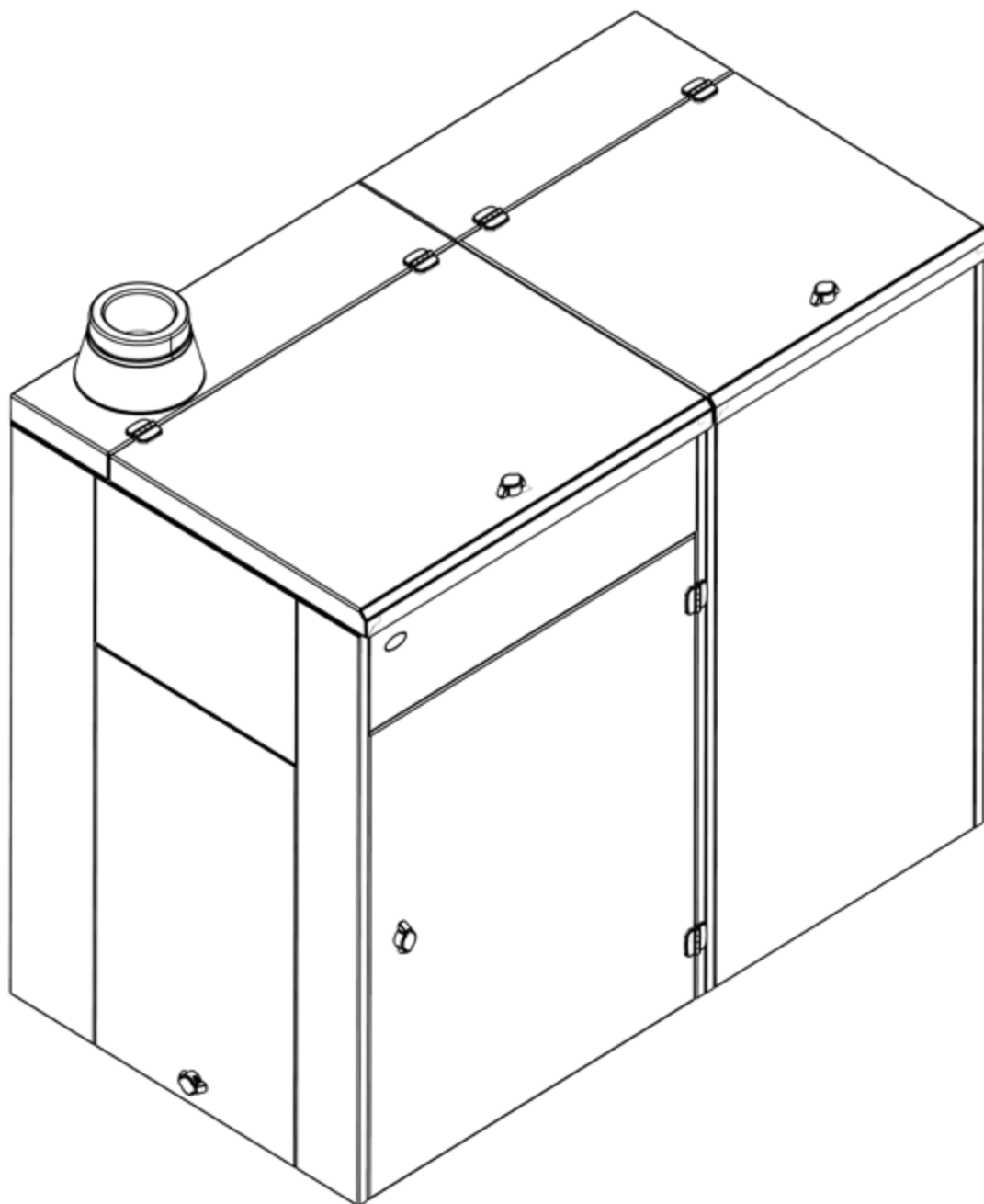


Grant External Vecta

4-16kW Condensing Wood Pellet Boiler and Side Pellet Store

Installation and Servicing Instructions



Important Note for Installers

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 Vecta Condensing Wood Pellet Boiler.

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

Special Text Formats

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



WARNING

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



CAUTION

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



NOTE

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



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Contents

1 Introduction	4	9 Boiler Operation	34
1.1 How the Condensing Wood Pellet Boiler Operates	5	9.1 General	34
1.2 Boiler Description	5	9.2 Modulation	34
1.3 Access	5	9.3 Automatic Cleaning	35
1.4 Flue System	5	9.4 Boiler Control Panel	36
1.5 Boiler Components	6	9.5 Boiler Setpoint Temperature	37
1.6 Logo Indicator	7	9.6 Service Menu (including Parameter Menu)	37
1.7 Boiler Cleaning and Servicing	7	9.7 Parameter Menu	38
2 Technical Data	8	9.8 Boiler Operating Sequence	40
2.1 Technical Specifications	8	9.9 Boiler Operation Flow Chart	41
2.2 Burner Settings	9	10 Side Pellet Store	42
2.3 Flue Gas Analysis	9	10.1 General	42
2.4 Clearances and Dimensions	9	10.2 Operation	42
3 Pellet Specification	11	10.3 Installation	43
3.1 Pellet Specification	11	10.4 Electrical Connections	46
3.2 Biomass Suppliers List	11	10.5 Commissioning the Side Store	47
4 Installation Information	12	11 Commissioning	48
4.1 Boiler Location	12	11.1 Equipment Required	48
4.2 Regulations	12	11.2 Preliminary Inspection	48
4.3 Heating System	12	11.3 Boiler	48
4.4 Pipework Materials	13	11.4 Hopper Lid Cut-out Switch	51
4.5 Connections	13	11.5 Control Settings	51
4.6 Wash System	14	11.6 Priming the Pellet Feed Auger	51
4.7 Before you Commission	14	11.7 Lighting the Boiler	51
4.8 Completion	14	11.8 Combustion Chamber Draught	52
4.9 'Meter Ready' Installations	14	11.9 Flue Gas Analysis	52
5 Condensate Disposal	16	11.10 Customer Handover	52
5.1 General Requirements	16	11.11 Commissioning Report Form	52
5.2 Connections	16	11.12 Commissioning Check List	53
5.3 Pipework	16	12 Servicing	54
5.4 External Pipework	16	12.1 General	54
5.5 Condensate Trap	17	12.2 Checks Before Servicing	54
5.6 Inspection and Cleaning of Trap	17	12.3 Heating System	54
6 Sealed Systems	18	12.4 Flue System	55
6.1 Sealed System Requirements	18	12.5 Combustion Ventilation	55
6.2 Filling the Sealed System	19	12.6 Boiler	55
6.3 Venting the Pump	19	12.7 Burner	58
6.4 Pressure Relief (Safety) Valve Operation	19	12.8 Ignition Element	59
7 Flue System and Air Supply	20	12.9 Condensate Disposal System	60
7.1 Air Supply	20	12.10 Boiler Settings	60
7.2 Flue Terminal Position and Clearances	20	12.11 Hopper Lid Cut-out Switch	60
7.3 Flue System Specification	21	12.12 Combustion Checks	60
7.4 Flue System Assembly	22	13 Fault Finding	61
7.5 Flue Testing	23	13.1 Fault Codes	61
7.6 Flue Notice Plate	23	13.2 Fault Details	62
7.7 Typical Flue Systems	24	14 Spare Parts	64
7.8 Flue System Component Dimensions	27	15 The Clean Air Act 1993 and Smoke Control Areas	66
7.9 Flue System Components	28	16 Declaration of Conformity	67
8 Electrical	30	17 Health and Safety Information	68
8.1 General Requirements	30	18 Disposal and Recycling	69
8.2 Boiler Electrical Connections	30	19 Guarantee	70
8.3 Remote Grant Logo Indicator Connections	31		
8.4 Connecting the Power Supply	31		
8.5 Heating System Controls	31		
8.6 Frost Protection	31		
8.7 S-plan	32		
8.8 Y-plan	32		
8.9 Boiler Wiring Diagram	33		

1 Introduction

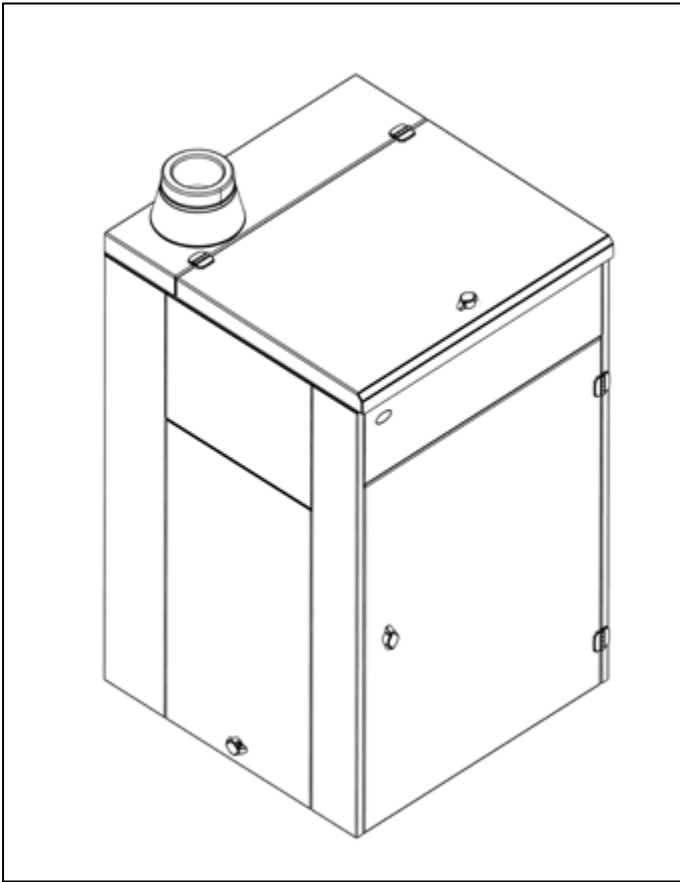


Figure 1-1: Front/left side view of boiler

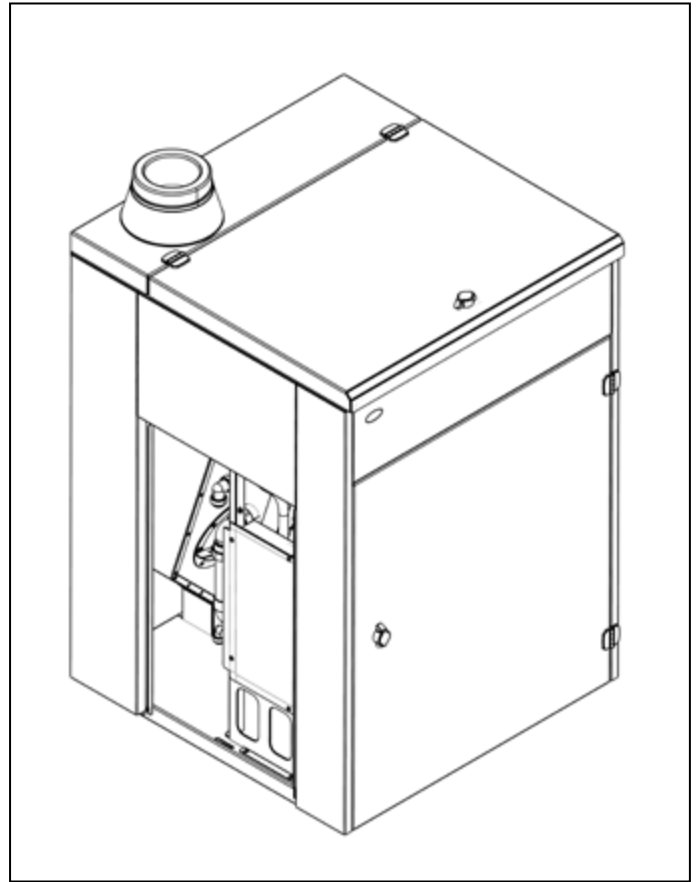


Figure 1-2: Front/left side view of boiler - side access panel removed

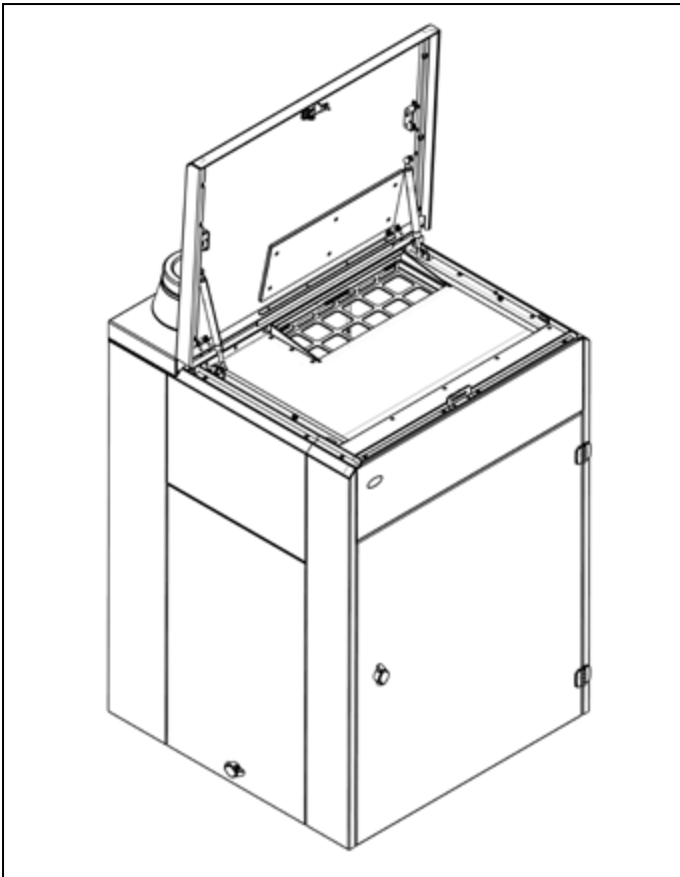


Figure 1-3: Front/left side view of boiler - top hooper lid open

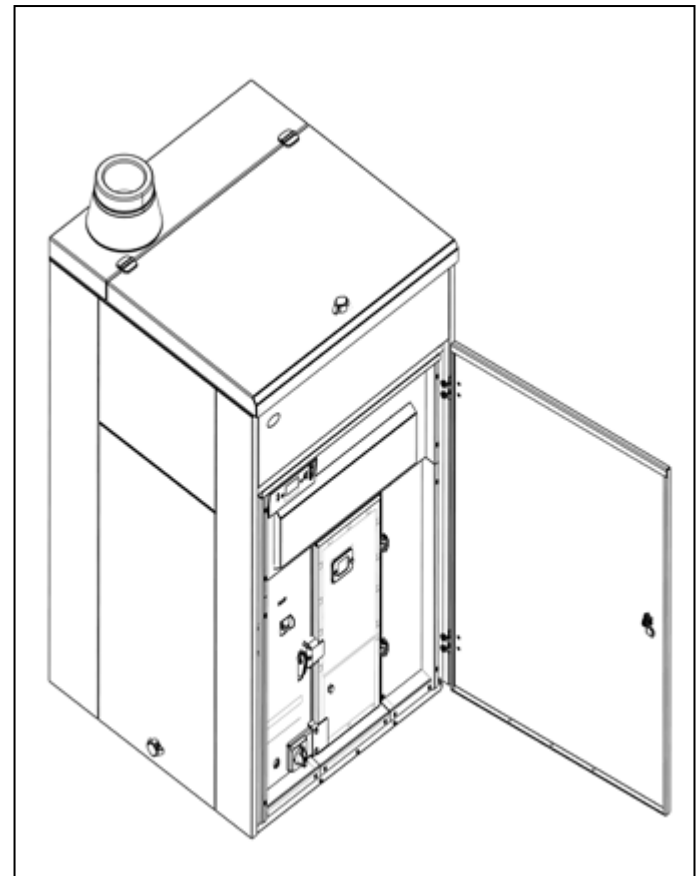


Figure 1-4: Front/left side view of boiler - hinged door open

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 External Vecta contains a unique extra (secondary) condensing heat exchanger which has been designed to capture some of this lost heat energy that would otherwise be lost, so it maintains extremely high efficiencies.

It does this by cooling the flue gases to their dew point (below 55°C) thus extracting more sensible heat.

The boiler has been independently tested to BS EN 303-5:2012 and BS EN 12809:2001+A1:2004 and will achieve the following net efficiencies when both the boiler and system are correctly set:

Operating Condition	Full load efficiency	Part load efficiency
Condensing	101.5%	97.5%

To ensure maximum efficiency from the Grant External Vecta 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 80°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.

The Grant External Vecta condensing wood pellet boiler 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

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

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

The boilers are not designed specifically for operation on a system with a buffer tank/ thermal store, however when used on such a system there is no effect on the boiler performance.

Refer to Section 4 for boiler installation.

1.3 Access

The External Vecta wood pellet boiler enclosure is fitted with the following means of access:

- A hinged door (with lockable door catch*) at the front - for access to the boiler for routine cleaning (emptying the ash pan) and access to boiler/burner controls.
- A hinged top hopper lid (with lockable door catch*) - to allow pellets to be tipped into the hopper by the user and for access to the top of the boiler for commissioning and servicing.
- A removable side access panel (with lockable door catch*) on the left hand side - to allow access to the electrical wiring/PCB enclosure, photocell ignition heater element, etc., and also the water and condensate connections.

* These door catches can be fitted with a small padlock (not supplied) if required.

To unlock and open any of the above, unlock/remove the padlock (if fitted). Rotate the knob of the catch clockwise to unlatch and open the front door, top hopper lid or side access panel.

Close and lock the door, lid or panel using the reverse of the above procedure.

1.4 Flue System

The Grant External Vecta wood pellet boiler must be connected to a conventional flue system.



NOTE

The ONLY flue suitable for use with the Grant Vecta wood pellet boilers is the Grant 'Biomass' conventional flue system. This is a 125mm (5") diameter twin wall insulated, powder coated stainless steel flue system. Refer to Section 7 for details.

1.5 Boiler Components

1.5.1 Burner

The Grant External Vecta 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. Refer to Section 9 for details of burner operation.

The burner is supplied factory-fitted in the boiler and is equipped with a self-cleaning device to prevent a build-up of ash and clinker in the burner brazier.

The boiler is supplied with the control parameters factory set to default settings.

During commissioning these control parameters should be checked to ensure they are correct. Refer to Section 11.5 for details.

1.5.2 Heat exchangers

The Grant External Vecta 4-16 condensing boiler is supplied with a combined primary and secondary heat exchanger. Both heat exchangers are equipped with a self-cleaning system.

1.5.3 Boiler controls



WARNING

After the burner has been switched off (either manually by the ON/STANDBY switch on the control panel, or automatically by the boiler control system, or the heating system controls) the burner needs to burn-down the remaining pellets in the brazier. Do not open the front combustion chamber access door until the burner display reads 'Standby'.

The Setpoint temperature of the boiler is user adjustable via the boiler control panel - refer to Section 9.4 for details.

The boiler control panel is located at the upper left corner of the boiler (behind the hinged front door of the boiler). Refer to Figure 1-5. To unlock/open the front door of the boiler, first unlock and remove the padlock (if fitted). Rotate the knob of the catch clockwise to unlatch and open the front door.

This control panel includes the following items (refer to Section 9.4 for further details of the control panel functions):

- 'ON/STANDBY' switch – to switch the burner off when required, by interrupting the switched live supply to the burner. This switch does not isolate the electrical supply to the burner.
- LCD screen – to display the boiler operating condition and (when necessary) a fault code
- Boiler control setting buttons – Refer to Section 9 for boiler control system operation and setting.

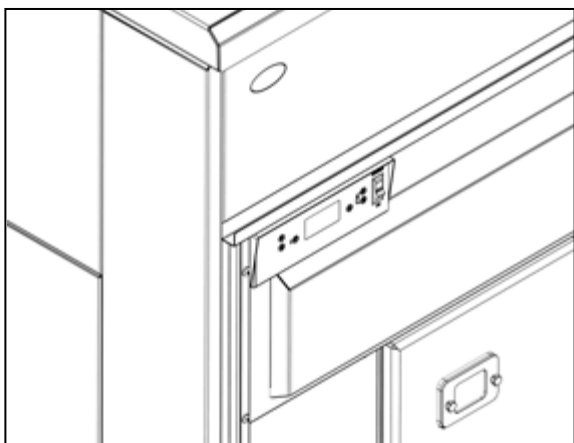


Figure 1-5: Boiler control panel

The boiler also includes an overheat thermostat – located at the bottom left corner of the boiler (inside the front door) with the reset button under the removable plastic cap. Refer to Figure 11-3. The

overheat thermostat bulb is situated in the top front left corner of the boiler, along with the boiler control thermistor sensor. Refer to Section 11.3 for the location of the bulb and sensor.

This overheat thermostat allows the boilers to be used on a sealed central heating system and will automatically switch off the boiler if the pre-set temperature of 100°C is exceeded.

1.5.4 Boiler Pellet Hopper

The Grant External Vecta boiler has an integral pellet hopper with a capacity of 80kg. This is accessed by lifting the hinged hopper lid on the top of the boiler so that pellets can be tipped into the hopper by the user.

The hopper is fitted with a contents switch. This detects when the level of pellets in the hopper falls to a pre-set minimum value. At this point the LCD screen will flash and display the 'Fuel Low Warning' message. The Grant logo indicator will also flash slowly to indicate the pellet level has fallen to the pre-set minimum. Refer to Section 1.5.

As soon as this happens the hopper should be topped up with more pellets. This will automatically cancel the flashing Grant logo and the flashing 'Fuel Low Warning' message on the control panel LCD screen.

If the pellet hopper is not topped up at this point, the boiler will continue to operate for a short period before the burner is automatically stopped. The Grant logo will continue to flash slowly, with the flashing 'Low Fuel Warning' message on the control panel LCD screen, to indicate the lack of pellets in the boiler.

If this happens, simply top up the hopper with more pellets. A minimum of 20kg of pellets will operate the contents switch and automatically re-start the burner (as long as there is a demand for the boiler to run).

To top up the hopper, first set the 'ON/STANDBY' switch to 'STANDBY' and wait for the boiler to stop. Then open the hinged hopper lid (on the top of the boiler) and tip in the required amount of pellets. Then close the hopper lid and reset the 'ON/STANDBY' switch to 'ON'. Whilst topping up with pellets, ensure that no foreign debris enters the hopper.



NOTE

The hinged hopper lid is fitted with a safety cut-out switch and MUST BE CLOSED for the boiler to operate. If the lid is opened for longer than 5 seconds, whilst the boiler is operating, the burner will be automatically stopped. Closing the hopper lid resets the cut-out switch and the boiler will restart. Refer to Section 11.4 for details of the hopper lid cut-out switch operation.

1.5.5 Frost Protection

The Grant External Vecta wood pellet boiler is supplied with a factory-fitted frost protection thermostat. This is pre-set to operate when the air temperature falls to 2°C.

This frost thermostat is located inside the PCB enclosure and wired to the boiler terminal block. For details of the frost thermostat electrical connections, refer to Section 8.6.

1.5.6 Side Pellet Store

An optional separate 140kg capacity pellet store is available to increase the pellet storage for the External Vecta boiler. This side pellet store is the same external design as the External Vecta boiler and is designed to be located at the right hand side of the boiler only. It incorporates an auger to automatically transfer pellets from the side pellet store to the boiler pellet store when activated by the contents switch. Refer to Section 10 for full details of the installation and operation of the side pellet store.



NOTE

This side pellet store CANNOT be installed on the left hand side of the External Vecta boiler.

1.6 Logo Indicator

The illuminated Grant logo indicator, supplied with the boiler, should be mounted on a standard electrical back box (either recessed or surface mounted) in a convenient and visible position within the property. Refer to Section 8 for electrical connection details.

The Logo Indicator has been designed to assist the user by clearly indicating the following boiler conditions:

Logo illuminated (low brightness):

Indicates the following:

- The electrical power supply is connected to the boiler and it is switched on
- There is no demand from the heating system controls for the boiler to operate
AND/OR
- The ON/STANDBY switch on the boiler control panel is set to OFF

This does not indicate that the boiler is operating or that the burner is firing. Refer to Section 9.

Logo illuminated (high brightness):

Indicates the following:

- The electrical power supply is connected to the boiler and it is switched on
- There is a demand from the heating system controls for the boiler to operate
AND
- The ON/STANDBY switch on the boiler control panel is set to ON

This does not necessarily indicate that the boiler is operating or that the burner is firing. Refer to Section 9.

Logo flashing (slow flash):

Indicates a low pellet level – when the minimum level of pellets in the pellet hopper has been reached. Top up the pellet hopper in the boiler without delay. Refer to Sections 1.4.4 and 3.

If a side pellet store is installed, also top up this store at the same time. Refer to Section 10.

Logo flashing (fast flash):

Indicates ash pan needs emptying – empty ash pan without delay. Refer to Section 1.7.

1.7 Boiler Cleaning and Servicing

The Grant External Vecta wood pellet boiler is equipped with an automatic cleaning system for the burner brazier and both heat exchangers.

The ash pan (located inside the combustion chamber) MUST be periodically emptied by the user. This simple task must be carried out when indicated by the Grant logo Indicator flashing (fast flash). Refer to Section 1.6.

The boiler is fitted with a hinged front door with a lockable door catch. This door must be opened to gain access to the ash pan for the periodic cleaning of the boiler. Refer to Section 12.6.5.

To open the door, first unlock and remove the padlock (if fitted). Rotate the knob of the catch clockwise to unlatch and fully open the front door.

A multi-purpose tool is supplied with the boiler for servicing and cleaning. This is used for the following functions:

- As the door catch handle – required to open the combustion chamber door
- As the ash pan carrying handle*
- To open the brazier catch
- To remove the brazier front plate, the brazier base plate and the brazier cotter pin

The multi-purpose tool is hung on a hook located on the panel to the left of the combustion chamber door. Always replace the tool back on this hook after use to ensure it is available when next required.

*An ash pan carrying handle is also supplied with the boiler. This must be used in conjunction with the multi-purpose tool, to support the opposite end of the ash pan, when removing it from the boiler. Refer to Section 12.6.5. The ash pan, once removed can only be replaced one way. If replaced incorrectly the combustion door cannot be closed.



CAUTION

Whilst removing the ash from the boiler, 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 the 'Service' message is displayed on the control panel LCD screen, whichever comes FIRST.

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

2 Technical Data

2.1 Technical Specifications

	Units	4-16
Maximum heat output	kW Btu/h	16.2 55,300
Minimum heat output	kW Btu/h	4.5 15,300
Flow connection	mm	22
Return connection	mm	22
Mains water connection	mm	15
Water content	litres	35
Minimum flow rate	litres/hour	690
Waterside resistance $\Delta T = 10^{\circ}\text{C}$	mbar	27
Waterside resistance $\Delta T = 20^{\circ}\text{C}$	mbar	9
Maximum mains inlet water pressure	kPa	800 (8 bar)
Minimum mains inlet water pressure	kPa	100 (1 bar)
Condensate connection	-	1¼ BSP (female)
Combustion chamber draught requirement	mbar	0.75 to 1.25
Maximum static head	metres	28
Minimum circulating head	metres	1
Boiler temperature set point range	$^{\circ}\text{C}$	55 to 75
Boiler temperature cut out point	$^{\circ}\text{C}$	80
Minimum return temperature	$^{\circ}\text{C}$	40
Water system overheat cut-out temperature	$^{\circ}\text{C}$	100
Electrical supply	-	~230V 1ph 50 Hz 5A fused
Maximum operating pressure - sealed system	bar	2.0
Maximum operating pressure - open system	bar	2.0
Maximum operating pressure - pressure relief valve	bar	2.5
Flue length - minimum	metres	1.4
Flue length - maximum	metres	12.0
Ignition element rating	Watts	283
Efficiency - full load (condensing)*	%	101.5
Efficiency - part load (condensing)*	%	97.5
Combustion gas temperature - maximum output	$^{\circ}\text{C}$	56
Combustion gas temperature - minimum output	$^{\circ}\text{C}$	47
Combustion gas mass flow rate - maximum output	m^3/h	66
Combustion gas mass flow rate - minimum output	m^3/h	26.35
Safety charge pipe thermostat cut-out temperature	$^{\circ}\text{C}$	90
Total boiler starting current	Amps	2.5
Total boiler running current	Amps	0.45
Weight of boiler - including water content and full pellet hopper	kg	380
Weight of boiler - excluding water content and empty pellet hopper	kg	265
Integral pellet hopper capacity	kg	80
Weight of side store (optional) - full pellet hopper	kg	220
Weight of side store (optional) - empty pellet hopper	kg	80
Side pellet store hopper capacity (optional)	kg	140

* Refer to Section 1.1

2.2 Burner Settings

Model	MAX flame							MIN flame		
	Burner setting		Heat output	Heat input	Full eff.	Input kg/hr*	Draught	CO ₂	Burner setting	Heat output
	TIME LOAD MAX	TIME PAUSE MAX	kW (Btu/h)	kW (Btu/h)			mbar (in.wg)	%	TIME PAUSE MIN	kW (Btu/h)
4-16	1.7 sec	3.0 sec	16.2 (55,300)	17.2 (58,700)	101.5	3.53	0.75 - 1.25 (0.30 - 0.5)	8-12	14.0 sec	4.5 (15,400)

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

There is no combustion test point on the boiler. A test point (and flue inspection hatch) is provided in the Inspection Pipe (product code: WPBOM/IP) that MUST be fitted to the boiler flue outlet.

To gain access to this test point, the circular outer cover must be removed. To do this, turn the knob in the centre of the outer cover approximately one turn anticlockwise and pull the cover away from the inspection pipe. The combustion test point is located immediately below the flue inspection hatch. Refer to Figure 11-11.

Unscrew and remove the test point screw to insert the combustion analyser probe.

Replace the outer cover using the reverse procedure, turning the knob approximately one turn clockwise to secure the cover in place.



Always replace the test point screw and outer access cover following combustion testing. Do not overtighten test point screw.

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.

To ensure correct combustion, the burner settings given in the table (in Section 2.2) must NOT be changed unless instructed to do so by Grant UK.

2.4 Clearances and Dimensions

2.4.1 Clearances

Clearances	
Right hand side	150 mm
Left hand side	400 mm
Front	850 mm
Rear	30 mm

2.4.2 Dimensions

Refer to Figures 2-1 to 2-7.

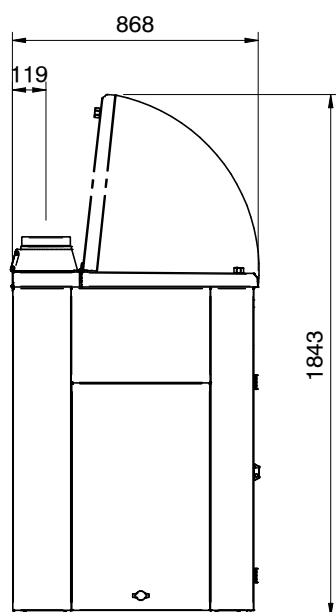


Figure 2-1: Boiler dimensions - left side view

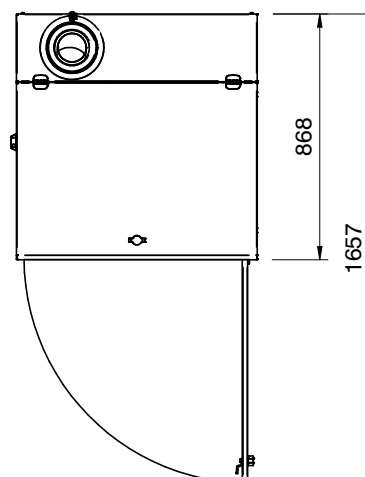


Figure 2-2: Boiler dimensions - top view

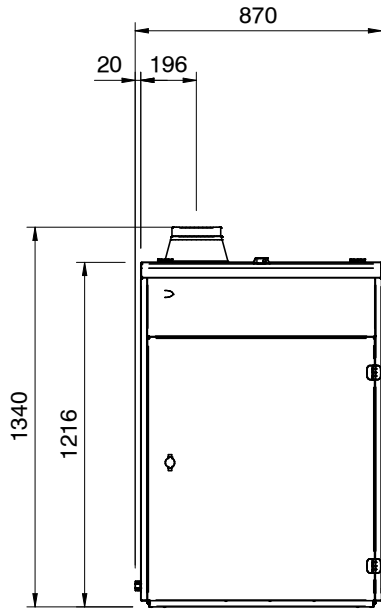


Figure 2-3: Boiler dimensions - front view

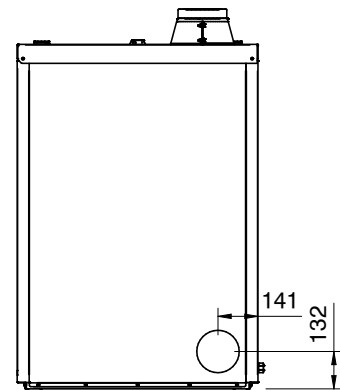


Figure 2-4: Boiler dimensions - rear view

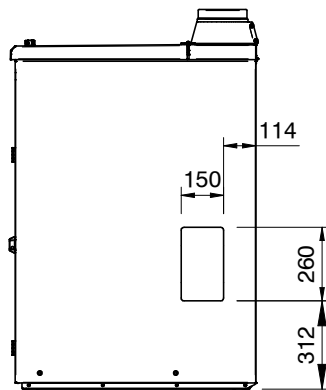


Figure 2-5: Boiler dimensions - right side view

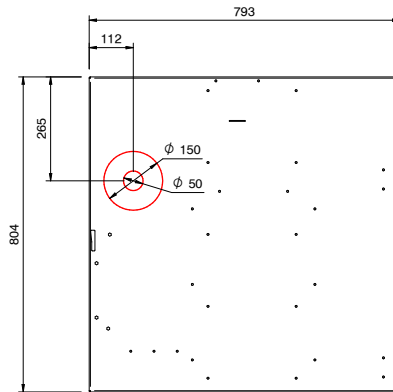


Figure 2-6: Boiler dimensions - top view of base

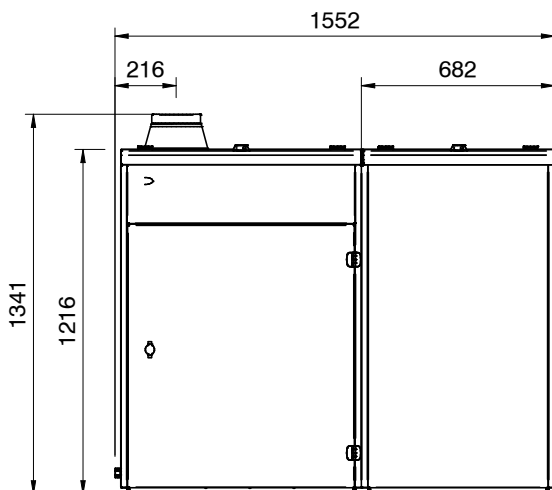


Figure 2-7: Boiler and side store dimensions - front view



NOTE

When the side store lid is open, it is the same height as the boiler lid open, i.e. 1,843 mm.

3 Pellet Specification

3.1 Pellet Specification

Grant Vecta boilers are designed to ONLY run on EN Plus Grade A1 wood pellets that comply with BS EN ISO 17225-2:2014 and meet the following criteria. Failure to use approved pellets will invalidate the product guarantee.

Property class	Unit	Limits as per BS EN ISO 17225-2
Origin and source		1.13 Stemwood 1.2.1 Chemically treated wood residues ^a
Diameter (D)	mm	3.15 < L ≤ 40
Length (L)		6 ± 1
Moisture (M)	w-%	≤ 10
Ash (A)	w-% dry	≤ 0.7
Mechanical durability (DU)	w-%	≥ 97.5
Fines (F) ^b	w-%	≤ 1.0
Additives ^c	w-%	≤ 2 Type and amount to be stated
Net calorific value (Q)	MJ/kg or	≥ 16.5
	kWh/kg	≥ 4.6
Bulk density (BD) ^d	kg/m ³	≥ 600
Chlorine (Cl)	w-% dry	≤ 0.02

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 between 3.15 and 40mm.
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/m ³ .
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 and sulphur	High levels of Nitrogen and Sulphur in the flue gases emissions can give rise to corrosion.

Footnotes

^a Negligible levels of glue, grease and other timber production additives used in sawmills during production of timber and timber product from virgin wood are acceptable, if all chemical parameters of the pellets are clearly within the limits and/or concentrations are too small to be concerned with.

^b At factory gate in bulk transport (at time of loading) and in small (up to 20kg) and big bags (at time of packing) or when delivering to end-user.

^c Type of additives to aid production, delivery or combustion.

^d It is recommended actual value of bulk density to be stated.

3.2 Biomass Suppliers List

The Biomass Suppliers List (BSL) is a list of suppliers of wood fuel who have been accredited as demonstrating that their fuel meets the sustainability criteria required under the RHI.

Recipients of the Domestic RHI will be obliged to source their fuel from suppliers on the BSL **unless they are supplying themselves**.

To find an approved supplier in your area go to www.biomass-suppliers-list.service.gov.uk/find-a-fuel

4 Installation Information

4.1 Boiler Location

The Grant External Vecta wood pellet boiler must be installed externally, either against the building or 'free standing' some distance away from the building. Refer to Section 7.7.

If the 'free standing' option is chosen, then the boiler flue system must be at least 2,300mm away from any buildings or structure that are higher than the flue outlet. Refer to Section 7.7.

If this distance cannot be achieved, then the External Vecta boiler will have to be located with the back of the enclosure close to or against the building and the flue system extended such that the terminal is above the eaves of the roof. Refer to Section 7.7.

The Grant External Vecta boiler must be positioned such that sufficient clearance is provided for maintenance, servicing and filling the pellet hopper. In the particular, the following minimum clearances are required around the External Vecta:

- Front: 850mm (to open the hinged front door to commission or service the boiler)
- Left hand side: 400mm (to access the PCB, water and condensate connections)
- Right hand side: 150mm (to access pellet hopper for filling with pellets)
- Rear: 30mm

The Grant External Vecta boiler must stand on a solid, level, non-combustible surface capable of supporting both the weight of the boiler when full of water and the pellet hopper is full of pellets. Refer to Section 2 for weights.

Grant recommends a prepared concrete standing (at least 150mm thick) with a smooth finish on the top extending beyond the enclosure base at least 100mm all around. Refer to Section 2.4 for boiler dimensions.

4.2 Regulations

Installation of a Grant Vecta wood pellet boiler must be in accordance with the following:

- National Building Regulations and any local Byelaws.
- Model Byelaws and the Water Supply Regulations.

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 EN 12828:2003. Heating systems in buildings. Design for water-based heating systems
- BS EN 12831:2003. Heating systems in buildings. Method for calculation of the design heat load.
- BS EN 14336: 2004. Heating systems in buildings. Installation and commissioning of water based heating systems.
- BS 7593:2006 Code of Practice for treatment of water in heating systems.
- BS 7671:2008 Requirements for electrical installations, IET wiring regulations.
- ONORM M7137 standard should be used as a guideline for DIY bulk storage units.



NOTE

Failure to install and commission the appliance correctly will invalidate the boiler guarantee.

4.3 Heating System



WARNING

Before starting any work on the boiler or fuel supply please read the Health & Safety information given in Section 17.

To achieve the maximum efficiency possible from the Grant Vecta condensing 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 60°C.

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



NOTE

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 'primary' jacket.

Open Vented Systems



NOTE

The presence of 'pumping over' in an open vented heating system connected to the Grant Vecta boiler will invalidate the product guarantee.

Open vented systems must be correctly designed and installed. The open safety vent pipe must be positioned to prevent 'pumping over' (i.e. the discharge of water from the open safety vent pipe into the feed and expansion cistern under the pressure created by the circulator).

For detailed information on the correct design of open vented heating systems, and the correct location of the open safety vent pipe, refer to the CIBSE Domestic Heating Design Guide.

4.4 Pipework Materials

The Grant Vecta boiler is 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 7291-1:2010) for the application concerned.

On either sealed or open-vented systems; where plastic pipe is used a minimum of ONE metre of copper pipe (or as per pipe manufacturers instructions) MUST be connected between both the boiler flow and return connections and the plastic pipe.



NOTE

Do not connect plastic pipe directly to the boiler.

Grant does 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.

Plastic pipe must be Class S to BS 7291-1:2010.



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 (product code: MPCBS63).

Underfloor Pipework

Plastic pipe may be used on underfloor floor 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.

4.5 Connections

4.5.1 Flow and return connections

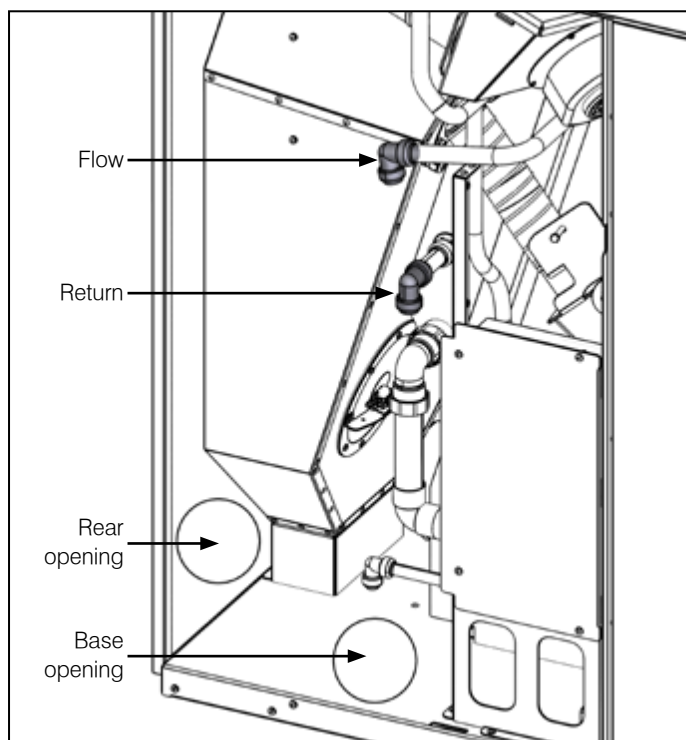


Figure 4-1: Location of flow and return connections and openings in rear panel and base

The flow and return connections are located on the left hand side of the boiler. Refer to Figure 4-1. Both connections are supplied fitted with 22mm Tectite elbow connectors.

Two 150mm diameter pre-cut 'knock-out' openings are provided for flow and return pipes and also the condensate disposal pipe. Refer to Figure 4-1:

- One is located in the lower left corner of the boiler back panel
- The other is located in the base of the boiler

The flow and return pipes can pass downwards and then to the rear of the boiler, through the opening in the boiler back panel and then through the wall and into the building.

Alternatively, if required, the flow and return pipes can pass downwards and through the opening in the base of the boiler to pass underground and into the house.



NOTE

It is NOT possible to have the flow and return pipes (or condensate pipe) passing through either the right or left hand side of the boiler casing.

4.5.2 Condensate Connection

The boiler is supplied with the condensate trap factory-fitted. Refer to Section 5.5. This trap is located inside the boiler casing and is accessed by removing the side access panel on the left hand side of the boiler. Refer to Section 1.3 for details.

Refer to Section 5 for details on the condensate disposal pipework.

4.5.3 Drain Cock

A drain cock is factory fitted to enable the draining of the boiler. This is located at the rear of the water jacket and accessed by removing the side access panel on the left hand side of the boiler. Refer to Figure 4-2.

To enable draining of the system, a suitable drain cock must be fitted at the lowest point of the heating system.

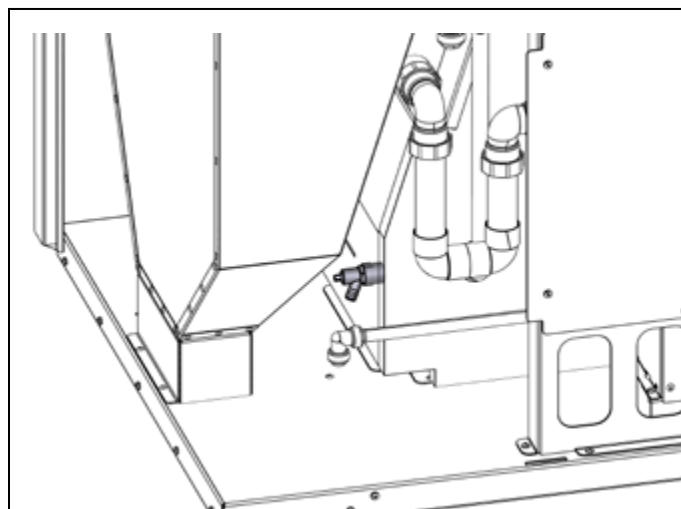


Figure 4-2: Location of drain cock (left hand side and rear panel removed for clarity)

4.6 Wash System

The Grant Vecta condensing boiler is supplied with an automatic cleaning system to wash any ash build up from the tubes of the condensing (secondary) heat exchanger.

This factory fitted wash system consists of two spray jets, mounted on the heat exchanger access cover, connected by a manifold pipe located on the upper side of the cover. Refer to Figure 4-3.

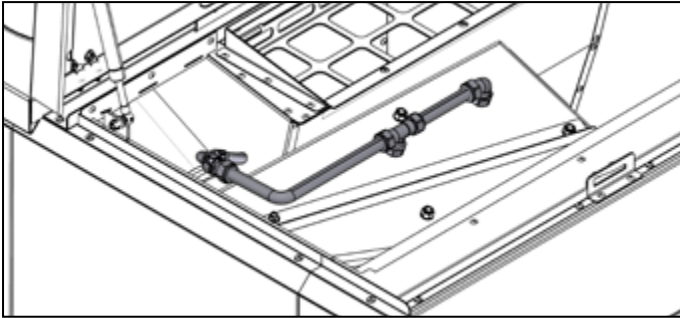


Figure 4-3: Location of wash system in top of boiler

This is fed with mains cold water via a solenoid valve located in the left side of the boiler. This is connected to the manifold by a flexible hose and isolating valve (with integral check valve). Refer to Figure 4-3.

Connect the mains water supply for the wash down system to the 15mm compression connection located at the bottom rear corner of the left side panel.

Connect the mains water supply for the wash system to the 15mm compression connection on the water solenoid valve. This is located at the side of the primary heat exchanger on the left hand side of the boiler and accessed by removing the access panel on the left hand boiler side panel.

The appliance must not be connected to the mains water supply via a flexible hose.



NOTE

A minimum inlet water pressure of 100 kPa (1 bar) is required to maintain an adequate supply for cleaning purposes. The maximum inlet water pressure is 800 kPa (8 bar).

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.

4.7 Before you Commission

To avoid the danger of dirt and foreign matter entering the boiler the complete heating system should be thoroughly flushed out – 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 older 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 Sentinel X300 (new systems), Sentinel X400 (existing systems), or Fernox Restorer.

After cleaning, it is vitally important that all traces of the cleaner are thoroughly flushed from the system.

For long term protection against corrosion and scale, after cleaning/flushing a suitable inhibitor should be added to the system water, such as Sentinel X100 or Fernox MB-1, in accordance with the manufacturers' instructions.

Failure to follow the above will invalidate the guarantee.

In order to provide further protection should there be a power failure in cold weather, a combined anti-freeze and corrosion inhibitor can be used such as Sentinel X500 or Fernox Alphi-11. Follow the manufacturers' instructions supplied to achieve the level of anti-freeze protection required.

For details of the Sentinel Products visit www.sentinel-solutions.net and for Fernox products visit www.fernox.com.

A Grant Mag-One in-line magnetic filter/s (or equivalent*) must be fitted in the heating system pipework. This must be installed and regularly serviced in accordance with the filter manufacturers' instructions.

* As measured by gauss. The Mag-One magnetic filter has a gauss measurement of 12000

4.8 Completion

Please ensure that the Grant Vecta 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 to register the installation of the boiler.

Ensure that the user guide (supplied with the boiler) is handed over to the householder along with this Installation and Servicing manual.

4.9 'Meter Ready' Installations

Grant Vecta wood pellet boiler installations that are receiving a Domestic Renewable Heat Incentive (RHI) payment will not usually require a heat meter to be fitted.

However, all such domestic RHI installations must be 'meter ready' in accordance with MCS requirements. Refer to the MCS Domestic RHI Metering Guidance Document for full details.

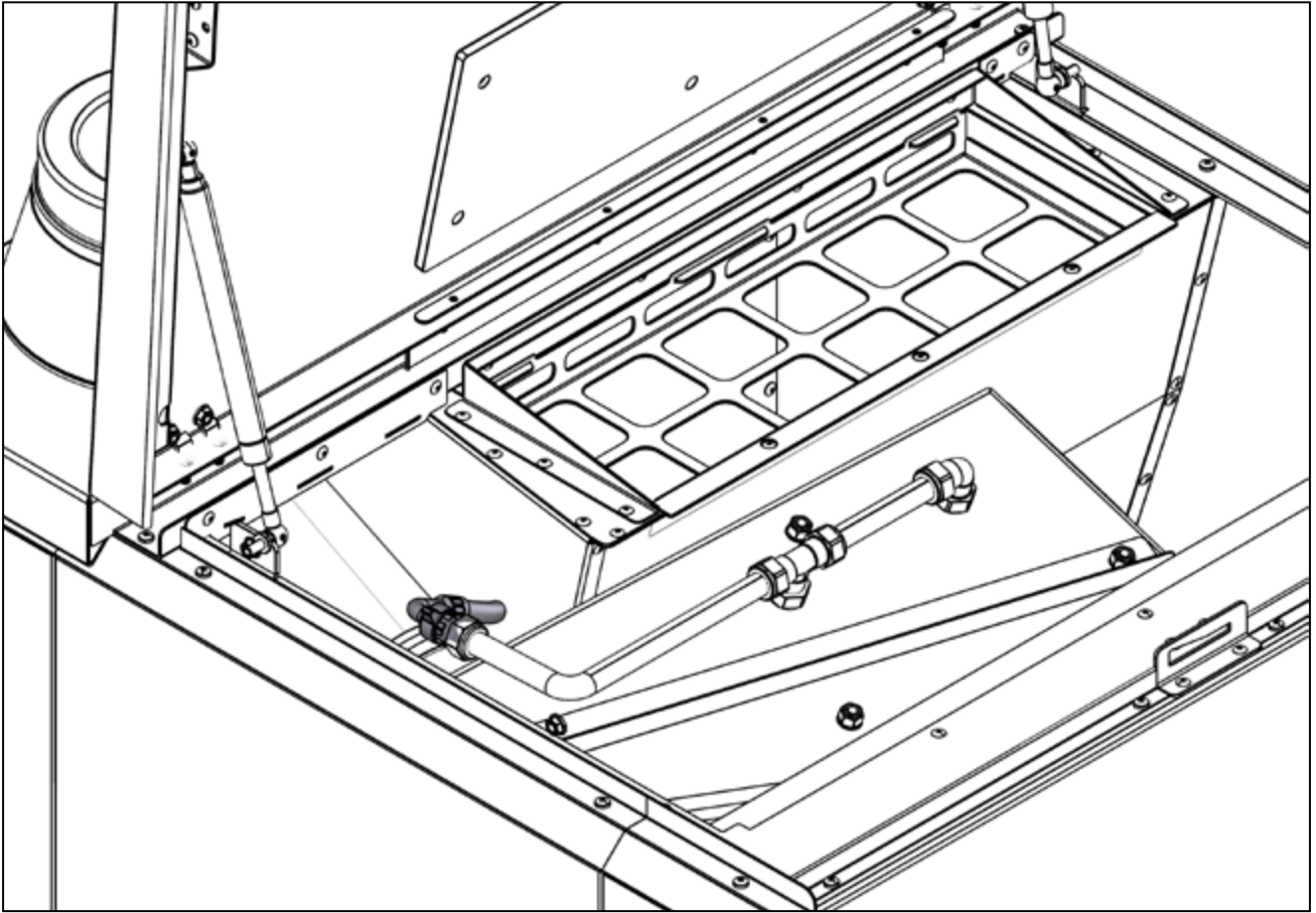


Figure 4-4: Water connection to wash system (via flexible hose from solenoid valve)

5 Condensate Disposal

5.1 General Requirements

When in condensing mode the Grant Vecta 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:

- into a soil stack – either directly or via an existing waste system
- into a gulley

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 or hopper.

Every Grant Vecta boiler is supplied with a trap and this MUST be used. Refer to Section 5.5 for trap details.

MCS Product Certification Scheme Requirements for Biomass (MCS 008) state that:

"Because of the volume of wash-down/condensate discharge, it is NOT recommended to discharge into a purpose-made soakaway."

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 can be connected directly into waste/soil systems connected to septic tanks, providing a neutraliser has been installed.

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 Vecta boiler must have a minimum 'nominal' diameter of 32mm (1 ¼") 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).



NOTE

Where it is not possible for the pipe to fall towards the point of discharge – either into a waste system or to a gulley, it will be necessary to use a condensate pump.

When using a condensate pump with a Grant Vecta 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 system 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. This must be located indoors.



WARNING

When using a condensate pump and holding tank, the Boiler control setting for 'Clean Boiler' (time between boiler cleaning operations) must not be set less than 480 minutes. Changing this setting could result in a more frequent wash down of the boiler which could exceed the capabilities of the tank and condensate pump.

The 'Max Cleaning Time' (maximum time boiler cleaning is in operation) is factory set at 60 seconds.

Refer to Section 9 for further details on boiler control settings.

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 Trap

The boiler is supplied with a factory-fitted condensate trap. This trap is located inside the boiler casing and is accessed by removing the side access panel on the left hand side of the boiler.



NOTE

Only this trap must be used with the Vecta boiler. No alternative trap should be used as it will not give the required depth of water seal. The trap is designed to be fitted as supplied, i.e. inside the boiler casing on the left hand side only.

Two 150mm diameter pre-cut 'knock-out' openings are provided in the boiler enclosure for the condensate disposal pipe (and also the flow and return pipes). Refer to Figure 4-1.

- One is located in the lower left corner of the boiler back panel (as viewed from the front)
- The other is located in the base of the boiler

The condensate disposal pipe can pass downwards from the trap outlet and then to the rear of the boiler, through the opening in the boiler back panel. It can then run either to an external gully or external soil pipe or it could pass through the wall and into the building to connect to an internal waste system or soil pipe.

Alternatively, if required, the condensate disposal pipe can pass downwards from the trap outlet, through the opening in the base of the boiler, and run underground and into soil pipe or waste system.

If the waste system for the property concerned is connected to a septic tank an in-line Condensate Neutraliser should be fitted in the condensate disposal pipe.

To connect the disposal pipe to the trap

To gain access to the condensate trap:

- Unlock/ remove the padlock (if fitted) to the door catch on the side access panel
- Rotate the door catch knob to unlatch and remove the side access panel.

Carefully press out the required pre-cut hole in either:

- The lower left corner of the boiler back panel
- The base of the boiler (directly below the condensate trap)

Adjust the outlet position of the trap to suit the required route of the disposal pipe.

Pass the 32mm (1¼") plastic waste pipe through the opening in the enclosure (either the back panel or base, as required).

Fit the end into the trap outlet and tighten the connector to secure the pipe in place.

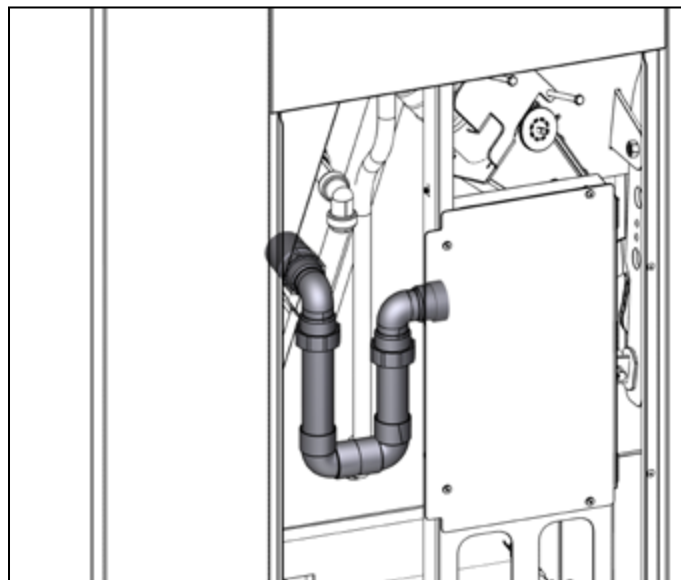


Figure 5-1: Condensate trap

5.6 Inspection and Cleaning of Trap

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

With the trap removed, also check the condensate outlet of the heat exchanger. Ensure it clear and remove any debris as necessary.



CAUTION

Failure to regularly check and clean the condensate trap may result in damage to the boiler and this will not be covered by the product guarantee.



CAUTION

All condensate pipework must be adequately protected against freezing.

6 Sealed Systems

6.1 Sealed System Requirements

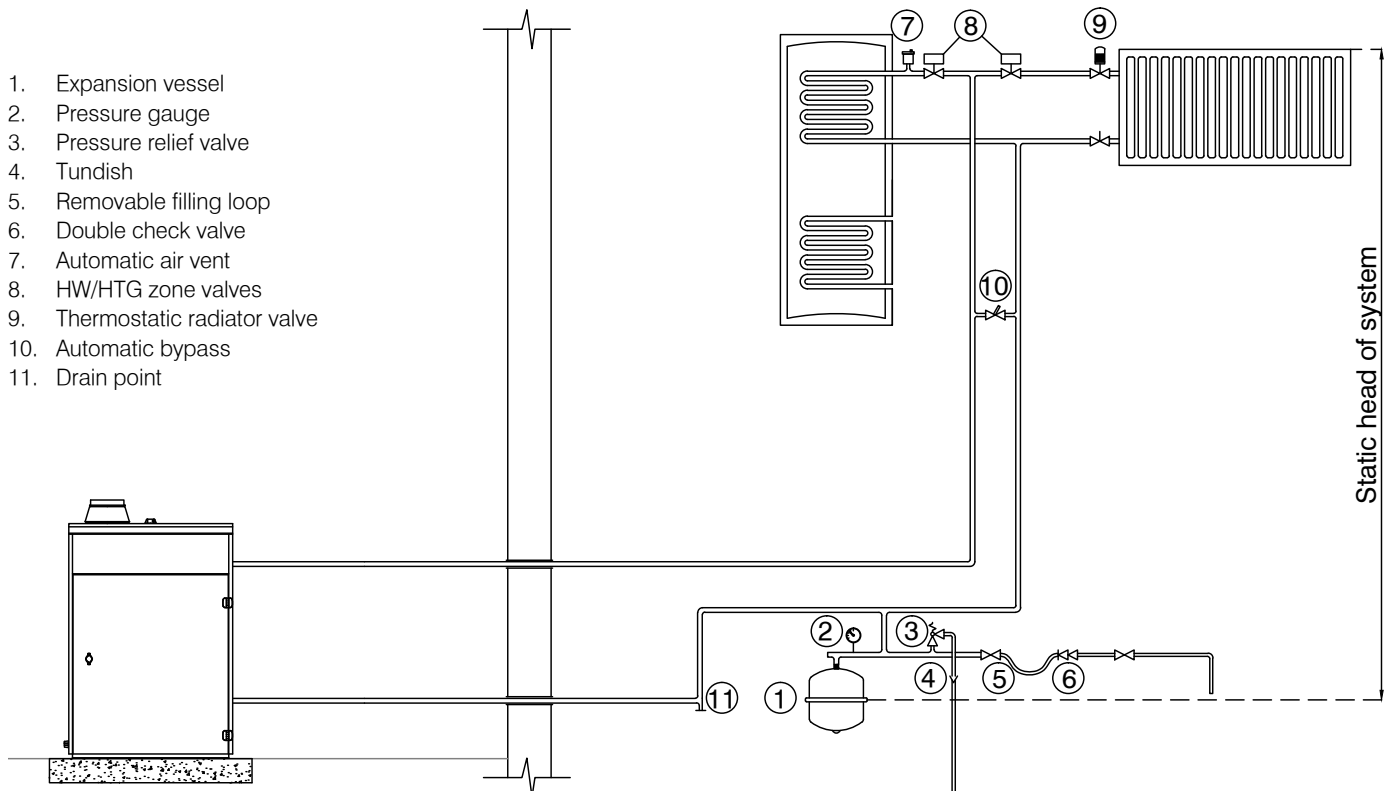


Figure 6-1: Sealed heating system components

All Grant Vecta boilers are suitable for use with sealed systems complying with the requirements of BS EN 12828:2003, BS EN 12831:2003 and BS EN 14336:2004.

The system must be provided with the following items:

- Diaphragm expansion vessel complying with BS EN 13831:2007
- Pressure gauge
- Pressure relief (safety) valve
- Approved method for filling the system

6.1.1 Expansion 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, 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.



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.

6.1.2 Pressure Gauge

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.

6.1.3 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 damage to property.

6.1.4 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.

6.1.5 Heating System

The maximum 'setpoint' temperature for 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 2767:1991.

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.

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). Refer to Figure 6-1.

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



NOTE

The air charge pressure may be checked using a tyre pressure gauge on the expansion vessel Schraeder valve. The vessel may be re-pressurised, 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.

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

2. Open the hinged hopper lid. Undo the two screws (one on the right and one on the left) and remove the access cover from the top of the boiler.

Pull out the air vent tube so that it will discharge any water outside the boiler and have a small container available to catch this water. Open the manual air vent located under the access cover. Refer to Figure 6-2.

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.
4. Open the fill point valve.
5. Gradually open the double check valve from the water supply until water is heard to flow.
6. When the needle of the pressure gauge is between 0.5 and 1.0 bar, close the valve.
7. Vent each radiator in turn, starting with the lowest one in the system, to remove air.
8. 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.
9. Repeat steps 7 and 8 as required until system is full of water at the correct pressure and vented.
10. Water may be released from the system by manually operating the safety valve until the system design pressure is obtained

11. Close the fill point and double check valves either side of the filling loop and disconnect the loop.
12. Check the system for water soundness, rectifying where necessary.

6.3 Venting the Pump

For those heating circulating pumps fitted with a vent plug, 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 over tighten.



NOTE

Some heating circulating pumps are not fitted with a vent plug so it is not possible to vent these pumps in the manner described above. Refer to pump manufacturers own instructions for further details.

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.

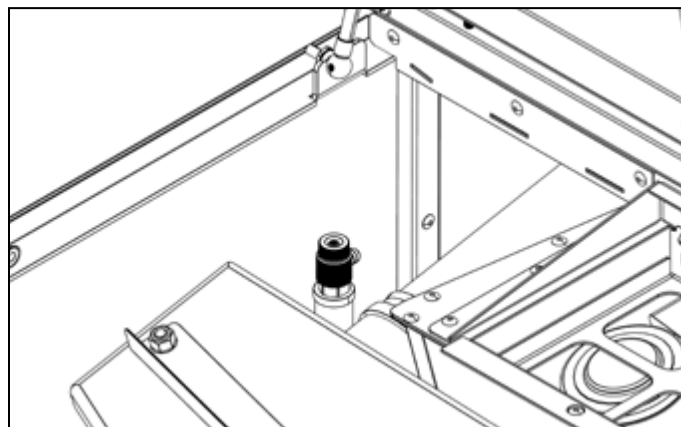


Figure 6-2: Location of manual air vent (wash system removed for clarity)

7 Flue System and Air Supply

7.1 Air Supply

The Grant External Vecta wood pellet boiler draws air for combustion from the surrounding atmosphere. The combustion air inlet to the boiler is provided by the gap along the bottom edge of the hinged front door. This opening must not be blocked off or obstructed in any way. Refer to Figure 7-1.

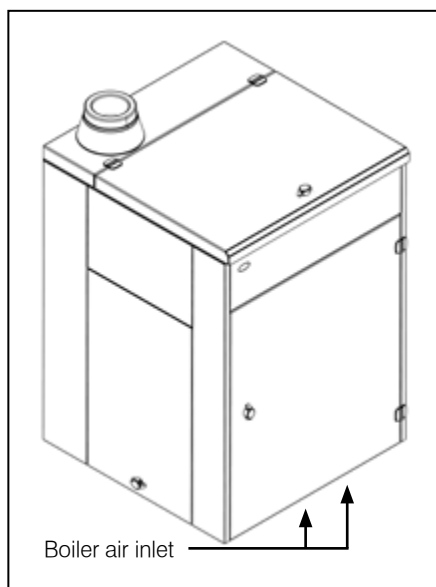


Figure 7-1: Boiler air inlet

7.2 Flue Terminal Position and Clearances

The Grant External Vecta wood pellet boilers have high operating efficiencies and low flue gas temperatures. Only the Grant 'Biomass' insulated twin-wall flue system can be used with the Grant External Vecta boiler.



NOTE

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

The following points **MUST** be taken into consideration with regard to the design and installation of the flue system:

- The flue system must include the Inspection Pipe (product code: WPBOM/IP) , which should be fitted directly to the flue outlet of the boiler. This incorporates both a combustion test point and a flue inspection hatch. Refer to Section 7.4.5.
- Grant recommends that the flue is vertical for a minimum distance of 600mm (measured from the top of the boiler) before any elbow. However, this is not essential for the operation of the boiler.
- There must NOT be any change of direction greater than 45° from the vertical, e.g. two 45° elbows must NOT be used together to form a 90° elbow.
- The flue system must NOT include any horizontal sections of flue.
- Grant recommends that an adjustable flue extension be fitted in the flue system as close to the boiler as possible, to enable the flue system to be disconnected from the boiler flue connection, as and when required, for future boiler maintenance.
- The weight of the flue system must NOT be carried by the boiler, but must be supported using the various support options available in the Grant 'Biomass' flue system. Refer to Section 7.4.4.
- The minimum distance between the outer surface of any part of the flue system and any combustible material is 60mm. Refer to Section 7.3 for flue system designation. A minimum clearance of 25mm around the flue is required for the fitting/removal of locking bands.
- The flue terminal should be located in a draught free area, i.e. above the roof, where it can discharge freely and not present a fire hazard whatever the wind conditions. The flue outlet positions shown in Figure 7-2 (from Approved Document J) can meet this requirement.
- The heights and separation distances shown in Figure 7-2 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.
- No other appliance can be connected to the boiler flue.
- Any condensate in the flue can run back into the boiler. A condensate drain at the base of the flue system is not required as the flue system is designed to allow the condensate to run back into the boiler.

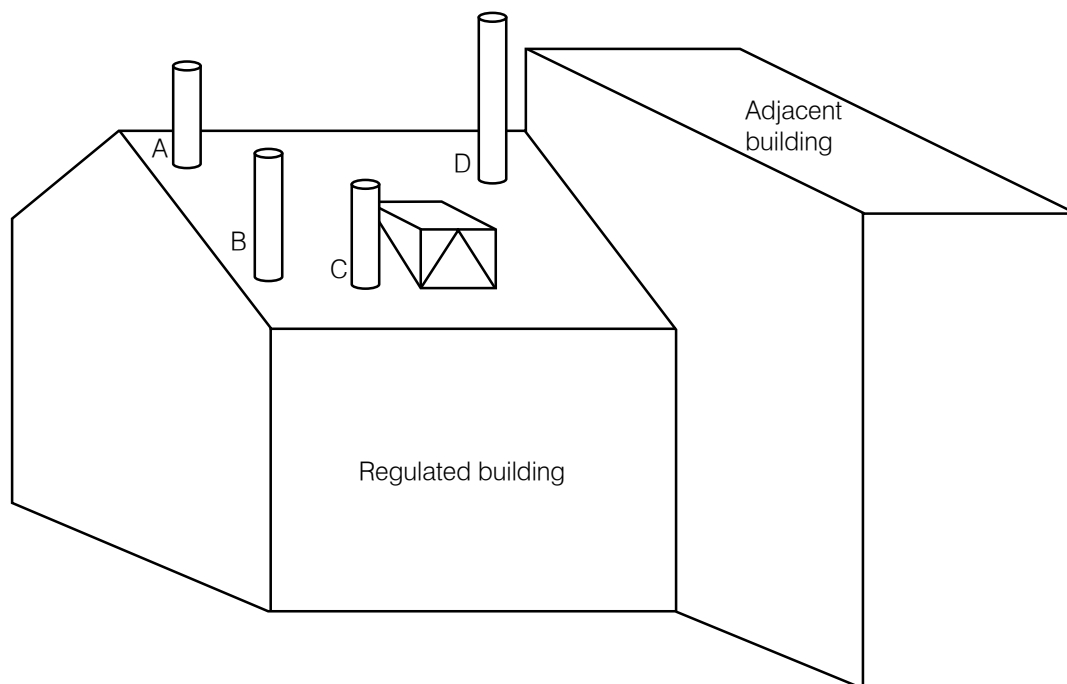


Figure 7-2: Flue terminal positions

Point where flue passes through weather surface (Notes 1, 2)		Clearances to flue outlet
A	At or within 600mm of the ridge	At least 600mm above the ridge
B	Elsewhere on a roof (whether pitched or flat)	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.
C	Below (on a pitched roof) or within 2300mm horizontally to an openable rooflight, dormer window or other opening (Note 3)	At least 1000mm above the top of the opening.
D	Within 2300mm of an adjoining or adjacent building, whether or not beyond the boundary (Note 3)	At least 600mm above any part of the adjacent building within 2300mm.

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.
4. A vertical flue fixed to an outside wall should be treated as equivalent to an inside flue emerging at the nearest edge of the roof.

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

7.3 Flue System Specification

The Grant 'Biomass' 125mm (5in) flue system is a fully insulated stainless steel twin-wall flue finished with either a Black or White 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 CE designation of this flue system (to EN1856-1) is:

T450 N1 W V2 L50 050 G 60

Where:

- T450 (Temperature rating) - 450°C maximum temperature for continuous operation
- N1 (Pressure rating) - Negative pressure
- W (Condensate resistance) - Able to contain condensate within the flue
- V2 (Corrosion resistance) - Resistant to attack from products of combustion from natural wood
- L50 (Liner material) - 316L stainless steel
- 050 (Material thickness) - 0.5mm
- G (Soot fire resistance) - Tested at 1000°C for 30mins
- 60 (Distance to combustibles) - 60mm minimum clearance is required from combustibles

Masonry chimneys **MUST** be lined using the 125mm stainless steel flexible 'smoothbore' liner – available as part of the Grant 'Biomass' flue system. Refer to Section 7.4.9.

7.4 Flue System Assembly

7.4.1 Boiler Flue Connection

The Grant External Vecta boiler is supplied with a flue outlet located on the top of the boiler in the rear left corner and is designed to fit the Grant 'Biomass' flue system. Refer to Figure 7-3.

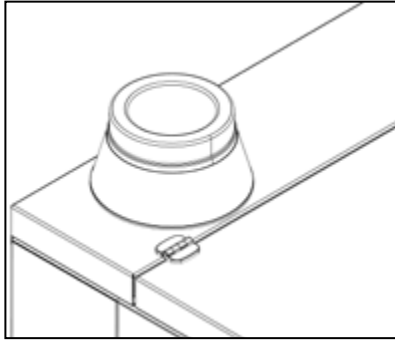


Figure 7-3: Boiler flue connection

The flue system must include the Grant Inspection Pipe (Grant Ref. WPBOM/IP), which should be fitted to the outlet of the boiler. This incorporates both a combustion test point and a flue inspection hatch. Refer to Figure 7-4 and also Section 7.4.5.

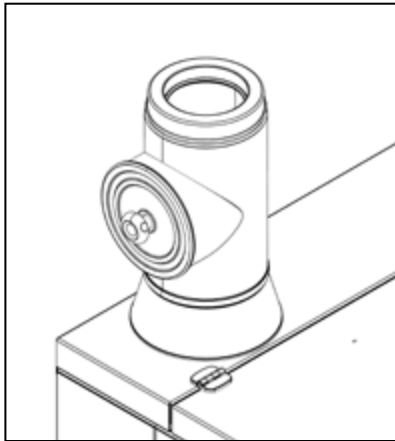


Figure 7-4: Inspection pipe

When fitting the flue to the boiler flue outlet, the lip seal supplied with the flue component must be fitted into the groove around the inside surface of the flue, and the locking band fitted to secure the joint.



NOTE

The Inspection Pipe should be positioned such that the cover plate faces to the left, not towards the right or front of the boiler.

7.4.2 Joining Components

All the 'Biomass' system twin-wall flue components (with the exception of the elbows) use a 'twist lock' jointing system. The 'male collar' end of the flue component **MUST** always be uppermost when fitted.

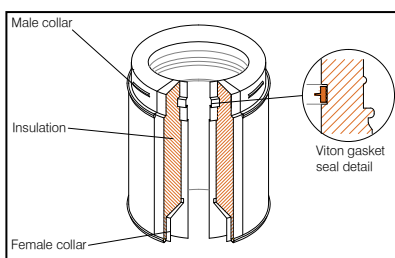


Figure 7-5: Male and female flue connections

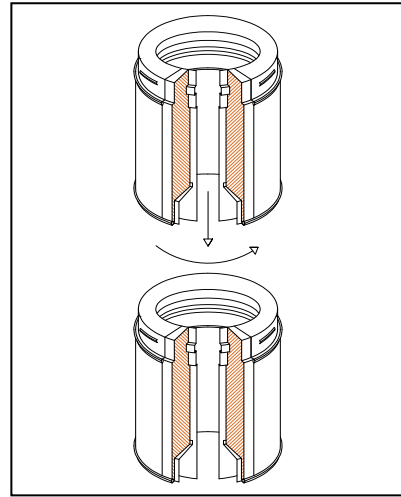


Figure 7-6: Twist lock joint between components

To join two components together:

All flue joints must have a lip seal gasket fitted. This seal is supplied with the flue component.

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.

First fit the lip seal supplied into the groove (in the inner flue liner) at the 'male collar' end of the flue component. Refer to Figure 7-5. The lip seal should be fitted **dry**, i.e. with no lubricating grease applied at this stage. The lubricating grease (also supplied with the component) should be applied to the seal after it is fitted but before fitting the two flue components together.

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 7-6.

Ensure that the two beaded ends of the flue components are in contact with each other all round. Position the locking band and so that it grips the beaded edge of both components and fasten using the spring clip. The locking bands provided **MUST** be fitted at **ALL** flue joints. Refer to Figure 7-7.

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

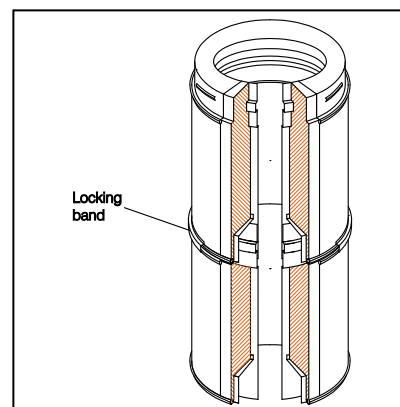


Figure 7-7: Fitting of locking band



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.

7.4.3 Adjustable Length

The Grant 'Biomass' flue system includes an Adjustable flue extension. Refer to Section 7.9. This allows any of the straight flue extension components to be extended in length by between 00mm to 230mm (this does not apply to the 200mm extension). This adjustable extension must be used in conjunction with any straight extension (1000mm, 500mm, 333mm or 200mm) 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 loadbearing, therefore adequate support of the flue system MUST be provided immediately above the adjustable extension.

7.4.4 Support Components

The weight of the flue system is considerable. It must NOT be carried by the flue connection on the appliance, but requires independent support using one or more of the various flue support options available in the Grant 'Biomass' flue system.

Intermediate Top Plate (product code: WPB/TP)

Flue systems running up against an external wall surface can be supported using the Intermediate Top Plate. This is mounted on either a pair of Wall Support Side Plates (product code: WPB/WS or WPB/WS) or a pair of Cantilever brackets (product code: WPB/CANT), 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 Brackets (product codes: WPB/WB60 and WPB/WB300)

Both the Wall bracket and the Adjustable Wall Bracket (Grant Ref. WPB/WB60 and WPB/WB300) are NOT load-bearing but 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.

Structural Locking Band (product code: WPB/LBEXT)

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 Structural locking band at the joint immediately below, and at every joint above, the last flue support.

7.4.5 Flue Inspection Pipe (product code: WPBOM/IP)



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. Refer to Section 11.4.

The Building Regulations Approved Document J requires a flue system to have the means to be inspected and cleaned as required. To meet this requirement, a Flue Inspection Pipe incorporating an inspection hatch and combustion test point is available as part of the Grant 'Biomass' flue system. This must be fitted directly to the boiler flue connector with the inspection hatch facing to the LEFT.

7.4.6 Elbows

Two elbows are available - 30° (product code: WPB/30) and 45° (product code: WPB/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.

There should be no more than 2 elbows – of maximum angle 45° from the vertical – fitted between the inspection hatch of the flue Inspection pipe (at the boiler) and the terminal. This can be increased to a maximum of four elbows (maximum 45°) between the boiler and terminal if there is a second flue Inspection Pipe fitted between the second and third elbows. Any Inspection hatch must be accessible for checking and cleaning purposes.

Roof Cowl (product code: WPB/RC)

The Rain Cap type terminal is fitted either directly to the Intermediate Top Plate on the top of the flue or, if necessary (i.e. to achieve the required distance between the terminal and the roof surface), to a length of flue that is, in turn, connected to the Intermediate Top Plate. Fit the Terminal to either the Intermediate Top Plate or flue extension and twist through 1/6 of a turn to lock in place. Ensure that the locking band (supplied with the terminal) is correctly fitted to secure the terminal in place. Refer to Section 7.4.2 for further details on connecting the flue components.

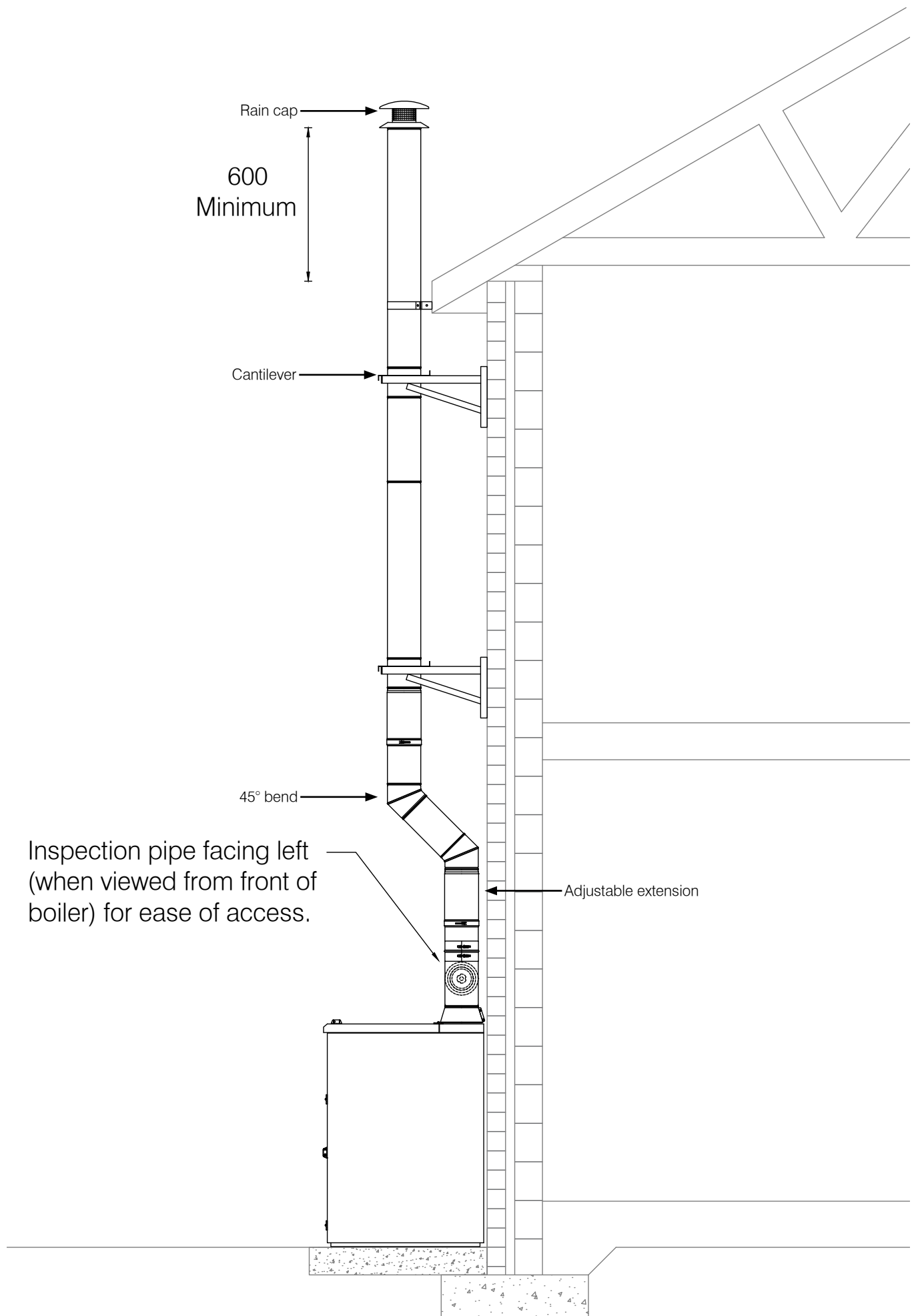
7.5 Flue Testing

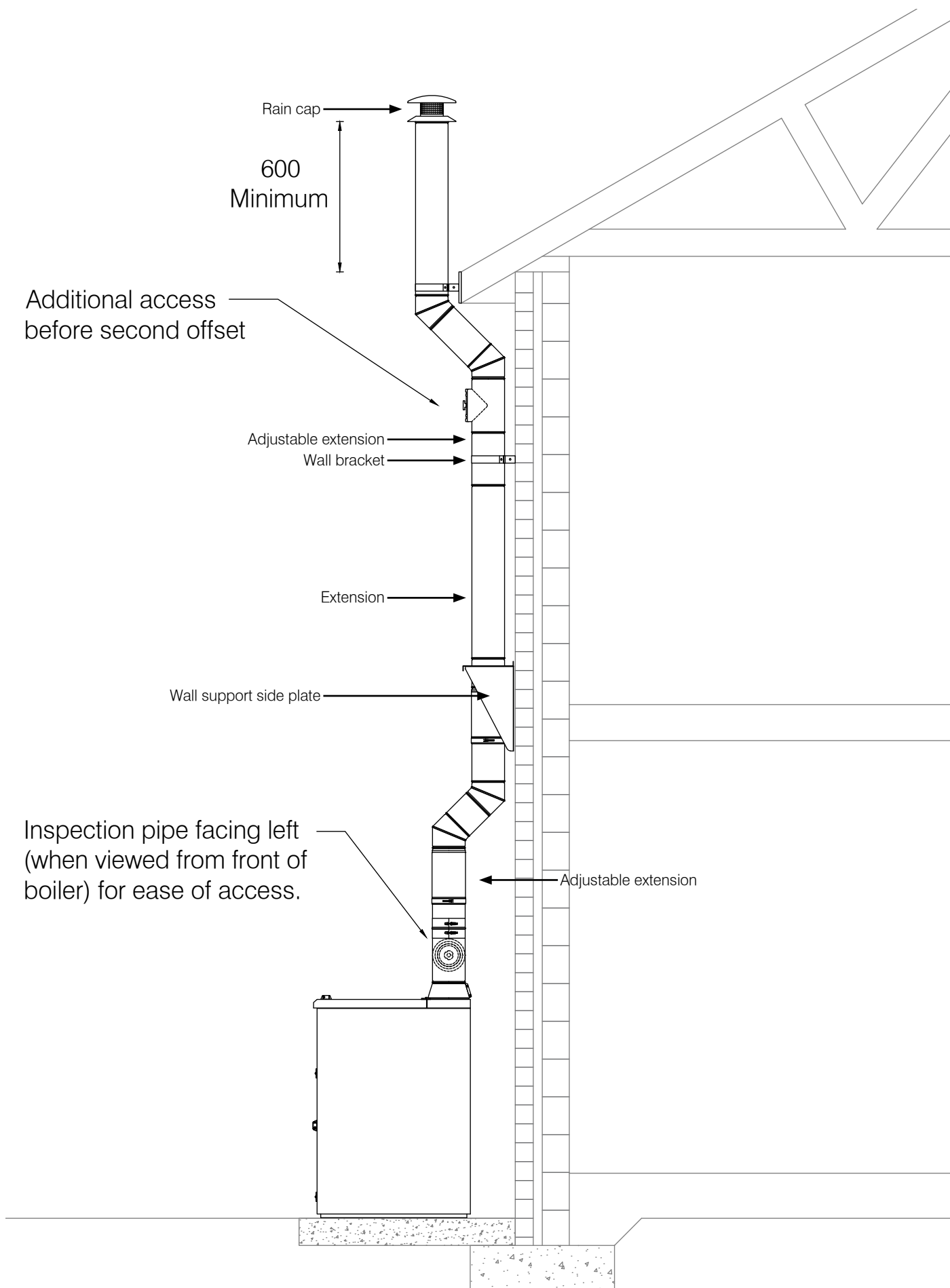
Once installed, the flue system should be tested in accordance with the requirements of The Building Regulations Approved Document J, Appendix E, Section E13 – Smoke Test I.

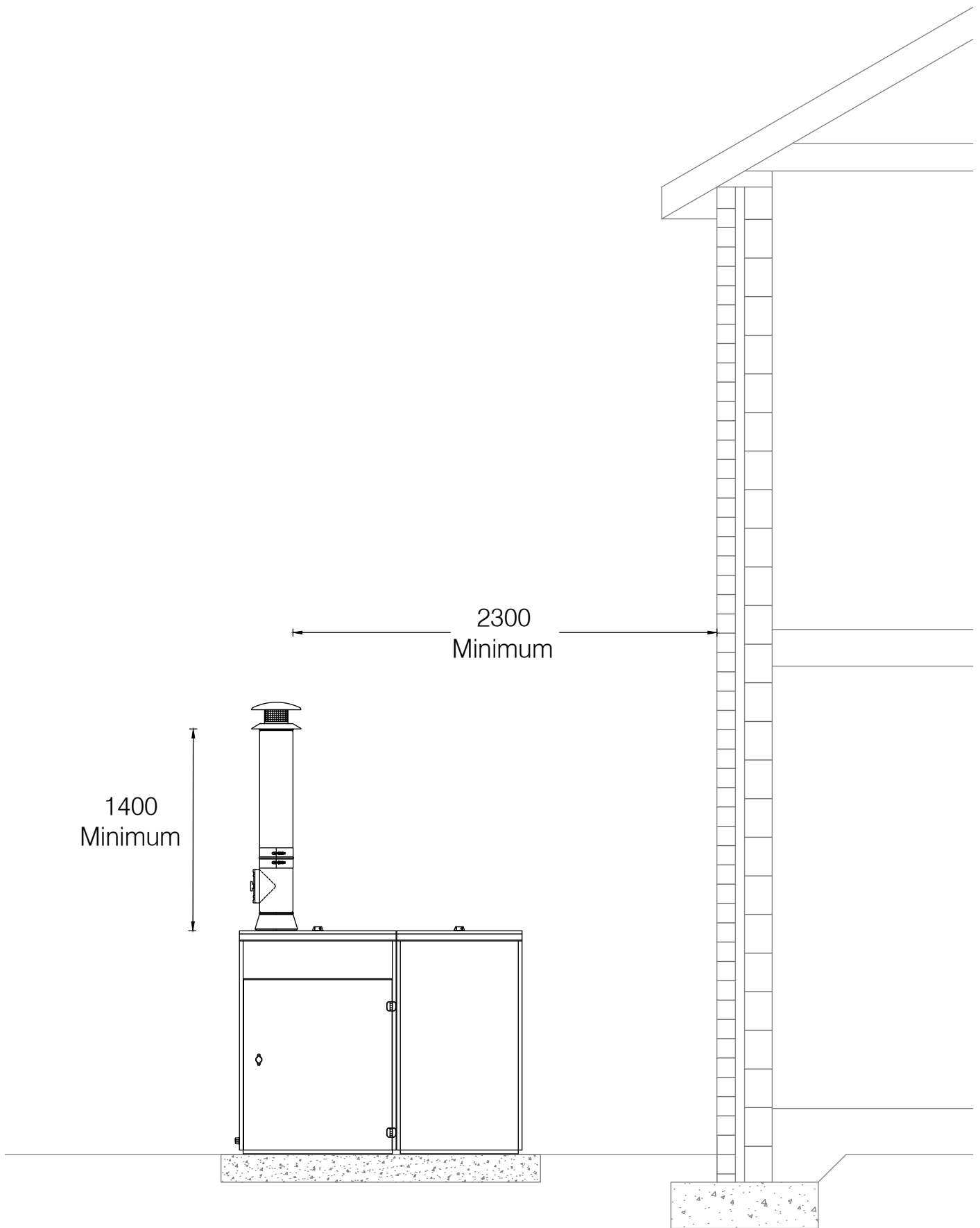
7.6 Flue Notice Plate

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 'Biomass' flue system and this must be completed by the installer and displayed in an unobtrusive but obvious position within the building concerned, e.g. on the inside of the boiler door.

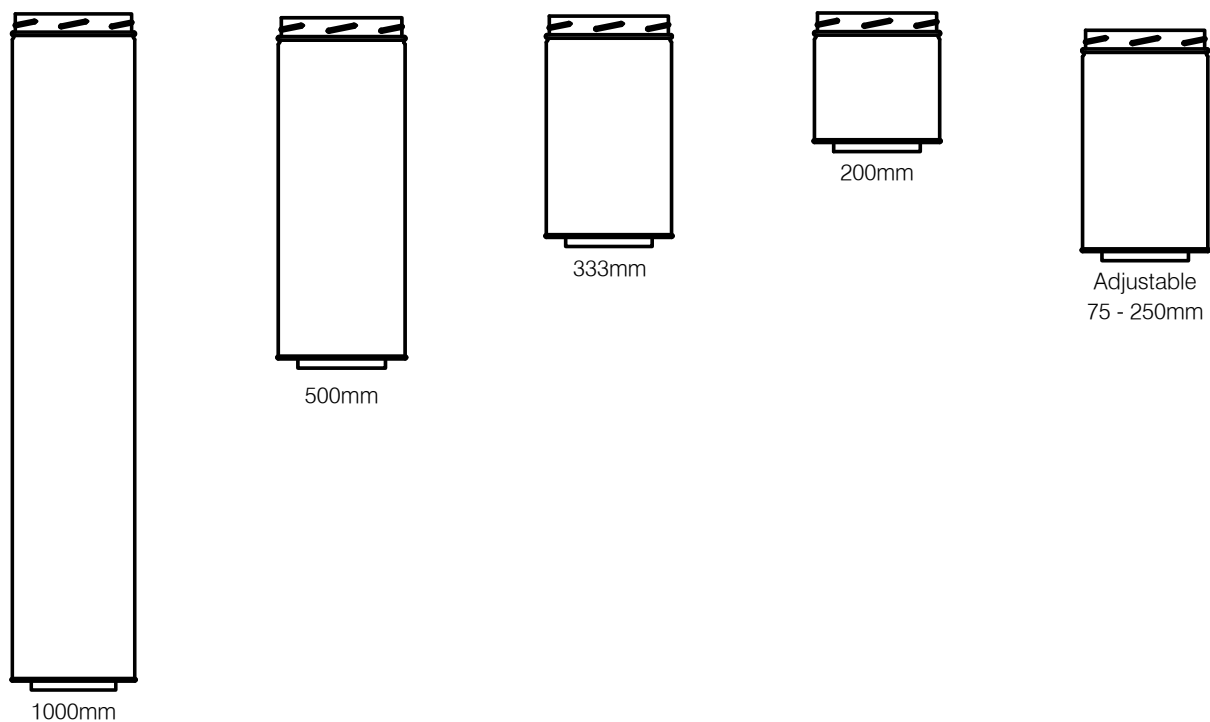
7.7 Typical Flue Systems







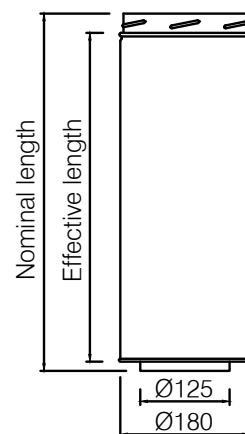
7.8 Flue System Component Dimensions



Straight pipe lengths (mm)		
Product code	Nominal length	Effective length
WPB/EXT200	200	160
WPB/EXT333	333	293
WPB/EXT500	500	460
WPB/EXT1000	1000	960

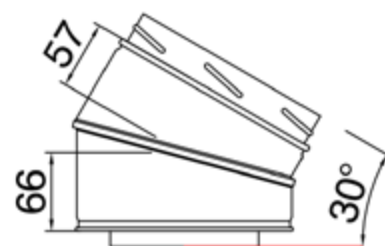
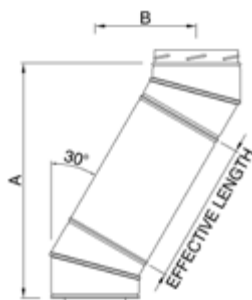
Adjustable pipe length (mm)		
Product code	Nominal length	Effective length
WPB/ADJ250	75- 250 mm	50 - 230mm

Complete with locking band.
 Telescopes over pipe below.
 Minimum engagement should be half the diameter.
 This component is NOT load-bearing.

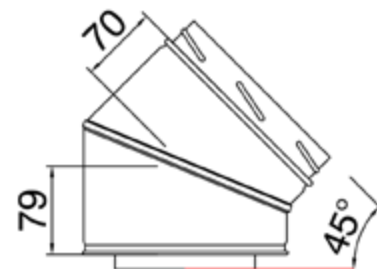
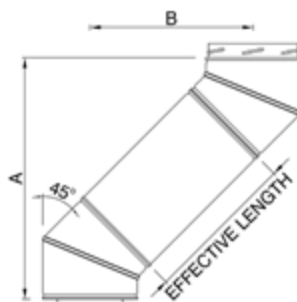


Straight and adjustable pipe lengths (mm)		
Product code	Effective length	
	Minimum	Maximum
WPB/ADJ250 and WPB/EXT200	350	440
WPB/ADJ250 and WPB/EXT333	393	573
WPB/ADJ250 and WPB/EXT500	560	740
WPB/ADJ250 and WPB/EXT1000	1060	1240

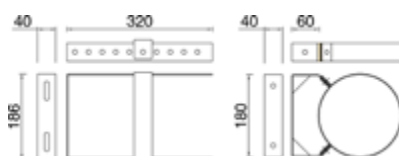
Double 30° bend and straight pipe length (mm)		
Effective length	Dimension	Length
960	A / B	1061 / 542
460	A / B	628 / 292
293	A / B	483 / 208
160	A / B	368 / 142



Double 45° bend and straight pipe length (mm)		
Effective length	Dimension	Length
960	A / B	933 / 784
460	A / B	580 / 431
293	A / B	462 / 313
160	A / B	367 / 218



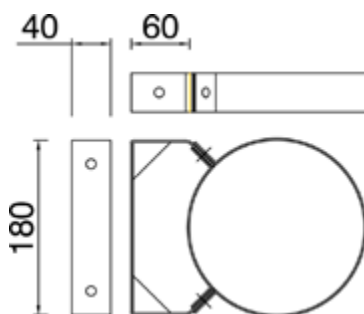
7.9 Flue System Components



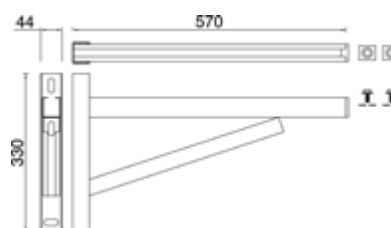
WPB/WB300 - Wall bracket (50 - 300mm)



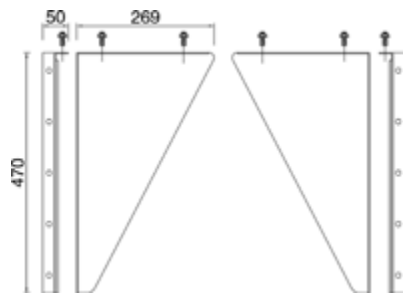
WPBOM/IP - Inspection pipe



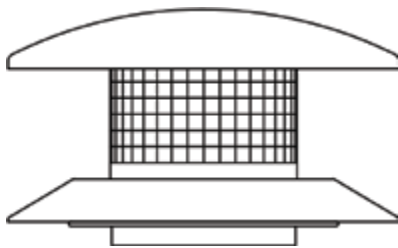
WPB/WB60 - Wall bracket (60mm)



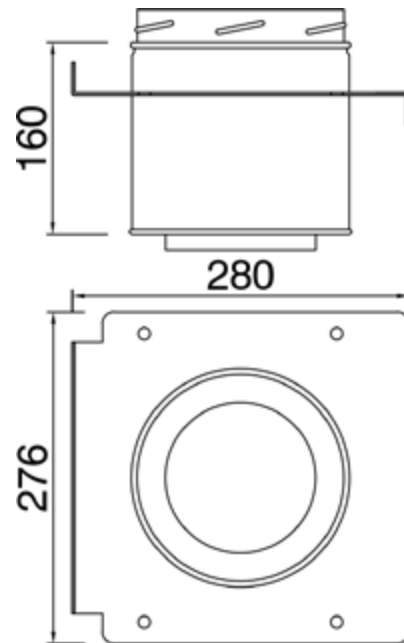
WPB/CANT - Cantilever (570mm)



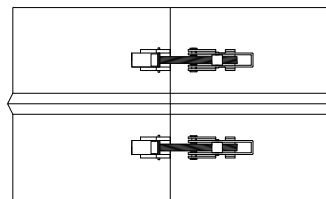
WPB/WS - Wall support side plate



WPB/RC - Rain cap



WPB/TP - Intermediate top plate



WPB/LBEXT - Structural locking band

8 Electrical

8.1 General Requirements

The Grant External Vecta wood pellet boiler requires a ~230V 1ph 50 Hz electrical supply. The unit must be connected to a mains power supply that is protected by a 5A fuse.



WARNING

As a stationary appliance not fitted with a means for disconnection from the supply mains having a contact separation in all poles that provide full disconnection under overvoltage category III, means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.

A fused double pole switch, with contact separation of at least 3mm in both poles, should be used for connection to the mains electrical supply, serving the boiler and heating system controls only.

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 – IET Wiring Regulations 17th Edition (including all amendments).

All the wiring and supplementary earth bonding external to the boiler must be in accordance with the above mentioned 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.

The boiler requires a permanent mains supply and switched live (for the heating and hot water control) to operate the boiler. For details of heating and hot water system controls refer to Sections 8.5 and 8.6.

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

8.2 Boiler Electrical Connections

All the electrical connections (permanent mains supply and switched live from the heating control system) to the boiler are made via the terminal block in the lower left corner of boiler. Refer to Figures 8-7 and 8-10.

To access the terminal block, the terminal block cover must be removed using the following procedure:

1. Open the front door of the boiler. First unlock and remove the padlock (if fitted), rotate the knob of the catch clockwise to unlatch and fully open the door.
2. Switch the electrical isolator to OFF. Refer to Figure 11-4.
3. Fit the multi-purpose tool (provided with the boiler) into the slot in the door catch. Refer to Figure 11-5.
4. Lift the tool handle to release the door catch and fully open the combustion chamber door of the boiler. Refer to Figure 11-6.
5. Undo the seven screws and remove the grey left hand cover panel from the boiler
6. Remove the side access panel from the left side of the boiler. Unlock/remove padlock (if fitted). Rotate the knob of the catch clockwise to unlatch and remove the access panel

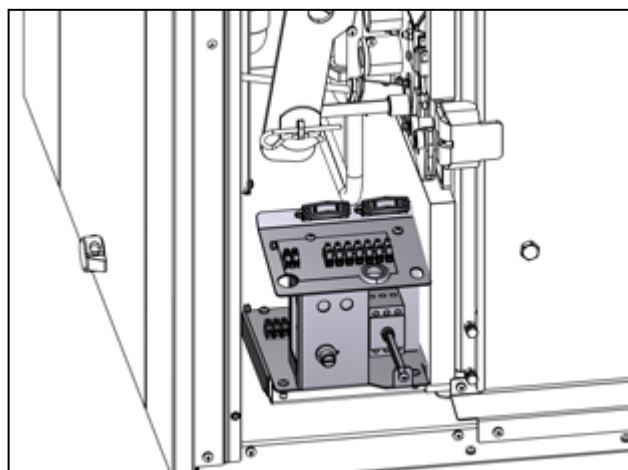


Figure 8-1: Boiler terminal block location (cover removed)

7. Slacken and remove the four screws securing the PCB housing. Refer to Figure 8-2.

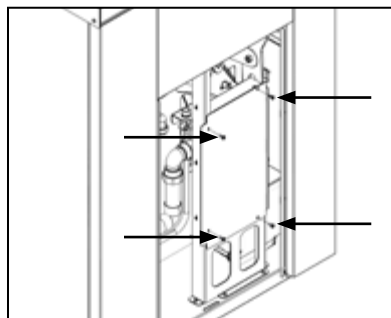


Figure 8-2: PCB housing screws

8. Carefully swing the PCB housing out from the side of the boiler casing. Refer to Figure 8-3.

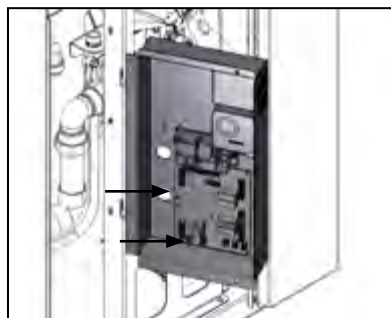


Figure 8-3: PCB housing pivoted

9. It will be necessary at this point to remove the photocell from the mount on the left side of the boiler heat exchanger. Refer to Figure 8-4.

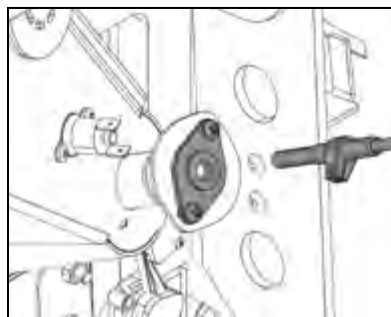


Figure 8-4: Removing the photocell

10. Locate the two terminal block cover fixing screws. Refer to Figure 8-5.

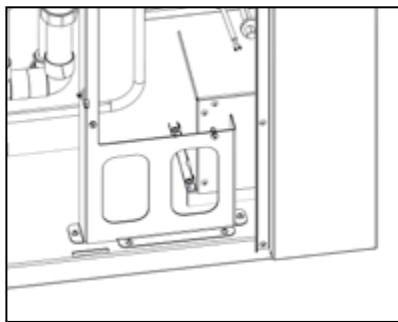


Figure 8-5: Terminal block cover fixing screws

11. Unscrew both screws and remove the cover from the boiler.
12. After making the electrical connections the terminal block cover must be re-fitted using the reverse of this procedure.

8.3 Remote Grant Logo Indicator Connections

The Grant logo indicator, supplied with the boiler, should be mounted on a standard electrical back box (either recessed or surface mounted) in a convenient and visible position within the house.

Using a suitable length of 0.75mm² 2-core PVC flex, connect the remote Logo indicator to the corresponding terminal block in the boiler. This terminal block is located to the left of the main boiler terminal block, at the front lower left corner of the boiler (behind the inner access cover). Refer to Figure 8-6 for electrical connection details.

When connecting the Remote Grant Logo Indicator, ensure that the terminal with the red wire on the boiler terminal block is connected to the terminal with the red wire on the logo indicator terminal block.

Likewise, ensure that the terminals with the black wire on both the boiler and logo indicator terminal blocks are connected together.

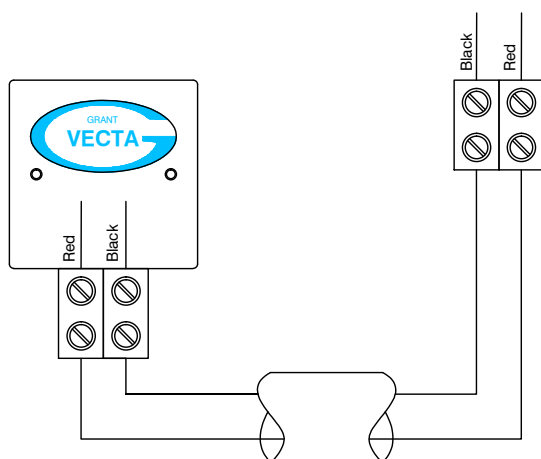


Figure 8-6: Connection diagram for Remote Grant Logo Indicator

8.4 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.

Use a suitable length of 4-core flex, at least 1.5mm² PVC between the heating controls wiring centre or junction box and the terminal block in the boiler. Ensure that the flex passes through and is secured by the cable clamp next to the terminal block.

Connect the mains supply to the boiler terminal block from left to right, as per Figure 8-7.

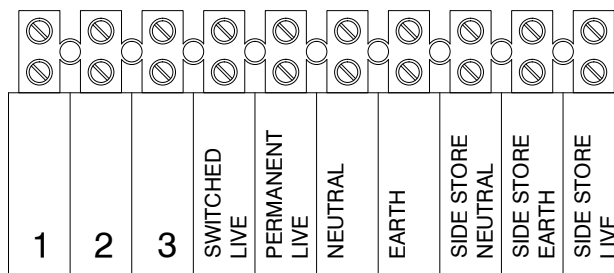


Figure 8-7: Boiler terminal block



NOTE

If the 4-core flex between the heating controls and the boiler terminal block is damaged at anytime, it must be replaced by a competent engineer in accordance with the requirements of the Electricity at Work Regulations 1989 and BS7671:2008 – IET Wiring Regulations 17th Edition (including all amendments).

8.5 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 for typical control system wiring diagrams.

8.6 Frost Protection

The Grant External Vecta wood pellet boiler is supplied with a factory-fitted frost protection thermostat. This is pre-set to operate when the air temperature falls to 2°C.

This frost thermostat is located inside the PCB enclosure and is connected between the Terminal 2 and Terminal 3 on the boiler terminal block.

For details of the frost thermostat electrical connections refer to Figures 8-8 and 8-9.



NOTE

In order for the frost protection thermostat to operate, ensure that a link is fitted between terminal 1 and the permanent live terminal on the boiler terminal block.

Grant recommends the use of a pipe thermostat (not supplied) in conjunction with the frost thermostat to avoid unnecessary and wasteful overheating of the property. This pipe thermostat should be located on the boiler return pipe and set to operate at 25°C.

To connect a pipe thermostat:

- Remove the factory fitted link between terminals 1 and 2 on the boiler terminal block.
- Connect the pipe thermostat between terminals 1 and 2 on the boiler terminal block.

Refer to the Figures 8-8 and 8-9 for details of the frost thermostat and pipe thermostat electrical connections.

For total system protection against freezing, particularly during extended periods without electrical power, Grant recommends the use of a combined heating system antifreeze and corrosion inhibitor, used in accordance with the manufacturer's instructions.

8.7 S-plan type system connection diagram

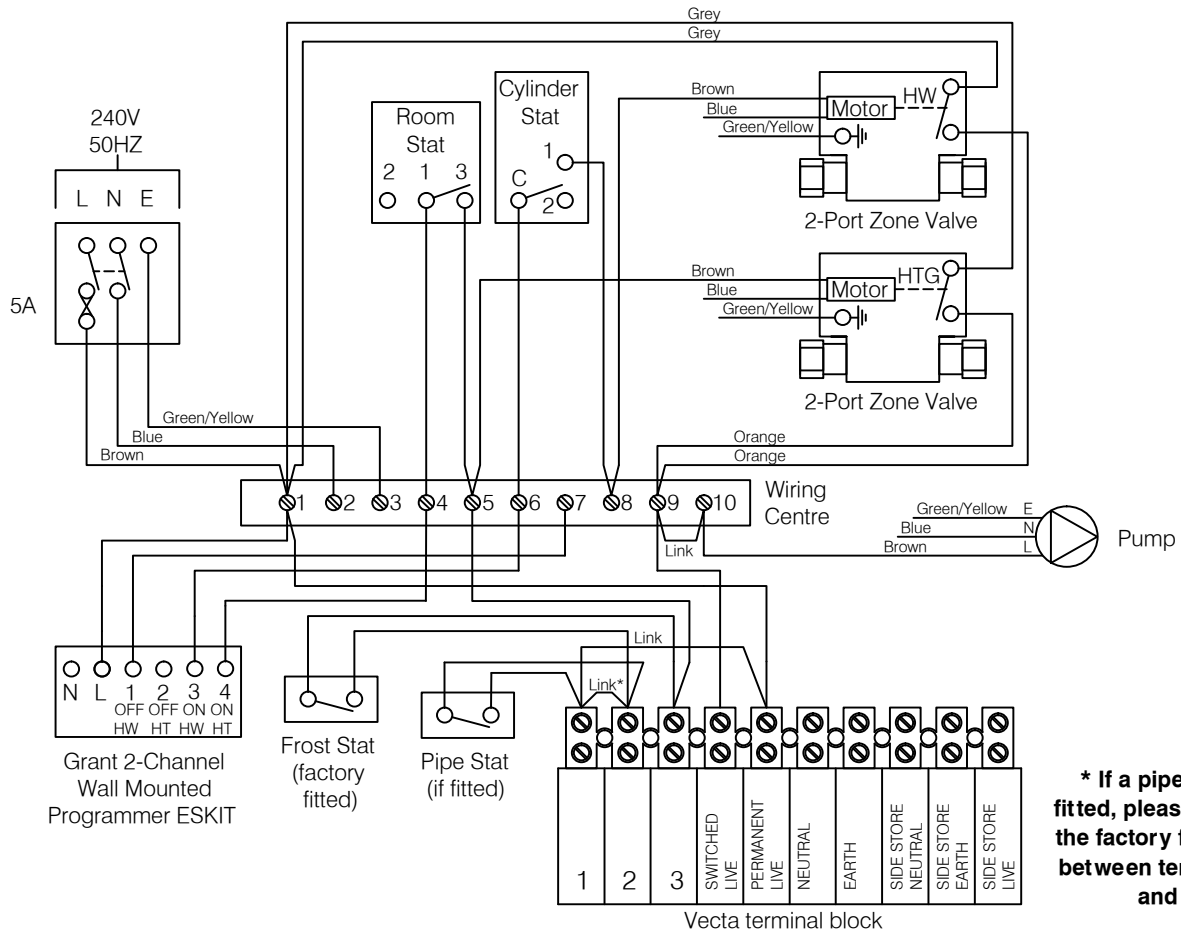


Figure 8-8: Heating system controls - S-plan type system connection diagram

8.8 Y-plan type system connection diagram

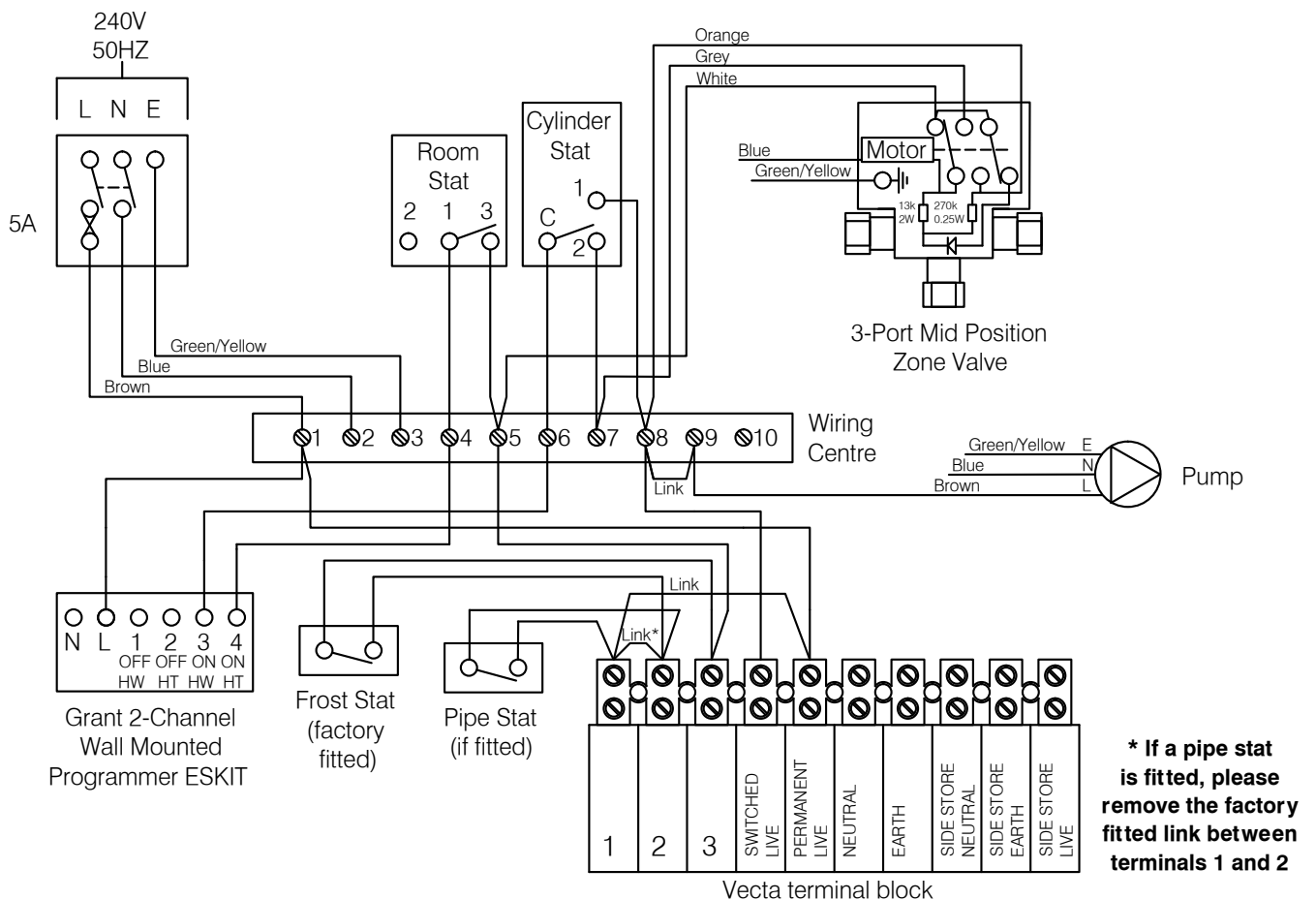
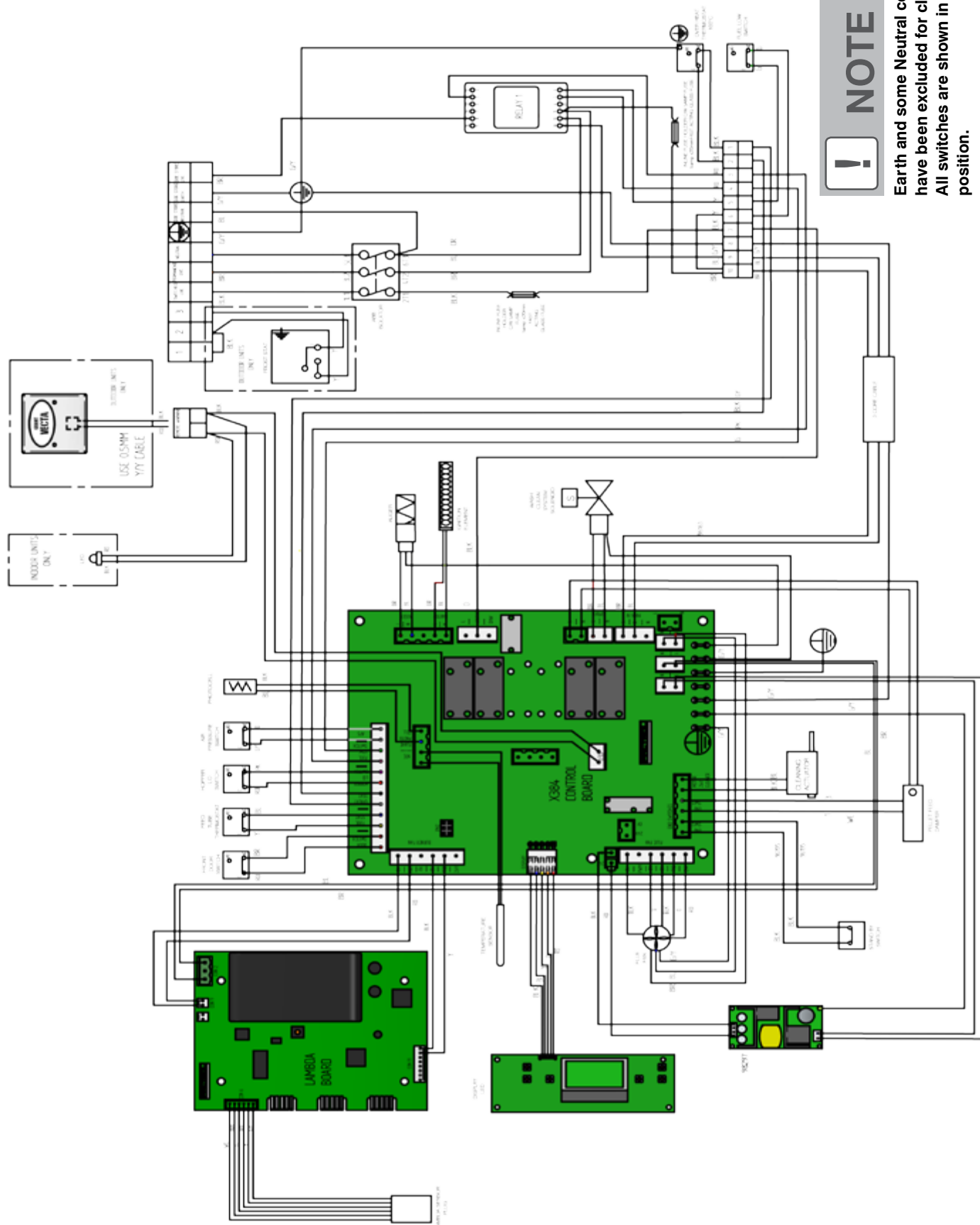


Figure 8-9: Heating system controls - Y-plan type system connection diagram

8.9 Boiler Wiring Diagram



NOTE

Earth and some Neutral connections have been excluded for clarity. All switches are shown in the closed position.

Figure 8-10: Boiler wiring diagram

9 Boiler Operation

9.1 General

The control system automatically regulates all aspects of the boiler operation including:

- Burner start up and shut sequences
- Output modulation
- Combustion

It also controls the automatic cleaning sequences for both the burner and heat exchanger(s) and indicates when a service is required. The automatic cleaning of the burner brazier and heat exchanger(s) is activated after the pellet feed auger running time has exceeded the period pre-set in the burner control settings. Refer to Section 9.3.

The boiler control panel (located on the front panel of the boiler) features a display screen and six control buttons. These buttons are used to access and adjust the boiler control parameters. Refer to Section 9.4.

The control system also has a diagnostic feature, where a fault code will be displayed on the control panel LCD. Refer to Section 12 – Fault Finding.

9.2 Modulation

Adjustable boiler control parameter numbers are shown in square brackets. Refer to Parameter Menu in Section 9.7.

The boiler has a 'setpoint' temperature. This is the target flow temperature from the boiler. The default 'setpoint' temperature is 75°C, but this can be adjusted by the installer if required. The boiler temperature is monitored by a thermistor located in the water jacket of the boiler and this is used by the control system to control the modulation of the boiler output.

When a demand from the heating system controls is detected and the ON/STANDBY switch is set to ON, the circulating pump runs and the boiler control checks that the boiler water temperature is cool enough for the boiler/burner to start. The boiler water temperature must be at least the 'Hysteresis On' temperature value below the 'Set Point' (i.e. boiler temperature < 'Set Point' – 'Hysteresis On').

If not, the circulating pump continues to run and the boiler water temperature checked until the conditions to start the boiler/burner are met.

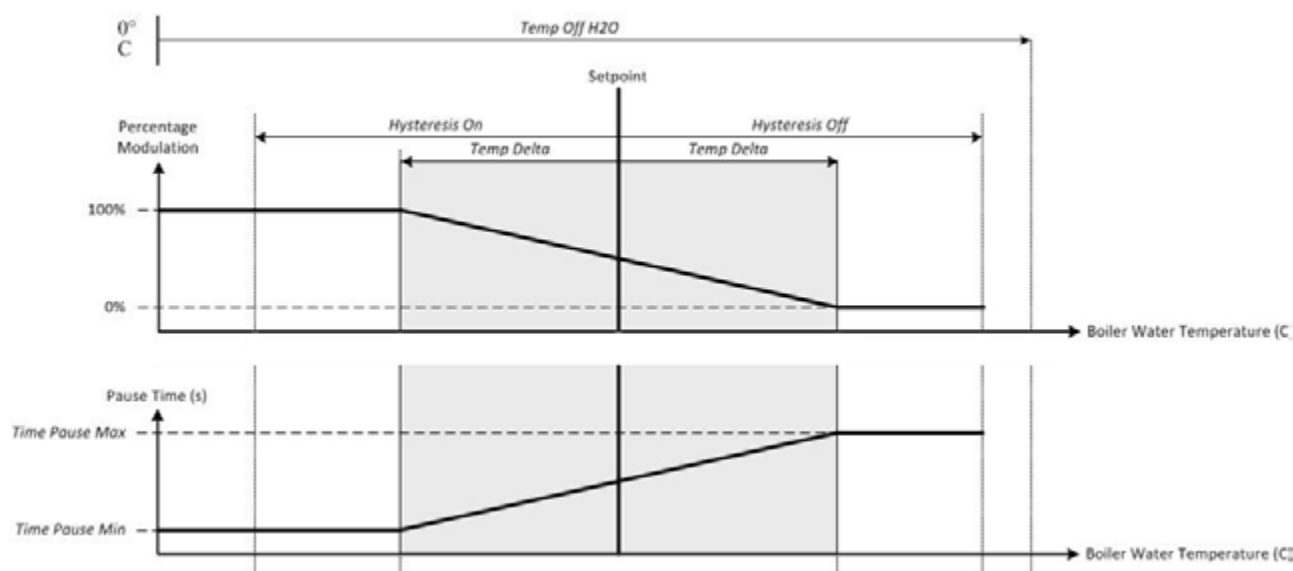


Figure 9-1: Boiler modulation

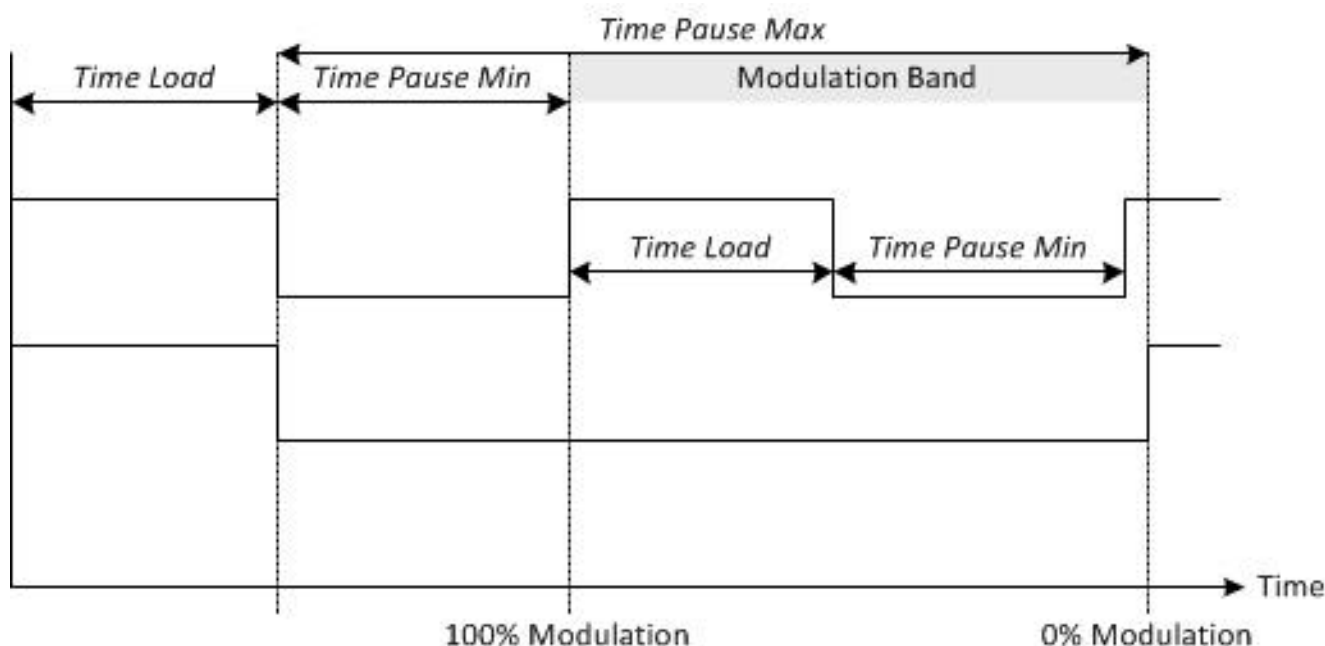


Figure 9-2: Pellet auger modulation

The boiler water temperature is continually monitored during boiler operation. If it exceeds 'Hysteresis On' temperature plus 'Set Point' temperature (i.e. boiler temperature > 'Set Point' + 'Hysteresis On'), OR the 'Temp Off H2O' value, the boiler/burner will stop operating.

The boiler water temperature will now have to drop to below the 'Set Point' – 'Hysteresis On' temperature before the boiler/burner will operate again.

There is a pre-set 'Temp Delta' value (5°C). This gives the temperature band above and below the 'Set Point' temperature – within which the boiler output will be modulated. Refer to Figure 9-1.

When the boiler temperature is below the 'Set Point' temperature minus 'Temp Delta' value, the modulation of the burner is set to maximum.

When the boiler temperature is above the 'Set Point' temperature plus 'Temp Delta' value, the modulation of the burner is set to minimum.

When the boiler temperature is within the modulation band, the modulation level is varied in direct proportion to the boiler temperature, i.e. boiler output varies linearly from maximum at the bottom of the modulation band (boiler temperature = 'Set Point' – 'Temp Delta') to minimum at the top of the modulation band (boiler temperature = 'Set Point' + 'Temp Delta'). Refer to Figure 9-1.

Pellets are delivered to the burner by switching the pellet feed auger on and off. The auger 'On' period is defined by the pre-set 'Time Load' parameter (1.7s).

The burner is modulated by varying the 'pause' time between the pre-set parameters 'Pause Max Power' [7] at maximum output and 'Pause Min Power' [6] at minimum output. Refer to Figure 9-2.

The fan speed is automatically controlled to maintain the required air supply for the output of the boiler as the burner modulates, i.e. if the output decreases the air supply (and fan speed) will be automatically reduced, if the output increases the air supply (and fan speed) will be automatically increased.

This control of the air supply is achieved using the Lambda sensor, located at the top of the primary heat exchanger. This measures the oxygen level in the combustion gases and, via the boiler control system, automatically adjusts the fan speed to achieve the required level of oxygen for the output level of the burner at that time. Thus, as the output changes so will the fan speed and air supply rate.

As this system is monitoring the oxygen level and adjusting the air supply rate accordingly it will automatically compensate for the gradual increase of ash blockage in the boiler over time, ensuring that the combustion remains at the optimum throughout the period between boiler services.

9.3 Automatic Cleaning

Adjustable boiler control parameter numbers are shown in square brackets. Refer to Parameter Menu in Section 9.7.

The control system is programmed to carry out a self-cleaning function on the burner brazier, heat exchanger and secondary (condensing) heat exchanger at pre-set intervals.

This self-cleaning operation is automatically performed:

- on power-up, i.e. when the power to the boiler is connected (this includes the cleaning of the condensing heat exchanger)
- after the pellet feed auger running time exceeds the pre-set 'Clean Boiler' parameter (480 mins).

The control system will inform the user when a service is required by displaying a 'Service' message on the boiler control panel LCD when the auger run time exceeds the pre-set 'Hours service' period [14]. Once the service is completed, the service engineer can reset the auger run time hours to zero so that the control will indicate when the next service is required (after the 'Hours Service' value is exceeded). Refer to Section 12 – Servicing.

If a fault occurs with the operation of the boiler, the control panel LCD will display a fault code to assist in the diagnosis and rectification. Refer to Section 13 – Fault Finding.

9.4 Boiler Control Panel

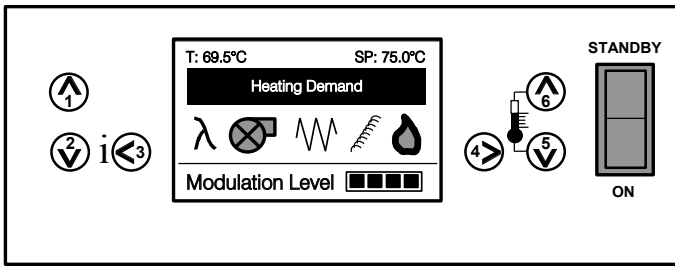


Figure 9-3: Boiler control panel

The boiler control panel is located at the top front of the boiler (behind the control panel cover) and includes the following:

- LCD screen: this displays the boiler operating condition and (when necessary) a 'Service', 'Fault' or 'Fuel Low Warning' message for the user.
- Boiler control setting buttons: for boiler control system operation and setting
- 'ON/STANDBY' switch: to switch the burner off when required, by interrupting the switched live supply to the burner. This switch does NOT isolate the electrical supply to the burner.

9.4.1 Function of buttons

The six control buttons perform different tasks depending on which mode the control is in, as follows:

Button No.1

In 'Service Menu' mode – to scroll up

In 'Parameter Menu' mode – to both enter parameter menu password and to scroll up

Button No.2

In 'Service Menu' mode – to scroll down In 'Parameter Menu' mode – to scroll down

Button No.3

In 'Service Menu' mode – to exit function In 'Parameter Menu' mode – to exit parameter

In 'Home screen' mode (when Fault Message is displayed) – to reset control

Button No.4

In 'Home screen' mode – to enter boiler set point temperature adjustment

In 'Service Menu' mode – to select function

In 'Parameter Menu' mode – to enter parameter

Button No.5

In 'Home screen' mode – to decrease boiler set point temperature

In 'Parameter Menu' mode – to decrease parameter value

Button No.6

In 'Home screen' mode – to increase boiler set point temperature

In 'Parameter Menu' mode – to increase parameter value

9.4.2 Boiler Control LCD screen

The control LCD screen can show six different display types:

- Home Screen – Indicating the current stage in boiler operating sequence (Refer to Section 9.6)
- Information - Displays the 'Flame lux' and 'Fan speed' at that moment
- Oxygen Level - displays the target level and actual level of oxygen in the combustion gases, as measured by the Lambda sensor
- Service Information – Displays pellet auger 'Run time' and 'Service In' period (both in hours)
- Service Menu – To select 'Brazil Clean', 'Restore Default Setup', 'Reset Service Timers', 'Parameter Menu' and 'Prime Auger' functions

- Parameter Menu – to check/adjust the boiler control parameters (Refer to Section 9.7) – this is accessed from the Service Menu.



NOTE

Access to the Service Menu (and thus the Parameter Menu) is password protected.

9.4.3 'Home Screen' Display

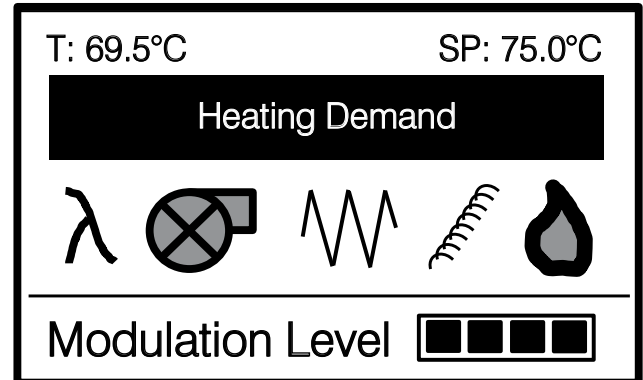


Figure 9-4: Home screen display

This indicates the following information for the boiler:

- The current boiler temperature (top left corner)
- The boiler 'Setpoint' temperature (top right corner)
- Heating demand present or not (upper centre)
- Functions in operation (mid centre) – Lambda sensor (λ symbol flashes to indicate operation), fan, ignition element, auger, flame on.
- Operating sequence stage (bottom left)
- Modulation indicator (bottom right) – e.g. 4 segments = 100%, 3 segments = 75%, etc.

9.4.4 Information and Service information

To access these displays:

- Press button 3 (i) once 'Information' screen is displayed, showing:
Flame lux: %
Fan Speed: RPM
- Press button 3 again
'Oxygen Level' screen is displayed showing
Target level: %
Actual level %
- Press button 3 again
'Service Information' screen is displayed, showing
Run time: Hrs.
Service in: Hrs.
- Press button 3 again to return to the 'Home screen' display

9.5 Boiler Setpoint Temperature

To adjust the boiler 'Setpoint' temperature (when in 'Home Screen')

- Press button 4
- Adjust 'Setpoint' temperature by pressing button 5 (to decrease) or button 6 (to increase)
- Press button 4 to confirm the new setting and return to 'Home Screen' display

The boiler 'setpoint' temperature can be set between 55 and 75°C. The factory default setting is 75°C.

The boiler 'setpoint' can also be adjusted in the 'Parameter Menu'. Refer to Section 9.7.5.

9.6 Service Menu (including Parameter Menu)

To access 'Service menu':

- Press and hold button 1 (until four zeros are displayed)
- Enter the 4-digit access code – use buttons 5 or 6 to set first digit – then press button 1
Repeat process for remaining three digits
- Press button 4 to enter 'Service Menu'
- Press button 2 to scroll down through 'Service menu' functions (Press button 1 to scroll up)
- Press button 4 to select function in 'Service menu'
- Press button 3 to exit function and return to 'Service menu'
- Press button 3 again to return to 'Home screen'

The six functions in the 'Service Menu' are as follows:

9.6.1 Fan Power Select

Used to manually test the fan operation, if required.

9.6.2 Brazier Clean

Used to manually operate the brazier and boiler (both primary and condensing heat exchangers) cleaning function. Press button 4 (Confirm) to start boiler cleaning function. Press button 3 (Cancel) to exit this function if manual operation is not required.

9.6.3 Restore Default Setup

Used to reset all control parameters to the factory-set default values. Press button 4 (Confirm) to restore default values. Press button 3 (Cancel) to exit this function if restoring the default values is not required.

9.6.4 Reset Service Timers

Used to reset the service time period after the boiler has been serviced. Press button 4 (Confirm) to reset the service time period. Press button 3 (Cancel) to exit this function if resetting the service time period is not required.

9.6.5 Parameter Menu

Used to access the boiler control parameters to check and adjust as required. Refer to Section 9.7.

9.6.6 Prime Auger

Used to prime the boiler pellet feed auger during commissioning or after pellet hopper and auger has been emptied.

To prime the auger, press and hold button 4 (Prime Auger) for at least 3 minutes, or until pellets are heard dropping into the burner. The control panel LCD screen shows the countdown (time remaining) from the 5 minute start point. Refer to Section 11.6.

If necessary the 'Prime Auger' function can be repeated, using the above procedure.

Once priming is completed, exit the 'Prime Auger' function and return to the 'Service Menu' by pressing Button 3.

9.7 Parameter Menu

The boiler control parameters accessible to the installer are given in the 'Parameter Menu' – accessed via the 'Service Menu'.

Refer to Section 9.6 for guidance to access 'Service Menu' and 'Parameter Menu'.

When in the 'Parameter Menu':

- Press button 1 to scroll up through parameters (in numerical order)
- Press button 2 to scroll down through parameters (in numerical order)
- Press button 4 to select parameter (parameter flashes)
- Press button 5 to decrease parameter or button 6 to increase parameter
- Press button 3 to exit parameter (stops flashing)
- Press button 3 to exit boiler control parameters menu

9.7.1 Pause Min Power

The time between pellet feed auger operations when the burner is operating at minimum output.

Adjusting this parameter adjusts the boiler input at minimum output, i.e. the longer the pause period the lower the input and the shorter the pause period the higher the input. Refer to Section 2.2 and Figures 9-1 and 9-2.

9.7.2 Temp Off H₂O

The maximum temperature at which the burner shuts down.

9.7.3 Hysteresis Off

The temperature above the setpoint at which the burner will stop operating, i.e. if the water temperature exceeds the 'Set Point' + 'Hysteresis Off' value, or the 'Temp Off H₂O' value (see above) the burner will stop.

9.7.4 Hysteresis On

The temperature below the setpoint at which the burner will start to operate, i.e. the water temperature must be less than the 'Set Point' – 'Hysteresis On' value for the burner to start.

9.7.5 Setpoint

This is an alternative means of setting the boiler 'setpoint' temperature between 55 and 75°C. The factory default setting is 75°C.

9.7.6 Short Cleaning Cycles

The control system will perform a short clean operation after a pre-set number of completed burner operations (or demands). After the post purge is completed for the last of these burner operations, the cleaning arm will move the brazier forwards and back once only.

The heat exchanger cleaning shaker mechanism and wash systems are NOT operated during this short cleaning operation.

9.7.7 Fan Power Post Purge

This parameter sets the fan speed when the burner is in the post purge mode.

9.7.8 Fan Power Lighting

This parameter sets the fan speed when the burner is in pre-load, lighting and flame stabilisation modes.

9.7.9 Fan Power Min

This parameter sets the fan speed at minimum boiler output.

9.7.10 Fan Power Max

This parameter sets the fan speed at maximum boiler output.

9.7.11 Hours service

The total pellet feed auger run time before the control panel LCD displays 'Service'. This indicates that a service is now due.

Following every boiler service this MUST be reset using the 'Reset Service Timers' function. Refer to Section 9.6.4.

9.7.12 Motor Type

This parameter defines the power supply required for the cleaning motor.

9.7.13 Cleaning Cycles

This parameter sets the number of operations of the brazier cleaning actuator at every brazier cleaning operation.

9.7.14 Clean Boiler

The total pellet feed auger run time before the automatic brazier cleaning operation is activated.

9.7.15 Pause Max Power

The time between pellet feed auger operations when the burner is operating at maximum output. Adjusting this parameter adjusts the boiler input at maximum output, i.e. the longer the pause period the lower the input and the shorter the pause period the higher the input. Refer to Section 2.2 and Figures 9-1 and 9-2.



NOTE

All parameters (excluding setpoint) MUST be left at the default settings unless instructed to do so by Grant UK.

Number	Parameter	Units	Range	Default settings
6	Pause Min Power	Seconds	0.5 to 60	14.0
3	Temp Off H ₂ O	°C	0 to 95	80
2	Hysteresis Off	°C	0 to 20	5
1	Hysteresis On	°C	0 to 20	5
0	Setpoint	°C	55 to 75	75
54	Short Clean Cycles	Demands	0 to 100	5
18	Fan Power Post Purge	RPM	1000 to 4500	4500
17	Fan Power Lighting	RPM	1000 to 4500	2000
16	Fan Power Min	RPM	1000 to 4500	1600
15	Fan Power Max	RPM	1000 to 4500	3100
14	Hours Service	Hours	1 to 1000	400
11	Motor Type	-	-	24V DC
9	Cleaning Cycles	Cycles	1 to 20	2
8	Clean Boiler	Minutes	0 to 4800	480
7	Pause Max Power	Seconds	0.5 to 60	3.0

Table 9-5: Boiler control parameters (installer settings)

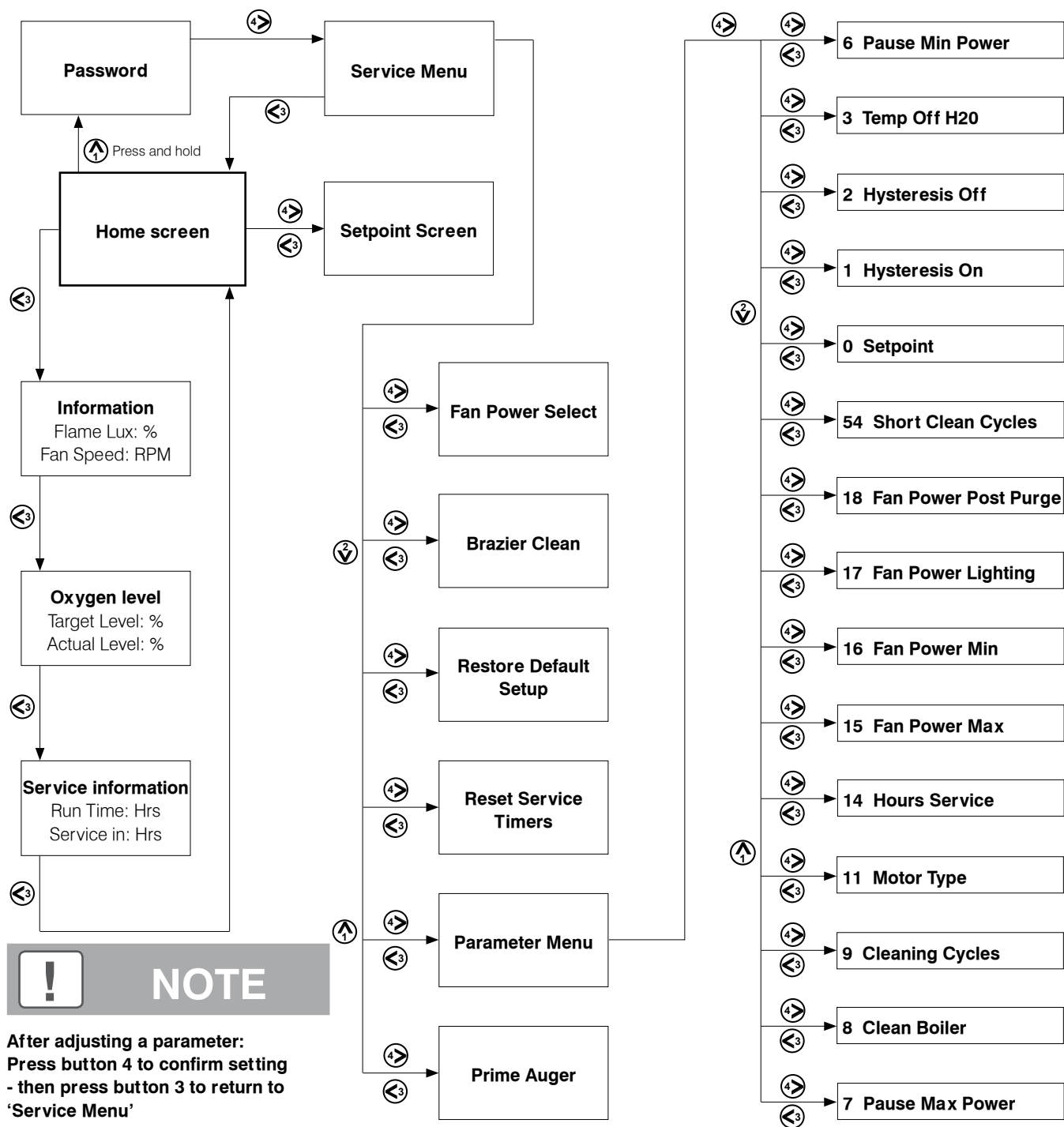


Figure 9-6: Control system flowchart

9.8 Boiler Operating Sequence

The following stages of the boiler operation are displayed on the control panel LCD screen.



NOTE

The number shown in brackets [X] indicates the parameter setting – refer to Section 9.7 and Table 9-5.

Standby

Boiler not operating but ready to start in response to the following:

- A switched live input signal from control system for heating or hot water.
- The boiler temperature drops below the 'Setpoint' [0] minus 'Hysteresis On' (5°C) temperature – if boiler temperature has exceeded the pre-set 'Temp Off H₂O' setting (80°C).
- The ON/STANDBY switch on the control panel is set to the 'ON' position.

Wait Pre Load Brazier

Initial loading of pellets into the brazier to start the burner.

- Activated when a switched live input signal and/or temperature drops below the pre-set 'Setpoint' minus 'Hysteresis On' value (5°C).
- Deactivated when the pre-set 'Preload Time' period of 46 seconds has elapsed.
- Fan is operating at 'Fan Power Lighting' speed setting [17].

Lighting

Period of time allowed for pellets to light.

- Activated after 'Wait Pre Load Brazier' stage is completed.
- Deactivated once photocell lux reading exceeds pre-set 'Flame On' setting of 20%.
- Note: ignition element remains on until end of pre-set 'Flame Stabilisation' stage (10 seconds).
- Fan is operating at 'Fan Power Lighting' speed setting [17].

Flame Stabilisation

Period of time allowed for flame to stabilise after pellets have ignited.

- Activated after 'Lighting' stage is completed.
- Deactivated when the pre-set 'Time Flame Stabilisation' period of 10 seconds has elapsed.
- Fan is operating at 'Fan Power Lighting' speed setting [17].

Lighting Feed Reduced

Period when pellet feed provides intermittent quantities of pellets to the brazier to increase the flame.

The auger off period is given by the pre-set 'Time Pause Lighting' setting of 22 seconds and the auger on time is given by the pre-set 'Time Load Lighting' setting of 1 second.

- The combustion fan is operating at 'Fan Power Max' speed setting [15].
- Activated after pre-set 'Flame Stabilisation' stage period (10 seconds) is completed.
- Deactivated when the pre-set 'Feed Time Reduced' period of 220 seconds has elapsed.

Modulation Level

The boiler is now firing.

- Activated after pre-set 'Feed Time Reduced' period of 220 seconds has elapsed.
- Deactivated when either the demand ceases or the temperature exceeds pre-set 'Temp Off H₂O' [3] setting (80°C).

Initially, the boiler will operate at 25% output – indicated by one segment showing on the modulation indicator.

After 25 seconds the boiler output will increase to 50% - indicated by two segments on the modulation indicator.

After a further 25 seconds the boiler output will increase to 75% (three segments on modulation indicator).

Finally, after a further 25 seconds the boiler output will increase to 100% (four segments on modulation indicator). The boiler is now operating at maximum output.

After that, the boiler temperature and set point are used to determine the required output and level of modulation. This in turn controls the auger operating cycle. Refer to Section 9.2 for details of boiler modulation.

- Fan is operating between 'Fan Power Max' [15] and 'Fan Power Min' [16] speed settings to suit the modulating burner output.

Turning Off Brazier

Burn down period to remove any pellets remaining in the brazier.

Pellet feed auger is switched off.

- Fan speed changes to pre-set 'Fan Power Post Purge' [18] setting (4500rpm).
- Activated once switched live input signal is switched off or the boiler temperature exceeds the pre-set 'Temp Off H₂O' [3] setting.
- Deactivated once photocell Lux reading has dropped below pre-set 'Flame Off' setting of 4%.

Wait Post Purge

Burner fan continues to run at pre-set 'Fan Power Post Purge' [18] setting (4500rpm) for a period of time after burn down is completed.

- Activated after 'Turning off Brazier' stage is completed.
- Deactivated when pre-set 'Post Ventilation' period of 120 seconds has elapsed.

9.9 Boiler Operation Flow Chart

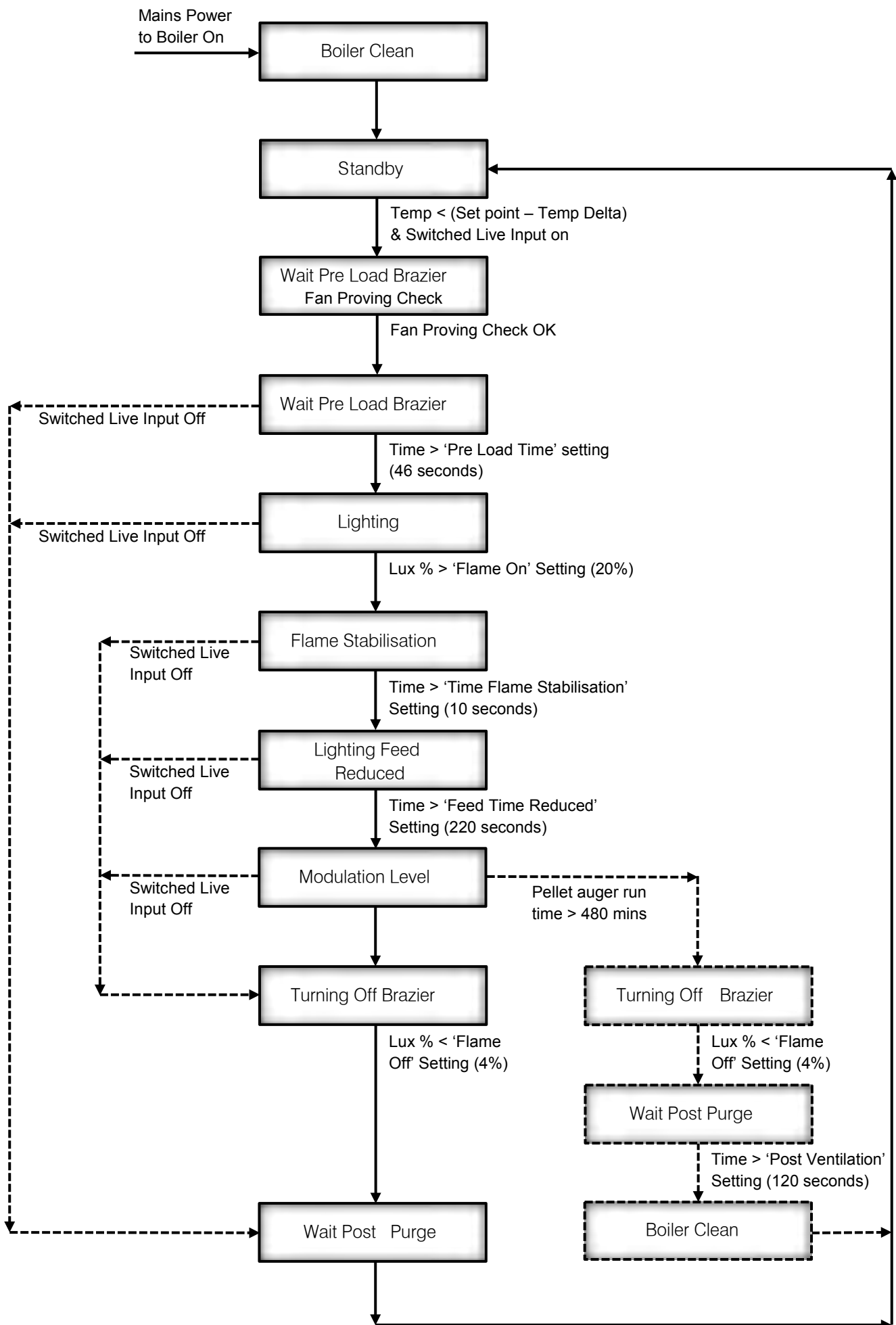


Figure 9-7: Boiler control sequence flow chart

10 Side Pellet Store

10.1 General

The optional side pellet store for the Grant External wood pellet boiler is designed to provide an increased storage capacity, allowing the boiler to run for longer periods before topping-up is required.

The capacity of the side pellet store is 140kg. With the 80kg capacity of the boiler pellet hopper this gives a total pellet storage capacity of 220kg.

This side pellet store is the same external design as the External Vecta boiler and is designed to be located at the right hand side of the boiler only. It incorporates an auger to automatically transfer pellets from the side pellet store to the boiler pellet store when activated by the contents switch. Refer to Section 10.2.



NOTE

This side pellet store can only be fitted on the right hand side of the Grant External Vecta boiler. It CANNOT be fitted on the left hand side of the boiler under any circumstances.

The side pellet store auger pipe is supplied in two pieces. The lower section is supplied factory-fitted in the bottom of the side pellet store along with the auger motor and spiral. The end of the auger spiral is secured to the side pellet store by the packaging.



WARNING

Great care must be taken when removing the packaging holding the auger spira as the end of the auger spiral can spring out and cause injury.

The auger extension pipe is supplied loose and must be fitted as described in these installation instructions. Refer to Section 10.3 for full details.

10.2 Operation

When fitted to the boiler, the side pellet store auger extends from within the side pellet store into the boiler pellet hopper.

The side pellet store is connected to the electrical controls of the boiler. When the diaphragm contents switch fitted to the boiler pellet hopper detects a low fuel level the side pellet store auger will be automatically operated.

The control panel LCD screen will show 'Fuel Low Warning' and the Remote Grant logo indicator (located inside the house) will also flash (slowly) to indicate that the pellet level in the boiler hopper has fallen to the pre-set minimum.

Pellets will be transferred from the side pellet store to the boiler pellet hopper. This will continue until the contents switch in the boiler pellet hopper is satisfied, at which point the side pellet store auger will stop. Both the 'Fuel Low Warning' on the control panel LCD screen and the slow flashing Grant logo indicator will be automatically cancelled.



NOTE

The boiler pellet hopper will not be completely filled by the side pellet store. The auger will only transfer pellets to the boiler pellet hopper until the contents switch is satisfied.

The side pellet store is also fitted with a diaphragm contents switch.

The side pellet store auger will only operate when this contents switch indicates there are sufficient pellets in the side pellet store. If this level drops below the minimum to activate the contents switch, the auger will no longer operate to transfer pellets to the boiler pellet hopper.

In this instance, when the boiler pellet hopper contents switch detects a low fuel level no pellets will be transferred to the boiler pellet hopper.

The control panel LCD screen will show 'Fuel Low Warning' and the Remote Grant logo indicator (located inside the house) will also flash (slowly) to indicate that the pellet level in the boiler hopper has fallen to the pre-set minimum.

If the boiler pellet hopper is not topped up at this point, the boiler will continue to operate for a short period before the burner is automatically stopped.

Topping up the boiler pellet hopper with at least 20kg of pellets will operate the contents switch and automatically re-start the burner (as long as there is a demand present for the boiler to run). Both the 'Fuel Low Warning' on the boiler control panel LCD screen and the slow flashing Grant logo indicator will be automatically cancelled.



NOTE

In order to maximise the combined pellet storage capacity of the boiler and side pellet store, it is recommended that both the boiler pellet hopper and the side pellet store are filled to the top when topping-up.

10.3 Installation

10.3.1 Boiler Installation

Install the boiler in the required location allowing sufficient room for the installation of the side pellet store. Refer to Section 2.4 for details of dimensions and clearances required for the boiler and side pellet store.

10.3.2 Preparing the Boiler



NOTE

Do NOT position the side pellet store alongside the boiler at this stage.

Prepare the boiler for the installation of the side pellet store as follows:

1. Ensure that the electrical supply to the boiler is isolated.
2. Open the hinged hopper lid on the boiler.
3. Undo and remove the three screws along the top edge of the right hand side panel. Refer to Figure 10-1. Keep these screws for re-fitting later.

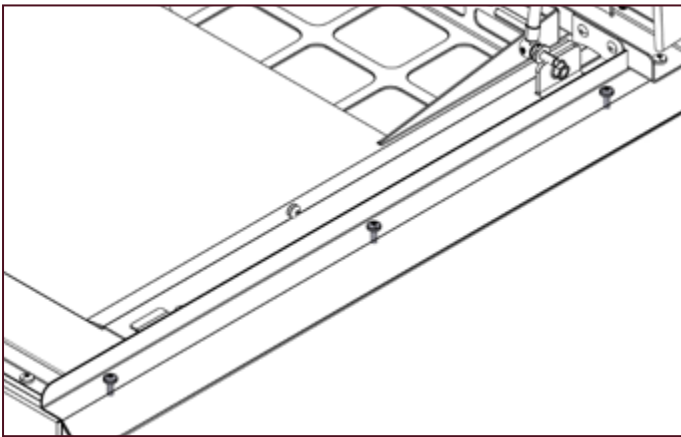


Figure 10-1: Removing the three screws

4. Undo the two screws (one on each side) and remove the access cover from the top of the boiler. Refer to Figure 11-2.
5. Remove the pellet hopper grille. Pull up the front edge. Lift the grille off the three tabs in the slots along at the rear edge, and remove it from the boiler. Refer to Figure 10-2.

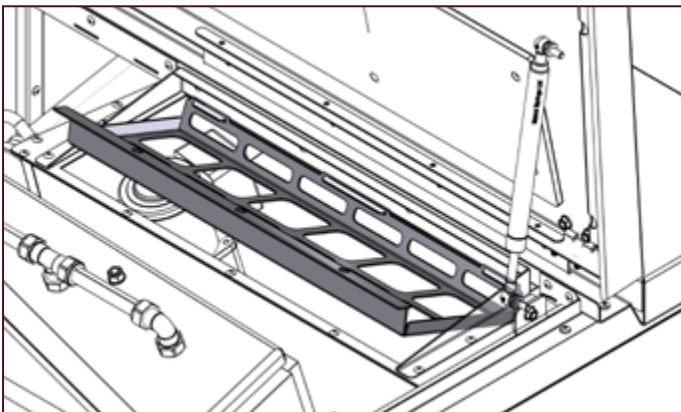


Figure 10-2: Removing the pellet hopper grille

6. Ensure that the boiler pellet hopper is empty of pellets. If not remove all pellets before proceeding any further.
7. Remove the pre-cut knock-out in the lower right hand side of the boiler pellet hopper to provide the hole for the side pellet store auger.

To do this, use a hammer to strike the pre-cut round section from within the pellet hopper just enough to start to break it out of the panel. Refer to Figure 10-3.

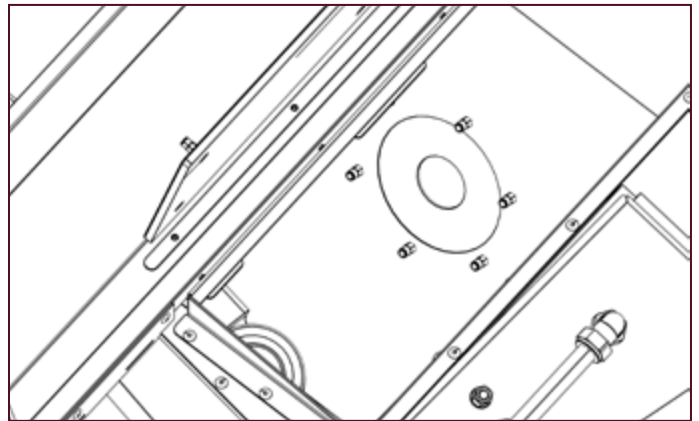


Figure 10-3: Removing the knockout in the pellet hopper



NOTE

It is NOT necessary to unscrew and remove the diaphragm seal plate to make this hole in the side of the boiler pellet hopper.

8. Then, working through the rectangular opening, use a screwdriver to prise the circular part from the opening, remove it from the boiler and discard. This will leave the opening in the boiler pellet hopper and the rubber diaphragm seal through which the auger pipe will be fitted.
9. Undo and remove the two hex head screws from along the bottom edge of the boiler right hand side panel. Refer to Figure 10-4. Keep these screws for re-fitting later.

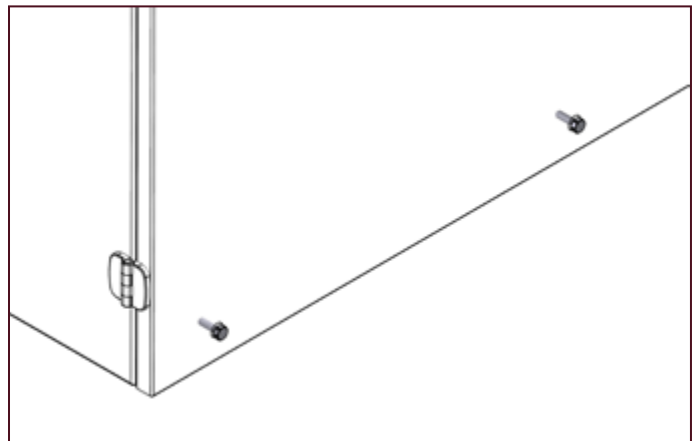


Figure 10-4: Removing the two hex head screws

10.3.3 Side Pellet Store Installation

Install the side pellet store using the following procedure:

1. Undo and remove the three screws along the top edge of the left hand side panel of the side pellet store. Refer to Figure 10-5. Keep these screws for re-fitting later.

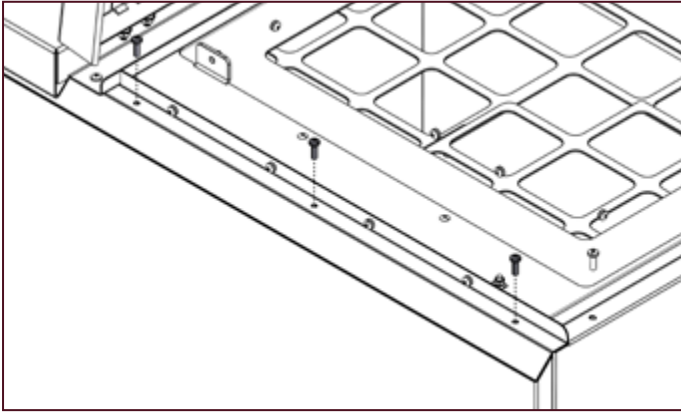


Figure 10-5: Removing the three screws from the side store

2. Remove the front panel from the side pellet store. Undo and remove the four panel retaining screws at the top edge of the front panel. Refer to Figure 10-6. Lift the front panel upwards and off the side pellet store casing.

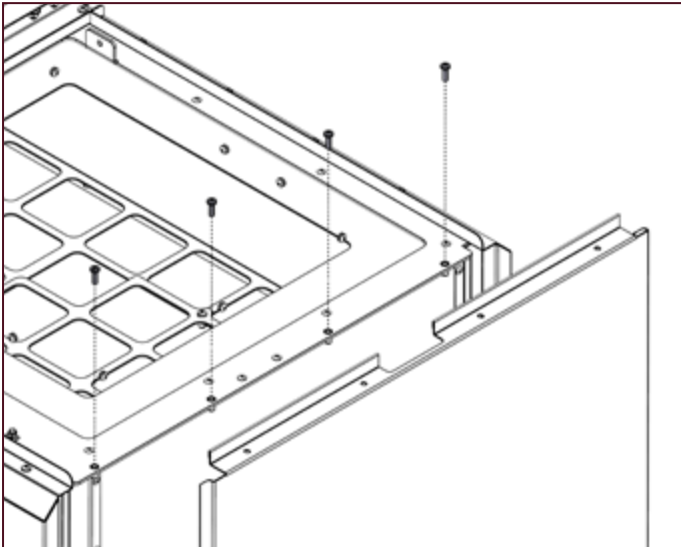


Figure 10-6: Removing the four screws and front panel

3. Remove the centre section of the grille inside the side pellet store. Undo the single fixing screw and lift the centre section away from the surrounding part of the grille. Refer to Figure 10-7.

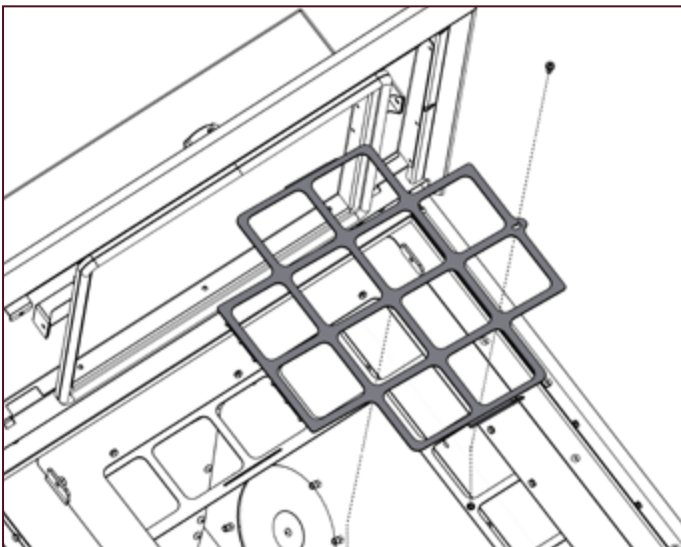


Figure 10-7: Removing the single fixing screw and grille

4. Whilst firmly holding the end of the auger spiral in position, cut and remove the packaging securing it to the side pellet store.



WARNING

The end of the auger spiral MUST be FIRMLY held to prevent it from springing out and possibly causing injury when the packaging is cut and removed.

5. Slacken the clamp bolt on the auger pipe socket so that the auger extension pipe can be fitted. Refer to Figure 10-8 for location of auger pipe clamp bolt.

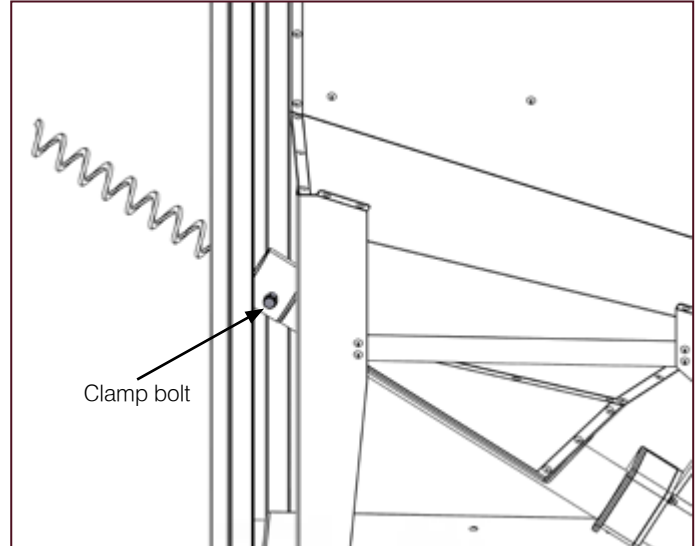


Figure 10-8: Location of auger pipe clamp bolt

6. Manoeuvre the side pellet store into position alongside right hand side of the boiler, carefully feeding the end of the auger spiral through the hole in the diaphragm seal plate in the side of the boiler pellet hopper.



NOTE

Leave a gap of approximately 10mm between the spacer channel and the side of the boiler at this stage of the installation.

7. Lubricate the outer surface of the auger extension pipe (at the unpainted end) with some silicone grease, washing up liquid or similar.
8. Working from within the boiler hopper, locate the unpainted end of the auger extension pipe over the end of the auger spiral.
9. Looking through the 10mm gap between the boiler and side pellet store spacer channel, carefully push the end of the auger extension pipe through the diaphragm seal and into the auger pipe socket.
10. Ensure it is fully pushed in and then secure in place by tightening the auger pipe clamp bolt.



NOTE

Do not over tighten the clamp bolt as this can distort the auger extension pipe and prevent the auger spiral from rotating freely.

11. Now push the side pellet store into its final position with the left side of the side pellet store hard up against the right hand side of the boiler casing.
12. From inside the side pellet store enclosure; re-fit the two hex head screws through the bottom left hand edge of the side pellet

store and into the boiler casing. Leave finger tight at this stage. Refer to Figure 10-9.

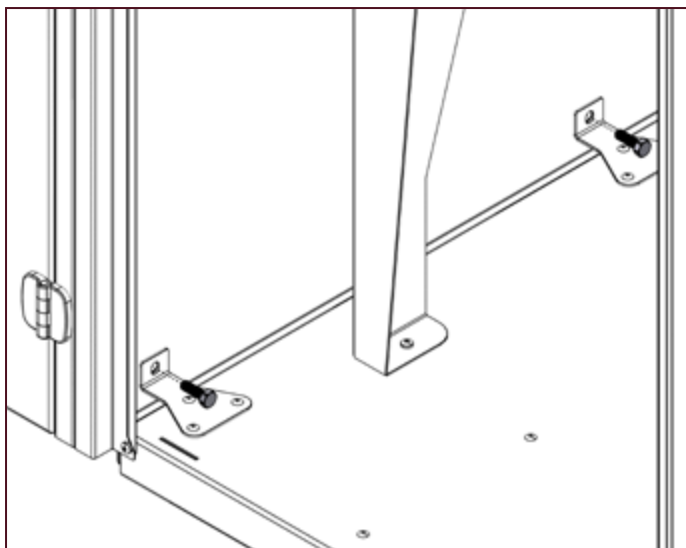


Figure 10-9: Refitting the two hex head screws

13. Fit the top joining channel between the boiler and side pellet store with the V-shaped tongue facing towards the back of the boiler/side store. Carefully slide the joining channel in the V-shaped groove formed between the two boilers. Refer to Figure 10-10.

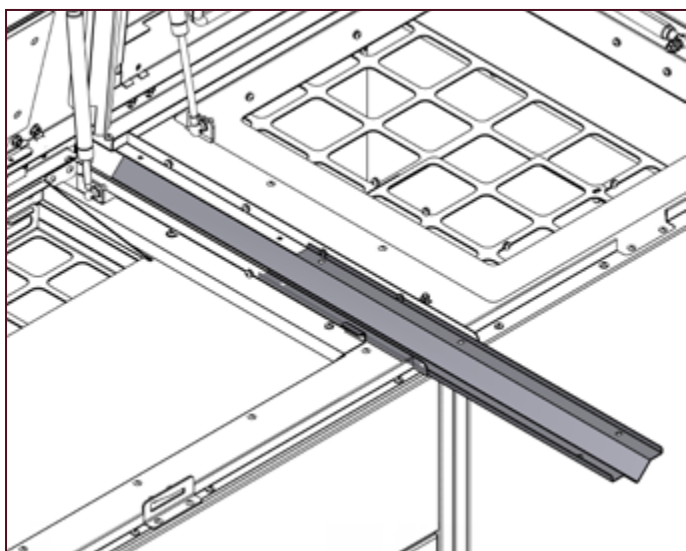


Figure 10-10: Fitting the top joining channel

14. Push the channel as far back as possible – until the fixing holes in the flat sections (on each side of the V) line up with the holes in the top edges of the side panels on both the boiler and side pellet store.
15. Secure the channel in place using the six screws previously removed from the top edges of the side panels. Refer to Figure 10-11.

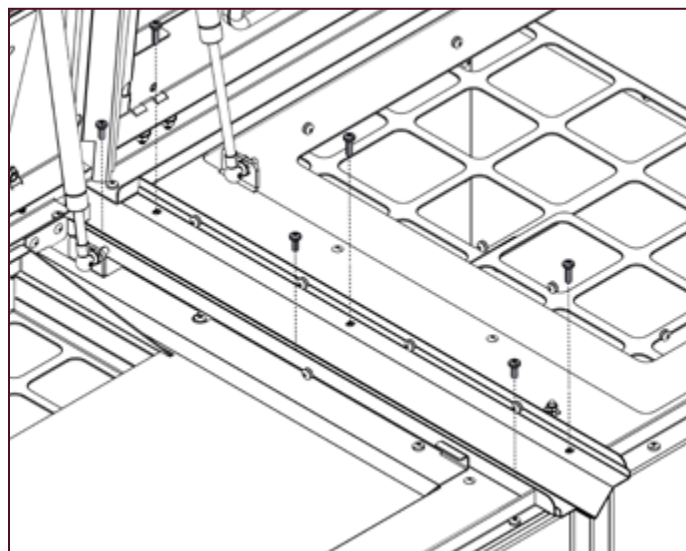


Figure 10-11: Fitting the top joining channel screws

16. Re-fit the centre section of the grille inside the side pellet store and secure with the single fixing screw previously removed. Refer to Figure 10-7.
17. Finally, from inside the side pellet store; tighten the two hex head screws to secure the bottom of the side pellet store to the boiler casing.



NOTE

The hinged lids on both the boiler and side pellet store are each fitted with a cut-out switch and BOTH must be closed in order for the boiler to operate.

10.4 Electrical Connections

10.4.1 Pellet side store contents switch

1. Feed the white cable from the side pellet store contents switch through the opening between the side pellet store and the boiler and into the boiler casing.
2. Route it under the hopper and around to the boiler wiring terminal block at the left front of the boiler.
3. Remove the terminal block cover (refer to Section 8.2) and feed the cable through the right hand cable clamp.
4. Connect the cable to the terminal block as follows (Refer to Figure 10-12):
 - Blue wire – 'side store neutral'
 - Green/Yellow wire – 'side store earth'
 - Brown wire – 'side store live'
5. Tighten the cable clamp to secure the cable and re-fit the terminal block cover.

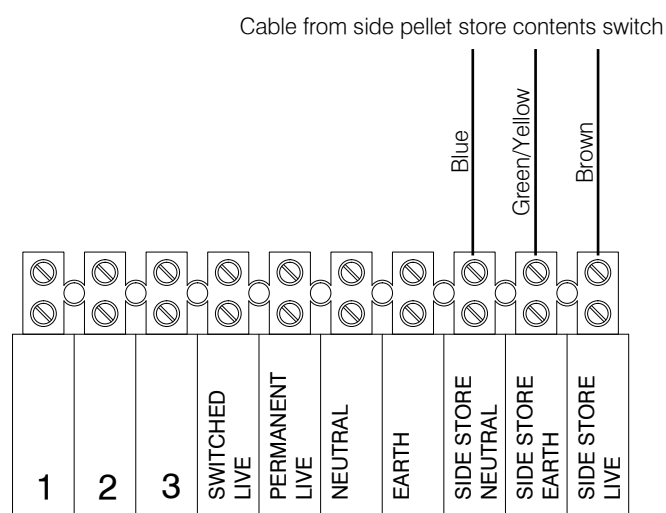


Figure 10-12: Pellet side store electrical connection diagram

10.4.2 Pellet side store lid cut-out switch

1. Locate the in-line male and female connectors next to the boiler lid cut-out switch (under the upper front edge of the boiler front panel in the centre) and carefully separate the two connectors.
2. Feed the grey cable, from the side pellet store lid cut-out switch, through the opening between the side pellet store and the boiler and into the boiler casing.
3. Route the cable up inside the right hand boiler side panel. Pass it through the two cable loops (under the upper front edge of the boiler front panel at the right hand side).
4. First connect the male connector on the grey cable to the female connector from the boiler lid cut-out switch.
5. Then connect the female connector on the grey cable to the male connector from the boiler lid cut-out switch. The boiler lid cut-out switch is now connected in series with the side pellet store lid cut-out switch.



NOTE

If either the boiler hinged hopper lid OR the side pellet store lid is opened for longer than 5 seconds, whilst the boiler is operating, the burner will be automatically stopped. Closing the hopper lid resets the cut-out switch and the boiler will restart. Refer to Section 11.4 for details of the hopper lid cut-out switch

6. Re-fit the front panel to the side pellet store. First engage the three tabs on the bottom edge of the front panel into the corresponding slots in the bottom of the side pellet store. Then secure it in place by re-fitting the four panel retaining screws previously removed.

10.5 Commissioning the Side Pellet Store

Following installation, the operation of the side pellet store auger must be checked using the following procedure:

1. Open the hinged lid and put 30kg of pellets (e.g. three 10kg bags) in the side pellet store.
2. Close both the side pellet store and boiler hinged lids.
3. Check that the ON/STANDBY switch on the boiler control panel is set to STANDBY.
4. Switch the power supply to the boiler to ON. The boiler will go through the automatic cleaning operation. Refer to Section 9.3 for details.
5. The boiler control panel LCD will flash with the message 'Low Fuel Warning', and the remote Grant Logo Indicator will also flash slowly, indicating a low pellet level and that the boiler hopper needs to be topped-up.

DO NOT PUT PELLETS INTO THE BOILER PELLET HOPPER AT THIS TIME.

6. The side pellet store auger should start operating to transfer pellets from the side pellet store into the boiler pellet hopper.
7. Wait for about five minutes and then briefly (i.e. for less than five seconds) open the hinged hopper lid on the boiler. There should be pellets in the bottom of the hopper.
8. Close the lid immediately and leave the side pellet store auger running until enough pellets are transferred into the boiler pellet hopper to satisfy the contents switch.
9. At this point both the remote Grant Logo Indicator and 'Low Fuel Warning' message on the boiler control panel LCD will stop flashing.
10. Both the boiler hopper and the side pellet store can now be filled to the top with pellets. Use only ENPlus Grade A1 pellets that comply with BS EN ISO 17225-2:2014.



NOTE

The operation of the side pellet store auger MUST be checked BEFORE filling the boiler pellet hopper with pellets.

11 Commissioning

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

11.1 Equipment Required

To carry out a complete and comprehensive commissioning of the Grant Vecta wood pellet boiler the following equipment is required:

- Electronic draught meter.
- Flue gas analyser (with 'wood pellet' fuel setting).

11.2 Preliminary Inspection

Before switching on the power supply to the boiler, the following must be checked:

11.2.1 Heating System

Check the following:

- That corrosion inhibitor and, where necessary antifreeze, is present in the system water. Refer to Section 4.7.
- That a magnetic in-line filter has been fitted in the system return. Refer to Section 4.7.
- 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.

11.2.2 Electrical Connections

Check the following:

- The electrical connections to the boiler are correct. Refer to Figure 8-7.

11.2.3 Wash-down System

Check the following:

- The inlet to the wash-down system (located at the bottom rear corner of the left side panel) is connected to an uninterrupted mains water supply.
- All valves in this water supply are open.

11.2.4 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.

11.2.5 Flue System

Check the following:

- The correct flue system has been used. Only the Grant 'Biomass' flue system should be used.
- The flue system is correctly connected to the boiler flue outlet. Refer to Section 7.4.
- The boiler combustion air inlet along the bottom of the front door is clear and unobstructed.
- The flue system conforms to the relevant requirements of The Building Regulations Approved Document J for solid fuel appliances.

11.2.6 Combustion Ventilation

Check that the combustion air inlet to the boiler along the lower front edge of the boiler front door is unobstructed. If necessary remove any obstructions, e.g. leaves, etc.

Check that the combustion air inlet to the burner, located in the front of the boiler, is unobstructed. Refer to Figure 11-1.

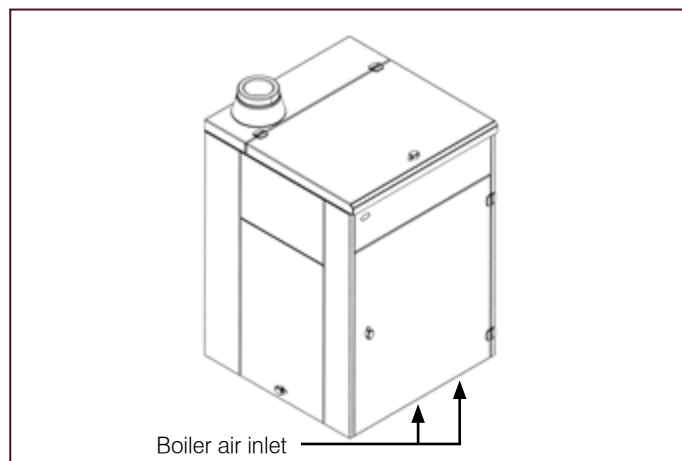


Figure 11-1: Air inlet

11.3 Boiler

11.3.1 Control Thermistor and Overheat Thermostat

- Isolate the electrical supply to the boiler.
- Open the hinged hopper lid on the boiler.
- Undo the two screws (one on each side) and remove the access cover from the top of the boiler. Refer to Figure 11-2.

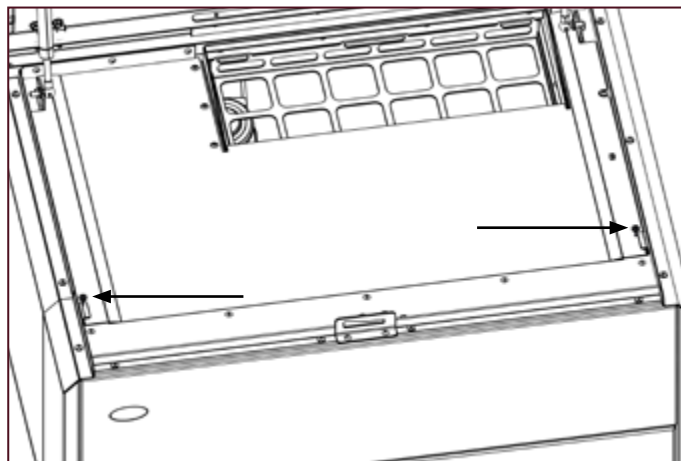


Figure 11-2: Removing the access cover

- Remove the pellet hopper grille. Pull up the front edge. Lift the grille off the three tabs in the slots along at the rear edge, and remove it from the boiler.
- Ensure that the boiler pellet hopper is empty of pellets. If not remove all pellets before proceeding any further.
- The pocket, containing both the boiler control thermistor sensor and overheat thermostat bulb, is located in the upper left front of the boiler, to the left of the heat exchanger housing. Refer to Figure 11-3.

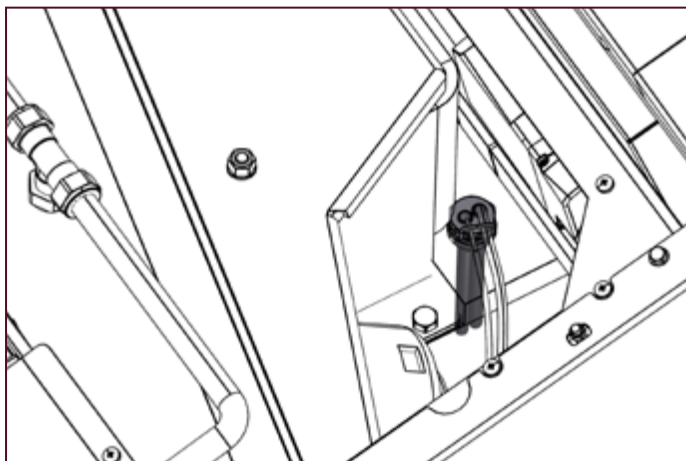


Figure 11-3: Location of boiler control thermistor sensor and overheat thermostat bulb

Check the following:

- That both the overheat thermostat bulb and control thermistor probe bulb are fully inserted in the boiler waterway pocket and the retaining clip is fitted.
- The condition of thermistor cable and thermostat capillary, i.e. not damaged, broken or kinked.

11.3.2 Combustion Chamber

Open the front door. First unlock and remove the padlock (if fitted), rotate the knob of the catch clockwise to unlatch and fully open the front door.

Switch the electrical isolator to OFF. Refer to Figure 11-4 for location of isolator.



WARNING

The electrical isolator switch does NOT isolate the electricity supply to the boiler. The power supply to the boiler wiring terminal block will still be live when the isolator is set to OFF. If required, the electrical supply to boiler should be isolated at the fused spur supplying the heating system and controls.

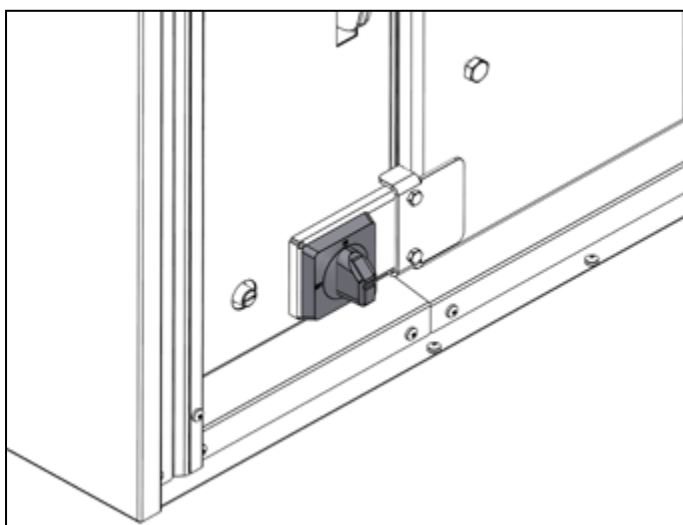


Figure 11-4: Location of electrical isolator

Fit the multi-purpose tool (provided with the boiler) into slot in door catch. Refer to Figure 11-5.

Lift the tool handle to release the door catch and fully open the combustion chamber door of the boiler. Refer to Figure 11-6.

Check the following:

- The ash pan is empty and correctly located on the base of the combustion chamber
- The horizontal and vertical baffles are correctly fitted in the rear of the combustion chamber.
- The burner flame pot is correctly located in the top of the burner.
- Close the combustion chamber door.
- Remove the multi-purpose tool from the door catch and hang it back on the hook provided on the panel to the left of the combustion chamber door.

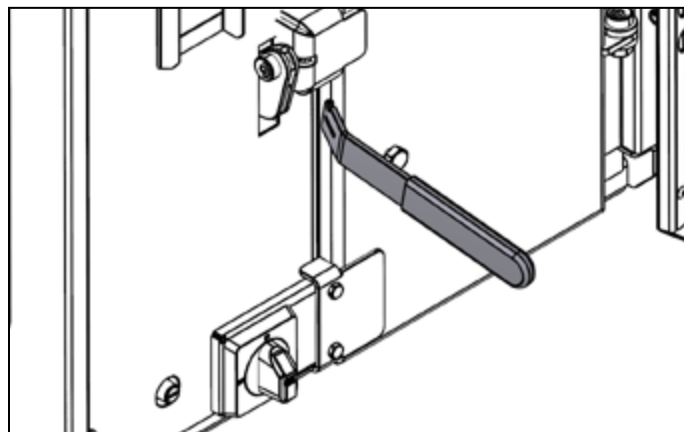


Figure 11-5: Opening combustion chamber

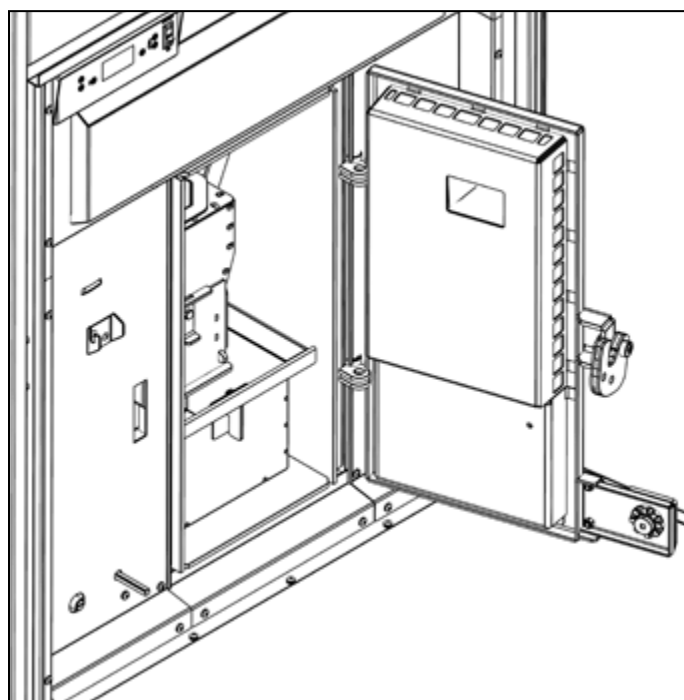


Figure 11-6: Combustion chamber door open

11.3.3 Primary Heat Exchanger

To gain access to the top of the heat exchanger:

- With hinged hopper lid open and top access cover removed (as per Section 11.3.1)
- Shut off the cold water supply to wash system.
- Disconnect the water supply hose from the wash system. Refer to Figure 12-2.
- Unscrew and remove the five nuts (and washers) securing the heat exchanger cover and remove it from the top of the heat exchanger. Refer to Figure 11-7.
- Check that the spiral baffles in the heat exchanger are all in place. Lift and drop each one to check all are free to move in their respective tubes. Refer to Figures 11-8.

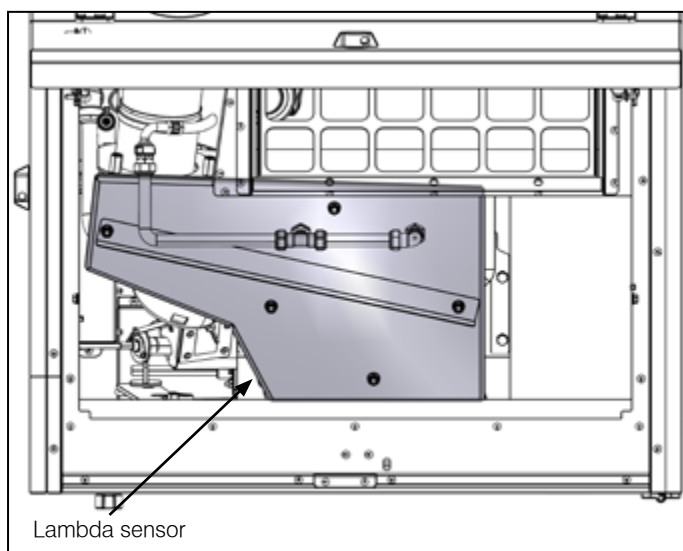


Figure 11-7: Heat exchanger cover and Lambda sensor position

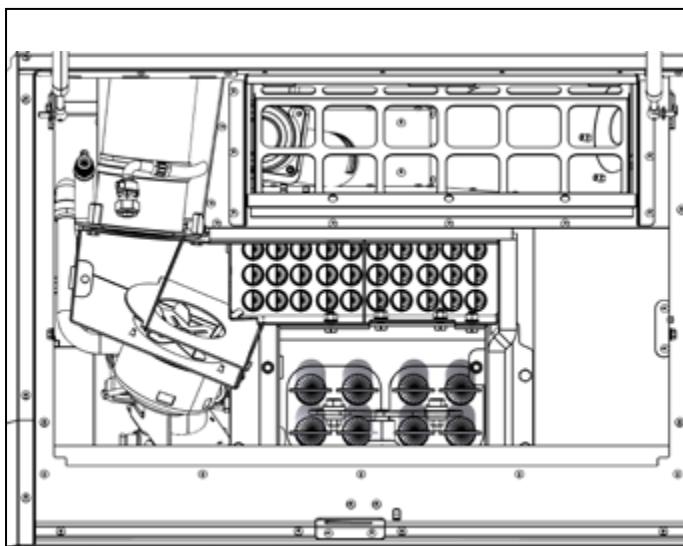


Figure 11-8: Primary heat exchanger spirals

11.3.4 Secondary Heat Exchanger



NOTE

There are two different types of spiral baffle fitted to the secondary heat exchanger.

The spiral baffles fitted to the right hand side have a 2½ turn spiral and are different to those on the left hand side which have 4½ turn spiral.

Whenever these are removed, it is important that they are re-fitted in the correct side of the secondary heat exchanger.

With the hinged hopper lid open and both top access cover and heat exchanger cover removed (as per Section 11.3.3).

- Check that the spiral baffles in the secondary heat exchanger are all in place.
- Check that all spiral baffles are correctly aligned with the top edges running 'front to back'. Refer to Figure 11.9.
- Refit the heat exchanger cover to the top of the heat exchangers and secure with the nuts previously removed. Do not over tighten
- Re-connect water supply hose to connection on wash system manifold. Refer to Figure 12-2.

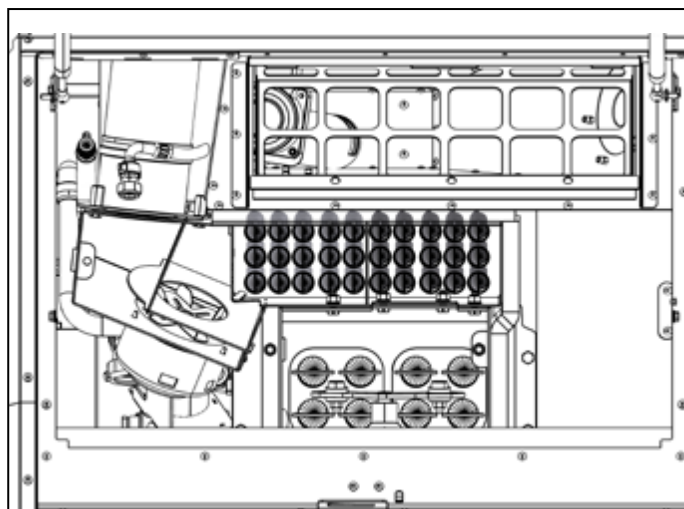


Figure 11-9: Secondary heat exchanger spirals

11.3.5 Boiler Pellet Hopper



NOTE

If the optional side pellet store is fitted, the operation of the side pellet store auger MUST be checked BEFORE filling the boiler pellet hopper. Refer to Section 10.5 for details.



CAUTION

Before filling the boiler pellet hopper with pellets for the first time, ensure that hopper is empty of all other debris or objects, e.g. screws, nuts, etc.

- Check that the pellet hopper is full of pellets. Fill the hopper with pellets by hand from bags. Ensure that only EN Plus Grade A1 pellets, that comply with BS EN ISO 17225-2:2014, are used with the Grant Vecta boiler. Refer to Section 3 for details.

11.4 Hopper Lid Cut-out Switch

With the power supply to the boiler switched OFF:

- Set the ON/STANDBY switch on the boiler to STANDBY and switch the power to the boiler ON.
- Open the hinged hopper lid and wait.
- After 5 seconds, the control panel LCD screen will flash and indicate a 'Hopper Lid Open' (Error Code 16) fault.
- Wait for at least 15 seconds for the fire damper in the pellet feed system to fully close.
- Close the pellet hopper lid. The control panel LCD screen will flash and indicate a 'Safety Flap Closed' (Error Code 22) fault. Wait for 30 seconds, for the fire damper to re-open. The fault message will automatically disappear from the LCD screen and 'Standby' will be displayed.

11.5 Control Settings

The boiler comes with the control system 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 boiler switched ON and the burner ON/STANDBY switch set to STANDBY,

- Check ALL control settings in the 'Parameter Menu'. Refer to Section 9.7 for details of how to access and check these settings.
- Set the boiler 'Set Point' temperature using buttons 4, 5 and 6 on the boiler control panel. Refer to Section 9.5 for detail on how to adjust boiler setpoint temperature. Refer to Section 1.1 for required flow and return temperatures.

11.6 Priming the Pellet Feed Auger

The pellet feed auger **MUST** be fully primed **BEFORE** attempting to start the boiler. To prime the auger proceed as follows;

- Check the burner ON/STANDBY switch is set to STANDBY.
- Access the 'Service Menu' (refer to Section 9.6 for guidance).
- When in the 'Service Menu' - press button 2 to scroll down to 'Prime Auger' function.
- Press button 4 to select 'Prime Auger' function. This function has a pre-set maximum time of 5 minutes.
- Press and hold button 4 for at least 3 minutes or until a steady stream of pellets are heard dropping into the burner.
- The control panel LCD screen shows the countdown (time remaining) from 5 minute start point
- If necessary the 'Prime Auger' function can be repeated, using the above procedure.

If the priming is stopped during the 5 minutes, the timer automatically resets to 5 minutes (and this is displayed on the boiler control panel LCD screen).

11.7 Lighting the Boiler



NOTE

BEFORE attempting to light the boiler, open the combustion chamber door and remove ALL pellets from the burner. Close the combustion chamber door and proceed to lighting the boiler.

Ensure that the electrical supply to the boiler is switched ON and that the heating system controls are operating and are calling for heat. Set the burner ON/STANDBY switch to ON. The 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 stop. The burner may go into post purge with error message 'False flame' (and fault code 19) displayed on the control panel LCD screen. The burner will 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. 'Modulation Level' is displayed on the burner control panel LCD screen with all four segments showing (i.e. burner firing at 100% output).



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.

11.8 Combustion Chamber Draught

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

- Ensure the control panel LCD screen is showing 'Modulation' and the Modulation Indicator (in the lower right corner of display) is showing FOUR segments (100% output).
- Remove the screw from the draught test point, located to the bottom left corner of the combustion chamber door. Refer to Figure 11-10.

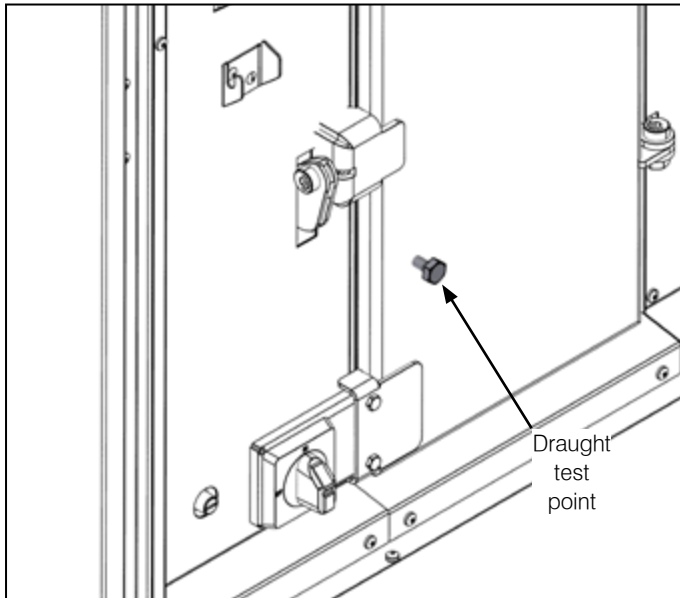


Figure 11-10: Draught test point

- Ensure that the draught test point hole is open right through into the combustion chamber. If necessary push a suitably sized screwdriver through to ensure that the hole is clear.
- Using an electronic draught gauge - check 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 fully pushed through the door insulation and into the combustion chamber.
- A draught reading of between 0.75 and 1.25 mbar is required. If the draught reading is outside of this range, set the ON/STANDBY switch to STANDBY and contact Grant UK for advice.

11.9 Flue Gas Analysis

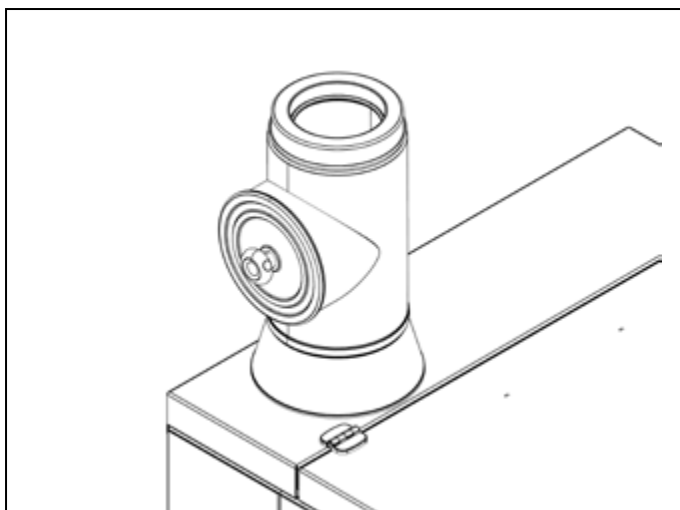


Figure 11-11: Combustion test point

Once the combustion chamber draught has been checked, as described in Section 11.8, the %CO₂ in the flue gases must be checked as follows:

- Allow the boiler to run for a period of at least 15 minutes, until the boiler and flue system are warmed up.

- Ensure the control panel LCD screen is showing 'Modulation' and the Modulation Indicator (in the lower right corner of display) is showing FOUR segments (100% output).
- There is no combustion test point on the boiler. A test point (and flue access door) is provided in the Inspection Pipe (product code: WPBOM/IP) that MUST be fitted to the boiler flue outlet.
- To access the flue inspection hatch, remove the circular outer cover. To do this, turn the knob in the centre of the outer cover approximately one turn anticlockwise and pull the cover away from the inspection pipe. Refer to Figure 11-11.
- Remove the flue inspection hatch. Turn the knurled knob (in the centre of the hatch) approximately one turn anticlockwise, pull the hatch out of the flue and inspect the inside of the flue system.
- Unscrew and remove the test point screw to insert combustion analyser probe.
- Monitor the %CO₂ for a few minutes to see the maximum and minimum values reached.
- The %CO₂ measured should range between a minimum of 8% and a maximum of 12%.
- If the %CO₂ measured is outside of this range, set the ON/STANDBY switch to STANDBY and contact Grant UK for advice.



NOTE

Always replace the test point screw and outer access cover on the flue inspection pipe following combustion testing. Do not over tighten test point screw.

11.10 Customer Handover

The customer/user must be informed of the correct operation and use of their Grant Vecta 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 guide supplied with the boiler.
- 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.
- How to access the ash pan and the need to periodically empty the ash pan. Refer to Section 1.6 and the user guide.
- The need to have the boiler serviced either annually or when 'Service' is shown on the boiler control panel display (whichever comes first). Refer to Section 1.6 and the user guide.
- That servicing should only be carried out by a Grant trained installer.

11.11 Commissioning Report Form

The Commissioning Report form (supplied with the boiler) must be completed at the end of the commissioning process. Refer to Section 4.8.

The following information must be entered on the form:

- Boiler details (model, serial number, 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. Refer to Section 4.8.

11.12 Commissioning Check List

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

Preliminary Inspection	Tick box	Notes
Heating system	<input type="checkbox"/>	
Electrical connections	<input type="checkbox"/>	
Condensate disposal	<input type="checkbox"/>	
Flue system	<input type="checkbox"/>	
Combustion ventilation	<input type="checkbox"/>	
Boiler		
Control panel	<input type="checkbox"/>	
Overheat and temperature control thermistor	<input type="checkbox"/>	
Combustion chamber	<input type="checkbox"/>	
Heat exchanger – primary	<input type="checkbox"/>	
Heat exchanger – secondary	<input type="checkbox"/>	



NOTE

There are two different types of spiral baffle fitted to the secondary heat exchanger.

The spiral baffles fitted to the right hand side have a 2½ turn spiral and are different to those on the left hand side which have 4½ turn spiral.

Whenever these are removed, it is important that they are re-fitted in the correct side of the secondary heat exchanger.

Pellet Hopper

Pellets	<input type="checkbox"/>
---------	--------------------------

Safety Device Checks

Hopper cover cut-out switch	<input type="checkbox"/>
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Combustion chamber door cut-out switch	<input type="checkbox"/>
--	--------------------------

Burner settings checked	<input type="checkbox"/>
--------------------------------	--------------------------

Priming pellet feed auger	<input type="checkbox"/>
----------------------------------	--------------------------

Lighting the boiler	<input type="checkbox"/>
----------------------------	--------------------------

Flue gas analysis	<input type="checkbox"/>
--------------------------	--------------------------

Combustion chamber draught	<input type="checkbox"/>
-----------------------------------	--------------------------

Customer handover	<input type="checkbox"/>
--------------------------	--------------------------

Commissioning Report Form completed	<input type="checkbox"/>
--	--------------------------

12 Servicing

12.1 General

It is essential that Grant Vecta boilers are serviced at regular intervals of no longer than 12 months OR when 'Service' is shown on the burner control panel display – whichever comes FIRST.

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 9.6 for details on how to access and check this setting in the boiler control parameter menu.

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 boiler control parameter menu.



CAUTION

The ash pan (located inside the combustion chamber) MUST be periodically emptied by the user. This simple task must be carried out when indicated by the Remote Grant Logo Indicator, located within the house, flashing (fast flash).

Refer to Sections 1.5 and 1.6.



NOTE

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

Servicing and replacement of parts must only be carried out by a Grant Trained installer, or Grant Service Engineer, who has successfully completed the Grant Vecta wood pellet boiler training course.

Details of every service should be entered in the Service log section of the user guide.

A multi-purpose tool is supplied with the boiler for servicing and cleaning. This is used for the following functions:

- As the door catch handle – required to open the combustion chamber door
- As the ash pan carrying handle – required to remove the ash pan from the boiler*
- To open the brazier catch
- To remove the brazier front plate
- To remove the brazier base plate
- To remove the brazier cotter pin

The multi-purpose tool is hung on a hook located on the panel to the left of the combustion chamber door. Always replace the tool back on this hook after use to ensure it is available when next required.

* An ash pan carrying handle is also supplied with the boiler. This must be used in conjunction with the multi-purpose tool, to support the opposite end of the ash pan, when removing it from the boiler. Refer to Section 12.6.5.

12.2 Checks before Servicing



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.

BEFORE starting any service work on the boiler 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 'STANDBY' is shown on the burner control panel display, before proceeding further.
- Isolate the electrical supply to the boiler and remove the fuse from the fused spur.

12.3 Heating System

Open the hinged hopper lid.

Undo the two screws (one on each side) and remove the access cover from the top of the boiler. Refer to Figure 11-2.

Remove the top access cover from inside the top of the boiler.

Check the boiler for any indication of leaks from:

- Flow and return connections
- Manual air vent. Refer to Figure 12-1.

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

If the 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)

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.

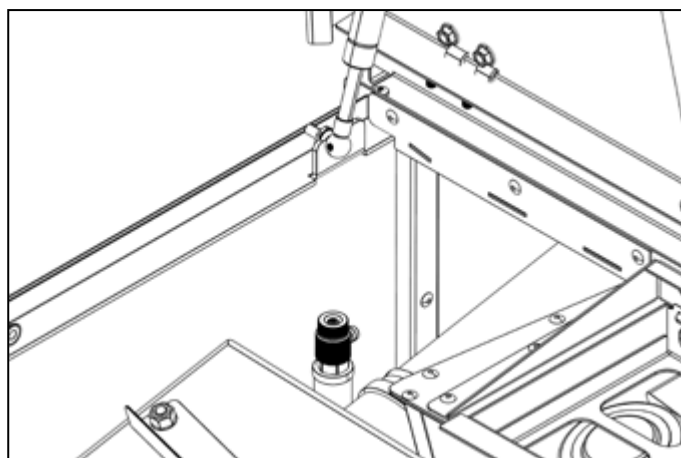


Figure 12-1: Location of manual air vent (water connection to wash system removed for clarity)

12.4 Flue System

12.4.1 Flue Terminal



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.

Check the flue terminal and ensure that it is not blocked or damaged.

12.4.2 Flue

To access the flue inspection hatch, remove the circular outer cover. To do this, turn the knob in the centre of the outer cover approximately one turn anticlockwise and pull the cover away from the inspection pipe.

Remove the flue inspection hatch. Turn the knurled knob (in the centre of the hatch) approximately one turn anticlockwise, pull the hatch out of the flue and inspect the inside of the flue system.

Clean the flue by sweeping as required.

Replace the inspection hatch using the reverse procedure turning the knurled knob approximately one turn clockwise to secure it in the flue.

Replace the circular outer cover using the reverse procedure, turning the knob approximately one turn clockwise to secure the cover in place.

12.4.3 Smoke Test

Following inspection and cleaning of the flue system, carry out a smoke test as specified in The Building Regulations Approved Document J, Appendix E, Section E15 – Smoke Test II.

12.5 Combustion Ventilation

Check that the combustion air inlet to the boiler along the lower front edge of the boiler front door is unobstructed. If necessary remove any obstructions, e.g. leaves, etc.

Check that the combustion air inlet to the burner, located in the front of the boiler, is unobstructed.

12.6 Boiler

12.6.1 Overheat thermostat and Temperature probe

With the hinged hopper lid open and top access cover removed:

Check the following:

- That both the overheat thermostat probe and thermistor bulb are fully inserted in the boiler waterway pocket (on the upper left side of the boiler), and the retaining clip is fitted. Refer to Figure 11-3.
- The condition of thermistor cable and thermostat capillary, i.e. not damaged, broken or kinked.

12.6.2 Primary heat exchanger

With the hinged hopper lid open and top access cover removed (as Section 12.3 above):

- Shut off the cold water supply to wash system.
- Disconnect the water supply hose from the wash system. Refer to Figure 12-2.

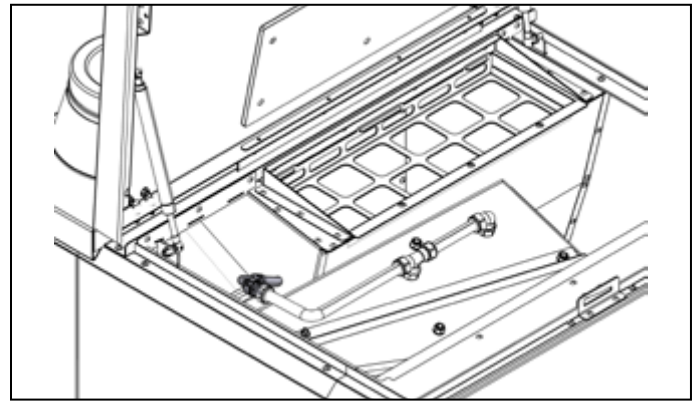


Figure 12-2: Wash system connection

- Unscrew and remove the five nuts (and washers) securing the heat exchanger cover and remove it from the top of the heat exchangers. Refer to Figures 12-3.

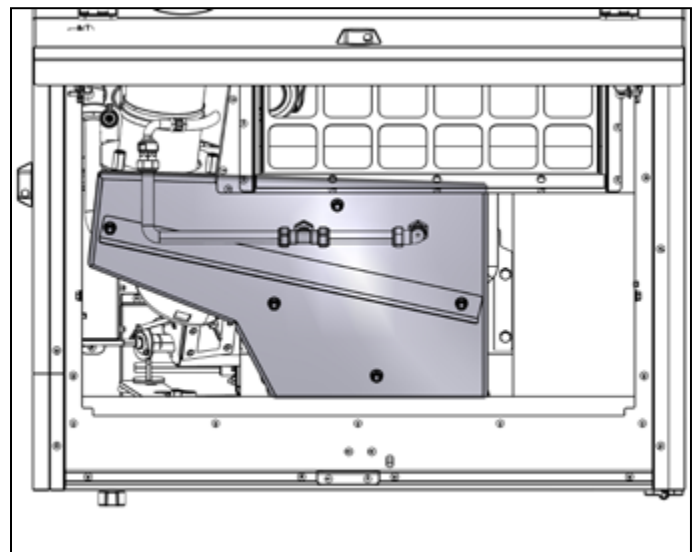


Figure 12-3: Heat exchanger cover

Clean primary heat exchanger as follows:

- Remove all eight mild steel spiral baffles by lifting them vertically up and out from the primary heat exchanger tubes. Refer to Figure 12-4.

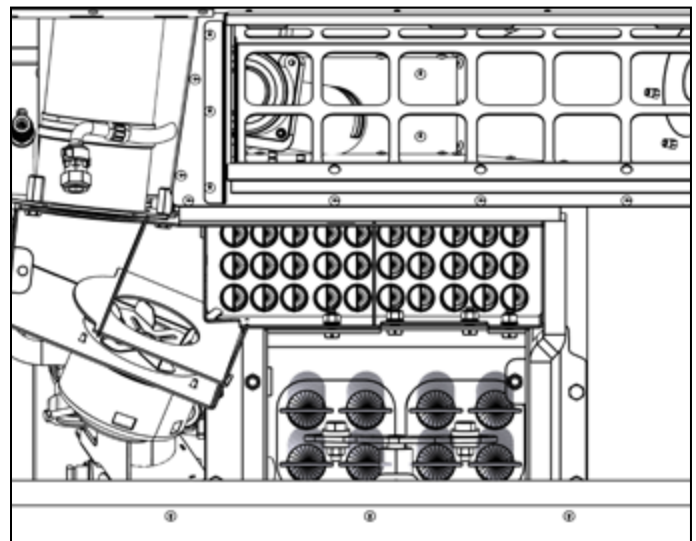


Figure 12-4: Primary heat exchanger spirals

- Clean down any ash inside tubes, using a suitable pipe brush, into the combustion chamber and ash pan below.
- Carefully clean the Lambda sensor - located on the left side in the top chamber of the primary heat exchanger. Remove any ash deposits using a soft bristle brush (e.g. a small paint brush) and

vacuum.

- 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 baffles into heat exchanger tubes, fitting them through shaker plates.
- Lift and drop each spiral baffle to check that all baffles are free to move in their respective tubes.

12.6.3 Secondary Heat Exchanger



NOTE

There are two different types of spiral baffle fitted to the secondary heat exchanger.

The spiral baffles fitted to the right hand side have a 2½ turn spiral and are different to those on the left hand side which have 4½ turn spiral.

Whenever these are removed, it is important that they are re-fitted in the correct side of the secondary heat exchanger.

With the hinged hopper lid open, top access cover and heat exchanger removed (as per Section 12.6.2)

- Clean the secondary heat exchanger as follows:
- Remove all of the stainless steel spirals from the secondary heat exchanger tubes. Refer to Figure 12-5.

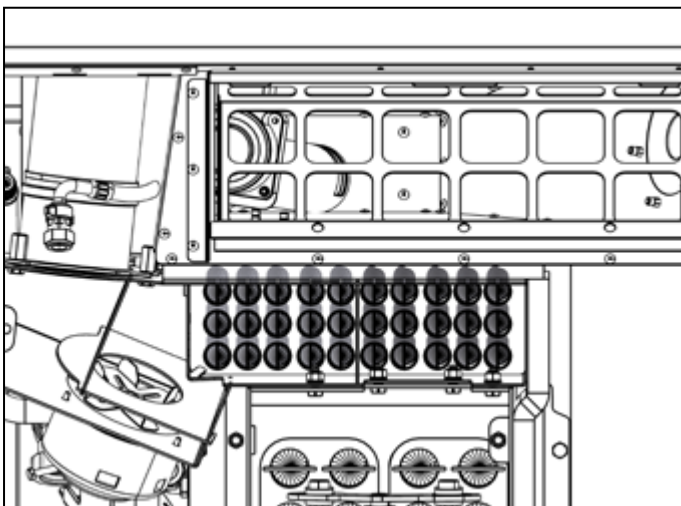


Figure 12-5: Secondary heat exchanger spirals

- 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) 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 11-9.

12.6.4 Fan

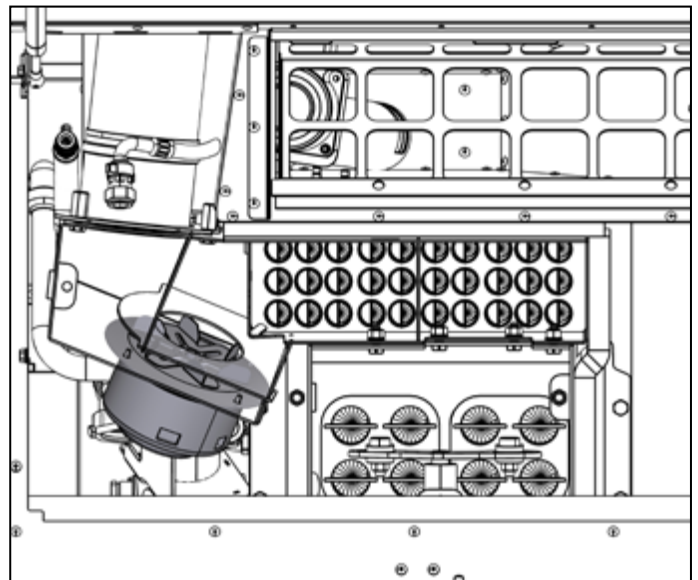


Figure 12-6: - Location of fan

- With the hinged hopper lid open, top access cover and heat exchanger cover removed (as per Section 12.6.2), clean the fan.
- Using a small wire brush, clean any ash deposits from the fan blades and mounting plate.



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.

- Check and clean the wash system jets to ensure all ash deposits and other debris is removed.
- Refit the heat exchanger cover to the top of the heat exchanger(s) and secure with the nuts previously removed. Do not over tighten.
- Reconnect air inlet hoses.
- Re-connect water supply hose to connection on wash system manifold. Refer to Figure 12-2.

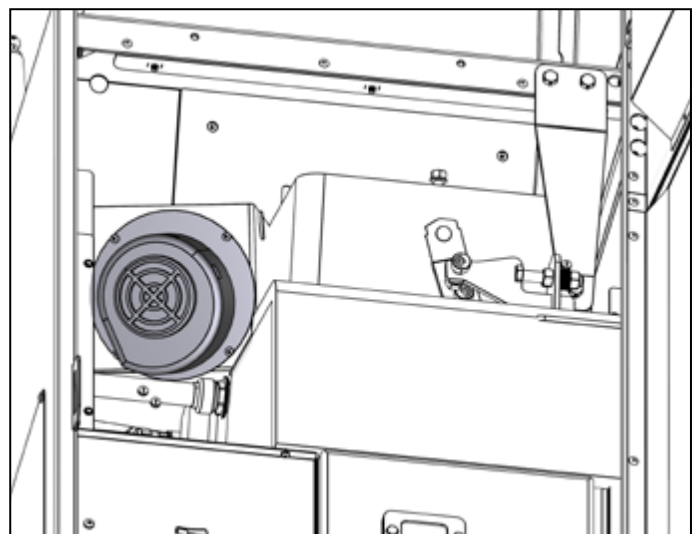


Figure 12-7: Removal of fan

12.6.5 Combustion Chamber



WARNING

Ensure the electrical supply to the boiler is isolated at the fused spur before proceeding.

Shut off the isolator.

- Fit the multi-purpose tool (provided with the boiler) into slot in door catch. Refer to Figure 11-5.
- Lift the tool handle to release the door catch and fully open the combustion chamber door of the boiler. Refer to Figure 11-6.
- Using the multi-purpose tool supplied with the boiler, carefully remove ash pan from combustion chamber. Refer to Figure 12-9.

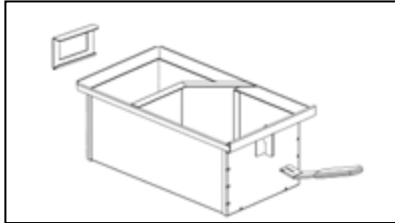


Figure 12-8: Carrying ash pan

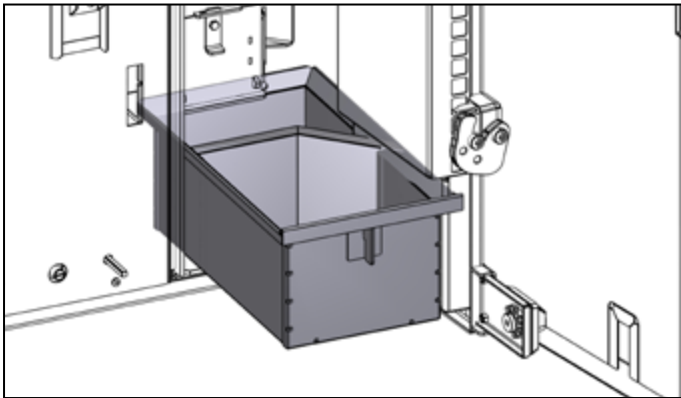


Figure 12-9: Ash pan removal



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.

- When carrying the ash pan use both the multi-purpose tool and the ash pan carrying handle (also provided with the boiler). Refer to Figure 12-8.
- Remove both the horizontal and vertical baffles from the rear of the combustion chamber and inspect them. Refer to Figures 12-10 and 12-11.
- Clean off any remaining deposits using a brush and vacuum.
- Before re-fitting the baffles, remove all ash deposits from all the internal combustion chamber surfaces using a vacuum.
- Clean any ash deposits from the inner face of the combustion chamber door.
- Re-fit the baffles to the combustion chamber.

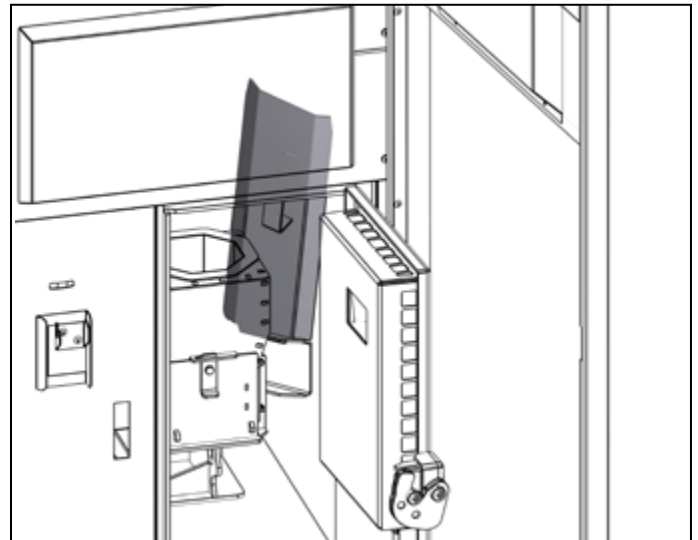


Figure 12-10: Vertical combustion chamber baffle

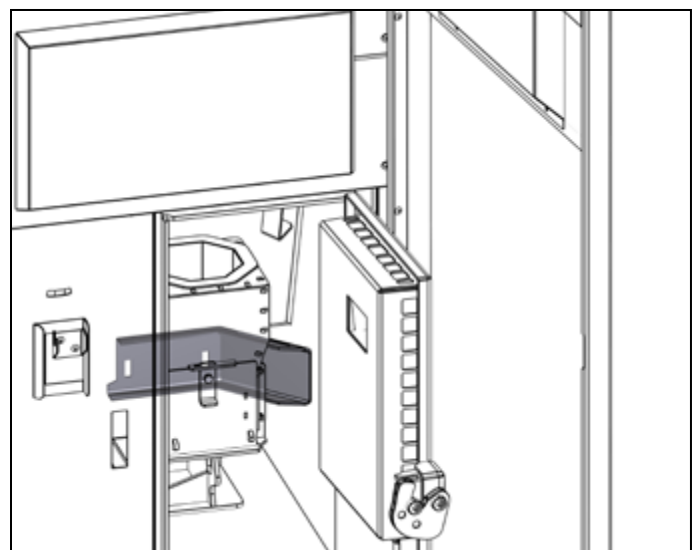


Figure 12-11: Horizontal combustion chamber baffle

12.7 Burner

12.7.1 Dismantling the Burner



WARNING

Ensure the electrical supply to the boiler is isolated at the fused spur before proceeding.

To clean the burner thoroughly it is necessary to dismantle it using the following procedure:

- Fully open the combustion chamber door (as per Section 12.6.5).
- Clean any ash deposits from the external surfaces of the burner.
- Using the multi-purpose tool supplied with the boiler, rotate the brazier catch (on the front of the burner) 90° anticlockwise to release it from the upper front of the burner housing. Refer to Figure 12-12.

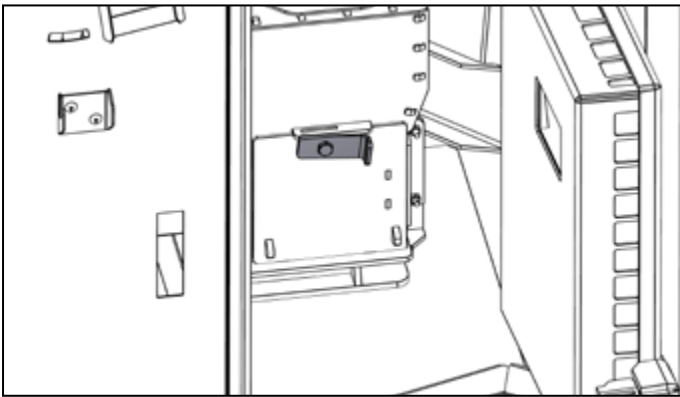


Figure 12-12: Brazier catch

- Hinge down and remove the brazier front plate from the burner. Refer to Figure 12-13.

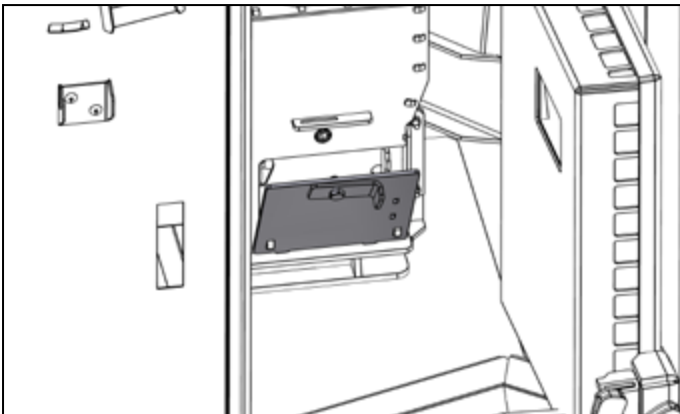


Figure 12-13: Removal of brazier front plate

- Using the multi-purpose tool supplied with the boiler, remove the brazier base plate from the lower front of the burner housing. Refer to Figure 12-14.

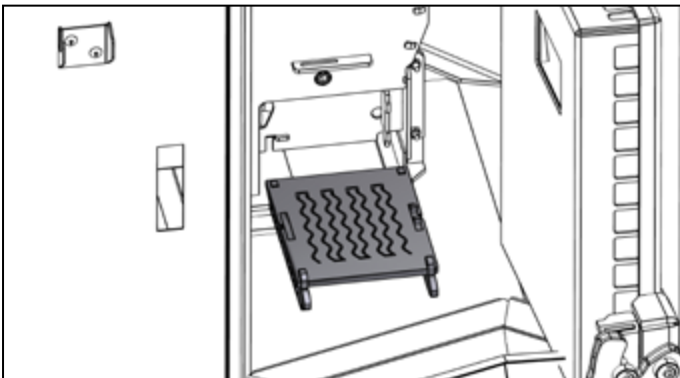


Figure 12-14: Removal of brazier base plate

- Remove the flame pot from the top of the burner. Refer to Figure 12-15.

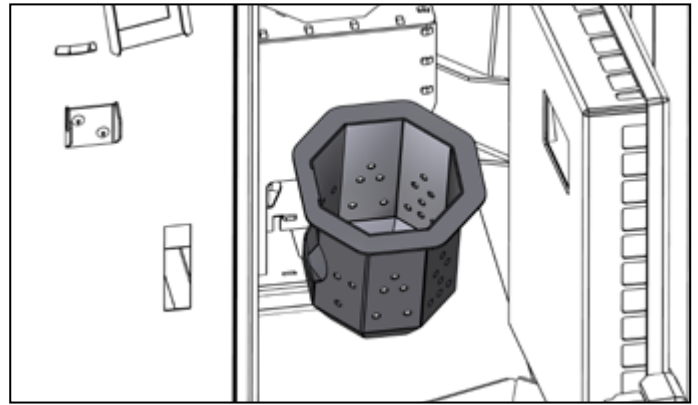


Figure 12-15: Removal of flame pot

- Using the multi-purpose tool supplied with the boiler, remove the wire cotter pin that attaches the brazier assembly to the brazier cleaning shaft. Refer to Figure 12-16.

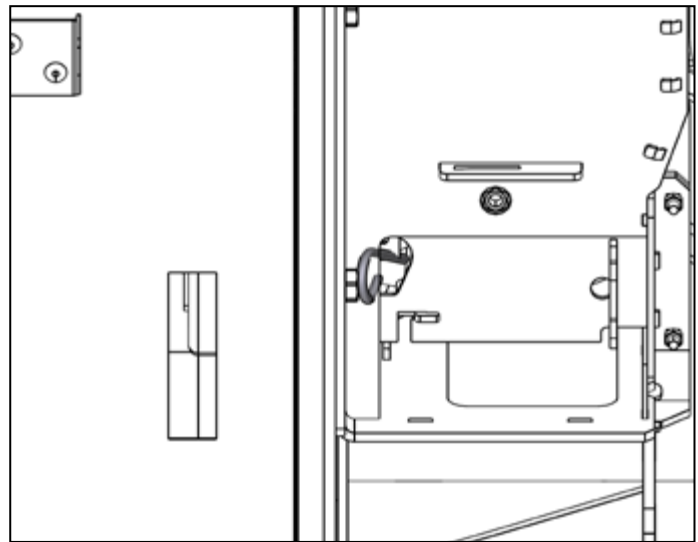


Figure 12-16: Cotter pin removal

- Remove the brazier assembly from the burner. Pull to the right (until it touches combustion chamber wall) and then remove it from the front. Refer to Figures 12-17 and 12-18.



WARNING

Do NOT attempt to force the brazier assembly open without removing the wire cotter pin from the brazier cleaning shaft. Failure to follow this guidance will result in damage to cleaning actuator, cleaning mechanism or brazier.

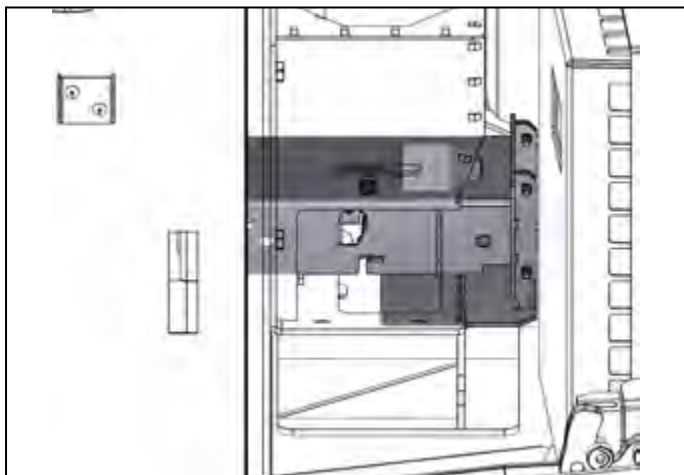


Figure 12-17: Brazier assembly removal to side

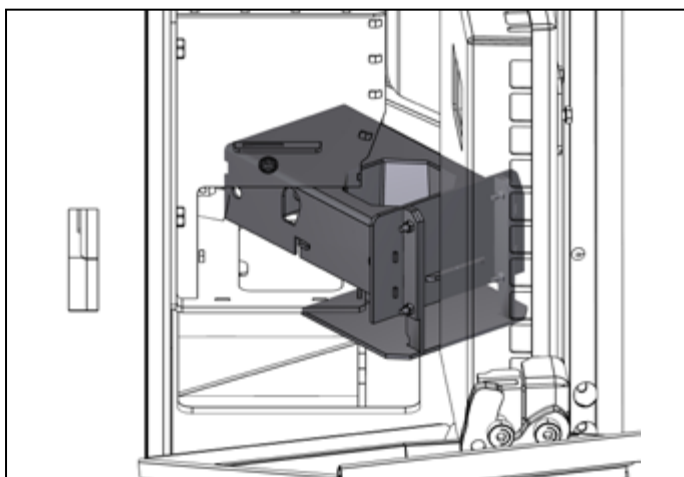


Figure 12-18: Brazier assembly removal

12.7.2 Cleaning the Burner

Once dismantled, clean the burner as follows:

- Clean and inspect the burner housing (inside the combustion chamber).
- Remove all ash deposits and check that all openings and air holes are clear.
- Clean and inspect the brazier assembly, flame pot (refer to Figure 12-19), brazier base plate and brazier front plate.

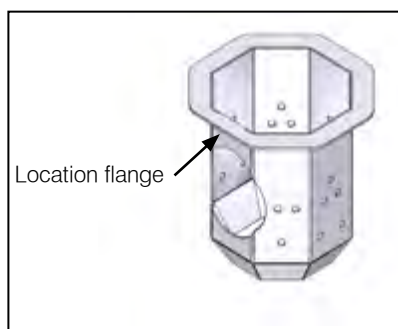


Figure 12-19: Flame pot flange

- Remove all ash and clinker deposits from these parts using a wire brush and, where necessary, a flat scraper. Check that all air holes are clear.
- Re-fit brazier assembly into the burner housing – locating the brazier cleaning shaft into the opening in the left side of the brazier assembly.
- Replace the wire cotter pin to secure the brazier assembly to the brazier cleaning shaft.
- Re-fit the flame pot into the top of the burner housing.



NOTE

The flange on one side of the octagonal pot is narrower than the other seven sides. Refer to Figure 12-19. This side **MUST be located on the left hand side or the pot will not fit into the burner housing.**

- Re-fit the brazier base plate into the lower front of the burner housing using the multi-purpose tool supplied with the boiler
- Re-fit the brazier front plate onto the lower front of the burner housing. Secure in place by engaging the brazier catch into the catch plate on the upper front face of the burner housing. Rotate catch 90° clockwise to ensure it is fully engaged in the catch plate using the multi-purpose tool supplied with the boiler.
- Finally, remove any remaining deposits of ash from the bottom of the combustion chamber and then re-fit the ash pan in the base of the combustion chamber.



NOTE

The boiler will perform an automatic brazier cleaning operation when power to the boiler is re-connected.

12.7.3 Photocell

Remove the photocell from the mount on the left side of the heat exchanger. Check and clean the photocell. Replace if damaged. Refer to Figure 12-20.

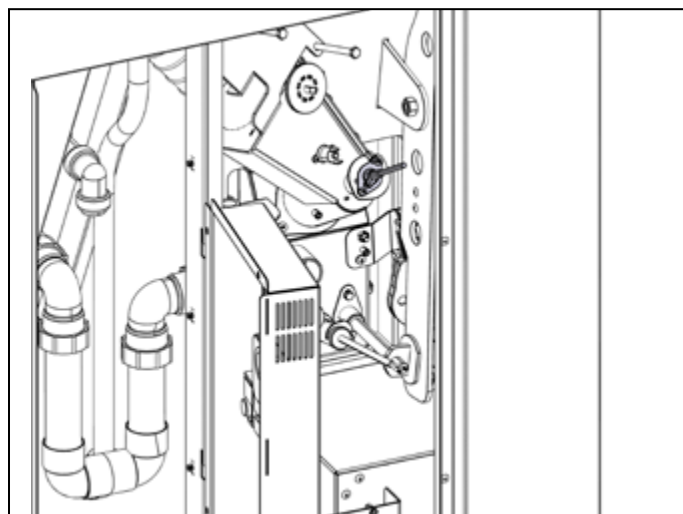


Figure 12-20: Photocell location

12.8 Ignition Element

Remove and check the condition of the ignition heater element.

To remove; first remove steel clip holding grommet in place. Grasp the black grommet and pull the element from the mounting tube (on the left side of the heat exchanger). Do NOT pull on the element power cable. Refer to Figure 12-21.

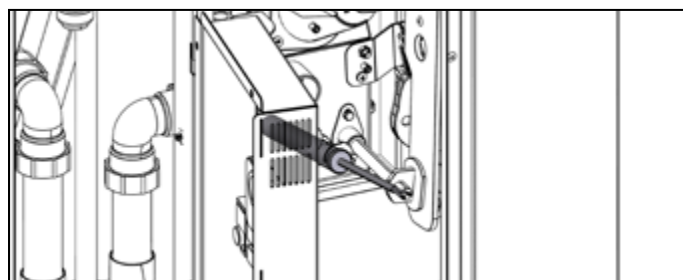


Figure 12-21: Ignition element location

Clean the inside of the element mounting tube using a suitable size of tube brush.

Check and clean both ignition element and ceramic socket and ensure the ignition element is correctly fitted into the ceramic socket.

To ensure that the element is correctly positioned in the tube check the distance from the shoulder of the grommet to the element socket is 35 – 40mm. Adjust the position of the grommet as necessary. Refer to Figure 12-22.

Refit ignition element into mounting tube until grommet is fully pushed home.

Refit steel clip to secure grommet in place.

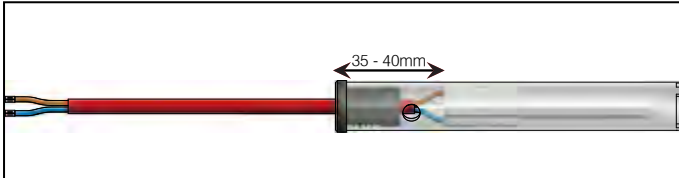


Figure 12-22: Correct ignition element position

12.9 Condensate Disposal System

12.9.1 Condensate Trap



NOTE

The condensate trap, condensate outlet and disposal pipe MUST be checked on EVERY service and cleaned as necessary. Failure to regularly check and clean the condensate trap and disposal pipe may result in damage to the boiler and this will not be covered by the product guarantee.

The condensate must be checked and cleaned as necessary on every service.

To check/clean the trap:

- Disconnect the condensate disposal system from the outlet of the trap.
- Disconnect the trap from the boiler condensate outlet. Refer to Section 5.5 for condensate trap connection details.
- Check that the boiler condensate outlet is clear. Remove any blockage or ash build-up.
- Thoroughly clean out the trap to remove any deposits and re-fit to condensate disposal pipe.
- Reconnect trap to the boiler condensate outlet. Refer to Section 5.5 for condensate trap connection details.

12.9.2 Condensate Disposal Pipe

Before re-connecting discharge pipe to the trap outlet:

- Check entire length of disposal pipe, for any leaks or blockages.
- Thoroughly clean to remove any deposits or replace as necessary.
- Dismantle and Check that any outlets to a gully or hopper are not obstructed. Remove any blockages.

12.9.3 Condensate Pump

If a condensate pump is fitted to the system, check:

- The condition of the holding tank. Thoroughly clean, if required, to remove any deposits.
- Operation of the overflow cut-out float switch.
- That the pump is operating correctly.

12.10 Boiler Settings

With the electrical power to the hopper and boiler switched on, and the boiler ON/STANDBY switch set to STANDBY, check that ALL boiler settings in the 'parameter menu' 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 Sections 9.6 and 9.7 for details on how to access and check these settings.

Reset the 'Service' period to zero as follows:

- Access the 'Service Menu' (refer to Section 9.6 for guidance)
- When in the 'Service Menu' - press button 2 to scroll down to 'Reset Service Timers' function
- Press button 4 to select 'Reset Service Timers' function
- Press button 4 to confirm
- Press button 3 twice to return to 'Home Screen'

12.11 Hopper Lid Cut-out Switch

Check operation of the cut-out switch. Follow the procedure given in Section 11.4.

12.12 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.

12.12.1 Combustion Chamber Draught

Check the combustion chamber draught. Follow the procedure given in Section 11.8.

12.12.2 Flue Gas Analysis

Check the %CO₂ in the flue gases. Follow the procedure given in Section 11.9.



WARNING

To ensure safe and efficient operation of the boiler it is important that boiler/burner is re-commissioning as detailed in Section 11.

13 Fault Finding

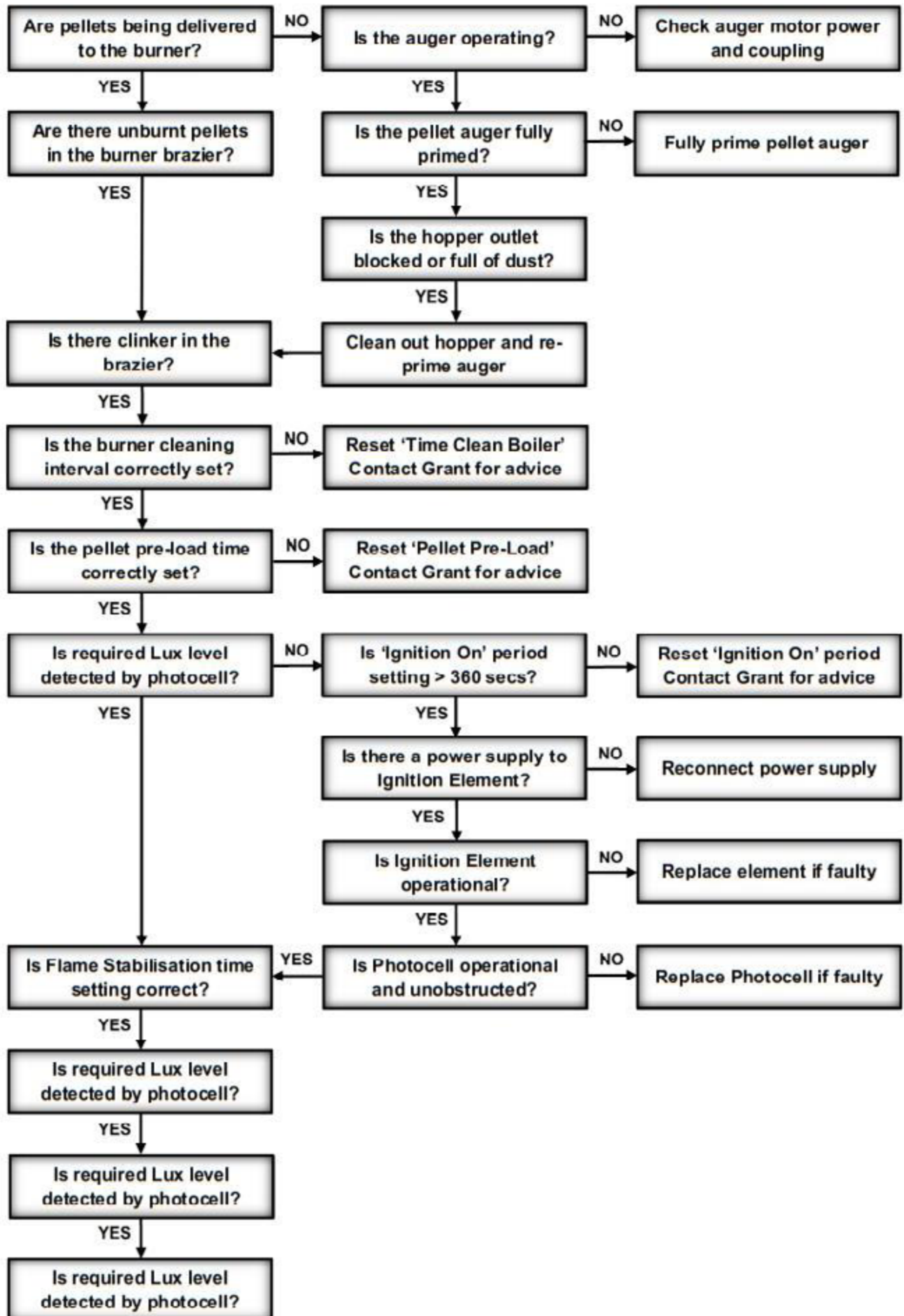
13.1 Fault Codes

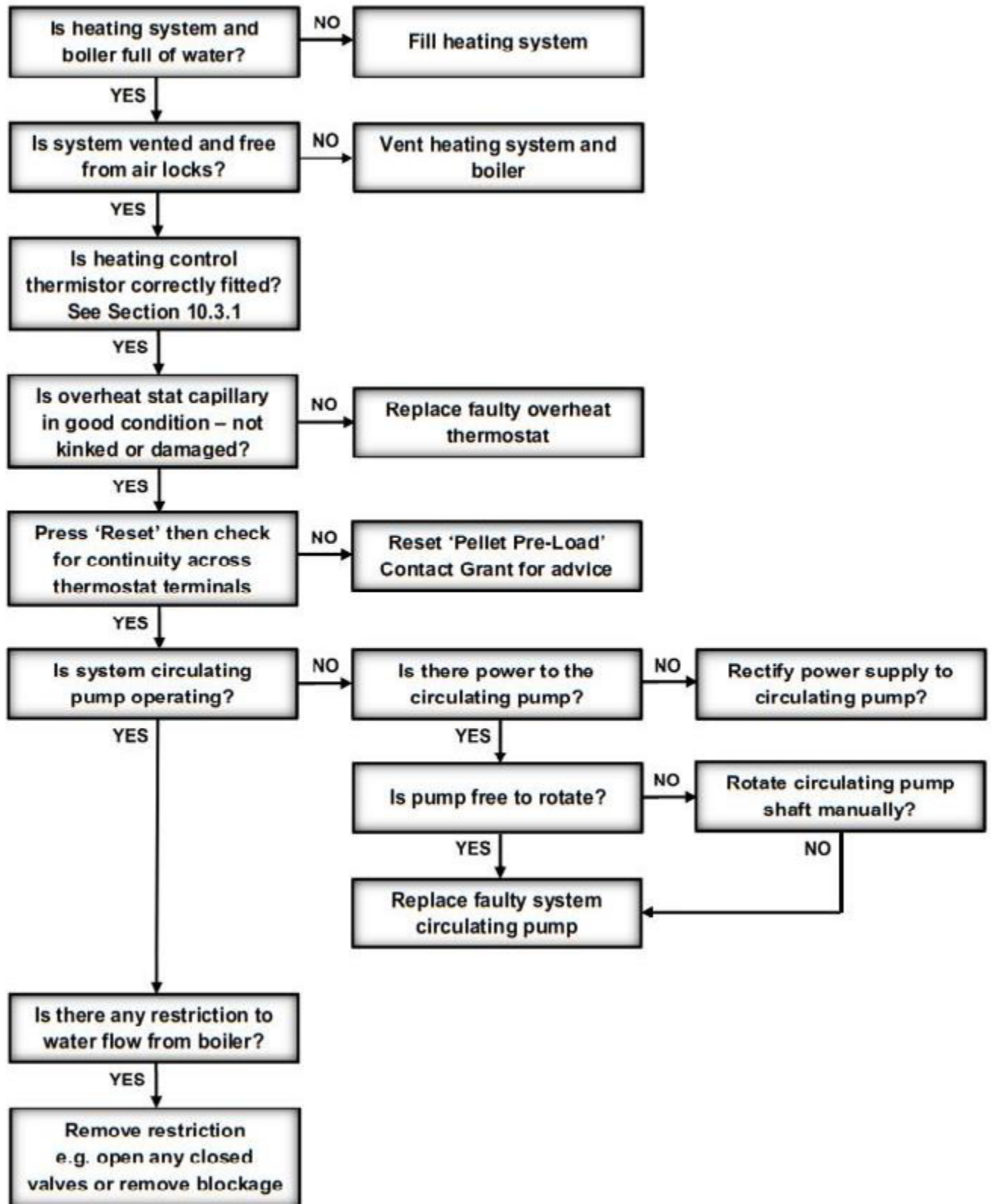
The boiler control system monitors all aspects of the boiler operation and, should a fault occur, will display a fault message and fault code on the control panel LCD.

The fault messages and codes are as follows:

Fault message	Error code
Safety Relay Fault	1
Auger Monitor Fault	2
Failed Pellet Lighting	2
Ignition Monitor Fault	3
Safety Charge Pipe Stat	3
Overheat Thermostat	4
Servo Motor Blocked	8
Flue Fan Ignition Rate	10
Flue Fan Failed	11
Water Flow Switch	12
Fuel Low	13
Safety Shutdown	14
Door Open	15
Hopper Lid Open	16
Burner Fan Ignition Rate	17
Burner Fan Failed	18
False Flame	19
EN60730 Fault (PCB fault)	20
Safety Flap Open	21
Safety Flap Closed	22
APS Fault	23
Safety Monitor	24

13.2 Fault Details
13.2.1 Failed Pellet Lighting





14 Spare Parts

14.1 Boiler Parts List

Item	Description	Grant UK product code	Quantity
N/A	Front door lock and keys	VEC001	1
N/A	Lid safety switch	WPS88	1
N/A	Front cleaning door safety switch	WPS88	1
N/A	Electrical isolation switch	VEC002	1
N/A	Display board (LED screen)	VEC003	1
N/A	On / off switch	VEC004	1
N/A	Vecta PCB board	VEC005	1
N/A	Power unit for PCB board	VEC006	1
N/A	Lambda sensor	VEC007	1
N/A	Lambda sensor PCB board	VEC008	1
N/A	Complete heat exchanger cover complete with manifold	VEC009	1
N/A	Nozzle tube (for wash down)	VEC010	1
N/A	Nozzle holder (for wash down)	VEC011	1
N/A	Wash down flexible hose	Special - please call Grant UK	1
N/A	Primary heat exchanger spirals	VEC012	8
N/A	Secondary heat exchanger spirals (LHS - 4½ turns)	VEC013	15
N/A	Secondary heat exchanger spirals (RHS - 2½ turns)	VEC014	15
N/A	Shaker box gasket	VEC015	1
N/A	Photocell	WPS09	1
N/A	Photocell tube	VEC016	1
N/A	Ignition element	WPS10A	1
N/A	Ignition element tube	VEC017	1
N/A	Ash pan	VEC018	1
N/A	Carry handle	Special - please call Grant UK	1
N/A	Multi purpose tool	VEC019	1
N/A	Vertical combustion chamber baffle	VEC020	1
N/A	Horizontal combustion chamber baffle	VEC021	1
N/A	Brazier front plate c/w catch	VEC022	1
N/A	Brazier base plate	VEC023	1
N/A	Complete brazier assembly	VEC024	1
N/A	Flame pot	VEC025	1
N/A	Air pressure switch	VEC026	1
N/A	Manual air vent	VEC027	1
N/A	High limit stat	WPS107	1
N/A	Temperature thermistor	WPS25	1
N/A	Solenoid coil and valve	WPS76	1
N/A	Flue fan motor	VEC028	1
N/A	Actuator board	VEC029	1
N/A	Fire damper motor (Belimo)	VEC030	1
N/A	Auger motor (SPG)	Special - please call Grant UK	1
N/A	Low fuel warning microswitch	Special - please call Grant UK	1
N/A	Low fuel diaphragm	Special - please call Grant UK	1
N/A	Linear motor (Lynex)	VEC031	1
N/A	Fuse (5 amp - fast acting glass)	Special - please call Grant UK	1

14.2 Side Store Parts List

Item	Description	Grant UK product code	Quantity
N/A	Auger motor (SPG)	Special - please call Grant UK	1
N/A	Low fuel warning microswitch	Special - please call Grant UK	1
N/A	Low fuel diaphragm	Special - please call Grant UK	1

15 The Clean Air Act 1993 and Smoke Control Areas

The Clean Air Act 1993 and Smoke Control Areas

Under the Clean Air Act local authorities may declare the whole or part of the district of the authority to be a smoke control area. It is an offence to emit smoke from a chimney of a building, from a furnace or from any fixed boiler if located in a designated smoke control area. It is also an offence to acquire an "unauthorised fuel" for use within a smoke control area unless it is used in an "exempt" appliance ("exempted" from the controls which generally apply in the smoke control area).

The Secretary of State for Environment, Food and Rural Affairs has powers under the Act to authorise smokeless fuels or exempt appliances for use in smoke control areas in England. In Scotland and Wales this power rests with Ministers in the devolved administrations for those countries. Separate legislation, the Clean Air (Northern Ireland) Order 1981, applies in Northern Ireland. Therefore it is a requirement that fuels burnt or obtained for use in smoke control areas have been "authorised" in Regulations and that appliances used to burn solid fuel in those areas (other than "authorised" fuels) have been exempted by an Order made and signed by the Secretary of State or Minister in the devolved administrations.

Further information on the requirements of the Clean Air Act can be found at www.gov.uk/smoke-control-area-rules

Your local authority is responsible for implementing the Clean Air Act 1993 including designation and supervision of smoke control areas and you can contact them for details of Clean Air Act requirements.

The Grant Vecta 4-16 Condensing Wood Pellet Boiler has been recommended as suitable for use in smoke control areas when burning EN Plus A1 pellets.

16 Declaration of Conformity

EC Declaration of Conformity

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

We: Grant Engineering (UK) Limited

Of: Hopton House
Hopton Industrial Estate
Devizes
SN10 2EU

Telephone: +44 (0)1380 736920

Fax: +44 (0)1380 736991

Email: info@grantuk.com

Website: www.grantuk.com

Declare that:

Equipment: Floor Standing Domestic Condensing Wood Pellet Boiler

Model Name/Number: Grant Vecta 4-16 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.
92/42/EC	Conforms with the requirements of the Boiler Efficiency Directive.

Has been designed and manufactured to the following specifications:

EN60335-1:2012	Household and similar electrical appliances. Safety – General requirements.
EN60335-2-102:2006+A1:2010	Household and similar electrical appliances. Safety. Particular requirements for gas, oil and solid fuel burning appliances having electrical connections.
EN303-5:2012	Heating Boilers for solid fuels. Manually or automatically stoked. Nominal heat output up to 500kW.

I hereby declare that the equipment named above has been tested and found to comply with the relevant sections of the above referenced specifications. The unit complies with all essential requirements of the Directives.

Responsible Person:

Neil Sawers

Position:

Technical Manager

Signature:



Date:

15th December 2016



17 Health and Safety Information

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

17.1 Insulation Materials

Material types:

Ceramic fibre board, mineral wool.

Description:

Rigid board, slabs, sleeves, gaskets, ropes.

Known Hazards:

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

Precautions:

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

Avoid inhalation and contact with skin and eyes.

After handling always follow normal good hygiene practices.

Protection:

Use disposable gloves, face mask and eye protection.

First Aid:

Eyes – if irritation occurs, wash eyes with copious amounts of water. If symptoms persist, seek immediate medical advice.

Skin:

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

Inhalation:

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

Ingestion:

Drink plenty of water.

17.2 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. Seek immediate medical attention.

Skin:

Wipe off and wash with soap and water.

Inhalation:

Remove to fresh air.

18 Disposal and Recycling

General

Grant wood pellet boilers incorporate components manufactured from a variety of different materials. The majority of these materials can be recycled whilst the smaller remainder cannot.

Materials that cannot be recycled must be disposed of according to local regulations using appropriate waste collection and/or disposal services.

Disassembly

There is little risk to those involved in the disassembly of this product. Please refer to and follow the Health and Safety Information given in the Installation & Servicing Instructions provided with the boiler.

For guidance on the disassembly of the boiler refer to the information given in the Servicing section of the Installation & Servicing Instructions provided with the boiler.

Recycling

Many of the materials used in Grant oil boilers can be recycled, these are listed in the table below:

Component	Material
Outer casing panels	Mild steel (polyester powder coated)
Primary heat exchanger and baffles	Mild steel
Secondary heat exchanger	Stainless steel
Secondary heat exchanger spirals	Stainless steel
Pipework	Copper
Burner body/brazier	Stainless steel
Electrical wiring	Copper / plastic
Thermostats	Copper / plastic
Printed circuit boards	Copper / plastic

Disposal

All materials other than those listed above must be disposed of responsibly as general waste

19 Guarantee

You are now the proud owner of a wood pellet boiler from Grant Engineering (UK) Limited, which has been designed to give years of reliable, trouble free, operation.

Grant Engineering (UK) Limited guarantees the manufacture of the boiler including all electrical and mechanical components for a period of **twelve months from the date of installation⁴**, provided that the boiler has been installed in full accordance with the installation and servicing instructions issued.

This will be extended to a total period of **two years** if the boiler is registered with Grant Engineering (UK) Limited within **thirty days of installation⁴** and it is serviced at regular intervals³. See main Terms and Conditions below.

Registering the product with Grant Engineering (UK) Limited

Please register your wood pellet boiler with Grant Engineering UK Limited **within thirty days of installation⁴**. To do so visit www.grantuk.com, where you can register your boiler for a further **twelve months** guarantee (giving **two years** from the date of installation). This does not affect your statutory rights¹.

If a fault or defect occurs within the manufacturer's guarantee period

If your boiler should fail within the guarantee period, you must contact Grant Engineering (UK) Limited who will arrange for the repair under the terms of the guarantee, providing that the boiler has been correctly installed, commissioned and regularly serviced by a competent person and the fault is not due to tampering, running out of fuel, the use of unapproved wood pellets, contamination, debris, system water contamination, misuse, trapped air or the failure of any external components not supplied by Grant Engineering (UK) Limited, e.g. motorised valve, etc.

This two year guarantee only applies if the boiler is registered with Grant Engineering (UK) Limited within thirty days of installation⁴ and is regularly serviced³.

In the first instance

Contact your installer or commissioning engineer to ensure that the fault does not lie with the system components or any incorrect setting of the system controls that falls outside of the manufacturer's guarantee otherwise a service charge could result. Grant Engineering (UK) Limited will not be liable for any charges arising from this process.

If a fault covered by the manufacturer's guarantee is found

Ask your installer to contact Grant Engineering (UK) Limited Service Department on +44 (0)1380 736920 who will arrange for a competent service engineer to rectify the fault.

Remember - before you contact Grant Engineering (UK) Limited:

- Ensure the boiler has been installed, commissioned and serviced by a competent person in accordance with the installation and servicing instructions.
- 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 installation and servicing instructions supplied with the boiler for guidance.
- Ensure the problem is not being caused by poor quality or incorrect pellets.

Free of charge repairs

During the **two year** guarantee period 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 installation and servicing instructions, it was registered with Grant Engineering (UK) Limited within thirty days of installation⁴ and details of regular servicing is available³.

The following documents must be made available to Grant Engineering (UK) Limited on request:

- Proof of purchase
- Commissioning Report Form
- Service documents

Chargeable repairs

A charge may be made (if necessary following testing of parts) if the cause of the breakdown is due to any fault(s) 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 guarantee' below.

Extent of manufacturer's guarantee:

The manufacturer's guarantee does not cover the following:

- If the boiler has been installed over **two years**.
- If the boiler has not been installed, commissioned, or serviced by a competent person in accordance with the installation and servicing instructions.
- The serial number has been removed or made illegible.
- Fault(s) due to accidental damage, tampering, unauthorised adjustment, neglect, misuse or operating the boiler contrary to the manufacturer's installation and servicing instructions.
- Damage due to external causes such as bad weather conditions (flood, storms, lightning, frost, snow, ice), fire, explosion, accident or theft.
- Fault(s) due to incorrectly sized expansion vessel(s), incorrect vessel charge pressure or inadequate expansion on the system.
- Fault(s) caused by external electrics and external components not supplied by Grant Engineering (UK) Limited.
- 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 Engineering (UK) Limited).
- Removing any pellet store or hopper contamination or blockages in the pellet augers, pellet hopper or bulk pellet store.
- Removal of dust from 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.
- Cleaning out condensate traps/discharge pipework or thawing frozen condensate pipework.
- Checking or replenishing system pressure.
- Electrical cables and plugs, heating system controls not supplied by Grant Engineering (UK) Limited.
- Heating system components, such as radiators, pipes, fittings, pumps and valves not supplied by Grant Engineering (UK) Limited.
- Instances where the wood pellet boiler has been un-installed and re-installed in another location.
- Use of spare parts not authorised by Grant Engineering (UK) Limited.
- Consumable items including, but not limited to, gaskets, seals, etc.

IMPORTANT

Do not wait until your wood pellet supply runs out before you re-order.

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 the regular service to prevent nuisance stoppage of the boiler.

Terms of manufacturer's guarantee:

- The Company shall mean Grant Engineering (UK) Limited.
- The boiler must be installed by a competent installer and in full accordance with the relevant Codes of Practice, Regulations and Legislation in force at the time of installation.
- The boiler is guaranteed for **two years** from the date of installation⁴, providing that regular servicing has been completed³ and the boiler registered with the Company within thirty days of installation. Any work undertaken must be authorised by the Company and carried out by a competent service engineer.
- The boiler must be installed by an engineer that has attended and passed a Grant Engineering (UK) Limited accredited training course.
- The shell (heat exchanger) of the wood pellet boiler is covered by a **five year parts only** guarantee from the date of installation⁴. This is subject to the following:
 - The boiler is operated correctly, in accordance with the installation and servicing instructions.
 - Proof is provided that the system has been flushed or chemically cleaned where appropriate (refer to BS 7593) and that the required quantity of a suitable corrosion inhibitor added.
 - Proof of regular servicing (including the checking of any expansion vessels and pressure relief valves) must be provided if and when requested by the Company.

IMPORTANT

Grant Engineering (UK) Limited strongly recommends that a Grant Mag-One in-line magnetic filter/s (or equivalent⁵) is fitted in the heating system pipework. This should be installed and regularly serviced in accordance with the filter manufacturer's instructions.

- 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 installation and servicing instructions.
- The boiler is registered with the Company within thirty days of installation⁴. Failure to do so does not affect your statutory rights¹.
- The balance of the guarantee is transferable providing the installation is serviced prior to the dwelling's new owners taking up residence. Grant Engineering (UK) Limited must be informed of the new owner's details.

- 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.
- This guarantee applies to Grant Engineering (UK) Limited boilers purchased and installed on the UK mainland, Isle of Wight, Channel Islands and Scottish Isles only². Provision of in-guarantee cover elsewhere in the UK is subject to agreement with the Company.
- 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.
- Proof of purchase and date of installation, commissioning and service documents must be provided on request.
- If a replacement boiler is supplied under the guarantee (due to a manufacturing fault) the product guarantee continues from the installation date of the original boiler, and **not** from the installation date of the replacement⁴.
- Breakdown/failure due to lime scale will not be covered by this guarantee.
- The replacement of a boiler under this guarantee does not include any consequential costs.
- The boiler must not be sited in a location where it may be subjected to frost.
- The ceramic ignition element is covered by a two year guarantee.

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 guarantee. Ask your installer for advice.

Foot notes:

1. Your statutory rights entitle you to a one year guarantee period only.
2. The UK mainland consists of England, Scotland and Wales only. Please note that for the purposes of this definition, Northern Ireland, Isle of Man and Scilly Isles are not considered part of the UK mainland.
3. Your wood pellet boiler must be regularly serviced as per the installation and servicing instructions, (even when the guarantee has expired) to prolong the lifespan and ensure it is operating safely and efficiently.
4. The guarantee period will commence from the date of installation, unless the installation date is more than six months from the date of purchase, in which case the guarantee period will commence six months from the date of purchase.
5. As measured by gauss. The Mag-One magnetic filter has a gauss measurement of 12000.

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