Important Note

Important Note for Installers

After installing the boiler leave these instructions with the Appliance. Leave the user manual with the householder.

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

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This manual is accurate at the date of printing but will be superseded and should be disregarded if specifications and/or appearances are changed in the interests of continued product improvement.

All goods sold are subject to our official Conditions of Sale, a copy of which may be obtained on application.

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1 Introduction

This manual is intended to guide Installers who have completed the Grant Wood Pellet Boiler Installer training course on the installation, commissioning and servicing of the Grant SPIRA Condensing Wood Pellet Boiler.

A separate manual is available to guide users in the operation of the boiler.

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

**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.

Grant SPIRA Condensing Wood Pellet Boiler & Intermediate Hopper

![Diagram of Grant SPIRA Condensing Wood Pellet Boiler & Intermediate Hopper]
1.1 How the Condensing Wood Pellet Boiler Operates

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 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 SPIRA Condensing wood pellet boiler contains an extra (secondary) 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.

The boiler has been independently tested to BS EN303-5 and will achieve the following full load efficiencies when both the boiler and system are correctly set:

To ensure maximum efficiency from the Grant SPIRA boiler, the boiler return temperature should be 55°C or less (but NOT less than 40°C) at maximum operating temperature. This will enable the latent heat to be condensed out of the flue gases.

The boiler is capable of a maximum flow temperature of 75°C.

To achieve the required return temperature (55°C or less), it is recommended that the heating system is designed and balanced to operate with a temperature differential of 20°C between flow and return. The use of modulating circulating pumps (now widely available) and effective control systems should be considered.

Grant SPIRA condensing wood pellet boilers will still operate at extremely high efficiencies even when not in condensing mode and are therefore suitable for fitting to an existing heating system without alteration to the radiator sizes.

1.2 Boiler Description

The Grant SPIRA boiler uses a drop feed type burner with modulated heat output. The burner output is determined by varying the feed and pause time of the pellet feed auger supplying pellets to the burner. See Section 8 for details of burner operation.

The boiler is suitable for use on a sealed or open vented central heating system. When commissioned and set correctly, Grant SPIRA condensing wood pellet boilers will operate automatically, using a typical heating control system.

All models are supplied with the control panel and burner factory fitted. The combined fan box & flue starter, pellet feed auger and hopper are supplied separately and are fitted by the installer. See Section 4 for boiler installation.

![NOTE](image)

The only flue suitable for use with the Grant SPIRA condensing wood pellet boiler is the Grant ‘Black’ twin-wall insulated conventional flue system. This 125mm (5") diameter, black powder coated stainless steel flue system is suitable for both 6-26kW and 9-36kW Spira models.

For the 52kW, 62kW and 72kW double boiler installations each boiler must have a separate flue system. Refer to Section 7.

1.3 Boiler Models

The Grant SPIRA condensing wood pellet boiler is available in eleven different models:

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WPS626RH110</td>
<td>6-26</td>
<td>1 x 6-26kW boiler + 110kg right hand hopper</td>
</tr>
<tr>
<td>WPS626LH110</td>
<td>6-26</td>
<td>1 x 6-26kW boiler + 110kg left hand hopper</td>
</tr>
<tr>
<td>WPS626Rh200</td>
<td>6-26</td>
<td>1 x 6-26kW boiler + 200kg right hand hopper</td>
</tr>
<tr>
<td>WPS626LH200</td>
<td>6-26</td>
<td>1 x 6-26kW boiler + 200kg left hand hopper</td>
</tr>
<tr>
<td>WPS936RH110</td>
<td>9-36</td>
<td>1 x 9-36kW boiler + 110kg right hand hopper</td>
</tr>
<tr>
<td>WPS936LH110</td>
<td>9-36</td>
<td>1 x 9-36kW boiler + 110kg left hand hopper</td>
</tr>
<tr>
<td>WPS936Rh200</td>
<td>9-36</td>
<td>1 x 9-36kW boiler + 200kg right hand hopper</td>
</tr>
<tr>
<td>WPS936LH200</td>
<td>9-36</td>
<td>1 x 9-36kW boiler + 200kg left hand hopper</td>
</tr>
<tr>
<td>WPS1252</td>
<td>12-52</td>
<td>2 x 6-26kW boilers + 140kg double boiler hopper</td>
</tr>
<tr>
<td>WPS1562</td>
<td>15-62</td>
<td>1 x 6-26kW boiler and 1 x 9-36kW boiler + 140kg double boiler hopper</td>
</tr>
<tr>
<td>WPS1872</td>
<td>18-72</td>
<td>2 x 9-36kW boilers + 140kg double boiler hopper</td>
</tr>
</tbody>
</table>
1 Introduction

1.4 Boiler Components

1.4.1 Burner. The burner is supplied factory-fitted to the boiler. All burners are supplied with factory default settings. During commissioning each burner parameter will need to be checked (see Section 8), and adjusted if necessary as the flue length can have a significant effect on the boiler performance. Refer to commissioning in Section 9.

The Burner is equipped with a self cleaning device to prevent a build up of ash and clinker in the burner brazier.

The burner output is determined by the feed / pause times of the pellet feed auger supplying the burner. See Section 8 for full burner operation details.

1.4.2 Boiler. The SPIRA condensing boiler is supplied with a combined primary and secondary heat-exchanger. Both heat exchangers are equipped with a self cleaning system.

1.4.3 Boiler controls. The set-point temperature of the boiler is user adjustable via two push buttons on the burner control panel - see Section 8, 4 for details.

The boiler control panel (See Figure 1.1.) is located at the top of the boiler and is fitted with three controls, as follows:

ON/STAND-BY switch – to switch off the burner when required, by interrupting the switched live supply to the burner. This switch does not isolate the electrical supply to the burner.

OVERHEAT thermostat - this allows the boiler to be used on a sealed central heating system and will automatically switch off the boiler if the pre-set temperature of 110°C is exceeded.

CLEANING switch - when pressed and held in the TEST position, it allows the cleaning system to be manually operated and tested. When released it will automatically return to the default AUTO position to allow the boiler cleaning system to perform automatically. Only operate the cleaning switch when the boiler is in ‘WAIT BOILER THERMOSTAT’.

ALL the Grant pellet hoppers are for indoor use only and must be positioned in a dry environment.

Hopper contents switch
All hoppers are fitted with a contents switch. This detects when the level of pellets in the hopper falls to a pre-set minimum value and triggers the operation of either a bulk store auger, or vacuum system, to delivery pellets from the bulk pellet store.

If no bulk store is used, the contents switch will stop the burner operating when the minimum pellet level is reached.

Topping up the hopper with more pellets will automatically operate the contents switch and the burner will restart (if there is a demand for the boiler to run).

The minimum quantity of pellets required to restart the boiler is 20kg for the single boiler hoppers and 3kg for the double boiler hoppers.

All boiler pellet hoppers are for indoor use only and MUST be positioned in a dry environment free from dampness. They must be located on the same floor level as the boiler, or boilers, they are supplying.

All hoppers are mounted on four castors (with the two front castors lockable) to allow it to be easily moved when required. Allow sufficient area in front of the hopper for it to be moved out and away from the boiler(s) during servicing.

The electrical connections to the boiler(s) are all made to the 4-way electrical plug on one of the three factory-fitted 'flying leads' at the rear of the hopper. Refer to Section 7 for details.
All hoppers are supplied with a rectangular blanking plate fitted on the top rear panel. This can be removed, as required, to allow the fitting of the Grant SPIRA-VAC pellet feed system. Refer to Installation Instructions supplied with the Grant SPIRA-VAC system for further details.

This blanking plate has a single round ‘knock-out’ to provide an entry into the hopper from an auger supplying pellets from a bulk hopper system. This knockout is positioned to ensure the pellets drop into the hopper and operate the hopper contents switch. Only this opening MUST be used as making another opening in the intermediate hopper could affect the operation of the contents switch.

Electrical connection for either a bulk auger or Grant SPIRA-VAC system, if required, is made using the 6-way electrical plug and flying lead supplied factory-fitted at the rear of the hopper. Refer to Section 7 for connection details.

Always ensure that the door and top panel of the boiler hopper are fitted to ensure no foreign debris enters the hopper. If a bulk system with an auger is fitted, ensure that the bulk auger does not impede the opening of the hopper door.

1.4.5 Pellet Feed Auger. All Grant hoppers are supplied with either one or, on double boiler hoppers, two 1.2m pellet feed augers. These are set at a fixed angle of 45° to maintain a consistent feed. If the pellet feed auger angle is altered the input to the boiler will also be altered.

The pellet feed auger is a hollow spiral type. Its function is to deliver the pellets from the hopper to the burner. The output of the boiler is determined by varying the on/off periods of the pellet feed auger motor. Refer to Section 2.2 for pellet feed data.

1.5 Boiler Cleaning and Servicing

Grant SPIRA condensing wood pellet boilers are equipped with an automatic cleaning system for each of the two heat exchangers and also for the burner brazier.

CAUTION

The ash pan (located inside the combustion chamber) will need to be periodically emptied. This simple task must be carried out by the user at MONTHLY intervals for the FIRST THREE MONTHS. Thereafter, the ash pan should be emptied regularly, on at least a monthly basis, or as indicated by the amount of ash found during the first three months. Two carrying handles are supplied with the boiler to allow removal of the ash pan when hot.

WARNING

Care must be taken to avoid contact with hot surfaces.

Always wait for the boiler to cool down before opening the combustion chamber door and removing the ash pan.

The boiler MUST be serviced either ANNUALLY or when a service is indicated on the burner control panel display, whichever comes first.

Servicing should only be carried out by a Grant Approved Installer and details of each service should be recorded in the Service Log in the back of the User Operating Manual.

NOTE

The amount of ash produced varies between the different pellet brands and this will affect the frequency of cleaning and maintenance required.
## Technical Data

### 2.1 Boiler & Hopper Technical Data

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Units</th>
<th>Spira Model</th>
<th>6-26</th>
<th>9-36</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum heat Output</td>
<td>kW</td>
<td></td>
<td>26</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Btu/hr</td>
<td></td>
<td>88,700</td>
<td>122,800</td>
</tr>
<tr>
<td>Flow connection</td>
<td></td>
<td></td>
<td>1&quot; BSP (Female)</td>
<td>1 1/4&quot; BSP (Female)</td>
</tr>
<tr>
<td>Return connection</td>
<td></td>
<td></td>
<td>1&quot; BSP (Female)</td>
<td>1 1/4&quot; BSP (Female)</td>
</tr>
<tr>
<td>Water content</td>
<td>Litres</td>
<td></td>
<td>51.5</td>
<td>60</td>
</tr>
<tr>
<td>Waterside resistance $\Delta T = 10{^\circ}C$</td>
<td>mbar</td>
<td></td>
<td>26.0</td>
<td></td>
</tr>
<tr>
<td>Waterside resistance $\Delta T = 20{^\circ}C$</td>
<td>mbar</td>
<td></td>
<td>9.5</td>
<td></td>
</tr>
<tr>
<td>Mains water (cleaning system)</td>
<td>bar</td>
<td></td>
<td>1 bar operating pressure</td>
<td></td>
</tr>
<tr>
<td>Condensate connection</td>
<td></td>
<td></td>
<td>1 1/4&quot; BSP (Female)</td>
<td></td>
</tr>
<tr>
<td>Conventional flue</td>
<td></td>
<td></td>
<td>125mm (5&quot;) Black system</td>
<td></td>
</tr>
<tr>
<td>Combustion chamber draught requirement</td>
<td>mbar</td>
<td></td>
<td>0.10 to 0.15 (running)</td>
<td></td>
</tr>
<tr>
<td>Maximum static head</td>
<td>m</td>
<td></td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Minimum circulating head</td>
<td>m</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Boiler temperature set point range</td>
<td>°C</td>
<td></td>
<td>55° to 75°C</td>
<td></td>
</tr>
<tr>
<td>Boiler temperature cut out point</td>
<td>°C</td>
<td></td>
<td>65° to 80°C</td>
<td></td>
</tr>
<tr>
<td>Minimum return temperature</td>
<td>°C</td>
<td></td>
<td>40°C</td>
<td></td>
</tr>
<tr>
<td>Water system overheat cut-out temp.</td>
<td>°C</td>
<td></td>
<td>110°C</td>
<td></td>
</tr>
<tr>
<td>Burn-back overheat thermostat cut-out</td>
<td>°C</td>
<td></td>
<td>60°C</td>
<td></td>
</tr>
<tr>
<td>Electricity supply</td>
<td></td>
<td></td>
<td>230V-50Hz</td>
<td></td>
</tr>
<tr>
<td>Max operating pressure - sealed system</td>
<td>bar</td>
<td></td>
<td>2.5 bar</td>
<td></td>
</tr>
<tr>
<td>Max operating pressure - open system</td>
<td>bar</td>
<td></td>
<td>2.5 bar</td>
<td></td>
</tr>
<tr>
<td>Maximum auger length (bulk hopper)</td>
<td>metres</td>
<td></td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>Maximum auger speed (bulk hopper)</td>
<td>rpm</td>
<td></td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Minimum flue length</td>
<td>m</td>
<td></td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Maximum flue length</td>
<td>m</td>
<td></td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td>Heating element rating</td>
<td>Watts</td>
<td></td>
<td>450</td>
<td></td>
</tr>
<tr>
<td>Intermediate auger motor power</td>
<td>Watts</td>
<td></td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Intermediate auger motor starting current</td>
<td>Amps</td>
<td></td>
<td>0.64</td>
<td></td>
</tr>
<tr>
<td>Intermediate auger motor running current</td>
<td>Amps</td>
<td></td>
<td>0.64</td>
<td></td>
</tr>
<tr>
<td>Intermediate auger speed</td>
<td>rpm</td>
<td></td>
<td>8.1</td>
<td></td>
</tr>
<tr>
<td>Flue fan motor power</td>
<td>Watts</td>
<td></td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Flue fan motor starting current</td>
<td>Amps</td>
<td></td>
<td>0.27</td>
<td></td>
</tr>
<tr>
<td>Flue fan motor running current</td>
<td>Amps</td>
<td></td>
<td>0.13</td>
<td></td>
</tr>
<tr>
<td>Cleaning solenoid power</td>
<td>Watts</td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Cleaning solenoid current</td>
<td>Amps</td>
<td></td>
<td>0.087</td>
<td></td>
</tr>
<tr>
<td>Burner fan motor power</td>
<td>Watts</td>
<td></td>
<td>56</td>
<td></td>
</tr>
<tr>
<td>Total burner start current</td>
<td>amp</td>
<td></td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Total burner run current</td>
<td>amp</td>
<td></td>
<td>0.60</td>
<td></td>
</tr>
</tbody>
</table>
2.2 Boiler Input and Output Data

The settings in the table below are based on the boiler using the Grant fixed angle pellet feed auger at 45° with an auger motor fixed speed of 8.1 rpm.

Only ENplus A1 (EN14961-2) pellets MUST be used with the Grant SPIRA boilers. These pellets must be bark and sand free AND approved by Grant UK BEFORE being used in the Spira boilers. Failure to use approved pellets will invalidate the product warranty.

2.2.1 Burner settings

All burner settings must be checked as part of commissioning and servicing. Refer to Section 9.6 for full details of the burner settings and how to access, check and, where necessary, how to adjust them.

2.3 Flue Gas Analysis

As part of both the commissioning and servicing procedures, the CO₂ content of the flue gases must be checked. To enable this to be done, the boiler is supplied with a combustion test point in the top rear cleaning door. Refer to Figure 10-17.

To gain access to this test point, first remove the top casing panel from the boiler. The test point should be at the back left corner of the rear cleaning door. If it is located at the front right corner of the cleaning door, then remove the door and refit it with the test point in the correct position.

---

### Boiler and Hopper Weights

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Spira Model</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight boiler – less burner and fan box (empty)</td>
<td>kg</td>
<td>201</td>
</tr>
<tr>
<td>Weight burner</td>
<td>kg</td>
<td>25.5</td>
</tr>
<tr>
<td>Weight fan box</td>
<td>kg</td>
<td>5</td>
</tr>
<tr>
<td>Total weight of boiler (empty)</td>
<td>kg</td>
<td>231.5</td>
</tr>
<tr>
<td>Total weight of boiler (full)</td>
<td>kg</td>
<td>283</td>
</tr>
<tr>
<td>Weight 110kg pellet hopper (empty) – incl. auger</td>
<td>kg</td>
<td>41.35</td>
</tr>
<tr>
<td>Weight 110kg pellet hopper (full) – incl. auger</td>
<td>kg</td>
<td>151.35</td>
</tr>
<tr>
<td>Weight 200kg pellet hopper (empty) – incl. auger</td>
<td>kg</td>
<td>77</td>
</tr>
<tr>
<td>Weight 200kg pellet hopper (full) – incl. auger</td>
<td>kg</td>
<td>277</td>
</tr>
<tr>
<td>Weight of auger</td>
<td>kg</td>
<td>8.35</td>
</tr>
<tr>
<td>Weight 140kg double pellet hopper (empty) – incl. 2 augers</td>
<td>kg</td>
<td>42</td>
</tr>
<tr>
<td>Weight 140kg double pellet hopper (full) – incl. 2 augers</td>
<td>kg</td>
<td>182</td>
</tr>
<tr>
<td>9-36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight boiler – less burner and fan box (empty)</td>
<td>kg</td>
<td>231</td>
</tr>
<tr>
<td>Weight burner</td>
<td>kg</td>
<td>25.5</td>
</tr>
<tr>
<td>Weight fan box</td>
<td>kg</td>
<td>5</td>
</tr>
<tr>
<td>Total weight of boiler (empty)</td>
<td>kg</td>
<td>261.5</td>
</tr>
<tr>
<td>Total weight of boiler (full)</td>
<td>kg</td>
<td>321.5</td>
</tr>
<tr>
<td>Weight 110kg pellet hopper (empty) – incl. auger</td>
<td>kg</td>
<td>41.35</td>
</tr>
<tr>
<td>Weight 110kg pellet hopper (full) – incl. auger</td>
<td>kg</td>
<td>151.35</td>
</tr>
<tr>
<td>Weight 200kg pellet hopper (empty) – incl. auger</td>
<td>kg</td>
<td>77</td>
</tr>
<tr>
<td>Weight 200kg pellet hopper (full) – incl. auger</td>
<td>kg</td>
<td>277</td>
</tr>
<tr>
<td>Weight of auger</td>
<td>kg</td>
<td>8.35</td>
</tr>
<tr>
<td>Weight 140kg double pellet hopper (empty) – incl. 2 augers</td>
<td>kg</td>
<td>42</td>
</tr>
<tr>
<td>Weight 140kg double pellet hopper (full) – incl. 2 augers</td>
<td>kg</td>
<td>182</td>
</tr>
</tbody>
</table>

---

**NOTE**

Use only a calibrated flue gas analyser with a 'Wood Pellet' fuel setting. Setting the fuel to anything other than wood pellets will give an incorrect reading.

---

**CAUTION**

Do not sample the flue gases through either the draught stabiliser, or from within the flue, as they will have been diluted with air entering through the draught stabiliser.

Only use the combustion test point in the top rear access door to check the CO₂ content of the flue gases. See Fig. 10-17.

---

**CAUTION**

To ensure correct combustion, the burner settings given in the table above must NOT be changed unless instructed to do so by Grant UK.

---

### Technical Data

<table>
<thead>
<tr>
<th>Model</th>
<th>Pellet feed Auger angle</th>
<th>Burner setting</th>
<th>MAX Flame</th>
<th>MIN Flame</th>
<th>CO₂</th>
<th>Burner Setting</th>
<th>Heat Output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>TIME LOAD MAX</td>
<td>TIME PAUSE</td>
<td>kW (Bu/h)</td>
<td>kW (Bu/h)</td>
<td>Full Eff.</td>
<td>Input kg/hr*</td>
</tr>
<tr>
<td>SPIRA 6-26</td>
<td>45°</td>
<td>0.025 (2.5sec)</td>
<td>0.025 (2.5sec)</td>
<td>29.3 (99,276)</td>
<td>27.1 (92,500)</td>
<td>97.4</td>
<td>5.70</td>
</tr>
<tr>
<td>SPIRA 9-36</td>
<td>45°</td>
<td>0.0065 (6.5sec)</td>
<td>0.025 (2.5 sec)</td>
<td>36 (122,832)</td>
<td>38.7 (132,000)</td>
<td>93.1</td>
<td>7.78</td>
</tr>
</tbody>
</table>

1. *Heat input is based on a calorific value of 4.81 kWh/kg.
2. Heat input and output data given above is approximate only.
2 Technical Data

2.4 Boiler and Hopper Dimensions and Clearances

2.4.1 Single Boiler with Left Hand Hopper

Figure 2-1: Boiler and hopper dimensions and clearances – single boiler with left hand hopper
2.4.2 Single Boiler with Right Hand Hopper

Figure 2-2: Boiler and hopper dimensions and clearances – single boiler with right hand hopper

<table>
<thead>
<tr>
<th>Spira Wood Pellet Boiler</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model</strong></td>
<td><strong>A</strong></td>
</tr>
<tr>
<td>6-26 110kg right hand hopper</td>
<td>1056</td>
</tr>
<tr>
<td>6-26 200kg right hand hopper</td>
<td>1256</td>
</tr>
<tr>
<td>9-36 110kg right hand hopper</td>
<td>1056</td>
</tr>
<tr>
<td>9-36 200kg right hand hopper</td>
<td>1256</td>
</tr>
</tbody>
</table>

If the measurement from the flue centre line to the rear wall is increased (shown as 134 in the plan view), then the dimensions D, E & G will have to be increased by the same increment. All units in millimeters.
2 Technical Data

2.4.3 Double Boiler with Central Hopper

<table>
<thead>
<tr>
<th>Spira Wood Pellet Boiler</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>A</td>
</tr>
<tr>
<td>12-52 with double hopper</td>
<td>1792</td>
</tr>
<tr>
<td>15-62 with double hopper</td>
<td>1792</td>
</tr>
<tr>
<td>18-72 with double hopper</td>
<td>1792</td>
</tr>
</tbody>
</table>

*If the measurement from the flue centre line to the rear wall is increased (shown as 134 in the plan view), then the dimensions D, E & G will have to be increased by the same increment. All units in millimeters*

**Figure 2-3:** Boiler and hopper dimensions and clearances – double boiler with central hopper
3.1 Pellet Specification

Grant SPIRA boilers are designed to run on EN Plus A1 wood pellets that comply with EN 14961 and meet the following criteria:

<table>
<thead>
<tr>
<th>Key Parameter</th>
<th>Limits</th>
<th>Category as per EN 14961</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diameter</td>
<td>6mm</td>
<td>D06,</td>
</tr>
<tr>
<td>Average length</td>
<td>L&lt;5 x diameter</td>
<td></td>
</tr>
<tr>
<td>Minimum and maximum length</td>
<td>3.15 to 40mm</td>
<td></td>
</tr>
<tr>
<td>Moisture Content</td>
<td>&lt;10%</td>
<td>S0.05</td>
</tr>
<tr>
<td>Mechanical durability</td>
<td>&gt;97.5%</td>
<td>DU 97.5</td>
</tr>
<tr>
<td>Amount of fines</td>
<td>&lt;1.0%</td>
<td>F1.0</td>
</tr>
<tr>
<td>Additives</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Nitrogen</td>
<td>&lt;0.3%</td>
<td>N0.3</td>
</tr>
<tr>
<td>Nett calorific value</td>
<td>4.8 to 5.2 kWh/kg</td>
<td></td>
</tr>
<tr>
<td>Bulk density</td>
<td>≈650 kg/m³</td>
<td></td>
</tr>
<tr>
<td>Chlorine</td>
<td>&lt;0.03%</td>
<td>CL 0.03</td>
</tr>
</tbody>
</table>

The following terms are commonly used when describing the properties of wood pellets:

- **Additives**: Additives are used to improve the stability of the pellets. If manufactured correctly, and of a sufficiently low moisture content, quality pellets will require no additives.

- **Ash**: Ash represents the non-combustible content of the pellet. Higher ash content reduces the calorific value of the pellet and requires the appliance to be cleaned more frequently.

- **Average Length**: To provide a predictable flow of fuel into the burner, the recommended length of a pellet is deemed greater than 5mm and less than 5 times the diameter.

- **Bulk Density**: Bulk density is the ratio between the weight of the pellet and the amount of space they take up. A good quality pellet will have a density of 650 kg/m³.

- **Chlorine**: High levels of chlorine in the flue gases emissions can give rise to corrosion.

- **Diameter**: The most common diameter is 6mm with some 8mm also available. This boiler is designed for 6mm only.

- **Fines**: Pellets are made from compressed wood. As pellets rub together they can break down slightly, producing dust or fines. Too many fines indicate a poor quality pellet and can impede pellet flow in addition to causing dust problems when delivering and storing the pellets.

- **Mechanical Durability**: This is a measure of how stable the pellet is and how likely it is to produce fines from normal handling. A high durability percentage is an indicator of a good quality pellet.

- **Moisture Content**: Moisture affects the calorific value of the pellet. Low moisture content guarantees constant and predictable combustion efficiency. Higher moisture contents can result in pellet breakdown.

- **Net Calorific Value**: This is the useful energy contained in a kilogram of fuel. This value is affected by the amount of non-combustible materials (ash) and the moisture content of the pellet. Typical values range from 4.8 kWh/kg to 5.2 kWh/kg.

- **Nitrogen**: High levels of nitrogen in the flue gases emissions can give rise to corrosion.

- **Sulphur**: High levels of sulphur in the flue gases emissions can give rise to corrosion.
3 Pellet Specification, Storage & Delivery

3.2 Pellet Storage

3.2.1 Pellet Hoppers & Pellet Feed Auger

All Grant SPIRA boilers are supplied with a pellet hopper. Refer to Section 1.4.4 for further details of the hoppers.

All Grant hoppers are supplied with either one or, on a double boiler hopper, two 1.2 m pellet feed augers, to deliver the pellets from the hopper to the boiler. Refer to Section 1.4.5.

The pellet hopper, along with the boiler (or boilers) it is supplying, MUST be installed in a dry indoor environment free from dampness. The hopper and boiler(s) must be located on the same floor level.

If a bulk hopper is to be used, there are two methods of transferring the pellets from the bulk store to the intermediate hopper:

a) Via a bulk pellet feed auger
b) Via the Grant SPIRA-VAC vacuum pellet feed system

All boiler pellet hoppers are supplied to accept either of these two pellet supply systems, as required. Refer to Section 1.4.4 for further details on the hoppers.

The electrical connections to the boiler(s) are all made to the 4-way electrical plug on one of the three factory-fitted ‘flying leads’ at the rear of the hopper. Refer to Section 7 for details.

Electrical connection for either a bulk auger or Grant SPIRA-VAC system, if required, is made using the 6-way electrical plug and flying lead supplied factory-fitted on the hopper.

3.2.2 Bulk Hopper

It is advisable to fit a bulk pellet store to take advantage of the lower cost of pellets purchased in bulk.

The pellet hopper must still be used, situated between the bulk hopper and the boiler, as the auger fitted to the hopper delivers the precise quantity of pellets required by the burner. The pellet hopper also allows any problems with bulk pellet quality to be isolated and the intermediate hopper can be used temporarily as the source of pellets for the boiler.

It is essential to only use a bulk storage unit that is:

a) Waterproof
b) Specifically designed to store wood pellets
c) Supplied with appropriate connections for pellet delivery, which are within the drivers reach
d) Fitted with a vent connection (for dust extraction) during filling
e) Permanently vented (if located outside) or unvented (if installed indoors)
f) Fitted with a rubber arrester mat (or similar) to limit pellet damage during filling
g) Is electrically earthed

A range of suitable bulk pellet stores are available from Grant UK. These are supplied flat packed for on-site assembly. Refer to assembly instructions supplied with each kit. For details of capacities and dimensions contact Grant UK.

The use of a self constructed wood pellet storage facility should be pre-approved by the fuel supplier before any pellets are delivered and must meet relevant building and fire regulations. The ONORM M7137 standard should be used as a guideline for DIY bulk storage units.

A storage unit should not be positioned where it would result in a fire risk. The store should be located on a suitable base (e.g. concrete) capable of supporting the weight of the store when full of pellets.
To determine the length of auger required the following factors must be determined:

a) Difference in height between the ground/floor level (on which the store will stand) and the floor level (on which the hopper will stand).

b) Horizontal distance between the back of the hopper and the store.

If the store is to be situated outside this will be

a) the distance from the rear of the hopper to the inner face of the wall

b) the thickness of the wall

c) the distance to the store from the outside face of the wall.

Refer to Figure 3-3 for further details.

<table>
<thead>
<tr>
<th>Product Code</th>
<th>Bulk Auger Length m</th>
<th>Auger Weight kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>WPAUG25</td>
<td>2.5m</td>
<td>21.3</td>
</tr>
<tr>
<td>WPAUG30</td>
<td>3.0m</td>
<td>24.1</td>
</tr>
<tr>
<td>WPAUG35</td>
<td>3.5m</td>
<td>26.9</td>
</tr>
<tr>
<td>WPAUG40</td>
<td>4.0m</td>
<td>29.7</td>
</tr>
<tr>
<td>WPAUG45</td>
<td>4.5m</td>
<td>32.5</td>
</tr>
<tr>
<td>WPAUG50</td>
<td>5.0m</td>
<td>35.3</td>
</tr>
<tr>
<td>WPAUG55</td>
<td>5.5m</td>
<td>38.1</td>
</tr>
<tr>
<td>WPAUG60</td>
<td>6.0m</td>
<td>40.9</td>
</tr>
</tbody>
</table>

Grant UK offer a range of eight bulk pellet augers, from 2.5m to 6m in length in 0.5m steps, as given in the table above.

NOTE

Each bulk pellet supplier has clear guidelines on the requirements of a bulk storage hopper used to store their pellets, together with requirements on positioning, access, and minimum deliveries.

ALWAYS check with the pellet supplier you wish to use BEFORE installing a bulk storage system.

3.2.3 Bulk Pellet Feed Auger

When installing a bulk pellet store with a bulk pellet feed auger, consideration must be given to the position of the store in relation to the hopper as this will dictate the length of the auger.

The length of the pellet feed auger, supplying pellets from the bulk store, is limited to a maximum of 6 metres in length, as a longer auger can damage the pellets.
4 Boiler Installation Information

4.1 Introduction
For the 6-26 and 9-36 models, the appliance comes supplied on two pallets:

a) Pallet 1 contains the intermediate hopper and auger
b) Pallet 2 contains the boiler, burner, and combined fan box & flue starter.

For the 12-52, 15-62 and 18-72 models (‘double boiler’ installations), the appliance comes supplied on two pallets:

a) Pallet 1 contains the intermediate hopper and augers
b) Pallet 2 contains both boilers, each with burner and combined fan box & flue starter.

An accessories box is packed with each boiler and this contains the following:

a) fan box (which comes complete with exhaust fan and draught stabiliser),
b) condensate drain trap items
c) wash pipe manifold assembly
d) auger feed tube

Check the packing list (supplied in the accessories carton) to ensure all items have been delivered.

The Grant ‘Black’ flue system comes separately and its configuration will depend on the installation requirements.

4.2 Boiler Location
The boiler must be installed in a damp free environment.

Refer to Section 2.4 for boiler and hopper clearances. These clearances are to allow for access during servicing. Also if fitting a bulk hopper system refer to Section 3.2.2 as the location of the bulk hopper can influence the boiler location.

4.3 Preparation for Installation
With the units on the pallet, remove all outer packaging from the units. Unpack the accessories box supplied with the boiler and check the packing list against all items present.

4.4 Installing the Boiler
The boiler and hopper must be positioned on a level, solid, non-combustible base of at least 125mm thick. This must also extend past the boiler and hopper by 225mm at the front and 150mm on the remaining sides. The boiler position must comply with clearances shown in Section 2.4.

4.5 Regulations
Installation of a Grant SPIRA wood pellet boiler and hopper must be in accordance the following recommendations:

- National Building Regulations and any local Byelaws which you must check with the local authority for the area.
- Model and local Water Undertaking Byelaws.

The installation should also be in accordance with the latest edition of the following standards and codes of Practice:

- BS 715:2005 Metal flue pipes, fittings, terminals and accessories.
- BS 7671:2008 Requirements for electrical installations, IEE wiring regulations.
- ONORM M7137 standard should be used as a guideline for DIY bulk storage units.

4.6 Heating System Design Considerations
To achieve the maximum efficiency possible from the Grant SPIRA wood pellet boiler, the heating system should be designed to the following parameters:

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

Size the radiators using a mean water temperature of 55°C. Design system controls with programmable room thermostats, or use weather compensating controls, to maintain return temperatures below 55°C.

Underfloor Heating
- Flow temperature 50°C
- Return temperature 40°C
- Differential 10°C

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

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

NOTE
Before starting any work on the boiler or fuel supply please read the Health & Safety information given in Section 13.

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

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

Underfloor Heating
- Flow temperature 50°C
- Return temperature 40°C
- Differential 10°C

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

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

On either sealed or open-vented systems; where plastic pipe is used a minimum of ONE metre of copper pipe MUST be connected between both the boiler flow and return connections and the plastic pipe. DO NOT CONNECT PLASTIC PIPE DIRECTLY TO THE BOILER.

Grant UK do not accept any responsibility for any damage, however caused, to plastic piping or fittings.

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-level 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. MPCBS62.

Refer to Figure 8.11 for the electrical connection details on this switch.

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.

4.8 Pipe Connections
Flow and return connections:
The flow and return connection are at the rear of the boiler (see Section 2.4) and the sizes are as follows;

SPIRA 6-26  Flow 1” ¾ BSP Female
Return 1” ¾ BSP Female

Drain Cock:
Fit the ½” drain cock to the bottom rear ½” BSP connection. Fit the air vent assembly into the ½” connection on the rear of the boiler (this is to vent the secondary unit only), the flow pipe from the boiler must be vented.

Condensate Connection:
The 1¼” BSP female condensate outlet connection is located at the rear of the boiler. Refer to Section 5 for details on condensate connection and disposal pipework.

4.9 Wash System Manifold
The boiler is supplied with a cleaning manifold system to wash the condensing unit of any ash build up in the tubes.

A minimum running (dynamic) pressure of 0.8 to 1.0 bar pressure (as shown on the gauge when the system is operating) is required to maintain an adequate supply for cleaning purposes.

The wash system manifold pipe is factory fitted through the right hand side of the boiler. This manifold pipe can be fitted in either one of two different positions, depending on the location of the pellet hopper, as follows:

With hopper located on the left side of the boiler - the wash system manifold pipe and jets.

With hopper located on the right side of the boiler - the wash system manifold pipe and jets.

In all cases, ensure adequate clearance (minimum 400mm) is present for removal of the wash system during servicing. Refer to Section 2.4 for clearance dimensions.

The remainder of the washdown cleaning system consists of the pressure gauge and solenoid valve assembly, flexible hose, isolating valve (with integral check valve).

Fit the gauge/valve assembly to the end of the manifold pipe using the 22mm compression elbow.

Connect the mains water supply to the 15mm compression connection on the isolating/check valve inlet. Fit the flexible hose between the outlet of the isolating/check valve outlet and the inlet to the solenoid valve and leave in place.

NOTE

A minimum running (dynamic) pressure of 0.8 to 1.0 bar pressure (as shown on the gauge when the system is operating) is required to maintain an adequate supply for cleaning purposes.

The wash system manifold pipe is factory fitted through the right hand side of the boiler. This manifold pipe can be fitted in either one of two different positions, depending on the location of the pellet hopper, as follows:

With hopper located on the left side of the boiler - the wash system manifold if fitted from the right-hand side of the boiler, through the holes provided in the right hand side panel of the boiler and both sides of the heat exchanger chamber.

With hopper located on the right side of the boiler - the wash system manifold if fitted from the left-hand side of the boiler. A semi-pierced hole (provided in the left hand side panel of the boiler) must be pushed out to allow the manifold to be fitted from this side.

In hard water areas an anti-scale device should be fitted on the cold water supply to the wash system to prevent scale build-up in the manifold pipe and jets.

4.10 Fan Box and Flue Starter
Fit the fan box to the flanged flue outlet on the back of the boiler so that the flue starter outlet is at the top.

Remove the nuts and washers from the four studs around the fan box inlet. With the neoprene gasket in place on the fan box, locate the four studs through the corresponding holes in the boiler flue outlet flange. Secure the fan box using the nuts and washers previously removed.

Ensure that the fan box is vertical and the neoprene gasket is evenly compressed to give an adequate seal between the fan box and the boiler flange.

Fit the solenoid head (fitted to the same 5-way plug as the lead from the flue fan motor) on to the solenoid valve shaft and secure with the steel clip provided.

Fit the 5-way plug from the flue fan /solenoid valve into the socket at the top right rear of the boiler. Ensure that the plug is fully pushed home. See Figure 4-1.
4 Boiler Installation Information

4.11 Pellet Hoppers

4.11.1 Single Boiler Installation
Position the pellet hopper on the same firm level surface as the boiler, on either the left-hand or right-hand side of the boiler (depending on hopper type used), with the top access door facing forwards. Refer to Figure 2-1 or 2-2 as required, for clearance dimensions.

4.11.2 Double boiler installation
Position the pellet hopper on the same firm level surface as, and in between, the two boilers, with the top access door facing forwards. Refer to Figure 2-3 for clearance dimensions.

Failure to adhere to these measurements can cause blockage of the pellets in the pellet delivery hose or can prevent access for servicing at a later date. The hopper is supplied with castors which allows the hopper be moved during servicing. Once in the correct position, engage the brakes on the front casters to maintain this position.

4.12 Pellet Feed Auger

4.12.1 Single Boiler Hoppers
The pellet feed auger is supplied packed with the hopper but not factory-fitted to it.

To fit, unpack the hopper and auger. Remove the M5 screw fitted below the auger opening on the front of the hopper. Fit the end of the auger into opening in the front of the hopper as far as it will go and secure by fitting the M5 screw through the auger fixing flange and tighten. See Figure 4-2.

4.12.2 Double Boiler Hoppers
Both augers on the ‘double boiler’ Intermediate hoppers are supplied factory-fitted to the hopper.

To connect the hopper to the boiler, fit one end of the pellet delivery hose onto the pellet feed auger outlet and the other end onto the burner feed tube. The pellet delivery hose may need to be cut if too long. A sachet of lubricant is supplied in the accessories carton; apply the lubricant to the joint to ensure the pellet delivery hose is easily fitted. Ensure the pellet delivery hose is not kinked in any way.

Fit the 6-way plug (No.3), from the pellet feed auger motor, into the corresponding 6-way socket on the left side of the burner. Ensure that the plug is fully pushed home until the small catch it clicks into place. See Figure 4-3. Refer to Section 8.3 for all boiler plug connections.

![Figure 4-1: Flue/solenoid valve plug connection](image)

![Figure 4-2: Pellet feed auger fixing](image)

![Figure 4-3: Auger plug connection](image)

**WARNING**

Ensure the pellet delivery hose forms an air tight seal at each end and that the pellet delivery hose is not damaged. Leakage of air could cause increased temperature in the pellet delivery hose and result in the pellet feed tube (burn back) thermostat operating and shutting down the burner.
4.13 Before you Commission
To avoid the danger of dirt and foreign matter entering the boiler the complete heating system should be thoroughly flushed out – both 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 to be installed on an old system.

For optimum performance after installation, the boiler and the 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 Betz Dearborn’s Sentinel x300 or x400, or Fernox Restorer. Full instructions are supplied with the products but for more details visit either www.sentinel-solutions.net for Betz Dearborn products or www.fernox.com for Fernox products.

After flushing the system, an inhibitor such as Sentinel X100 or Fernox MB-1 should be used in accordance with the guidelines given in BS 7593:1992 for long term protection against corrosion and scale,

Grant UK strongly recommend that a magnetic in-line filter is fitted in the heating system pipework. A magnetic in-line filter must be fitted in the heating system pipework. This should be installed and serviced in accordance with the filter manufacturer’s instructions.

4.14 Completion
Please ensure that the Grant SPIRA Commissioning form (supplied with the boiler) is completed in full and that it is signed by the householder/user.

Leave the White copy with the user, retain the Pink copy for your own records, and return the Yellow copy to Grant UK to register the installation of the boiler.

Ensure that the User Information pack (supplied with the boiler) is handed over to the householder along with this Installation and Servicing manual.
5 Condensate Disposal

5.1 General Requirements
When in condensing mode the Grant SPIRA condensing wood pellet boilers produce condensate from the water vapour in the flue gases. This condensate is slightly acidic with a pH value of around 6. Provision must be made for the safe and effective disposal of this condensate.

Condensate can be disposed using one of the following methods:

a) Into a soil stack – either directly or via an existing waste system.
b) Into an external gulley.
c) Into a 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. Every Grant SPIRA boiler is supplied with a trap and this MUST be used. Refer to Section 5.6 for trap details.

5.2 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 must not be connected directly into rainwater downpipes or to waste/soil systems connected to septic tanks.

Condensate must 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.

5.3 Pipework
Condensate disposal pipework must be plastic. Copper or steel pipe is not suitable and must NOT be used.

All condensate disposal pipes connected to a Grant SPIRA boiler must have a minimum ‘nominal’ diameter of 38mm (1 ½”) plastic pipe.

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.

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

5.4 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 38mm (1 ½”) waste pipe used to minimise the risk of ice blocking the pipe in freezing conditions.

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

5.5 Condensate Soakaway
To keep external pipework to a minimum, locate the soak away as close as possible to the boiler but ensure it is at least 1 metre from building foundations and away from other services, for example gas, electricity or other services.

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 5.1.

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

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

Only use a soakaway where the soil is porous and drains easily.

WARNING
When using a condensate pump and holding tank, the burner settings for ‘TIME CLEAN PERIOD’ (time boiler cleaning is in operation) must not be set greater than 600 (60 seconds) and the ‘TIME CLEAN BOILER’ (time between boiler cleaning operations) must not be set less than 180 minutes, as modifying these times could result in larger and more frequent wash down of the boiler which could exceed the capabilities of the tank and condensate pump. Refer to Section 8 for further details of the burner settings.

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.

For a boiler installed in an unheated area such as an outhouse or garage, all condensate pipework should be considered as an ‘external’.

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.

When using a condensate pump with a Grant SPIRA boiler, a condensate holding tank of at least 40 litres is required. This is to ensure that when the boiler cleaning cycle has operated the holding tank can collect the total volume of the water used in the wash down and the condensate pump can then discharge the waste water effectively.

A boiler interlock should be fitted to shut off the boiler in the event of a malfunction of the condensate pump.

WARNING
When using a condensate pump and holding tank, the burner settings for ‘TIME CLEAN PERIOD’ (time boiler cleaning is in operation) must not be set greater than 600 (60 seconds) and the ‘TIME CLEAN BOILER’ (time between boiler cleaning operations) must not be set less than 180 minutes, as modifying these times could result in larger and more frequent wash down of the boiler which could exceed the capabilities of the tank and condensate pump. Refer to Section 8 for further details of the burner settings.

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5.6 Condensate Trap

Grant SPIRA condensing boilers are supplied with condensate trap. This trap must be used. No alternative trap should be used in place of the trap supplied with the boiler. The 1¼” BSP female condensate outlet connection is located at the rear of the boiler.

Fit the 1¼” 311 fitting (supplied) into this connection. Using the elbow and pipe (supplied), connect the trap to the condensate outlet on the boiler, as shown in Figure 5-2.

A condensate discharge pipe with a minimum diameter of 38mm (1½”) must be fitted to the outlet connection at the base of the trap.

In all cases the overflow pipe (see Figure 5-2) must be fitted to the trap and the end left open. This will protect the boiler from becoming blocked with condensate in the event of the condensate discharge pipe blocking or frozen.

If connecting the condensate discharge into a waste system or soil stack, either internally or externally, a second trap must be fitted in the condensate discharge pipe. This trap must provide the required 75mm water seal. It must be located between the boiler condense trap and the connection to the soil stack, in a position accessible for checking and cleaning.

5.7 Inspection and Cleaning of Trap

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

CAUTION

Failure to regularly check and clean the condensate trap (or traps) may result in damage to the boiler and this will not be covered by the product warranty.

CAUTION

All condensate pipework must be adequately protected against freezing, however if the condensate pipe is frozen, water will build up and discharge through the overflow on the trap.
6 Sealed Systems

6.1 Sealed System Requirements

All Grant Spira boilers are suitable for use with sealed systems complying with the requirements of BS5449.

The system must be provided with the following items:-
- Diaphragm expansion vessel complying with BS 4814.
- Pressure gauge.
- Pressure relief (safety) valve.
- Approved method for filling the system.

Expansion vessel

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 6-1. 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. If the expansion vessel is connected via a flexible hose, care must be taken to ensure that the hose is not twisted.

The pressure gauge must have an operating range of 0 to 4 bar.

It must be located in an accessible place next to the filling loop for the system.

Safety Valve

The safety valve (provided with the boiler) is set to operate at 2.5bar. It 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.

Filling Loop

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.

The filling loop must be isolated and disconnected after filling the system.

Heating System

The maximum temperature of the central heating water is 75°C. Refer to Section 1.1.

An automatic air vent should be fitted to the highest point of the system.

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

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.

6.2 Filling the Sealed System

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

WARNING

Only ever fill or add water to the system when it is cold and the boiler is off. Do not overfill.
The procedure for filling the sealed system is as follows:

1. Check the air charge pressure in the expansion vessel BEFORE filling the system.

![NOTE]

The air charge pressure may be checked using a tyre pressure gauge on the expansion vessel Schrader valve. The vessel may be repressurised, when necessary, 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.

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 6-2.

The charge pressure must not be less than the actual static head at the point of connection.

2. Check that the small cap (or screw) on all automatic air vents (including the one fitted at the left rear of the boiler) is open at least one turn. The cap (or screw) remains in this position from now on.

3. Ensure that the flexible filling loop 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 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. 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.

8. Repeat steps 5 and 6 as required until system is full of water at the correct pressure and vented.

9. Water may be released from the system by manually operating the safety valve until the system design pressure is obtained.

10. Close the fill point and double check valves either side of the filling loop and disconnect the loop.

11. Check the system for water soundness, rectifying where necessary.

6.3 Venting the Pump

It is important that the pump is properly vented to avoid an air lock and also prevent it running dry and damaging the bearings.

Unscrew and remove the plug from the centre of the pump motor.

Using a suitable screwdriver, rotate the pump spindle about one turn.

Replace the plug in the motor. Do not overtighten.

6.4 Pressure Relief (Safety) Valve Operation

Check the operation of the pressure relief (safety) valve as follows:

1. Turning the head of the valve 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. Top-up the system pressure, as necessary.

![NOTE]

The expansion vessel air pressure, system pressure and operation of the pressure relief valve must be checked on an annual service. Refer to Section 11.
7 Flue System and Air Supply

7.1 Air Supply
The Grant SPIRA wood pellet boiler draws air for combustion from the room in which it is located.

Any such room or space containing an appliance must have sufficient permanent air supply to the boiler

a. To ensure correct combustion of the fuel and effective operation of the flue system (i.e. to discharge of combustion products to the open air).

b. To supply enough free air to the draught stabiliser.

The ventilation area provided must be in accordance with the requirements of The Building Regulations Approved Document J – Section 2: Appliances burning solid fuel.

For a boiler with a draught stabiliser, a permanent air vent with a total free area of at least 850mm² per kW of appliance rated output is required. To achieve this, the following minimum vent opening areas are required:

<table>
<thead>
<tr>
<th>Boiler Model</th>
<th>Minimum Vent Open Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grant SPIRA 6-26</td>
<td>221cm² (35in²)</td>
</tr>
<tr>
<td>Grant SPIRA 9-36</td>
<td>306cm² (48in²)</td>
</tr>
<tr>
<td>Grant SPIRA 12-52</td>
<td>442cm² (70in²)</td>
</tr>
<tr>
<td>Grant SPIRA 15-62</td>
<td>527cm² (83in²)</td>
</tr>
<tr>
<td>Grant SPIRA 18-72</td>
<td>612cm² (96in²)</td>
</tr>
</tbody>
</table>

If a bulk pellet store is fitted internally, refer to the manufacturer’s instructions for any ventilation requirements.

7.2 Flue Position and Clearances
The Grant Spira wood pellet boilers have high operating efficiencies and low flue gas temperatures. Only the Grant ‘BLACK’ insulated twin-wall flue system must used with the Grant SPIRA boilers.

- The flue outlet positions shown in Figure 7-1 (taken from Approved Document J – Section 2) can meet the above requirement.
- The heights and separation distances shown in Figure 7-1 may have to be increased in particular cases, e.g. where high wind exposure, surrounding tall buildings, or adjacent trees can cause adverse wind effects.
- The boiler flue cannot terminate into an existing brick or clay lined chimney. All masonry flues must be lined using the Grant Black system stainless steel flexible flue liner.
- No other appliance can be connected to the boiler flue.
- The minimum clearance between the outer flue surface and any combustible material is 60mm.
- Any condensate in the flue can run back into the boiler. A condensate drain at the base of the flue system is not required.

Point where flue passes through weather surface (Note 1,2) Clearance to flue outlet

<table>
<thead>
<tr>
<th>Point</th>
<th>Clearance to flue outlet</th>
</tr>
</thead>
<tbody>
<tr>
<td>A At or within 600mm of the ridge</td>
<td>At least 600mm above the ridge</td>
</tr>
<tr>
<td>B Elsewhere on a roof (whether pitched or flat)</td>
<td>At least 2300mm horizontally from the nearest point on the weather surface and; a; at least 1000mm above the highest point of intersection of the chimney and the weather surface; or b; at least as high as the ridge</td>
</tr>
<tr>
<td>C Below (on a pitched roof) or within 2300mm horizontally to an openable rooflight, dormer window or other opening (Note 3)</td>
<td>At least 1000mm above the top of the opening</td>
</tr>
<tr>
<td>D Within 2300mm of an adjoining building, whether or not beyond the boundary (Note 3)</td>
<td>At least 600mm above the adjacent building</td>
</tr>
</tbody>
</table>

Notes
1) The weather surface is the building external surface, such as its roof, tiles or external walls.
2) A flat roof has a pitch less than 10°.
3) The clearance given for A or B, as appropriate, will also apply.

Figure 7-1: Flue terminal positions

The above clearances are as specified in Building Regulations Approved Document J. Also refer to Approved Document J of either the England and Wales or Irish building regulations for further requirements on the installation of flue systems for solid fuel appliances.
7.3 Flue System Assembly

7.3.1 Fan Box & Flue Starter

The fan box supplied with the boiler (packed in the accessories carton) incorporates:

- Flue exhaust fan
- Draught stabiliser
- Flue starter connection (to fit Grant ‘Black’ flue system)
- Clean out hatch

The fan box is supplied with a neoprene gasket for connection to the boiler. This neoprene gasket is to accommodate the low temperature wet flue system of the Grant SPIRA boilers. Refer to Section 4.15 for fitting details.

The lead for the flue fan (supplied factory-fitted to the fan box) is connected to the same 5-way plug as the lead for the wash system solenoid valve. Refer to Section 4.15 for connection details.

When fitting the flue system to the flue starter connection, on the fan box, the lip seal supplied with the flue component must be fitted to the inner flue liner, and the locking band fitted to secure the joint.

When installed, the draught stabiliser must not be boxed in or obstructed from operation in any way.

The clean out hatch allows access to the inside of the fan box for inspection and, where necessary, removal of any ash that may have dropped down inside the flue system. The clean-out hatch MUST be correctly fitted during normal boiler operation. See Section 10 - Servicing.

A condensate drain at the base of the flue is not required as the flue system is designed to allow the condensate to run back into the boiler.

7.3.2 Flue System

The Grant ‘Black’ flue system is a fully insulated stainless steel twin-wall flue - finished with a Black Polyester Powder paint finish. This insulated flue system reduces the possibility of the condensate freezing in the flue, and also has a high corrosion resistance suitable for solid fuel.

The 125mm (5in) ‘Black’ twin-wall flue system is suitable for BOTH the SPIRA 6-26 & 9-36 models.

Masonry chimneys MUST be lined using the 125mm stainless steel flexible ‘smoothbore’ liner – available as part of the ‘Black’ system - due to the condensate produced from the boiler.

NOTE

The Grant BLACK flue system is the ONLY flue system suitable for use with the Grant SPIRA Wood pellet boilers. The use of other flue systems will invalidate the product warranty on the boiler.

6.3.3 Joining Components

All the ‘Black’ system twin-wall flue components (with the exception of the elbows) use a ‘twist lock’ jointing system.

Figure 7-2: Male and female flue connections

The ‘male collar’ end of the flue component MUST always be uppermost when fitted.

To join two components together:

First fit the lip seal supplied into the groove (in the inner flue liner) at the ‘female collar’ end of the flue component to be fitted.

All flue joints must have a lip seal gasket fitted. The lip seal should be fitted dry and the lubricating grease (supplied with the component) applied to the internal surface of the socket into which it is to be fitted.

Loosen the locking band at the ‘female collar’ end. Insert the ‘male collar’ into the ‘female collar’ and twist through 1/6 of a turn to lock in place. Refer to Figure 7-3.
To temporarily assemble the flue system components, to check component lengths, alignment of connections, etc. DO NOT fit the lip seals. However, for FINAL assembly the lip seals provided MUST be fitted at EVERY joint.

**WARNING**
All joints in the flue system must be accessible for inspection. No joints should be located within a wall, floor or ceiling spaces or any other inaccessible place.

7.3.4 Adjustable Length
The Grant ‘Black’ flue system includes an Adjustable flue extension. Refer to Section 7.6. This allows any of the straight flue extension components to be extended in length by between 75mm to 250mm.

This adjustable extension must be used in conjunction with any straight extension (1000mm, 500mm or 333mm) to achieve the actual straight length required.

To fit the adjustable extension, first remove insulation from between the inner and outer walls of the component, as necessary. Fit the open end over the ‘male collar’ end of the fixed extension and adjust to achieve the required overall length. Secure the two components together using the wide locking band supplied.

**NOTE**
The adjustable section is not load-bearing, therefore adequate support of the flue system MUST be provided immediately above the adjustable extension.

7.3.5 Support Components
The weight of the flue system is considerable. It must NOT be carried by the fan box fitted to the appliance, but requires independent support.

Support Plate
On internal systems, the weight can often be supported where the flue passes through an upstairs floor, using the Support Plate with clamp band (Grant ref. WP/SP). A four-sided square opening, formed by timber stringers between the joists, is required to support the plate. Ensure that the minimum distance of 60mm is achieved between the flue outer surface and the any combustibles (e.g. timber joists).

A Fire Stop plate (Grant ref. WP/FP) is also required to be fixed to the ceiling below.

When passing through a second upstairs floor (in a 3-storey house) either a second support plate can be fitted or only two fire-stop plates (one above and one below) need be fitted as the flue is adequately supported at the first upstairs floor level.

Intermediate Top Plate
Flue systems running up against either an Internal or external wall surface can be supported using the Intermediate Top Plate (Grant Ref. WP/TP). This is mounted on a pair of Wall Support Side Plates (Grant Ref. WP/WS), which are fastened to the wall, to provide support at either the base, or part way up, a vertical section of flue.

The ‘female collar’ (on the underside of the plate) is fitted into the flue below and the ‘male collar’ (on the upper side of the plate) is a twist-lock connection into the flue above. Both joints are secured using the clamp bands provided.

Wall and Roof Brackets
Both the Wall bracket (Grant ref. WP/WB50) and the Adjustable Wall Bracket (Grant ref. WP/WB300) are NOT load bearing and are designed to give lateral support only. Wall brackets should be fitted with a maximum spacing of 3m on straight runs of flue and at any offset to ensure the system is rigidly supported.

Similarly, the Roof Support Band (Grant ref. WP/RS) is not load bearing and is designed to give lateral support only. Where the flue is free standing above the roof and its height exceeds 1.5m beyond the last support of the roof (e.g. Roof Support Band) a Guy Wire Bracket (Grant ref. WP/GB) MUST be used and at every 1.5m thereafter. Grant do not supply the guy wires or tie rods to use with this bracket.
Extended Locking Band
A height of up to 3m above the last support at the roof can be achieved, without the need for guy wires, by using an extended locking band (Grant ref. WP/LBEXT) at the joint immediately below, and at every joint above, the last flue support.

7.3.6 Elbows
Two elbows are available - 30° and 45°.

To allow for alignment, the female collars of these elbows do NOT have the twist lock flutes, but the locking band MUST still be used to secure the two flue components together.

The Building Regulations Approved Document J requires a flue system to have the means to be inspected and cleaned as required.

To allow for this there should be no more than 2 elbows – of maximum angle 45° from the vertical – fitted between the boiler fan box (clean out hatch) and the terminal.

This can be increased to a maximum of four elbows (maximum 45°) between the boiler and terminal if there is an inspection hatch between the second and third elbows. An Inspection Pipe incorporating an inspection hatch (Grant ref. WP/IP) is available as part of the Grant ‘Black’ flue system.

Any inspection hatch must be accessible for checking and cleaning purposes.

7.3.7 Wall Sleeves
In accordance with the Building Regulations Approved Document J, a wall sleeve should be used where the flue system passes through a wall. A suitable wall sleeve is available as part of the Grant ‘Black’ flue system. This 45° angled wall sleeve gives a 60mm clearance all round from the outer surface of the flue passing through it. The sleeve is 45° mitred at one end. The other end of the sleeve should be cut on site to the correct length, to leave it flush with the wall on both sides. The gap between the sleeve and flue should be adequately weatherproofed using a good quality mastic and fibre rope.

7.4 Flue Notice Plate
The Building Regulations Approved Document J requires a notice plate that conveys essential information regarding the flue installed to be permanently displayed. A suitable self adhesive notice plate is supplied with the Grant Black flue system and this must be completed by the installer and displayed in an unobtrusive but obvious position within the building concerned, e.g. next to the flue system/boiler.

7.5 Carbon Monoxide Alarm
The Building Regulations Approved Document J requires a Carbon Monoxide alarm to be fitted in the room where the boiler is located.

This should be positioned between 1 and 3m horizontally from the boiler either:
  a) on the ceiling at least 300mm from any wall, or
  b) on a wall as high up as possible (above any windows or doors) at least 150mm from ceiling.

WARNING
Failure to maintain a clean flue can result in the emission of flue gases into the dwelling or damage from fire in the flue. See Section 11.4 Cleaning the Boiler & Flue.

WARNING
No horizontal section or no bend greater than 45° should be used as these can cause a build up of ash and condensate in the flue.
7 Flue System and Air Supply

7.6 Flue System Components

WPADJ 250 EXT 250
WPEXT333 Extension 333mm
WPEXT500 Extension 500mm
WPEXT1000 Extension 1000mm
WP45 45˚ Bend
WP30 30˚ Bend
WPRC Rain Cap
WP01 Locking band
WPFP Firestop plate 2PC
WPWB50 50mm Wall bracket
WPWB300 300mm Wall bracket
Adj. 50-300mm
WPSC Storm collar
WPUF 200 Uni flash
WPGB Guy wire bracket
WPSP Support plate 2pc
WPTP Intermediate top plate
WPAP
Anchorplate to chimflex adaptor

WPWS Wall support plate

WPCA ICID to chimflex adaptor
7 Flue System and Air Supply

7.7 Flue Component Dimensions

revised drawings to come

**Adjustable Pipe 75 - 250mm**
Part no. WP/ADJ250
Complete with locking band.
Telescopes over pipe below.
Minimum engagement should be half the diameter.
This component is NOT load-bearing.

### Straight Pipe Length (mm)

<table>
<thead>
<tr>
<th>Nominal Length</th>
<th>Effective Length (mm)</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>960</td>
<td>WP/EXT1000</td>
</tr>
<tr>
<td>500</td>
<td>460</td>
<td>WP/EXT500</td>
</tr>
<tr>
<td>333</td>
<td>293</td>
<td>WP/EXT333</td>
</tr>
<tr>
<td>200</td>
<td>160</td>
<td>WP/EXT200</td>
</tr>
</tbody>
</table>

### Double 30° Bend and Straight Pipe Length (mm)

<table>
<thead>
<tr>
<th>Effective Length</th>
<th>Dimension</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>960</td>
<td>A</td>
<td>1061</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>542</td>
</tr>
<tr>
<td>460</td>
<td>A</td>
<td>628</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>292</td>
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<tr>
<td>293</td>
<td>A</td>
<td>483</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>208</td>
</tr>
<tr>
<td>160</td>
<td>A</td>
<td>368</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>142</td>
</tr>
</tbody>
</table>

### Double 45° Bend and Straight Pipe Length (mm)

<table>
<thead>
<tr>
<th>Effective Length</th>
<th>Dimension</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>960</td>
<td>A</td>
<td>933</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>784</td>
</tr>
<tr>
<td>460</td>
<td>A</td>
<td>580</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>431</td>
</tr>
<tr>
<td>293</td>
<td>A</td>
<td>462</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>313</td>
</tr>
</tbody>
</table>
7.8 Typical Flue Systems

Figure 7-5: Typical flue installations details
8 Electrical

8.1 General Requirements
The Grant SPIRA Condensing Wood Pellet boiler requires a 230 V ~50 Hz electrical supply. The unit should be connected to a mains power supply that is protected by a 30mA RCD.

For the UK, the electrical installation must be carried out by a competent installer in accordance with the requirements of the Electricity at work Regulations 1989 and BS7671:2008 – IEE Wiring Regulations 17th Edition (including all amendments)

If installed in the Republic of Ireland, the wiring installation must comply with all ETCI rules.

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

Any heating system controls, e.g. room thermostat, frost thermostat, etc. connected to this boiler must be suitable for use on mains voltage.

8.2 Hopper Electrical Connections

7.2.1 Single Boiler Hopper (with a single auger) – in either a left hand or right hand version as required, to supply a single boiler.

This hopper is fitted with three pre-wired flying leads with factory-fitted plugs:
- 4-way plug – for connection of the permanent live, earth and neutral and also the switched live from the heating controls system.
- 5-way plug – to connect the hopper to the boiler.
- 6-way plug – to connect either a bulk pellet store auger or Grant SPIRA-VAC vacuum system to the hopper and boiler.

Refer to Figure 8-7 for hopper wiring diagram.

8.2.2 Double Boiler Hopper (with two augers) – to supply two boilers in a ‘double boiler’ installation.

This hopper is fitted with four pre-wired flying leads with factory-fitted plugs:
- 4-way plug – for connection of the permanent live, earth and neutral and also the switched live from the heating controls system.
- Two 5-way plugs – one to connect to each of the two boilers.
- 6-way plug – to connect either a bulk pellet store auger or Grant SPIRA-VAC vacuum system to the hopper and boiler.

Refer to Figure 8-8 for double hopper wiring diagram.

8.2.3 For Installations with a Bulk Pellet Store only
Both single boiler and double boiler hoppers are supplied with the 6-way plug parked inside the wiring enclosure. See Figure 8-1.

If a bulk pellet store is to be used:
- Remove the wiring centre cover from the rear of the hopper.
- Unclip the 6-way plug from diaphragm switch bracket.
- Pass the 6-way plug lead through a grommet just below the wiring centre cover.
- Set the toggle switch on the diaphragm switch bracket to ‘BULK STORE’. See Figure 8-1.
- Replace the wiring centre cover and fasten in place using the screws previously removed.
- Connect the 6-way plug to the corresponding 6-way connector on the pre-wired flying lead fitted to either the bulk pellet auger or Grant SPIRA-VAC system.

If using the Grant SPIRA-VAC system, refer to the installation instructions supplied with the system for further details on its installation and operation.

8.2.4 For Installations using the Pellet Hopper only
When used without a bulk pellet store, the pellet hopper has the facility for the connection of a 230V ‘low pellet’ indicator lamp (not supplied). This will indicate to the householder that the pellets in the hopper have reached the minimum level and the hopper needs to be topped up.

The indicator lamp should be positioned so it can be easily viewed by the householder. See either Figure 8-7 or 8-8, as applicable, for the connection details.

If a bulk store is used, with either the Grant SPIRA-VAC system or a Grant bulk auger, a ‘low pellet’ indicator lamp cannot be fitted to the pellet hopper.

8.3 Boiler Plug Connections

Before making any electrical connections to the hopper (by connecting the 4-way plug and socket together) ensure that all the plug connections have been correctly made between the hopper, boiler and (if fitted) the bulk pellet supply system, as follows:

1. Fit the 5-way plug from the flue fan and solenoid valve into the socket at the top right rear of the boiler. See Figure 8-2. Ensure it is fully pushed home.

2. Fit the 5-way plug from the hopper into the socket at the top left rear of the boiler. See Figure 8-3. Ensure it is fully pushed home.
3. On a double boiler installation, fit the second 5-way plug from the double hopper into the top right rear of the second boiler. Ensure it is fully pushed home.

4. Fit the two 7-way plugs (No.1 and No.2) from the boiler control panel into the two lower connections on the left side of the burner. These plugs are male and female and cannot be fitted into the wrong connections. Refer to Figure 8-3. Ensure that both plugs are fully pushed home until the small catch clicks into place.

5. Fit the 6-way plug (No.3) from the pellet feed auger motor into the upper connection on the left side of the burner. Refer to Figure 8-4. Ensure that the plug is fully pushed home until the small catch it clicks into place.

6. If a bulk pellet store is to be used, connect the 6-way plug to the corresponding connection on the flying lead from either the Grant SPIRA-VAC system or Grant bulk pellet store auger. Ensure that the plug and socket are fully pushed together until the small catch clicks into place.

Refer to instructions supplied with either the Grant SPIRA-VAC or Grant bulk store auger for further details.

8.4 Heating System Controls
The boiler can be used in conjunction with typical heating control system, e.g. ‘S-Plan’ or ‘Y-Plan’ type controls. Refer to Figures 8-9 and 8-10 and for typical control system wiring diagrams.

As the electrical connection (permanent mains supply and switched live from the heating control system) to the boiler is made via the flying lead with 4-way plug connection it will be necessary to provide a 4-core flying lead either

a) Directly from the heating controls wiring centre – if suitable located adjacent to the boiler/hopper, or

b) Via a junction box situated adjacent to the boiler hopper.

The length of 4-core flex required (between the wiring centre or junction box and the 4-way plug connection) must be sufficient to allow the hopper to be moved out enough to allow disconnection the 4-way plug.

Frost Protection
For additional protection of either the entire heating system, or the boiler and localised pipework, it is recommended that a frost thermostat be installed. It is also recommended that it be used in conjunction with a pipe thermostat to avoid unnecessary and wasteful overheating of the property.

The pipe thermostat should be located on the boiler return pipe, and set to operate at 25°C. Refer to Figures 8-9 or 8-10 as appropriate for connection details.

8.5 Connecting the Power Supply

WARNING

Before making any connections to the heating systems controls ensure that the electrical supply is isolated at the fused spur serving the controls and boiler, that the fuse has been removed and the isolator is locked off.

Do NOT connect the electrical supply to the hopper, by connecting the 4-way plug and socket together, until ALL plug connections have been correctly made between the hopper, boiler and (if fitted) the bulk pellet supply system.

The boiler requires a permanent mains supply and a switched live supply to control the boiler. For details of Controls refer to Section 8.4 and Figures 8-9 or 8-10.

Do NOT interrupt the permanent supply to the hopper/boiler with any external controls.

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

Connect the mains supply using the following procedure:

1. Press down on the small catch (between the two parts of the factory-fitted 4-way plug/socket connector) to release it.

2. Separate the two parts and remove the cover from the male 4-way plug.

3. Connect the flex to the 4-way male plug as follows:
   - Terminal L2 – Switched live (from heating system controls)
   - Terminal N – Mains neutral
   - Terminal (earth) – Mains earth
   - Terminal L1 – Mains (permanent) live

4. Replace the cover, ensuring outer sheath of the flex is held in the cable grip of the plug, and secure using the screws previously removed.
5. Connect the other end of the 4-core flex to the either the heating system controls wiring centre or junction box. Refer to either Figures 8-9 or 8-10, as appropriate, for details of the connections required.

6. Fit the two parts of the 4-way connector back together. Ensure the plug and socket are fully pushed together until the small catch clicks into place.

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

8.6 Wiring Diagrams

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**Figure 8-5:** Boiler internal wiring diagram

Colour code: BR - Brown, BL - Blue, RD - Red, G/Y - Green/Yellow, BLK-Black, OR - Orange, Y - Yellow
Figure 8-6: Burner wiring diagram
Figure 8-7: Hopper wiring diagram – single boiler hopper
Figure 8-8: Hopper wiring diagram – double hopper
Figure 8-9: Heating system controls – S-plan type system connection diagram

*See Figure 8-11 for wiring Pressure Switch Kit for use with plastic pipe in installation

Wall mounted Junction box*

Use four core flex at least 0.75 mm between junction box and hopper

Four-way plug (comes fitted to four-way socket on rear of Grant Spira hopper)
Figure 8-10: Heating system controls – Y-plan type system connection diagram

*See Figure 8-11 for wiring Pressure Switch Kit for use with plastic pipe in installation

Figure 8-11: Connection of Grant low water pressure switch (ref. MPCBS62)
9 Burner

9.1 Burner Operation
The burner controls the pellet feed auger, flue fan, boiler temperature and also the boiler and brazier cleaning systems. The burner comes with a display screen and six control buttons. These buttons are to access the menus and control the burner functions.

The burner is equipped with a brazier where the combustion of the wood pellets takes place within the boiler. The self cleaning device on the brazier is automatically activated after the pellet feed auger run time has exceeded a predetermined set time. The pellet feed auger run time for brazier and boiler cleaning is pre-set in the burner menu.

The temperature of the water within the boiler is controlled via a thermistor to the burner. The thermistor is inserted into the boiler water jacket and is used by the burner to control the modulation of the boiler output.

The boiler has a set point temperature. This is the target flow temperature from the boiler. As the temperature of the boiler increases and reaches the set point less 5°C the output of the boiler is reduced by one step. Each subsequent 1°C increase in boiler temperature reduces the output of the boiler by one modulation step until the temperature reaches the set point plus 5°C. At this point the boiler output is ‘MINIMUM FLAME’ which is minimum output setting of the boiler. The percentage increase or decrease in power is calculated on the rate of temperature change. The sequence of operation is described in Section 9.3.

9.2 Burner Operational Modes

**‘BOILER WAIT THERMOSTAT’:** (operation code 03) Boiler is in standby awaiting the following:
- A switched live input signal from a control system.
- The boiler temperature to drop below the ‘DELTA RESTART’ temperature. (‘DELTA RESTART’ is the temperature the burner restarts after maximum temperature has been reached).
- The ON/STANDBY switch on the control panel is set to the ‘ON’ position.

**‘WAIT PRELOAD BRAZIER’:** (operation code 40) Initial loading of pellets into the brazier to enable combustion to start.
- Activated with a switched live input signal and/or temperature drops below the ‘DELTA RESTART’ temperature.
- Deactivated after time exceeds ‘T08’.

**‘WAIT LIGHTING’ – IGNITION:** (operation code 41) Period of time given for pellets to light.
- Activated after ‘PRE LOAD’ operation is complete.
- Deactivated once photocell lux reading exceeds ‘FLAME ON’ setting.

**‘WAIT LIGHTING’ – FLAME STABILISATION:** (operation code 45) Period of time to allow flame stabilise after pellets have ignited.
- Activated after ignition mode.
- Deactivated after time exceeds ‘T13’.

**‘WAIT LIGHTING’ – LIGHTING FEED REDUCED:** (operation code 42) Period of time intermittent quantities of pellets supplied to the brazier to increase the flame.
- Activated after ‘WAIT LIGHTING’ flame stabilization mode.
- Deactivated after time exceeds ‘T09’.

**‘PELLET BURNER FIRING’**: Power 100% (operation code 13) Flame is fully developed and boiler is operating on full power.
- Activated after –’WAIT LIGHTING’ lighting feed reduced mode
- Deactivated after temperature is within ‘TEMP DELTA’ range.

**‘PELLET BURNER FIRING’**: Power (modulating) (operation code 13) Flame is reduced and boiler output is modulating.
- Activated once the boiler temperature is within the ‘TEMP DELTA’ range.
- Deactivated after temperature exceeds the ‘TEMP DELTA’ range.

**‘PELLET BURNER FIRING’**: Power (minimum) (operation code 13) Flame is reduced and boiler is at its minimum output.
- Activated once the boiler temperature exceeds the ‘TEMP DELTA’ range.
- Deactivated after the temperature exceeds ‘TEMP OFF H2o’.

**‘TURNING OFF BRAZIER’**: (Operation code 14). Burn down period to remove any pellets remaining in the brazier.
- Activated once switched live input signal is switched off or the boiler temperature exceeds ‘TEMP OFF H2o’ setting.
- Deactivated once photocell lux reading has dropped below the ‘FLAME ON’ setting less.

**‘WAIT POST PURGE’**: (operation code 26) Period of time after burn down is complete to ensure no unburnt pellets ignite.
- Activated after ‘TURNING OFF BRAZIER’ is complete.
- Deactivated after time exceeds ‘T22’.
9.3 Burner Operational Sequence

Flow Chart of Operation of Wood Pellet Boiler

For 'STEP AUTO' function (the two digit code allocated to each function). Refer to Section 9.7.3.
9 Burner

9.4 Burner Display Screen

- Boiler thermostat calling
- Burner fan operational
- Pressure switch closed
- Ignition element operational
- Feed auger operational
- Photocell lux reading >‘Flame On’ setting
- n/a
- Error

9.5 Burner Control Buttons

The burner has six control buttons, these perform the following tasks.

Button No.1
Normal Mode; Increase temperature set point by 1°C
Menu mode; Scroll up

Button No.2
Normal mode; Decrease temperature set point by 1°C
Menu mode; Scroll down

Button No.3
Menu mode; Scroll forward

Button No.4
Normal mode; Reset fault
Menu mode; Scroll back

Button No.5
Menu mode; Decrease parameter value

Button No.6
Menu mode; Increase parameter value
9.6 Burner Menu Navigation Chart and Factory Default Settings

- **Menu 1:** INSTAL MANUFACT
  - Set Point Range 55° - 75°C

- **Menu 2:** INSTAL FW8
  - NOT APPLICABLE

- **Menu 3:** INSTAL H2o
  - Menu 2-4 POWER PELLET
    - TIME LOAD MAXR 6.26 = 2.5
    - TIME PAUSE 4 - 6.5
    - TIME PAUSE MIN 6.5
  - TIME CLEAN BRAZ 2.5
  - TIME CLEAN PERIOD 6.5
  - FLASH CLEANING 20
  - HOURS SERVICE 100
  - RESTART SERVICE 100

- **Menu 4:** CLEAN
  - POWER MAXIMUM 6.26 = 36
  - POWER MINIMUM 5.9 = 36
  - POWER LIGHTING 100
  - POWER TEST 100

- **Menu 5:** MANUFACT VIEW
  - LANGUAGE
  - ENGLISH

- **Menu 6:** USER VIEW
  - ITALIAN

- **Burner Control Buttons:**
  - X = BURNER CONTROL BUTTON

- **Back Button:** TO STEP BACK
9 Burner

9.7 Burner Menu

Using the main menu flow chart shown in Section 9.6 navigate the menus using the buttons as described in Section 9.5.

Each of the four main folders is described in further detail as follows;

‘INSTAL’, Installer folder, see Section 9.7.1

‘MANUFACT’ not applicable.

‘VIEW’ folder, see Section 9.7.3.

‘USER’ folder, see Section 9.7.4.

Press button ‘3’ to open the menu settings. Once the menu settings option is activated there are four folders to choose from as shown below.

9.7.1 ‘INSTAL’ menu folder

‘INSTAL’ represents the Installer folder. It enables the installer access relevant parameters for adjustment during the installation / commissioning of the appliance. Only accessible with an access code.

The ‘INSTAL’ folder has four sub folders;

- menu 1-4, H2o
- menu 2-4, POWER PELLET
- menu 3-4, CLEAN
- menu 4-4, SETUP FAN

To access the parameters within the ‘INSTAL’ folder from the main burner display, navigate as follows;

9.7.1.1 ‘menu 1-4- H2o’ sub folder contains three parameters stored within this folder;

a) TEMP DELTA: Defines the boiler temperature either side of the Set-point in which the boiler will modulate. Units °Celsius. Default setting 6-26 & 9-36 = 5 (5°C).

b) TEMP OFF H2o: Temperature the burner shuts down. Units °Celsius. Default setting 6-26 & 9-36 = 80 (80°C).

c) DELTA RESTART: Temperature drop below the set-point before burner re-starts. Units °Celsius. Default setting 6-26 & 9-36 = 5 (5°C).
Settings in the burner menu’s below are based on the boiler using the Grant fixed angle pellet feed auger at 45° and an auger motor fixed speed of 8.1 rpm. Only ENplus A1 (EN14961-2) pellets MUST be used with the Grant SPIRA boilers. These pellets must be bark and sand free AND approved by Grant UK. BEFORE being used in the Spira boilers. Failure to use approved pellets will invalidate the product warranty.

9.7.1.2 ‘Menu 2-4- POWER PELLET’
The parameters stored within this folder are:

a) **TIME LOAD MAX**: Time the pellet feed auger operates to deliver pellets to the brazier when the burner is in max flame mode. Adjusting this time adjusts the boiler input in max flame, i.e. the larger the load time, the greater the input. Alternatively the smaller the load time the lower the input (see table Section 2.2.1).
   - Units: 000.0 seconds.
   - Default setting: 6-26 = 25 (2.5 seconds).
   - Default setting: 9-36 = 65 (6.5 seconds).

b) **TIME PAUSE MAX**: Time between pellet feed auger operations when the burner is in max flame mode. Adjusting this time adjusts the boiler input in max flame, i.e. the larger the pause time, the lower the input. Alternatively the smaller the pause time the higher the input.
   - Units: 000.0 seconds.
   - Default setting: 6-26 = 140 (14.0 seconds).
   - Default setting: 9-36 = 250 (25 seconds).

c) **TIME PAUSE MIN**: Time between pellet feed auger operations in min flame. Adjusting this time adjusts the boiler input in min flame, i.e. the larger the pause time, the lower the input. Alternatively the smaller the pause time the higher the input.

9.7.1.3 ‘Menu 3-4- CLEAN’
The parameters stored within this folder are:

a) **TIME CLEAN BRAZ**: Total pellet feed auger run time before burner brazier cleaning operation activates. (If the burner shuts down immediately or waits for the next shut down is determined by ‘FLASH CLEANING’ see 8.3.1.3 d.)
   - Default setting: 6-26 & 9-36 = 180 (180 minutes).

b) **TIME CLEAN BOILER**: Total pellet feed auger run time before boiler cleaning operation activates.
   - Default setting: 6-26 & 9-36 = 180 (180 minutes).

c) **TIME CLEAN PERIOD**: Time period boiler cleaning function is operational once ‘TIME CLEAN BOILER’ has elapsed.
   - Default setting: 6-26 & 9-36 = 60 (60 seconds).

d) **FLASH CLEANING**: Commencement of brazier cleaning.
   - 1 = Interrupt burner firing, shut down and clean brazier when time is greater than ‘TIME CLEAN BRAZ’.
   - 0 = at next burner shut-down, clean brazier when time is greater than ‘TIME CLEAN BRAZ’.

e) **HOURS SERVIC**: Time lapse period before the burner screen displays ‘SERVICE’. This is to indicate a service is now due.
   - Default setting: 6-26 & 9-36 = 500 (500 hrs).

**RESET SERVICE** to cancel the ‘SERVICE’ display on the burner screen after the boiler has been serviced. Press button 3 (*SET*) followed by button 4 (*RESET*) five times to exit the menu. IT IS ESSENTIAL TO RESET THE SERVICE DISPLAY AND AFTER EACH SERVICE.

9.7.1.4 ‘Menu 4-4- SETUP FAN’
a) **POWER MAXIMUM**: Burner fan speed setting when burner in ‘max’ output mode.
   - Default setting: 6-26 = 36.
   - Default setting: 9-36 = 43.

b) **POWER MINIMUM**: Burner fan speed setting when burner in ‘min’ output mode.
   - Default setting: 6-26 = 21.

c) **POWER LIGHTING**: Burner fan speed setting when burner in lighting mode.

d) **POWER TEST**: Used to simulate the burner fan speed for test purposes only. Once the ‘POWER TEST’ is cancelled from the screen the burner fan reverts to its required operational speed.

e) **LOAD DEFAULT**: Load factory default settings. Press button 3 to activate factory default settings.

9.7.2 ‘MANUFACT’ Menu Folder

‘MANUFACT’ displays the manufacturer folder; it enables the manufacturer set parameters required for an individual boiler. This folder should not be accessed or modified in anyway.
9 Burner

9.7.3 VIEW Menu Folder

The ‘VIEW’ menu folder has 4 readout displays as follows:

a. LUX %: Light illumination measured by the Photocell. Readout is instantaneous.

b. STEP AUTO: Each boiler function is allocated a two digit number. This menu displays the function the boiler is in when viewing. The list of the functions are as follows:
   - 03 - Wait Boiler Thermostat
   - 13 - Pellet Burner Firing
   - 14 - Turning Off Brazier
   - 15 - Brazier is moving back
   - 15 - Brazier is moving forward
   - 26 - Post Purge
   - 29 - Air Pressure Error
   - 33 - Failed Pellet Lighting
   - 34 - Servo Motor Blocked
   - 40 - Pre-load
   - 41 - Wait Lighting (Ignition)
   - 42 - Wait Lighting (Lighting Feed Reduced)
   - 45 - Wait Lighting (Flame Stabilisation)
   - 46 - Safety Charge Pipe Thermostat
   - 46 - Safety Boiler Thermostat
   - 47 - Probe Fault

The ‘VIEW’ folder displays the function or status of the boiler.
To access the menu displays within the ‘VIEW’ folder from the main burner display, navigate as follows;

- TO STEP BACK
  - To Increase Parameter
  - To decrease Parameter
  - To Accept Parameter Change & Exit

9.7.4 USER Menu Folder

The language options are Italian or English. Once exited, the language selection shown on screen becomes the displayed language.

The ‘USER’ folder; allows the user change the language on the burner display.
To access the menu displays within the ‘USER’ folder from the main burner display, navigate as follows;

- TO STEP BACK
  - To Increase Parameter
  - To decrease Parameter
  - To Accept Parameter Change & Exit

The language options are Italian or English. Once exited, the language selection shown on screen becomes the displayed language.

c. VIEW CLE BRAZ Total pellet feed auger run time since brazier last cleaned. When ≥ “T16” brazier cleaning operation will commence. Resets after each brazier clean.

d. VIEW CLE BOILER Total pellet feed auger run time since boiler last cleaned. When ≥ “T17” boiler cleaning operation will commence. Resets after each boiler clean.
10 Commissioning

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

For double boiler installations this procedure must be carried out in full on both boilers.

10.1 Equipment Required
To carry out a complete and comprehensive commissioning of the Grant Spira wood pellet boiler the following equipment is required.
- Draught meter.
- Flue gas analyser (with “wood pellet” fuel setting).
- Container of at least 1 litre capacity.

10.2 Preliminary Inspection
Before switching on the power supply to the hopper and boiler check the following:

10.2.1 Heating System
Check the following:
- That corrosion inhibitor and, where necessary antifreeze, is present in the system water. Refer to Section 4.6.
- That a magnetic in-line filter has been fitted in the system. Refer to Section 4.6.
- The auto air vent (supplied with the boiler) is open.
- The boiler drain cock (supplied with the boiler) is closed.
- Both the boiler and heating system is filled and vented.
- On sealed systems the expansion vessel charge pressure is correct and system is filled to correct pressure.
- For any leaks at joints, fittings, etc.

10.2.2 Electrical Connections
Check the following:
- The 5-way plug (from the hopper) is fully inserted in the socket at the top left rear of boiler. Refer to Figure 8-3.
- The 5-way plug (from the flue fan and washdown solenoid valve) is fully inserted in the socket at the top right rear of the boiler. Refer to Figure 8-2.
- The two 7-way plugs (from the boiler control panel) are fully inserted into the corresponding two lower connections on the left side of the burner. Refer to Figure 8-4.
- The 6-way plug (from the pellet auger) is fully inserted into the upper connection on the left side of the burner. Refer to Figure 8-4.

On double boiler installations, repeat the process for the second boiler.

10.2.3 Washdown System
Check the following:
- The washdown system manifold pipe is correctly fitted into either the right or left side of the boiler, as required to suit the type of hopper used.
- The solenoid valve head is correctly fitted and secured in position with the steel clip provided with the boiler.
- The solenoid valve is connected to an uninterrupted mains water supply via the flexible hose and valve (with integral check valve) provided with the boiler.
- All valves in this water supply are open.

On double boiler installations, repeat the process for the second boiler.

10.2.4 Condensate Disposal System
Check the following:
- The condensate trap (supplied with the boiler) and condensate disposal pipework has been fitted correctly. Refer to Section 5.
- If a condensate pump is fitted, that a condensate holding tank of at least 40 litres capacity has also been installed. Refer to Section 5.

10.2.5 Flue System
Check the following:
- The draught stabiliser damper, on the fan box, is unobstructed and free to move. Ensure that the damper locking lever is in the ‘unlocked’ position. Refer to Figure 10-1.
- The flue system conforms to the relevant requirements of The Building Regulations Approved Document J for solid fuel appliances.

9.2.6 Combustion Ventilation
Check that the combustion air supply conforms to the relevant requirements of The Building Regulations Approved Document J, for solid fuel appliances with a draught stabiliser. Refer to Section 7.1.

10.3 Boiler

10.3.1 Control Panel
Isolate the electrical power to the hopper and boiler.

Unscrew and remove the six self tapping screws securing the boiler control panel cover and lift the cover off the control panel.

Check the following:
- That both the overheat thermostat probe and thermistor bulb are fully inserted in the boiler waterway pocket, and the retaining clip is fitted. Refer to Figure 10-2.
- The condition of thermistor cable and thermostat capillary, i.e. not damaged, broken or kinked.

Refit the control panel cover and secure with the six screws previously removed.

10.3.2 Combustion Chamber
Open front access cleaning door and check:
- The ash pan is empty and correctly positioned on the base of the combustion chamber.
- The baffle (in the top of the combustion chamber) is correctly located on the fixing brackets at both sides. Refer to Figure 10-3.

Close the front access cleaning door and ensure that door catch is fully engaged (to activate door cut-out switch).

Figure 10-2: Boiler control panel (cover removed)
10 Commissioning

10.3 Heat Exchangers
To gain access to the top of both heat exchangers:

- Remove the boiler top casing panel.
- Unscrew and remove the two nuts securing the front access panel and remove it from the primary heat exchanger.
- Unscrew and remove the two nuts securing the rear access cover and remove it from the secondary (condensing) heat exchanger.

Check that the spiral baffles in the primary heat exchanger are all in place. Lift and drop each one to check all are free to move in their respective tubes.

Check that the spiral baffles in the secondary heat exchanger are all in place and are all aligned with the top edges running ‘front to back’.

Test the automatic cleaning functions as follows:

- Set the ON/STANDBY switch to STANDBY.
- Switch on the electrical supply to the hopper and boiler. The burner fan should briefly run.
- Press and hold down the ‘CLEANING’ switch, on the boiler control panel, in the ‘TEST’ position.
- Release switch to automatically reset cleaning function back to ‘AUTO’.
- Note that setting this switch to ‘TEST’ does NOT operate the burner cleaning function, but only that of the two heat exchangers.

Primary Heat Exchanger
Check the shaker unit (located in the top of the primary heat exchanger) is operating freely and that the spirals are moving up and down with two intermittent vertical motions.

Secondary Heat Exchanger
Check the wash system manifold (located under the top rear access door) is spraying water directly into each flue gas tube of the unit. Refer to Figure 10-4.

If the water jets are not spraying directly into the flue gas tubes, adjust the spray as follows:

- Slacken the two screws securing the manifold pipe flange to the boiler side panel.
- Carefully rotate the pipe until jets spray directly into tubes.
- Tighten the two screws to secure manifold pipe in this position.

Refit both front and rear access panels and secure with the nuts previously removed. Do not overtighten.

10.4 Pellet Hopper
Check the pellet feed auger is fully inserted into the pellet hopper and secured with the single screw through the auger fixing flange. Refer to Figure 10-6: Do NOT fill hopper with pellets until AFTER the auger is fitted and secured.

Ensure that fingers are clear of all moving parts inside the top of the primary heat exchanger BEFORE operating ‘CLEANING TEST’ switch.

WARNING

Ensure that only pellets that comply with ENplus A1 standard, to EN14961, are used with the Grant Spira boiler. Refer to Section 3.

Fill the hopper with pellets either:
- By hand from bags, or
- Automatically from a bulk pellet store, via a bulk auger or Grant SPIRA-VAC vacuum pellet feed system.

When using a Grant SPIRA-VAC system, refer to the Installation instructions supplied with the Grant SPIRA-VAC vacuum pellet feed system.

10.5 Safety Device Checks
10.5.1 Burn Back Thermostat
When the burner display reads ‘WAIT BOILER THERMOSTAT’ check the operation of the burn-back thermostat (on the pellet feed tube) as follows:

- Remove the steel clip from the thermostat.
- Disconnect the lead from the thermostat terminals. Refer to Figure 10-7.
The burner display screen should automatically go blank, as all power to the burner has been interrupted.

To make the burner operational again:
- Re-connect the lead.
- Refit the clip.

10.5.2 Combustion Chamber Door Switch
When the burner display reads ‘WAIT BOILER THERMOSTAT’ check the operation of the combustion chamber door interlock as follows:
- The interlock is activated by opening the combustion chamber door.
- Operate the door catch and open the door.
- The burner display screen should automatically go blank, as all power to the burner has been interrupted.

To restart the display; close the door and fully engage the door catch to re-make the cut-out switch. Refer to Figure 10-8.

Closing the door will reconnect the power supply to the burner and the display will return, confirming that the door interlock is operating correctly.

10.6 Burner Settings
The boiler comes with the burner pre-set from the factory. However, the burner settings should be checked as part of the commissioning process and recorded on the Commissioning Report form. Refer to Section 10-12.

With the electrical power to the hopper and boiler Switched on, and the burner ON/STANDBY switch set to STANDBY, check that ALL burner settings in the ‘INSTAL’ (Installer) menu are as given in Section 9.6.

Refer to Section 9.7 for details of how to access and check these settings.

Set the boiler temperature set point using buttons 1 or 2 on the burner control panel. Refer to Section 1.1 for required flow and return temperatures.

10.7 Priming the Pellet Feed Auger
The pellet feed auger MUST be fully primed BEFORE attempting to start the boiler.

Prime the auger as follows:
- Disconnect the 6-way plug (No.3), from the pellet feed auger, from the upper socket on the left side of the burner. Refer to Figure 10-9.

! WARNING

The interlock on the combustion chamber door interrupts the power supply to the burner if the door is opened. IT DOES NOT IMMEDIATELY EXTINGUISH THE BURNER FLAME. If the burner door is opened whilst the burner is firing, there can still be a large uncontrolled flame from the brazier.

- Disconnect the 7-way plug (No.1) from the socket on the left side of the burner. Refer to Figure 10-10.
- Disconnect the pellet delivery hose from the pellet feed tube (on the burner) and place in a container of at least 1 litre capacity. Refer to Figure 10-10.

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1. Insert the 6-way plug into the 7-way plug. Refer to Figure 10-11. It is not possible to connect these two plugs incorrectly as they will only fit together one way. The feed pellet feed auger will now run continuously until the plug and socket is disconnected.

2. Leave the auger running until there is a continuous flow of pellets from the pellet delivery hose. This will take between 15 to 20 minutes.

3. Disconnect the two plugs from each other and the auger will stop. The feed pellet feed auger is now fully primed.

4. Refit the pellet delivery hose onto the pellet feed tube of the burner.

5. Check the condition of the pellet delivery hose and ensure it forms an air tight seal each end. Check for damage and replace if necessary.
10 Commissioning

A damaged pellet delivery hose can allow a back draught through the boiler resulting in the pellet tube (burn back) thermostat operating and shutting down the burner.

- Finally, re-fit both the 6-way and then 7-way plugs to their corresponding sockets on the left side of the burner. Ensure that both plugs are fully pushed home until the small catch clicks into place. Refer to Figure 10-9.

**WARNING**

Ensure the pellet delivery hose forms an air tight seal each end and that the hose is not damaged. Leakage of air could cause increased temperature in the pellet delivery hose and result in the burn-back thermostat shutting down the burner.

10.8 Lighting the Boiler

Ensure that the electrical supply to the hopper and boiler is switched on connected and that the heating system controls are operating and are calling for heat.

Set the burner ON/STANDBY switch to ON. The flue fan will start and pellets will be delivered to the burner.

Refer to Section 9.1 for details of the burner start-up, running and shut down sequences.

**NOTE**

If the boiler ON/STANDBY switch is set to STANDBY during the initial pellet pre-load period, the pellet feed will continue until the pre-load is complete. The burner will then complete the shut-down sequence before it can start-up again, even if the ON/STANDBY switch is reset to ON.

If the ON/STANDBY switch is set to STANDBY during the start-up sequence, but AFTER the pre-load is finished, then the burner will immediately enter and complete the shut-down sequence before it can start-up again, even if the ON/STANDBY switch is reset to ON.

After completing the start-up sequence, the burner should be firing at maximum output and the display on the burner control shows ‘BURNER FIRING 100%’.

10.9 Combustion Chamber Draught

10.9.1 Burn Back Thermostat

The combustion chamber draught must be checked and adjusted (where necessary) as follows:

- Allow the boiler to run for a period of 15 minutes, until the boiler and flue system are warmed up.
- Ensure the burner display is showing ‘BURNER FIRING 100%’.
- Remove the screw from the draught test point, located to the left of the burner on the combustion chamber door. Refer to Figure 10-12.
- After setting the zero on the draught gauge, insert the end of the draught gauge sample tube into the test point on the door. Ensure that it is pushed through the door insulation and into the combustion chamber.
- A draught reading of between 0.1 and 0.15mbar is required (0.04 and 0.06 in.wg).

10.9.2 Draught Stabiliser Adjustment

To adjust the combustion chamber draught reading, re-position the weight on the stabiliser door arm as follows:

- To increase draught – move the weight away from the damper (or add extra weights if necessary – see right).
- To decrease draught – move the weight closer to the damper. Refer to Figure 10-13.

If it is necessary to increase the draught, but the weight fitted is already at the end of the damper arm, extra slotted disc weights (supplied with the boiler) can be used.

These weights are fitted on the “flue end” of the damper arm, as follows:

- Slacken the grub screw and slide the fitted weight along the arm towards the damper.
- Fit one of the slotted weights onto the arm.
- Secure by inserting a flat bladed screwdriver into the slot and twisting it. Refer to Figure 10-14.
- Slide both the weights to the end of the shaft and secure by tightening the grub screw in the fitted weight. Refer to Figure 10-15.

Repeat this process as necessary to achieve the required draught.

**NOTE**

If the boiler ON/STANDBY switch is set to STANDBY during the initial pellet pre-load period, the pellet feed will continue until the pre-load is complete. The burner will then complete the shut-down sequence before it can start-up again, even if the ON/STANDBY switch is reset to ON.

If the ON/STANDBY switch is set to STANDBY during the start-up sequence, but AFTER the pre-load is finished, then the burner will immediately enter and complete the shut-down sequence before it can start-up again, even if the ON/STANDBY switch is reset to ON.
10.9.3 Fan Box SliderPlate

If the combustion chamber draught is too high, and adjustment of the draught stabiliser alone cannot bring it within the required range of 0.1 to 0.15mbar (0.04 and 0.06 in.wg), it may be necessary to adjust the setting of the fan box slider plate.

This is located within the fan box and is supplied set fully closed.

Opening this slider plate allows some of the flue gases to by-pass the flue fan, and reduces the combustion chamber draught. Refer to Figure 10-16.

If required, adjust the slider plate as follows:
- With the boiler firing at maximum output and the burner display is showing 'BURNER FIRING 100%'.
- Set the draught stabiliser weight midway on the damper arm.
- Unscrew and remove the single screw securing the end of the slider plate arm.
- This screw is located on the right hand side of the fan box - immediately above the draught stabiliser.
- Carefully pull out the end of the slider arm whilst monitoring the combustion chamber draught on the draught gauge.
- When the draught gauge indicates a draught midway between 0.1 to 0.15mbar the slider position is correct.
- Without moving the position of the slider plate, bend up the end of the slider arm so the nearest hole in the arm lines up with the threaded hole in the fan box.
- Secure the slider arm to the fan box using the screw previously removed.

If necessary make any fine adjustment of the combustion chamber draught by altering the position of the weight on the damper arm.

NOTE

The normal means of setting the correct combustion chamber draught is by adjusting the position of the damper weight, as detailed in Section 10.9.2.

ONLY adjust the slider plate when absolute necessary, i.e. when the draught reading is too high and beyond the adjustment range of the damper weight.

10.10 Flue Gas Analysis

Check the %CO₂ in the flue gases as follows:
- Ensure the burner display is showing ‘BURNER FIRING 100%’.
- Remove the screw from the combustion test point, located at the left rear corner of the rear access cover (on the secondary heat exchanger). Refer to Figure 10-17.
- Insert the analyser probe a minimum of 100mm into the test point.
- Monitor the %CO₂ for a few minutes to see the maximum and minimum values reached.
- The %CO₂ measured should range between a maximum of 12% and a minimum of 10%.

If necessary the %CO₂ may have to be adjusted to be within these limits, as follows:
- Access the 'INSTAL' (Installer) menu in the burner control settings and go to the ‘SETUP FAN’ sub menu.
- Go to the ‘POWER MAXIMUM’ value and adjust the burner fan speed using buttons 5 and 6 on the burner control panel. Refer to Section 9.4.
- To decrease the %CO₂ – increase the fan speed using button 6.
- To increase the %CO₂ – decrease the fan speed using button 5.
- To confirm the change in the ‘POWER MAXIMUM’ fan setting, press button 4 twice, to exit the ‘SETUP FAN’ and ‘INSTAL’ menus and return to the normal control panel display (showing H₂O and SET temperature).
- Monitor the %CO₂ for a few minutes to see if the maximum and minimum values are 12% and 10% as required.
- If necessary make a further adjustment of the fan speed and check the resulting %CO₂ as described above, until it remains within the required maximum and minimum limits.
- Record the maximum and minimum values on the Commissioning Report form. Refer to Section 10.12.

NOTE

It is essential to continue to monitor the combustion chamber draught, whilst adjusting the CO₂ in the flue gases, and to adjust the draught stabiliser to keep it within the required limits. Refer to Section 10.9.

On double boiler installations, the above process – as covered in Sections 10.3 to 10.10 – must be fully carried out on BOTH boilers.

10.11 Customer Handover

The customer/user must be informed of the correct operation and use of their Grant Spira wood pellet boiler installation. This must include the following information:
- The use of the boiler controls – how to switch the boiler off and on, as required. Refer customer to the User Instructions at the back of this manual.
10 Commissioning

- The use of the heating system controls – how to set the programmer, room and cylinder thermostats, etc.
- The importance of using the correct type of wood pellet.
- The need to routinely check the pellet level in the pellet hopper and how to re-fill it (hopper only installations).
- The need to routinely check the pellet level in the bulk pellet store (bulk pellet store installations only).
- How to access the ash pan and the need to periodically empty the ash pan. Refer to Section 1.5 and the User instructions.
- The need to have the boiler serviced either annually or when ‘SERVICE’ is shown on the burner control panel display (whichever comes first). Refer to Section 1.5 and User Instructions.
- That servicing should only be carried out by a Grant Approved installer.

10.12 Commissioning Report Form

The Commissioning Report form (supplied with the boiler) must be completed at the end of the commissioning process. Refer to Section 4.7.

For a double boiler installation, a commissioning form must be completed for each of the two boilers.

The following information must be entered on the form:

- Boiler details (model, serial No., etc.)
- Combustion readings
- Installation details
- Burner settings
- Customer handover details

The completed form must be signed by both installer and customer/user.

A copy of the completed form must be left with the customer/user, one must be returned to Grant UK and the remaining third copy retained by the Installer.

10.13 Commissioning Check List

The following checklist must be used in conjunction with the preceding information given in this section:

<table>
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**Boiler**
- Control panel
- Combustion chamber
- Heat exchangers – primary
- Heat exchangers – secondary

**Pellet Hopper**
- Auger
- Pellets

**Safety Device Checks**
- Burn-back thermostat
- Combustion chamber door switch

**Priming Pellet Feed Auger**

**Lighting the Boiler**

**Combustion Chamber Draught**

**Flue Gas Analysis**

**Customer Handover**

**Commissioning Report Form**
11 Boiler Servicing

11.1 General
It is essential that the Grant Spira boiler is serviced at regular intervals of no longer than 12 months OR when the ‘SERVICE’ is shown on the burner control panel display.

The burner will automatically indicate ‘SERVICE’ on the burner control panel display once the pre-set period of pellet feed auger run time (‘HOURS SERVICE’) is achieved. Refer to Section 9.7 for details on how to access and check this setting in the ‘INSTAL CLEAN’ sub-menu of the burner settings.

This interval is based on the auger running time, i.e. the actual quantity of pellets used based on the pellet feed auger rate and pellet delivery settings. Refer to Section 9.7 for details on how to access and check this setting in the ‘POWER PELLET’ sub-menu of the burner settings.

The ash pan (located inside the combustion chamber) will need to be periodically emptied. This simple task must be carried out by the user at MONTHLY intervals for the FIRST THREE MONTHS. Thereafter, the ash pan should be emptied regularly, on at least a monthly basis, or as indicated by the amount of ash found during the first three months. Two carrying handles are supplied with the boiler to allow removal of the ash pan when hot.

Servicing and replacement of parts must only be carried out by a Grant Approved installer who has successfully completed the Grant Spira wood pellet boiler training course.

11.2 Checks Before Servicing
BEFORE starting any service work on the boiler or pellet storage/supply installation:

- Set the ON/STANDBY switch, on the boiler control panel, to STANDBY. If the boiler was operating, wait for it to shut-down and ‘WAIT BOILER THERMOSTAT’ is shown on the burner control panel display before proceeding further.
- Isolate the electrical supply to the hopper and boiler and remove the 5A fuse from the fused spur.
- Disconnect the 5-way plug (on the lead from the hopper) from the socket at the left rear of the boiler. Refer to Figure 11-1.
- If a double boiler installation, remove the 5-way plug from both boilers.
- Disconnect the 5-way plug (on the lead from the flue fan and solenoid) from the socket at the right rear of the boiler. Refer to Figure 11-2.

This will allow the hopper to be moved to give easy access to the rear of the boiler for servicing.

NOTE
Details of every service should be entered in the Service log at the front of this manual.

WARNING
Before starting any work on the boiler, or on the pellet storage and supply installation, please read the health and safety information in Section 15.

11.3 Heating System
If boiler is part of a sealed heating system, check the following:

- System pressure
- Pressure relief valve operation
- Expansion vessel air charge pressure (when the system pressure is zero)

Check the boiler for any indication of leaks from:

- Flow and return connections
- Automatic air vent (at rear of boiler)
- Drain cock (at lower rear of boiler)

Remake any joints and re-check tightness of any fitting that may be leaking.

Re-fill and vent the system to the required pressure. Refer to Section 6.

On either sealed or open-vented systems:

- Inspect and clean the in-line magnetic filter in accordance with the filter manufacturer’s instructions.
- Ensure that adequate corrosion protection is present in system.

11.4 Flue System
11.4.1 Flue Terminal
Check the flue terminal and ensure that it is not blocked or damaged.

11.4.2 Fan Box
Unscrew the eight screws securing the flue inspection plate on to the fan box and remove the plate. Inspect inside of both flue and fan box. Refer to Figure 11-3. Clean any ash deposits from the inside of the fan box, as necessary.

Clean the flue by sweeping, as required.

Replace plate and secure using the eight screws, ensuring that it is correctly sealed to the fan box on the neoprene gasket.
11.4.3 Draught Stabiliser
Check draught stabiliser damper is free to move. Remove draught stabiliser from fan box and clean if required. Refer to Figure 11-2.

Re-fit draught stabiliser to fan box and check damper is free to move.

Draught stabiliser setting must be checked when boiler is operational. Refer to Section 11.9.

11.4.4 Flue Fan
Unscrew the four screws securing the flue fan to the fan box and remove the fan. Clean any ash deposits from the fan blades and mounting plate. Refer to Figure 11-3.

Re-fit fan to fan box and secure with screws. Ensure that it is correctly sealed to the fan box on the neoprene gasket.

Re-fit the 5-way (on the lead from the flue fan and solenoid) into the socket at the right rear of the boiler. Refer to Figure 11-2.

11.4.5 Flue Fan
Unscrew the four screws securing the flue fan to the fan box and remove the fan. Clean any ash deposits from the fan blades and mounting plate. Refer to Figure 11-3.

Re-fit fan to fan box and secure with screws. Ensure that it is correctly sealed to the fan box on the neoprene gasket.

Re-fit the 5-way (on the lead from the flue fan and solenoid) into the socket at the right rear of the boiler. Refer to Figure 11-2.

11.5 Combustion Ventilation
Check that the combustion air supply conforms to the relevant requirements of The Building Regulations Approved Document J, for solid fuel appliances with a draught stabiliser. Refer to Section 6.1.

Check that all ventilation openings are free from any obstructions, both inside and outside. If necessary remove any blockages (e.g. fluff, dog hair, leaves, etc.).

11.6 Boiler

11.6.1 Control Panel

WARNING
Failure to maintain a clean flue can result in the emission of flue gases into the dwelling or damage from potential fire in the flue.

Ensure the electrical supply to the hopper and boiler is isolated by disconnecting the 4-way plug from the socket (on the flying lead) at the rear of the hopper.

Unscrew and remove the six self tapping screws securing the boiler control panel cover and lift the cover off the control panel.

Proceed as follows:
- Check both the overheat thermostat probe and thermistor bulb are fully inserted in the boiler waterway pocket, and the retaining clip is fitted. Refer to Figure 11-6.
- Check the condition of thermistor cable and thermostat capillary, i.e. not damaged, broken or kinked.
- Grease the edge of the shaker motor cam with high temperature grease. Refer to Figure 11-7.

Re-fit the control panel cover and secure with the six screws previously removed.

11.6.2 Heat exchangers

To gain access to the top of both heat exchangers. (Refer to Figure 11-7):
- Remove the boiler top casing panel.
- Unscrew and remove the two nuts securing the front access panel and remove it from the top of the primary heat exchanger.
- Unscrew and remove the two nuts securing the rear access cover and remove it from the top of the secondary (condensing) heat exchanger.

CAUTION
When cleaning the fan blades ensure they are all thoroughly cleaned. Uneven cleaning will result in the fan being ‘out of balance’ and could cause damage to the fan motor.

WARNING
Failure to maintain a clean flue can result in the emission of flue gases into the dwelling or damage from potential fire in the flue.

Failure to maintain a clean flue can result in the emission of flue gases into the dwelling or damage from potential fire in the flue.

Figure 11-6: Boiler control panel (cover removed)

Figure 11-7: Shaker motor cam location

Figure 11-8: Top of heat exchangers

Figure 11-4: Draught stabiliser

Figure 11-5: Flue fan

Figure 11-6: Boiler control panel (cover removed)

Figure 11-7: Shaker motor cam location

Figure 11-8: Top of heat exchangers
Operate the automatic cleaning function in both heat exchangers, as follows:

- Set the ON/STANDBY switch to STANDBY.
- Re-fit the 5-way plug (on the lead from the hopper) into the socket at the left rear of the boiler. Refer to Figure 11-1.
- Replace the 5A fuse in the fused spur and switch on the electrical supply to the hopper and boiler. The burner fan should briefly run.
- Press and hold down the ‘CLEANING’ switch, on the boiler control panel, in the ‘TEST’ position for about 60 seconds.
- Release switch to automatically reset cleaning function back to ‘AUTO’.

Note that setting this switch to ‘TEST’ does NOT operate the burner cleaning function, but only that of the two heat exchangers.

Ensure the electrical supply to the hopper and boiler is isolated by disconnecting the 4-way plug from the socket (on the flying lead) at the rear of the hopper.

**Primary heat exchanger** – clean as follows:
- Remove all of the mild steel spirals by lifting them vertically up and out from the primary heat exchanger tubes.
- Clean down any ash inside tubes, using a suitable pipe brush, into the combustion chamber and ash pan below.
- Clean all ash deposits from top chamber of the primary heat exchanger (above tubes) and shaker mechanism/plates, using brush and vacuum.
- Clean and check condition of all spiral baffles.
- Re-fit spiral baffles into heat exchanger tubes, fitting them through shaker plates.
- Lift and drop each spiral to check that all spirals are free to move in their respective tubes.

**Secondary heat exchanger** – clean as follows:
- Shut off cold water supply to wash system manifold.
- Remove the securing clip from the end of the solenoid valve shaft. Then separate solenoid head from valve body.
- Unscrew the two screws securing the manifold pipe flange to the boiler side panel.
- Carefully remove the wash system manifold pipe through the side of the secondary heat exchanger and boiler.
- Check and clean the manifold tube thoroughly, ensuring that all the jets are clear. Rinse inside of manifold pipe to ensure all ash deposits and other debris is removed.
- Remove all of the stainless steel spirals from the secondary heat exchanger tubes.
- Clean down any ash inside tubes, using a suitable pipe brush, into the base of the condensing heat exchanger below.
- Clean all ash deposits from top chamber of secondary heat exchanger (above tubes) and from rear flue gas duct (at rear of secondary heat exchanger) using brush and vacuum.
- Clean and check condition of all spiral baffles. Replace if necessary.
- Re-fit baffles into heat exchanger tubes, such that all the top edges of the baffles are running ‘front to back’. Refer to Figure 11-5.
- Re-fit wash system manifold tube using the two screws previously removed, but do not tighten at this stage (the wash system manifold needs to be correctly aligned once the boiler power supply is reconnected).
- Re-fit solenoid head to valve body and secure in place with the spring clip.

Test the automatic cleaning functions as follows:
- Check the ON/STANDBY switch is set to STANDBY.
- Re-connect the electrical supply to the hopper and boiler by fitting the 4-way plug into the socket (on the flying lead) at the rear of the hopper. The burner fan should briefly run.
- Press and hold down the ‘CLEANING’ ‘TEST’ switch on the boiler control panel.

**WARNING**

Ensure that fingers are clear of all moving parts inside the top of the primary heat exchanger BEFORE operating ‘CLEANING TEST’ switch.

**Primary Heat Exchanger**

Check the shaker unit (located in the top of the primary heat exchanger) is operating freely and that the spirals are moving up and down with two intermittent vertical motions.

If there is no movement of the shaker system, isolate the electrical supply and check that:
- the motor and cam is rotating.
- the cam follower is in contact with the cam.
- the condition of the cam follower spring (located in the rear of the control panel). Replace if necessary.

**Secondary heat exchanger**

Check the wash system manifold (located under the top rear access door) is spraying water directly into each flue gas tube of the unit. Refer to Figure 11-4.

If the water jets are not spraying directly into the flue gas tubes, adjust the spray as follows:
- Slacken the two screws securing the manifold pipe flange to the boiler side panel.
- Carefully rotate the pipe until jets spray directly into tubes.
- Tighten the two screws to secure manifold pipe in this position.

Inspect the condition of the two access panels before re-fitting. Replace any damaged or worn rope seal or gaskets if necessary.

Re-fit both front and rear access panels and secure with the nuts previously removed. Do not overtighten.

Ensure that the rear access panel is fitted with the flue gas sample point in the rear left hand corner.
11 Boiler Servicing

11.6.3 Combustion Chamber

**WARNING**

Ensure the electrical supply to the hopper and boiler is isolated by disconnecting the 4-way plug from the socket (on the flying lead) at the rear of the hopper, before proceeding.

Disconnect the pellet delivery hose from the burner pellet feed tube. Then fully open the combustion chamber door on the front of the boiler and clean as follows:

- Before moving the combustion chamber baffle (located in the top of the combustion chamber) remove all ash deposits from the upper surface using a vacuum. Refer to Figure 11-8.
- Remove and inspect the baffle and clean off any remaining deposits using a brush and vacuum.
- Check the baffle condition and replace if necessary.
- Clean the underside of upper rear section of the primary heat exchanger (at the rear of combustion chamber) BEFORE replacing baffle.
- Clean down the combustion chamber side, back and base surfaces, removing all ash deposits.
- Clean any ash deposits from the top of the burner hood and the inner face of the combustion chamber door.
- Clean out the burner brazier to remove as much loose ash as possible using a vacuum.
- Refit the combustion chamber baffle in position ensuring it is seated correctly on the fixing brackets. Refer to Figure 11-8.
- Refit the ash pan in the base of the combustion chamber.
- Grease the front cleaning door latch mechanism and close the door.

11.7 Burner Brazier

**WARNING**

Ensure that electrical supply to the hopper and boiler is isolated by disconnecting at the 4-way plug from the socket (on the flying lead) at the rear of the hopper, before proceeding.

11.7.1 Removal of Burner

To clean the burner thoroughly it will be necessary to remove it from the boiler, as follows:

- Disconnect the three plugs from the left side of the burner. Refer to Figure 11-9.
- Remove the steel clip from the burn back thermostat (on the pellet feed pipe) and disconnect the lead from the thermostat terminals.
- Remove the red burner cover by loosening the four M5 screws (two each side of the cover) and lifting it off the burner.
- Whilst supporting the burner, unscrew and remove the two M8 burner securing nuts, one on each side of the burner. Refer to Figure 11-10.

**CAUTION**

Extreme care is required when emptying the ash pan as smouldering ash could be present and cause serious damage to persons or property. Ensure the ash is disposed of in a safe manner.

11.7.2 Cleaning Burner Brazier

Dismantle and clean the burner as follows:

- Carefully withdraw the burner from the combustion chamber door taking care not to damage the burner door gasket.
- Place the burner on a suitable bench (e.g. portable ‘workmate’ type bench or similar) to work on.
- Remove the burner hood by loosening the two M5 bolts (highlighted below) each side of the brazier. Slide the forwards and then up to disengage the hood from the burner. Refer to Figure 11-11.
- Clean and inspect the hood for any damage or distortion. Replace if necessary. Remove all ash deposits and check that all air holes (on the inside surface of the hood) are clear.
NOTE

After a period of time in use, the semi-circular end wall of the brazier hood may distort or show minor cracks. This does not affect the operation of the burner. The hood should only be changed if there is considerably deterioration.

- Open the brazier manually by operating the release switch on the servo motor and carefully pulling on the end wall of the brazier.
- To operate the switch and release the motor, either press and hold down the switch down or lift and hold the switch up – depending on motor type used. Refer to Figure 11-12.

WARNING

DO NOT ATTEMPT TO FORCE THE BRAZIER OPEN WITHOUT OPERATING THE SERVO MOTOR RELEASE SWITCH.

Failure to operate the servo motor release switch WILL result in damage to the servo motor gears.

With the brazier open, dismantle the brazier to thoroughly clean all parts as follows, referring to Figure 13-2:

- Unscrew and remove the upper two M6 nuts and washers on either side of the brazier chassis, securing the two brazier flame plates.
- Remove the four M6 screws from the inside of the brazier.
- Unscrew and remove the two M6 screws securing the photocell back plate to the burner.
- Remove both the two brazier flame plates and photocell back plate from brazier.
- Unscrew and remove the two M6 nuts and washers on either side of the brazier chassis securing the 3-sided grate enclosure.
- Remove the four M6 screws from inside the brazier and remove the grate enclosure.
- Unscrew and remove the two M6 screws and washers (one each side of the brazier chassis) securing the ignition element mounting plate, and remove it from the brazier chassis.
- From below the burner, unscrew and remove the single cap screw attaching the push rod of the moveable brazier base to the shaft of the servo motor.
- Disengage the push rod from the motor shaft and remove brazier base assembly from the brazier chassis.

Inspect all components for distortion or damage and replace if necessary.

Clean all ash and clinker deposits from all surfaces (in particular the upper surface of the brazier chassis and the underside of the brazier base assembly) using wire bush and, where necessary, a flat scraper.

Ensure that all air holes are clear.

Reassemble the brazier using the following procedure:

- Fit the moveable brazier base assembly to the burner and reconnect the pushrod to the motor shaft using the cap screw.
- Whilst operating the servo motor release switch, push the brazier base assembly fully back into the brazier chassis.
- Insert the brazier clearance gauge plate (supplied with the boiler) between the brazier chassis and brazier base assembly. Refer to Figure 11-13.
- The clearance gauge should slide in using manual force only. DO NOT FORCE THE GAUGE INTO THE BRAZIER!
- Reassemble the remainder of the brazier, using the reverse of the dismantling procedure.
- Leave all screws loose until all components (excluding the burner hood) are assembled correctly.

BEFORE fitting the burner hood, tighten the two screws securing the photocell back plate to the front of the burner.

- Fit the burner hood and then finally tighten all remaining burner fixings.
- Remove brazier clearance gauge from burner brazier.
- Operate servo motor release switch and manually open and close brazier to check it is free to move.

失败 to operate the servo motor release switch WILL result in damage to the servo motor gears.

With the brazier open, dismantle the brazier to thoroughly clean all parts as follows, referring to Figure 13-2:

- Unscrew and remove the upper two M6 nuts and washers on either side of the brazier chassis, securing the two brazier flame plates.
- Remove the four M6 screws from the inside of the brazier.
- Unscrew and remove the two M6 screws securing the photocell back plate to the burner.
- Remove both the two brazier flame plates and photocell back plate from brazier.
- Unscrew and remove the two M6 nuts and washers on either side of the brazier chassis securing the 3-sided grate enclosure.
- Remove the four M6 screws from inside the brazier and remove the grate enclosure.
- Unscrew and remove the two M6 screws and washers (one each side of the brazier chassis) securing the ignition element mounting plate, and remove it from the brazier chassis.
- From below the burner, unscrew and remove the single cap screw attaching the push rod of the moveable brazier base to the shaft of the servo motor.
- Disengage the push rod from the motor shaft and remove brazier base assembly from the brazier chassis.

Inspect all components for distortion or damage and replace if necessary.

Clean all ash and clinker deposits from all surfaces (in particular the upper surface of the brazier chassis and the underside of the brazier base assembly) using wire bush and, where necessary, a flat scraper.

Ensure that all air holes are clear.

Reassemble the brazier using the following procedure:

- Fit the moveable brazier base assembly to the burner and reconnect the pushrod to the motor shaft using the cap screw.
- Whilst operating the servo motor release switch, push the brazier base assembly fully back into the brazier chassis.
- Insert the brazier clearance gauge plate (supplied with the boiler) between the brazier chassis and brazier base assembly. Refer to Figure 11-13.
- The clearance gauge should slide in using manual force only. DO NOT FORCE THE GAUGE INTO THE BRAZIER!
- Reassemble the remainder of the brazier, using the reverse of the dismantling procedure.
- Leave all screws loose until all components (excluding the burner hood) are assembled correctly.

BEFORE fitting the burner hood, tighten the two screws securing the photocell back plate to the front of the burner.

- Fit the burner hood and then finally tighten all remaining burner fixings.
- Remove brazier clearance gauge from burner brazier.
- Operate servo motor release switch and manually open and close brazier to check it is free to move.

Figure 11-13: Manual opening of brazier

Figure 11-14: Fitting brazier clearance gauge

Figure 11-15: Interior of burner enclosure

11.8 Burner Components

Check the burner fan inlet is clear of debris.

If there is a build-up of debris remove the burner fan and clean the fan blades and fan housing. Refer to Figure 11-14.

11.8.1 Burner Fan

Check the burner fan inlet is clear of debris. If there is a build-up of debris remove the burner fan and clean the fan blades and fan housing. Refer to Figure 11-14.
11 Boiler Servicing

11.8.2 Photocell
Remove photocell from mount. Check and clean the photocell. Replace if damaged. Refer to Figure 11-14.

Remove the two screws securing the photocell mount and pull out the photocell tube. Check the condition and thoroughly clean the inside of the tube. Refit tube to burner.

Ensure the photocell clamp is fitted 25mm from end as shown in Figure 11-15. Refit into photocell mount

![Figure 11-16: Photocell clamp position](image)

11.8.3 Ignition Element
Remove and check the condition of the ceramic heating element. Replace if damaged.

To remove the element from the tube, grasp the black grommet and pull out of the tube. Do NOT pull on the element power cable.

Unscrew and remove the single screw securing the ignition element tube and pull it out of the burner.

Check the condition and thoroughly clean the inside of the tube. Replace the tube in the burner and secure with the screw.

Check that the ceramic element is correctly fitted into the ceramic socket. Replace the ignition element in the tube, ensuring that the element is correctly mounted and fixed to the top of the tube.

![Figure 11-17: Ceramic ignition element](image)

11.8.4 Pellet Feed Tube
Unscrew the three fixing screws and remove the feed pipe and gasket from the top of the burner.

Check the condition of the gasket and replace if necessary.

Check the condition of the feed tube and thoroughly clean the inside.

Check that the burn back thermostat is correctly mounted and fixed to the top of the tube.

Replace on burner, ensuring gasket is correctly fitted, and secure with the three screws

11.9 Re-fitting Burner
Before re-fitting the burner, check the condition of the burner door gasket. Replace if necessary.

With the gasket correctly located, re-fit the burner to the combustion chamber door. Carefully insert the burner brazier through the opening and locate the holes in the burner flange onto the M8 studs (on either side of the burner).

Secure the burner to the door with the two M8 nuts previously removed.

Re-connect the three plugs to their corresponding sockets on the left side of the burner. Ensure that each plug is fully pushed home until the small catch clicks into place. Refer to Figure 11-9.

Check the condition of the pellet delivery hose and ensure it forms an air tight seal each end.

Check for any damage to the hose and replace if necessary.

A damaged pellet delivery hose can allow a back draught through the boiler, resulting in the pellet tube (burn back) thermostat operating and shutting down the burner.

11.10 Condensate Disposal System

11.10.1 Condensate Trap
Disconnect the condensate disposal system from the outlet at the back of the boiler. Check that the boiler condensate outlet is clear. Remove any blockage or ash build-up.

Remove the condensate trap (supplied with the boiler) from the condensate disposal system. Dismantle and check the condition of the trap.

Thoroughly clean out the trap to remove any deposits and re-fit to condensate disposal system.

Reconnect the disposal system to boiler outlet.

11.11 Burner Settings
With the electrical power to the hopper and boiler Switched on, and the burner ON/STANDBY switch set to STANDBY, check that ALL burner settings in the ‘INSTAL’ (Installer) menu are as given in Section 9.6.

Check the burner control settings match those set on commissioning (i.e. as recorded on the Commissioning Report form), a copy of which was left with the householder/user.

Refer to Section 9.7 for details of how to access and check these settings.

Reset the SERVICE timer as follows:

- Go to the ‘CLEAN’ sub menu in the installer (‘INSTAL’) menu
- Go to the ‘RESET SERVICE’ setting.
- Press button 3 to reset timer to zero.

Refer to Section 9.7.1.3 for further details on settings.
11.12 Safety Device Checks

The following safety checks must be made before putting the boiler back into operation:

11.12.1 Burn Back Thermostat
Check operation of burn back thermostat. Follow the procedure given in Section 10.5.1

11.12.2 Combustion Chamber Door Switch
Check operation of combustion chamber door switch. Follow the procedure given in Section 10.5.2.

11.13 Combustion Checks

To ensure safe and efficient operation of the boiler, it is essential that the boiler combustion is re-checked and adjusted as necessary.

11.13.1 Combustion Chamber Draught
Check the combustion chamber draught, and adjust the draught stabiliser setting as required. Follow the procedure given in Section 9.9.

11.13.2 Flue Gas Analysis
Check the %CO₂ in the flue gases and adjust the burner fan setting as required. Follow the procedure given in Section 10.10.

WARNING

To ensure safe and efficient operation of the boiler it is important that boiler/burner is re-commissioning as detailed in Section 10.
12 Fault Finding

12.1 General
If a fault occurs with the boiler, the display screen on the burner control panel helps to identify the nature and cause of that fault.

There are THREE basic screen displays that can be seen in the event of a fault, as follows:

a) Normal screen display (with WAIT BOILER THERMOSTAT continuously scrolling across the lower part of the screen). Refer to Figure 12-1.

If this is the case go to Section 12.2 for fault finding procedure.

b) No display – screen is BLANK. Refer to Figure 12-2.

If this is the case go to Section 12.3 for fault finding procedure.

c) An ERROR message is displayed.

If this is the case refer to ‘Error Messages’ below.

It is essential, at this stage, to check and identify which of these three displays is shown on the burner control panel screen, before proceeding to attempt to diagnose the fault.

Error Messages
There are FOUR possible error messages that can be displayed on the burner control panel screen in the event of a fault. In all cases the cursor will be next to the error symbol (at the lower left corner of the display). Refer to Figure 12-3.

The four possible error messages that can be displayed (continuously scrolling across the lower part of the screen) are listed below. Each one identifies a particular fault. Refer to the relevant section of this manual for detailed guidance to diagnose and rectify the fault, as follows:

- FAILED PELLET LIGHTING - Go to Section 12.6
- SERVO MOTOR BLOCKED - Go to Section 12.7
- PROBE FAULT - Go to Section 12.8
- AIR PRESSURE ERROR - Go to Section 12.9
Note 1 - Is the cursor next to the thermostat symbol on the burner display?
When there is a switched live supply to the burner (i.e. when the heating system controls are ‘calling’ and the ON/STANDBY switch is set to ON), the burner screen display shows a cursor highlighted next to the boiler thermostat symbol. Refer to Figure 12-4.

Note 2 - Is the boiler above ‘DELTA RESTART’ temperature?
If the boiler has exceeded the ‘TEMP OF H2o’ setting (80°C) the boiler will shut down. The boiler temperature will have to fall to below the ‘DELTA RESTART’ value (5°C below the boiler set point temperature) before it can start again. Refer to Section 9.1.

Note 3 - Is there a sufficient quantity of pellets in the pellet hopper?
The effect of insufficient pellets will depend on the type of pellet storage used, as follows:

Using a pellet hopper only – if there are insufficient pellets, the hopper contents switch will break the switched live to the boiler, causing ‘WAIT BOILER THERMOSTAT’ to be displayed. Refill the hopper to start the boiler. Refer to Section 1.4.4 for further details.

Using a bulk pellet store – the hopper contents switch will control the operation of either the bulk store auger or Grant Spira-vac system. It will NOT interrupt the switched live to the boiler and thus ‘WAIT BOILER THERMOSTAT’ will NOT be displayed. The boiler would continue to operate until ALL pellets in the hopper are used and then stop, with ‘FAILED PELLET LIGHTING’ displayed on the burner control screen.

In this case, check that:
- there are pellets in the bulk store auger, or Grant Spira-vac system, is operating correctly (refer to instructions supplied with the Spira-vac system).
- Rectify as necessary.

Note 4 - Is there a switched live from the heating system controls connected to the hopper/boiler?
Check that switched live from the controls is correctly connected to terminal L2 on the 4-way plug at the rear of the hopper. Also check that this 4-way plug is fully pushed into the socket on the flying lead, at the rear of the hopper. Refer to Sections 8.4 and 8.5 for further details.

Check that ALL controls (programmer and room thermostat) are ‘calling’ and that there is a 230V output to the boiler.

Note 5 - Is there continuity between terminals T1 and T2 on burner plug No.2?
Disconnect the plug from left side of burner and check for continuity between terminals T1 and T2. Refer to Figure 8-5 for wiring details.
### 12.3 No Screen Display - Boiler will not fire – blank screen

**Note 1** - Is there a permanent mains live supply connected to the hopper/boiler?

Check that the permanent live from the fused spur is correctly connected to terminal L1 on the 4-way plug at the rear of the hopper. Also check that 4-way plug is fully pushed into the socket on the flying lead, at the rear of the hopper. Refer to Sections 8.4 and 8.5 for further details.

Also check that 5-way plug from hopper is fully pushed into the socket at the top left rear of the boiler.

Check that the fused spur is switched ON and, if necessary, check the fuse is OK.

**Note 2** - Is there a permanent mains live supply connected to the burner?

Check that the two 7-way plugs are fully pushed into the two lower sockets on the left side of the burner.

Also check for permanent live on terminal L1 of burner plug No.1. Refer to Figure 8-5.

**Note 3** – Has the boiler overheating thermostat tripped?

Unscrew and remove the black cover from the overheating reset button on the boiler control panel to check if boiler overheating thermostat has tripped. If YES, go to Section 12.4 for further guidance.

**Note 4** – Has the pellet feed tube thermostat tripped?

Remove the steel retaining clip and disconnect the lead from the pellet feed tube (burn back) thermostat. Check the reset button to see if thermostat has tripped. If YES, go to Section 12.5 for further guidance.

**Note 5** - Is the combustion chamber door closed and catch fully engaged?

The combustion chamber door is fitted with a safety interlock. Once the door catch is disengaged all power to the burner is interrupted. Refer to Section 10.5.2. Check that catch is FULLY engaged when door is closed.

**Note 6** - Is the door micro-switch operational?

Check electrical continuity of door micro-switch. Replace if faulty. Refer to Figure 8-5 and 12-4.
Note 7 - Is the fuse on the PCB OK?

Remove fuse from holder on PCB and check. Replace if necessary. Fuse type F5AL250V. Refer to Figure 12-5.

**Figure 12-6:** Location of fuse on PCB
Note 1 - Is heating system and boiler full of water and vented?
The central heating system must be free of any air locks. Ensure auto air vent on secondary heat exchanger (at left rear of the boiler) is open and vented. Vent the primary heat exchanger on the heating flow pipe. If installed on a sealed system: check expansion vessel charge pressure and correct as necessary. Check system pressure and top-up as necessary. Refer to Section 7 for sealed system details.

Note 2 - Is the heating thermistor correctly fitted?
Isolate electrical supply and remove boiler control panel cover. Check that the heating thermistor, and the overheat thermostat sensor, are correctly fitted into the pocket (inside the boiler control panel). Refer to Section 10.3.1. Ensure that both are held in place with the retaining clip supplied.

Also, check the condition of the thermistor and the overheat thermostat capillary for any damage, replace if necessary.

Note 3 - Is there continuity between the overheat thermostat terminals?
With electrical supply isolated, reset the overheat thermostat and check electrical continuity across the terminals. If no continuity found, replace the overheat thermostat. Note that the thermostat continuity can be checked by removing the 7-way plug (plug No. 1) from the socket on the left of the burner and testing between terminals T1 and T2. Refer to Section 8 and Figure 8-5.

Note 4 - Is the circulating pump operational?
With the burner ON/STANDBY switch set to “STANDBY”, reconnect the power supply to the boiler and check that the heating system controls are “calling”. Set the switch to ON and the pump should be running.
If not check that:
• the pump is vented
• there is power to the pump
• that the pump is not seized/stuck
If pump has failed then replace it.

Note 5 - Is there any restriction to water flow from the boiler?
Check that all valves on the heating circuit are open and that there are no blockages. Rectify as necessary.
12.5 Pellet Tube Thermostat

Primary Fault

Secondary follow on checks

**BLANK DISPLAY SCREEN**

**PELLET TUBE STAT TRIPPED**

When pellet tube has cooled - does pressing RESET button on stat correct the fault?

- No
- Yes

Is the pellet delivery hose damaged?

- No
- Replace pellet delivery hose

Is the room ventilation adequate?

- No
- Unblock or increase ventilation as required

Is the mains water supply to boiler connected & switched on?

- No
- Connect the mains water supply & switch on

Is the boiler wash system operating correctly when tested (using the test switch)?

- No
- Is the boiler cleaning system operating correctly when tested (using the test switch)?

Is the boiler cleaning interval correctly set?

- No
- In burner menu reset 'TIME CLEAN BRAZIER' & 'TIME CLEAN BOILER' settings

Is the duration of the boiler cleaning period correctly set?

- No
- In burner menu reset 'TIME CLEAN PERIOD' setting

Check that manifold jets are clear & correctly set?

- No
- Is is lea correctly connected?

Is there continuity between the terminals?

- No
- Replace pellet tube stat

Is the lead correctly connected?

- No
- Is the mains water supply to boiler connected & switched on?

Is the room ventilation adequate?

- No
- Unblock or increase ventilation as required

Is the boiler wash system operating correctly when tested (using the test switch)?

- No
- Is the boiler cleaning system operating correctly when tested (using the test switch)?

Is the boiler cleaning interval correctly set?

- No
- In burner menu reset 'TIME CLEAN BRAZIER' & 'TIME CLEAN BOILER' settings

Is the duration of the boiler cleaning period correctly set?

- No
- In burner menu reset 'TIME CLEAN PERIOD' setting

Check that manifold jets are clear & correctly set?

- Yes
12 Fault Finding

12.5 Pellet Tube Thermostat

Note 1 - Is the fault cleared by pressing the reset button?
Is the pellet feed tube less than 60°C?
If not then allow it to cool before proceeding.

When cool, remove the steel retaining clip and disconnect the lead from the pellet feed tube (burn back) thermostat.
Press the reset button on the thermostat.

Note 2 - Is feed pipe thermostat (burn back sensor) damaged or faulty?
Check the electrical continuity and condition of the thermostat. Replace if necessary.

Note 3 - Is the pellet delivery hose damaged/correctly fitted?
Check the condition of the hose. Is it damaged? If so replace it.
Is it fitted correctly at both ends – with an air tight fit onto both pellet feed pipe and pellet auger outlet? Rectify as necessary.

A damaged (or incorrectly fitted) pellet delivery hose can allow a back draught through the boiler, resulting in the pellet tube (burn back) thermostat operating and shutting down the burner.

Note 4 - Is the ash pan overflowing?
An overflowing ash pan, and ash build-up on the baffle, can block the passage of the combustion gases from the burner, causing them to back-up through the burner into the pellet feed tube. This will activate the pellet feed tube (burn back) thermostat.

Note 5 - Is combustion chamber draught correct?
Check combustion chamber draught. Refer to Section 10.9 for procedure.
If it is incorrect, BEFORE making any adjustment to the draught stabiliser, carry out the following checks as per the flow chart:
- Is condensate trap or pipework blocked or frozen? Defrost/remove blockage as necessary.
- Is ash pan overflowing? Empty and clean ash pan as necessary.
- Is the flue system incorrectly installed or blocked? Rectify as necessary.
- Is the flue fan operational?
- Is the room ventilation adequate?
If all the above are OK, then adjust the draught stabiliser as necessary to achieve the required combustion chamber draught. Refer to Section 10.9 for procedure.

Note 6 - Is condensate trap/pipe blocked?
Thoroughly check the entire condensate disposal system, including all the pipework and the trap(s), to ensure that it is not blocked or frozen (even partially).

If the condensate backs-up into the condensing heat exchanger, it can block the passage of the combustion gases from the burner, causing them to back-up through the boiler and burner into the pellet feed tube. This will activate the pellet feed tube (burn back) thermostat.

Note 7 - Is the flue correct type and correctly installed?
Only the Grant Black flue system can be used with the Grant Spira wood pellet boilers. Check that the flue has been correctly assembled and that the terminal position complies with the requirements of The Building Regulations – Approved Document J. Refer to Sections 7.2 for guidance.

Note 8 - Is flue fan operational and clean?
If the flue fan is not running, or is coated with ash, the draught in the combustion will be reduced causing the combustion gases from the burner to back-up through the burner into the pellet feed tube. This will activate the pellet feed tube (burn back) thermostat.

Note 9 - Is the room ventilation adequate?
Check that sufficient permanent ventilation is present in the room containing the boiler(s). Refer to Section 7.1 for guidance.

Lack of ventilation will lead to incomplete combustion, and an increased temperature in the pellet feed tube that will activate the burn back thermostat.

Note 10 - Is the wash system operating correctly?
Check the water supply to the wash system is connected and turned on. Operate the CLEANING switch and check the solenoid valve is opening and the water jets are all clear and spraying into heat exchanger tubes. Refer to Section 10.3.3.

If necessary remove, clean and refit the wash system manifold. Refer to Section 11.6.2.

In hard water areas an anti-scale device should be fitted on the cold water supply to the wash system to prevent scale build-up in the manifold and jets.

Note 11 - Is the boiler cleaning period correct?
Go to the ‘CLEAN’ sub menu of the burner control settings and check that both ‘TIME CLEAN PERIOD’ and ‘TIME CLEAN BOILER’ are correctly set. If not, re-set to the correct value. Refer to 9.7.1.3.
12.6 Failed Pellet Lighting

**Primary Fault**

**Secondary follow on checks**

**FAILED PELLET LIGHTING**

1. Is there a sufficient quantity of pellets in the hopper? **No**
   - Fill hopper with correct grade of pellets
2. Is the pellet auger fully primed? **No**
   - Fully prime pellet auger
3. Are pellets being delivered to the burner? **No**
   - Check auger motor power & coupling
4. Are there unburnt pellets in the brazier? **No**
   - Empty hopper & refill with correct grade pellets
5. Is there clinker in the brazier? **No**
   - Replace element if faulty
6. Is the ignition element operational? **No**
   - Replace element if faulty
7. Is the burner cleaning interval correctly set? **No**
   - In burner menu reset 'TIME CLEAN BRAZIER' & 'TIME CLEAN BOILER' settings
8. Is the pellet pre-load time correctly set? **No**
   - In burner menu reset 'TIME LOAD LIGHTING' time 4 seconds
9. Is the 'TIME PAUSE LIGHTING' time 15 seconds? **No**
   - In burner menu reset 'TIME LIGHTING CYCLE REDUCED' time 120 seconds
10. Is the required lux level being detected by photocell? **No**
    - Check that photocell & tube are clear
11. Is the flame stabilisation time [45] correct? **No**
    - Contact GRANT for assistance
12. Is the required lux level being detected by photocell in 'LIGHTING CYCLE REDUCED' [42]? **No**
    - In burner menu reset 'TIME CLEAN BRAZIER' & 'TIME CLEAN BOILER' settings
13. Does the ignition element on period exceed 360 seconds? **No**
    - Contact GRANT for assistance
14. Is the ignition element operational? **No**
    - Replace element if faulty
15. Is the photocell operational? **No**
    - Replace photocell if faulty
16. Is pre-load quantity of pellets correct? **No**
    - Replace photocell if faulty
17. Contact GRANT for assistance to set pre-load
18. In burner menu reset 'TIME CLEAN BRASSER' & 'TIME CLEAN BOILER' settings
19. Contact GRANT for assistance
20. Contact GRANT for assistance
21. Contact GRANT for assistance
22. Contact GRANT for assistance

**Notes:**
- Note 1
- Note 2
- Note 3
- Note 4
- Note 5
- Note 6
- Note 7
- Note 8
- Note 9
- Note 10
- Note 11
- Note 12
12 Fault Finding

12.6 Failed Pellet Lighting

Note 1 - Is there a sufficient quantity of pellets in the pellet hopper?
The effect of insufficient pellets will depend on the type of pellet storage
used, as follows:

Using a pellet hopper only – if there are insufficient pellets, the hopper contents
switch will break the switched live to
the boiler, causing ‘WAIT BOILER
THERMOSTAT’ to be displayed. Refill
the hopper to start the boiler. Refer to
Section 1.4.4 for further details.

Using a bulk pellet store – the hopper
contents switch will control the
operation of either the bulk store auger,
or Grant Spira-vac system. It will NOT
interrupt the switched live to the boiler
and thus ‘WAIT BOILER
THERMOSTAT’ will NOT be displayed.

The boiler would continue to operate
until ALL pellets in the hopper are used
and then stop, with ‘FAILED PELLET
LIGHTING’ displayed on the burner
control screen.

In this case, check that:
• there are pellets in the bulk store
• the bulk store auger, or Grant Spira-
vac system, is operating correctly
(refer to instructions supplied with
the Spira-vac system).

Rectify as necessary.

Note 2 - Is the pellet auger fully
primed?
Refer to Section 10.7 for procedure to
prime the auger.

Note 3 - Is there ‘clinker’ in the
brazier?
Clinker is the hard deposits of solidified
ash, containing sand particles, which
the automatic burner cleaning system is
unable to remove. Clinker is caused by
using unsuitable pellets. See note 4.

If there is no clinker, but brazier is full of
unburnt pellets, remove all pellets and
clean brazier.

Note 4 - Are the correct pellets being
used?
Check the pellets being used. Only EN
Plus Grade A1 pellets conforming to
EN14961 must be used with the Grant
Spira boilers. Refer to Section 3.1 for
details pellet specification.

Check the brazier cleaning setting –
‘TIME CLEAN BRAZIER’. Refer to
Section 9.7.1.3 for settings.

Note 5 - Is the ignition element
operational?
To check, isolate electrical supply and
disconnect the two leads from the
element cable. Grasp the black
grommet and pull the complete element
and cable from the tube. Check the
condition of the ceramic element and
that it is correctly fitted into the ceramic
socket. Also check it is correctly
positioned inside the tube. Refer to
Section 10.8.3 for details.

Check across the two terminals for
electrical continuity. Resistance of
element ≈ 89\Omega. If no continuity is found,
then replace the element.

Note 6 - Is the burner cleaning
interval correct?
Go to the ‘CLEAN’ sub menu of the
burner control settings and check that
‘TIME CLEAN BRAZIER’ and ‘TIME
CLEAN BOILER’ are correctly set.
Refer to 9.7.1.3.

Note 7 - Is the pellet pre-load time
correct?
Measure the duration of the pellet pre-
load period (i.e. whilst the ‘STEP
AUTO’ function is 40 in the ‘VIEW
menu), at the beginning of the burner
lighting sequence. Refer to Section 9.3
for burner operating sequence and also
Section 9.7.3 for ‘VIEW’ menu folder.
Pre-load should be 65 seconds. If not,
contact Grant UK for technical advice
on how to adjust the pre-load period.

Note 8 - Is the required LUX level
being detected by the photocell?
In the ‘WAIT LIGHTING (IGNITION)’
period of the burner lighting sequence
(i.e. whilst the ‘STEP AUTO’ function is
41 in the ‘VIEW’ menu), if the LUX value
fails to reach 2 after a time of 360
seconds, then the error message
‘FAILED PELLET LIGHTING’ is
displayed. Refer to Section 9.7.3 for
procedure to access LUX value in
‘View’ menu.

Note 9 - Is the preload quantity of
pellets correct?
When the pre-load operation is
complete, the pellets should cover the
heating element but not cover the
opening at the end of the photocell
tube.

Note 10 - Is the flame stabilization
period correct?
The ‘FLAME STABILISATION’ period
(i.e. ‘step auto’ function 45 in the
‘VIEW’ menu) is an over-run of the
ignition element on period AFTER the 2
lux has been detected. This is factory
set at 30 seconds.

Note 11 - Is the required LUX level
being detected by the photocell?
In the ‘LIGHTING CYCLE REDUCED’
period of the burner lighting sequence
(i.e. whilst the ‘STEP AUTO’ function is
42 in the ‘VIEW’ menu), if the flame
drops below 1 lux then the error
message ‘FAILED PELLET LIGHTING’
is displayed. Refer to Section 9.7.3 for
procedure to access LUX value in
‘View’ menu.

Note 12 - TO BE CONFIRMED
???
12.7 Servo Motor Blocked

**SERVO MOTOR BLOCKED**

- Open the combustion chamber door. Is the brazier blocked up?
  - Yes: Remove the blockage & close the combustion chamber door.
  - No: Can the brazier be opened manually?
    - Yes: Is the brazier distorted or damaged?
      - Yes: Replace damaged parts & reset brazier clearance
      - No: Is the brazier clearance correctly set?
        - Yes: Reset brazier clearance using Grant brazier clearance gauge
        - No: In burner menu reset ‘TIME CLEAN BRAZIER’ & ‘TIME CLEAN BOILER’ settings
          - Adjust servo motor setting or replace servo motor if necessary
    - No: Replace damaged parts & reset brazier clearance

**Primary Fault**

**Secondary follow on checks**

Note 1 - Opening the combustion chamber door.
Before attempting to open the combustion chamber door, set the ON/STANDBY switch to STANDBY.

Note 2 - Can the brazier be opened manually?
First clear any blockage (clinker/ash) from the brazier. To open the brazier manually, operate the release switch on the servo motor. Refer to Section 11.7.2.

**DO NOT FORCE THE BRAZIER OPEN WITHOUT OPERATING THE SERVO MOTOR RELEASE SWITCH OR THE SERVO MOTOR GEARS WILL BE DAMAGED AS A RESULT!**

Note 3 - Is the brazier clearance correctly set?
To check the gap between the fixed and moving part of the brazier, use the brazier clearance gauge (supplied with the boiler). Refer to Section 11.7.2. If it is necessary to dismantle the brazier, the burner must be removed from the combustion chamber door. Refer to Section 11.7.

Note 4 - Is the servo motor operating correctly?
Set the ON/STANDBY switch to STANDBY. Go to the ‘CLEAN’ sub menu of the burner control settings and set “TIME CLEAN BRAZIER” to 0.

Set the ON/STANDBY switch to ON and start the boiler. When the burner display shows ‘100% POWER’ set the ON/STANDBY switch back to STANDBY. When the burner has completed the shut down process the brazier cleaning operation will start automatically. The burner control screen will first show ‘BRAZIER CLEANING FORWARD’ for between 2 to 2½ minutes. Then the burner fan will start and the screen will show ‘BRAZIER CLEANING BACK’ for between a further 2 to 2½ minutes. Thus the total time for the brazier cleaning operation is between 4 to 5 minutes.

Ensure ‘TIME CLEAN BRAZIER’ is then reset to its original setting or the brazier cleaning operation will be repeated every time the burner shuts down.

Note 5 - Is the servo motor correctly set?
The stroke of the servo motor is factory set and should not be adjusted. Check with Grant UK for correct setting.

Note 6 - Is the boiler cleaning interval correct?
Go to the ‘CLEAN’ sub menu of the burner control settings and check that ‘TIME CLEAN BRAZIER’ and ‘TIME CLEAN BOILER’ are correctly set. Refer to 9.7.1.3
12 Fault Finding

12.8 Probe Fault

**Notes 1** - Are burner plugs correctly fitted?
Check that all three plugs are fully pushed into sockets on the left side of the burner – in particular plug No.2. Refer to Section 8 and Figure 8-5.

**Note 2** - Is heating thermistor damaged?
Isolate electrical supply to boiler and remove boiler control panel cover. Check the condition of the thermistor for any damage and replace if necessary.
Check that the heating thermistor is correctly fitted into the pocket (inside the boiler control panel). Refer to Section 10.3.1. Ensure that both thermistor and thermostat sensor are held in place with the retaining clip supplied.

**Note 3** - Is thermistor connected to burner PCB?
With electrical supply to boiler still isolated, remove both the burner cover and PCB cover. Check the thermistor connections to the PCB – from terminals S3 and B4 on plug/socket No.2. Refer to Section 8 and Figure 8-6.
If fault still exists, replace thermistor.
12.9 Air Pressure Error

**Note 1 - Does fault occur during lighting sequence?**
During the ‘PRE-LOAD’ operation, the burner controls check that burner fan is generating enough air pressure to close the air pressure switch. If the pressure switch is not closed during pre-load, then the warning ‘AIR PRESSURE ERROR’ is displayed on the burner screen.

**Note 2 - Is the burner fan operational?**
During the ‘PELLET BURNER FIRING’ operation the burner controls checks that the burner fan speed is correct. It does not check if the fan is generating enough air pressure. If during the ‘PELLET BURNER FIRING’ operation the burner fan speed is not correct then the warning ‘AIR PRESSURE ERROR’ is displayed on the burner screen.

Check that the fan inlet is not blocked and that the fan blades are free to rotate. If necessary, thoroughly clean and remove any dust or debris. If fan still does not rotate freely, replace fan.

**Note 3 - Is the air pressure switch operational?**
Check that air supply tube is correctly connected to the pressure switch and not blocked or twisted. Refer to Figure 12-6. Rectify as necessary. Check condition of tube and replace if damaged. Check operation of air pressure switch.

**Note 4 - Is fan air pressure tube OK?**
Check that the plastic tube from the fan is not twisted, kinked or blocked. Check that it is correctly connected to the both the fan and pressure switch (lower of the two connections on the pressure switch).

**Note 5 - Is burner fan pressure correct?**
Using a digital manometer (set for positive pressure) check the pressure generated by the burner fan is the minimum of 0.8mbar required to activate the air pressure switch. Refer to Figure 12-7. If fan pressure is incorrect, replace fan.

If correct pressure is still not achieved, replace burner PCB.

**Figure 12-6: Air pressure switch & fan**
**Figure 12-7: Checking air pressure from fan**
13 Spare Parts

13.1 Burner

Figure 13-1: Burner Control Components – Exploded View
13.2 Burner Brazier

Figure 13-2: Burner Brazier Components – Exploded View
## 13.3 Burner Parts List

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Part No.</th>
<th>Quantity 6-26</th>
<th>Quantity 9-36</th>
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<td>1</td>
<td>Pressure switch</td>
<td>WP111</td>
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<td>1</td>
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<td>Primary printed circuit board 6-26</td>
<td>WP112A</td>
<td>1</td>
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<tr>
<td>2b</td>
<td>Primary printed circuit board 9-36</td>
<td>WP112B</td>
<td>-</td>
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<td>Burner fan</td>
<td>WP03</td>
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<td>Servomotor</td>
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<td>Photocell tube</td>
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13.4 Boiler

Figure 13-3: Boiler Components – Exploded View
## 13.5 Boiler Parts List

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<th>Part No.</th>
<th>Quantity 6-26</th>
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Items not indexed are specific to the 9-36 model.
13 Spare Parts

13.6 Pellet Hopper (110kg)

Figure 13-4: 110kg Pellet Hopper Components - Exploded View
### 13.7 Pellet Hopper (110kg) Parts List

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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:** Wipe off and wash with soap and water.

**Inhalation:** Remove to fresh air.

14.2 Sealant and Adhesive

**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. See immediate medical attention.

**Skin:** Wipe off and wash with soap and water.

**Inhalation:** Remove to fresh air.

**Ingestion:** Drink plenty of water.
EC Declaration of Conformity

(In accordance with BS EN ISO/IEC 17050-1:2004)

We: GRANT ENGINEERING (IRL) LTD.
Of: Crinkle
   Birr
   Co. Offaly
   Ireland
   Telephone: 057 9120089
   Fax: 057 9121060
   Email: info@grantengineering.ie.
   Website: www.grantengineering.ie

Declare that:

Equipment: Floor Standing Domestic Condensing Wood pellet boiler
Model name/number: Grant Spira 6-26 Wood Pellet Boiler
                      Grant Spira 9-36 Wood Pellet Boiler

In accordance with the following Directives:

2006/95/EC Conforms with the safety objectives of the Low Voltage Directive and its amending directives
2004/108/EC Conforms with the essential protection requirements of the Electromagnetic Compatibility Directive and its amending directives

has been designed and manufactured to the following specifications:

EN 303-5:1999
The Spira Wood Pellet Boiler Warranty

Dear Customer,

You are now the proud owner of a Grant Spira Wood Pellet Boiler from Grant Engineering (UK) Ltd, which 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 installation, unless the installation was more than six months from the date of purchase, in which case the warranty period will commence six 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 Main Terms and Conditions below.

IMPORTANT

Please register your Grant Spira Wood Pellet boiler with Grant UK within thirty days of installation. To do so visit www.grantuk.com and follow the links to the ‘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 fall within the warranty period, 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 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 is available.

The following documents must be made available to Grant UK on request:

- Proof of purchase
- Grant Commissioning report form
- Service documents

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 faults caused by the plumbing or heating system, e.g. contamination of parts due to system contamination, sludge, scale, debris or trapped air. See Extent of Manufacturer’s Warranty below.

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 is available.

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 that falls outside the manufacturer’s warranty otherwise a service charge could result.

If a fault covered by the manufacturer’s warranty 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.

One year warranty:

Free of Charge Repairs:

- Boiler servicing, de-scaling or flushing.
- Cleaning condensate traps/pipework or thawing frozen condensate pipework.
- Electrical cables and plugs, heating system controls not supplied by Grant UK.
- Heating system components, such as radiators, pipes, fittings, pumps and valves not supplied by Grant UK.
- Consumable items including, but not limited to, gaskets, seals, etc.

Remember - before you contact Grant:

Ensure the boiler has been commissioned and serviced by a competent person in accordance with the installation and servicing manual.

Ensure there is an adequate quantity of the approved type of pellets in the hopper (and bulk store if fitted) to supply the burner.

Ensure the problem is not being caused by the heating system or its controls. Consult the User Instructions supplied with the boiler for guidance.

In conclusion, the Spira Wood Pellet Boiler is designed to give years of trouble free operation, providing the boiler is installed and commissioned correctly in accordance with the manufacturer’s instructions, it was registered with Grant UK within thirty days of installation and it is serviced at twelve month intervals.

In the event of a breakdown and it is established that Grant Engineering (UK) Ltd is not liable, the person and the fault is not due to tampering, running out of fuel, the use of unapproved wood pellets, contamination, system water contamination, misuse, or the failure of any external components not supplied by Grant UK (e.g. motorised valve, etc.). This extended two year warranty only applies if the boiler is registered with Grant UK within thirty days of installation.

Extent of Manufacturer’s Warranty:

The Manufacturer’s Warranty does not cover the following:

- Damage due to external causes such as bad weather conditions (flood, storms, lightening, frost, snow, ice), fire, explosion, accident or theft.
- Faults due to incorrectly sized expansion vessel(s) or incorrect vessel charge pressure.
- Faults caused by external electrics and external components.
- Problems caused by lack of pellets, the use of unapproved pellets or faults with the pellet storage and supply system (if not supplied by Grant UK).
- Removing any pellet store or hopper contamination or blockages in the pellet augers, pellet hopper or bulk pellet store.
- Problems due to the flue system being incorrectly fitted or not installed to meet installation requirements.
- Boiler servicing, de-scaling or flushing.

* Faults due to tampering, unauthorised adjustment, neglect, misuse or operating the boiler contrary to the manufacturer’s User Instructions.
NOTE
Do not wait until your wood pellet supply runs out before you order some more.

Dust in the bottom of the pellet store or hopper may prevent the supply of pellets to the burner. It is important that this is checked for and, if dust is present, removed on an annual service to prevent nuisance stoppage of 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 pellet 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 transferable 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.

Hard Water Advice
If you live in a hard water area, protection against scaling of the wash system manifold in your boiler must be provided. You should fit an appropriate scale inhibitor or water softener as any breakdown caused by water scaling is not covered by either the manufacturer’s warranty. Ask your installer for advice.