**Installation & Service Instructions**

**Statesman**

45/50, 50/70, 70/90, 90/110, System, Flowsure, Flowsure +

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**About the Boiler**

This is a Floor Standing, Horizontally Fired, Automatic Pressure Jet Oil Boiler. The boiler can be flued conventionally or with a kit as a balanced flue. This boiler is for use with Kerosine or Gas Oil and for use in GB & IE.

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**About Safety**

Installation must be in accordance with the Installation & Service Instructions and the rules in force.

Leave these instructions with the user for use on future calls.
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### WARNING ! - this is about YOUR safety

Safe use of Kerosines and Gas Oils

**Hazards**
- These fuels give off a flammable vapour when heated even moderately.
- This vapour ignites easily, burns fiercely and can be explosive.
- Vapour can flow along at ground level and collect as an explosive mixture in drains, cellars etc. at considerable distances from open containers or spillages.
- Fuels remove natural oils and fats, and may thus cause cracking and irritation of the skin.
- Gas oil may also cause irreversible damage to your health on prolonged or repeated skin contact.

**Precautions**
- **ALWAYS HANDLE** fuels in the open air or in a well ventilated place, well away from all sources of ignition such as fires, sparks, hot surfaces and **DO NOT SMOKE**.
- **ALWAYS DRAIN** fuels using a proper fuel retriever, mechanical siphon or funnel.
- **NEVER SUCK** fuels up a tube by mouth. If accidentally swallowed - call a doctor - **DO NOT INDUCE VOMITING**.
- **NEVER APPLY** heat to a fuel tank, pipework or container.
- **AVOID INHALING** fuel vapour; it can make you light-headed and seriously impair your judgement.
- **ALWAYS STORE** fuels in a properly constructed and labelled tank.

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### If there is a Fuel Spillage

**IMMEDIATELY** STOP/SWITCH OFF all electrical and other ignition risks

**REMOVE** all contaminated clothing to safeguard yourself against fire risk and skin damage. Wash the affected skin thoroughly with soap and water and remove the clothing to a safe, well ventilated place and allow to air before washing or dry cleaning.

** CONTAIN** and smother the spill using sand, soil or other suitable incombustible material.

**DO NOT ALLOW** spilled fuel to escape into drains or water courses. If fuel does enter a drain, warn the Water Authority and Fire Brigade.

**CONSULT** your Local Authority about disposal of contaminated soil.

**FIRST AID** if fuel is accidentally swallowed, **SEEK IMMEDIATE MEDICAL ATTENTION - DO NOT INDUCE VOMITING**.

if fuel is splashed into eyes, wash out with running water for at least 10 minutes and **SEEK IMMEDIATE MEDICAL ATTENTION**.
1 - Technical Data

- The Statesman boilers are horizontally fired, automatic pressure jet boilers. These boilers are intended for use on indirect central heating systems. Their use on direct systems is not recommended.
- The boilers as supplied can be installed directly to suitable conventional chimneys. For balanced flue installations, an appropriate flue kit is additionally required.
- The Statesman boilers have been independently tested to standards EN 55014 and EN 50082-1 and show compliance with the E.M.C. Directive 89/336/EEC.
- The boiler has an easily removable front access door which gives quick access for cleaning.
- The maximum static head of water permissible is 27.44 metres (90 ft).
- Water flow and return connections are provided on each side and rear of the boiler (dependant on model).

Note: When installing the boiler, make sure all unwanted tappings are blanked off.

Health & Safety Information for the Installer & Service Engineer

Under the Consumer Protection Act 1987 and Section 6 of the Health and Safety at Work Act 1974, we are required to provide information on substances hazardous to health.

Small quantities of adhesives and sealants used in the product are cured and present no known hazards when used in the manner for which they are intended. The following substances are also present:

Insulation and Seals

Material - Man Made Mineral Fibre.
Description - Boards, Ropes, Gaskets.
Known Hazards - Some people can suffer reddening and itching of the skin. Fibre entry into the eye will cause foreign body irritation which can cause severe irritation to people wearing contact lenses. Irritation to respiratory tract.
Precautions - Dust goggles will protect eyes. People with a history of skin complaints may be particularly susceptible to irritation. High dust levels are only likely to arise following harsh abrasion. In general, normal handling and use will not present high risk, follow good hygiene practices, wash hands before, touching eyes, consuming food, drinking or using the toilet.
First Aid - Medical attention must be sought following eye contact or prolonged reddening of the skin.

Flue Gas Sampling Point

To aid commissioning, a flue gas sampling point is built into the heat exchanger front access door. If this door is removed make sure that when re-fitted, the sampling point is at the top.

Oil Pipe Installation

The boiler base features "Knock Out" holes for installation purposes. Remove using a drift or dot punch as required. Grommets are provided for cable protection within the connection pack. Additional holes have been provided in the front of each side of the base. These are to provide more options when bringing in the fuel hoses and if required, electrical wiring.

Burner

The burner is an automatic pressure jet type, pre-wired, with a photocell flame failure control. The standard burner fitted is the Riello RDB with different combustion heads to suit boiler ratings.

Boiler Thermostats

A pre-wired control thermostat is provided with each boiler. This thermostat is calibrated to give a maximum boiler temperature of 82°C (180 °F) and a minimum temperature of 55 °C (130 °F). Under no circumstances should the boiler be operated below the minimum indicated setting, or below a flow temperature of 55 °C (130 °F). For best operation it is suggested that the boiler should be operated at a setting just below maximum on the thermostat setting. The boiler also has a limit (overheat) thermostat calibrated to operate at 110 °C (230 °F). This is located on the underside of the control panel, see the Users Instructions.

Statesman, Statesman System

System & Boiler Control

Due to the high efficiency of the Statesman boilers, the following should be taken into consideration during installation:-

Control of the Boiler: When the demand for heating and/or hot water is satisfied, the controls should be arranged such that the burner is switched off. If due to the system design nuisance tripping of the overheat thermostat occurs, it may be advisable to fit a pump overrun device (Incorporating a by-pass system where necessary).
Statesman System, Flowsure & Flowsure+

Principal boiler components

Automatic and Manual Air Vents

Manual air vents are provided on the Flowsure and Flowsure+ only.

Pressure Relief Valve

This is factory set at 3 bar (45 lb/in²).

Pump

An integral circulating pump is incorporated within the boiler casing. This also serves the functions of both the central heating circuit and domestic hot water (Flowsure/Flowsure+).

Expansion Vessel

A 10 litre expansion vessel, charged to 0.5 bar and is suitable for a static head of 5 metres (16.5 ft), is included within the boiler casing.

Diverter Valve

On the Flowsure and Flowsure+, a motorised diverter valve is located on the pump outlet. The valve is normally closed to the central heating circuit and is powered open when there is a demand for central heating via the room thermostat.

Flow Switch

On the Flowsure and Flowsure+, the domestic mains water inlet is connected to a flow switch, this detects when a domestic hot water tap has been opened. This activates the burner and pump.

Domestic Service Cock

The domestic service cock fitted to the mains water inlet of the Flowsure and Flowsure+, incorporates a pre-set flow regulation device, this restricts the maximum flow of domestic hot water to the taps, 13 l/m and 17.5 l/m respectively.

Domestic Hot Water Heat Exchanger

On the Flowsure and Flowsure+, a water to water heat exchanger is located within the boiler casing. Primary water is pumped from the boiler (heatstore tank on Flowsure+) to the heat exchanger whenever there is a flow of domestic water through a hot water tap. The domestic water thereby extracts the heat from the plate heat exchanger giving mains pressure domestic hot water. The domestic hot water temperature can be increased by reducing the water flow rate at the tap (Flowsure) or adjusting the hot water mixing valve to a higher setting (Flowsure+).

Pump overrun

On the Flowsure and Flowsure+, a pump overrun facility has been incorporated into the electrical control panel which allows excess heat to be dissipated to either the central heating circuit or boiler shell, dependant on mode selected. This prevents the possibility of the boiler overheating.

Heatstore tank

On the Flowsure+, the heatstore tank is a heatbank containing 40 litres (8.8 gallons) of primary hot water. The tank temperature is controlled by the DHW thermostat to approximately 75 °C.

Note: A bypass system should be fitted between the flow and return pipes, where primary water flow may be prevented during a pump overrun situation (Flowsure, Flowsure+).

DHW Mixing Valve (Flowsure+ Only)

The DHW mixing valve is factory set to the mid position, this will give a blended water temperature of approximately 60°C. After removing the front casing (Pull forward off the mounting clips), the control knob (top right, behind control panel) will be accessible and can be turned as required. Clockwise to decrease and anti-clockwise to increase temperature - See Fig. 4. for the position of the valve.
Control Panel Wiring Diagram

Colour Coding For The Wiring
- b - Blue
- br - Brown
- gy - Grey
- r - Red
- g/y - Green/Yellow
- w - White
- v - Violet
- y - Yellow
- o - Orange
- p - Pink
- bl - Black

LINK to be replaced with room thermostat
## Technical Data

<table>
<thead>
<tr>
<th>Model</th>
<th>45/50</th>
<th>50/70</th>
<th>70/90</th>
<th>90/110</th>
<th>System Flowsure+</th>
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<tbody>
<tr>
<td></td>
<td>Btu/h</td>
<td>kW</td>
<td>Btu/h</td>
<td>kW</td>
<td>Btu/h</td>
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<tr>
<td>Maximum Output</td>
<td>51,000 15</td>
<td>68,000 20</td>
<td>89,000 26</td>
<td>110,000 32</td>
<td>85,000 25</td>
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<td>Minimum Output</td>
<td>44,000 13</td>
<td>51,000 15</td>
<td>68,000 20</td>
<td>89,000 26</td>
<td>68,000 20</td>
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<tr>
<td>Factory Set Output</td>
<td>Kerosine 51,000 15</td>
<td>Gas Oil 61,000 18</td>
<td>82,000 24</td>
<td>102,000 30</td>
<td>82,000 24</td>
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<tr>
<td>Riello Burner Type</td>
<td>RDB1</td>
<td>RDB1</td>
<td>RDB1</td>
<td>RDB2</td>
<td>RDB1</td>
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<td>Combustion Head Type</td>
<td>Kerosine LD2SH</td>
<td>LD2SH</td>
<td>LD3</td>
<td>LD3</td>
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<td></td>
<td>Gas Oil LD2SH</td>
<td>LD2SH</td>
<td>LD3</td>
<td>LD3</td>
<td>LD3</td>
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<tr>
<td>Nett Full Load Efficiency</td>
<td>%</td>
<td>93.2</td>
<td>87.5</td>
<td>92.6</td>
<td>89.8</td>
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<tr>
<td>Boiler Gas Volume</td>
<td>m³</td>
<td>0.041</td>
<td>0.041</td>
<td>0.058</td>
<td>0.055</td>
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<tr>
<td>Exit Flue Gas Mass Flow (Max)</td>
<td>kg/h</td>
<td>23.42</td>
<td>32.81</td>
<td>41.72</td>
<td>52.14</td>
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<tr>
<td>Flue Gas Temperature Rise Above Ambient</td>
<td>°C</td>
<td>200</td>
<td>220</td>
<td>230</td>
<td>235</td>
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<tr>
<td>Resistance To Combustion Products</td>
<td>mbar</td>
<td>0.15</td>
<td>0.4</td>
<td>0.55</td>
<td>0.7</td>
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<tr>
<td>Maximum Hearth Temperature</td>
<td>°C</td>
<td>60</td>
<td>62</td>
<td>50</td>
<td>50</td>
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<tr>
<td>Water Side Resistance (Cold)</td>
<td>10°C Differential</td>
<td>mbar</td>
<td>11.0</td>
<td>11.0</td>
<td>21.2</td>
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<td></td>
<td>20°C Differential</td>
<td>mbar</td>
<td>4.0</td>
<td>4.0</td>
<td>6.7</td>
</tr>
<tr>
<td>Maximum Static Head</td>
<td>ft. Water (40 p.s.i.)</td>
<td>90</td>
<td>Minimum Static Head</td>
<td>ft. Water (3.0 p.s.i.)</td>
<td>5.0</td>
</tr>
<tr>
<td>Maximum Operating Temperature</td>
<td>°C</td>
<td>82 (180 °F)</td>
<td>Minimum Operating Temperature</td>
<td>°C</td>
<td>55 (131 °F)</td>
</tr>
<tr>
<td>Maximum Boiler Operating Pressure</td>
<td>Bar (Class 2)</td>
<td>3</td>
<td>Conventional Flue Draught at Boiler</td>
<td>w.g. (8.75 N/m²): Minimum</td>
<td>0.035</td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td>0.16</td>
<td>0.04</td>
<td>0.058</td>
<td>0.055</td>
</tr>
<tr>
<td>Limit Thermostat Setting</td>
<td>°C</td>
<td>110 (230 °F) Manual Reset</td>
<td>Maximum Casing Panel Temperature</td>
<td>°C Above Room Temperature</td>
<td>Less Than 35</td>
</tr>
<tr>
<td></td>
<td>Maximum Surface Temperatures of</td>
<td>°C</td>
<td>Less Than 30 °C Above Room Temperature</td>
<td>Adjusting, Control &amp; Safety Devices</td>
<td>Water Temperature</td>
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<tr>
<td></td>
<td>Electrical Supply</td>
<td>230V 1 Phase 50Hz Fuse 5A</td>
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### Flowsure

<table>
<thead>
<tr>
<th>Model</th>
<th>Flowsure</th>
<th>Flowsure+</th>
</tr>
</thead>
<tbody>
<tr>
<td>DhW Limit Thermostat Setting</td>
<td>73 °C (163 °F)</td>
<td>73 °C (163 °F)</td>
</tr>
<tr>
<td>DhW Store Thermostat Setting</td>
<td>88 °C (190 °F)</td>
<td>88 °C (190 °F)</td>
</tr>
<tr>
<td>DhW Store Limit Thermostat Setting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pump Overrun Thermostat Setting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flow Restrictor</td>
<td>13 l/m (Brown)</td>
<td>17.5 l/m (Green)</td>
</tr>
<tr>
<td>Maximum DhW Flow Rate</td>
<td>13 ± 1.5 l/m (2.9 ± 0.3 g/m)</td>
<td>17.5 ± 1.5 l/m (3.9 ± 0.3 g/m)</td>
</tr>
<tr>
<td>Minimum DhW Flow Rate</td>
<td>2.5 ± 0.5 l/m (0.5 ± 0.1 g/m)</td>
<td>2.5 ± 0.5 l/m (0.5 ± 0.1 g/m)</td>
</tr>
<tr>
<td>Maximum DhW Inlet Pressure</td>
<td>10 Bar (145 p.s.i.)</td>
<td>10 Bar (145 p.s.i.)</td>
</tr>
<tr>
<td>Minimum DhW Inlet Pressure</td>
<td>1 Bar (14.5 p.s.i.)</td>
<td>1 Bar (14.5 p.s.i.)</td>
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<tr>
<td>DhW Temperature Rise At a Constant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 °C</td>
<td>12.5 l/m (2.7 g/m)</td>
<td>17.0 l/m (3.7 g/m)</td>
</tr>
<tr>
<td>50 °C</td>
<td>7.5 l/m (1.6 g/m)</td>
<td>12.0 l/m (2.6 g/m)</td>
</tr>
<tr>
<td>Store Capacity</td>
<td>40 Litres</td>
<td></td>
</tr>
<tr>
<td>Time to Achieve Storage Temperature</td>
<td>12 Minutes (From Cold)</td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td>45/50, 50/70</td>
<td>70/90</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--------------</td>
<td>-------</td>
</tr>
<tr>
<td>Height</td>
<td>mm A</td>
<td>850</td>
</tr>
<tr>
<td>Width</td>
<td>mm B</td>
<td>390</td>
</tr>
<tr>
<td>Depth</td>
<td>mm C</td>
<td>565</td>
</tr>
<tr>
<td>Centre of flue from rear</td>
<td>mm D</td>
<td>100</td>
</tr>
<tr>
<td>Flue Diameter</td>
<td>mm E</td>
<td>100</td>
</tr>
<tr>
<td>Height between connections</td>
<td>mm F</td>
<td>569</td>
</tr>
<tr>
<td>Height of bottom connection</td>
<td>mm G</td>
<td>97</td>
</tr>
<tr>
<td>Distance of conn. from wall</td>
<td>mm H</td>
<td>59</td>
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<tr>
<td>Return Connections</td>
<td>J</td>
<td>1” B.S.P</td>
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<tr>
<td>Flow connections</td>
<td>K</td>
<td>1” B.S.P</td>
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<tr>
<td>Cold Mains Inlet</td>
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<tr>
<td>DHW Outlet</td>
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<td></td>
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<tr>
<td>System Fill</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight empty</td>
<td>kg</td>
<td>105</td>
</tr>
<tr>
<td>Water content</td>
<td>ltr</td>
<td>18.2</td>
</tr>
<tr>
<td>Water content</td>
<td>Imp</td>
<td>4.0</td>
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<tr>
<td>Oil Supply Connection</td>
<td>BSP</td>
<td>¼”</td>
</tr>
<tr>
<td>Installation</td>
<td>Front</td>
<td>mm</td>
</tr>
<tr>
<td>Clearances</td>
<td>Top</td>
<td>mm</td>
</tr>
<tr>
<td></td>
<td>Sides BF</td>
<td>mm</td>
</tr>
<tr>
<td></td>
<td>Sides CF</td>
<td>mm</td>
</tr>
</tbody>
</table>

* If mounted under a worktop, the top needs to be removed

Table 2
2 - Pre-Installation Requirements

As with all building services, the oil fired systems have to be installed so as to ensure safe and efficient operation. The following notes provide a guide to current best practice. It is important that documents relating to Building Regulations and Standards are studied.

In addition we also recommend the following OFTEC publications:

**Technical Information Book 3**
Installation requirements for oil fired boilers and oil storage tanks.

**Technical Information Book 4**
Domestic heating systems
These books are available from OFTEC, Century House, 100 High Street, Banstead, Surrey SM7 2NN.

**Training**
Baxi have several training centres around the country, for details of courses for oil firing telephone 01926 430481. OFTEC also hold training courses on oil fired central heating.

**Regulations and Standards**
The installation of oil fired boilers is covered by the requirements of the Building Regulations which are statutory instruments and must be complied with.

Those for England and Wales are made by the Department of the Environment in London.

The Building Standards (Scotland) Regulations are made by the Scottish Office. Part F of the Technical Standards to the Regulations covers heat producing appliances and fuel storage.

The Building Regulations (Northern Ireland) are made by the Northern Ireland Department of the Environment. Heat producing appliances, including oil heating appliances, are covered by Technical Booklet L.

The Isle of Man has its own Building Bye-laws. In the Channel Islands, Jersey and Guernsey have their own separate Building Bye-laws.

The British Standard covering oil fired boiler installation is BS5410. This is issued as Part 1:1977 for installations up to 45 kW and Part 2:1978 for larger installations. This standard also covers oil storage tank installations.

Additional standards and regulations
- BS 5449: 1990 Forced circulation hot water
central heating systems for domestic premises.

- BS 7074: Pt.1:1989 Application, selection and installation of expansion vessels and ancillary equipment for sealed systems.
- BS 7571 Requirements for electrical installations. IEE wiring regulations 16th edition.
- Control of pollution (oil) regulations.
- Local water undertakings bye-laws.

Chimney

Every Baxi boiler has a very high efficiency and care must be taken to ensure that the chimney is suitable.

Chimneys may have been already built and completed before a choice of appliance has been made. Alternatively, chimneys may be installed to suit the particular appliance chosen.

A factory made insulated chimney complying with the requirement of BS4543 may be considered as an alternative to a conventional structural chimney for both new and existing buildings. A further alternative may be a suitable form of insulated flue pipe normally positioned on a wall outside a building.

Capacity

The chimney or flue must have a cross-sectional area throughout its whole length, that is at least the area of the flue outlet of the boiler and must be sealed at the boiler with fire clay or other suitable compounds. As few bends as possible should be used and, where necessary, 135° bends are recommended.

Height

The chimney or flue should be of sufficient height to provide a minimum draught of 0.035" w.g. measured above the boiler. Draught conditions that are excessive i.e. above 0.16" w.g. due to chimney height or location, should be controlled by means of a draught stabiliser fitted to the chimney.

External Flues

All external flues of metal or other materials should have cleaning facilities, and be well insulated to maintain the correct draught conditions.
Internal Flues

The exposed flue pipe between the boiler flue off-take and the chimney proper (either internally or externally) must not be of asbestos. Vitreous Cast Iron, Steel or similar materials should be used.

Note: When installing the boiler into a chimney previously fitted with a liner, the liner must be replaced and made weather-tight.

Choice of Materials

The materials used in the construction of chimneys and flues must always be suitable for the application. Their construction must be durable, non-combustible, able to resist the range of temperatures expected; and also resistant to external as well as internal corrosion. This is particularly important due to the Statesman’s high thermal efficiency, where correct choice of materials will prevent problems likely to be caused by condensation.

If you are in any doubt, you should seek advice of a reputable manufacturer of chimneys, names should be available from your local stockist.

Combustion & Ventilation Air for Open Flue Oil Fired Boilers

General. A sufficient permanent air supply to an appliance will be required.

a) For proper combustion of fuel and effective discharge of combustion products to the open air.

b) For the ventilation of any confined space in which an appliance is installed to prevent overheating of the appliance and any equipment in and near the appliance.

c) For the satisfactory operation of any draught break or stabilizer which may be fitted.

Air for Combustion

This requirement will be satisfied if the room or space in which the appliance is installed has an opening or duct which is designed to allow the passage of air at all times equivalent, in total free area, to 550 mm²/kW (2.5 in² per 10,000 btu’s) of the appliance rating.

If the space containing the appliance has an extract ventilation fan fitted, the supply of air should be such that the operation of the appliance and flue is unaffected when the windows and doors are closed and the extractor fan is running.

Air for Ventilation

For an appliance in a confined space, care shall be taken to provide air for ventilation. A working guide to the minimum free area of openings to be provided in addition to that for combustion air is as follows:

a) Where the air is taken from a heated space, 1100 mm²/kW at high level and 1100 mm²/kW (5.0 ins² per 10,000 Btu’s) at low level.

b) Where the air is taken from outside, 550 mm²/kW at both high level and low level (2.5 in² per 10,000 btu’s) at low level.

The above requirements are essential, in particular for appliances which are installed with a low level discharge. The warranty for such boilers could be affected if proper free air requirements are not provided.

FREE AREAS OF GRILLES ARE MM² PER KW OF APPLIANCE RATING (OUTPUT)
Extract Fans

If the room in which the appliance is located also has an extract fan the performance of the appliance must be unaffected when the fan is running with all doors and windows closed.

Draught Breaks

When an appliance with a draught break is fitted in a room add 550\(\text{mm}^2/\text{KW}\) to the free area of the combustion air inlet.

When an appliance with a draught break in a compartment which is ventilated as noted above, no additional allowance is required.

Combustion & Ventilation Air for Balanced Flue Oil Fired Boilers

FREE AREAS OF GRILLES ARE \(\text{mm}^2\) PER KW OF APPLIANCE RATING (OUTPUT)

Balanced Flue

Boilers fitted with balanced flues must only fire Kerosine and will not operate satisfactorily unless the free air requirements have been satisfied.

Consideration should be given to the texture of the wall onto which the low level flue terminal is fixed. As with all heat emitting devices the warm air from the terminal will encourage the accumulation of dirt which will at some time require removal with a detergent based cleaning fluid.

Clearances Required Around Balanced and Low Level Discharge Flues Fitted to Oil Fired Boilers

See Fig. 13

- A Below a gutter or sanitary pipework
- B Horizontal from opening, airbrick window etc.
- C Above ground or balcony level
- D Below eaves or balcony
- E From an internal or external corner
- F From a terminal facing a terminal
- G From a surface facing the terminal
- H Vertical from terminals on the same wall
- I Horizontal from terminals on the same wall
- J Below an opening, airbrick, window etc.
- K From vertical sanitary pipework
* Where the terminal is within 1 metre of any plastic material, such material should be protected from the effects of combustion products.

There are additional general requirements in most Regulations and Standards that the flue must be positioned so that it does not cause a nuisance and permits the dispersal of combustion products.

If the terminal is less than 2 metres above ground level, balcony or place to which any person has access, the terminal must be protected by a guard, (Flue Guard Part No. 26000045).
Tank Support

Steel tanks are normally supported on masonry piers. These have to maintain the tank at a sufficient height to enable access to be gained for painting.

Requirements for Tank Accommodation

Reference should be made to the relevant building regulations, bye-laws, etc. in order to achieve a satisfactory degree of safety in relation to the methods of protection. Underground tanks are also referred to in BS 5410:Pt.1. BS 5410:Pt.2 gives more detailed guidance on the burying of steel tanks.

The Scottish Building Standard requirements for underground tanks are the same as those of BS 5410:Pt.1.

Methods of Tank Protection

It is considered unlikely that a fire will originate from the stored oil and it is the purpose of these recommendations to ensure that a fire which may originate from a building or other external source is not transmitted to the tank contents.

Adequate safety may be achieved in a number of ways, for example:

a) Protecting the tank by a physical barrier or isolating the tank by sufficient space;

b) Enclosing the tank by non-combustible fire resisting construction; i.e., putting the tank underground.

Oil Storage Tank & Supply Installations

Steel Tanks

Steel tanks should be constructed so as to comply with BS 799:Pt.5:1987. Galvanised steel pipework or valves must never be used for oil storage or supply systems.

Plastic Tanks

Tanks made from plastics material are now available. Oil should never be stored in translucent plastic containers.
Storage Requirements and Tank Sizes

Tanks are available in a wide variety of sizes and capacities. For boilers of up to 13 kW (45,000 Btu/h) tanks with a capacity of 1200 litres (250 gallons) are satisfactory. Above that size of boiler a larger capacity tank should be considered.

Some typical tank sizes and capacities are noted below:

<table>
<thead>
<tr>
<th>Length (Metres)</th>
<th>Width (Metres)</th>
<th>Height (Metres)</th>
<th>Capacity (Litres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel Tanks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.52</td>
<td>1.22</td>
<td>0.61</td>
<td>1130</td>
</tr>
<tr>
<td>1.83</td>
<td>0.61</td>
<td>1.22</td>
<td>1360</td>
</tr>
<tr>
<td>1.83</td>
<td>1.22</td>
<td>1.22</td>
<td>2700</td>
</tr>
<tr>
<td>2.44</td>
<td>1.22</td>
<td>1.22</td>
<td>3650</td>
</tr>
<tr>
<td>Polythene Tanks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.03</td>
<td>0.69</td>
<td>1.36</td>
<td>1150</td>
</tr>
<tr>
<td>1.37</td>
<td>1.06</td>
<td>1.25</td>
<td>1250</td>
</tr>
<tr>
<td>2.02</td>
<td>1.36</td>
<td>1.36</td>
<td>2500</td>
</tr>
</tbody>
</table>

Tank Fittings

TANKS REQUIRE TO BE PROVIDED WITH THE FOLLOWING FITTINGS:

Fill Pipe

A 50 mm diameter black steel fill pipe terminating with a 50 mm male BSP thread hose coupling connection and non ferrous screw cap and chain.

Extended Fill Pipe

Extended fill pipes can be used when the location of the tank is such that access for filling would be difficult for a delivery tanker carrying 30 metres of hose. Extended fill lines must be run in 50 mm diameter black steel tube with proper support. They must be arranged so as to be self draining, preferably in to the tank. Where tanks are located lower than their filling connection care must be taken to ensure that the pressure head of oil applied during filling is not excessive. Where the use of an extended fill pipe means that the delivery driver cannot see the oil tank, an audible alarm should be fitted to indicate that the tank is nearly full.

Vent Pipe

A separate vent pipe with an internal diameter at least equal to that of the fill pipe must be fitted. The open end of the vent is fitted with a return bend and an open wire mesh balloon.

A mushroom type vent may be fitted provided its free area is at least equal to the cross sectional area of the fill pipe. The vent should normally rise no higher than 600 mm above the top of the tank.

If the vent pipe rises more than 600 mm above the tank a pressure relief outlet must be provided in the vent at the 600 mm level. This is normally a horizontal branch off the vent with a flap at its end. This is hinged at the top and fitted so that it is normally closed but will open easily if oil rises up to the level of the branch.

Isolating Valve

A valve is fitted in the tank outlet in an accessible position so that the oil supply to the burner can be shut off if required. The valve must be of a type suitable for use with oil. The outlet from the tank must be above the level of the bottom of the tank to prevent water and sediment being drawn in to the oil supply pipe.

Drain Valve

In order to enable the sediment and water to be removed from the tank a gate valve and plug are fitted in the bottom plate of the tank.

Contents Gauge

The most commonly used gauge is the sight tube type. These are simple and have some advantages for domestic use. An isolating valve must always be provided and is often incorporated in the gauge connection. The top of the gauge must be fixed to the top of the tank and provided with a cap to protect the oil from foreign matter. Integral gauges using internal floats are also available. These are less likely than sight gauges to give rise to leaks.

Overfill Alarms

Audible alarms can be fitted in tanks to indicate that they are nearly full. These are an essential requirement when the delivery point and tanker access are remote from each other.

Oil Supply Pipe Layout

Oil can be run from the storage tank to the burner by a single pipe gravity flow if there is a sufficient height difference between the bottom of the tank and the burner. Otherwise a two pipe system is needed.

a) Single Pipe Supply Systems - Tanks serving
appliances with pressure jet burners by means of a single pipe need to be positioned so that they will apply the 300 mm minimum required head of oil to the burner when the fuel level is at its lowest point. The fittings and layout are shown in Fig. 16.

<table>
<thead>
<tr>
<th>Pipe Dia I/D in mm.</th>
<th>8</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>'A' Metres</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.5</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>1.0</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>1.5</td>
<td>40</td>
<td>80</td>
</tr>
<tr>
<td>2.0</td>
<td>60</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4

b) Two Pipe Supply Systems - If the tank base is below the level at which gravity feed to the burner can be maintained, a two pipe oil supply system can be adopted. The fittings and layout are shown in Fig. 17. The non return valve in the supply line of the two pipe system is required to prevent oil running back from the burner and un-priming the oil pump. The non return valve in the return line is only required if the top of the tank is above the burner. Its purpose is to prevent oil running back through the burner during maintenance.

<table>
<thead>
<tr>
<th>Pipe Dia I/D in mm.</th>
<th>8</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>'B' Metres</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.0</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>0.5</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1.0</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>1.5</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>2.0</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>2.5</td>
<td>80</td>
<td>100</td>
</tr>
<tr>
<td>3.0</td>
<td>55</td>
<td>100</td>
</tr>
<tr>
<td>3.5</td>
<td>5</td>
<td>90</td>
</tr>
</tbody>
</table>

Table 5

Oil Line De-Aerating Devices

These may be used in conjunction with Statesman boilers. It is recommended that they are fitted outside the dwelling. It is not permissible to fit plastic components in fuel lines within dwellings or boiler rooms. The manufacturers instructions should always be followed, particularly when the oil tank may be situated at low level. The fittings and layout are shown in Fig. 16.

Oil Filter

An oil filter should always be fitted in the oil supply line. Facilities should be provided to enable it to be serviced without draining down the oil supply system.

Fire Valves

A fire valve is an essential part of the oil supply system. It should be capable of cutting off the flow of oil outside the building in the event of a fire starting up within the boiler.

The valve should be located just outside the building at the point where the oil supply line enters. It must be activated by a remote sensor located over the burner but in a position clear of any direct radiation or excessive heat. Weight operated valves connected to a sensor by wires and pulleys have been used for this purpose. It is preferable, however, to use a valve with a capillary connection between its sensor and the oil cut off mechanism. The use of fusible head isolating valves is not recommended.

It is essential that these devices conform to current Standards and Regulations. When they are installed, their manufacturers recommendations must be adhered to.

Copper Tube and Fittings

Copper tube for oil lines should be to BS.2871:Part 1: Table Y. It can be obtained in coil form or half hard for use with bending machines. This pipe can be obtained with protective plastic sheathing applied. Copper tubes for oil lines must not be soldered.

Note: Galvanised pipes must not be used.

Fittings for copper pipe should be of the flared manipulative type to BS.864:Part 2:1983. Steel pipe should be to BS.1387:1985. Fittings for steel pipe should be to BS.1740:Part 1:197271 with taper threads.

Floor Temperatures

The thermal insulation provided in the boiler base ensures the floor temperatures is kept below 80 °C and as such, a non combustible hearth is not required. The floor should always be smooth and flat and capable of supporting the installed weight of the boiler, including its water content. If constructed by a material which is softened by oil, it is advisable to install an additional metal tray underneath the boiler for protection against accidental damage.

The Heating System

When fitting into an existing installation the system should be chemically cleaned, and a suitable inhibitor added to keep it in good condition.

SYSTEM, FLOWSURE AND FLOWSURE +

System Requirements: These boilers are specifically designed for Sealed Systems but will operate on open vented systems. When used on a sealed system the central heating system should be in accordance with the relevant recommendations given in BS 5449 Pt 1 and BS 7074 Pt 1.
The appliances incorporate a circulating pump, no other pump is required. The appliances will operate satisfactory on a two pipe small bore or micro bore system using thermostatically controlled radiator valves. When employing a central heating system where primary water flow may be prevented during a pump overrun situation (i.e. by using thermostatic radiator valves on all radiators), a bypass valve should be fitted between flow and return pipes.

It is strongly recommended that isolating valves are fitted to the central heating flow and return pipes, this will allow the boiler and heatstore tank (Flowsure +) to be drained for service work without having to drain down the whole central heating circuit.

On the Flowsure and Flowsure + a drain point should be provided in the domestic hot water pipework at any point below the height of the domestic hot water heat exchanger. Provision should also be made to allow air to be vented from the domestic hot water pipework at any high points.

Sealed Primary System

A manual reset overheat thermostat is located on the underside of the electrical control panel and is accessible by removing the boiler front casing panel. If a boiler overheat condition arises the burner will remain inoperative until the thermostat button is reset. See the Users Instructions.

The pressure relief valve operates at 3 bar (45 lb/in²). Install a pressure relief valve discharge pipe, not less than 15 mm diameter and connect to the pressure relief outlet connection using a 15 mm compression fitting. The pipe run should be as short as possible, run continuously downwards and discharge to the outside of the building, where possible over a drain. The discharge point must be such that it will not be hazardous to occupants or cause damage to external electrical components or wiring.

Note: It must not discharge above an entrance, or window, or any type of public access. The installer must consider that the overflow could discharge boiling water. See Fig. 15.

The combined temperature / pressure gauge indicates the system pressure, which must be maintained, and the primary water temperature in the boiler shell.

The 10 litre expansion vessel is charged to 0.5 bar and is suitable for a static head of 5 metres (16.5 ft), i.e. the vertical distance between expansion vessel and highest point of system, usually the top of bedroom radiators. If the static head is greater than 5 metres, then the air charge in the vessel must be increased to equal this greater higher static pressure. The pressure can be increased by simply pumping up the vessel with a standard type pump and checking the pressure with a tyre gauge. A schraider type valve is provided on the vessel for this purpose. The air charge should not exceed a pressure of 1.5 bar (22 p.s.i.).

With an initial system pressure of 0.5 bar, a system capacity of about 120 litres (26.4 gals), can be accommodated. A check should be made to ensure the system volume comes within this capacity but if it is greater, than an additional expansion vessel will be needed. This should be fitted in either the flow or return pipes, as close as practicable to the boiler. Refer to BS 7074 Pt 1 for more information.

Note: The values given in Table 6 are the total system volumes. The primary water capacity given in Table 2 should be deducted from the total system volume when calculating the volume for the radiators, pipework etc.

<table>
<thead>
<tr>
<th>Safety Valve Setting (bar)</th>
<th>3.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial System Pressure (bar)</td>
<td>0.5</td>
</tr>
<tr>
<td>Total Water Content of System</td>
<td>VESSEL VOLUME (L)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>litres</th>
<th>litres</th>
<th>litres</th>
<th>litres</th>
</tr>
</thead>
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<tr>
<td>25</td>
<td>2.1</td>
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<td>100</td>
<td>8.3</td>
<td>10.9</td>
<td>15.6</td>
</tr>
<tr>
<td>125</td>
<td>10.4</td>
<td>13.6</td>
<td>19.5</td>
</tr>
<tr>
<td>150</td>
<td>12.5</td>
<td>16.3</td>
<td>23.4</td>
</tr>
<tr>
<td>175</td>
<td>14.6</td>
<td>19.1</td>
<td>27.3</td>
</tr>
<tr>
<td>200</td>
<td>16.7</td>
<td>21.8</td>
<td>31.2</td>
</tr>
<tr>
<td>225</td>
<td>18.7</td>
<td>24.5</td>
<td>35.1</td>
</tr>
<tr>
<td>250</td>
<td>20.8</td>
<td>27.2</td>
<td>39.0</td>
</tr>
</tbody>
</table>

For system volumes other than those given above, multiply the system volume by the factor across.

| Factor | 0.0833 | 0.109 | 0.156 |

Deduct from the value given in the table the 10 litre expansion vessel supplied.

Table 6
The automatic air vent automatically expels any air-released from the water and thereby keeps the boiler fully charged.

**Filling and Make-up Loop**

A connection must be incorporated into the central heating system to facilitate filling. There must be no direct connection to the mains water supply, even through a non-return valve, without the approval of the Local Water Authority. The filling point must be at low level, water loss must be replaced. The connection should be made in the central heating return as close to the boiler as possible.

**Permissible methods of filling**

*Direct method* - A detachable flexible hose is connected to a stop valve fitted to an outlet on the service main. The other end of the hose is connected to a second stop valve and a double check valve. The double check valve is fitted to an inlet connection on the central heating return pipe. The hose should be disconnected after filling. Where the mains pressure is excessive a pressure reducing valve shall be used to make filling easier.

*Note:* On the Flowsure and Flowsure+, this method is recommended, and the associated components are supplied with the boiler. A pressure reducing valve is not required as the stop valve incorporates a flow restrictor. (restricted to 10 l/m).

*Booster pump method* - The system may be filled through a self contained unit comprising a cistern, pressure booster pump and if necessary, an automatic pressure-reducing valve or flow restrictor. The pressure booster pump must be capable of pressurising the system to a minimum of 1.0 bar (14 p.s.i.) measured at the appliance. The cistern should be supplied through a temporary connection from a service pipe or cold water distributing pipe. The unit may remain permanently connected to the heating system to provide limited water make-up.

**Provision should be made for replacing water loss from the system by re-pressurisation of the system**

**Domestic Hot Water System**

The domestic hot water cylinder (where fitted) must be of the indirect coil type and suitable for working at a gauge pressure of 0.35 bar above the safety-valve setting, i.e. 3.65 bar.

**Flowsure and Flowsure+**

The final 600 mm of the mains cold water connection to the boiler should be made in copper tubing to BS 2871 Pt 1, which is recommended for water carrying pipework and must be used for pipework carrying potable water. All capillary joints in the D.H.W. pipework must be joined with a lead free solder.

The boiler is suitable for mains cold water supply having a maximum pressure of up to 10 bar (145 lb/in²). A pressure reducing valve must be fitted if the mains pressure exceeds 10 bar.

If there are long pipe runs to the taps or shower. It is suggested that they be insulated to prevent the rapid cooling of residual hot water in the pipes after the tap has been turned off.

**Taps and Valves** - Hot and cold taps and mixing valves used with these boilers must be suitable for operating at a mains pressure of up to 10 bar (145 lb/in²).

**Showers (Fixed head type)** - No anti-syphonage arrangements are necessary. Thermostatically controlled shower valves will give extra comfort and guard against flow of water at too high a temperature.

**Showers (Loose or flexible head type)** - A loose head shower hose must be fixed so that the head cannot fall closer than 25 mm (1 in) above the top edge of the bath to prevent its immersion in bath water. Alternatively the shower must incorporate or be fitted with an anti-syphonage device at the point of the flexible hose connections.

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

**Use in Hard Water Areas**

If the area of installation is recognised as a hard water area, (above 200 p.p.m.) it is essential that a suitable water treatment device of an electronic, magnetic or galvanic type be installed in the mains water supply.

To assess water hardness, immerse the test strip supplied, for about one second in a water sample (NOT IN RUNNING WATER) so as to moisten all the zones. Inspect the strip after 1-2 minutes, check the zones, if two or more zones have changed colour the hardness of the water is above 200 p.p.m. and a water treatment device will be required.
**Single Pipe Supply System**

- Oil Tank
- Below Burner
- Fire Valve
- Non-Return Valve
- Shut Off Valve
- Oil Return Pipe
- Oil Supply Pipe
- Filter
- Fire Valve Sensor
- Pump
- Max. Oil Level 4 metres Above Burner
- Max. Head 4m
- 'A'

**Twin Pipe Supply System**

- Oil Tank Below or Level with Burner
- Oil Supply Pipe
- Isolating Valve
- Filter
- De Aeration Device
- Pump
- Fire Valve
- Non-Return Valve
- Shut Off Valve
- Oil Return Pipe
- Oil Supply Pipe
- 'B'
- 150mm
3 - Installation & Commissioning

Low Level Horizontal - Kits 1 & 2 With Extensions

Low Level Rear ALL Models

<table>
<thead>
<tr>
<th>Wall Width</th>
<th>Kit Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 - 160</td>
<td>1</td>
</tr>
<tr>
<td>165 - 225</td>
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</tr>
<tr>
<td>230 - 290</td>
<td>2 + 6</td>
</tr>
<tr>
<td>300 - 360</td>
<td>2 + 6 + 6</td>
</tr>
<tr>
<td>400 - 480</td>
<td>2 + 6 + 6</td>
</tr>
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</table>

Low Level Left/Right 50/70 Models

<table>
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<th>Wall Width</th>
<th>Kit Numbers</th>
</tr>
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<tbody>
<tr>
<td>100 - 200</td>
<td>1</td>
</tr>
<tr>
<td>300 - 400</td>
<td>2</td>
</tr>
<tr>
<td>400 - 500</td>
<td>2 + 4</td>
</tr>
</tbody>
</table>

Low Level Left/Right 70/90 90/110 Models

<table>
<thead>
<tr>
<th>Wall Width</th>
<th>Kit Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 - 200</td>
<td>1</td>
</tr>
<tr>
<td>300 - 400</td>
<td>2</td>
</tr>
</tbody>
</table>

All Dimensions in mm

High Level Vertical - Kits 3, 4, 9 & 10

<table>
<thead>
<tr>
<th>Roof Height</th>
<th>Kit Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>150 - 200</td>
<td>3 + 4</td>
</tr>
<tr>
<td>200 - 250</td>
<td>3 + 5</td>
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<tr>
<td>250 - 300</td>
<td>3 + 6</td>
</tr>
<tr>
<td>300 - 350</td>
<td>3 + 6 + 6</td>
</tr>
</tbody>
</table>

All Dimensions in mm

High Level Horizontal - Kits 7, 8 & 12 With Extensions

Low Level Rear ALL Models

<table>
<thead>
<tr>
<th>Wall Width</th>
<th>Kit Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 - 160</td>
<td>1</td>
</tr>
<tr>
<td>165 - 225</td>
<td>2</td>
</tr>
<tr>
<td>230 - 290</td>
<td>2 + 6</td>
</tr>
<tr>
<td>300 - 360</td>
<td>2 + 6 + 6</td>
</tr>
</tbody>
</table>

Low Level Rear ALL Models

<table>
<thead>
<tr>
<th>Wall Width</th>
<th>Kit Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 - 160</td>
<td>1</td>
</tr>
<tr>
<td>165 - 225</td>
<td>2</td>
</tr>
<tr>
<td>230 - 290</td>
<td>2 + 6</td>
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<tr>
<td>300 - 360</td>
<td>2 + 6 + 6</td>
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</table>

Low Level Left/Right 50/70 Models

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<th>Kit Numbers</th>
</tr>
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<tbody>
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<tr>
<td>300 - 400</td>
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<td>400 - 500</td>
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Low Level Left/Right 70/90 90/110 Models

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<th>Wall Width</th>
<th>Kit Numbers</th>
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<tbody>
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<td>1</td>
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<tr>
<td>300 - 400</td>
<td>2</td>
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</table>

All Dimensions in mm

High Level Rear ALL Models

<table>
<thead>
<tr>
<th>Wall Width</th>
<th>Kit Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>125 - 175</td>
<td>3 + 7</td>
</tr>
<tr>
<td>175 - 225</td>
<td>3 + 7</td>
</tr>
<tr>
<td>225 - 275</td>
<td>3 + 7</td>
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</table>

High Level Left/Right 50/70 Models

<table>
<thead>
<tr>
<th>Wall Width</th>
<th>Kit Numbers</th>
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</thead>
<tbody>
<tr>
<td>125 - 175</td>
<td>3 + 7</td>
</tr>
<tr>
<td>175 - 225</td>
<td>3 + 7</td>
</tr>
<tr>
<td>225 - 275</td>
<td>3 + 7</td>
</tr>
</tbody>
</table>

All Dimensions in mm

Fig. 18
Installation & Commissioning

It is possible to install the boiler without removing the casing sides but care should be taken not to damage the panels when connecting the water pipes.

Fitting a Balanced Flue

Refer to the Instructions supplied with the flue.

Fitting a Conventional Flue

Local Building Regulations and Bye Laws should be consulted for details of the chimney, use a 135° bend. 90° bends must not be used, due to their flow resistance and baffling characteristics. Ensure that flue pipe entering a brick chimney is cut off flush with the inside surface or at a small inclined angle to prevent droppings entering the flue connection. Provision for cleaning the chimney should be made below the flue entry. Refer also to Section 2 of these Instructions.

a) Unpack the boiler.
b) Select the desired oil feed position and remove the appropriate knockout in the base using a suitable drift.
c) Position boiler.
d) Lift off top casing panel.
e) Carefully remove knockout panel in top casing panel using gentle manipulation.
f) Seal flue pipe to boiler with fire cement.
g) Re-fit top casing panel.

Connecting the Electricity Supply

Electrical Connections:

All electrical wiring must be carried out by a qualified electrician in accordance with current I.E.E. Regulations and any Local Regulations that may apply.

Earthing: It is essential that the appliance is earthed.

Cable Entry: The cable should be heat resisting and routed either along the top side of the casing or run from the bottom side through the knock out holes in the base tray, making sure they do not come in contact with the heat exchanger.

Fusing: The mains electrical supply should be taken from a double pole isolating switch (fused 5 amp) situated near the boiler.
Wiring Diagrams: Refer to wiring diagrams in Section 1 of these Instructions. The mains inlet plug is provided in the bag of fittings supplied.

Note: A permanent live supply must be made, to allow the pump overrun device, as fitted to the Flowsure and Flowsure+, to operate correctly.

To wire in external controls, open the door on the right hand side of the facia panel, to expose a blanking plate (Statesman, Statesman System) or programmer plate (Flowsure, Flowsure+).

Statesman, Statesman System: Remove the blanking plate you will then see a plug-in terminal block, remove the appropriate part, run wires through hole in panel, wire into plug refit plug into socket, pull through excess wires then refit blanking plate.

Flowsure, Flowsure+: Remove the programmer plate you will then see a plug-in terminal block, remove the plug, run wires through hole in panel, wire into plug refit plug into socket, pull through excess wires then refit programmer plate.

Facia Door

A plastic facia door is incorporated into the control panel. This door is designed to come off if any undue pressure is exerted on it when open but can easily be snapped back into place. It may however become detached if the appliance has been handled roughly during transit. If you find the door is missing when opening the carton, check to see if it is amongst the packaging.

Fuel Pipes

Refer to Section 2, Figs. 14, 16, 17 plus Tables 4 and 5.

Before connecting a flexible hose to the burner draw off a small quantity of oil, approximately two pints, into a suitable container, check that fuel is clean.

The flexible fuel pipe should be connected to the burner and the other end to the fuel line via the isolation valve (supplied). At this stage the connection should be left finger-tight as it will have to be disconnected before the burner is started in order to vent air from the line after the fuel has been turned on. Couple a filter to the rigid pipe and run pipework from the inlet of the filter to the tank. The filter should not be installed inside the boiler. continued on page 34.
**Standard Boiler Wiring Diagram**

*(Showing Method Of Connecting Various External Controls - Without Cylinder Stat)*

**Statesman Only**

Remove Link

Boiler Terminal Plug

Load

N

L

Pump

Room Stat.

Remove Boiler Terminal Socket & Wire The Circuit Into It, Then Re-connect

**Cylinder Stat.**

1

2

Fig. 21
**Flowsure**

**Flowsure +**

Detail With Room Stat/Frost Stat

**FLOWSURE ONLY**

**COLOUR CODING**
- b = Blue
- br = Brown
- gy = Grey
- w = White
- y = Yellow
- o = Orange
- p = Pink
- g/y = Green/Yellow

**Fig. 24**
An Isolation Valve should be placed on the tank side of the filter, so that the oil supply can be isolated when servicing is required.

Ensure that the filter is positioned correctly and that it is easily accessible with sufficient clearance below it for cleaning or replacing the filter element.

It is vital that all joints are completely oil-tight; leaks may cause air locks in the fuel supply pipe, and will almost certainly lead to complaints of oil odour.

Fit the fire valve in the oil line, as detailed in Section 2, Page 26.

Where the tank position provides a gravity flow of oil to the burner, THE SINGLE PIPE SYSTEM should be used. The difference in "head", i.e., the distance vertically between the pump and the outlet of the tank, dictates the maximum length of oil supply pipe, including horizontal and vertical runs (see Section 2).

When the tank outlet is below the level of the burner fuel pump, THE TWO PIPE SYSTEM MUST BE USED (See Fig. 17). Here a return line is piped from the pump back to the tank, finishing at least 150 mm above the bottom. This section of pipe must end at the same level in the tank as the suction as to prevent loss of prime.

The ends of the two pipes should be well separated so that no sludge is disturbed by the return, and will not be pulled into the suction pipe. An elbow at the end of the return will ensure that the discharge is away from the suction. A non-return valve should be fitted as close as possible to the tank and at the lowest available point in the suction line. Avoid having the bottom of the tank more than 3 m (10') below the burner. The difference in levels between the pump and the suction and the return lines in the tank controls the maximum length of pipe, including horizontal and vertical runs.

It is necessary to enable the pump to raise the oil out of the tank. Problems can be encountered, with air collecting on shut down, if the fuel pump is situated at the highest point in the system.

System and Flowsure:
Return connections are provided on each side of the boiler at low level. A flow connection is provided at high level at the top rear of the boiler. Connect the pipework to the selected connections and blank off the unused ones.

Flowsure+:
A flow connection is provided at high level at the top rear of the boiler and one return connection is provided at low level to the left side of the boiler.

Note: If the pipes are to be reduced down from 22 mm, eccentric adaptors should be used to prevent air being trapped in the boiler, see Fig. 25.

On the Flowsure and Flowsure+, domestic hot and cold water connections are provided at the top rear of the boiler.

Caution: On the Flowsure care should be taken if solder connections are made to the hot water outlet pipe, disconnect the DHW limit thermostat from the pipe prior to applying heat.

Filling and Make-Up Loop

On the Flowsure and Flowsure+ the flexible hose provides the means for initial filling of the system from the mains supply and also for subsequent make-up. It is fitted with a double check valve to ensure system water cannot feed back whilst filling and a shut-off valve is provided for mains isolation. IT IS IMPORTANT THAT FILLING IS DONE SLOWLY AND THE HOSE IS DISCONNECTED WHEN NOT IN USE.

On the System boiler a filling and make-up loop will need to be provided.

Retarders

There is an access door above the burner,(behind the expansion vessel on the System, Flowsure and Flowsure+), remove and check the retarders are sound and in position. Most models have three retarders above a baffle plate. The 45/50 has three retarders only and the 90/110 has six retarders and two baffle plates.

Thermostats

Check that all thermostats are secure in their pockets. On the 45/50, 50/70, 70/90 and 90/110 models it is recommended that on fully pumped systems the boiler stat phial is on the side nearest the flow outlet. If hot water is by gravity circulation fit the boiler stat phial on the gravity flow side.

Commission the boiler - See page 36.
Commissioning

It is strongly recommended that the boiler/burner is commissioned by a qualified technician, preferably OFTEC trained and registered.

Burner

1. Unless already removed, remove the top casing panel, front casing panel and burner cover.
2. Temporarily disconnect the fuel hose from the burner, run off the oil into a container to purge air from the fuel line.
3. Re-connect oil line and check for leaks.
4. Connect a pressure gauge to the oil pump.
5. Check that the water system is filled and vented.
6. Check that all controls are calling for heat.
7. Switch on electricity supply.
8. Turn on boiler thermostat. The burner will start and should light within 20 seconds. If the flame is not established during this time the burner lock out neon will light, wait about a minute before pressing the reset button to re-commence the lighting sequence.

Continuous failure to light is almost certainly due to air remaining in the fuel supply.
9. Start and stop the burner two or three times until the flame cuts off sharply - this indicates any remaining air has been dispersed.
10. When the burner is operating check the fuel supply pressure, adjust if necessary to give the required output.
11. Switch off the boiler, remove the pressure gauge and re-fit the plug.
12. Re-fit the burner cover and boiler casing panels,
13. Switch the boiler on. Allow the burner to run for about 15 minutes. The flue gas sampling point should be used whilst adjusting the air to give clean combustion. See the Burner Information Instructions for correct CO2 reading.

Boiler and system preparation

1. Remove the boiler top and front casing panels.
2. Check that all controls are not calling for heat.
3. Check that all water connections throughout the system are tight.

Models: 50/70, 70/90, System, Flowsure & Flowsure+. 90/110 has 6 Retarders

Fig. 26
Having completed the necessary water connections, those connections not utilised should be plugged.

Check that the central heating system has been fully flushed out at installation using a flushing agent. If not, add a suitable flushing agent to the system and fill the system. Then drain the system while hot and immediately refill adding a suitable proprietary corrosion inhibitor (such as Fernox).

The following procedures should be used when filling the sealed system boilers.

Set the diverter valve to the mid position by moving the manual lever to the left hand side and locking in position (Flowsure/Flowsure+). Open all radiators and lockshield valves and remove and discard the automatic air vent cap.

Fill the system and check that air is being discharged from the automatic air vent.

Vent each radiator in turn to remove the air from the system.

Bleed any air from the boiler pipework using the manual air vents provided (Flowsure/Flowsure+).

Disconnect the burner at the control box by pressing the connecting plug locking tab and pulling the plug free.

When the system has been completely vented, set the controls to call for heat. The pump will now operate and any remaining air can be purged from the system using the appropriate bleed points.

Set all controls to stand-by and reconnect burner electrical plug to control box.

Return the diverter valve lever to the normal right hand position (Flowsure/Flowsure+).

The charge pressure of the expansion vessel as dispatched is 0.5 bar, which is equivalent to a static head of 5 metres (16.5 ft). The charge pressure must not be less than the static head at the point of connection. A schraider type valve is fitted to the expansion vessel to allow the charge pressure to be increased if necessary.

Set the System Pressure

Fill the system until the pressure gauge shows 1.5 bar (21.5 lb/in²) and check for water soundness. Release water from the system until the system design pressure is obtained, up to a maximum of 1.5 bar.

System design pressure in bar = static head of the system in bar + 0.3

Note: 1 bar is equivalent to 10.2 metres (33.5 ft) of water. Set the movable pointer giving a permanent record of the set system pressure when cold.
Examine the interior of the boiler and if necessary, clean carbon off.

Model: 45/50

Remove the 3 retarders, examine for damage, replace if necessary.

Model: 50/70, 70/90

System, Flowsure & Flowsure+

Examine the interior of the flue and if necessary, clean inside.

Lift out the plate with these holes.

Baffle plates for models: 50/70, 70/90

Baffle plates for model 90/110

Clean combustion head (LD2SH model shown).

Replace nozzle with one of identical type.

Clean ignition electrodes.

Disconnect flange.

Remove front access door.

Disconnect suction line.

Disconnect burner plug.

Disconnect burner air supply pipe.

Remove burner.

Remove thermostat pocket.

Boiler shell.

Remove the baffle plate & examine for damage, replace if necessary.

Remove the 3 retarders, examine for damage, replace if necessary.

Baffle plate for models: 50/70, 70/90

Models: 50/70, 70/90, System, Flowsure & Flowsure+ 90/110 has 6 retarders

Models: 50/70, 70/90, System, Flowsure & Flowsure+

Remove front access door.

Disconnect burner lead.

Lift out the plate with these holes.

Remove front cover.

Fig. 27
4 - Servicing & Maintenance

• If the balanced flue is dismantled for any reason and the flue seals disturbed, new seals must be fitted. Refer to the Parts Catalogue for part numbers.

Servicing
• To maintain the boiler’s high thermal efficiency and reliable operation, it should be serviced annually by a qualified engineer preferably OFTEC trained and registered. If Gas Oil is the fuel two visits per year are advised.

• Operate the boiler and system. Note any faults which may need to be corrected during the service. It is advised that a set of combustion results are first obtained before undertaking any work.

• Switch off the electricity supply at the main isolating switch to the boiler. Turn off the fuel supply.

• Pull off front cover and disconnect the burner oil pipe(s), flexible air tube and burner plug, refer to the Burner Information Instructions.

• Remove expansion vessel assembly and lay to one side (where fitted).

• Undo burner retaining nut and withdraw burner from boiler, remove combustion head. Clean combustion head, making sure all slots and holes are clean. Clean ignition electrodes, examine for signs of damage.

• Remove nozzle and replace with one of identical type. Under no circumstances should the nozzle be stripped into component parts and never attempt to clean the nozzle tip.

• Remove burner cover, pull out and clean photocell.

• Remove air intake assembly and right hand side of fan casing and check impeller for deposits - clean blades as necessary.

• Remove end cap from oil pump and take out filter. Wash clean with kerosene and replace. (Caution - the oil pump contains a small amount of fuel, which will be released, when the end cap is removed).

• Re-assemble burner and check dimensions, refer to Burner Information Instructions. Note: Check all seals and replace if damaged.

• Remove access door on front of boiler, remove retarders and baffle plate (not 45/50) noting their positions. Brush off all deposits, if they show signs of damage replace.

• Examine interior of boiler and if necessary clean. Remove any loose debris from the combustion chamber.

• Check the condition of the refractory base and repair any minor cracks with fire cement.

• When satisfied refit retarders and baffle plate (not 45/50) and refit access door making sure that seals and gaskets are correctly fitted.

• Refit burner to boiler, connect flexible air tube, oil pipe(s) and refit burner lead.

• With all controls calling for heat, turn on fuel and switch on electricity. Allow burner to run for several minutes and then carry out combustion tests, refer to the Burner Information Instructions and if necessary, adjust to obtain best results.

• On completion of combustion tests, replace front cover and expansion vessel assembly (where fitted).

Note: It is advisable to replace flexible fuel pipes every five years.

Maintenance
• To ensure trouble-free heating and hot water, it is most important that the boiler and burner are correctly serviced.

• This is best carried out by entering into a Service Contract with your Installer.

• Conditions of operation will vary, but with normal usage the following is strongly advised:

At the end of winter
• Switch off main switch.
• Close all stop valves in the oil supply pipes.
• Clean the flueways and all inside surfaces of the boiler.
• Clean flue and chimney.
• Clean all boiler internal surfaces.

At the end of summer
• Isolate electrical supply to the boiler.
• Switch off main switch.
• Close all stop valves in the oil supply pipes.
• Clean the flueways and all inside surfaces of the boiler.
• Clean flue and chimney.
• Clean all boiler internal surfaces.

Also,
• De-sludge the fuel tank(s)
  There should be a sludge valve fitted to the tank(s).
• Replace/clean cartridge in main filter
  If a paper microbic cartridge has been in service
for more than one heating season, a replacement should be fitted. If a metal fine microbic filter is fitted then this should be cleaned with kerosene. Ensure that the filter bowl is thoroughly cleaned out before replacement.

- **Remove the burner**
  Service the burner, refer to the Burner Information Instructions.

- **Clean the boiler**
  This is required as follows if the boiler was not cleaned at the end of the heating season:
  Remove the expansion vessel assembly (if fitted) and the front access door from the boiler
  Remove the retarders and baffle plate (not 45/50), clean any soot and any hard deposits from the boiler surface.

- **Gaskets**
  It is advisable to replace all gaskets which have been disturbed unless it is certain that they are in excellent condition.

- **Check all thermostats**
  Test all thermostats to ensure that they are working correctly. Remove all dust with a soft brush and make sure that accessible contacts are clean.

- **Water system (Sealed system boilers only)**
  The system water should be topped up as necessary using the filling system provided.

  Filling must be carried out with the system cold so that the pressure can be brought up to the original cold fill reading indicated by the red pointer. A careful watch should be kept on the pressure gauge during filling and the mains pressure valve opened slowly.

  Topping up may, by arrangement, be a part of the annual service contract.

**Replacement of Parts**

Isolate the boiler from the Electricity, Oil and Water supplies before replacing any components.

On the sealed system boilers it should be remembered that the boiler is under system pressure and, as such, before disconnecting any parts that enter the water shell, the system pressure must be reduced and the boiler drained.
Replacement of Thermostats  
*(Statesman & System)*

1. Remove the front cover.
2. Pull off the temperature control knob.
3. If a clock is fitted un-clip from the facia and disconnect the plug at the back. On the System boiler disconnect the rear electrical connector.
4. Remove the facia retaining screws at the base of the facia.
5. Lift off the facia and disconnect the indicator lights plug.
6. Remove the controls assembly securing screws.
7. Lift away the controls assembly and un-clip both sensors and temperature bulb (where fitted) from their pockets.
8. Remove the retaining screws and split the controls box assembly apart.

**Limit Thermostat**

1. Remove the limit thermostat by disconnecting the electrical connections. Then unfasten the retaining nut at the base of the control box and remove.
2. Fit the new limit thermostat in reverse order to the above ensuring correct location.

**Boiler Control Thermostat**

1. Remove the boiler thermostat by disconnecting the electrical connections and removing the locknut securing the spindle to the controls assembly. Pull away the sensor from the control box front cover.
2. Fit the new boiler thermostat in reverse order to the above ensuring correct location.
Replacement of Thermostats (Flowsure/Flowsure+)

1. Remove the front and top covers.
2. Pull off the temperature control knob.
3. Un-clip the programmer assembly and push into the controls assembly.
4. Remove the facia retaining screws at the base of the facia.
5. Lift off the facia and disconnect the indicator lights plug.
6. Disconnect the inside and rear electrical connectors.
7. Remove the controls assembly lid securing screws and remove the lid.

Note which way the electrical connectors fit before removing any of the thermostats.
Re-assemble in reverse order unless stated otherwise.

Boiler Control Thermostat

1. Disconnect the electrical connections.
2. Remove the clip and withdraw the sensor from its pocket.
3. Remove the locknut securing the thermostat spindle to the controls assembly.

Limit Thermostat

1. Disconnect the electrical connections.
2. Remove the clip and withdraw the temperature gauge bulb and limit thermostat sensor from its pocket.
3. Remove the locknut securing the thermostat to the controls assembly. On re-assembly insert the thermostat sensor before the temperature gauge bulb.

Pump Overrun Thermostat

1. Disconnect the electrical connections.
2. Unscrew the two screws securing the thermostat to the controls assembly.
3. Remove the clip and withdraw the sensor from its pocket.

Tank Limit Thermostat (Flowsure+)

1. Disconnect the electrical connections.
2. Unscrew the two screws securing the thermostat to the controls assembly.
3. Remove the clip and withdraw the sensor from its pocket.

DHW Overheat Thermostat (Flowsure)

1. Disconnect the electrical connections.
2. Unscrew the two screws securing the thermostat to the bracket on the pipe.

Heatstore Thermostat (Flowsure+)

1. Disconnect the electrical connections.
2. Unscrew the two screws securing the thermostat to the bracket on the pipe.

Automatic Air Vent

1. Drain the boiler using the boiler drain point provided.
2. Unscrew the automatic air vent and fit a new one in the reverse order.
3. Fill the system as described in Section 2-Pre-installation Requirements.
Pressure Relief Valve

1. Drain the boiler using the boiler drain point provided.
2. Undo the compression fitting connecting the discharge pipe to the relief valve.
3. Undo the pressure gauge sensor retaining nut and withdraw sensor from the relief valve, taking care not to lose the fibre washer seal.
4. Undo the union nut at the rear of the relief valve and pull the relief valve clear of the pipework, taking care not to lose the fibre washer seal.
5. Fit a replacement valve in the reverse order.
6. Fill the system as described in Section 2 - Pre-Installation Requirements.

Circulating Pump

1. Remove the pump electrical cover and disconnect the electrical leads taking note of the wire positions.
2. Turn off the isolating valves mounted on the inlet and outlet of the pump. Undo the two union nuts and remove the pump from between the pipework.
   **Note:** A residue of water will remain in the pump.
3. Fit a replacement pump with new sealing washers.
   **Note:** The direction flow indicator on the pump should point from left to right.
4. Open all valves and fill the system as described in Section 2 - Pre-Installation Requirements.

Expansion Vessel

1. Drain the boiler using the boiler drain point provided.
2. Undo the nut connecting the vessel to the flexible pipe from the boiler.
   Take care not to lose the fibre washer seal.
3. Undo the two nuts retaining the expansion vessel assembly bracket to the boiler, lift bracket up and out, remove from boiler.
4. Remove top retaining arm, lift vessel up and out off bracket assembly.
5. Fit a new expansion vessel in reverse order to above.
6. Fill the system as described in Section C - Pre-Installation Requirements.

System Pressure/Temperature Gauge

1. Drain the boiler using the boiler drain point provided.
2. Turn off the isolating valves mounted on the inlet and outlet of the pump.
3. Undo the nut retaining the pressure gauge sensor from the pressure relief valve. Remove sensor, check fibre seal, replace if damaged on replacement of new sensor.
4. Remove the clip and withdraw the temperature bulb from its pocket.
5. Un-clip the temperature/pressure gauge from its bracket, remove gauge, carefully withdrawing sensor and bulb capillary tubes through bracket assembly.
6. Fit a replacement gauge in the reverse order.
7. Open the valves and fill the system as described in Section 2 - Pre-Installation Requirements.

Diverter Valve (Flowsure/Flowsure+)

1. Drain the boiler using the boiler drain point provided.
2. Turn off the isolating valves mounted on the inlet and outlet of the pump.
3. Disconnect the electrical lead from the connection plug, mounted on the rear of the control box, taking note of the wire positions.
4. Undo the two screws, retaining the central heating flow pipe to diverter valve, gently pull pipe away from diverter valve.
5. Undo the two screws, retaining the DHW flow pipe to diverter valve, gently pull pipe away from diverter valve.
6. Undo the two screws, retaining the pump to diverter pipe, remove diverter valve from pipe assembly.
7. Fit a replacement diverter valve in the reverse order, taking care to check and replace if necessary the “O” ring seals, fitted to the pipe tail ends.
8. Open the valves and fill the system as described in Section 2 - Pre-Installation Requirements.

Flow Switch (Flowsure/Flowsure+)

1. Close the mains water isolation valve to boiler.
2. Close the domestic service cock on the mains inlet pipework of the boiler.
3. Drain the residual water from the hot water pipework.
4. Disconnect the flow switch electrical lead from the connection plug, mounted on the rear of the control box, taking note of the wire positions.
5. Undo the nut connecting the flow switch to domestic service cock pipework.
6. Undo the nut connecting the flow switch to water to water heat exchanger pipework.
7. Pull the nuts back and extract the flow switch.
8. Fit new flow switch and new fibre washers in the reverse order, ensuring the flow switch head is inclined at least 15° above horizontal and will not foul the top casing panel. The direction flow indicator on the flow switch head should point in the direction of the water to water heat exchanger.
9. Open the domestic service cock and mains water isolation valve, turn on hot water tap, check connections are sound.
### Domestic Service Cock (Flowsure/Flowsure+)

1. Close the mains water isolation valve to boiler.
2. Drain the residual water from the hot water pipework.
3. Undo the nut connecting the domestic service cock to mains inlet pipework.
4. Undo the nut connecting the domestic service cock to flow switch pipework.
5. Pull the nuts back, gently ease out the domestic service cock from the pipework.
6. Fit new domestic service cock in reverse order, ensuring the direction flow indicator on the domestic service cock points to flow switch.
7. Open mains water isolation valve, turn on hot water tap, check connections are sound.

**Note:** A flow restrictor and filter is fitted in the outlet of the domestic service cock, ensure the correct colour flow restrictor is fitted for the correct boiler model, see Table 1 (page 13).

### Flow Restrictor

The flow restrictor cannot be replaced due to its location inside the domestic service cock, it is suggested that the domestic service cock be replaced when required. Follow instructions on replacement in paragraph covering the domestic service cock above.

### Domestic Hot Water Plate Heat Exchanger (Flowsure/Flowsure+)

1. Drain the boiler using the boiler drain point provided.
   - On the Flowsure+ drain approximately one litre of water from the heatstore tank using the tank drain point provided, this will prevent excessive residual spillage from the pipework when disconnecting.
2. Close the mains water isolating valve to the boiler, drain the residual water from the hot water pipework.
3. Remove the electrical spade connectors from the DHW overheat thermostat.
4. Remove the flow switch, refer to paragraph, flow switch replacement in this section.
5. Undo nut on cold inlet pipe feed to PHE, remove pipe.
6. Undo nut on hot water outlet pipe from the PHE, remove pipe.
7. Slacken the two screws retaining the DHW flow pipe to the diverter valve. Undo the nut retaining the DHW flow pipe to PHE inlet and swing pipe up and away.
8. Undo the nut retaining the primary return pipe, from the PHE outlet. Slide the plate heat exchanger back and out of the boiler.
9. Fit a new plate heat exchanger in reverse order, ensuring to replace any damaged fibre washers.

**Flowsure+**:

1. Undo both nuts retaining the mixer valve and flow switch assembly to the plate heat exchanger. Remove assembly, and place aside, ensuring electrical lead is not strained.
2. Undo both nuts retaining the primary return pipe, from PHE outlet and shell top return connections. Remove pipe assembly and place aside.
3. Slacken nut on tank outlet connection, pipe to PHE inlet. Undo nut retaining pipe and slide to one side. Remove plate heat exchanger.
4. Fit a new plate heat exchanger in reverse order, ensuring to replace any damaged fibre washers.

Open all isolation valves, fill the system as described in Section 2 - Pre-Installation Requirements. Vent air from the domestic hot water pipework. Open hot water tap check for correct operation of system.

**Note:** After the replacement of components, always check for soundness of connections. Always carry out a full functional check of the system.
Controls Assembly and Thermostats

- Automatic Air Vent
- Pressure Sensor
- Pressure Relief Valve
- Boiler Thermostat
- Pump Overrun Pocket
- Pump
- Rubber Grommet
- Limit Thermostat
- Boiler Thermostat
- Neon Connector (6 way)
- Burner Socket
- Mains Socket
- Relay
- Pump Overrun Thermostat
- Water Pressure & Temperature Gauge
- Domestic Service Cock
- Plate Heat Exchanger
- Flue Spigot
- Flow Switch (Type 1)
- Limit Thermostat and Temperature Gauge Bulb Pocket
- Manual Air Vents
- Diverter Valve

Fig. 31
## 5 - Fault Finding

### Burner Does Not Start, Motor Does Not Run

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>CHECK LIST</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains switched on</td>
<td>Switch on</td>
<td></td>
</tr>
<tr>
<td>Fuse in switch</td>
<td>Fit a fuse</td>
<td></td>
</tr>
<tr>
<td>Fuse blown</td>
<td>Replace fuse</td>
<td></td>
</tr>
<tr>
<td>All external controls call for heat</td>
<td>Set to call for heat</td>
<td></td>
</tr>
<tr>
<td>Boiler stat calls for heat</td>
<td>Set to an “ON” position</td>
<td></td>
</tr>
<tr>
<td>Limit stat tripped - Light on</td>
<td>Reset limit stat</td>
<td></td>
</tr>
<tr>
<td>Boiler at lock out - Light on</td>
<td>Reset</td>
<td></td>
</tr>
<tr>
<td>Faulty external wiring</td>
<td>Repair if necessary</td>
<td></td>
</tr>
<tr>
<td>Faulty external controls</td>
<td>Check that they are operating</td>
<td></td>
</tr>
<tr>
<td>Burner control box faulty</td>
<td>Check by fitting spare box</td>
<td></td>
</tr>
<tr>
<td>Boiler control panel wiring faulty</td>
<td>Check &amp; refer to wiring diagram</td>
<td></td>
</tr>
<tr>
<td>Section 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burner motor seized</td>
<td>Remove and check ease of rotation</td>
<td></td>
</tr>
</tbody>
</table>

### Boiler Starts, No Flame Established, No Oil To Burner

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>CHECK FOR</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil in the tank</td>
<td>Re-Fill</td>
<td></td>
</tr>
<tr>
<td>All valves open from tank to burner</td>
<td>Open valves</td>
<td></td>
</tr>
<tr>
<td>Fire valve correctly set</td>
<td>Set as per manufactures instructions</td>
<td></td>
</tr>
<tr>
<td>Filter blocked</td>
<td>Clean and replace elements</td>
<td></td>
</tr>
<tr>
<td>Air lock in fuel lines</td>
<td>Bleed burner</td>
<td></td>
</tr>
<tr>
<td>Nozzle blocked</td>
<td>Replace nozzle</td>
<td></td>
</tr>
<tr>
<td>Pump pressure correct</td>
<td>Set to correct pressure refer to Burner Instructions</td>
<td></td>
</tr>
<tr>
<td>Pump rotates:- Is it correct for either one or two pipe</td>
<td>Dismantle pump from Motor and check freedom of rotation</td>
<td></td>
</tr>
<tr>
<td>Pump drive coupling faulty</td>
<td>Remove pump and examine coupling for signs of wear and damage, refer to Burner Instructions</td>
<td></td>
</tr>
<tr>
<td>Solenoid valve not opening</td>
<td>Check operation of the solenoid valve</td>
<td></td>
</tr>
</tbody>
</table>

---

Part No. 5102478  
Fault Finding 47
<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>CHECK FOR</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Burner Starts, No Flame But Oil To Burner</strong></td>
<td>1. Signs of fuel in boiler</td>
<td>Check as for 2 to 8 below</td>
</tr>
<tr>
<td></td>
<td>2. Correct combustion head settings</td>
<td>Set correctly refer to Burner Instructions</td>
</tr>
<tr>
<td></td>
<td>3. Electrodes clean and not damaged</td>
<td>Clean</td>
</tr>
<tr>
<td></td>
<td>4. Nozzle blocked</td>
<td>Replace nozzle</td>
</tr>
<tr>
<td></td>
<td>5. If two pipe system, check pipe work is correct</td>
<td>Amend as necessary</td>
</tr>
<tr>
<td></td>
<td>6. Faulty Transformer</td>
<td>Replace control box if no spark is suspected</td>
</tr>
<tr>
<td></td>
<td>7. Electrode leads shorting out</td>
<td>Check leads for signs of shorting if found replace. Refer to Burner Instructions</td>
</tr>
<tr>
<td></td>
<td>8. Faulty pump solenoid</td>
<td>Replace pump assembly</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>CHECK FOR</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Burner Starts, Flame Established But Goes To Lock Out After 15 Seconds</strong></td>
<td>1. Intermittent oil supply</td>
<td>Check for dirt in filters or oil in fuel lines</td>
</tr>
<tr>
<td></td>
<td>2. If two pipe system, that pipework is correct</td>
<td>Refer to Table 5, Page 23</td>
</tr>
<tr>
<td></td>
<td>3. Combustion head settings correct</td>
<td>Refer to Burner Instructions</td>
</tr>
<tr>
<td></td>
<td>4. Photocell not fitted correctly</td>
<td>Replace correctly</td>
</tr>
<tr>
<td></td>
<td>5. Photocell circuit faulty</td>
<td>Replace</td>
</tr>
<tr>
<td></td>
<td>6. Dirty Photocell</td>
<td>Clean and replace</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>POSSIBLE CAUSE</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Locks Out In Morning Only</strong></td>
<td>1. Combustion air setting too high</td>
<td>Re-set and confirm by measuring CO₂ refer to Burner Instructions</td>
</tr>
<tr>
<td></td>
<td>2. Air collects in system overnight</td>
<td>Examine all joints and if suspect re-make</td>
</tr>
<tr>
<td></td>
<td>3. Faulty non return valve - 2 pipe system</td>
<td>Replace faulty valve</td>
</tr>
</tbody>
</table>
### Flame Established But Not Maintained

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Check For</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air in fuel line</td>
<td>Check for joints for increases of air, rectify as necessary, bleed burner and restart</td>
<td></td>
</tr>
<tr>
<td>Combustion settings incorrect</td>
<td>Adjust settings and confirm by flue gas analysis</td>
<td></td>
</tr>
<tr>
<td>Wrong grade of oil</td>
<td>Obtain correct grade of fuel or in case of conventional flue models adjust burner for correct grade.</td>
<td></td>
</tr>
<tr>
<td>Combustion products leaking</td>
<td>Check all seals, particularly the gasket between burner and boiler</td>
<td></td>
</tr>
<tr>
<td>Combustion products re-circulating into balanced flue terminal</td>
<td>Insert CO₂ probe and check</td>
<td></td>
</tr>
</tbody>
</table>

### Burner Runs But Smoke, and or Smell, and or Pulsation

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Check For</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct grade of fuel used</td>
<td>Either adjust for fuel used or drain and refill tank correctly</td>
<td></td>
</tr>
<tr>
<td>Correct nozzle fitted</td>
<td>Refer to Burner Instructions and fit correct nozzle</td>
<td></td>
</tr>
<tr>
<td>Correct oil pressure</td>
<td>Refer to Burner Instructions and set correct pressure</td>
<td></td>
</tr>
<tr>
<td>Correct air settings</td>
<td>Do combustion checks and re-set</td>
<td></td>
</tr>
<tr>
<td>Air in fuel lines</td>
<td>Bleed air from lines</td>
<td></td>
</tr>
<tr>
<td>Adequate access for combustion air</td>
<td>Refer to Section 2</td>
<td></td>
</tr>
<tr>
<td>Adequate ventilation</td>
<td>Refer to Section 2</td>
<td></td>
</tr>
<tr>
<td>One sided flame</td>
<td>Remove burner, clean and re-check settings, refer to Burner Instructions Clean or replace the nozzle</td>
<td></td>
</tr>
<tr>
<td>Oil leak within burner.</td>
<td>Remove burner and examine for leakage, repair suspect joints</td>
<td></td>
</tr>
<tr>
<td>Oil leak to burner within boiler</td>
<td>Suspect pump solenoid, replace pump assembly</td>
<td></td>
</tr>
<tr>
<td>Flue plus boiler resistance too high</td>
<td>Check retarders &amp; baffle plate positions, check for obstructions</td>
<td></td>
</tr>
<tr>
<td>Defective nozzle</td>
<td>Replace nozzle with one of same specification</td>
<td></td>
</tr>
</tbody>
</table>
### Part No. 5102478

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>POSSIBLE CAUSE</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. Bad oil cut off</td>
<td></td>
<td>Bleed air from pump or replace pump assembly</td>
</tr>
<tr>
<td>14. Dirt collecting on fan</td>
<td></td>
<td>Remove burner and clean</td>
</tr>
<tr>
<td>15. Combustion products leaking</td>
<td></td>
<td>Check all joints, replace suspect seals</td>
</tr>
</tbody>
</table>

### Other Problems

1. Boiler frequently tripping on limit stat
2. Limit stat calibration too low
   - Boiler stat max temperature too high
3. Lack of flow through boiler.
4. Condensation from Chimney
5. Noisy Motor
6. Pump pressure oscillating
7. Faulty pump cut off:-
   - oil in boiler

**A Burner Fault Finding Guide is incorporated within the Burner Information Instructions.**
Notes
## 6 - Short Spares

<table>
<thead>
<tr>
<th>Drg. Ref.</th>
<th>Description</th>
<th>Model - see key</th>
<th>Makers Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Boiler thermostat</td>
<td>A, B, C, D, E, F, G</td>
<td>26009018</td>
</tr>
<tr>
<td>2</td>
<td>Thermostat knob</td>
<td>A, B, C, D, E, F, G</td>
<td>26002014</td>
</tr>
<tr>
<td>3</td>
<td>Limit thermostat</td>
<td>A, B, C, D, E, F, G</td>
<td>26009097</td>
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<tr>
<td>4</td>
<td>Mains inlet plug</td>
<td>A, B, C, D, E, F, G</td>
<td>26009004</td>
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<tr>
<td>5</td>
<td>Retarder</td>
<td>A, B</td>
<td>26001224</td>
</tr>
<tr>
<td></td>
<td>Retarder</td>
<td>C</td>
<td>26001361</td>
</tr>
<tr>
<td></td>
<td>Retarder</td>
<td>D</td>
<td>26001283</td>
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<tr>
<td></td>
<td>Retarder Assembly</td>
<td>E, F, G</td>
<td>26001157</td>
</tr>
<tr>
<td>6</td>
<td>Baffle Plate</td>
<td>B</td>
<td>26001149</td>
</tr>
<tr>
<td></td>
<td>Baffle Plate</td>
<td>C</td>
<td>26001361</td>
</tr>
<tr>
<td></td>
<td>Baffle Plate</td>
<td>D</td>
<td>26001284</td>
</tr>
<tr>
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<td>Baffle Plate</td>
<td>E, F, G</td>
<td>26001152</td>
</tr>
<tr>
<td>7</td>
<td>Front plate seal</td>
<td>A, B, C, D, E, F, G</td>
<td>26001158</td>
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<tr>
<td>8</td>
<td>Viewing glass</td>
<td>A, B, C, D, E, F, G</td>
<td>10/17500</td>
</tr>
<tr>
<td>9</td>
<td>Viewing glass gasket</td>
<td>A, B, C, D, E, F, G</td>
<td>5000726</td>
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<tr>
<td>10</td>
<td>Air duct tube</td>
<td>A, B, C, D, E, F, G</td>
<td>26003019</td>
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<td>11</td>
<td>Jubilee clips</td>
<td>A, B, C, D, E, F, G</td>
<td>26009029</td>
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<td>12</td>
<td>Red neon</td>
<td>A, B, C, D, E, F, G</td>
<td>26009009</td>
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<td>13</td>
<td>Amber neon</td>
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<tr>
<td>14</td>
<td>Viewing glass gasket</td>
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<td>10/17499</td>
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<tr>
<td>15</td>
<td>Green neon</td>
<td>A, B, C, D, E, F, G</td>
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<tr>
<td>16</td>
<td>Expansion Vessel</td>
<td>E, F, G</td>
<td>26009157</td>
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<td>17</td>
<td>Expansion Vessel Flexible Hose</td>
<td>E, F, G</td>
<td>26009158</td>
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<tr>
<td>18</td>
<td>Drain Elbow - Boiler</td>
<td>E, F, G</td>
<td>26009109</td>
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<tr>
<td>19</td>
<td>Automatic Air Vent</td>
<td>E, F, G</td>
<td>26009104</td>
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<td>20</td>
<td>Pressure Safety Valve</td>
<td>E, F, G</td>
<td>404S601</td>
</tr>
<tr>
<td>21</td>
<td>Circulating Pump</td>
<td>E, F, G</td>
<td>405/0317</td>
</tr>
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<td>22</td>
<td>Pressure/Temperature Gauge</td>
<td>E, F, G</td>
<td>26009159</td>
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<td>23</td>
<td>Diverter Valve</td>
<td>F, G</td>
<td>26009160</td>
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<td>24</td>
<td>Double Check Valve</td>
<td>F, G</td>
<td>26009144</td>
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<tr>
<td>25</td>
<td>Flow Switch</td>
<td>F, G</td>
<td>26009166</td>
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<tr>
<td>26</td>
<td>Switch - 2 Position</td>
<td>F, G</td>
<td>26009090</td>
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<tr>
<td>27</td>
<td>Pump Overrun Thermostat</td>
<td>F, G</td>
<td>26009156</td>
</tr>
<tr>
<td>28</td>
<td>Plate Heat Exchanger</td>
<td>F</td>
<td>26009107</td>
</tr>
<tr>
<td>29</td>
<td>Plate Heat Exchanger</td>
<td>G</td>
<td>26009146</td>
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<tr>
<td>30</td>
<td>DHW Thermostat</td>
<td>F</td>
<td>10/18763</td>
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<td>31</td>
<td>Tank Thermostat</td>
<td>G</td>
<td>10/18763</td>
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<tr>
<td>32</td>
<td>Tank Limit Thermostat</td>
<td>G</td>
<td>26009156</td>
</tr>
<tr>
<td>33</td>
<td>Drain Elbow - Tank</td>
<td>G</td>
<td>26009149</td>
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<td>34</td>
<td>Mixer Valve</td>
<td>G</td>
<td>26009148</td>
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<td>35</td>
<td>Manual Bleed Valve</td>
<td>F, G</td>
<td>10/18944</td>
</tr>
<tr>
<td>36</td>
<td>Isolator Valve (System Fill)</td>
<td>F, G</td>
<td>10/11066</td>
</tr>
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<td>37</td>
<td>Flexible Hose (System Fill)</td>
<td>F, G</td>
<td>26009161</td>
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<td>38</td>
<td>Cold Main Isolator Valve (System Fill)</td>
<td>F, G</td>
<td>10/20142</td>
</tr>
<tr>
<td>39</td>
<td>Switch - 3 Position</td>
<td>F, G</td>
<td>404S684</td>
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<tr>
<td>40</td>
<td>Timer - ElectroMechanical</td>
<td>F, G</td>
<td>10/19114</td>
</tr>
<tr>
<td>41</td>
<td>Domestic Service Cock</td>
<td>F</td>
<td>10/20141</td>
</tr>
<tr>
<td>42</td>
<td>Domestic Service Cock</td>
<td>G</td>
<td>26009168</td>
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<tr>
<td>43</td>
<td>Relay</td>
<td>F, G</td>
<td>26009126</td>
</tr>
</tbody>
</table>

7 - Flue Kit Options

**KIT 1** Horizontal Low Level Telescopic  
(Short Wall) 100 - 275mm

- Gasket
- Inner Seal
- Outer Seal
- Dress Plate (Outer Wall)

**KIT 2** Horizontal Low Level Telescopic  
225 - 600mm

- Gasket
- Inner Seal
- Outer Seal
- Dress Plate (Outer Wall)

Fasteners Pack
- 4 - wood screws
- 4 - wall plugs

Instructions
### Kit 5
Horizontal and Vertical Flue Extension
950mm

- Inner Seal
- Outer Seal

### Kit 6
Horizontal and Vertical Flue Extension
300mm

- Inner Seal
- Outer Seal

### Kit 7
Horizontal High Level Telescopic (Short Wall)
100 - 275mm

- Inner Seal
- Outer Seal

### Kit 8
Horizontal High Level Telescopic
225 - 525mm

- Inner Seal
- Outer Seal

### Kit 9
Flashing Flat Roof

### Kit 10
Flashing Pitched Roof
22° to 45°

### Kit 4
Vertical Through The Roof Terminal

- Clamping Plate

### Kit 11
Terminal Guard (Supplied with Kits 1, 2, 7 & 8)

### Kit 3
Vertical High Level Riser Telescopic

- Fasteners Pack
  - 4 - Wall Plugs
  - 4 - Wood Screws
  - 3 - Self Tapping Screws

- Instructions
- Inner Seals (2 off)
- Outer Seals (2 off)
- Dress Plate (Outer Wall)
- Dress Plate (Inner Wall)
- Gasket

### Kit 12
Low Level Riser

- Instructions
- Fasteners Pack
  - 4 - Wall Plugs
  - 4 - Wood Screws
- Inner Seals (1 off)
- Outer Seals (1 off)
- Dress Plate (Inner Wall)
- Dress Plate (Outer Wall)
- Dress Plate (Case Top)
- Gasket
Sales Enquiries:
Sales Operations
Eastern Avenue,
Team Valley Trading Estate,
Gateshead,
Tyne & Wear. NE11 0PG.
Tel: 08706 060 403
Fax: 0191 491 7568

Service Enquiries:
Service Operations
Brooks House,
Coventry Road,
Warwick. CV34 4LL.
Tel: 08706 096 096 *
Fax: 01926 410006

Spares Enquiries:
Spare parts are available nationwide via the Interpart Stockists network.
For your local stockist consult Yellow Pages under Central Heating

Trade Support:
Trade Support
Brooks House,
Coventry Road,
Warwick. CV34 4LL.
Tel: 08706 049 049 - General *
Tel: 01926 409135 - Oil Installer
Fax: 01926 410006

Training Administration:
National Training Administrator
Tel: 0845 600 7402
Responsible for allocation and booking of all courses and activities at all training facilities in the UK

Brochure Hotline:
Tel: 08706 060 623

The Internet:
http://www.baxi.com
http://www.potterton.co.uk
http://www.oilboilers.co.uk

* To aid continuous improvement and staff training, calls to this line may be monitored or recorded.