Grant Vortex Pro

External Module Condensing Oil Boiler Range

Installation & Servicing Instructions
Commissioning Report

For use with Kerosene* only.

After installing the boiler leave these instructions with the User.

This appliance is deemed a controlled service and specific regional statutory requirements may be applicable.

*Operation on Bio-fuel

All Grant Vortex Pro condensing boilers, manufactured since May 2011, are suitable for operation on both standard kerosene (Class C2 to BS2869) and also bio-kerosene – up to a 30% blend (B30K).

All burner settings and nozzle sizes (as detailed in Section 2.3 of this manual) are correct for both standard kerosene and bio-kerosene (B30K).

In order to operate this boiler on bio-kerosene it will be necessary to take the following actions:

a) Use a bio-kerosene (B30K) compatible flexible oil line in place of the oil line supplied with this boiler.

b) Have your oil storage tank and oil supply line (including all pipework, sight gauges, filters, isolating valves, fire valves, de-aeration devices, etc.) checked for their compatibility with bio-kerosene (B30K).

Where necessary some, or all, of these items may have to be replaced with a bio-kerosene compatible alternative.

c) Check the suitability of the flue system with Grant UK.

d) Use only bio-kerosene (B30K) that conforms to OPS24.

IMPORTANT

Under no circumstances should the boiler be used with bio-kerosene without the above actions being taken first.

Date: ____________________________
Commissioning Engineer: _______________________________________________
Tel. No: ____________________________
Boiler model: _______________________  Boiler output: _______________ kW
Fuel type: Kerosene / Bio-Kerosene
Nozzle size: ________________________  Pump pressure: _________________
Air setting: _________________________  Flue gas % CO2: ________________
Net flue gas temp: __________________  Smoke No: _____________________
System flushed: yes / no  Corrosion inhibitor added: yes / no
Antifreeze added: yes / no

For Sealed systems only:

Expansion vessel size: _____________ litres
Expansion vessel charge pressure: ___________ bar
Sealed system fill pressure (cold): ___________ bar

Service Log

It is recommended that the boiler should be regularly serviced, at least once a year, and the details entered in the Boiler Handbook by the service engineer.
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This manual is intended to guide engineers in the installation and maintenance of Grant VORTEX Pro External modules. A User guide for the operation of this boiler is attached to the reverse of this manual.

The following special text formats are used in this manual for the purposes listed below:

**WARNING**

Warning of possible human injury as a consequence of not following the instructions in the warning.

**CAUTION**

Caution concerning likely damage to equipment or tools as a consequence of not following the instructions in the caution.

**NOTE**

Note text. Used for emphasis or information not directly concerned with the surrounding text but of importance to the reader.

1.1 How a Condensing Boiler Works

During the combustion process, hydrogen and oxygen combine to produce heat and water vapour. The water vapour produced is in the form of superheated steam in the heat exchanger. This superheated steam contains sensible heat (available heat) and latent heat (heat locked up in the flue gas). A conventional boiler cannot recover any of the latent heat and this energy is lost to the atmosphere through the flue.

The Grant VORTEX Pro condensing boiler contains an extra heat exchanger which is designed to recover the latent heat normally lost by a conventional boiler. It does this by cooling the flue gases to below 90°C, thus extracting more sensible heat and some of the latent heat. This is achieved by cooling the flue gases to their dew point (approximately 55°C).

To ensure maximum efficiency, the boiler return temperature should be 55°C or less, this will enable the latent heat to be condensed out of the flue gases.

- The boiler will achieve net thermal efficiencies of 100%.

To achieve maximum performance from the Grant Vortex Pro boiler, it is recommended that the heating system is designed so that a temperature differential of 20°C between the flow and return is maintained. The use of modulating circulating pumps (now widely available) and effective control systems should be considered.

The Grant VORTEX Pro boiler will however still operate at extremely high efficiencies even when it is not in condensing mode and therefore is suitable for fitting to an existing heating system without alteration to the radiator sizes. The boiler is capable of a maximum flow temperature of 75°C.

1.2 Boiler Description

Grant VORTEX Pro External modules have an insulated weatherproof enclosure made of galvanised steel with a powder coated finish, and are designed for external installation, either against a wall or free standing some distance away from the property, as required.

The External modules are part of the Grant range of automatic pressure jet oil boilers which have been designed for use with a fully pumped central heating system with indirect domestic hot water cylinder. They are not suitable for use with either a direct cylinder or a ‘primatic’ cylinder or gravity hot water.

The boilers are suitable for use on open vented or sealed central heating systems.

All models are supplied with the control panel and burner factory fitted. The factory fitted low level discharge flue system can be adjusted on site for either rear, left hand or right hand flue outlet position as required.

An external conventional flue (Green) system (Figure 9-3) is also available from Grant UK. Refer to Section 9.2 for further details.

A Hybrid flue (Green/Orange) system (Figure 9-1) is also available which allows the External module to utilise an existing chimney stack. Refer to Section 9.2 for further details.

Where an existing chimney is to be lined - Grant recommends the use of the Grant ‘Orange’ flue system, specifically designed for the Vortex range of condensing boilers. Refer to Section 9.2 for further details.

Where a rigid conventional flue is required, Grant recommends the use of the Grant ‘Green’ and ‘Orange’ flue system components. As no flue adaptor is supplied with the boiler it will be necessary to purchase the correct Grant Starter Elbow in order to connect this system to the boiler. Refer to Section for further details.

The ‘Green’ and ‘Orange’ system components can be used to construct a flue of maximum vertical height 19 metres.

A horizontal system - see Figure 9-4, is also available up to 3 metres - components available:

- Straight starter
- Extensions 150 mm, 250 mm, 450 mm and 950 mm
- Adjustable extension 195 to 270 mm
- 45° elbow
- Straight terminal

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The ‘Green’ and ‘Orange’ system components can be used to construct a flue of maximum vertical height 19 metres.

The flue system materials and construction MUST be suitable for use with oil-fired condensing boilers. Failure to fit a suitable conventional flue may invalidate the warranty on the boiler.

A horizontal system - see Figure 9-4, is also available up to 3 metres - components available:

- Straight starter
- Extensions 150 mm, 250 mm, 450 mm and 950 mm
- Adjustable extension 195 to 270 mm
- 45° elbow
- Straight terminal
**Green system**
Standard external high level/vertical flue starter kit - components available:
- External starter kit, straight or elbow
- Extensions 150 mm, 250 mm, 450 mm, 950 mm
- Adjustable extension 195 to 270 mm
- 45° elbow
- High level terminal
- Vertical terminal

1.3 Boiler Components
All burners are pre-set for use with kerosene and are supplied ready to connect to a single pipe fuel supply system with a loose flexible fuel hose and \( \frac{3}{8} \) to \( \frac{1}{4} \) BSP male adaptor supplied with the boiler.

If required, an additional flexible fuel line (900 mm) and \( \frac{3}{8} \) to \( \frac{1}{4} \) BSP male adaptor are available to purchase from Grant UK, for two-pipe oil supply systems, Part No. RBS36.

The temperature of the water leaving the boiler to heat the radiators and hot water cylinder is User adjustable.

The boiler is fitted with an overheat thermostat (which allows it to be used on a sealed central heating system) which will automatically switch off the boiler if the heat exchanger exceeds a pre-set temperature of 111°C ± 3°C.

The boiler control panel is fitted with an ON/OFF switch, boiler thermostat control knob and the manual reset button for the overheat thermostat.

An optional indoor programmer is available to purchase from Grant UK which allows the User to set the operating times for central heating and hot water, Part No. EPKIT.

To access the controls remove the front panel by turning the handle at the bottom and withdrawing the cover forwards at the bottom.

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**Figure 1-1**: Boiler controls for External modules

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**Control Panel**

- TEST SWITCH OFF
- BOILER OFF
- HEATING THERMOSTAT
- OVERHEAT RESET

- Test switch
- Boiler On/Off switch
- Boiler thermostat
- Overheat thermostat reset button (under screw cover)

---

*Lock-out* reset button
## Technical Data

### 2.1 Boiler Technical Data - Vortex Pro

<table>
<thead>
<tr>
<th>Model</th>
<th>External module</th>
<th>15/21</th>
<th>15/26</th>
<th>26/36</th>
<th>36/46</th>
<th>46/58</th>
<th>58/70</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water content (dry)</td>
<td>litre</td>
<td>16.5</td>
<td>19</td>
<td>21</td>
<td>21</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>gal</td>
<td>3.6</td>
<td>4.2</td>
<td>4.7</td>
<td>4.7</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>kg</td>
<td>99</td>
<td>157</td>
<td>174</td>
<td>174</td>
<td>335</td>
<td>339</td>
</tr>
<tr>
<td></td>
<td>lb</td>
<td>218</td>
<td>345</td>
<td>383</td>
<td>383</td>
<td>738</td>
<td>747</td>
</tr>
<tr>
<td>Max. heat output (kerosene)</td>
<td>kW</td>
<td>21</td>
<td>26</td>
<td>36</td>
<td>46</td>
<td>58</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Btu/h</td>
<td>71 650</td>
<td>88 700</td>
<td>122 840</td>
<td>157 000</td>
<td>197 896</td>
<td>238 840</td>
</tr>
<tr>
<td>Flow connection</td>
<td>mm</td>
<td>22</td>
<td>22</td>
<td>28</td>
<td>28</td>
<td>1¼&quot;BSP</td>
<td>1¼&quot;BSP</td>
</tr>
<tr>
<td>Return connection</td>
<td>mm</td>
<td>22</td>
<td>22</td>
<td>28</td>
<td>28</td>
<td>1¼&quot;BSP</td>
<td>1¼&quot;BSP</td>
</tr>
<tr>
<td>Min. flow rate (ΔT=10°C) l/h</td>
<td>l/h</td>
<td>1 800</td>
<td>2 200</td>
<td>3 000</td>
<td>4 000</td>
<td>5 200</td>
<td>6 000</td>
</tr>
<tr>
<td>Min. flow rate (ΔT=20°C) l/h</td>
<td>l/h</td>
<td>900</td>
<td>1 100</td>
<td>1 500</td>
<td>2 000</td>
<td>2 600</td>
<td>3 000</td>
</tr>
<tr>
<td>Condensate connection</td>
<td>mm (only connect plastic pipe)</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flue diameter (conventional)</td>
<td>100 mm (4 in)</td>
<td>125 mm (5 in)**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waterside resistance ΔT=10°C</td>
<td>mbar</td>
<td>28.5</td>
<td>26.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waterside resistance ΔT=20°C</td>
<td>mbar</td>
<td>10.0</td>
<td>9.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum static head</td>
<td>m</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum circulating head</td>
<td>m</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boiler thermostat range</td>
<td>°C</td>
<td>65 to 75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limit (safety) stat shut off temp</td>
<td>°C</td>
<td>111 ± 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. hearth temperature</td>
<td>°C</td>
<td>Less than 50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electricity supply</td>
<td>230/240V ~ 50 Hz Fused at 5 Amp</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor power</td>
<td>Watts</td>
<td>90</td>
<td>150</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starting current</td>
<td>Amps</td>
<td>4.2</td>
<td>2.6</td>
<td>2.6</td>
<td>4.2</td>
<td>6.4</td>
<td></td>
</tr>
<tr>
<td>Running current</td>
<td>Amps</td>
<td>0.85</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oil connection</td>
<td>¼&quot; BSP Male (on end of flexible fuel hose)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conventional flue draught</td>
<td>N/m²</td>
<td>Minimum 8.7 - Maximum 37</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>in wg</td>
<td>Minimum 0.035 - Maximum 0.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max operating press - sealed sys</td>
<td>bar</td>
<td>2.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max operating press - open sys</td>
<td>bar</td>
<td>2.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Weight includes burner but excludes flue.
** 125 mm diameter required for flexible flue liner (Orange system). For rigid flue system (e.g. Green system) 100 mm diameter flue required.
Refer to Section 9 Flue System and Air Supply for further details.

### 2.2 Sealed System Data - External modules

<table>
<thead>
<tr>
<th>External modules</th>
<th>15/21, 15/26, 26/36, 36/46</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating system pressure (cold)</td>
<td>Maximum 1.0 bar, Minimum 0.5 bar</td>
</tr>
<tr>
<td>Operating pressure of pressure relief valve</td>
<td>2.5 bar</td>
</tr>
<tr>
<td>Expansion vessel size (pre-charged at 1 bar)</td>
<td>10 litres (15/21), 12 litres (15/26), 16 litres (26/36, 36/46)</td>
</tr>
<tr>
<td>Max heating system volume (including boiler)*</td>
<td>106 litres (15/21), 128 litres (15/26), 170 litres (26/36, 36/46) - approx.</td>
</tr>
<tr>
<td>Cold water mains connection</td>
<td>15 mm copper pipe</td>
</tr>
<tr>
<td>Pressure relief valve discharge connection</td>
<td>15 mm copper pipe</td>
</tr>
<tr>
<td>Circulating pump head</td>
<td>6 m (15/21, 15/26), 7 m (26/36, 36/46)</td>
</tr>
</tbody>
</table>

* Based on vessel charge and system cold fill pressure of 0.5 bar
2.3 Vortex Pro Boilers using Class C2 Kerosene

<table>
<thead>
<tr>
<th>Model and burner type</th>
<th>Heat Output (kW)</th>
<th>SEDBUK 2009 efficiency (%)</th>
<th>Nozzle</th>
<th>Oil press. (bar)</th>
<th>Smoke No.</th>
<th>Burner head type</th>
<th>Burner head/disc setting</th>
<th>Fuel flow rate (kg/h)</th>
<th>Flue gas temp. (°C)</th>
<th>CO₂ (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15/21 Riello RDB2.2</td>
<td>15.0</td>
<td>91.2</td>
<td>0.50/80°EH 7.0</td>
<td>0 - 1</td>
<td>T1</td>
<td>Disc setting B</td>
<td>1.29</td>
<td>66</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>18.3</td>
<td></td>
<td>0.55/80°EH 7.5</td>
<td>0 - 1</td>
<td>T1</td>
<td>Disc setting C</td>
<td>1.56</td>
<td>73</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* 21.0</td>
<td></td>
<td>0.60/80°EH 9.0</td>
<td>0 - 1</td>
<td>T1</td>
<td>Disc setting C</td>
<td>1.83</td>
<td>80</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td>15/26 Riello RDB1</td>
<td>15.0</td>
<td>91.9</td>
<td>0.50/80°EH 7.0</td>
<td>0 - 1</td>
<td>T1</td>
<td>Fixed</td>
<td>1.25</td>
<td>60 - 65</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20.0</td>
<td></td>
<td>0.60/80°EH 8.0</td>
<td>0 - 1</td>
<td>T1</td>
<td>Fixed</td>
<td>1.67</td>
<td>65 - 70</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* 23.0</td>
<td></td>
<td>0.65/80°EH 8.5</td>
<td>0 - 1</td>
<td>T2</td>
<td>Fixed</td>
<td>1.94</td>
<td>70 - 75</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td>26/36 Riello RDB2</td>
<td>26.0</td>
<td>93.3</td>
<td>0.75/80°EH 8.0</td>
<td>0 - 1</td>
<td>T2</td>
<td>Fixed</td>
<td>2.16</td>
<td>68</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>36.0</td>
<td></td>
<td>0.85/80°EH 9.0</td>
<td>0 - 1</td>
<td>T3</td>
<td>Fixed</td>
<td>2.75</td>
<td>70</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td>36/46 Riello RDB2.2</td>
<td>36.0</td>
<td>90.7</td>
<td>1.00/80°EH 9.1</td>
<td>0 - 1</td>
<td>T3</td>
<td>Fixed</td>
<td>3.01</td>
<td>78</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* 41.5</td>
<td></td>
<td>1.20/80°S 8.0</td>
<td>0 - 1</td>
<td>T5</td>
<td>Fixed</td>
<td>3.56</td>
<td>80</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>46.0</td>
<td></td>
<td>1.25/80°S 8.0</td>
<td>0 - 1</td>
<td>T5</td>
<td>Fixed</td>
<td>3.90</td>
<td>88</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td>46/58 Riello RDB3.2</td>
<td>46.0</td>
<td>91.7</td>
<td>1.25/80°S 8.0</td>
<td>0 - 1</td>
<td>GIB</td>
<td>Head setting 0</td>
<td>4.01</td>
<td>75 - 80</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* 52.0</td>
<td></td>
<td>1.35/80°S 9.5</td>
<td>0 - 1</td>
<td>GIB</td>
<td>Head setting 0</td>
<td>4.47</td>
<td>75 - 80</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>58.0</td>
<td></td>
<td>1.65/80°S 8.0</td>
<td>0 - 1</td>
<td>GIB</td>
<td>Head setting 0</td>
<td>5.05</td>
<td>75 - 80</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td>58/70 Riello RDB3.2</td>
<td>58.0</td>
<td>91.4</td>
<td>1.65/80°S 8.0</td>
<td>0 - 1</td>
<td>GIB</td>
<td>Head setting 4</td>
<td>6.01</td>
<td>75 - 80</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>* 64.0</td>
<td></td>
<td>1.65/80°S 9.5</td>
<td>0 - 1</td>
<td>GIB</td>
<td>Head setting 4</td>
<td>6.01</td>
<td>75 - 80</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>70.0</td>
<td></td>
<td>1.75/80°S 9.5</td>
<td>0 - 1</td>
<td>GIB</td>
<td>Head setting 4</td>
<td>6.01</td>
<td>75 - 80</td>
<td>12.0</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. The data given above is approximate only.
2. The above settings may have to be adjusted on site for the correct operation of the burner.
3. Factory settings: 15/21 - 21 kW, 15/26 - 23 kW, 26/36 - 31.5 kW, 36/46 - 41.5 kW, 46/58 - 52.0 kW, 58/70 - 64.0 kW.
4. When setting the 15/21 to 15 kW output the burner air adjuster disc requires repositioning. Refer to Section 10 Commissioning.
5. When setting the 15/26 to 15 or 20 kW output the combustion head must be changed. Refer to Section 11.4 Cleaning the burner.
6. The combustion door test point may be used for CO₂ and smoke readings only. Do not use this test point for temperature or efficiency readings.
7. The data given above is approximate only.
8. The net flue gas temperatures given above are ± 10%.
9. When commissioning the air damper must be adjusted to obtain the correct CO₂ level.
10. The combustion door test point may be used for CO₂ and smoke readings only. Do not use this test point for temperature or efficiency readings.

2.4 Flue Gas Analysis

To allow the boiler to be commissioned and serviced, the boiler is supplied with a combustion test point on the front cleaning door. When this test point is used please note the following:

- The test point is for CO₂ and smoke readings only.
- The boiler efficiency and temperature must be taken from the flue test point on high level, vertical and conventional flue adaptors.
- Concentric low level flues do not contain a test point. The temperature and efficiency readings must be taken from the flue terminal.

2.5 Water Connections

<table>
<thead>
<tr>
<th>Boiler model</th>
<th>Flow connection</th>
<th>Return connection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Size</td>
<td>Fitting</td>
</tr>
<tr>
<td>15/21 External module</td>
<td>22mm pipe</td>
<td>Compression straight</td>
</tr>
<tr>
<td>15/26 External module</td>
<td>22mm pipe</td>
<td>Compression elbow</td>
</tr>
<tr>
<td>26/36 External module</td>
<td>28mm pipe</td>
<td>Compression straight</td>
</tr>
<tr>
<td>36/46 External module</td>
<td>28mm pipe</td>
<td>Tectite straight</td>
</tr>
<tr>
<td>46/58 External module</td>
<td>1¼” BSP</td>
<td>Female socket</td>
</tr>
<tr>
<td>58/70 External module</td>
<td>1¼” BSP</td>
<td>Female socket</td>
</tr>
</tbody>
</table>

Notes:
1. The data given above is approximate only.
2. The above settings may have to be adjusted on site for the correct operation of the burner.
3. Factory settings: 15/21 - 21 kW, 15/26 - 23 kW, 26/36 - 31.5 kW, 36/46 - 41.5 kW, 46/58 - 52.0 kW, 58/70 - 64.0 kW.
4. The combustion door test point may be used for CO₂ and smoke readings only. Do not use this test point for temperature or efficiency readings.
5. When setting the 15/21 to 15 kW output the burner air adjuster disc requires repositioning. Refer to Section 10 Commissioning.
6. When setting the 15/26 to 15 or 20 kW output the combustion head must be changed. Refer to Section 11.4 Cleaning the burner.
7. When setting the 58/70 to 70 kW output the combustion head setting must be changed. Refer to Section 11.4 Cleaning the burner.
8. The data given above is approximate only.
9. The net flue gas temperatures given above are ± 10%.
10. The combustion door test point may be used for CO₂ and smoke readings only. Do not use this test point for temperature or efficiency readings.
11. The data given above is approximate only.
12. The net flue gas temperatures given above are ± 10%.
13. The combustion door test point may be used for CO₂ and smoke readings only. Do not use this test point for temperature or efficiency readings.
14. When setting the 15/21 to 15 kW output the burner air adjuster disc requires repositioning. Refer to Section 10 Commissioning.
15. When setting the 15/26 to 15 or 20 kW output the combustion head must be changed. Refer to Section 11.4 Cleaning the burner.
16. When setting the 58/70 to 70 kW output the combustion head setting must be changed. Refer to Section 11.4 Cleaning the burner.
17. The data given above is approximate only.
18. The net flue gas temperatures given above are ± 10%.
19. The combustion door test point may be used for CO₂ and smoke readings only. Do not use this test point for temperature or efficiency readings.
20. When setting the 15/21 to 15 kW output the burner air adjuster disc requires repositioning. Refer to Section 10 Commissioning.
21. When setting the 15/26 to 15 or 20 kW output the combustion head must be changed. Refer to Section 11.4 Cleaning the burner.
22. When setting the 58/70 to 70 kW output the combustion head setting must be changed. Refer to Section 11.4 Cleaning the burner.
2.6 Boiler Dimensions

Figure 2-1: 15/21 External module dimensions

Figure 2-2: 15/26, 26/36, 36/46 External module dimensions

Figure 2-3: 46/58, 58/70 External module dimensions

All dimensions in the diagrams above are in millimetres
3 Oil Storage & Supply System

3.1 Fuel Supply

Fuel Storage
The tank should be positioned in accordance with the recommendations given in BS 5410:1:1997, which gives details of filling, maintenance and protection from fire.

A steel tank may be used and must be constructed to BS 799:5:1987 and OFS T200.

A galvanised tank must not be used.

A plastic tank may be used and must comply with OFS T100.

Plastic tanks should be adequately and uniformly supported on a smooth level surface, across their entire base area, that is, the area in contact with the ground.

Fuel Pipes
Fuel supply pipes should be of copper tubing with an external diameter of at least 10 mm.

Galvanised pipe must not be used.

All pipe connections should preferably use flared fittings. Soldered connections must not be used on oil pipes.

Flexible hoses must NOT be used outside the boiler case.

A remote sensing fire valve must be installed in the fuel supply line, with the sensing head located above the burner. Recommendations are given in BS 5410:1:1997.

A metal bowl type filter with a replaceable micron filter must be fitted in the fuel supply line adjacent to the boiler. A shut-off valve should be fitted before the filter, to allow the filter to be serviced.

A flexible fuel line, adaptor and ¼" BSP isolation valve are supplied loose with the boiler for the final connection to the burner. If a two pipe system or ‘Tiger Loop’ type de-aerator is used, an additional flexible fuel hose (900 mm) and ⅜" to ¼" BSP male adaptor are available to purchase from Grant UK, Part No. RBS36.

Metal braided flexible hoses should be replaced annually when the boiler is serviced. Long life flexible hoses should be inspected annually and replaced at least every 60 months.

Single pipe system - (See Figure 3-1)
With the storage tank outlet above the burner a single pipe system should be used. The height of the tank above the burner limits the length of pipe run from the tank to the burner.

As supplied the burner is suitable for a single pipe system

Two pipe system - (See Figure 3-2)
With the storage tank outlet below the burner, a two pipe system should be used. The pipe runs should be as shown in Figure 3-2. The return pipe should be the same level in the tank as the supply pipe, both being 75 to 100 mm above the base of the tank. The pipe ends should be a sufficient distance apart so as to prevent any sediment disturbed by the return entering the supply pipe.

Avoid the bottom of the tank being more than 3.5 m below the burner.

A non-return valve should be fitted in the supply pipe together with the filter and fire valve. A non-return valve should be fitted in the return pipe if the top of the tank is above the burner.

To be used with a two-pipe system, the burner must be fitted with an additional flexible fuel hose - a flexible fuel hose (900 mm) and ⅜" to ¼" BSP male adaptor are available to purchase from Grant UK, Part No. RBS36.

The pump vacuum should not exceed 0.4 bar. Beyond this limit gas is released from the oil.

For guidance on installation of top outlet fuel tanks and suction oil supply sizing, see OFTEC Technical Book 3. Available from OFTEC.

### Table 3-1: Maximum pipe run

<table>
<thead>
<tr>
<th>Head A (m)</th>
<th>Maximum pipe run (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10 mm OD pipe</td>
</tr>
<tr>
<td>0.5</td>
<td>10</td>
</tr>
<tr>
<td>1.0</td>
<td>20</td>
</tr>
<tr>
<td>1.5</td>
<td>40</td>
</tr>
<tr>
<td>2.0</td>
<td>60</td>
</tr>
</tbody>
</table>

![Figure 3-1: Single pipe system](image-url)
Figure 3-2: Two pipe system

Figure 3-3: De-aeration device system
Tiger Loop system - (See Figures 3-3 and 3-4)

When the storage tank outlet is below the burner, an alternative to a two pipe system can be achieved using a ‘Tiger Loop’ type oil de-aerator. This effectively removes the air from the oil supply on a single pipe lift.

The de-aerator is connected close to the boiler as a two pipe system (omitting the non-return valve) as shown in Figure 3-3. Refer to the manufacturers instructions supplied with the de-aerator.

The de-aerator must be mounted vertically. See Figure 3-3 and 3-4.

To be used with a de-aerator, the burner must be fitted with an additional flexible fuel hose - a flexible fuel hose (900 mm) and ¼” to ⅛” BSP male adaptor are available to purchase from Grant UK, Part No. RBS36.

3.2 Burner Oil Connection

The burner fuel pump is supplied for use with a single pipe fuel supply system.

For use on a two pipe system, it is necessary to fit the By-pass screw, as shown in Figure 3-5, into the tapping in the return port.

The By-pass screw is supplied in the boiler accessory pack.

On all models except 46/58 and 58/78:
Remove the plastic burner cover (secured by two screws).

On 46/58 and 58/70 models only:
Remove the plastic burner cover (secured by three screws).

For ease of access to the fuel pump, to fit the by-pass screw and connect the oil lines, the burner can be removed from the boiler. To do this, unscrew the single nut at the top of the burner (using a 13 mm spanner) and withdraw the burner from the boiler.

Remove and discard the blanking plug supplied in the inlet (suction) port may now be plastic and will not provide an oil tight seal when the pump is running.

Ensure that the supply from the tank is connected to this port and that the plastic plug is discarded.

Figure 3-4: Tiger loop de-aeration device

Figure 3-5: Riello RDB pump

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Inlet (suction) port</td>
</tr>
<tr>
<td>2</td>
<td>Return port</td>
</tr>
<tr>
<td>3</td>
<td>By-pass screw</td>
</tr>
<tr>
<td>4</td>
<td>Pressure gauge port</td>
</tr>
<tr>
<td>5</td>
<td>Pressure adjustment</td>
</tr>
<tr>
<td>6</td>
<td>Vacuum gauge port</td>
</tr>
<tr>
<td>7</td>
<td>Solenoid</td>
</tr>
<tr>
<td>8</td>
<td>Nozzle outlet</td>
</tr>
</tbody>
</table>

WARNING

The blanking plug supplied in the inlet (suction) port may now be plastic and will not provide an oil tight seal when the pump is running.

Flexible fuel hoses and adaptors are available to purchase from Grant UK.
Main Burner Components
It may be necessary to remove the burner from the boiler to access connections in the fuel pump.

Remove the single nut at the top of the burner (using a 13 mm spanner) and withdraw the burner from the boiler.

![NOTE]

Remove the factory fitted air inlet spigot adaptor (item 6 in Figure 3-6) from the air intake on the top right hand side of the burner and fit the grey plastic air inlet grille in its place.

Burner Connection
If a two pipe system is to be used refer to Section 3.2.

Remove and discard the blanking plug from the inlet (suction) port of the pump. Refer to Figure 3-5.

Connect the elbow of the flexible fuel hose supplied with the boiler to the inlet port.

Connect the other end of the flexible fuel hose to the rigid supply line using the adaptor supplied. The supply enters the enclosure through one of the holes in the bottom of the side panels.

---

**Figure 3-6: Riello RDB burner components**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Oil pump</td>
</tr>
<tr>
<td>2</td>
<td>Control box</td>
</tr>
<tr>
<td>3</td>
<td>Reset button with lock-out lamp</td>
</tr>
<tr>
<td>4</td>
<td>Flange with gasket (do not remove from boiler)</td>
</tr>
<tr>
<td>5</td>
<td>Air damper adjustment screw</td>
</tr>
<tr>
<td>6</td>
<td>Air supply tube connection (balanced flue)</td>
</tr>
<tr>
<td>7</td>
<td>Pump pressure adjustment screw</td>
</tr>
<tr>
<td>8</td>
<td>Pressure gauge connection</td>
</tr>
</tbody>
</table>
4.1 Introduction

All models are supplied fully assembled with the flue terminal guard supplied loose inside the boiler.

4.2 Boiler location

1. The External module must stand on a solid, level surface capable of supporting the weight of the boiler when full of water, e.g. a prepared concrete standing, paving slabs bedded down on sand/cement, or similar.

2. The module can be installed either against the building or ‘free standing’ some distance away from the building.

3. The module must be positioned such that the required clearances from the low level flue outlet, as shown in Figure 9-4, are achieved.

4. Adequate clearance must be left around the module for servicing. In particular, a minimum clearance of 600 mm above the module for removal of the top panel and 600 mm at the opposite end to the flue outlet for access to the burner. Sufficient clearance is required at the rear of the boiler to allow the rear panel to be removed for access to the condensate trap.

4.3 Preparation for Installation

1. Carefully remove the packaging from the boiler and remove it from the transit pallet.

2. Remove the case top panel (four screws) and also the front and rear panels, as required.

3. The flue may exit the boiler from the left, right or rear of the casing. Carefully press out the pre-cut section on the side or rear casing panel to provide the opening in the required position for the flue to pass through the casing.

4. Slacken the wing nuts holding the flue elbow and rotate the elbow to the required direction for the flue to exit the casing.

5. Push the end of the flue terminal section (with the red seal) through the sealing grommet in the casing panel. The terminal section has been factory lubricated. Take care not to dislodge or damage the red flue seal.

6. Carefully insert the terminal into the flue elbow until the bend of the terminal contacts the outer casing, then, pull the terminal forward approximately 25 mm and rotate the bend so that the outlet is horizontal.

Rear Exit - The flue must discharge away from the building.
Side Exit - The flue should discharge towards the rear of the casing to prevent flue gases re-entering the boiler casing through the air inlet vents on the casing front door.

The flue terminal must be fitted horizontally to prevent dripping from the end of the terminal.

7. Tighten the wing nuts holding the flue elbow and fit the stainless steel flue guard using the two screws provided.

8. The top panel of the casing has been designed so that it may be fitted to create a slight slope away from the side positioned against the wall. To tilt the top panel, loosen the four top panel casing screws, one at each corner and push down on the side furthest from the wall. Tighten the screws. See Figure 4-1.

Figure 4-1: Standard low level flue
4.4 Installing the Boiler

1. If the boiler is to be fitted against the wall, prepare the wall to accept the heating system pipework. To mark the wall for drilling, refer to Section 2.6 for the positions of the pipework openings in the enclosure sides.

Pipework should be insulated where it passes through the wall into the boiler enclosure.

If the boiler is to be installed ‘free standing’ (i.e. away from a wall) and the pipework run underground, push out the ‘knock-outs’ to open the required pipe openings in the base of the boiler enclosure. Using a sharp knife, cut through the polystyrene in the base, around the edge of the holes, to allow the flow and return pipes to enter the enclosure.

2. The electrical supply to the boiler should be routed through the wall in a suitable conduit, such that it enters the boiler enclosure via one of the unused pipework openings. The cable can be routed to the front of the boiler, for connection to the boiler control panel, either over the top or beneath the boiler heat exchanger. Heat resistant PVC cable, of at least 1.0 mm² cross section should be used within the boiler enclosure.

3. The oil supply line should be installed up to the position of the boiler. Refer to Section 3.1 for details. The final connection into the boiler enclosure can be made with 10 mm soft copper, routed along the base of the enclosure (either between the enclosure and wall or in front of the enclosure) to enter through one of the holes located in the bottom edge side panel, at the front (burner) end.

4.5 Regulations Compliance

Installation of a Grant VORTEX Pro boiler must be in accordance with the following recommendations:-

- Building Regulations for England and Wales, and the Building Standards for Scotland issued by the Department of the Environment and any local Byelaws which you must check with the local authority for the area.
- Model and local Water Undertaking Byelaws.
- Applicable Control of Pollution Regulations.
- The following OFTEC requirements:-
  - OFS T100 Polythene oil storage tanks for distillate fuels.
  - OFS T200 Fuel oil storage tanks and tank bunds for use with distillate fuels, lubrication oils and waste oils.

Further information may be obtained from the OFTEC Technical Book 3 (Installation requirements for oil storage tanks) and OFTEC Technical Book 4 (Installation requirements for oil fired boilers).

The installation should also be in accordance with the latest edition of the following British Standard Codes of Practice:-

- BS 715 Metal flue pipes, fittings, terminals and accessories.
- BS 799:5 Oil storage tanks.
- BS 1181 Clay flue linings and flue terminals.
- BS 4543:3 Factory made insulated chimneys for oil fired appliances.
- BS 4876 Performance requirements for oil burning appliances.
- BS 5410:1 Code of Practice for oil firing appliances.
- BS 5449 Forced circulation hot water systems.
- BS 7593 Code of Practice for treatment of water in heating systems.
- BS 7671 Requirements for electrical installations, IEE Wiring Regulations.

**NOTE**

Failure to install and commission appliances correctly may invalidate the boiler warranty.

**WARNING**

Before starting any work on the boiler, or fuel supply please read the health and safety information given in Section 14.

4.6 Completion

Please ensure that the OFTEC CD/10 installation completion report (provided with the boiler) is completed in full. Leave the top copy with the User. Retain the carbon copy.

Ensure that the User Information pack (supplied with the boiler) is handed over to the Householder.

4.7 Before you Commission

To avoid the danger of dirt and foreign matter entering the boiler the complete heating system should be thoroughly flushed out - before the boiler is connected and then again after the system has been heated and is still hot. This is especially important where the boiler is used on an old system.

For optimum performance after installation, this boiler and its associated heating system must be flushed in accordance with the guidelines given in BS 7593:1992 ‘Treatment of water in domestic hot water central heating systems’.

This must involve the use of a proprietary cleaner, such as BetzDearborn’s Sentinel X300 or X400, or Fernox Restorer. Full instructions are supplied with the products, but for more details of BetzDearborn’s products, view the website www.sentinel-solutions.net and for more details of Fernox products view the website www.fernox.com.
For long term protection against corrosion and scale, after flushing, it is recommended that an inhibitor such as Betzdearborn’s Sentinel X100 or Fernox MB-1 is dosed in accordance with the guidelines given in BS 7593:1992.

Failure to implement these guidelines will invalidate the warranty.

4.8 Heating System Design Considerations

To achieve the maximum efficiency possible from the Grant VORTEX Pro boiler, the heating system should be designed to the following parameters:

**Radiators:**
- Flow temperature 70°C
- Return temperature 50°C
- Differential 20°C

**Underfloor:**
- Flow temperature 50°C
- Return temperature 40°C
- Differential 10°C

Size radiators with a mean water temperature of 60°C.

Design system controls with programmable room thermostats or use weather compensating controls to maintain return temperatures below 55°C.

**NOTE**

The use of a pipe thermostat is recommended to control the return temperature when using weather compensating controls.

**WARNING**

Refer to Section 2.5 for the size and type of the connections and Section 5 for the position of the connections.

4.9 Underfloor Heating Systems

In underfloor systems it is essential that the return temperature must be maintained above 40°C to prevent internal corrosion of the boiler water jacket.

4.10 Pipework Materials

Grant boilers are compatible with both copper and plastic pipe. Where plastic pipe is used it must be of the oxygen barrier type and be of the correct class (to BS 7291:Part 1:2001) for the application concerned.

**WARNING**

The first metre of pipework connected to both the heating flow and return connections of the boiler must be made in copper on all types of system - sealed or open-vented.

4.11 Sealed Systems

If plastic pipe is to be used, the installer must check with the plastic pipe manufacturer that the pipe to be used is suitable for the temperature and pressures concerned.


**WARNING**

The system must incorporate a low-pressure switch to shut off power to the boiler if the system pressure drops below 0.2 bar. A suitable low pressure switch kit is available to purchase from Grant UK, Part No. MPCBS 63.

4.12 Underfloor Pipework

Plastic pipe may be used on Underfloor systems where the plastic pipe is fitted after the thermostatic mixing valve. Copper tube must be used for at least the first metre of flow and return primary pipework between the boiler and the underfloor mixing/blending valves.

**NOTE**

The boiler should not be allowed to operate with return temperatures of less than 40°C when the system is up to operating temperature.
5 Pipe Connections

5.1 Water Connections

The flow and return pipework can exit the boiler enclosure either through the pre-cut openings provided in both sides (under the movable cover plates) and through the wall when installed against the building, or down and through the pre-cut openings provided in the base of the enclosure for ‘free standing’ installations. See Section 2.6.

Push out the ‘knock-out’ from the required holes, taking care not to distort the side panel or base.

For condensate disposal pipework refer to Section 6.

1. To gain access to the water connections, remove the two screws securing the bottom of the back panel and remove it by withdrawing it forwards at the bottom. Remove the top casing panel.

2. If required, fit the Grant sealed system kit. Refer to Section 7.

3. Carefully manoeuvre the boiler in position to line up with pipework through the wall. Complete the water connections.

   Note: Check that the baffles are in position and that the cleaning cover is correctly fitted and a good seal made.

4. If the boiler is installed against a wall, fit the wall flashing strip. Position the strip with the bottom edge of the wider flange 20 mm above the enclosure top panel, with the narrow flange (with the three fixing holes) flat against the wall. The strip should overhang the top panel by an equal amount at each end.

5. Mark the position of the three fixing holes onto the wall, drill and plug the wall and secure the strip with suitable screws (not supplied).

15/21, 15/26, 26/36, 36/46 Flow connection: A pipe (22 mm for 15/21, 15/26 or 28 mm for 26/36, 36/46) is provided for the flow connection. This is located on the top of the boiler. The pipe will need to be vented, as it is the highest point on the primary heat exchanger.

15/21, 15/26, 26/36, 36/46 Return connection: A pipe (22 mm for 15/21, 15/26 or 28 mm for 26/36, 36/46) is provided for the return connection. This is located on the top of the boiler. The pipe will also need to be vented at some point, as it is the highest point on the secondary heat exchanger.

46/58, 58/70 Flow connection: A 1¼” BSP socket is provided for the flow connection. This is located on the top of the boiler. This flow pipe will need to be vented, as it is the highest point on the primary heat exchanger.

46/58, 58/70 Return connection: A 1¼” BSP socket is located on top of the boiler. This return pipe will also need to be vented at some point, as it is the highest point on the secondary heat exchanger.

NOTE

All pipes to be fitted into the push-fit connectors provided should be cut using a pipe slicer or pipe cutter - to leave the pipe ends with a slight radius and free from any burrs or sharp edges. Pipes to be used with these fittings should not be cut square using a hacksaw.
6 Condensate Disposal

6.1 General Requirements
When in condensing mode the Grant VORTEX Pro boilers produce condensate from the water vapour in the flue gases. This condensate is slightly acidic with a pH value of around 3 (similar to vinegar). Provision must be made for the safe and effective disposal of this condensate.

Condensate can be disposed of using one of the following methods of connection:

Internal connection (preferred option):
- into an internal domestic waste system (from kitchen sink, washing machine, etc.)
- directly into the soil stack

External connection:
- into an external soil stack
- into an external drain or gulley
- into a rainwater hopper (that is part of a combined system where sewer carries both rainwater and foul water)
- purpose made soakaway

All condensate disposal pipes must be fitted with a trap - whether they are connected internally or externally to a domestic waste system/soil stack or run externally to a gully, hopper or soakaway.

6.2 Connections
Connections into a rainwater hopper, external drain or gulley should be terminated inside the hopper/drain/gulley below the grid level but above the water level.

Condensate disposal pipes should not be connected directly into rainwater downpipes or to waste/soil systems connected to septic tanks.

Condensate pipes should not be discharged into ‘grey water’ systems that re-use water used in the home (not including water from toilets).

It should be noted that connection of a condensate pipe to the drain may be subject to local Building Control requirements.

6.3 Pipework
Condensate disposal pipework must be plastic (plastic waste or overflow pipe is suitable).

Condensate disposal pipes should have a minimum ‘nominal’ diameter of 22 mm (¾”) - e.g. use 21.5 mm OD polypropylene overflow pipe.

Condensate disposal pipes must be fitted with a fall (away from the boiler) of at least 2.5° (~45 mm fall per metre run).

NOTE
Where it is not possible for the pipe to fall towards the point of discharge - either internally into a waste system or externally to a gulley (e.g. for boilers installed in a basement), it will be necessary to use a condensate pump.

Condensate disposal pipes should be kept as short as possible and the number of bends kept to a minimum. Pipes should be adequately fixed to prevent sagging, i.e. at no more than 0.5 metre intervals.

6.4 External Pipework
Ideally, external pipework, or pipework in unheated areas, should be avoided. If unavoidable, external pipework should be kept as short as possible (less than 3 metres) and 32 mm waste pipe used to minimise the risk of ice blocking the pipe in freezing conditions.

The number of bends, fittings and joints on external pipes should be kept to a minimum to reduce the risk of trapping condensate.

6.5 Condensate Soakaway
To keep external pipework to a minimum, locate the soakaway as close as possible to the boiler but ensure it is at least 500 mm from building foundations and away from other services, e.g. gas, electricity, etc.

The condensate pipe may be run above or below ground level and can enter either the top or side of the soakaway tube. Refer to Figure 6-1.

Ensure that the drainage holes in the soakaway tube face away from the building.

Backfill both the soakaway tube, and the hole around it, with 10 mm limestone chippings.

Only use a soakaway where the soil is porous and drains easily. Do not use in clay soils or where the soil is poorly drained.

Any damage due to condensate backing up into the boiler due to a high water table, in the case of a soakaway, or flooded drains when the condensate disposal is via a gulley or soil stack, is not covered by the Grant product warranty.

Figure 6-1: Purpose made condensate soakaway
6.6 Condensate Trap

Grant VORTEX Pro boilers are supplied with a factory-fitted condensate trap to provide the required 75 mm water seal in the condensate discharge pipe from the boiler. This trap incorporates a float (which will create a seal when the trap is empty) and an overflow warning outlet (fitted with a plastic sealing cap), see Figure 6-2.

The trap is factory-fitted inside the boiler casing, mounted in the rear of the boiler (opposite end to the burner) on the inside of the side panel, see Figure 6-2.

Access must be available to allow for routine maintenance.

A flexible hose connects the outlet of the condensing heat exchanger to the trap inlet. Ensure the straight connector on the hose is fully pushed onto the ‘top hat’ inlet connector of the trap.

With the trap fitted inside the boiler casing, the sealing cap must be fitted.

If connecting the condensate discharge (either internally or externally) into a waste system or soil stack - the sealing cap must be fitted in the trap outlet.

On external discharge systems to a hopper, gully or soakaway, the sealing cap should be removed from the trap outlet.

If there is any discharge of condensate from the overflow outlet, this could indicate a blockage (possibly due to freezing). Turn off the boiler and investigate the cause. If necessary contact your service engineer for assistance.

The condensate trap outlet is at an angle of 48° below the horizontal. This is to automatically give a 3° fall on any ‘horizontal’ runs of condensate disposal pipe. Refer to Figure 6-2.

6.7 Condensate Disposal Pipework

The outlet of the trap will accept 21.5 mm to 23 mm OD Polypropylene overflow pipe for the condensate discharge pipe.

Possible routes for disposal pipework

The boiler enclosure has several 50 mm diameter openings in both the sides and base. These are designed to allow pipework to pass through, to suit the installation. These openings can be used to allow the condensate disposal pipe to exit the casing in one of the following ways:

Side outlet – The lower opening on either side of the enclosure can allow the condensate disposal pipe to be installed as follows:

- Connection to an internal stack – passing back through the wall of the house.
- Connection to an external soil stack adjacent to the boiler.
- Discharge into an adjacent (external) drain or gulley.
- Discharge into a soakaway – with pipe either above or below ground level.

Bottom outlet – There are three openings in the base that can allow the condensate disposal pipe to be installed as follows:

- Discharge into a drain or gulley beneath the boiler (e.g. drain built in to the concrete base for the boiler).
- Discharge into a soakaway – with pipe below ground level.

When connecting plastic discharge pipe, ensure that the pipe is fully pushed into the outlet end on the flexible pipe to prevent the possibility of leakage.

6.8 Inspection and Cleaning of Trap

The trap must be checked at regular intervals (e.g. on every annual service) and cleaned as necessary to ensure that it is clear and able to operate.

The bottom bowl is sealed to the trap body and cannot be removed.

To inspect and clean the trap:

1. Disconnect flexible condensate hose from inlet connector.
2. Unscrew the inlet connection nut.
3. Remove the inlet connector and nut from trap.
4. Remove trap from bracket.
5. Remove float from trap – clean if necessary.
6. Inspect inside of trap and clean as necessary.
7. Re-assemble trap, re-fit to boiler and re-connect flexible hose. Ensure that hose is fully pushed onto the trap inlet connector.

Failure to regularly check and clean the condensate trap may result in damage to the boiler and will not be covered by the Product Warranty.
7 Sealed Systems

7.1 Sealed System Installation
See Figure 7-1
All Grant VORTEx Pro boilers are suitable for use with sealed systems complying with the requirements of BS 5449.
The maximum temperature of the central heating water is 75°C.
The system must be provided with the following items:
- Diaphragm expansion vessel complying with BS 4814.
- Pressure gauge.
- Safety valve.
- Approved method for filling the system.

NOTE
Ensure that the expansion vessel used is of sufficient size for the system volume. Refer to BS 7074:1:1989 or The Domestic Heating Design Guide for sizing the required vessel.

The expansion vessel can be fitted in either the return or flow pipework in any of the recommended positions as shown in Figure 7-1. To reduce the operating temperature of the expansion vessel diaphragm, position it below the pipe to which it is connected. The expansion vessel may be positioned away from the system, providing the connecting pipe is not less than 13 mm diameter.
The pressure gauge should have an operating range of 0 to 4 bar.
The safety valve, set to operate at 2.5 bar, should be fitted in the flow pipework near to the boiler.
The pipework between the safety valve and boiler must be unrestricted, i.e. no valves.
The safety valve should be connected to a discharge pipe which will allow the discharge to be seen, but cannot cause injury to persons or property.
Provision should be made to replace water lost from the system. This can be done manually (where allowed by the local water undertaking) using an approved filling loop arrangement incorporating a double check valve assembly (as supplied fitted on System models).

An automatic air vent should be fitted to the highest point of the system.
The expansion vessel charge pressure should always be slightly greater than the maximum static head of the system, in bar, at the level of the vessel (1 bar = 10.2 metres of water). See Figure 7-2.
The system fill pressure (cold) should be 0.2 - 0.3 bar greater than the vessel charge pressure – giving typical system fill pressures of approx 0.5 bar for a bungalow and 1.0 bar for a two storey house. Refer to the Domestic Heating Design Guide for further information if required.

If thermostatic radiator valves are fitted to all radiators, a system by-pass must be fitted. The by-pass must be an automatic type.

Filling of the system must be carried out in a manner approved by the local Water Undertaking.

Where allowed, the system may be filled via the filling loop supplied (the loop arrangement includes a double check valve assembly).

All fittings used in the system must be able to withstand pressures up to 3 bar.

Radiator valves must comply with the requirements of BS 2767(10):1972.

One or more drain taps (to BS 2879) must be used to allow the system to be completely drained.

7.2 15/21 Sealed System Kit
See Figures 7-3 and 7-4

1. The kit includes the following items:
   - Pressure relief valve and automatic air vent.
   - 22 mm manifold pipe.
   - 10 litre expansion vessel with flexible hose and sealing washer.
   - Expansion vessel mounting bracket.
   - Filling loop kit.
   - Pressure gauge (mounted on compression tee).
   - 6 m head circulating pump with 22 mm gate valves.
   - 15 mm copper pressure relief valve discharge pipe (in two pieces with push-fit connector).
   - Pump support bracket (with fixing screws).
11. Fit the pump/pump valve assembly to the end of the pressure relief valve/auto air vent manifold pipe. Ensure that the pump shaft is horizontal and the pump motor is facing towards the right side of the boiler (viewed from the rear as shown in Figure 7-4). The flow arrow on the body of the pump must face in the required direction of flow – away from the boiler flow connection – downwards in this case.

12. Ensure that the pump/valve assembly is supported by the bracket. The upper part of the lower valve should rest on the support bracket, with the body of the valve passing through the cut-out. Connect the flow pipework to the lower pump valve.

13. Assemble the two sections of the pressure relief valve discharge pipe using the 15 mm straight push-fit connector provided. Adjust the pressure relief valve so that the outlet points to the rear left corner of the boiler (viewed from the rear of the boiler).

14. Fit the pressure relief valve discharge pipe to the pressure relief valve outlet using the nut and olive provided. Route the pipe down the left hand rear side of the boiler and locate the lower end through the slot in the bottom flange of the left hand side panel.

15. The circulating pump may be wired into the boiler control panel if required. Refer to Section 8.

16. The pressure gauge and filling loop should be installed in a convenient position inside the building.

1. The kit includes the following items:
   - Pressure relief valve and automatic air vent.
   - 22 mm manifold pipe.
   - 12 litre expansion vessel with flexible hose and sealing washer.
   - Filling loop kit.
   - Pressure gauge.
   - 6 m head circulating pump with 22 mm gate valves.
   - 15 mm copper pressure relief valve discharge pipe (in two pieces with push-fit connector).

2. Remove the ½” BSP black iron plug from the front of the boiler waterway, using a 3/8" drive socket wrench.

---

2. Unscrew and remove the two nuts and washers from the two cleaning door studs. Remove cleaning door from boiler.
3. Remove the ½” BSP black iron plug from the front of the boiler waterway, using a 3/8" drive socket wrench.
4. Fit the ½” BSP straight connector end of the flexible expansion vessel hose into the tapping on the front of the waterway using a suitable thread sealant.
5. Fit the ¼” BSP connection on the flexible expansion vessel hose to the vessel using the black rubber sealing washer supplied and tighten the union nut.
6. Replace the cleaning door on the two door studs. Fit the expansion vessel mounting bracket onto the studs. Replace the nuts and washers and re-tighten to secure door and bracket.
7. Push the 22 mm push-fit connector (supplied with the boiler) onto the end of the boiler flow pipe.
8. Fit the pressure relief valve and automatic air vent onto the manifold pipe. Then push fit the manifold pipe end into the 22 mm push-fit connector on the boiler flow pipe. Refer to Figure 7-3.
9. Fit both 22 mm pump valves to the circulating pump using the sealing washers provided.
10. Fit the pump support bracket, with the screws provided, using the two holes in the left hand side panel flange (viewed from rear of boiler as shown in Figure 7-4).
3. Fit the ½” BSP straight end of the flexible expansion vessel hose to the tapping on the front of the waterway using a suitable thread sealant.

4. Position the 12 litre expansion vessel on the front of the boiler combustion door locating the hook (on the back of the vessel) onto the uppermost handle of the combustion door.

5. Fit the ¾” BSP connection of the flexible expansion vessel hose to the vessel using the black rubber washer supplied and tighten the nut.

6. Push the 22 mm push-fit elbow (supplied with the boiler) onto the boiler flow pipe.

7. Fit the pressure relief valve and automatic air vent onto the manifold pipe, then push the manifold pipe end into the 22 mm push-fit elbow on the flow pipe. Refer to Figure 7-5.

8. Fit both 22 mm pump valves to the circulating pump using the sealing washers supplied.

9. Fit the pump assembly to the automatic air vent/pressure relief valve assembly ensuring that the pump shaft is horizontal and the pump motor is facing towards the front of the boiler. The flow arrow on the body of the pump must face in the direction of flow away from the boiler connection.

10. Fit the pressure relief valve discharge pipe to the pressure relief valve using the nut and olive supplied. Route the discharge pipe through the slot in the base of the right hand side panel. Push the panel insulation back to expose the slot.

11. The circulating pump may be wired into the boiler control panel if required. Refer to Section 8.

12. The pressure gauge and filling loop should be installed in a convenient position inside the building.

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**7.4 26/36, 36/46 Sealed System Kit**

See Figure 7-6

![Figure 7-6: 26/36, 36/46 pump assembly](image)

**1.** The kit includes the following items:
- Pressure relief valve and automatic air vent.
- 28 mm manifold pipe.
- 16 litre expansion vessel with flexible hose and sealing washer.
- Expansion vessel mounting bracket with vessel locking screw.
- Filling loop kit.
- Pressure gauge.
- 7 m head circulating pump with 28 mm gate valves.
- 15 mm copper pressure relief valve discharge pipe (in two pieces with push-fit conn.

**2.** Remove the ½” BSP black iron plug from the front of the boiler waterway, using a 3/8" drive socket wrench.

**3.** Fit the ½” BSP straight end of the flexible expansion vessel hose to the tapping on the front of the waterway using a suitable thread sealant.

**4.** Remove the nuts and washers from the boiler combustion door.

**5.** Fit the vessel support bracket to the studs of the combustion door and refit the nuts and washers. Tighten to ensure an adequate seal is made.

**6.** Position the 16 litre expansion vessel onto the support bracket in front of the boiler combustion door locating the top of the vessel behind the control panel first.

**7.** Screw in the locking screw on the base of the bracket to secure the vessel in place.

**8.** Fit the ¾” BSP connection of the flexible expansion vessel hose to the vessel using the black rubber washer supplied and tighten the nut.

**9.** Remove the right hand boiler casing panel (viewed from the burner end). This panel is fixed in place by:
- Two screws in the right end of the upper rear panel.
- Four screws along the lower outer edge of the side panel.
- Two screws at the right end of the control panel.

**Note:** It will be necessary to support the control panel when the side panel is removed.

**10.** Slacken the compression nut at the base of the flow connection pipe (on the right hand side of the boiler). Carefully rotate the flow pipe through 180° until it faces to the front of the boiler, then re-tighten the compression nut.

**11.** Push the 28 mm push-fit connector (supplied with the boiler) onto the end of the boiler flow pipe.

**12.** Fit the pressure relief valve and automatic air vent onto the manifold pipe, then push the manifold pipe end into the 28 mm push-fit elbow on the flow pipe. Refer to Figure 7-6.

**13.** Remove the two screws securing the motor to the pump body. Rotate the motor through 180°, then replace and secure with the two screws. Fit both 28 mm pump valves to the pump using the sealing washers supplied.

**14.** Fit the pump assembly to the automatic air vent/pressure relief valve assembly ensuring that the pump shaft is horizontal and the pump motor is facing towards the rear of the boiler. The flow arrow on the body of the pump must face in the direction of flow away from the boiler connection.

**15.** Fit the pressure relief valve discharge pipe to the pressure relief valve using the nut and olive supplied. Route the discharge pipe through the slot in the base of the right hand side panel. Push the panel insulation back to expose the slot.
The air charge pressure may be checked using a tyre pressure gauge on the expansion vessel Schraeder valve. The vessel may be re-pressurised using a suitable pump. When checking the air pressure the water in the heating system must be cold and the system pressure reduced to zero.

**7.6 Fill the Sealed System**

Automatic air vent(s) are fitted to the top of the boiler (see Figures 7-3, 7-5 and 7-6). Check that the small cap on the top of each air vent is screwed on fully, then unscrew it one complete turn - the cap remains in this position from now on.

The procedure for filling the sealed system is as follows:

1. Only ever fill or add water to the system when it is cold and the boiler is off. Do not overfill.
2. Ensure that the flexible filling loop supplied is connected and that the double check shut off valve connecting it to the water supply is closed. A valve is open when the operating lever is in line with the valve, and closed when it is at right angles to it.
3. Open the fill point valve.
4. Gradually open the double check valve from the water supply until water is heard to flow.
5. When the white needle of the pressure gauge is between 0.5 and 1.0 bar, close the valve.
6. Vent each radiator in turn, starting with the lowest one in the system, to remove air.
7. Continue to fill the system until the pressure gauge indicates between 0.5 and 1.0 bar. Close the fill point valve.
8. Repeat steps 4 and 5 as required.
9. Close the fill point and double check valves either side of the filling loop and disconnect the loop.

**7.7 Vent the Pump**

It is important that the pump is properly vented to avoid it running dry and damaging its bearings. The procedure is as follows:

1. Remove the cap, then unscrew and remove the plug from the centre of the pump.
2. Using a suitable screwdriver rotate the exposed spindle about one turn.
3. Replace the plug and cap.

**7.8 Pressure Relief Safety Valve**

Now the pressure relief safety valve operation must be checked and set. The procedure is as follows:

1. Check the operation of the safety valve (see Figure 7-2) by turning the head anticlockwise until it clicks. The click is the safety valve head lifting off its seat allowing water to escape from the system.
2. Check that the water is escaping from the system.
3. Continue to fill the system until the pressure gauge indicates between 0.5 and 1.0 bar.
4. Close the fill point valve and check the system for water soundness, rectifying where necessary.
5. Water may be released from the system by manually operating the safety valve until the system design pressure is obtained. The system design pressure (cold) should be between 0.5 bar and 1.0 bar. The pressure is equivalent to the maximum static head in bar + 0.3 (1 bar = 10.2 metres of water), where the static head is the vertical height from the centre of the expansion vessel to the highest point of the system.

Now close the valves either side of the filling loop and disconnect the loop.

---

**NOTE**

The air pressure in the vessel must be checked annually.

The central heating system volume, using the expansion vessel as supplied, must not exceed the recommended volumes. If the system volume is greater, an extra expansion vessel (complying with BS 4841) must be fitted as close as possible to the central heating return connection on the boiler. The charge pressure of the extra vessel must be the same as the vessel fitted in the boiler.

Refer to either BS 7074:1:1989 or The Domestic Heating Design Guide for the required total expansion vessel volume for the system concerned.
The VORTEX Pro External module requires a 230/240 V – 50 Hz supply. It must be protected by a 5 Amp fuse. Refer to Figures 8-1 to 8-4 for typical control system wiring diagrams. Refer to Figure 8-5 for boiler internal wiring diagram.

![WARNING]

The VORTEX Pro External module contains electrical switching equipment and must be earthed.

The supply must be fused at 5 Amp and there must only be one common isolator for the boiler and control system, providing complete electrical isolation.

A fused double pole switch or a fused three pin plug and shuttered outlet socket should be used for the connection.

The power supply cable should be at least 0.75 mm² PVC as specified in BS 6500, Table 16.

All the wiring and supplementary earth bonding external to the boiler must be in accordance with the current I.E.E. Wiring Regulations.

Any room thermostat or frost thermostat used must be suitable for use on mains voltage.

The boiler requires a permanent mains supply, do not interrupt it with any external time control.

In the event of an electrical fault after installation of the boiler, the following electrical system checks must be carried out:

- Short circuit
- Polarity
- Earth continuity
- Resistance to earth.

**8 Electrical**

### 8.1 Connecting the Power Supply

#### NOTE

A Test switch is fitted to the control panel (see Figure 1-1) to allow the boiler to be test-fired. When On, the switch by-passes the external control system.

It is recommend that the boiler should be connected to a switched mains power supply from a programmer or control system. If a Grant remote programmer is used, a permanent 240 V mains supply (fused at 5 Amp) must be taken to the boiler. A three core cable is required to connect the boiler terminal block to the live supply. Refer to Figures 8-1 to 8-4 for typical control system wiring diagrams.

The procedure is:

1. Undo the three screws and remove the left hand cover from the control panel to gain access to the boiler terminal block.
2. Pass the mains power supply cable through the cable grommet in the control panel, through the cable clamp and connect to the terminal block as follows:
   - Brown to live (terminal 2)
   - Blue to mains neutral (terminal 3)
   - Green/Yellow to mains earth (terminal 4)
3. Refer to Figures 8-1 to 8-4 for a typical control system wiring diagrams.
4. If the circulating pump is to be fitted within the boiler enclosure, the pump live must be connected to terminal 7 of the boiler terminal block.

Pass the pump power supply cable through the cable grommet in the control panel, through the cable clamp and connect to the terminal block as follows:
- Brown to live (terminal 7)
- Blue to mains neutral (terminal 9)
- Green/Yellow to earth (terminal

Connecting the pump in this way allows it to be isolated using the isolating switch fitted in the boiler control panel, for servicing or maintenance work.

5. Ensure that the cable clamp is tightened and that all cables are secure and all external wiring is adequately supported.

6. Replace the cover on the control panel, with the yellow warning label facing outwards and secure with the three screws.

**Do not switch on the electricity supply to the External module at this stage.**

### 8.2 Frost Protection

External Modules are supplied with a factory fitted frost protection thermostat, located inside the boiler control panel. This is pre-wired to the boiler electrical system and factory set to 2°C.

For total system protection against freezing, particularly during extended periods without electrical power, Grant recommend the use of a combined heating system antifreeze and corrosion inhibitor, used in accordance with the manufacturer’s instructions.
8.3 Control System Wiring Diagrams

Figure 8-1: Grant 2 channel wall mounted programmer (Ref. ESKIT) - CH and HW controlled by two 2-port zone valves

Figure 8-2: Grant 2 channel wall mounted programmer (Ref. ESKIT) - CH and HW controlled by 3-port mid position valve
Figure 8-3: Grant wireless twin channel control (RFKIT) - CH and HW controlled by two 2-port zone valves

Figure 8-4: Grant wireless twin channel control (RFKIT) - CH and HW controlled by 3-port mid position valve
8.4 Boiler Control Panel Wiring

Wireless receiver unit to be installed indoors (refer to RFTKIT instructions)

Switched live
Permanent live
Mains neutral
Mains earth

Supply to CH valve
If used, remove link between 6 & 7

Switched supply to DHW valve OFF
Switched supply to DHW valve ON

Boiler Terminal Block

Test Switch
Frost Thermostat
Mains On/Off Switch c/w Neon

Limit Thermostat
Control Thermostat
Control Box Chassis Earth

Boiler Terminal Block

Colour code: R - Red, Bl - Blue, Y - Yellow, G/Y - Green/Yellow

Figure 8-5: Receiver for optional Grant wireless twin channel control (RFKIT) shown

A programmable room thermostat - Part No. RSKIT is available from Grant UK. The thermostat has a 5/2 day operation and enables six time and temperature changes each day. The thermostat incorporates frost protection and an On/Off facility.

Figure 8-6: Grant programmable room thermostat
9 Flue System and Air Supply

9.1 Low Level Discharge Flue

The Grant VORTEx Pro External module is supplied with a low level discharge flue (see Section 4).

The minimum dimensions for locating the standard terminal from building features (windows, doors, etc.) are shown in Figure 9-1.

The terminal must be positioned so as to avoid products of combustion accumulating in stagnant pockets around the buildings or entering into buildings. Care should be taken that the plume from the condensed flue gases does not cause a nuisance.

Where it is not practical to use this flue, the External module may be fitted with an alternative flue system available from Grant UK.

NOTE

Under no circumstances can the External module be installed with an existing flue system. Only Grant flue systems and components suitable for wet flues should be used. Failure to install the correct type of flue system will invalidate the warranty.

9.2 Grant Green System

This vertical twin wall stainless steel insulated flue system - constructed using components from the Grant Green system - connects to a Grant Starter elbow and may terminate at high level or vertically as required. See Figure 9-2.

The insulated Starter elbow includes the boiler connector, complete with test point, replacing the low level terminal and flue guard supplied with the boiler.

Figure 9-1: Clearances for flue terminals

<table>
<thead>
<tr>
<th>Terminal position</th>
<th>Min. distance (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Below a gutter or sanitary pipework</td>
</tr>
<tr>
<td>B</td>
<td>Horizontal from an opening, air brick or window</td>
</tr>
<tr>
<td>C</td>
<td>Above ground or balcony level</td>
</tr>
<tr>
<td>D</td>
<td>Below eaves or balcony</td>
</tr>
<tr>
<td>E</td>
<td>From an internal or external corner</td>
</tr>
<tr>
<td>F</td>
<td>From a terminal facing the terminal</td>
</tr>
<tr>
<td>G</td>
<td>From a surface facing the terminal</td>
</tr>
<tr>
<td>H</td>
<td>Vertical from terminals on the same wall</td>
</tr>
<tr>
<td>I</td>
<td>Horizontal from terminals on the same wall</td>
</tr>
<tr>
<td>J</td>
<td>Below an opening, air brick, window etc.</td>
</tr>
<tr>
<td>K</td>
<td>From vertical sanitary pipework</td>
</tr>
<tr>
<td></td>
<td>From an oil storage tank</td>
</tr>
</tbody>
</table>

Notes:
* 75 mm with protection.
** Only applies if one or both terminals are balanced flues.

The terminal should be positioned so as to avoid products of combustion accumulating in stagnant pockets around the building or entering into buildings. Care should also be taken that the plume from the condensed flue gases does not cause a nuisance.

Distances measured to rim of terminal.
Clearances recommended by Grant UK in accordance with British Standards and Building Regulations.

NOTE

1. An opening means an openable element, such as an openable window, or a permanent opening such as a permanently open air vent.
2. Notwithstanding the dimensions given, a terminal should be at least 300 mm from combustible material, e.g. a window frame.
3. A way of providing protection of combustible material would be to fit a heat shield at least 750 mm wide.
### Green System Components

<table>
<thead>
<tr>
<th>Item - for models up to 26 kW output</th>
<th>Part No.</th>
<th>Item - for models 26 to 70 kW output</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
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<td>GKM90</td>
<td>External starter elbow</td>
<td>GKM200</td>
</tr>
<tr>
<td>External starter - straight</td>
<td>GKM90C</td>
<td>External starter - straight</td>
<td>GKM200C</td>
</tr>
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<td>GEB200</td>
</tr>
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<td>GFCON80</td>
<td>Twin wall to single wall adaptor</td>
<td>GFCON100</td>
</tr>
<tr>
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<td>GTL90</td>
<td>Straight terminal - Horizontal flue</td>
<td>GTL200</td>
</tr>
</tbody>
</table>

**Figure 9-2:** Vertical external conventional flue (Green system)
9.3 Grant Hybrid System

This vertical option allows the use of an existing chimney using part of the ‘Green’ system and the flexible liner and terminal of the Grant ‘Orange’ system. See Figure 9-3. This is only available for boilers up to 46 kW.

If an existing chimney is to be used, it must be lined with a smooth bore stainless steel liner suitable for use with oil fired condensing boilers. The top and bottom of the annular space must be sealed.

Grant recommends the use of the Grant ‘Orange’ flue system, specifically designed for the VORTEX range of condensing boilers.

The internal flue and liner diameter for all models up to 46 kW output must be 100 mm (4 in).

The maximum vertical height (from the top of the boiler to the terminal) for the ‘Orange’ system is 19 metres.

In order to correctly connect the Grant hybrid system, it will be necessary to purchase the Grant Starter Elbow.

This insulated Starter elbow includes the boiler connector, complete with test point, replacing the low level terminal and flue guard supplied with the boiler.

![NOTE]

The Grant Orange system flexible stainless steel liner is directional. The arrows marked on the liner MUST be pointing vertically upwards, following the direction of the flue gases. Failure to comply with this instruction could lead to a leakage of condensate from the flue liner.

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![Figure 9-3: Vertical hybrid flue (Green to Orange system)](image-url)

---

**NOTE**

The Grant Orange system flexible stainless steel liner is directional. The arrows marked on the liner MUST be pointing vertically upwards, following the direction of the flue gases. Failure to comply with this instruction could lead to a leakage of condensate from the flue liner.
9.4 Grant Horizontal System

This option uses the Grant Straight Starter boiler connector, replacing the low level terminal and flue guard supplied with the boiler, along with components from the Grant Green system. See Figure 9-4.

A complete list of Grant Green system flue components are given on page 28.

9.5 Conventional Flue Systems

All flue components are stainless steel and fully insulated with ‘O’ ring seals and locking bands.

The flue must terminate in a down draught free area, i.e. at least 600 mm above the eves or point of exit through the roof, or preferably above the ridge level.

The condensate may be allowed to run back into the boiler. A condensate drain at the base of the flue system is not required.

The flue terminal must be at least 600 mm from any opening into the building, and 600 mm above any vertical structure or wall less than a horizontal distance of 750 mm from the terminal.

No part of any flue system should be made of an asbestos material; aluminium must not be used in any part of the flue. Only stainless steel flue components should be used.

If the draught conditions are satisfactory, the flue should terminate with a standard cowl.

Refer to the locally applicable Building Regulations, BS 5410:1 and OFTEC Installation Requirements (OFTEC Technical Books 2 and 4) for further guidance on conventional flue systems.

9.6 Air Supply

A permanent air supply must be provided to the burner, sufficient to ensure proper combustion of fuel and effective discharge of combustion products to open air.

The ventilation openings provided in the upper part of the front door of the boiler casing must not be obstructed at any time.
10 Commissioning

Figure 10-1: Boiler controls

It is important that the following commissioning procedure is carried out to ensure safe and efficient operation of the boiler.

To access the controls, remove the front panel (turn the handle and withdraw it forwards at the bottom).

The controls are shown in Figure 10-1.

10.1 Before Switching On

1. Ensure the boiler On/Off switch and the test switch are set to OFF.
2. Check that the high limit thermostat and boiler thermostat bulbs are correctly located in their respective pockets. Refer to Figures 5-1, 5-2 or 5-3. Check condition of thermostat capillaries, not damaged, broken or kinked and not crushed.
3. Remove the nuts and washers securing the front cleaning door. Withdraw the door - take care it is HEAVY!
4. Check that the turbulators are in position and that the ends are vertical.
5. Check that the baffles are in position. Refer to Figures 11-1, 11-2, 11-3 or 11-4 as required.
6. Re-fit the cleaning door and check it is fitted correctly and that a good seal is made.
7. Remove and check the burner. Check that the burner head is correct (and set correctly on the 46/58 and 58/70 models). Refer to Section 2.3 and Figure 11-9.
8. Check that the electrodes are set correctly. Refer to Figure 11-6 or 11-8 as required. Check the nozzle is correct for the output rating required. Refer to Section 2.3.
9. Check that the water system has been vented (and pressurised if sealed system) and there are no leaks.
10. Ensure the automatic air vent on the condensing heat exchanger is open.
12. Remove the plastic burner cover if it was not previously removed.
12. Connect a combined vent manifold and pressure gauge to the pressure gauge connection port on the oil pump. See Figure 3-6. Open the vent screw on the vent manifold to vent the supply while the pump is running.
13. Check that all system controls are calling for heat and turn the boiler thermostat to maximum.

10.2 Switching On

1. Switch on the electricity supply.
2. Set the Boiler On/Off switch to ON. A neon in the switch lights when it is in the ON position. The boiler will now light automatically. Note that the neon lights when the boiler is switched on, but does not necessarily indicate the burner is firing.
3. The burner fan should start and the burner should light within about 12 seconds. If the burner does not light and the ‘Lock-out’ reset button lights, wait for about 45 seconds then press the reset button to restart the ignition process. This procedure may have to be repeated several times during first lighting.
4. With the burner alight, check the fuel pressure.
5. Refer to the Technical Information, Section 2.3.
6. Adjust the pressure if necessary - see Figure 3-6.

NOTE

If a 15/21 model is down rated to 15 kW, the burner air adjuster disc must be adjusted to setting B as described in Section 10.6. Refer also to Section 2.3.
If a 15/26 model is down rated to 20 or 15 kW, the burner head must also be changed to a T1 head. See Section 11.4. Refer also to Section 2.3.

It is important that the oil pressure is correctly set.

7. Operate the boiler until it reaches normal operating temperature. Check oil supply/return pipe for leaks, rectifying where necessary.
8. Check the operation of the boiler thermostat. Ensure that by turning it anticlockwise it switches the burner off.

9. With the burner alight, re-check the fuel pressure and re-adjust if necessary. Turn the boiler off, remove the pressure gauge and replace the plug in the pump.

10. Ensure that there are no oil leaks, replace the burner cover.

10.3 Running the Boiler
1. Relight the boiler and allow it to run for at least 20 minutes.
2. Check the smoke number, if satisfactory check the CO₂. Set the CO₂ to the value given in Section 2.3 for the boiler concerned.

Final combustion readings can only be measured outside through the low level flue terminal (or the test point on the conventional flue starter elbow when used) with all the casing panels fitted.

3. Use the hexagonal key supplied to adjust the burner air damper (see Figure 3-6) as required. Turning the screw anti-clockwise closes the damper and increases CO₂ level, turning the screw clockwise opens the damper and reduces CO₂ level.
4. Re-check the smoke number if the damper has been moved. Under no circumstances must the smoke number be above 1.

It is important that the air damper is correctly set.

5. Check the flue gas temperature by placing the combustion analyser in the low level flue terminal (or into the test point on the conventional flue starter elbow if either the Green system or Hybrid system is used).

10.4 Balancing the System
1. When the boiler has been adjusted and is running satisfactorily, balance the central heating system by adjusting the radiator lock shield valves. Start with the radiator nearest the boiler and adjust the valves to achieve the required temperature drop across each radiator. If thermostatic radiator valves have been installed, check the system by-pass.
2. Switch off the boiler.

10.5 Completion
1. With the system hot, check again for leaks, rectifying where necessary. Drain the system while it is hot to complete the flushing process. Refill and vent (and pressurise if a sealed system) the system.
2. A suitable central heating system inhibitor must be added to protect the system against the effect of corrosion.
3. A suitable antifreeze should be used to prevent damage to the boiler in areas where electrical power failure can occur in winter months.
4. Replace the top, front and rear panels as necessary.

After commissioning the boiler complete the Commissioning Report in the front of this manual and the OFTEC CD/11 commissioning report. Leave the top copy with the User and retain the carbon copy.

If the boiler is to be left in service with the User, set the controls and room thermostat (if fitted) to the User’s requirements.

If the boiler is not to be handed over immediately, close the boiler fuel supply valve and switch off the electricity supply.

If there is any possibility of the boiler being left during frost conditions, then the boiler and system should be drained. Alternatively, a suitable antifreeze should be used.

To allow the boiler to be commissioned and serviced correctly a combustion test point is provided on the front cleaning door. The CO₂ and smoke test may all be carried out using this test point.

The test point is not suitable for measuring boiler efficiency or conventional flue draught. When using the test point on the cleaning cover note that the flue gas temperature reading will be higher than that measured in the flue thus resulting in an inaccurate efficiency reading. To obtain an accurate flue gas temperature and efficiency, the reading can only be measured outside through the low level flue terminal or the test point on the conventional flue starter elbow when fitted - with all the casing panels fitted.

10.6 Air Adjuster Disc - 15/21 only
To adjust the 15/21 air adjuster disc when downrating - See Figure 10-2
1. Ensure the boiler is isolated from the electrical supply.
2. Remove the burner from the boiler.
3. Undo the two screws and remove the air inlet cover from the side of the burner.
4. The secondary air shutter disc is factory set in position ‘C’ – i.e. with the cut-out marked C located against the die-cast boss on the fan housing - suitable for outputs of 18.3 and 21 kW only. See Figure 10-2.
5. Remove the screw from the centre of the air shutter disc, and re-position the disc such that the cut-out ‘B’ (corresponding to 15 kW output setting – See Section 2.3) is located against the cast boss on the fan housing. Replace the screw in the centre of the air shutter disc and tighten.
6. Re-fit the air inlet cover to the side of the burner and reassemble in reverse order.

Figure 10-2: 15/21 air adjuster disc at position ‘C’
To ensure efficient operation of the boiler it is recommended that it is checked and serviced as necessary at regular intervals. The frequency of servicing will depend upon the particular installation conditions and usage, but in general once per year should be adequate.

Servicing and replacement of parts must only be carried out by a suitably qualified engineer.

Details of every service should be entered in the Service Log, in the Boiler Handbook. This information may be required to validate the Grant extended warranty.

Before starting any work on the boiler, or fuel supply please read the health and safety information given in Section 14. External equipment operated at 230 volts should not be serviced or repaired under adverse weather conditions.

A test switch is fitted to the control panel to allow the boiler to be test-fired. When On, the switch by-passes the external control system.

11.1 Checking Before Servicing

The following sequential checks should be made before any servicing:

1. Check the flue terminal and ensure it is not blocked or damaged.
2. Run the boiler and check the operation of its controls.
3. Ensure that all water/fuel system connections and fittings are sound. Remake any joints and check the tightness of any fittings that may be leaking. 
4. If the boiler is used on a sealed central heating system, check the system pressure, check the operation of the pressure relief valve and check the expansion vessel air charge. See Section 7.2.
5. Refill, vent and re-pressurise the system as necessary. See Section 7.3.
6. Check that the louvres in the front panel are clear.
7. Remove any sludge/water from the fuel tank by opening the sludge valve at the lower end of the tank.
8. With the fuel supply valve closed, clean/replacement the filter element and clean the filter bowl.
9. Braided flexible fuel supply hoses (as supplied with the boiler) should be replaced annually. If long-life hoses have been installed, these should be inspected annually. If in doubt replace the hoses. In any event, these hoses must be replaced every five years.

Before servicing, set the boiler On/Off switch to Off, isolate the electricity supply and close the fuel supply valve. Allow the boiler to cool.

The data label on the inside of the case side panel will indicate the fuel used and the nozzle fitted.

11.2 Dismantling Prior to Servicing

The procedure for dismantling the boiler is as follows:

1. Remove the front panel by turning the handle and withdrawing it forwards at the bottom.
2. Remove the four screws securing the top panel and carefully lift it off, taking care not to damage the insulation.
3. If a sealed system kit is fitted, carefully lift up and remove the expansion vessel from the front of the boiler. Place the vessel on the floor taking care not to strain the flexible hose.

11.3 Cleaning the Boiler

The procedure for cleaning the boiler is as follows:

1. Remove the nuts and washers securing the front cleaning door and withdraw the door. Take care - it is heavy.
2. Remove the baffles as shown in Figures 11-1, 11-2, 11-3 or 11-4.
3. Remove all deposits from the baffle plates and all the boiler internal surfaces using a stiff brush and scraper if necessary.
4. Check the condition of the flue, clean as necessary.
5. Check the condition of the front cleaning door seal, replace if necessary.
6. Replace the baffles, ensuring they are correctly fitted. See Figures 11-1, 11-2, 11-3 or 11-4.
7. Pull out the spiral turbulators from the heat exchanger tubes. See Figure 11-5.
8. Clean the turbulators using a stiff brush
9. Test the heat exchanger condensate drain by pouring water into one of the lower tubes and observe whether the water discharges from the 22 mm condensate outlet. Replace the turbulators.
10. Replace the front cleaning door, ensuring the seal is in good condition and secure it in position with the nuts and washers previously removed. Tighten to form a seal.

If two flexible hoses are connected to the burner, identify (mark if necessary) which is the inlet and return if they are to be disconnected.
11. Remove the condensate trap and check that it is not blocked and is operating correctly, i.e. the float is free to move. Clean the trap and float as required. Refer to Section 6.8.

12. Check that the boiler condensate outlet is unobstructed. Clean if necessary. The condensate trap and condensate outlet must be checked on every service and cleaned as necessary.

**NOTE**

**11.4 Cleaning the Burner**

15/21, 15/26, 26/36, 36/46 models

The procedure is as follows:

1. Combustion head: Loosen the two screws securing the combustion head and withdraw the head.

2. Clean the combustion head.

3. Inspect the ignition electrodes: Loosen the electrode clamp screw and withdraw the electrode assembly. Wipe clean and check for any cracks in the ceramic insulation. Replace if necessary.
4. Nozzle: The nozzle should be replaced on an annual service. Check that the nozzle size and type are correct, refer to table in Section 2.3 and boiler data label.

5. With the combustion head removed, loosen the electrode assembly clamp screw and slide the electrodes away from the nozzle.

6. Do not attempt to clean the nozzle.

7. Remove the nozzle using a good fitting spanner (16 mm).

**CAUTION**

The use of an ill-fitting spanner will damage the nozzle and could lead to an incorrect flame pattern.

8. Always check the electrode settings after replacing the nozzle, see Figure 11-6.

46/58 or 58/70 models

The procedure is as follows:

1. Combustion head: Loosen the two screws securing the combustion head (not the screws in the slotted ring, Figure 11-7) and withdraw the head.

2. Clean and refit the combustion head.

3. Inspect the ignition electrodes: Loosen the electrode clamp screw, disconnect the leads and withdraw the electrode assembly. Wipe clean and check for any cracks in the ceramic insulation. Replace if necessary.

4. Check the electrode and diffuser settings: Figure 11-8.

5. To adjust the diffuser disc: Loosen the diffuser clamp screw and slide the disc along the nozzle holder to achieve the gap ‘A’ in Figure 11-8, tighten the screw.

6. To adjust the electrodes: Loosen the electrode clamp screw and move the electrode unit to achieve the gap ‘B’ in Figure 11-8, tighten the screw.

7. The combustion head position is adjustable on the 46/58 and 58/70 burners. Check that it is fully closed (position 0), or the 4th line if the 58/70 has been set to maximum output (70 kW).

8. To adjust the head setting, refer to Figure 11-9 and proceed as follows: Loosen the two screws in the slotted ring - not the two fixing screws, and turn the blast tube until ‘0’ or the 4th line lines up with the edge of the slotted ring (see paragraph 7 above). Tighten the two screws.
All models

**Photocell** - The photocell is a push-fit in the burner body. Carefully pull it out to clean.

**Burner fan** - With the air intake grille or spigot removed, remove the screws securing the fan housing cover (R/H side of burner) and remove the cover. Inspect the fan and housing and clean as necessary. Replace the cover.

**Pump filter** - With the burner cover removed, remove the four screws securing the pump end cover. Remove the filter and wash in kerosene. Replace the filter and end cover, ensure the ‘O’ ring is in position. Re-assemble in reverse order.

**WARNING**

To ensure safe and efficient operation of the boiler it is important that re-commissioning is carried out, especially combustion checks (CO₂ level, flue gas temperature and smoke number) after the boiler has been serviced.

Refer to the Commissioning instructions in Section 10.
## Fault Finding

### 12.1 Boiler Fault Finding

Always isolate the electricity supply to the boiler before working on the boiler.

<table>
<thead>
<tr>
<th>Fault</th>
<th>Remedies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Boiler will not start:</strong></td>
<td></td>
</tr>
<tr>
<td>1 No fuel supply.</td>
<td>Ensure that an adequate supply of fuel is available and that the fuel supply valve is open.</td>
</tr>
<tr>
<td></td>
<td>Check the condition of the fuel filter, clean if necessary.</td>
</tr>
<tr>
<td></td>
<td>Ensure fuel supply is reaching burner and vent pump.</td>
</tr>
<tr>
<td>2 No electricity supply.</td>
<td>Ensure electricity supply to the boiler is switched on and that all controls are calling for heat.</td>
</tr>
<tr>
<td></td>
<td>Ensure that the overheat thermostat has not tripped, reset if necessary.</td>
</tr>
<tr>
<td></td>
<td>Check that a mains supply is present at the burner terminal block.</td>
</tr>
<tr>
<td></td>
<td>If not, check the boiler and overheat thermostat.</td>
</tr>
<tr>
<td>3 Burner not starting - fuel and electricity supplies present.</td>
<td>Press the reset button on the burner control box if it is lit.</td>
</tr>
<tr>
<td></td>
<td>Refer to burner fault finding charts.</td>
</tr>
<tr>
<td>4 Burner lights but goes to lock-out.</td>
<td>If the flame is unstable, check the combustion settings.</td>
</tr>
<tr>
<td></td>
<td>Refer to burner fault finding charts.</td>
</tr>
<tr>
<td><strong>Boiler works but:</strong></td>
<td></td>
</tr>
<tr>
<td>5 Visible smoke from flue or high smoke number.</td>
<td>Insufficient air supply - check the air damper setting and the condition of the fan.</td>
</tr>
<tr>
<td></td>
<td>Check ventilation openings in door are clear, see Section 9.6.</td>
</tr>
<tr>
<td></td>
<td>Check the nozzle size and type.</td>
</tr>
<tr>
<td></td>
<td>Fuel pressure may be too high - check and adjust.</td>
</tr>
<tr>
<td>6 Burner pulses.</td>
<td>Insufficient air supply - check the air damper setting and the condition of the fan.</td>
</tr>
<tr>
<td></td>
<td>Check ventilation openings in door are clear, see Section 9.6.</td>
</tr>
<tr>
<td></td>
<td>Check the nozzle size and type.</td>
</tr>
<tr>
<td>7 Flame slow to stabilise during start up.</td>
<td>Insufficient air supply - check the air damper setting and the condition of the fan.</td>
</tr>
<tr>
<td></td>
<td>Check ventilation openings in door are clear, see Section 9.6.</td>
</tr>
<tr>
<td></td>
<td>Check the nozzle size and type.</td>
</tr>
<tr>
<td></td>
<td>Fuel pressure may be too low - check and adjust.</td>
</tr>
<tr>
<td></td>
<td>Insufficient draught - clean boiler heat exchanger and check condition of flue.</td>
</tr>
<tr>
<td>8 Water temperature low.</td>
<td>Undersize nozzle and/or low fuel pressure.</td>
</tr>
<tr>
<td></td>
<td>Check condition of boiler heat exchanger and clean if necessary.</td>
</tr>
<tr>
<td></td>
<td>Check the boiler thermostat.</td>
</tr>
<tr>
<td></td>
<td>Check the combustion settings.</td>
</tr>
<tr>
<td></td>
<td>Check the condition of the fuel filter.</td>
</tr>
<tr>
<td>9 Boiler operating on overheat thermostat.</td>
<td>Faulty boiler thermostat. No circulation, check circulating pump. Check for air lock.</td>
</tr>
<tr>
<td>10 Oil odours.</td>
<td>Check all fuel line connections, remake as necessary.</td>
</tr>
<tr>
<td>11 Combustion fumes smell.</td>
<td>Check boiler cleaning cover and seal are correctly fitted.</td>
</tr>
<tr>
<td></td>
<td>Check burner is correctly fitted onto flange.</td>
</tr>
<tr>
<td></td>
<td>Check flue is correctly sealed into flue outlet of boiler.</td>
</tr>
<tr>
<td></td>
<td>Check the condensate pipe and trap are operating correctly.</td>
</tr>
</tbody>
</table>
Fault Finding

12.2 Burner Fault Finding - Riello RdB burners

- Motor/pump seized or tight
  - Replace motor/pump
- Motor gives 50 Volts to white wire
  - Replace burner motor
- Motor/pump seized or light
  - Repair or replace motor/pump
- Lockout after 12 sec purge
  - Replace burnermotor
- Lockout within 1 sec
  - Check boiler controls
- Burner motor runs
  - Check L & N to control box
- Check and set the electrodes
  - Replace the control box
- Wash pressure 1 to 2 bar
  - Drive coupling broken
  - Replace oil pump
- Solenoid valve operating
  - Check oil pressure regulator
  - Replace coil and/or stem valve
- Replace nozzle
- Replace solenoid
  - Replace solenoid coil
- Replace photocell
  - Replace control box
- Combustion air set
  - Combustion head set
- Flame off and relights
  - Boiler or flue blocked
- Yes
  - Combustion head set
- No
  - Combustion head set

Notes:
* Motor white wire returns 50 - 53 V AC to control box.
** Test solenoid coil for continuity or 100 ohms.
*** Test photocell by disconnecting it in control box. If burner fires and then goes to lockout, photocell should be replaced. It is best to replace the photocell if it is suspect.
Burners on balanced flue systems can recirculate flue products causing burner recycling. If this happens, check flue position and sealing.
## 13 Spare Parts

### 13.1 Boiler parts list

<table>
<thead>
<tr>
<th>Description</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning door nut and washer set</td>
<td>EFBS14</td>
</tr>
<tr>
<td>Double pole switch</td>
<td>EFBS19</td>
</tr>
<tr>
<td>Test switch</td>
<td>EFBS21</td>
</tr>
<tr>
<td>Frost thermostat</td>
<td>EFBS23</td>
</tr>
<tr>
<td>Baffle set (complete) - 15/21</td>
<td>VBS93</td>
</tr>
<tr>
<td>Baffle set (complete) - 15/26</td>
<td>VBS01</td>
</tr>
<tr>
<td>Baffle set (complete) - 26/36 and 36/46</td>
<td>VBS36</td>
</tr>
<tr>
<td>Baffle set (complete) - 46/58</td>
<td>VBS76</td>
</tr>
<tr>
<td>Baffle set (complete) - 58/70</td>
<td>VBS77</td>
</tr>
<tr>
<td>Turbulator baffle - single (all models)</td>
<td>VBS05</td>
</tr>
<tr>
<td>Sealed system - Expansion vessel 10 litre - 15/21</td>
<td>MPCBS27</td>
</tr>
<tr>
<td>Sealed system - Expansion vessel 12 litre - 15/26</td>
<td>MPSS01</td>
</tr>
<tr>
<td>Sealed system - Expansion vessel 16 litre - 26/36 and 36/46</td>
<td>MPSS07</td>
</tr>
<tr>
<td>Sealed system - Water pressure gauge</td>
<td>MPSS02</td>
</tr>
<tr>
<td>Sealed system pressure relief valve</td>
<td>MPSS03</td>
</tr>
<tr>
<td>Sealed system - Expansion vessel flexible hose</td>
<td>MPSS04</td>
</tr>
<tr>
<td>Cleaning door rope seal - 15/21 and 15/26</td>
<td>VBS15</td>
</tr>
<tr>
<td>Cleaning door rope seal - 26/36 and 36/46</td>
<td>VBS16</td>
</tr>
<tr>
<td>Cleaning door rope seal - 46/58 and 58/70</td>
<td>VBS111</td>
</tr>
<tr>
<td>Overheat thermostat</td>
<td>TPBS33</td>
</tr>
<tr>
<td>Boiler thermostat</td>
<td>TPBS34</td>
</tr>
<tr>
<td>Circulating pump - 6 m head</td>
<td>MPCBS23</td>
</tr>
<tr>
<td>Circulating pump - 7 m head</td>
<td>VBS04</td>
</tr>
</tbody>
</table>

### 13.2 Burner heads

**Figure 13-1: Burner heads**

- **T1 - 15/21, (15/26 15-20kW)**
  - 15 x 4 dia.
  - 18 dia.
  - 5 x R3

- **T2 - 15/26 (23-26 kW)**
  - 15 x 4.5 dia.
  - 20 dia.
  - 5 x R5

- **T3 - 26/36**
  - 15 x 5.5 dia.
  - 20 dia.
  - 5 x R5

- **T5 - 36/46**
  - 15 x 5.5 dia.
  - 23 dia.
  - 5 x R5

- **GIB - 46/58, 58/70**
This section gives exploded views of the Riello burners in the Grant VORTEX Pro boilers, and parts lists associated with them.

### 13.3 Riello RDB1, RDB2 and RDB2.2 burners

*Figure 13-2: Riello RDB1, RDB2 and RDB2.2 burner components diagram*
### Riello RDB1, RDB2 and RDB2.2 Burner Parts List

<table>
<thead>
<tr>
<th>Key No.</th>
<th>Description</th>
<th>Riello Part No.</th>
<th>Grant Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not applicable</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>Flange</td>
<td>3005786</td>
<td>RBS119</td>
</tr>
<tr>
<td>3</td>
<td>Combustion head T1 - 15/21 kW</td>
<td>3002507</td>
<td>RBS146</td>
</tr>
<tr>
<td>3</td>
<td>Combustion head T2 - 15/26</td>
<td>3002423</td>
<td>RBS147</td>
</tr>
<tr>
<td>3</td>
<td>Combustion head T3 - 26/36</td>
<td>3002447</td>
<td>RBS144</td>
</tr>
<tr>
<td>3</td>
<td>Combustion head T5 - 36/46</td>
<td>3002533</td>
<td>RBS150</td>
</tr>
<tr>
<td>4</td>
<td>Electrode assembly</td>
<td>3007513</td>
<td>RBS108</td>
</tr>
<tr>
<td>5</td>
<td>Electrode bracket</td>
<td>3006552</td>
<td>RBS29</td>
</tr>
<tr>
<td>6</td>
<td>Nozzle holder</td>
<td>3008642</td>
<td>RBS111</td>
</tr>
<tr>
<td>7</td>
<td>Collar</td>
<td>3008643</td>
<td>RBS112</td>
</tr>
<tr>
<td>8</td>
<td>High voltage lead</td>
<td>3008794</td>
<td>RBS129</td>
</tr>
<tr>
<td>9</td>
<td>Air damper assembly</td>
<td>3008647</td>
<td>RBS116</td>
</tr>
<tr>
<td>10</td>
<td>Fan - 15/26</td>
<td>3005708</td>
<td>RBS39</td>
</tr>
<tr>
<td>10</td>
<td>Fan - 26/36</td>
<td>3008645</td>
<td>RBS142</td>
</tr>
<tr>
<td>10</td>
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<td>Pump seal</td>
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<tr>
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<td>'O' ring</td>
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<td>31</td>
<td>Air tube spigot</td>
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</table>
Figure 13-3: Riello RDB3.2 burner components diagram
### Riello RDB3.2 burner parts list

<table>
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<tr>
<th>Key No.</th>
<th>Description</th>
<th>Riello Part No.</th>
<th>Grant Part No.</th>
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<td>Diffuser disc assembly</td>
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<tr>
<td>29</td>
<td>Cover</td>
<td></td>
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</tbody>
</table>
14 Health and Safety Information

Under the Consumer Protection Act 1987 and Section 6 of the Health & Safety at Work Act 1974, we are required to provide information on substances hazardous to health (COSHH Regulations 1988).

Adhesives, sealants and paints used in the manufacture of the product are cured and present no known hazards when used in the manner for which they are intended.

The following other materials are present in the product:

14.1 Insulation Materials

**Material Types:** Ceramic fibre board, mineral wool.

**Description:** Rigid board, slabs, sleeves, gaskets, ropes.

**Known Hazards:** May cause temporary irritation or rash to skin. High dust levels may irritate eyes and upper respiratory system.

**Precautions:** Avoid unnecessary or rough handling, or harsh abrasion of boards. Normal handling and use of material should not produce high dust levels.

Avoid inhalation, and contact with skin and eyes.

After handling always follow normal good hygiene practices.

**Protection:** Use disposable gloves, face mask and eye protection.

**First Aid:** Eyes - If irritation occurs, wash eyes with copious amounts of water. If symptoms persist, seek immediate medical advice.

Skin - If irritation occurs, wash under running water before washing with soap and water.

Inhalation - Remove to fresh air, drink water to clear throat and blow nose to remove dust/fibres.

Ingestion - Drink plenty of water.

14.2 Sealant Materials

**Material Types:** Silicone elastomer.

**Description:** Sealant and adhesive.

**Known Hazards:** Irritation to eyes.

**Precautions:** Avoid inhalation of vapour, contact with eyes and prolonged or repeated contact with skin.

After handling always follow normal good hygiene practices.

**Protection:** Use eye protection. Rubber or plastic gloves should be worn where repeated contact occurs and a face mask worn when working in confined spaces.

**First Aid:** Eyes - Flush eyes with water for 15 minutes. Seek immediate medical attention.

Skin - Wipe off and wash with soap and water.

Inhalation - Remove to fresh air.

14.3 Kerosene and Gas Oil Fuels (mineral oils)

**Known Hazards:** The effect of mineral oils on the skin vary according to the duration of exposure and the type of oil.

The lighter fractions remove the protective grease naturally present on the skin, leaving it dry, liable to crack and more prone to damage by cuts, abrasions and irritant chemicals.

Skin rashes (Oil acne) most often on arms, but also on any part of the body in contact with oil or oily clothing.

Contact with fuel oils can cause dermatitis.

**Precautions:** Avoid as far as possible any skin contact with mineral oil or with clothing contaminated with mineral oil.

The use of a lanolin-based barrier cream is recommended, in conjunction with regular washing with soap and rinsing with water to ensure all oil is removed from the skin.

Take care to prevent clothing, especially underwear, from becoming contaminated with oil.

Do not put oily rags or tools in pockets, especially trouser pockets.

Have first-aid treatment at once for an injury, however slight.

Do not inhale any vapours from mineral oils.
We declare that the Grant VORTEX range of Oil Boilers equipped with Riello RDB burners approved to EN 267: 1999 satisfy the requirements of the following European Directives:-

   Referred to the generic standards EN 55014: 1993, EN 50082: 1: 1992

   Referred to the generic standard NO: 3260: The Electrical Equipment (Safety) Regulations: 1994

   Referred to the generic standard The Boiler (Efficiency) (Amendment) Regulations 1994 (SI 1994/3083)

### In EU Countries
The following information is provided to enable regulatory compliance with the European Union (EU) directives identified and any amendments made to these directives when using electrical or electronic equipment in EU countries.

**Disposal of Electrical and Electronic Equipment**
Do not dispose of electrical or electronic equipment in landfill sites. In the EU, it is the individual recipient’s responsibility to ensure that discarded electrical or electronic materials are collected and recycled according to the requirements of EU environmental law.

**Disposal of Surplus Packaging**
Do not dispose of surplus packaging in landfill sites. In the EU, it is the individual recipient’s responsibility to ensure that packaging materials are collected and recycled according to the requirements of EU environmental law.

### In non-EU Countries
In non-EU countries, dispose of electrical and electronic equipment and all surplus packaging in accordance with national and regional regulations.

Complies with EC Low voltage Electromagnetic compatibility and Boiler efficiency Directives.

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**EC Declaration of Conformity**
16 Warranty

16.1 The Vortex Oil Boiler Warranty

Dear Customer

You are now the proud owner of a Grant Vortex Pro condensing boiler from Grant Engineering (UK) Ltd. that has been designed to give years of reliable, trouble free operation.

Grant Engineering (UK) Ltd. guarantees the manufacture of the boiler including all electrical and mechanical components for a period of twelve months from the date of purchase, provided the boiler is installed in full accordance with the installation instructions provided. This will be extended to a period of two years if the boiler is registered with Grant UK within thirty days of installation and it is serviced at twelve month intervals. See Terms and Conditions below.

Important

Please register your Grant Vortex Pro boiler with Grant UK within thirty days of installation. To do so visit www.grantuk.com and follow the links to 'Householder Zone', where you can register your boiler for a further one year warranty (giving two years from the date of purchase). This does not affect your statutory rights.

Breakdown During the Manufacturer’s Warranty

If your Grant boiler should fail within the first two years, you must contact Grant Engineering (UK) Ltd. who will arrange for the repair under the terms of their Warranty, providing that the boiler has been correctly installed and commissioned, serviced (if older than twelve months) and the fault is not due to tampering, running out of oil, oil contamination, system water contamination, misuse or the failure of any external components not supplied by Grant UK (e.g. fire valve, motorised valve etc.). This extended two year warranty only applies if the boiler is registered with Grant UK within thirty days of installation.

In the First Instance

Contact your installer or commissioning engineer to ensure that the fault does not lie with the system or any other components, or any incorrect setting of the system controls.

If a Fault is Found

Ask your installer to contact Grant Engineering (UK) Ltd. Service Department on 01380 736920 who will arrange for a qualified service engineer to attend to the fault.

Free of Charge Repairs

During the first two years no charge for parts or labour will be made, provided that the boiler has been installed and commissioned correctly in accordance with the manufacturer’s instructions, it was registered with Grant UK within thirty days of installation and, for boilers over twelve months old, details of annual maintenance are available. The following documents must be made available to Grant UK on request:

- Proof of purchase
- CD10 Installation Completion form
- CD11 Commissioning report form
- Service documents (CD11 or equivalent document).

Chargeable Repairs

A charge may be made (if necessary following testing of parts at Grant UK) if the cause of the breakdown is due to any of the following:

- Faults caused by the plumbing or heating system, e.g. contamination of parts due to system contamination, debris or trapped air.
- Faults due to incorrectly sized expansion vessel or incorrect vessel charge pressure.
- Faults caused by external electrics and external components.
- The boiler has not been commissioned, or serviced in accordance with the installation and servicing manual.
- Problems caused by lack of oil or faults with the oil supply system.
- The flue system has been incorrectly fitted or does not meet installation requirements.
- The boiler has been installed for over two years and no extended warranty cover has been taken.

Note: The nozzle supplied with the boiler is only covered for a period up to the time of the first service (twelve months).

Remember - before you contact Grant

Ensure the boiler has been commissioned and serviced in accordance with the installation and servicing manual.

Ensure there is oil supply to the burner.

Ensure the problem is not being caused by the heating system or its controls. Consult the boiler handbook for guidance.

Please note: Do not wait until the fuel supply runs out before you order some more. Sludge in the bottom of the tank may be drawn into the fuel lines. It is recommended that the boiler is switched off when the new supply is delivered and that the fuel is allowed to settle for an hour before restarting the boiler.

Terms of Manufacturer’s Guarantee

1. The Company shall mean Grant Engineering (UK) Limited.

2. The boiler is guaranteed for two years from the date of purchase, providing that after twelve months the annual service has been completed and the boiler registered with the Company within thirty days of the installation date. Any work undertaken must be authorised by the Company and carried out by an approved service agent.

3. The shell (heat exchanger) of the oil boiler supplied by the Company is covered by a five year parts only guarantee from the date of purchase subject to correct operation of the boiler. Proof of annual maintenance must be provided.

4. This guarantee does not cover breakdowns caused by incorrect installation, neglect, misuse, accident or failure to operate the boiler in accordance with the manufacturer’s instructions.

5. The boiler is registered with the Company within thirty days of installation. Failure to do so does not affect your statutory rights.

6. This guarantee is not transferrable unless sanctioned by the Company.
7. The Company will endeavour to provide prompt service in the unlikely event of a problem occurring, but cannot be held responsible for any consequences of delay however caused.

8. This guarantee applies to Grant boilers installed on the UK mainland, Isle of Man and Channel Islands only. Provision of in-warranty cover elsewhere in the UK is subject to agreement with the Company.

9. All claims under this guarantee must be made to the Company prior to any work being undertaken. Invoices for call out/repair work by any third party will not be accepted unless previously authorised by the Company.

10. Proof of purchase and date of installation, commissioning and service documents must be provided on request.

11. If a replacement boiler is supplied under the warranty (due to a manufacturing fault) the product warranty continues from the installation date of the original boiler, and not from the installation date of the replacement.

16.2 Extended Warranty

For further peace of mind Grant Engineering (UK) Ltd. offer the option to insure all the components of your Grant Vortex Pro boiler for a further three years, following on from the two year product warranty period. For a single premium payment (inclusive of Insurance Premium tax) you get five years of protection against breakdown costs. At the end of this period you will have the opportunity to continue this cover on an annual basis.

To access full details and an application form for this extended cover, first visit www.grantuk.com follow the links to the ‘Householder Zone’, register your Grant Vortex Pro boiler for a further one year product warranty (giving two years from the date of purchase), and then download the extended warranty details and application form.

Please note that this special offer is only available if the application form is submitted to Bluefin Insurance Services Ltd. within three months of the installation date.
User Instructions

Frost Protection
Your Installer may have fitted a frost thermostat. If not, and you are likely to be away for a short time, leave the boiler on with the boiler thermostat set at a low setting. For longer periods the boiler and system should be drained. Contact your Service engineer for draining and filling the system.

The control panel of the External module includes a built-in frost thermostat factory set to 2°C.

We recommend that both antifreeze and corrosion inhibitor be used in the primary water system.

Cleaning and Servicing
Lightly wipe over the case with a damp cloth and a little detergent. Do not use abrasive pads or cleaners.

You must have your boiler serviced at least once a year to ensure safe and efficient operation. Contact your Service engineer for further details.

External equipment operated at 230 volts should not be serviced or repaired under adverse weather conditions.

Failure of Electricity Supply
If the electricity supply fails, the boiler will not operate. It should relight automatically when the supply is restored.

Electricity Supply
The boiler requires a 230/240 V ~ 50 Hz supply. It must be protected by a 5 Amp fuse.

The electricity connections to the boiler must be earthed.

Sealed Central Heating System
If your boiler is operating on a sealed heating system, the installer will have pressurised the system and should have told you (or set it on the pressure gauge) the system pressure when cold (this is normally between 0.5 and 1.0 bar, which will increase slightly when hot). If the pressure (when cold) is below the set pressure mentioned above, you can re-pressurise the system. If this is frequently required, ask your Installer or Service engineer to check the heating system for leaks and to check the expansion vessel air charge.

The boiler or system will be fitted with an automatic air vent to remove air from the system. Any air trapped in the radiators should be removed by venting the radiators using the vent screw at the top of each radiator. Only vent a radiator if the top is cool and the bottom is hot. Excessive venting will reduce the system pressure, so only vent when necessary and check the system pressure as mentioned above.

Re-pressurise the system if necessary. The sealed system is fitted with a safety valve to release excess pressure from the system. If water or steam is emitted from the end of the safety valve, switch off the power to the boiler and contact your Installer or Service engineer.

To re-pressurise the system by adding water:

1. Only add water to the system when it is cold and the boiler is off. Do not overfill.
2. Ensure the flexible filling loop (see Figure 3) is connected and that the shut off valve connecting it to the boiler is open and the double check valve is closed. (A valve is open when the operating lever is in line with the valve, and closed when it is at right angles to it).
3. Gradually open the double check valve on the front of the filling loop until water is heard to flow. When the black needle of the pressure gauge is between 0.5 and 1 bar, close the valve.
4. Vent each radiator in turn, starting with the lowest one in the system, to remove air.
5. Continue to fill the system until the pressure gauge indicates between 0.5 and 1.0 bar. Close the fill point valve.
6. Repeat steps 4 and 5 as required.

WARNING!

Figure 3: Sealed system filling loop arrangement

WARNING!

NOTE!
5. Check that the fire valve in the oil supply line has not tripped.
6. Ensure that the electric power supply and gas supply are not isolated.
7. Check that the electric power supply and gas supply are not isolated.

Ventilation

Ensure that the flue terminal is not obstructed or damaged. In severe conditions, check that the boiler has adequate ventilation. Any ventilation openings provided by the installer must not be obstructed. Periodically check that they are clear.

Controls

If the condition continues to repeat, turn the boiler OFF and consult your installer.

About your Fuel

Grant VORTEX Pro External modules only operate on Class C2 Kerosene to BS 2869:1998. You should always quote this type of fuel when ordering from your supplier.

Do not wait until the fuel runs out before you order some more. Sludge in the bottom of the tank may be drawn into the fuel lines. If it is possible, switch off the boiler when the new supply is delivered and leave the fuel to settle for an hour before restarting the boiler.

Spare parts

Spare parts listed on these pages are subject to availability and may be discontinued. The parts list may be altered without notice. Grant reserves the right to alter prices and modifications to any boilers, products or components without prior notice.

General Notes and Care of your System

Boiler thermostat

This control allows the temperature of the water leaving the boiler to heat the radiators and domestic hot water to be adjusted. If you have a cylinder thermostat on your hot water cylinder, this will control the temperature of your domestic hot water. The boiler thermostat setting must be equal to or above the cylinder thermostat setting to enable the cylinder thermostat to control the domestic hot water system.

Burner Lock-out reset button

If there is a burner malfunction, a built-in safety circuit switches the burner off and the ‘Lock-out’ reset button (on the burner) will light. Usually such malfunctions are short lived and pressing the reset button will restore normal operation.

Figure 1 shows the position of the Lock-out reset button on the burner.

Make the following checks:

1. Check that the boiler On/Off switch is ON.
2. Check that the programmer (if fitted) is ON.
3. Check that all thermostats are set to the desired setting and are calling for heat.
4. Check if the burner lock-out reset button is lit. If it is, press it to start the burner. If the burner fails to light and goes to ‘Lock-out’ again, check that you have sufficient fuel in the storage tank and that the fuel supply valve is open.
5. Check that the fire valve in the oil supply line has not tripped.
6. Ensure that the electric power supply and gas supply are not isolated.
7. Check that the electric power supply and gas supply are not isolated.

System

If you have a cylinder thermostat on your hot water cylinder, this will control the temperature of your domestic hot water system.
Introduction

This User Guide is intended to assist the User in the operation of the Grant VORTEX Pro External modules. The engineers manual for the installation and maintenance of this boiler is attached to the reverse of these instructions.

The following special text formats are used in this manual for the purposes listed below.

**Warning** of possible human injury as a consequence of not following the instructions in the warning.

**Note** text. Used for emphasis or information not directly concerned with the surrounding text but of importance to the reader.

About your boiler

The boiler is fully automatic once switched on, providing central heating (and also heating your domestic hot water if you have a hot water cylinder fitted). An illuminated On/Off switch, see Figure 1, is fitted to the External modules which lights when the boiler is switched on, but does not necessarily indicate the burner is firing.

**Boiler Controls**

1. When the following checks are made:
   - If your boiler fails to light
     1. The boiler will now light
     2. The boiler is in the on position.
     3. The power in the switch lights when lit.
     4. The boiler OFF switch is set to ON (the
        power supply to the boiler is off). The
        electric supply in the supply are open.
     5. Check that all thermostats are set to the
        desired setting and are calling for heat.

**Lighting your Boiler**

The lighting procedure is:

1. Ensure that there is sufficient fuel, of the correct type, in the supply tank and all fuel supply valves are open.
2. Ensure that there is an adequate electric supply to the boiler is switched on.
3. Ensure that there is an adequate heat supply to the boiler is switched on.
4. Ensure that all thermostats are set to the required setting.
5. The water supply to the boiler is on. The electricity supply to the boiler is off. The boiler On/Off switch is set to OFF (the neon in the switch is not alight).
6. The room thermostat (if fitted) is at the desired setting.

2. Switch on the electricity supply to the boiler.
3. Set the boiler On/Off switch to ON. The neon in the switch lights when it is in the on position.
4. The boiler OFF switch is set to OFF (the power supply to the boiler is switched off). The electric supply to the boiler is closed. The water supply to the boiler is on. The electricity supply to the boiler is off. The boiler On/Off switch is set to ON (the power supply is switched on). The controller is the correct type in the supply tank. The neon in the switch lights when it is in the on position. The boiler OFF switch is set to OFF (the power supply to the boiler is closed).

**Boiler Controls**

- **Overheat thermostat**
- **Reset button**
- **Test switch**
- **Overheating switch**
- **Control panel**
- **DANGER**
- **THERE IS MORE THAN ONE LIVE SUPPLY TO THIS CONTROL PANEL**
- **BOILER OFF**
- **OVERHEAT**
- **RESET**
- **TEST**
- **SWITCH OFF**
- **HEATING THERMOSTAT**
- **ON**

*NOTE*

Used in this manual for the purposes of emphasizing and contrasting the surrounding text or information.

*WARNING*

The reverse of these instructions, which is intended to assist the user in the operation of the Grant VORTEX Pro External modules, is not intended to assist the reader with the surrounding text or information.
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Flue Terminal

Ventilation

Programmer

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Bumper Lock-out Indicator

Boiler Thermostat

your system

General Notes and Care of your Boiler

Introduction
For use with Kerosene* only.

After installing the boiler leave these instructions with the User.

This appliance is deemed a controlled service and specific statutory requirements may be applicable.

*Operation on Bio-fuel

All Grant Vortex Pro condensing boilers, manufactured since May 2011, are suitable for operation on both standard kerosene (Class C2 to BS2869) and also bio-kerosene (B30K).

All burner settings and nozzle sizes (as detailed in Section 2.3 of this manual) are correct for both standard kerosene and bio-kerosene (B30K).

In order to operate this boiler on bio-kerosene it will be necessary to take the following actions:

a) Use a bio-kerosene (B30K) compatible flexible oil line in place of the oil line supplied with this boiler.

b) Have your oil storage tank and oil supply line (including all pipework, sight gauges, filters, isolating valves, etc.) checked for their compatibility with bio-kerosene (B30K). Where necessary some, or all, of these items may have to be replaced with a bio-kerosene compatible alternative.

c) Check the suitability of the flue system with Grant UK.

d) Use only bio-kerosene (B30K) that conforms to OPS24.

IMPORTANT

Under no circumstances should the boiler be used with bio-kerosene without the above actions being taken first.

It is recommended that the boiler should be regularly serviced, at least once a year, and the details entered in the Boiler Handbook by the service engineer.
User Instructions

External Module Condensing Oil Boiler Range

Grant Vortex Pro