



NO.I011 Rev:4 November 2011

INSTALLATION, COMMISSIONING AND SERVICING INSTRUCTIONS

GRANT SPIRA 6-26 kW CONDENSING WOOD PELLET BOILER

GRANT SPIRA 9-36 kW CONDENSING WOOD PELLET BOILER

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

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

Index of Wood pellet Boiler installation manual

1. Introduction	1.1	How the wood pellet boiler operates
	1.2	Boiler description
	1.3	Boiler components
2. Technical data	2.1	Boiler & Hopper technical data
	2.2	Boiler output data
	2.3	Flue gas analysis
	2.4	Boiler & hopper set up Dimensions
3. Pellet specification & storage	3.1	Pellet specification
	3.2	Pellet storage
4. Installation information	4.1	Introduction
	4.2	Boiler location
	4.3	Regulations to comply with
	4.4	Preparation for installation
	4.5	Installing the boiler
	4.6	Make the water connections
	4.7	Fan box
	4.8	Burner
	4.9	Intermediate hopper
	4.10	Pellet Feed Auger
5. Condensate disposal	5.1	General requirements
	5.2	Connections
	5.3	Pipe work
	5.4	External pipework
	5.5	Condensate soak away
	5.6	Condensate trap
	5.7	Inspection and cleaning of trap
6. Flue system & Air supply	6.1	Air supply
	6.2	Flue position and clearances
	6.3	Flue Components & assembly
7. Electrical	7.1	Connecting the power supply
	7.2	Frost protection
	7.3	Boiler wiring diagram
	7.4	Burner wiring diagram
	7.5	Intermediate hopper –Low pellet warning light
	7.6	Intermediate hopper – Bulk hopper feed
	7.7	Control system wiring diagram –S plan
	7.8	Control system wiring diagram –Y plan
	7.9	Pressure switch wiring diagram
8. Burner	8.1	Burner operation
	8.2	Burner modes
	8.3	Operational sequences
	8.4	Burner display screen
	8.5	Burner control buttons
	8.6	Burner menu navigation chart
	8.7	Burner menu description
9. Commissioning	9.1	Equipment required
	9.2	Before switching on
	9.3	Priming the pellet feed auger
	9.4	Lighting the boiler
10. Boiler servicing	10.1	Checking before servicing
	10.2	Cleaning the burner
	10.3	Cleaning the boiler & Flue
11. Fault finding	11.1	Boiler won't fire (no error message)
	11.2	Blank display screen
	11.3	Error messages
12 Spare parts.		
13 Health & safety information.		
14 Notes		



Grant SPIRA Condensing Wood Pellet Boiler & Intermediate Hopper

1 Introduction

This manual is intended to guide Engineers who have completed the Grant Wood Pellet Boiler Installer training course on the installation, commissioning and servicing of the Grant SPIRA Condensing Wood Pellet Boiler. A separate manual is available to guide users in the operation of the boiler.

The following special text formats are used in this manual of the purposes listed below;



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



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



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

1.1 How the condensing wood pellet boiler operates

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

The Grant SPIRA Condensing wood pellet boiler contains an extra (secondary) heat exchanger which is designed to recover the latent heat normally lost by a conventional boiler. It does this by cooling the flue gases to below 90°C thus

extracting more sensible heat and some of the latent heat. This is achieved by cooling the flue gases to their dew point.

To ensure maximum efficiency, the boiler return temperature should be 55°C or less (minimum of 40°C) at maximum operating temperature. This will enable the latent heat to be condensed out of the flue gases.

The boiler will achieve full load efficiency as follows;

SPIRA 6-26 Full output = 97.4% Reduced output = 96.4%

SPIRA 9-36 Full output = 93.1% Reduced output = 98.1%

The Grant SPIRA condensing wood pellet boiler operate extremely high efficiencies even when it is not in condensing mode and therefore is suitable for fitting to an existing heating system without alteration to the radiator sizes. The boiler is capable of a maximum flow temperature 80°C.

The burner is a drop feed burner. The output of the burner is determined by varying the feed and pause time of the pellet feed auger supplying pellets to the burner.

1.2 Boiler Description

When commissioned correctly, the Grant SPIRA condensing wood pellet range of boilers operate automatically as they are equipped with an automatic cleaning system. The ash pan will need to be emptied after each 3 tonnes of pellet consumption and serviced annually by a Grant trained service Engineer. Details of each service should be recorded in the Service Log in the back of the User Operating Manual.



To ensure the safe and trouble free operation of the boiler ensure the ash pan is emptied after each 3 tonne of pellets burnt as failure to do so could cause the boiler to malfunction.

The boiler is suitable for use on a sealed or open vented central heating system. All models are supplied with the control panel factory fitted. The burner, combined fan box & flue starter, pellet feed auger and hopper come separately and needs to be fitted by the installer. See section 4 for boiler installation.

The boiler needs to be connected to a conventional flue system. There is no provision for connection to a balanced flue system as there is draft regulator fitted to the appliance.

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



The only flue system suitable for the Grant SPIRA condensing wood pellet boiler is the Grant 'Black' insulated conventional flue system.

This 125mm (5") 'Black' flue system is suitable for both models 6-26 & 9-36.

1.3 Boiler components

1.3.1 Burner. The burner is supplied separately and will need to be mounted to the boiler on site. All burners are supplied at a factory default setting. During commissioning each burner parameter will need to be checked and adjusted if necessary as pellet feed auger angle, pellet size and flue sizes/length can have significant effect on the boiler performance. Refer to commissioning in section 9. The Burner is equipped with a self cleaning device to prevent a build up ash and clinker in the burner brazier. The burner output is determined by the feed / pause times of the pellet feed auger supplying the burner. See section 8 for full burner operation.

1.3.2 Boiler. The SPIRA condensing boiler is supplied with a combined primary and secondary heat-exchanger. The boiler is also equipped with a self cleaning system, of which the primary heat-exchanger cleaning system comes fitted in the boiler and the secondary heat-exchanger cleaning system needs to be fitted. See section 4. Boiler Installation.

1.3.3 Boiler controls. The set-point temperature of the boiler is user adjustable on the burner menu see section 8. The boiler is fitted with an overheat thermostat (which allows it to be used on a sealed central heating system) which will automatically switch off the boiler if the temperature exceeds a pre-set temperature of 110°C. The control panel is fitted with a Burner ON/STAND-BY switch. This switch interrupts the switched live supply to the burner, it does not isolate the electrical supply to the burner. The control panel is also fitted with a cleaning switch, in the default position it allows the boiler cleaning system to perform automatically, when pressed it allows the cleaning system to be manually tested.

Only operate the cleaning switch when the boiler is in 'WAIT BOILER THERMOSTAT'. See figure 1.1

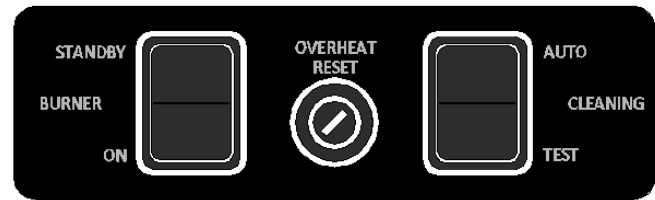


Fig. 1.1



After the burner has been switched off (either manually by the switch on the control panel, the boiler stat', or the switched live input) the burner needs to burn-down the remaining pellets in the brazier. Do not AT ANY TIME open the front combustion chamber access door until the burner display reads "WAIT BOILER THERMOSTAT"

1.3.4 Pellet Feed Auger. The pellet feed auger is a hollow spiral type. Its function is to deliver the pellets from the hopper to the burner. The output of the boiler is determined by varying the on/off periods of the pellet feed auger motor. All Grant hoppers are fitted with a fixed angle feed pellet feed auger at 45° to maintain consistent feed. Once the pellet feed auger angle is altered the input to the boiler is also altered.

1.3.5 Hopper. The system comes complete with an intermediate hopper. This hopper stores 120 kg (169 lt) of wood pellets with a refill capacity of 80 kg. The hopper is for indoor use only and should be positioned in a dry environment. Position the hopper to the left side of the boiler only and on the same floor level as the boiler. The hopper is supplied with castors, allow sufficient area in front of the hopper for removal during servicing. **The hopper comes with 'knock-out' to allow entry of pellets from a bulk hopper system, this knockout is positioned to ensure the pellets drop into the hopper and will de-activate the low level indicator.** Making an alternate opening in the intermediate hopper could effect the operation of the low level indicator.

Always ensure that the door and top panel of the intermediate hopper are fitted to ensure no foreign debris enters the hopper. If a bulk system is fitted ensure the bulk auger does not stop the opening of the intermediate hopper access door.

2 Technical Data

2.1 Boiler & Hoper technical data

Model	Units	SPIRA	
		6-26	9-36
Water content	Litres	51.5	60
Weight boiler heat-exchanger	kg	201	231
Weight of auger	kg	8.35	8.35
Weight burner	Kg	25.5	25.5
Weight intermediate hopper (empty)	Kg	33	33
Weight intermediate hopper (full)	kg	153	153
Weight fan box	Kg	5	5
Maximum heat Output	kW	26	36
	Btu/hr	88,700	122,800
Flow connection	--	1" B.S.P. (F)	1 1/4" B.S.P. (F)
Return connection	--	1" B.S.P. (F)	1 1/4" B.S.P. (F)
Waterside resistance $\Delta T = 10^{\circ}\text{C}$	mbar	26.0	
Waterside resistance $\Delta T = 20^{\circ}\text{C}$	mbar	9.5	
Mains water (cleaning system)	Litre/min	XXXXXX???	
Condensate connection	--	1 1/4" B.S.P. Female	
Conventional flue	--	125mm (5") Black system	
Combustion chamber draught requirement	mbar	0.10 to 0.15 (running)	
Maximum static head	m	25	
Minimum circulating head	m	1	
Boiler temperature set point range	$^{\circ}\text{C}$	55° to 80°	
Boiler temperature cut out point	$^{\circ}\text{C}$	65° to 80°	
Minimum return temperature	$^{\circ}\text{C}$	40°	
Water system overheat cut-out temp.	$^{\circ}\text{C}$	110°	
Burn-back overheat thermostat cut-out	$^{\circ}\text{C}$	60°	
Electricity supply	--	230V ~50Hz	
Max operating pressure -sealed system	bar	2.5 bar	
Max operating pressure -open system	bar	2.5 bar	
Maximum auger length (bulk hopper)	meter	7.5	
Maximum auger speed (bulk hopper)	rpm	30	
Minimum flue length	m	2.0	
Maximum flue length	m	12.0	
Heating element rating	Watts	450	
Intermediate auger motor power	Watts	55	
Intermediate auger motor starting current	Amps	0.64	
Intermediate auger motor running current	Amps	0.64	
Intermediate auger speed	rpm	8.5	
Flue fan motor power	Watts	32	
Flue fan motor starting current	Amps	0.27	
Flue fan motor running current	Amps	0.13	
Cleaning solenoid power	Watts	10	
Cleaning solenoid current	Amps	0.087	
Burner fan motor power	Watts	56	
Total burner start current	amp	2.5	
Total burner run current	amp	0.60	

2.2 Boiler output data

Settings in the table below are based on the boiler using the Grant fixed angle pellet feed auger at 45° and an auger motor fixed speed of 8.5 rpm using 6mm ‘Balcas Brites’ or 6mm ‘Verdo’ pellets. All pellets used must meet ENplus standard EN14961-2 and be free of bark and sand.

For settings on other brand pellets contact Grant Engineering.

2.2.1 Burner settings

Model	Pellet feed Auger angle	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'	kW (Btu/h)	kW (Btu/h)			Mbar	%	'TIME PAUSE MIN'	kW Btu/h
SPIRA 6-26	45°	0025 (2.5sec)	0025 (2.5sec)	26.3 (89,735)	27.1 (92,500)	97.4	5.70	0.1–0.15	10–12	0175 (17.5sec)	6.5 (22,100)
SPIRA 9-36	45°	0065 (6.5sec)	0025 (2.5 sec)	36 (122,832)	38.7 (132,000)	93.1	7.78	0.1–0.15	10–12	0250 (25sec)	9 (30,700)

1. * = Based on a calorific value of 4.81 kW/kg
2. Data given above is approximate only.
3. The above settings will have to be adjusted on site for correct operation of burner.
4. The installer must amend the boiler data label if the output is changed.

2.3 Flue Gas Analysis



Only use a calibrated flue gas analyser that has a ‘Wood Pellet’ fuel setting. Setting the fuel to an alternative fuel will give incorrect readings.

To allow the boiler to be commissioned and serviced, the boiler is supplied with a test point in the top cleaning door. When this test point is used, note that the test point is for CO₂ and smoke reading only. The boiler efficiency and flue gas analysis must be taken from the flue test point that is closest to the flue connection chamber on the top rear cleaning door. To gain access to this test point, remove the top panel from the boiler.



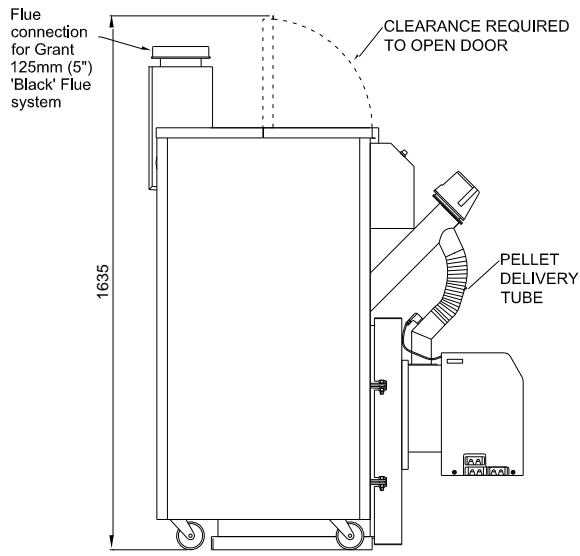
To obtain good combustion the minimum ‘TIME LOAD MAX’ setting should not be set lower than 25 (2.5 seconds)



Do not sample flue gases through the draught stabilizer or within the flue as the gases will have been diluted with air from the draught regulator. Only use the test points in the top rear access door

2.4 Boiler & Hopper setup dimensions

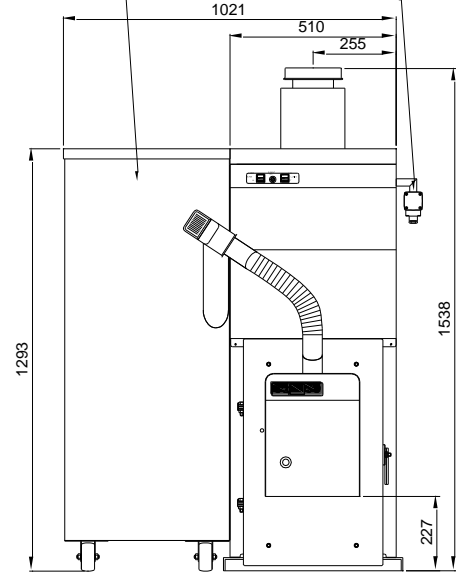
2.4.1 6-26 SPIRA



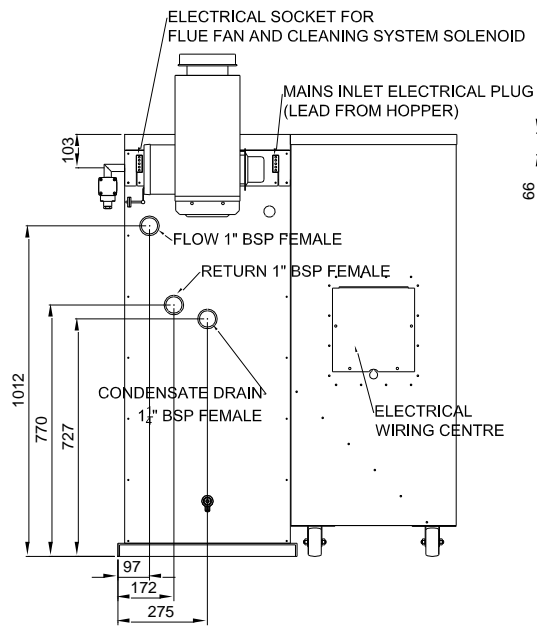
SIDE VIEW - BOILER & HOPPER

HOPPER POSITIONED ON LEFT SIDE OF BOILER ONLY

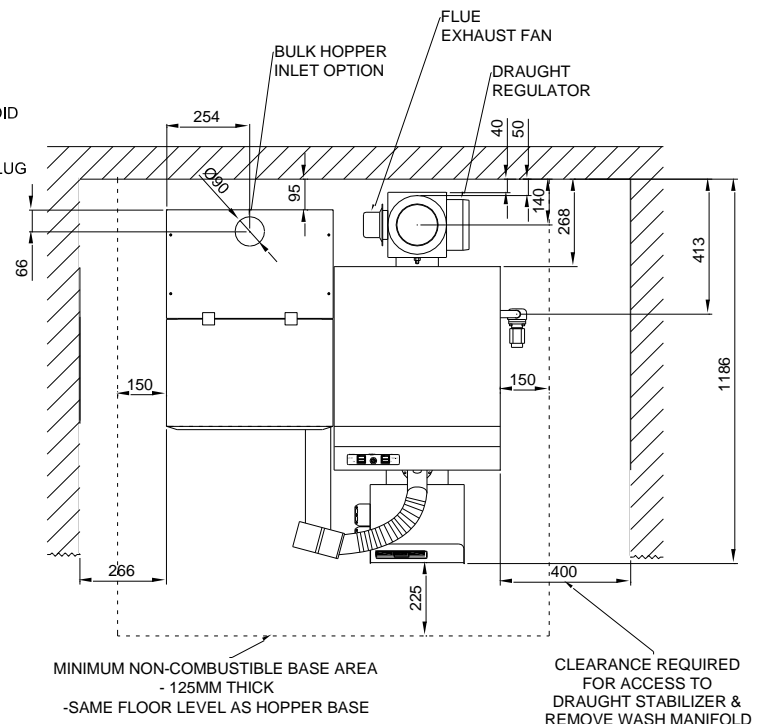
CONDENSING UNIT WASH SYSTEM (15MM COMPRESSION MAINS)



FRONT VIEW - BOILER & HOPPER



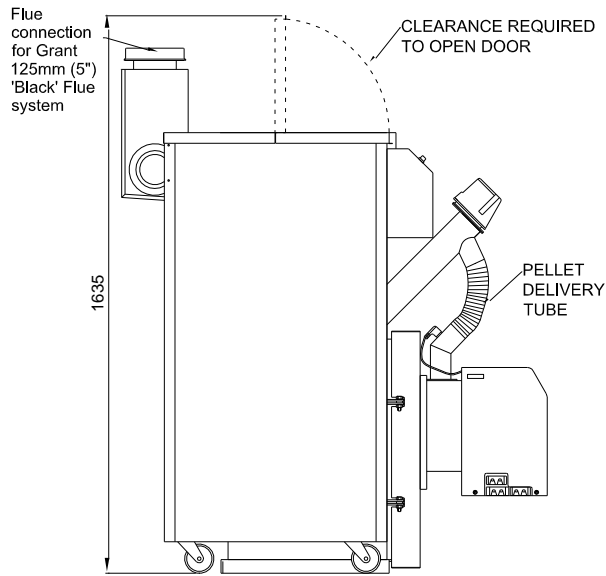
REAR VIEW - BOILER & HOPPER



PLAN VIEW - BOILER & HOPPER

Fig 2.1

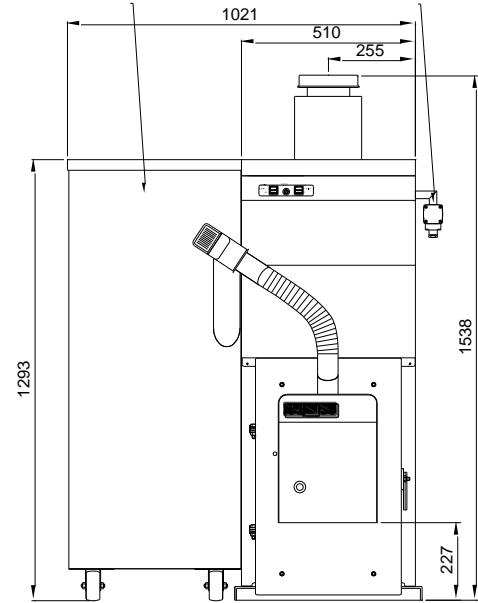
2.4.2 9-36 SPIRA



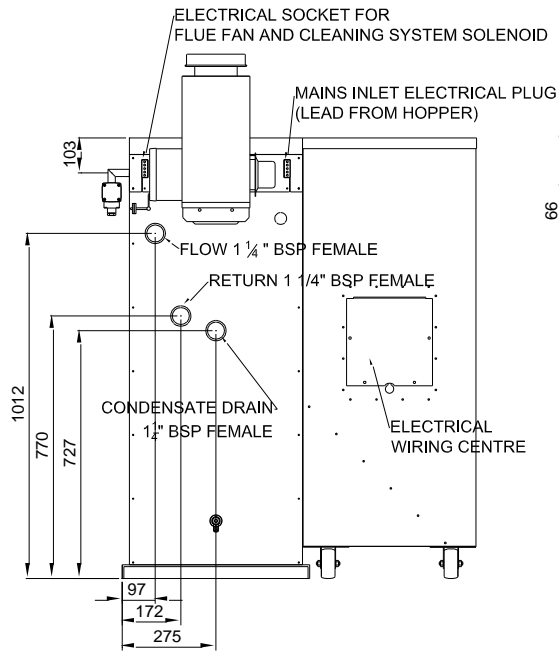
SIDE VIEW - BOILER & HOPPER

HOPPER POSITIONED ON LEFT SIDE OF BOILER ONLY

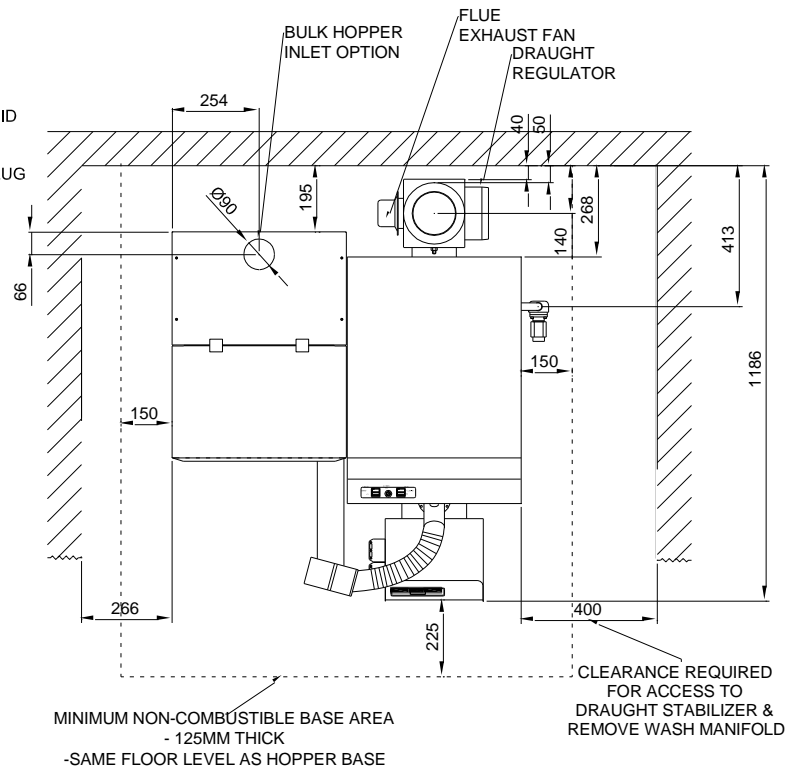
CONDENSING UNIT WASH SYSTEM (15MM COMPRESSION MAINS)



FRONT VIEW - BOILER & HOPPER



REAR VIEW - BOILER & HOPPER



PLAN VIEW - BOILER & HOPPER

Fig 2.2

3. Pellet Specification, Storage & Delivery

3.1 Pellet specification.

This Grant SPIRA boiler is designed to run on wood pellets that meet the following criteria;

Key Parameter	Limits	Category as per prCEN/TS 14961:2004
Diameter	6mm	D06,
Average length	$L \leq 5 \times \text{diameter}$	
Maximum length	40mm	
Moisture Content	<10%	S0.05
Mechanical durability	$\geq 97.5\%$	DU 97.5
Amount of fines	<1.0%	F1.0
Additives	None	
Nitrogen	$\leq 0.3\%$	N0.3
Nett calorific value	Ca. 4.8 to 5.2 kWh/kg	
Bulk density	Ca 650 kg/m ³	
Chlorine	$\leq 0.03\%$	CL 0.03

Additives;	Additives are used to improve the stability of the pellets. If manufactured correctly, and of a sufficiently low moisture content, quality pellets will require no additives.
Ash;	Ash represents the non-combustible content of the pellet. Higher ash content reduces the calorific value of the pellet and requires the appliance to be cleaned more frequently.
Average length:	To provide a predictable flow of fuel into the burner, the recommended length of a pellet is deemed greater than 5mm and less than 5 times the diameter.
Bulk density;	Bulk density is the ratio between the weight of the pellet and the amount of space they take up. A good quality pellet will have a density of 650 kg/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 6 only.
Fines	Pellets are made from compressed wood. As pellets rub together they can break down slightly, producing dust or fines. Too many fines indicate a poor quality pellet and can impede pellet flow in addition to causing dust problems when delivering and storing the pellets.
Mechanical Durability	This is a measure of how stable the pellet is and how likely it is to produce fines from normal handling. A high durability percentage is an indicator of a good quality pellet.
Moisture content	Moisture affects the calorific value of the pellet. Low moisture content guarantees constant and predictable combustion efficiency. Higher moisture contents can result in pellet breakdown.
Net Calorific Value	This is the useful energy contained in a kilogram of fuel. This value is affected by the amount of non-combustible materials (ash) and the moisture content of the pellet. Typical values range from 4.8 kWh/kg to 5.2 kWh/kg.
Nitrogen	High levels of nitrogen in the flue gases emissions can give rise to corrosion.
Sulphur	High levels of sulphur in the flue gases emissions can give rise to corrosion.

3.2 Pellet Storage

3.2.1 Intermediate Hopper & Pellet Feed Auger. The appliance is supplied with an intermediate hopper and a 1.2 metre pellet feed auger to deliver the pellets from the hopper to the boiler. The intermediate hopper should only be fitted on the left-hand side of the boiler. Once commissioned the angle of the intermediate pellet feed auger should not be adjusted in any way as this will vary the input to the boiler. The intermediate hopper and pellet feed auger together with the boiler should be installed in an indoor area and should be protected from dampness. Both the boiler and the intermediate hopper should be situated on the same level. The intermediate hopper also has a system to control the pellet feed auger from a bulk hopper. See figure 7.4. The top rear panel of the intermediate hopper has a knock-out to allow the pellet delivery hose from the bulk hopper auger to enter the hopper.



Fig. 3.1

3.2.2 Bulk Hopper. It is advisable to fit a bulk hopper storage unit to take advantage of the lower cost of bulk pellets.



The boiler can be fed directly from a bulk storage unit. If a bulk storage unit is used directly, careful attention is needed during commissioning as the angle and speed of the pellet feed auger motor will determine the amount of pellets delivered to the boiler. Contact Grant Engineering for further details.

The use of an intermediate hopper between the bulk hopper and the boiler is advisable as any problems with a bulk pellet quality can be isolated and the intermediate hopper can be used as the main input to the boiler.

Only use a bulk storage unit that is

- (a) Specifically designed to store wood pellets
- (b) Is waterproof.
- (c) Vented
- (d) Supplied with appropriate connections for delivery which are within the drivers reach.
- (e) Is electrically earthed.

The length of the pellet feed auger used to feed pellets from the bulk hopper should be limited to a maximum of 3 meters in length, as any longer can damage the pellets.

The use of a self constructed wood pellet storage facility should be preapproved by the fuel supplier before any pellets are delivered and should meet relevant building and fire regulations.

The ONORM M7137 standard should be used as a guideline for DIY bulk storage units.

A storage unit should not be positioned where it would result in a fire risk.



Bulk hopper feeding intermediate hopper.

Fig. 3.2



Each bulk pellet manufacturer has clear guidelines on the requirements of a bulk storage hopper used to store their pellets together with requirements on positioning, access, and minimum deliveries. Check with the pellet supplier/manufacturer you wish to use before installing a bulk hopper system.

4 Installation Information

4.1 Introduction

The appliance comes complete on one pallet, this consists of the boiler, burner, intermediate hopper (fitted with pellet feed auger) and combined fan box & flue starter (complete with exhaust fan and draught stabilizer packed inside the boiler). Check the packing list (supplied in the boiler) to ensure all items were delivered.

The Grant SPIRA condensing wood pellet flue system comes separately and its configuration will depend on the installation requirements.

4.2 Boiler Location

The boiler must be installed in a damp free environment. Refer to section 2.4 for boiler and hopper clearances. These clearances are to allow for access during servicing. Also if fitting a bulk hopper system refer to section 3.2.2 as the location of the bulk hopper can influence the boiler location.

4.3 Regulations to comply with

Installation of a Grant wood pellet boiler and hopper must be in accordance the following recommendations;-

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

The installation should also be in accordance with the latest edition of the following standard codes of Practice;

- BS 715 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 Code of Practice for treatment of water in heating systems.
- BS 7671 Requirements for electrical installations, IEE wiring regulations.

The ONORM M7137 standard should be used as a guideline for DIY bulk storage units.

4.4 Preparation for installation

With the units on the pallet, remove all outer packaging from the units.

Open the boiler front cleaning door and remove the ash-pan and all items from the combustion chamber.

Remove the packing list and check all items are present.

Fit the ash-pan in place in the combustion chamber and close the front cleaning door.

4.5 Installing the boiler

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

4.6 Make the water connections

Flow and return connections: The flow and return connection are as follows;

SPIRA 6-26 = Flow 1" BSP Female
Return 1" BSP Female
SPIRA 9-36 = Flow 1" ¼ BSP Female
Return 1" ¼ BSP Female

All flow and return connections are at the rear of the boiler, refer to section 2.4 for dimensions.

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 pressure concerned. Pipe must be class S to BS 7291:Part 1: 2001

The system should 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 your stockist. Part no. MPCBS 62.

Underfloor systems – 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.

Pipework connections

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

Condensate Connection;

Refer to section 5 for details on condensate connections and disposals.

Wash system manifold;

The boiler is supplied with a cleaning manifold system to wash the condensing unit of any ash build up in the tubes. The cleaning system manifold assembly comes complete with wash pipe, solenoid valve, flexible hose, isolating valve and pressure gauge. A 15mm (1/2") compression connection is needed to supply mains water to this pipe. A minimum running pressure of 0.8 to 1.0 bar pressure is required to maintain an adequate supply for cleaning purposes. The wash system manifold has to be fitted from the right-hand side of the boiler. Ensure adequate clearance (400mm) for

removal of the system during servicing. Refer to section 2.4 for clearance dimensions.



If using plastic piping for the heating system consult with the manufacturer of the pipe before use on how best to protect the piping from overheating.

If you then choose to use plastic piping after advice from the pipe manufacture, fit a minimum of one meter of copper on the flow and return from the boiler, do not connect plastic piping directly to the boiler. Grant Engineering do not accept any responsibility for any damage, how so ever caused, to plastic piping or fittings.

4.7 Combined fan box & flue starter

Fit the combined fan box & flue starter to the flue outlet of the boiler using the M8 nuts and washers supplied. Ensure there is an adequate seal between the unit and the boiler. Fit the solenoid head (fitted to the lead from the fan box) to the solenoid valve on the wash system manifold just fitted. Fit the plug from the flue fan /solenoid to the socket into the rear of the boiler as shown in figure 4.1.

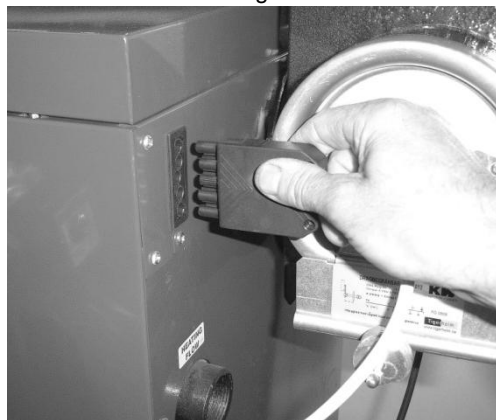


Fig 4.1

4.8 Burner

Fit the burner to the front of the boiler door using the two M8 nuts that come fitted to the boiler. Ensure the burner gasket makes an adequate seal with the boiler. Fit the seven pin plug and socket into the side of the burner.

4.9 Intermediate hopper

Position the intermediate hopper on a firm level surface on the left-hand side of the boiler with the top access door facing

forwards as per the dimensions shown in section 2.4. Failure to adhere to these measurements can cause blockage of the pellets in the pellet delivery hose or can prevent access for servicing at a later date. The hopper is supplied with castor wheels which allows the hopper be moved during servicing. Once in the correct position engage the brakes on the front casters to main this position.

4.10 Pellet feed Auger

The intermediate auger comes fitted to the Intermediate hopper. Fit the pellet delivery hose onto the pellet feed auger and the opposite end onto the burner feed tube. (The pellet delivery hose may need to be cut if too long). A lubricant such as Vaseline may be required to ensure the pellet delivery hose is easily fitted. Ensure the pellet delivery hose is not kinked in any way. Plug the 6 way plug from the pellet feed auger into the 6 way socket on side of the burner as shown in Fig 4.2.

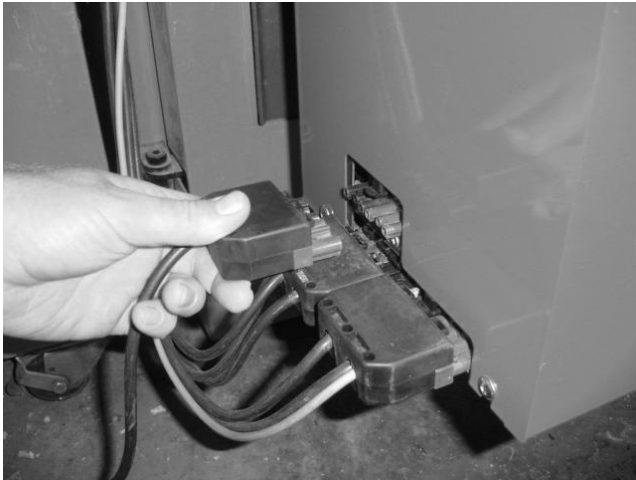


Fig 4.2



Ensure the pellet delivery hose forms an air tight seal each end and that the pellet delivery hose is not damage. Leakage of air could cause increased temperature in the pellet delivery hose and result in the 'SAFETY CHARGE PIPE THERMOSTAT' shutting down the burner.

5 Condensate Disposal

5.1 General Requirements

When in condensing mode the Grant SPIRA condensing wood pellet boilers produce condensate from the water vapour in the flue gases and the fuel. 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 should be disposed of using an internal 4" gulley connected to a foul water system or alternatively or into a purpose built high capacity soakway.

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

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

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

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

5.3 Pipework



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



Condensate disposal pipework must be plastic.

Copper or steel pipe is **not** suitable and **must not** be used.

Condensate disposal pipes should have a minimum 'nominal' diameter of 38mm (1 1/2") plastic pipe.

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



Where it is not possible for the pipe to fall towards the point of discharge –either internally into a waste system or externally to a gulley (e.g. for boilers installed in a basement), it will be necessary to use a condensate pump. When fitting a condensate pump, a condensate holding tank of at least 40 litres is required. This is to ensure that when the boiler cleaning cycle has operated the holding tank can collect the total volume of the water used in the wash down and the condensate pump can then discharge the waste effectively. A boiler interlock should be fitted to shut off the boiler in the event of a malfunction of the condensate pump.



When using a condensate pump and condensate holding tank, the burner settings for 'T18' / 'TIME CLEAN PERIOD' (time boiler cleaning in operation) must not be set greater than 600 (60 seconds) and the 'T17' / 'TIME CLEAN BOILER' (time between boiler cleaning operations) must not be set less than 240 minutes, as modifying these times could result in larger and more frequent wash down of the boiler which could exceed the capabilities of the tank and condensate pump.

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.

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 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.



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

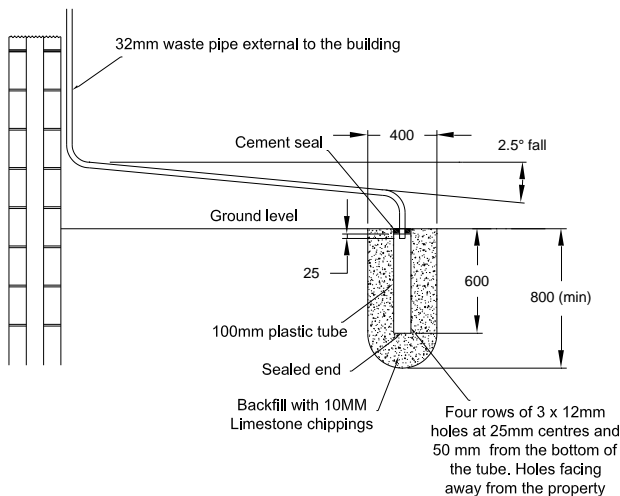
5.5 Condensate Soakway

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

The condensate pipe may be run above or below ground level and can enter either the top or side of the soakway tube. Refer to figure 6.1

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

Backfill the soakway tube and the hole around it with 10mm limestone chippings. Only use a soakway where the soil is porous and drains easily.



PURPOSE MADE CONDENSATE SOAKWAY

Fig 5.1

5.6 Condensate Trap

Grant SPIRA condensing boilers are supplied with a 1 1/4" G.B female condensate connection on the rear of the boiler. Fit the 1 1/4" 311 fitting and pipework supplied into this connection on the boiler and fit the pipework and trap as

shown in fig. 5.2. A condensate discharge pipe with a minimum diameter of 38mm is required to be fitted to the connection at the base of the trap.

If connecting the condensate discharge pipe into rainwater hopper external drain or gully the overflow pipe should be left fitted to the trap and the end left open. This is added frost protection in the unlikely event that the discharge pipe from the trap freezes.

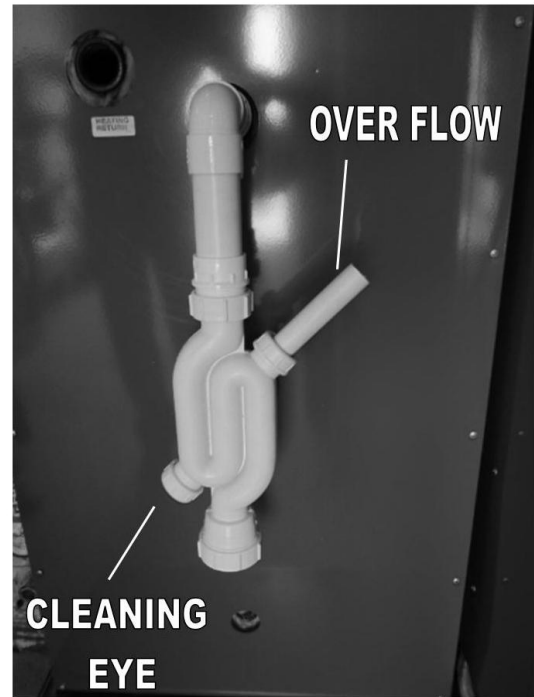


Fig 5.2

If connecting the condensate discharge internally –into a waste system or soil stack –the overflow pipe should be removed and replaced with the red plug (supplied loose).

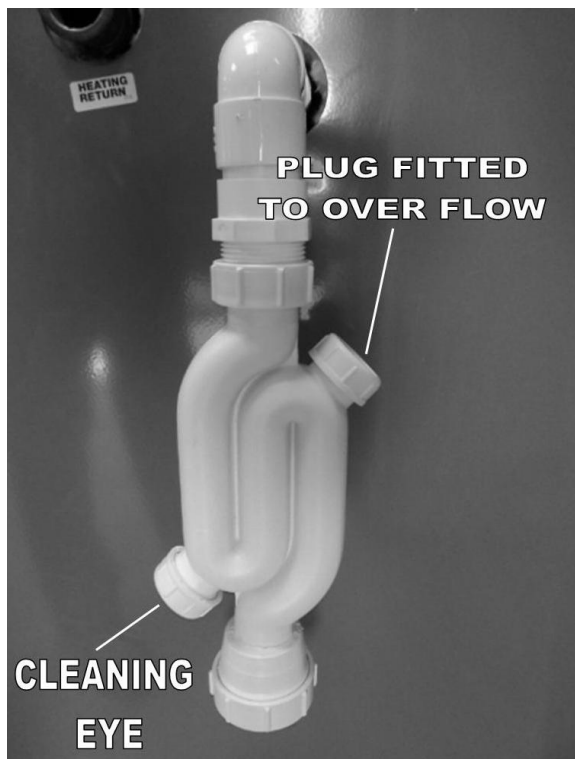


Fig 5.3

5.7 Inspection and Cleaning of Trap

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



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

6 Flue system and Air Supply



The only flue system suitable for the Grant SPIRA Wood pellet boiler is the Grant 'Black' insulated conventional flue system.

This 125mm 5" 'Black' flue system is suitable for both models 6-26 & 9-36. The use of a masonry chimney is not permitted due to the condensate produced from the boiler.

6.1 Air supply

The Grant wood pellet boiler draws air from the room in which the boiler is located. A sufficient permanent air supply to the boiler should be provided;

- For proper combustion of fuel and effective discharge of combustion products to the open air.
 - To supply enough free air to the draught stabilizer.
- A permanent air vent with a total free area of 550 mm² per kW shall be provided for combustion along with 300 mm² per kW to supply free air to the draught stabilizer. To achieve this, the following is the vent opening requirements.

Boiler model	Vent opening
Grant SPIRA 6-26 Wood pellet	221 cm ² (35 in ²)
Grant SPIRA 9-36 Wood pellet	306 cm ² (48 in ²)

If a bulk hopper is fitted internally refer to the manufacturer instructions for ventilation requirements.

6.2 Flue position and clearances

The Grant wood pellet boilers have high operating efficiencies and low flue gas temperature. Care should be taken to ensure that only the 'Black' system is used, as this is the only flue system suitable for the range of Grant wood pellet boilers.

- The boiler flue cannot terminate into an existing brick or clay lined chimney.
- The flue must terminate as per the details shown in Fig. 6-1.
- The flue must also discharge in a down draught free area, i.e. at least 1 metre above the point of exit through the roof or 600mm above the apex of the roof. See fig 6.1 for further details.
- No other appliance can be connected to the flue.
- Clearances to combustibles must be at least 75mm.

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

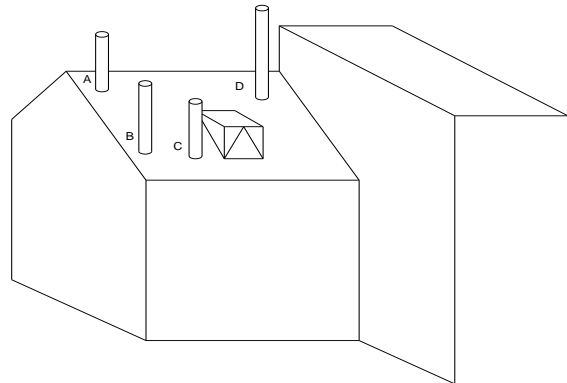


Fig 6.1

Point where flue passes through weather surface (Note 1,2)		Clearance 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 building, whether or not beyond the boundary (Note 3)	At least 600mm above the adjacent building.
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.		

Clearances recommended by Grant Engineering Limited in accordance with British Standards and Building Regulations. Also refer to section J of either the England and Wales or Irish building regulations for comprehensive details on flue systems.

6.3 Flue components & assembly

6.3.1 Combined fan box & flue starter. The boiler is supplied with a combined fan box & flue starter connector that comes packed inside the boiler combustion chamber. The unit comes complete with exhaust flue fan, draught stabilizer and a connection to take the Grant 'Black' flue system. The draught stabilizer must not be boxed or obstructed from operation in any way. Also fitted is a clean out hatch to allow removal of any ash that may have dropped down the flue system. The clean-out hatch should be fully closed during normal operation. See section 10 servicing.

The flue connector is fitted with a neoprene gasket for connection to the boiler. The neoprene gasket is to accommodate a low temperature wet flue system that is achieved on the condensing boiler. The attached wiring harness is for flue fan along with the connection for the wash system manifold.

When fitting the flue system to the boiler the gasket seals supplied **must** be fitted to the flue inner liner at every joint.

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

6.3.2 Flue System. The 'Black' flue system is a twin wall fully insulated flue which reduces the possibility of freezing in the flue on condensing boilers. The flue also has a high corrosion resistance suitable for solid fuel.



No horizontal section should be used or no elbow greater than 45° should be used as these can cause a build up of ash and condensate in the flue. Also all flue joints must have a seal fitted on each joint of the inner liner.



Failure to maintain a clean flue can result in the emission of flue gases into the dwelling or damage from fire in the flue. See section 10.3 Cleaning the Boiler & Flue

6.3.3 Joining components. The joint is locked by rotating the upper section clockwise. To secure the joint, the locking band supplied with the female end of all components must be used. To allow alignment, there are no locating flutes on the female section of the elbow. For this reason these joints **MUST** be secured using the locking band. All flue joints must have a lip seal gasket fitted on the bead of the

projecting liner spigot of every joint. The lip seal should be fitted dry and lubrication applied to the internal of the socket into which it is to be assembled.

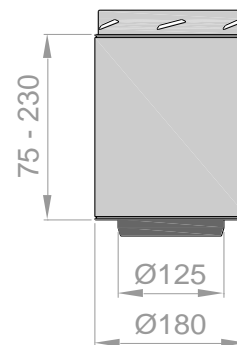
6.3.4 Adjustable length. An adjustable flue length allows adjustment from 75mm up to 250mm. Assembly is achieved by fitting the adjustable length over the proceeding pipe. Remove insulation as necessary and secure when desired length is achieved using joint band supplied. The adjustable section is not load-bearing, therefore adequate support must be provided immediately above.

6.3.5 Support components. The weight of a chimney system is considerable and requires independent support. No weight should be taken by the appliance. On internal systems the weight is held by using a support plate and clamp fixed on top of the first floor/ceiling joist. A fire-stop plate is also required fixed to the ceiling below. In a normal house, when passing through the second floor the only requirements is two fire-stop plates because the system is adequately supported at first floor level.

Wall brackets and roof brackets are not load bearing and give lateral support only. Wall brackets should be fitted every 3m and at any offset to ensure the system is rigidly supported.

Where the flue is free standing above the roof and its height exceeds 1.5m beyond the last support or the roof a guy wire bracket must be used and every 1.5m thereafter.

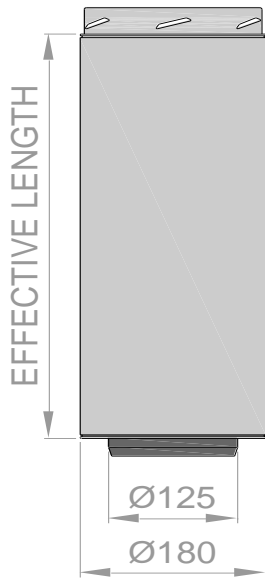
Alternatively a height of up to 4m can be achieved unsupported with the use of an extended locking band at the joint immediately below every joint above the roof.



Adjustable Pipe 75 - 250mm-
Part no. WP/ADJ250

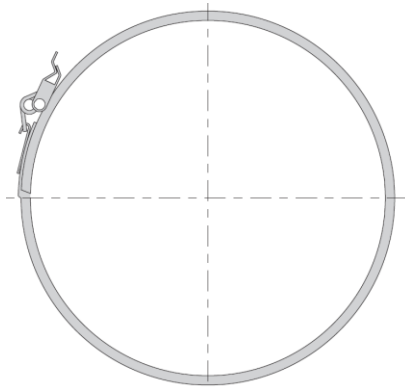
Internal diameter 125mm. External diameter 180mm

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



Straight Pipe
DN21009

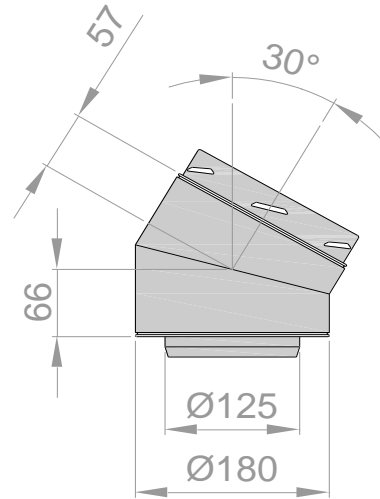
Nominal Length	Effective Length	Code Number
XXX	XXX	WP/EXT1XXX
1000	960	WP/EXT1000
500	460	WP/EXT500
333	293	WP/EXT333
200	160	WP/EXT200
Internal diameter 125mm. External diameter 180mm		



Locking band
Part no. WP01

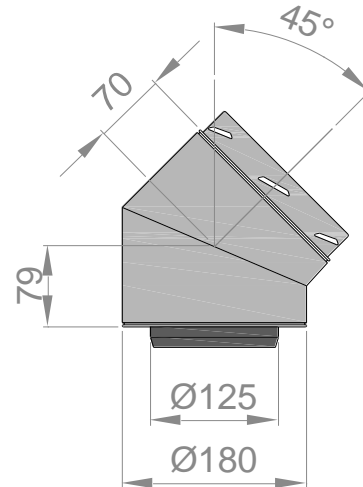
Internal diameter 125mm. External diameter 180mm

This item is supplied with pipes, bends, tees and terminals



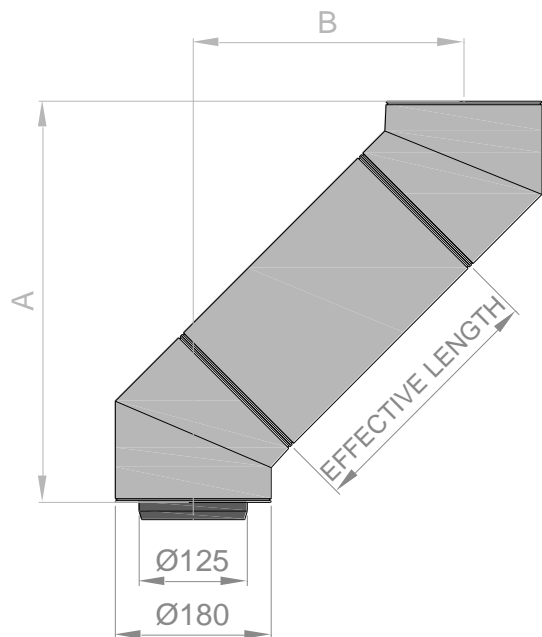
30° Bend
Part no. WP/30

Internal diameter 125mm. External diameter 180mm



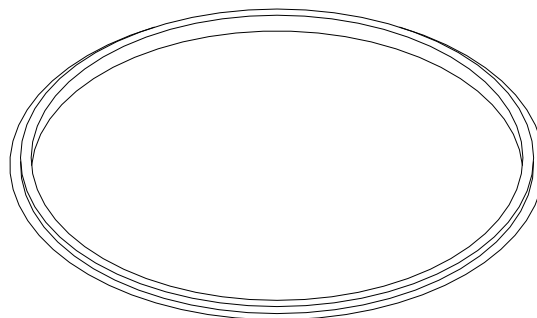
45° Bend
Part no. WP/45

Internal diameter 125mm. External diameter 180mm



Double 30° Bend and straight pipe length

XXX Eff pipe	A	XXX
	B	XXX
960 Eff pipe	A	1061
	B	542
460 Eff pipe	A	628
	B	292
293 Eff pipe	A	483
	B	208
160 Eff pipe	A	368
	B	142



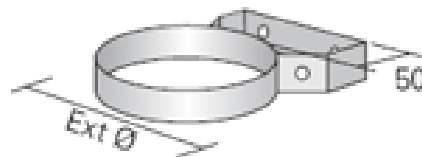
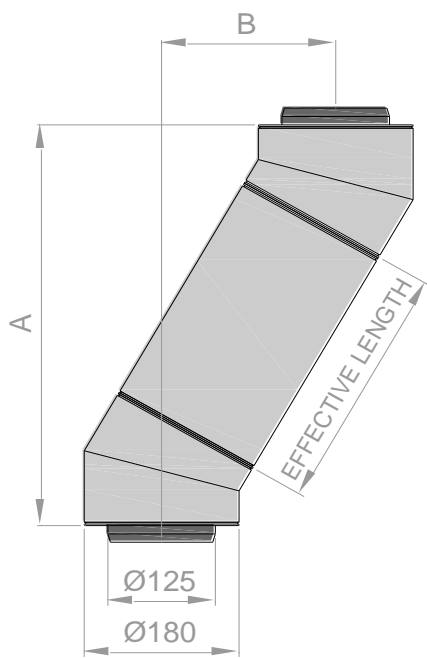
Double 45° Bend and straight pipe length

xxx Eff pipe	A	XXX
	B	XXX
960 Eff pipe	A	933
	B	784
460 Eff pipe	A	580
	B	431
293 Eff pipe	A	462
	B	313

Viton Seal

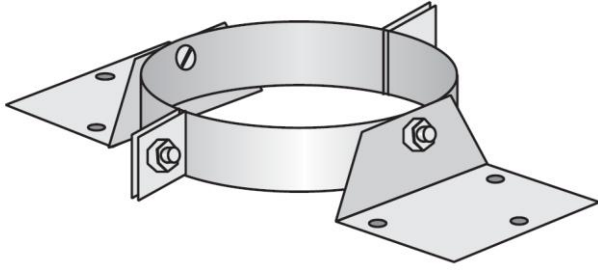
Part no. WP02

Internal diameter 125mm.



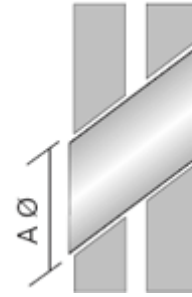
ø125mm Wall Band (50mm)
Internal/external Code WP/WB50

External diameter 180mm.



Roof Support
Code WP/RS

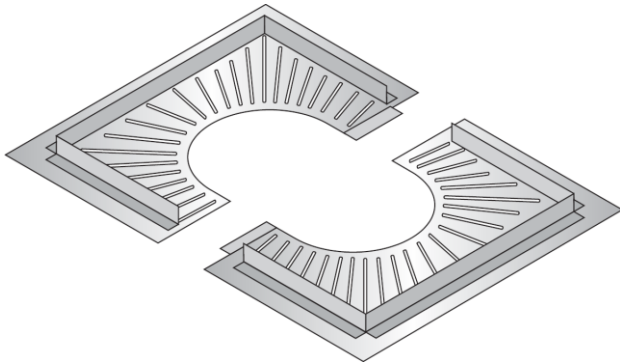
External diameter 180mm.



Wall sleeve Code WP/SP

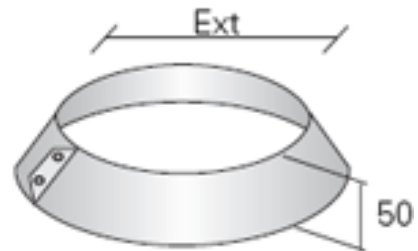
This component must be used where the chimney is passing through an external wall. It is supplied 400mm long to enable it to be cut to the necessary length on site

External diameter 180mm.



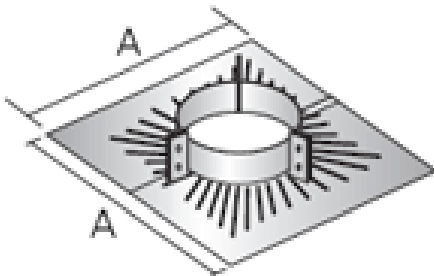
Fire stop plate
Code WP/FP

External diameter 180mm.



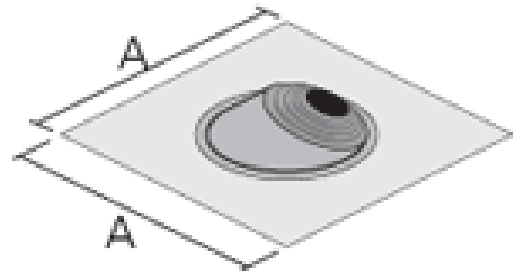
Storm collar Code WP/SC

Diameter 180mm.



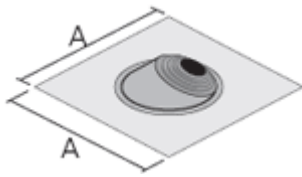
Support plate
Code WP/SP

Diameter 180mm.



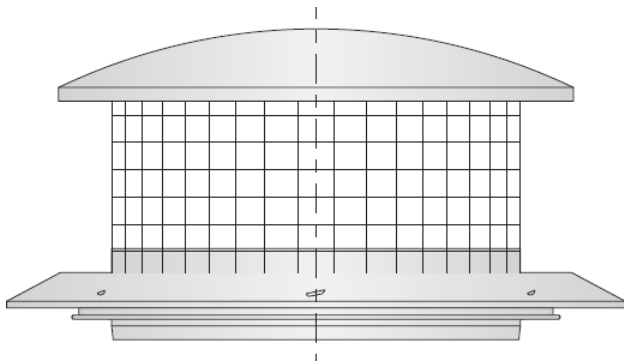
Angled Uniflash Code WP/UF200

Diameter 180mm.



Straight Uniflash

Diameter 180mm.

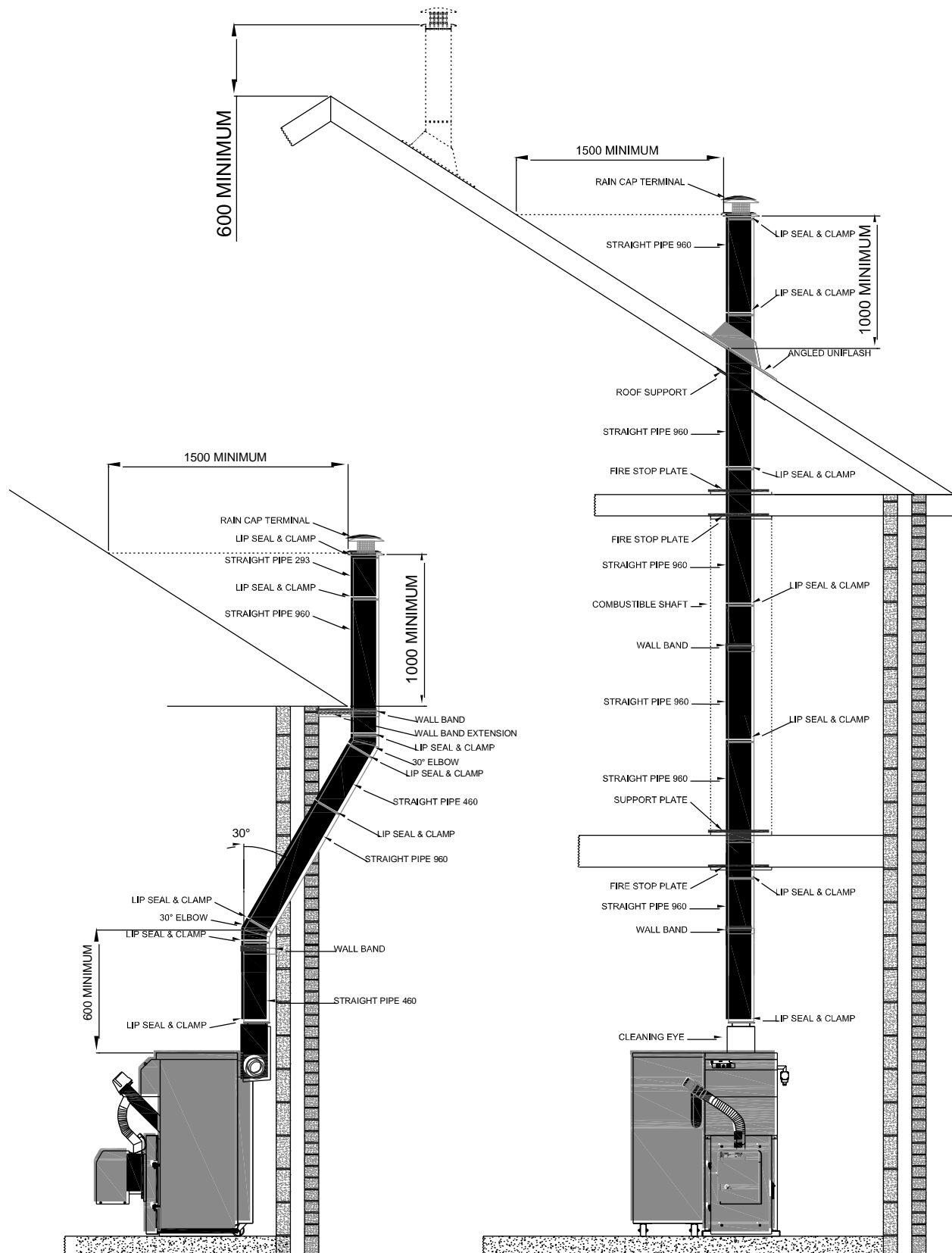


Rain cap terminal Code WP/RC

Diameter 180mm.

6.3 Flue notice plate

The building regulations Part J requires a notice plate to be displayed that conveys essential information regarding the flue installed. A suitable self adhesive notice plate is supplied with the Grant Black flue system and must be displayed in an unobtrusive but obvious position within the building concerned, e.g. next to the flue system/appliance.



6.2 Typical flue installations details.

7 Electrical

The Grant Spira Condensing Wood Pellet boiler requires a 230 V ~50 Hz supply.

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

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

Refer to figure 7.1 to 7.4 for wiring diagrams.



The Grant wood pellet boiler and intermediate hopper contains electrical switching equipment and must be earthed; also any bulk hopper system fitted should also be earthed.

The electrical supply to the appliance and bulk hopper (if fitted) must only have one common three pole isolator, providing complete electrical isolation for the permanent live, switched live and neutral.

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

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

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

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

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

The Grant hopper has the facility to wire in an indicator lamp (not supplied), this is to indicate to the householder that the pellets in the hopper have reached its minimum level and the hopper needs to be topped up. The indicator lamp should be positioned so it can be easily viewed by the householder. See figure 7.3

If fitting a bulk hopper then the Grant hopper can control the feed auger from the bulk hopper to the Grant hopper. When using a bulk hopper to supply the Grant hopper then a low pellet indicator lamp can not be fitted to the Grant hopper. See figure 7.4

7.1 Connecting the power supply

The boiler requires a permanent mains supply and a switched live supply to control the boiler. Do not interrupt the permanent supply with any external controls. Refer to figure 7.3 and 7.4 to determine the number of cores required for the cable supply and for typical control system wiring diagrams.



Before making any electrical connections to the hopper ensure the following;

- a. The flue fan / solenoid plug is fitted to the rear panel of the boiler.
- b. The 7 pin plug and 7 pin socket is fitted to the left-hand side of the burner.
- c. The pellet feed auger plug is fitted to the side of the burner.

The procedure for connecting the mains supply is as follows;

1. Remove the four screws on the rear of the Grant hopper to gain access to the wiring centre.

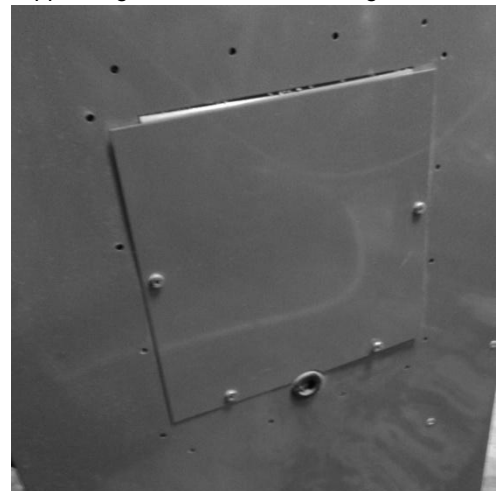


Fig 7.1

2. Remove the cable lead and socket from the hopper wiring centre and insert the socket into plug located on the top left-hand side of the boiler rear panel

(when viewed from the front). Ensure the cable is routed so as to prevent damage.



Fig 7.2

3. Make the electrical connection to suit either of the following.
 - Grant hopper only and low pellet indicator lamp see figure 7.3.
 - Grant hopper supplied by bulk hopper system see figure 7.4.



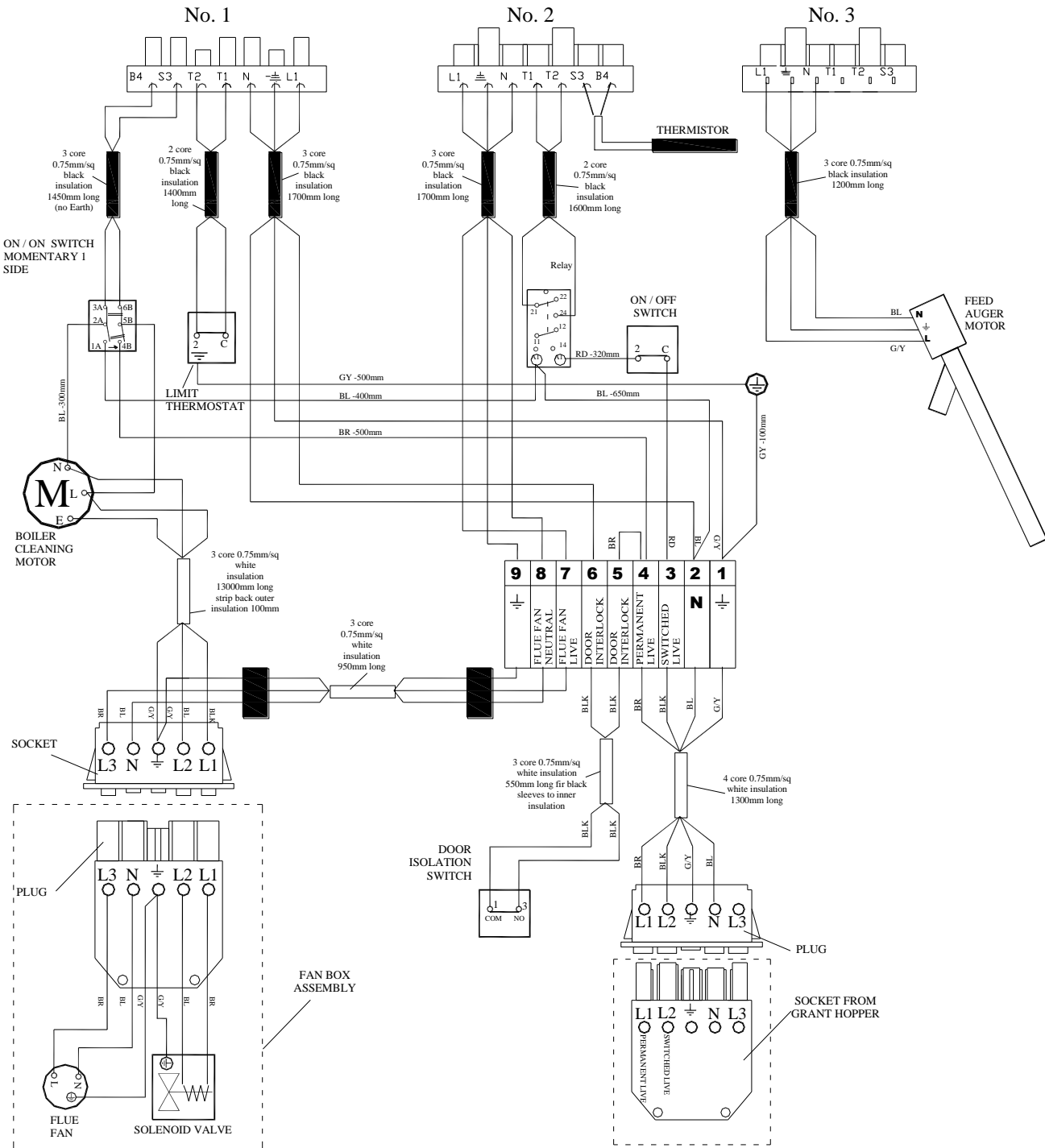
The electrical supply to the bulk feed auger will need a mains isolator to isolate the auger when the hopper is empty of pellets.

4. Secure all cables fitted in the cable clamp and refit the panel cover.

7.2 Frost protection

For additional protection of either the entire heating system, or the boiler and localised pipework, it is recommended that a frost thermostat be installed; it is also recommended that it be used in conjunction with a pipe thermostat to avoid unnecessary and wasteful overheating of the property. The pipe thermostat should be located on the boiler return pipe, and set to operate at 25°C. Refer to fig 7.5 & 7.6 for connection details.

GRANT WOOD PELLET 6-26 & 9-36 BOILER WIRING DIAGRAM



Colour code: BR - Brown, BL - Blue, RD - Red, G/Y - Green/Yellow, BLK-Black, OR - Orange, Y - Yellow

Fig 7.3

GRANT WOOD PELLET 6-26 & 9-36 BURNER WIRING DIAGRAM

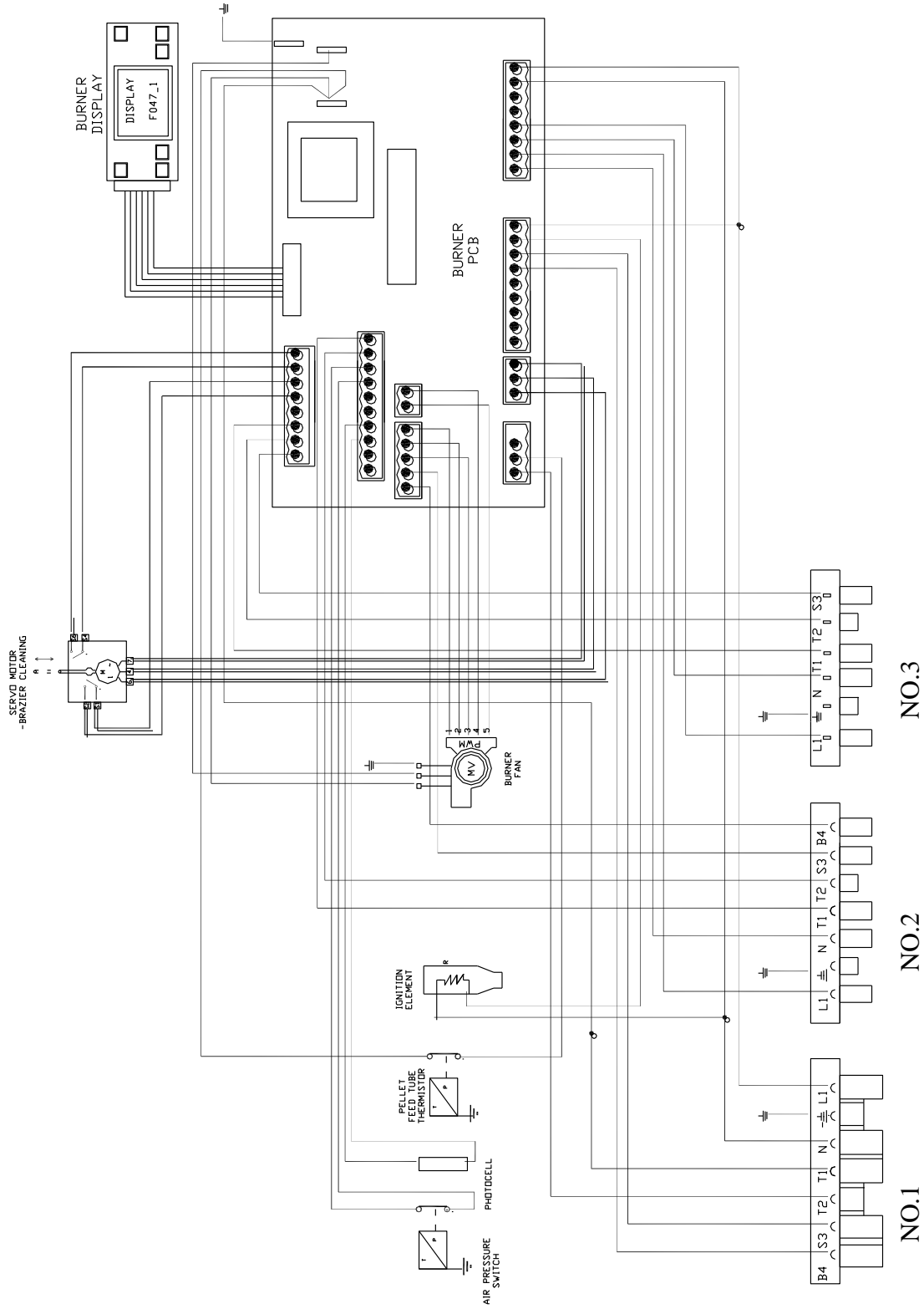


FIGURE 7.4

GRANT WOOD PELLET INTERMEDIATE HOPPER -INSTALLER WIRING OPTIONS

LOW PELLET CUT-OUT WITH WARNING LAMP

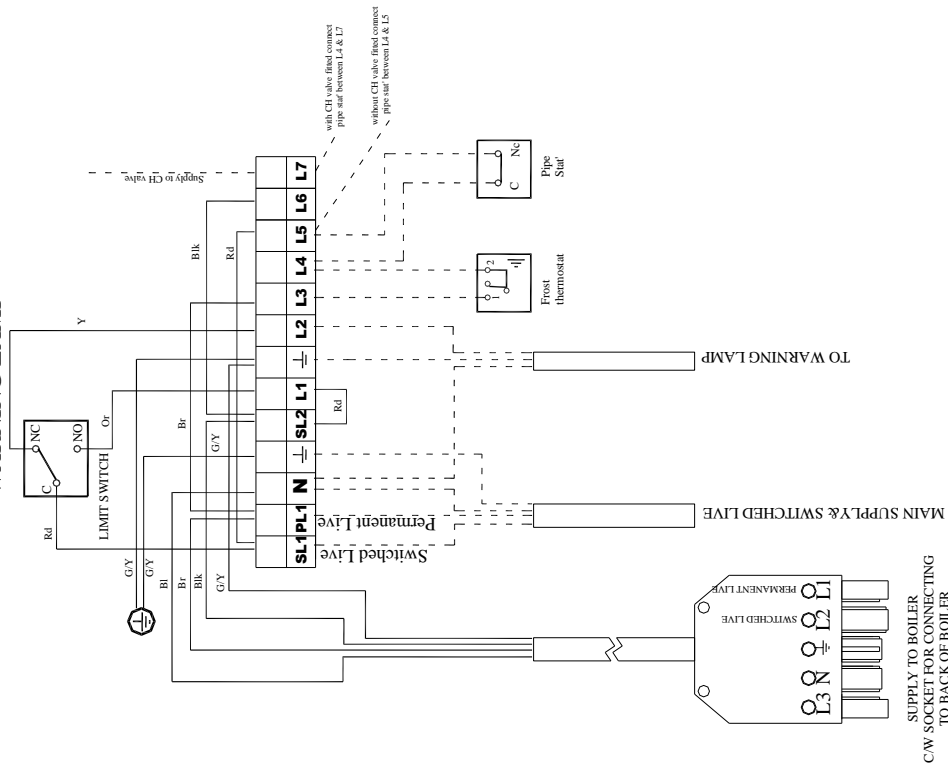


Figure 7.5

BULK HOPPER FEED

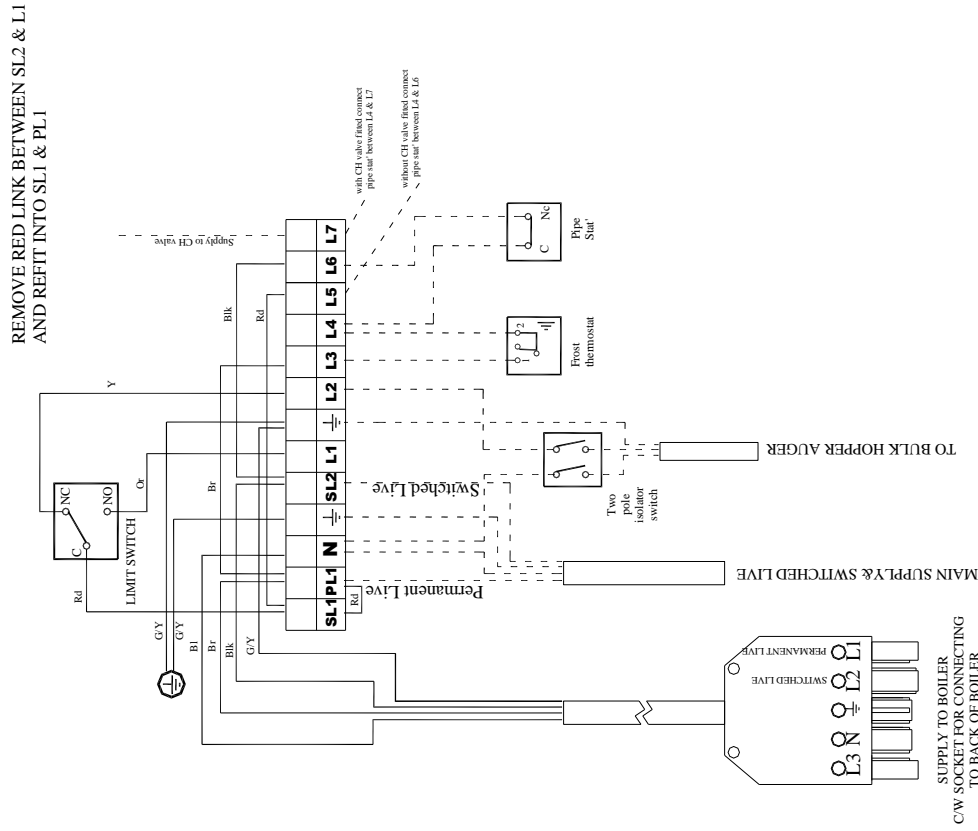


Figure 7.6

----- = INSTALLER WIRING

CONTROL SYSTEM WIRING DIAGRAM
GRANT SPIRA WOOD PELLET BOILER WITH S-PLAN CONTROL SYSTEM

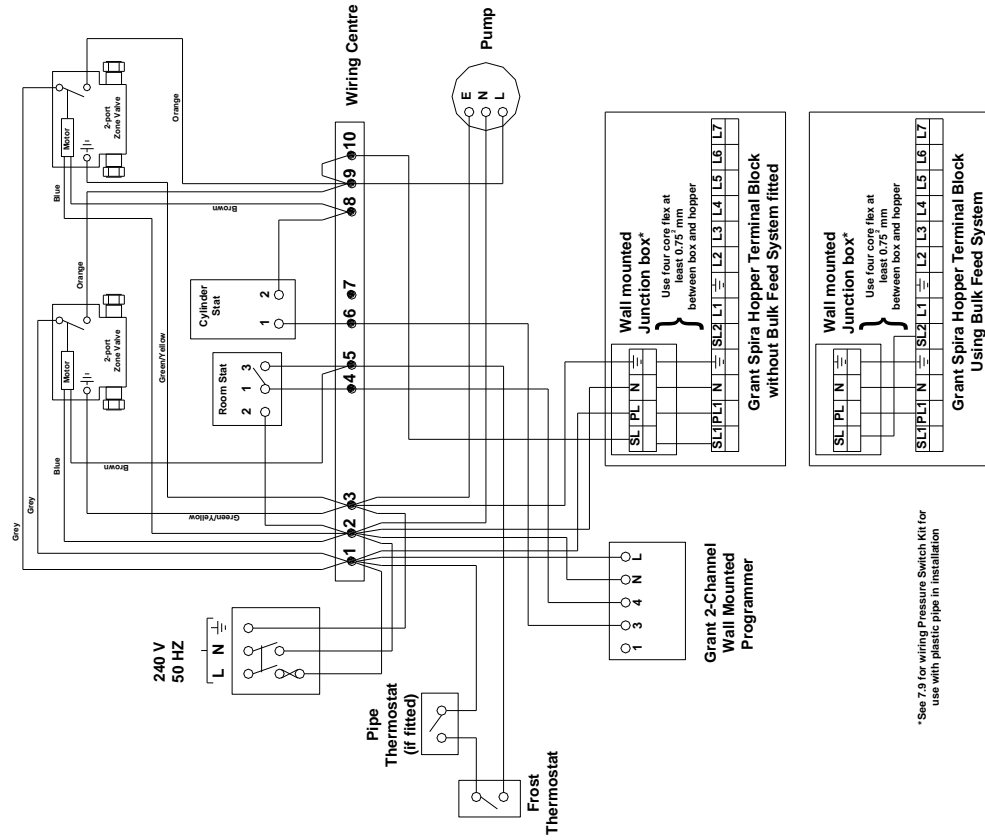


Figure 7.7

CONTROL SYSTEM WIRING DIAGRAM
GRANT SPIRA WOOD PELLET BOILER WITH Y-PLAN CONTROL SYSTEM

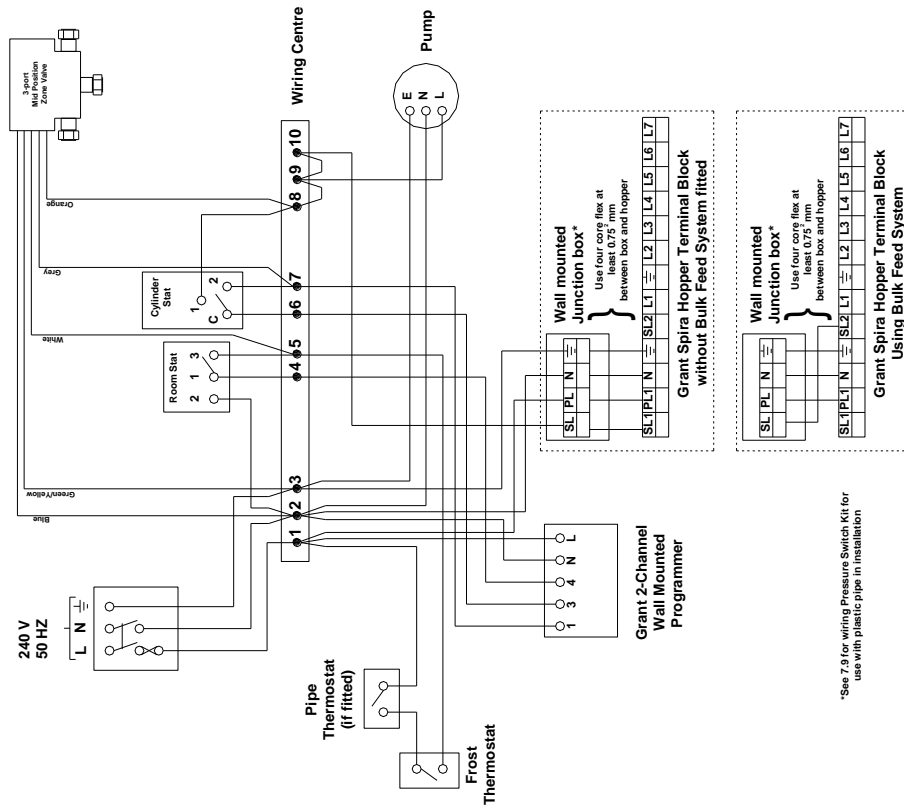


Figure 7.8

**Pressure Switch Kit
Wiring Diagram
Grant Part No. MPCBS62**

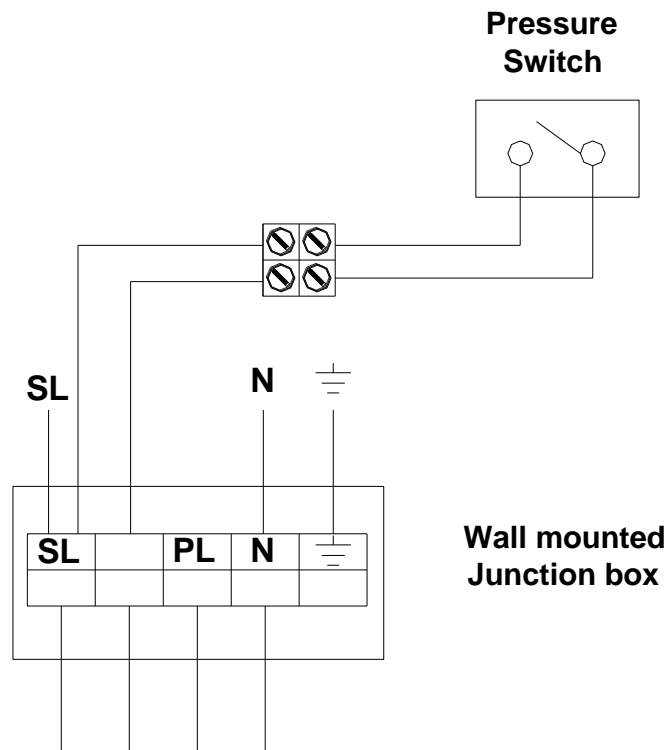


Figure 7.9

8. Burner

8.1 Burner Operation

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

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

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

The boiler has a set point temperature. This is the target flow temperature from the boiler. As the temperature of the boiler increases and reaches the set point less 5°C the output of the boiler is reduced by one step. Each subsequent 1°C increase in boiler temperature reduces the output of the boiler by one modulation step until the temperature reaches the set point plus 5°C. At this point the boiler output is 'MINIMUM FLAME' which is minimum output setting of the boiler. The percentage increase or decrease in power is calculated on the rate of temperature change. The sequence of operation is described in section 8.3.

8.2 Burner Operational Modes

'BOILER WAIT THERMOSTAT'; (operation code 03) Boiler is in standby awaiting a switched live input signal and/or the boiler temperature to drop below the 'DELTA RESTART' temperature. ('DELTA RESTART' is the temperature the burner restarts after maximum temperature has been reached).

'WAIT PRELOAD BRAZIER' (operation code 40) Initial loading of pellets into the brazier to enable combustion to start.

- Activated with a switched live input signal and/or temperature drops below the 'DELTA RESTART' temperature.
- Deactivated after time exceeds 'T08'.

'WAIT LIGHTING' –IGNITION (operation code 41) Period of time given for pellets to light.

- Activated after 'Pre load' operation is complete.
- Deactivated once photocell lux reading exceeds 'FLAME ON' setting.

'WAIT LIGHTING'–FLAME STABILIZATION (operation code 45) Period of time to allow flame stabilize after pellets have ignited.

- Activated after ignition mode.
- Deactivated after time exceeds 'T13'

'WAIT LIGHTING' –LIGHTING FEED REDUCED (operation code 42) Period of time intermittent quantities of pellets supplied to the brazier to increase the flame.

- Activated after -'WAIT LIGHTING' flame stabilization mode.
- Deactivated after time exceeds 'T09'.

'PELLET BURNER FIRING'; Power 100% (operation code 13) Flame is fully developed and boiler is operating on full power.

- Activated after –'WAIT LIGHTING' lighting feed reduced mode
- Deactivated after temperature is within 'TEMP DELTA' range.

'PELLET BURNER FIRING'; Power (modulating) (operation code 13) Flame is reduced and boiler output is modulating.

- Activated once the boiler temperature is within the 'TEMP DALTA' range.
- Deactivated after temperature exceeds the 'TEMP DELTA' range.

'PELLET BURNER FIRING'; Power (minimum) (operation code 13) Flame is reduced and boiler is at its minimum output.

- Activated once the boiler temperature exceeds the 'TEMP DELTA' range.
- Deactivated after the temperature exceeds 'TEMP OFF H2o'.

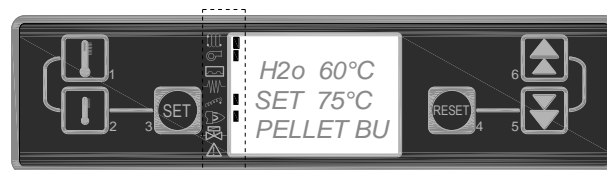
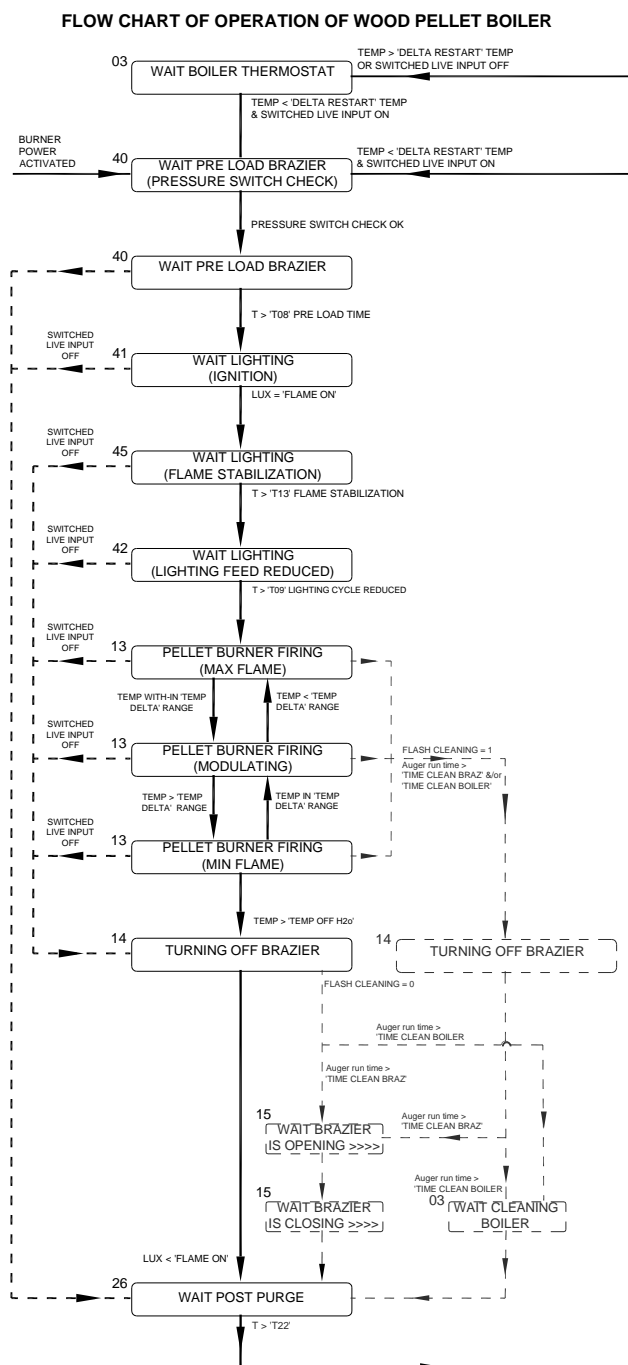
'TURNING OFF BRAZIER'; (Operation code 14). Burn down period to remove any pellets remaining in the brazier.

- Activated once switched live input signal is switched off or the boiler temperature exceeds 'TEMP OFF H2o' setting.
- Deactivated once photocell lux reading has dropped below the 'FLAME ON' setting less.









'WAIT POST PURGE' (operation code 26) Period of time after burn down is complete to ensure no unburnt pellets ignite.

- Activated after 'TURNING OFF BRAZIER' is complete.
- Deactivated after time exceeds 'T22'

8.4 Burner display screen



Active symbols

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

8.5 Burner control buttons

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

Button no. 1



Normal Mode; Increase temperature set point by 1°C
Menu Mode; Scroll up.

Button no. 2



Normal mode; Decrease temperature set point by 1°C
Menu mode; Scroll down.

Button no. 3



Menu mode; Scroll forward.

Button no. 4



Normal mode; Reset fault
Menu mode; Scroll back.

Button no. 5



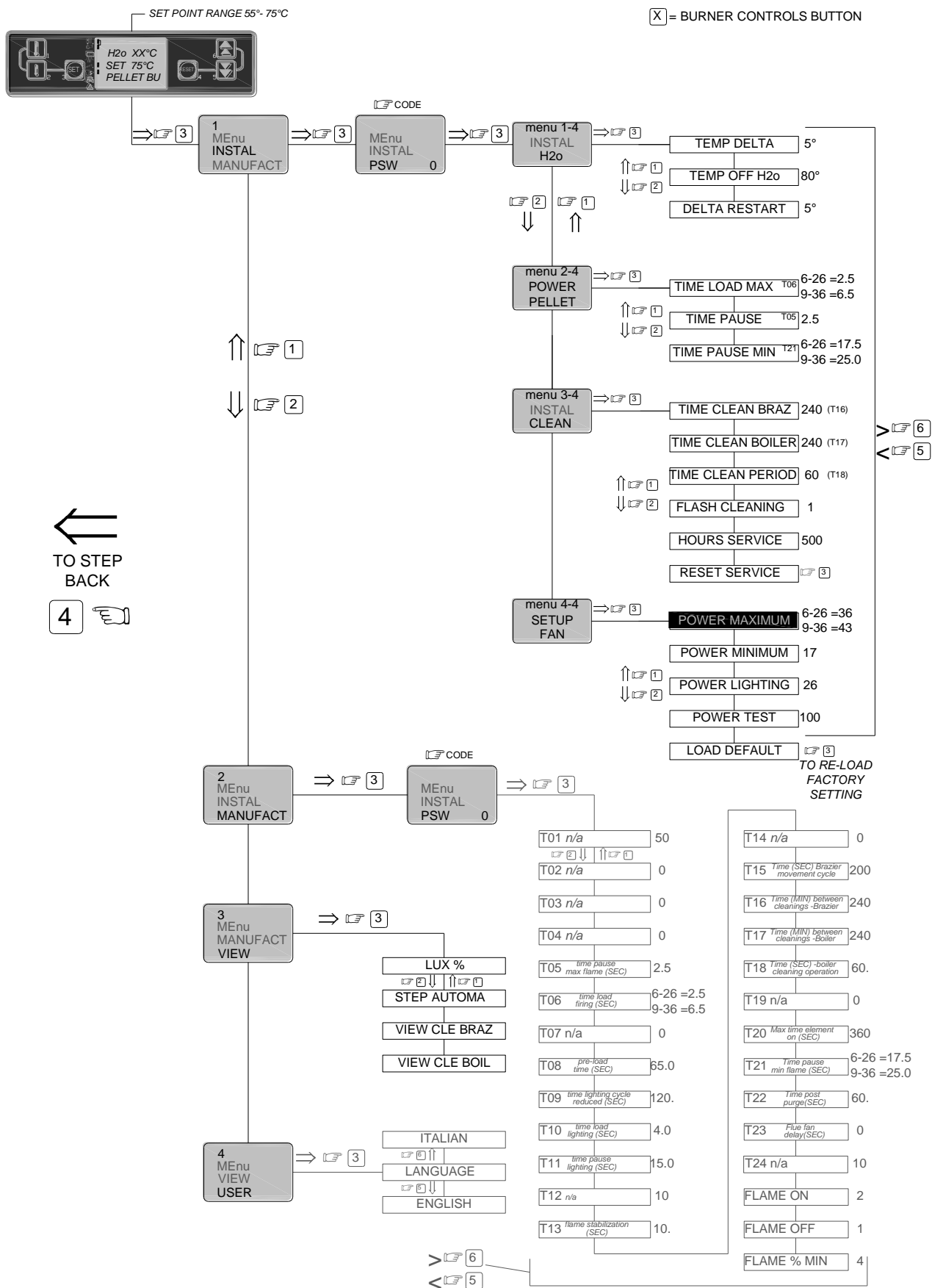
Menu mode; Decrease parameter value

Button no. 6



Menu mode; Increase parameter value.

8.6 Burner menu navigation chart and factory default settings



Using the main menu flow chart shown in fig. 8.6 navigate the menus using the buttons as described in section 8.5.

'INSTAL', Installer folder, see section 8.3.1

'VIEW' folder, see section 8.3.3

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

1
MEnu
INSTAL
MANUFACT

The 'INSTAL' folder has four sub folders;

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

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



- a) TEMP DELTA; Temperature range of modulation each side of set point.
Units -°Celsius.
Default setting 6-26 & 9-36 = 5 (5°C)
- b) TEMP OFF H2o; Temperature the burner' shuts down.
Units -°Celsius.
Default setting 6-26 & 9-36 = 80 (80°C)
- c) DELTA RESTART; Temperature drop below the set-point before burner re-starts.
Units -°Celsius.
Default setting 6-26 & 9-36 = 5 (5°C)



Settings in the burner menu's below are based on the boiler using the Grant fixed angle pellet feed auger at 45° and a motor fixed speed of 8.5 rpm using 6mm 'BNM Premium', 6mm 'Balcas Brites' or 6mm 'Verdo' pellets.

All pellets used must meet ENplus standard EN14961-2 and be free of bark and sand.

For settings on other brand pellets contact Grant.

8.7.1.2 'menu 2-4- POWER PELLET'. The parameters stored within this folder are;

- a) TIME LOAD MAX; Time the pellet feed auger operates to deliver pellets to the brazier when the burner is in max flame mode.
Adjusting this time adjusts the boiler input in max flame, i.e. the larger the load time, the greater the input, alternatively the smaller the load time the lower the input (see table section 2.2.1).
Units 000.0 seconds.
Default setting 6-26 = 25 (2.5 seconds)
Default setting 9-36 = 65 (6.5 seconds)
- b) TIME PAUSE MAX; Time between pellet feed auger operations when the burner is in max flame mode.
Adjusting this time adjusts the boiler input in max flame, i.e. the larger the pause time, the lower the input, alternatively the smaller the pause time the higher the input (see table section 2.2.1).
Units 000.0 seconds.
Default setting 6-26 & 9-36 = 0025 (2.5 seconds)
- c) TIME PAUSE MIN; Time between pellet feed auger operations in min flame. Adjusting this time adjusts the boiler input in min flame, i.e. the larger the pause time, the lower the input, alternatively the smaller the pause time the higher the input (see table section 2.2.1).
Units 000.0 seconds.
Default setting 6-26 = 175 (17.5 seconds)
Default setting 9-36 = 250 (25 seconds)



Adjusting this setting will also result in the input during the modulation period being adjusted as the modulation input is automatically calculated on the max/min & load/pause settings.

8.7.1.3 'menu 3-4- CLEAN'

- a) TIME CLEAN BRAZ; Total pellet feed auger run time before burner brazier cleaning operation activates. (If the burner shuts down immediately or waits for the next shut down is determined by 'FLASH CLEANING' see 8.3.1.3 d.)
Default setting 6-26 & 9-36 = 240. (240 Minutes)
- b) TIME CLEAN BOILER; Total pellet feed auger run time before boiler cleaning operation activates.
Default setting 6-26 & 9-36 = 240. (240 Minutes)
- c) TIME CLEAN PERIOD; Time period boiler cleaning function is operational once 'TIME CLEAN BOILER' has elapsed.
Default setting 6-26 & 9-36 = 60. (60 Seconds)
- d) FLASH CLEANING; Commencement of brazier cleaning.
1 = Interrupt burner firing, shut down and clean brazier when time greater than 'TIME CLEAN BRAZ'.
0 = At next burner shut-down, clean brazier when time greater than 'TIME CLEAN BRAZ'.
Default setting 6-26 & 9-36 = 1
- e) HOURS SERVICE; Time lapse period before the burner screen displays 'SERVICE'. This is to indicate a service is now due.
Default setting 6-26 & 9-36 = 500 (500 hrs)
- f) RESET SERVICE; To cancel the 'SERVICE' display on the burner screen after the boiler has been serviced. Press button 3 ('SET') follow by button 4 ('RESET') five times to exit the menu.

8.7.1.4 'menu 4-4- SETUP FAN'.

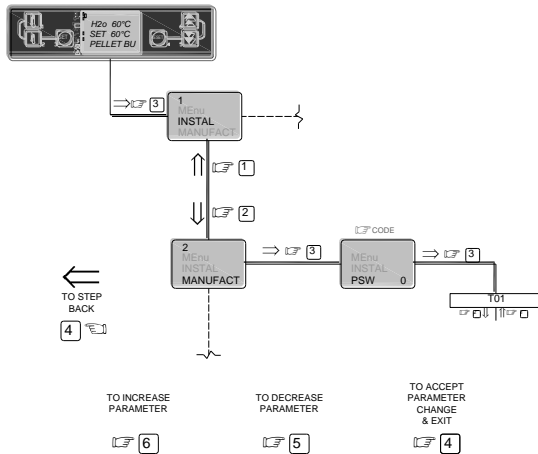
- a) POWER MAXIMUM; Burner fan speed setting when burner in 'max' output mode.
Default setting 6-26 = 36
Default setting 9-36 = 43
- b) POWER MINIMUM; Burner fan speed setting when burner in 'min' output mode.
Default setting 6-26 & 9-36 = 17
- c) POWER LIGHTING; Burner fan speed setting when burner in lighting mode.
Default setting 6-26 & 9-36 = 26
- d) POWER TEST; Used to simulate the burner fan speed for test purposes only. Once the 'POWER TEST' is cancelled from the screen the burner fan reverts to its required operational speed.
- e) LOAD DEFAULT; Load factory default settings.
Press button 3 to activate factory default settings.

8.7.2 'MANUFACT' menu folder.



'MANUFACT' represents the manufacturer folder, it enables the manufacturer set parameters required for an individual boiler. This folder is only accessible with correct access code. If required the installer may require access to this folder to modify the boiler input setting.

To access the parameters within the 'MANUFACT' folder from the main burner display, navigate as follows;



The 'MANUFACT' menu folder has 27 parameter settings as follows;

'T01' n/a

'T02' n/a

'T03' n/a

'T04' n/a

'T05' TIME PAUSE MAX; Time between pellet feed auger operations in max flame. Adjusting this time adjusts the boiler input in max flame, i.e. the larger the pause time, the lower the input, alternatively the smaller the pause time the higher the input (see table in section 2.2).

Units 000.0 seconds.

Default setting 6-26 & 9-36 = 0025 (2.5 seconds)

'T06' TIME LOAD MAX; Time the pellet feed auger operates to deliver pellets to the brazier in max flame. Adjusting this time adjusts the boiler input in max flame, i.e. the larger the load time, the greater the input, alternatively the smaller the load time the lower the input (see table in section 2.2).

Units 000.0 seconds.

Default setting 6-26 = 0025 (2.5 seconds)

Default setting 9-36 = 0065 (6.5 seconds)

'T07' n/a

'T08' PRELOAD TIME; Time the pellet feed auger runs during the lighting sequence to initially charge the brazier with pellets. If set too low there may be insufficient pellets to cover the element. If set too high it could cover the photocell and obscure the view of the photocell.

Units 000.0 seconds.

Default setting 6-26 & 9-36 = 0650 (65 seconds)

'T09' TIME LIGHTING FEED REDUCED; Period of time reduced charges of pellets are delivered to the brazier during light-up.

('T11' x no of loads) + ('T10 x no. pauses) = 'T09'

Activated after pro-load, Deactivate once time has exceeded time setting for parameter 'T09'.

If set too low the flame may not be sufficiently established resulting in the flame being smothered when the function changes to max flame feed. If set too high, pellets could burn away faster than the pellets were delivered.

Units 000.0 seconds.

Default setting 6-26 & 9-36 = 0120 (120 seconds)

'T10' TIME LOAD LIGHTING; Time the pellet feed auger operates to deliver reduced quantity pellets during 'lighting feed reduced'.

Units 000.0 seconds.

Default setting 6-26 & 9-36 = 0040 (4 seconds)

'T11' TIME PAUSE LIGHTING; Time between pellet feed auger operations during 'lighting feed reduced'.

Units 000.0 seconds.

Default setting 6-26 & 9-36 = 0150 (15 seconds)

'T12' n/a

'T13' FLAME STABILIZATION; Time to allow flame stabilize during lighting. Activated after ignition mode (once lux ≥ 'FLAME ON' setting) Deactivate once time has exceeded time setting for parameter 'T13'.

If set too low the flame may not be sufficiently established resulting in the flame being smothered when the function changes to 'lighting flame reduced'. If set too high, pellets could burn away resulting in not flame.

Units 0000 seconds.

Default setting 6-26 & 9-36 = 0010 (10 seconds)

'T14' n/a

'T15' BRAZIER MOVEMENT CYCLE TIME; Time allowed for the Brazier to complete one movement i.e. open or close. If the brazier blocks during cleaning, it automatically attempts one release (i.e. short reverse followed by forward movement) When a release is attempted the counter is reset to 0. If the blockage is not cleared and the brazier is jammed then after 200 seconds the error 'SERVO MOTOR BLOCKED' is displayed on the burner screen.

Units 0000 seconds.

Default setting 6-26 & 9-36 = 200 (200 seconds)

'T16' TIME CLEANING BRAZIER; Total pellet feed auger run time before burner brazier cleaning operation activates.

Units 0000 minutes.

Default setting 6-26 & 9-36 = 240 (240 minutes)

'T17' TIME CLEAN BOILER; Total pellet feed auger run time before boiler cleaning operation activates.

Units 0000 minutes.

Default setting 6-26 & 9-36= 240 (240 minutes)

'T18' TIME CLEAN BOILER; Time period boiler cleaning function is operational once 'TIME CLEAN BOILER' has elapsed.

Units 0000 seconds.

Default setting 6-26 & 9-36= 60 (60 seconds)

'T19' n/a

'T20' MAXIMUM TIME ELEMENT ON' The maximum time allowed for the element to remain on. If the photocell does not read 5 lux within this time, then 'FAILED PELLET LIGHTING IS DISPLAYED'

Default setting 6-26 & 9-36=360 (360 Seconds)

'T21' TIME PAUSE MIN; Time between pellet feed auger operations in min flame. Adjusting this time adjusts the boiler input in min flame, i.e. the larger the pause time, the lower the input, alternatively the smaller the pause time the higher the input.

Units 000.0 seconds.

Default setting 6-26 = 175 (17.5 seconds)

Default setting 9-36 = 250 (25.0 seconds)

'T22' POST VENTILATION; Time burner fan runs once 'TURNING OFF BRAZIER' function is complete (i.e. lux < Turning off brazier' setting). Deactivate once time has exceeded time setting for parameter 'T22'.

Units 0000 seconds.

Default setting 6-26 & 9-36= 60 (60 seconds)

'T23' Delayed start on the flue fan start.

Units 0000 seconds.

Default setting 6-26 & 9-36= 0 (0 seconds)

'T24' Default setting 6-26 & 9-36= 10 (required for modulation –do not adjust).

'FLAME ON' Flame lux reading to;

- Activate countdown of T13 to switch off ignition element during lighting.
- Deactivate the 'Turning off brazier' function when the burner is shutting down.

Default setting 6-26 & 9-36 = 2 (2 Lux)

'FLAME OFF' ; In "*PELLET BURNER FIRING*" mode if the flame Lux value is less than the 'FLAME OFF' setting for 15 seconds, then error 'FAILED PELLET LIGHTING' is displayed and the burner. The burner fan continues to run.

Default setting 6-26 & 9-36 = 1 (1 Lux)

'FLAME % MIN' When combined with the 'FLAME OFF' setting is the Lux valve required before the fan changes to high speed in 'WAIT LIGHTING MODE'

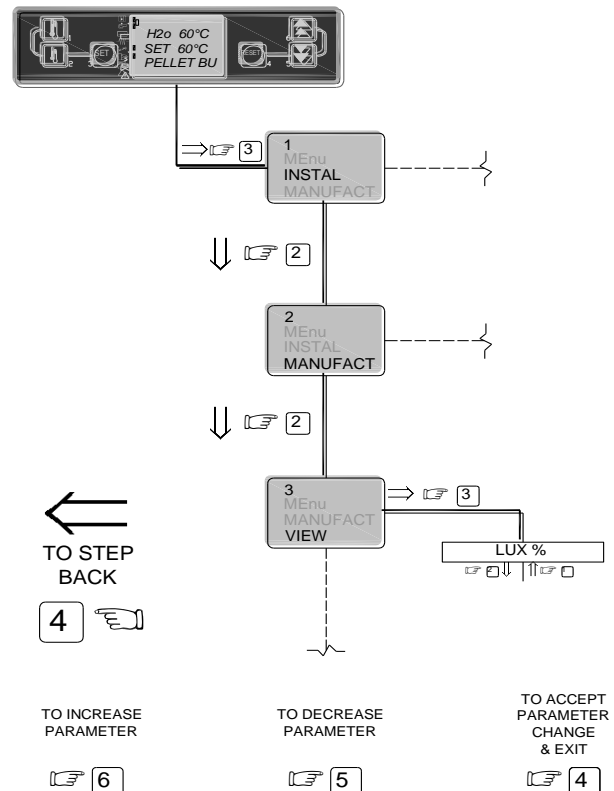
Default setting 6-26 & 9-36 = 4 (4 Lux)

8.7.3 VIEW menu folder.



'VIEW' folder displays the function or status of the boiler.

To access the menu displays within the 'VIEW' folder from the main burner display, navigate as follows;



The 'VIEW' menu folder has 4 readout displays as follows;

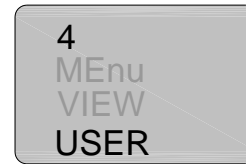
- LUX %** -Light illumination measured by the Photocell. Readout is instantaneous.
- STEP AUTO**; Each boiler function is allocated a two digit number. This menu displays the function the

boiler is in when viewing. List of functions are as follows;

- 03 -WAIT BOILER THERMOSTAT
- 13 -PELLET BURNER FIRING
- 14 -TURNING OFF BRAZIER
- 26 -POST PURGE
- 29 -AIR PRESSURE ERROR
- 33 -FAILED PELLET LIGHTING
- 40 -PRE-LOAD
- 41 WAIT LIGHTING (IGNITION)
- 42 WAIT LIGHTING (LIGHTING FEED REDUCED)
- 45 WAIT LIGHTING (FLAME STABILIZATION)
- 34 -SERVO MOTOR BLOCKED
- 15 - BRAZIER IS MOVING FORWARD
- 15 – BRAZIER IS MOVING BACK
- 47 – PROBE FAULT
- 46 – SAFETY CHARGE PIPE THERMOSTAT
- 46 – SAFETY BOILER THERMOSTAT

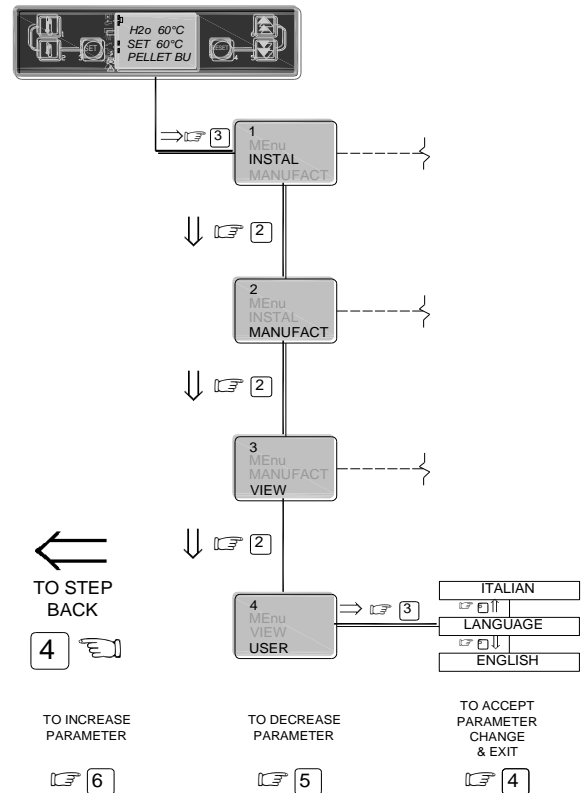
- c. **VIEW CLE BRAZ** Total pellet feed auger run time since brazier last cleaned. When \geq "T16" brazier cleaning operation will commence. Resets after each brazier clean.
- d. **VIEW CLE BOILER** Total pellet feed auger run time since boiler last cleaned. When \geq "T17" boiler cleaning operation will commence. Resets after each boiler clean.

8.7.4 USER menu folder.



'USER' folder; allows the user change the language on the burner display.

To access the menu displays within the 'USER' folder from the main burner display, navigate as follows;



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

9. Commissioning

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

9.1 Equipment required

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

- Draught meter.
- Flue gas analyser –with a specific “wood pellet” setting.
- Container of at least 1 litre capacity.

9.2 Before switching on

1. Open front access cleaning door and check ash pan is empty and positioned on the base of the combustion chamber, check the baffle (located in the top of the combustion chamber) is secured correctly on fixing brackets. Close the front access cleaning door.

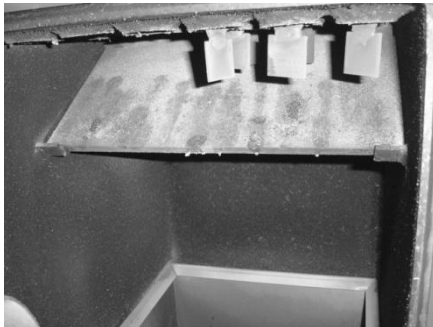


Fig. 9.1

2. Check boiler flow and return are adequately vented. Check boiler and heating system has been vented (and pressurised if sealed system). Check the wash system manifold has been fitted and connected to an uninterrupted main water supply with all valves open.
3. Remove boiler top panel and boiler top access doors. Check that the spiral baffles in both the primary and secondary heat-exchangers are in place.
4. Test the boiler cleaning function by operating the momentary ‘CLEANING’ ‘TEST’ switch on the boiler control panel.
- (a) Check the wash system manifold (located under the top rear access door) is spraying water directly into each flue gas tube of the unit. If the water jets are not spraying directly into the flue gas tubes adjust the orientation of the wash system manifold, using the screw in the right-hand side panel (above the wash system manifold on the right-hand side panel.)

Jets spraying correctly

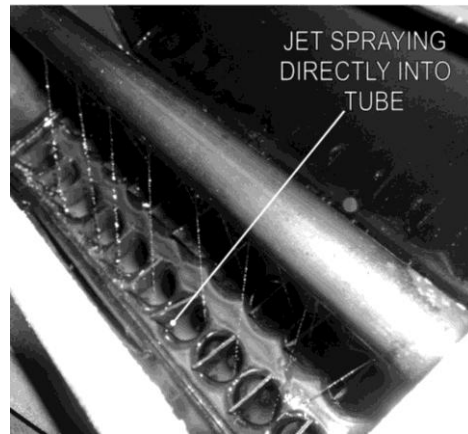


Fig. 9.2

Jets spraying incorrectly



Fig. 9.3

- (b) Check the shaker unit (located under the top front access door) is operating freely and that the spirals are moving up and down with an intermittent sudden vertical motion.
5. Refit the top access cleaning doors in position and tighten nuts.
6. Check the draught stabilizer is unobstructed and the stopper is in the fully open position.



Fig. 9.4

7. Check the quality of the wood pellets to be used (see section 3 Pellet specification and storage). Do not use wood pellets that have not being approved by Grant for use with this boiler.

8. Check the pellet feed auger is fully inserted into the Grant hopper and the bolt fitted in the pellet feed auger fixing flange. Check the hopper is empty of all objects,

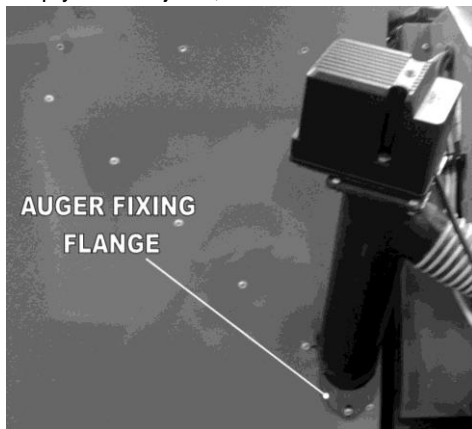


Fig. 9.5

9. Fill the Grant Intermediate hopper with approved wood pellets.
10. Isolate the electrical power to the appliance and remove the boiler control panel cover. Check the overheat thermostat probe and thermistor bulb is fully inserted in the boiler waterway pocket. (To view pocket, remove control panel cover). Also check the condition of cable and capillary, i.e. not damaged, broken or kinked. Refit the control panel cover.
11. Set the burner On/Standby switch to On. Check that all system controls are calling for heat.
12. The burner comes pre-set as shown in table 2.2.1. To confirm the burner output, check 'TIME LOAD MAX', 'TIME PAUSE' & 'TIME PAUSE MIN' SETTINGS is correct. See section 8 for access to the burner menu.



The data table shown in section 2.2.1 is when using a Grant Intermediate Hopper only. When using a different hopper to feed the boiler directly contact Grant IRL or Grant UK for advice.

9.3 Priming the pellet feed auger

1. Disconnect the 7 pin plug and 6 pin socket from the left-hand side of the burner.

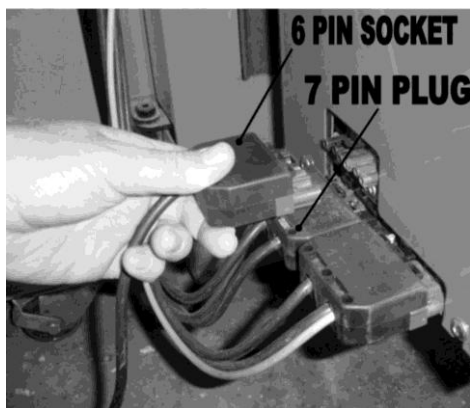


Fig. 9.6

2. Disconnect the pellet delivery hose from the burner and place in a container of at least 1 litre capacity as shown below.



Fig. 9.7

3. Place the 7 pin plug into the 6 pin socket as shown below. The feed pellet feed auger will now run continuously until the plug and socket is disconnected.

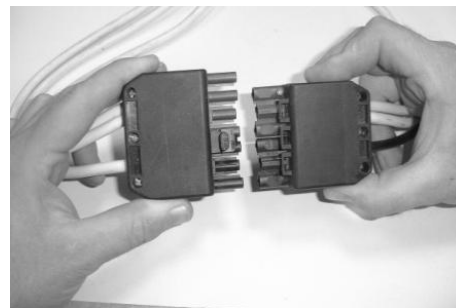


Fig. 9.8

4. The pellet feed auger will prime itself with wood pellets after a period of 15 to 20 minutes depending on the pellet feed auger length. Once there is a continuous flow of pellets from the pellet delivery hose disconnect the plug and socket. The pellet feed auger is now fully primed.
5. Refit the pellet delivery hose into the Burner feed tube of the burner.

⚠ WARNING

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

6. Refit the 7 pin socket and 6 pin plug into the original position on the side of the burner.

9.4 Lighting the boiler

1. Ensure that system controls are calling for heat.
2. Switch the Burner STANDBY/ON switch on the boiler control panel to the ON position. The flue fan will start and pellets will be delivered to the burner.

⚠ NOTE

If the burner STANDBY/ON switch is switched off at this stage the pellet feed will stop and the burner will run through the post purge sequence before pellet feed starts again.

⚠ WARNING

Do not repeatedly switch on and off the burner at this stage as a build up of pellets in the brazier will occur resulting in poor combustion during lighting.

3. The boiler should now be operational. See section 8.3 for lighting, running and shut down sequence of operation.
4. Check the flue fan is operational.
5. After the boiler has been running for 15 minutes and the flue is warmed up, check the combustion chamber draught when the burner operation mode is 'POWER 100%' only by inserting the draft meter probe into the test point located to the left of the burner on the combustion chamber door.

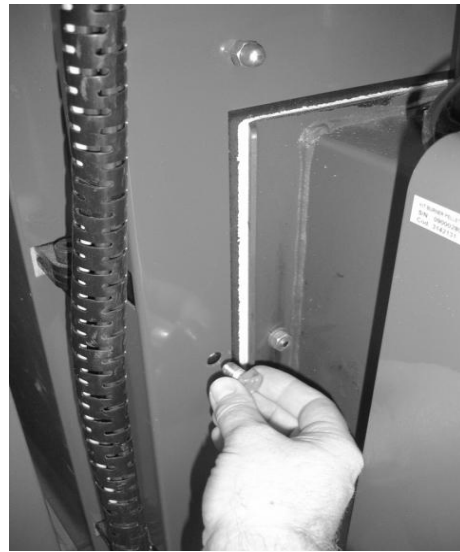


Fig. 9.9

A draught reading of between 0.1 & 0.15 mbar should be achieved. To adjust the combustion chamber draft move position of weights on draft regulator and add/remove if necessary as follows.

- To increase draft – move weight away from damper or add extra weights (if necessary.)
 - To decrease draft – move weight closer to damper or remove weights (if necessary.)
6. Insert combustion analyser probe into rear test point on top rear access door (secondary heat exchanger).

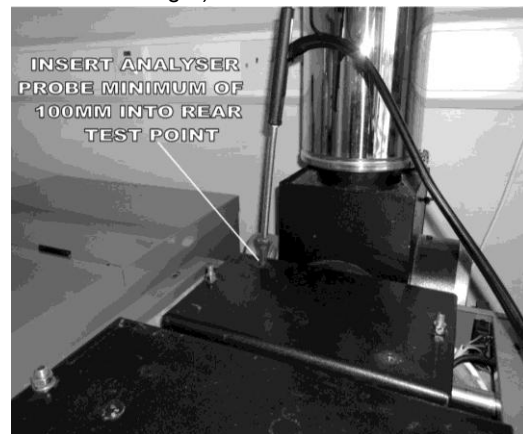


Fig. 9.10

7. When the burner is in MAX flame (Power 100%) operation, adjust the CO₂ to achieve a mean peak reading of between 10 & 12% CO₂ over a minimum of five minute period. To adjust the CO₂ in 'MAX flame (Power 100%)' access the burner sub menu 'SETUP FAN' and adjust 'POWER MAXIMUM'. To increase the CO₂ value, reduce the 'POWER MAXIMUM' value. To reduce the CO₂ value increase the 'POWER MAXIMUM VALUE'.

8. Also record the combustion analysis details from the combustion analyser and record the details on the commissioning sheet.
9. When the 'Burner display reads 'WAIT PELLET THERMOSTAT', remove the burner burn-back thermostat from the pellet feed tube. The Burner display should read 'SAFETY CHARGE PIPE THERMOSTAT' once the burn-back thermostat is disconnected. Refit the thermostat then press reset the burner will be operational.



Fig. 9.11

10. When the boiler is in 'WAIT BOILER THERMOSTAT' mode check the burner door interlock is operating by opening the combustion chamber door. The burner led display should then be switched off, closing the door should power up the display. This confirms that the door interlock is operating.



The interlock on the burner door disconnects the power to the burner to prevent firing when the door is opened. It does not extinguish the flame immediately. If the burner door is opened during the operation of the burner there can be a large uncontrollable flame emitted from the brazier.

11. Check the condition of the pellet delivery hose and ensure it forms an air tight seal each end. Check for damage and replace if necessary. A damaged pellet delivery hose can allow a back draft through the boiler resulting in burner displaying error 'SAFETY CHARGE PIPE THERMOSTAT'.
12. If a condensate pump is fitted, check that a condensate holding tank of at least 40 litres is also fitted. This is to ensure that when the boiler cleaning cycle has operated the holding tank can collect the total volume of the water used in the wash down and the condensate pump can then discharge the waste effectively. Also check that the burner settings 'T18' (TIME-BOILER

CLEANING OPERATION) is not set greater than 600 (60 seconds) and that 'T17' (TIME (MIN) BETWEEN CLEANINGS) is not set less than 240 minutes, as modifying these times could result in larger and more frequent wash down of the boiler which could exceed the capabilities of the tank and condensate pump.

10. Boiler Servicing

To ensure a safe and efficient operation of the boiler the ash pan must be emptied after each 3 tonne of pellets is used and serviced after each 6 tonne of pellets is used.

The burner is programmed to display 'SERVICE' on the burner display screen once a pre-determined pellet feed auger run time is achieved. The interval of the display is programmed by the commissioning engineer based on the pellet feed auger feed rate and the time taken to delivery 6 tonne to the boiler.



Servicing and replacement of parts must only be carried out by a suitably qualified Engineer who has completed the Grant training course on wood pellet boilers.



Details of every service should be entered in the service log, in the boiler hand book.



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

10.1 Checks before servicing

1. Check the flue terminal and ensure it is not blocked or damaged.
2. If the boiler is used on a sealed central heating system, check the system pressure, check the operation of the pressure relief valve and check the expansion vessel air charge. The expansion vessel air charge should be 1.0 bar when the system pressure is zero.
3. Check the burner parameters setting correspond with the commissioning sheet attached to the boiler.

4. Ensure all connections and fittings are sound. Remake any joints and check tightness of any fitting that may be leaking.
5. Refill, vent and re-pressurise the system as necessary.
6. Check that any ventilation openings are adequate and are clear. See section 6.1.
7. Operate the manual boiler cleaning system for at least 60 seconds to ensure the boiler is cleaned down. This is achieved by holding the boiler cleaning switch in 'TEST' mode. Only operate when the burner is not firing.



Before servicing, set the burner switch to 'Standby' and after the burner has shut down and displays 'WAIT PELLET THERMOSTAT' isolate the electricity supply by disconnecting the mains socket fitted in the rear of the boiler as shown in fig 10.1 below

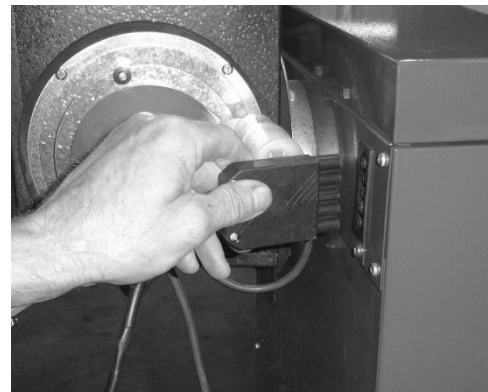


Fig 10.1

10.2 Cleaning the burner

1. Disconnect the seven pin plug & socket and the six pin socket from the side of the burner. Disconnect the pellet delivery hose to the burner and open the front access cleaning door.

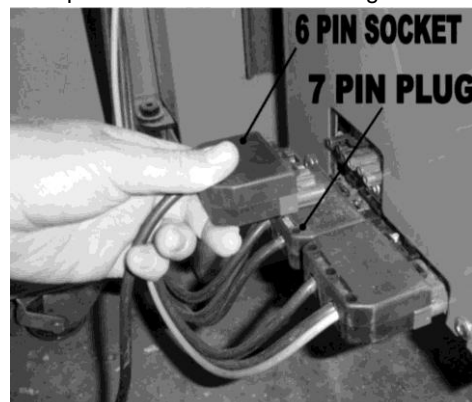


Fig 10.2

2. Clean out the brazier and remove all ash ensuring all air holes are free.
3. Remove the burner cover by loosening the two M5 screws each side of the burner and lifting off the cover.
4. Remove the M8 nut each side of the burner and withdraw the burner from the boiler. Remove the burner hood by loosening the two M5 bolts (highlighted below) each side of the brazier. Slide the hood away from the burner and lift up.

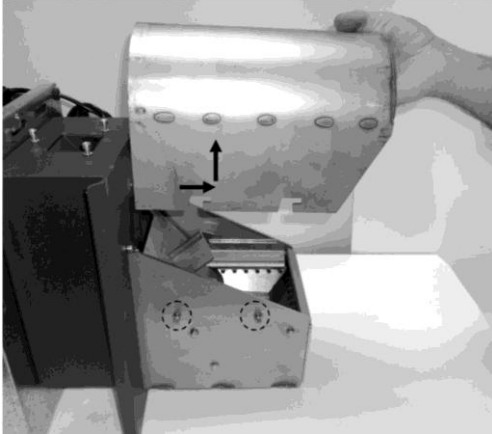


Fig 10.3



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

5. Open the brazier manually by pulling up on the red slider of the electromechanical motor and at the same time pulling on the end wall of the brazier as shown in fig 10.4 below. Remove any ash from within the brazier. Close the brazier manually by pulling up on the red slider of the electromechanical motor and at the same time pushing on the end wall of the brazier.

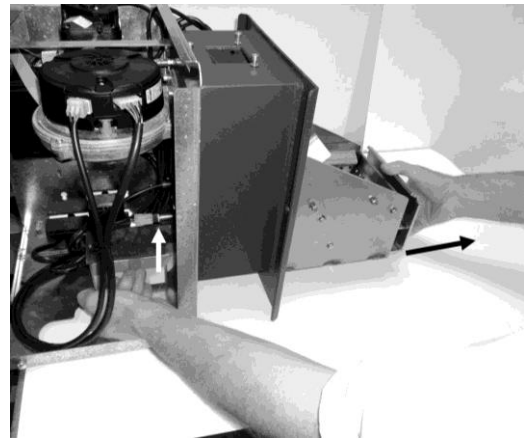


Fig 10.4



Do not to force the brazier end wall without disengaging the servo motor release switch. Failure to release servo motor release switch WILL damage servo motor gears.

6. Check the clearance of the brazier using the 'Grant' clearance gauge. Insert the gauge into the brazier as shown in fig 10.5. The gauge should slide in using manual force only.

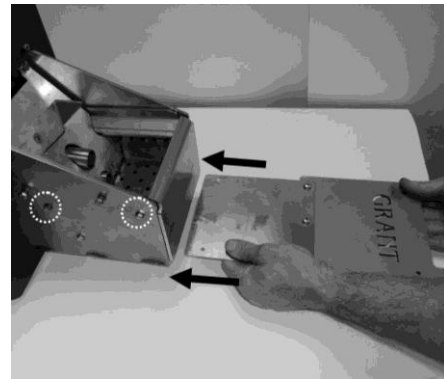


Fig 10.5

If the gauge does not fit or the clearance is too great;

- a. Loosen the two M5 nuts (highlighted above) each side of the brazier
- b. Insert the gauge as shown in fig 10.5.
- c. With the gauge in place lightly tighten the M5 screws using minimum force.
- d. Ensure the base of the brazier is fully down by inserting a steel strip between the brazier chassis and the 'Flame plate' and lightly

- tapping each side of the brazier as shown in fig 10.6, remove the steel strip when finished.
- Tighten the screws each side.
 - Remove gauge.

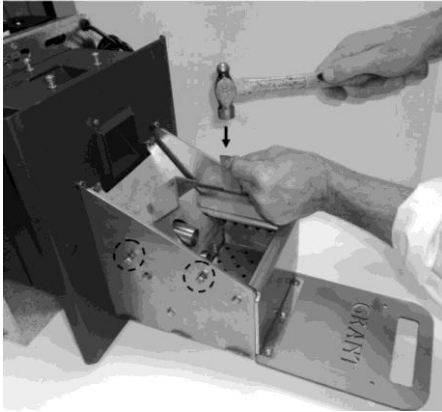


Fig 10.6

- Check the condition of the heat-shield hood and replace if necessary.

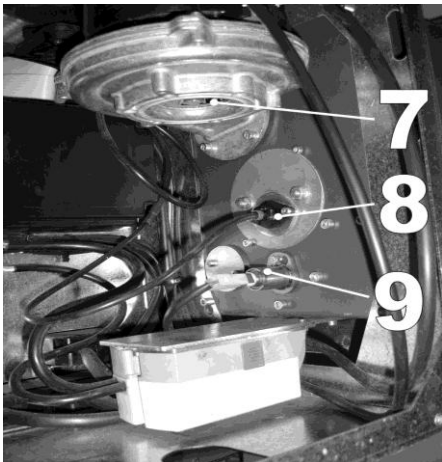


Fig 10.7

- Check the burner fan inlet is clear of debris. If there is a build-up of debris remove the burner fan and clean the fan blades and fan housing.
- Remove, check and clean the photocell. Replace if damaged. Ensure the photocell clamp is fitted 25mm from end as shown in fig 10.8.

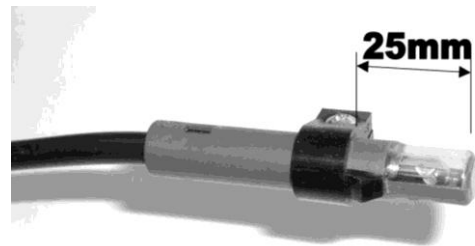


Fig 10.8

- Remove and check the condition of the heating element. Replace if damaged.
- Also check the pellet feed pipe, clean out if necessary.
- If the burner was removed from the boiler check the condition of the burner gasket and replace the gasket if necessary. Refit the burner and tightening the M8 nut each side.
- Refit the burner cover and tighten the two M5 screws each side.

10.3 Cleaning the Boiler & Flue

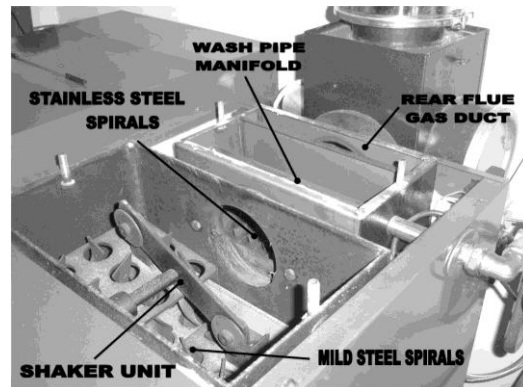


Fig 10.8

- Remove the boiler top panel, remove both top access cleaning covers.
- Remove the mild steel spirals (from the chamber at the front of the boiler), examine condition and clean down or replace if necessary. Remove any ash on the chamber walls and from underneath the spiral hangers. Refit spirals in position.
- Remove the wash system manifold from the rear chamber of the boiler, clean thoroughly ensuring all jets are clear and rinse the inside of the wash system manifold thoroughly to ensure all debris is removed.
- Remove the stainless steel spirals (from the chamber at the rear of the boiler), examine condition and clean down or replace if necessary. Remove any ash on the chamber walls and from the rear flue gas duct.
- Refit the wash system manifold in place, but do not tighten at this stage. (The system manifold

needs to be aligned once the unit is powered up).

6. Remove the flue inspection plate and examine flue condition. Clean the flue by sweeping it clean. Chemical cleaners are not recommended.



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.

7. Remove the draught stabilizer from the combined fan box & flue starter. Open the clean out hatch. Clean out the combined fan box & flue starter and the base of the flue (through the opening left by the by-pass slider). Check fan blades and fan blade chamber, clean if necessary by removing the fan.



When cleaning the fan blades ensure a thorough cleaning is carried out as an uneven cleaning will result in the fan being off balance and could possible damage the fan.

8. Reposition the draught by-pass slider to original position and refit the draught stabilizer.
9. Remove and clean the baffle (located in the top of the combustion chamber).

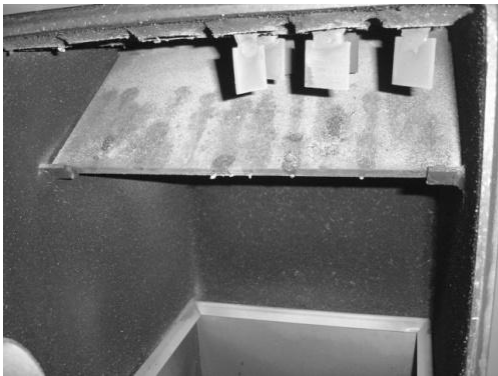


Fig 10.9

10. Remove the ash pan (using the ash pan handles supplied with the boiler) and dispose of the ash safely.



Extreme care is required when emptying the ash pan as smouldering ash could be present and cause serious damage to

persons or property. Ensure the ash is disposed of in a safe manner.

11. Clean down the combustion chamber and the combustion chamber door fully.
12. Check the baffle condition and replace if necessary. Refit the baffle in position ensuring it is seated correctly on the fixing brackets.
13. Refit the ash pan in the base of the combustion chamber.
14. Grease the front cleaning door latch mechanism and close the door.
15. Remove the boiler control panel cover to gain access to the boiler cleaning mechanism. Grease the cam edge using high temperature grease. Refit the boiler control panel. Also remove the M8 grub screw located on the shaft of the cleaning mechanism (within the top front chamber) and recharge the reservoir with high temperature grease, refit the M8 grub-screw do not tighten.
16. Power up the boiler by inserting the main connection into the back of the boiler as shown in fig 10.10.

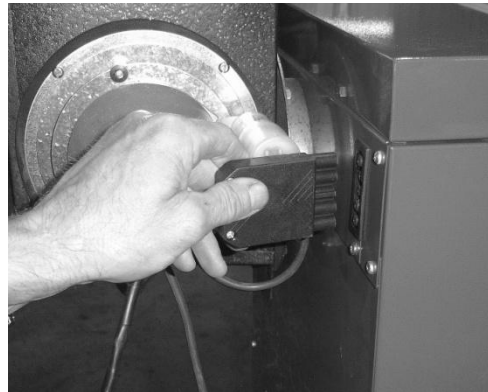


Fig 10.10

17. Manually operate the boiler cleaning system by holding down the 'TEST' switch on the boiler control panel.
 - I. Align the spray from the wash system manifold jets with the pipes in the rear chamber of the boiler, check all jets are clear. Tighten the M5 screw located on the fixing flange to maintain the position of the manifold.
 - II. Check the shaker unit (located under the top front access door) is operating freely and that the spirals are moving up and down with an intermittent sudden vertical motion. (If there is no sudden vertical motion, isolate the power as shown in fig 10.1 and check the condition of the spring located in the rear of the control panel replace if necessary).
18. Check the condition of the top access cleaning covers and replace gaskets and seals if

necessary. Refit the top access cleaning covers and the boiler top panel.

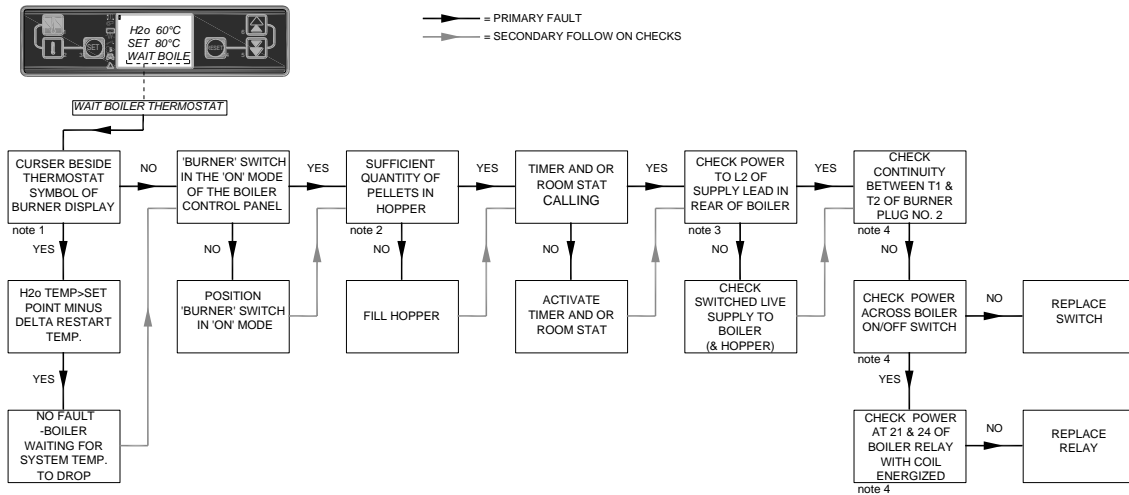
19. Disconnect the drain trap located on the condensate drain system from the back of the boiler. Clean thoroughly and re-fit.
20. Check the condition of the pellet delivery hose and ensure it forms an air tight seal each end. Check for damage and replace if necessary. A damaged pellet delivery hose can allow a back draft through the boiler resulting in burner displaying error 'SAFETY CHARGE PIPE THERMOSTAT'.
21. On the burner menus reset the service time by pressing the SET button (3) when the burner display shows RESET SERVICE. See section 8.6.



To ensure safe and efficient operation of the boiler it is important that re-commissioning is carried out, refer to Commissioning instructions 9.4 Lighting the boiler'.

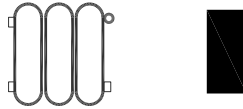
11 Fault finding

11.1 Boiler won't fire (no error message)



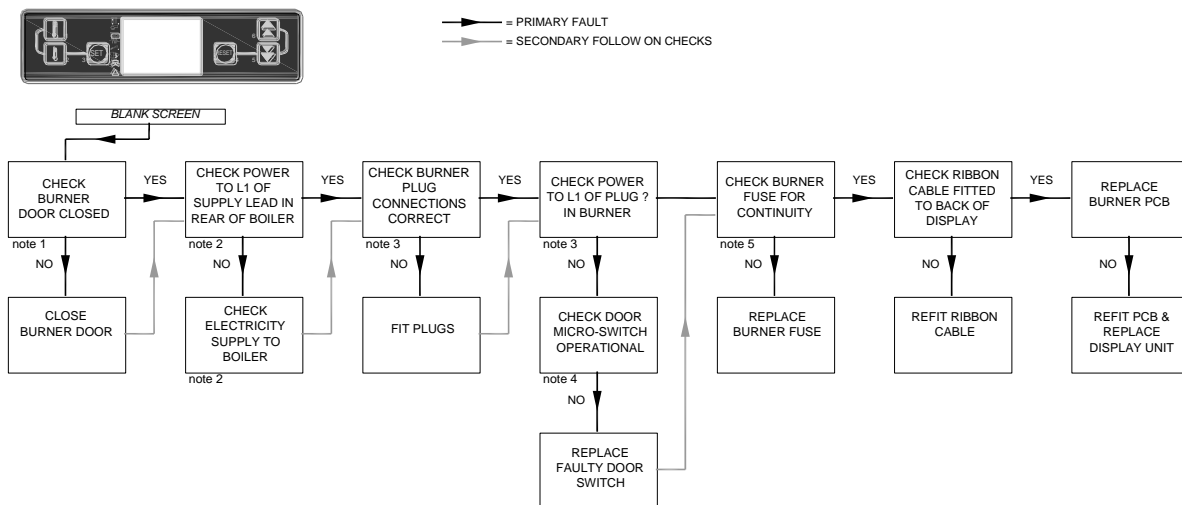
Notes;

1. When the switched live supply to the burner is activated, the burner display shows a cursor highlighted beside the boiler thermostat symbol, as shown below.



2. Depending on the type of installation, insufficient pellets in the intermediate hopper will result in either of the following;
 - a. Intermediate hopper controlling a bulk hopper feed system will **not** use the low level cut out system, the burner will display error message 'FAILED PELLET LIGHTING' when the intermediate hopper has insufficient pellets.
 - b. Intermediate hopper using the low level cut out system will switch the boiler to standby mode and the burner will display 'WAIT BOILER THERMOSTAT' when the intermediate hopper has insufficient pellets.
3. Refer to diagram in section 7.1.2.
4. Refer to section 7 Electrical.

11.2 Boiler won't fire (Blank screen)



Notes;

1. The burner door is fitted with a safety interlock. Once the door is opened all power is disconnected to the burner.
2. See diagram shown in section 7.1.
3. See diagram shown in section 9.3.1
- 4.

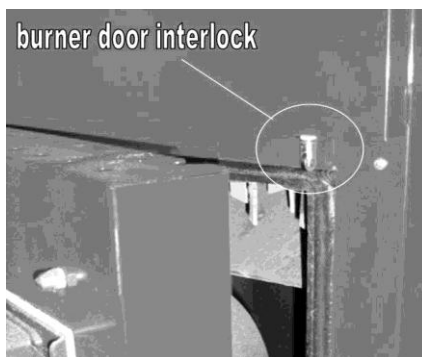


Diagram showing burner door interlock

5.

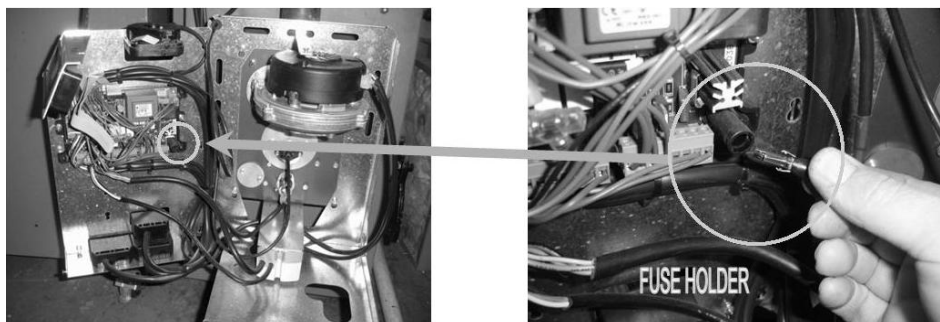
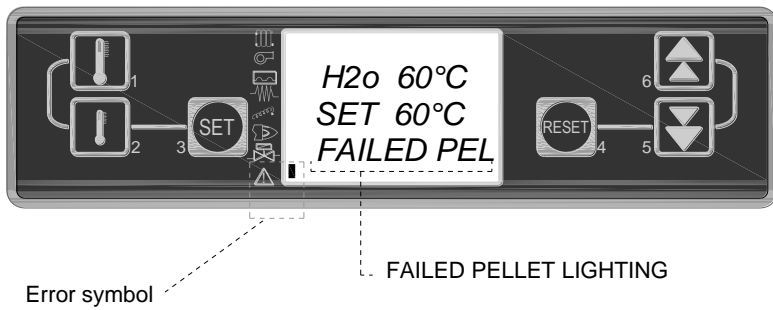


Diagram showing the fuse holder located within the burner PCB enclosure.
 Fuse type F5AL250V

11.3 Error messages

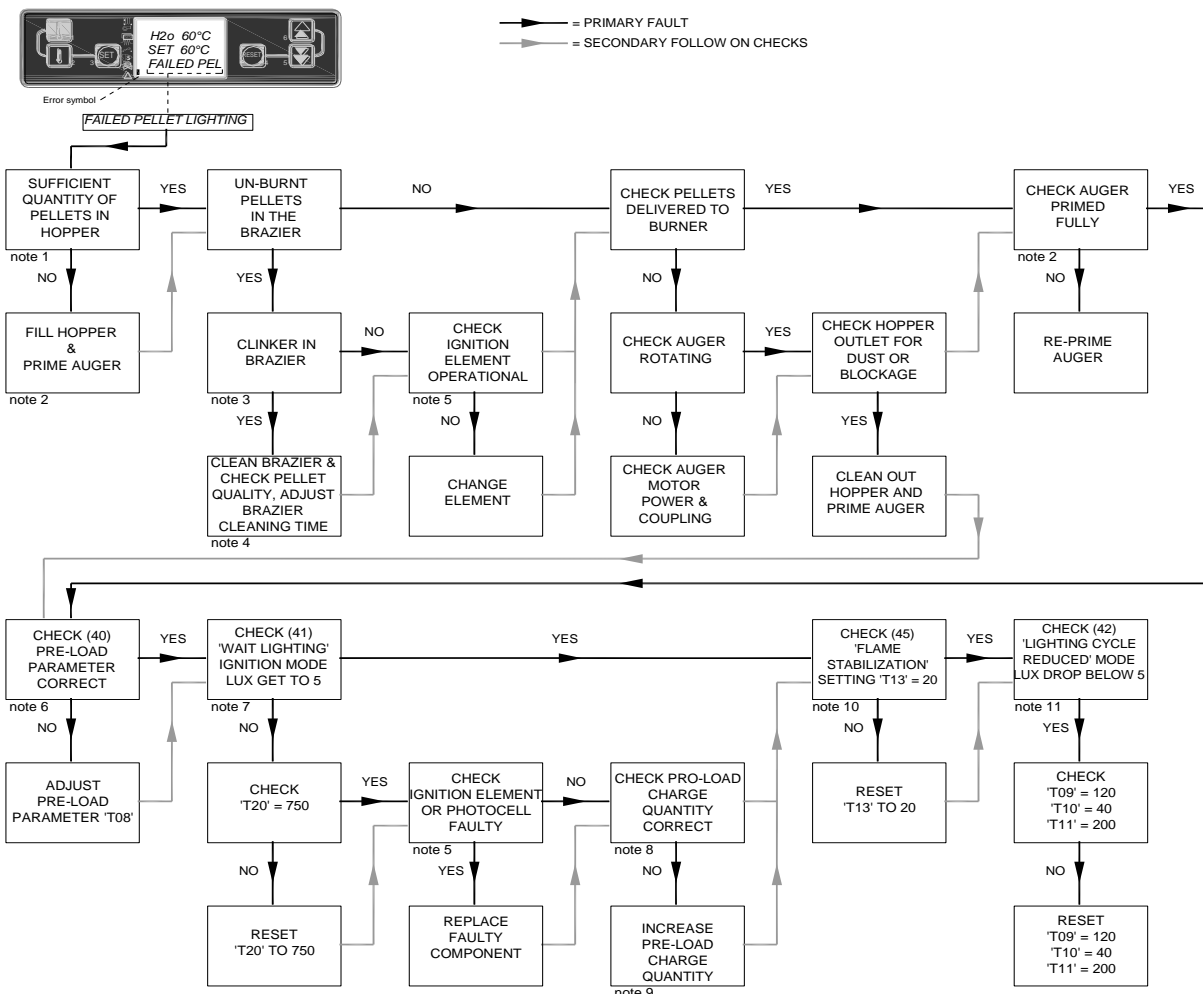
When a fault occurs with the burner, the burner display screen displays a block to the right of the error symbol as shown below. The lower area of the text screen also displays a message of the fault that occurred.



List of possible error messages;

- | | | |
|----------------------------------|------------------------|------------------|
| • FAILED PELLET LIGHTING, | Step Auto function -33 | See section 11.1 |
| • SERVO MOTOR BLOCKED, | Step Auto function -34 | See section 11.2 |
| • SAFETY CHARGE PIPE THERMOSTAT, | Step Auto function -46 | See section 11.3 |
| • SAFETY BOILER THERMOSTAT, | Step Auto function -46 | See section 11.4 |
| • PROBE FAULT, | Step Auto function -47 | See section 11.5 |
| • AIR PRESSURE ERROR, | Step Auto function -29 | See section 11.6 |

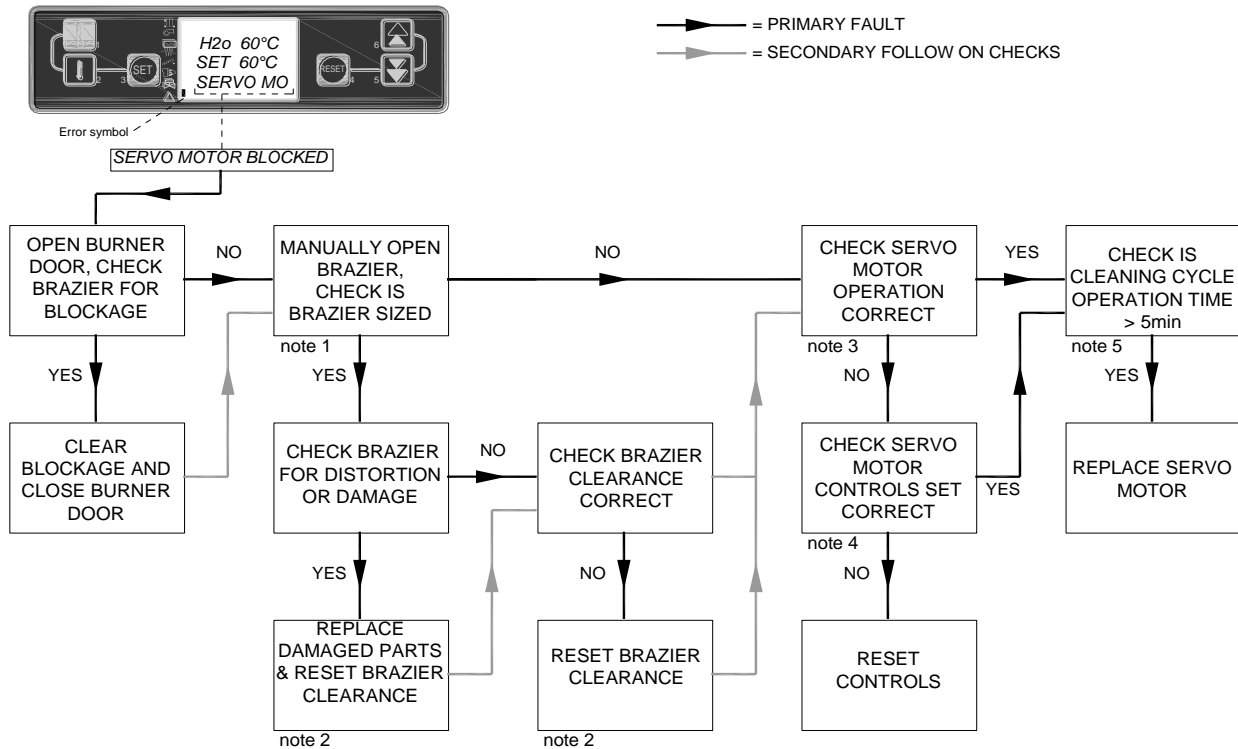
11.3.1 FAILED PELLET LIGHTING



Notes;

- Depending on the type of installation insufficient pellets in the intermediate hopper will result in either of the following;
 - Intermediate hopper controlling a bulk hopper feed system will **not** use the low level cut out system, the burner will display error message 'FAILED PELLET LIGHTING' when the intermediate hopper has insufficient pellets.
 - Intermediate hopper using the low level cut out system will switch the boiler to standby mode and the burner will display 'WAIT BOILER THERMOSTAT' when the intermediate hopper has insufficient pellets..
- Clinker is classed as solidified ash containing sand particles that the burner cleaning system is unable to remove. Clinker is caused by using unsuitable pellets.
- Refer to section 8.7.1.3a. menu folder 'TIME CLEAN BRAZ'
- The ignition element is operational in Functions 40, 41 & 45. see section 8.7.3.b.
- Check continuity across the ignition element when the element is disconnected.
- Refer to section 8.7.2 'MANUFACT' menu folder.
- When in function '41' (ignition), if after a time of 'T20' & photocell Lux valve doesn't get to 5 lux, then the error message 'FAILED PELLET LIGHTING' is displayed. Max 'T20' = 750 See section 9.4.10, how to check pre-load.
- See section 8.7.2, how to adjust the 'preload' setting.
- 'T13' is the 'FLAME STABILIZATION' period. This is the period allowed for the flame to establish. Too short a time prevents the flame from developing or too long a period allows the flame burn-up the fuel. Ideal time is 2 minutes or a 'T13' setting of 20. If the flame drops below 5 lux in this function then error message 'FAILED PELLET LIGHTING' is displayed.
- See section 8.7.3.a VIEW menu folder. To display the photocell value view 'LUX %'.

11.3.2 SERVO MOTOR BLOCKED



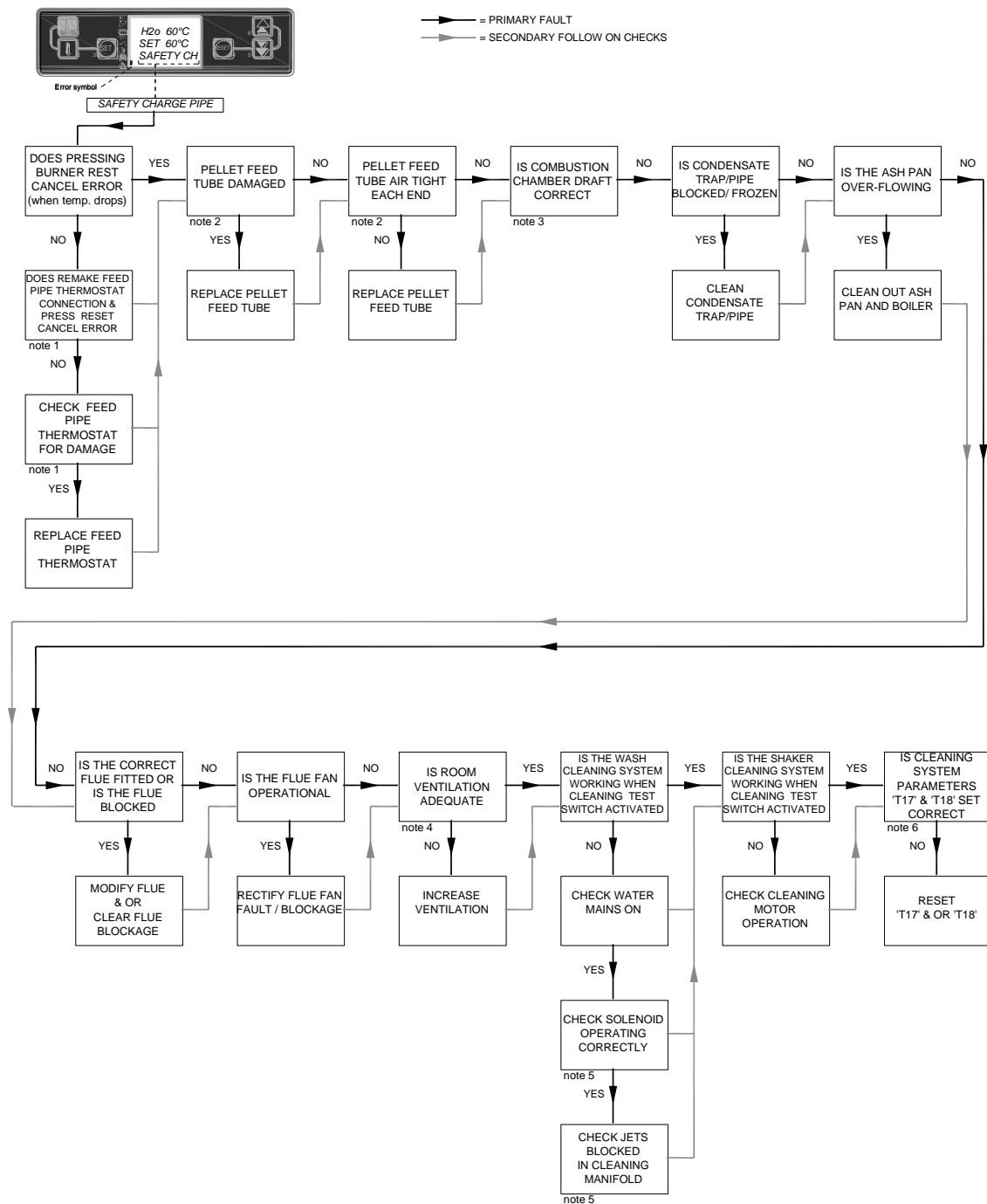
Notes;

1. Refer to section 10.2.3 opening the brazier manually.
2. Refer to section 10.2.5 setting the brazier.
3. Set 'T16' (time cleaning brazier) to 0, fire-up the boiler immediately switch off the boiler On/Off switch on the control panel. The brazier cleaning operation will now commence. **Ensure 'T16' is reset to its original setting or else the brazier operation will be activated after each lighting operation.**
4. The stroke of the servo motor is factory set and should not be adjusted. Check with Grant Engineering for correct setting.
5. The total cleaning time for the brazier should be between 4 and 5 minutes.



Do not to force the brazier end wall
 without first disengaging the servo motor release switch.
 Failure to release servo motor release switch
will damage servo motor gears.

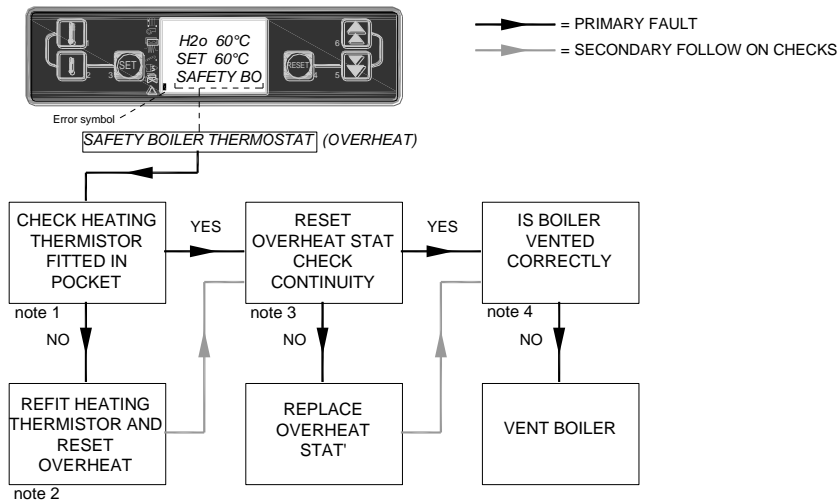
11.3.3 SAFETY CHARGE PIPE



Notes;

1. Refer to diagram shown in 9.4.10.
2. **Leakage of air could cause increased temperature in the pellet delivery hose and result in the burn-back thermostat shutting down the burner .**
3. Refer to section 9.4.5.
4. Refer to section 6.1.
5. Refer to section 10.3.3
6. Refer to section 8.6. and 8.7.2 p & q

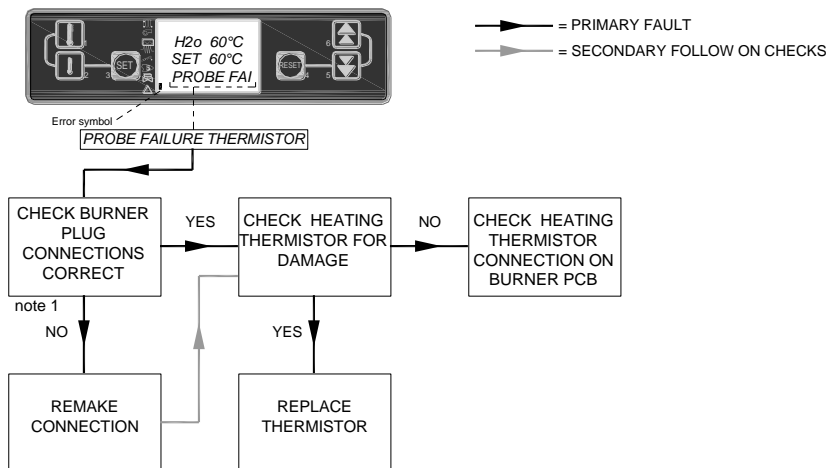
11.3.4 SAFETY BOILER THERMOSTAT



Notes;

1. The pocket is located within the boiler control panel. Remove control panel outer cover to gain access.
2. Ensure the heating thermostat is retained in the heating pocket using the clip supplied.
3. Continuity can be checked between T1 & T2 of the seven way male connector plug fitted to the side of the burner.
4. The boiler comes complete with an air vent to vent the secondary heat-exchanger. The primary heat-exchanger needs to be vented on the heating flow pipe. Check flow is adequately vented.

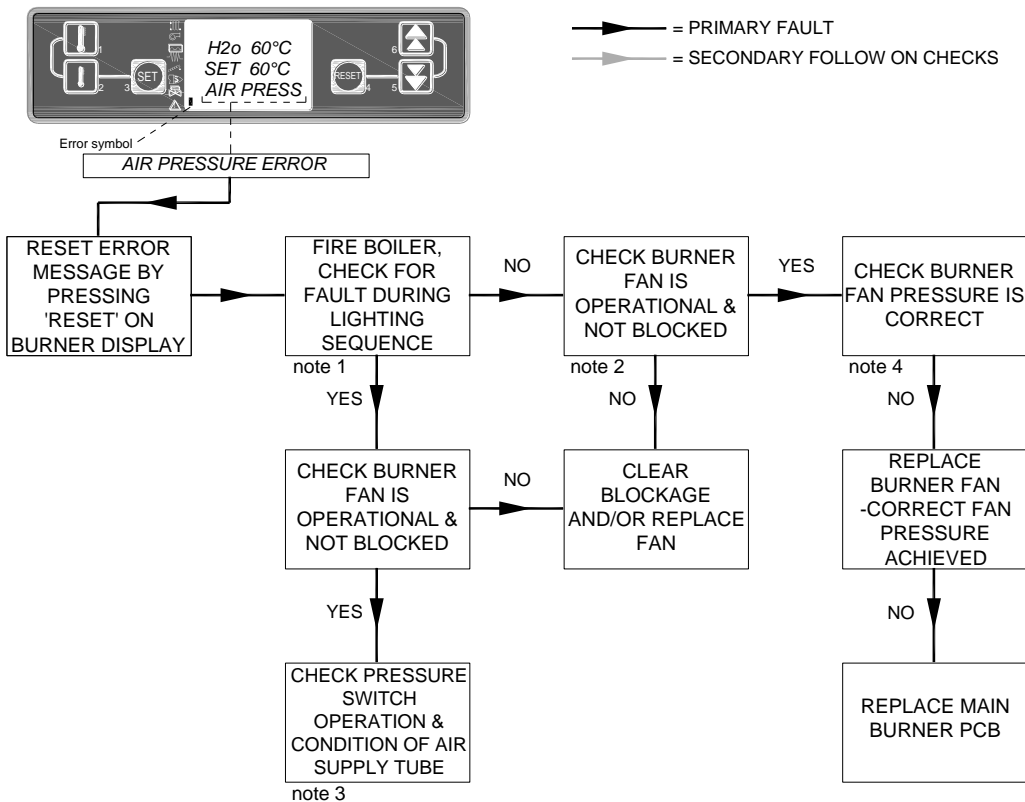
11.3.5 PROBE FAILURE THERMOSTAT



Notes;

1. See diagram 9.3.1

11.3.6 AIR PRESSURE ERROR

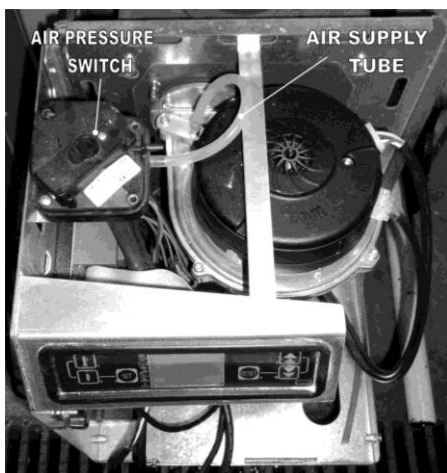


Note 1. Before the 'PRE-LOAD' operation commences and during the LIGHTING FEED REDUCED period, the burner controls check that burner fan has enough air pressure generated to close the air pressure switch. If during these operations the pressure switch is not closed then the warning 'AIR PRESSURE ERROR' is displayed on the burner screen.

Note 2. During the 'PELLET BURNER FIRING' operation the burner controls checks that the burner fan speed is correct. (It does not check if the fan is generating enough air pressure). If during the 'PELLET BURNER FIRING' operation the burner fan speed is not correct then the warning 'AIR PRESSURE ERROR' is displayed on the burner screen.

Note 3. Check the condition of the air supply tube to the pressure switch, replace if necessary.

Note 4. Using a digital manometer (set for positive pressure) connected as shown below. Check the burner fan is generating a minimum air pressure of 0.8mbar to activate the air pressure switch.



12 Spare parts

12.1 Burner
Burner controls –Exploded view

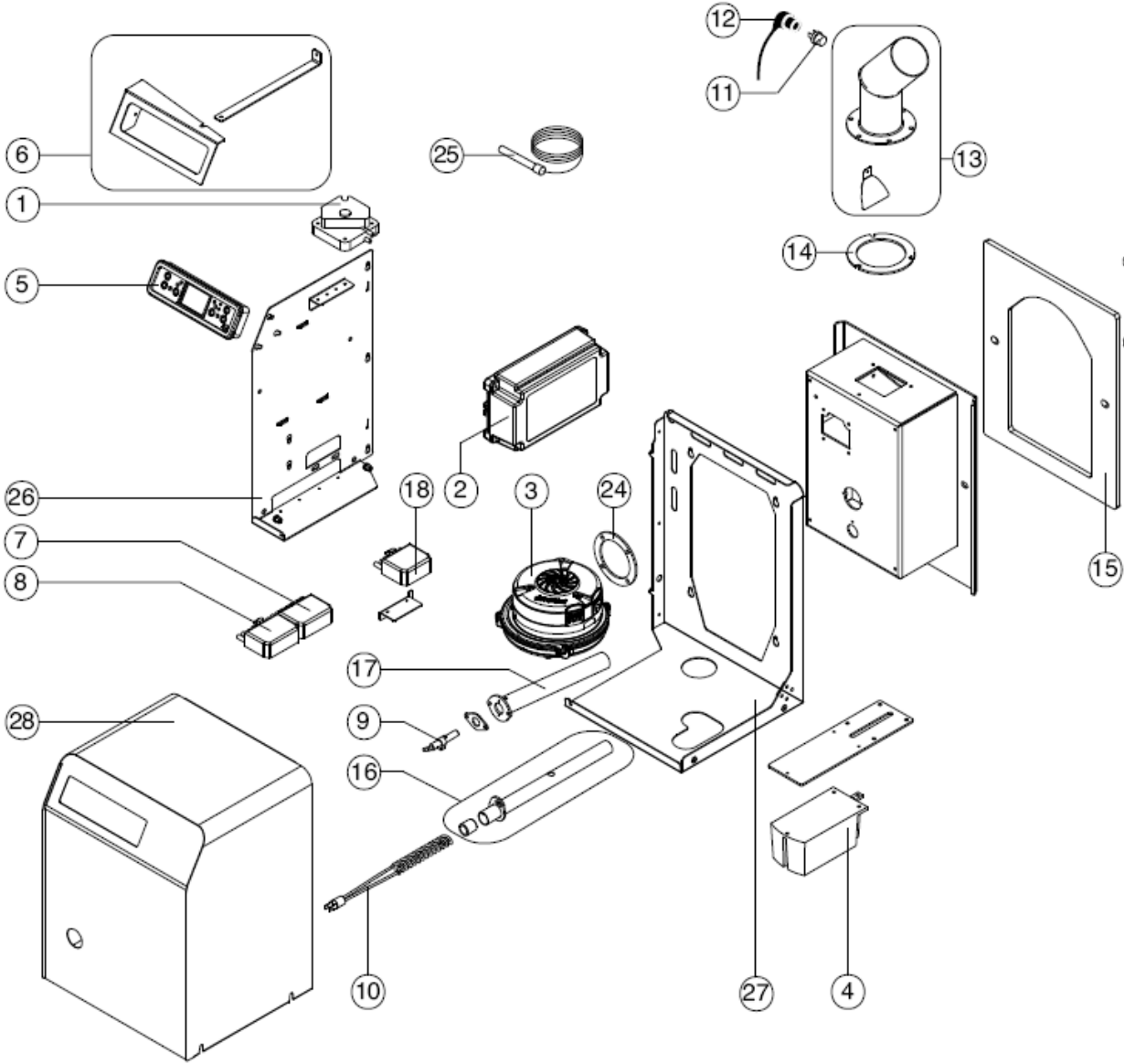


Fig 12.1

Burner Brazier –Exploded view

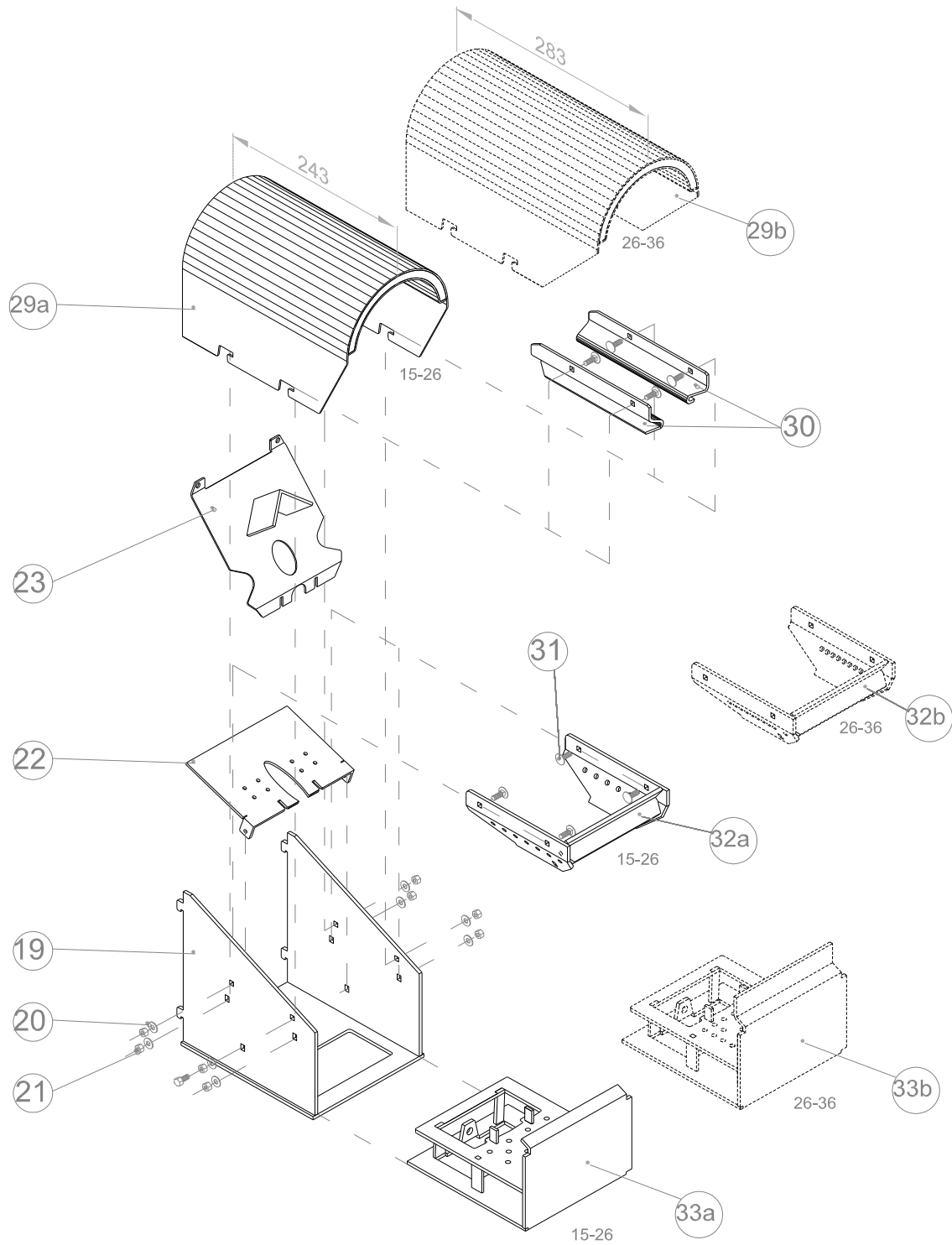


Fig 12.2

Burner parts list

Item	Description	Part No.	Quantity 6-26	Quantity 9-36
1	Pressure switch	WP111	1	1
2a	Primary printed circuit board 6-26	WP112A	1	-
2b	Primary printed circuit board 9-36	WP112B	-	1
3	Burner fan	WP03	1	1
4	Servomotor	WP04	1	1
5	LED display unit c/w enclosure	WP05	1	1
6	Mounting bracket set (LED display)	WP06	1	1
7	Electrical connector 7 way female	WP07	1	1
8	Electrical connector 7 way male	WP08	1	1
9	Photocell	WP09	1	1
10	Ignition element	WP10	1	1
11	Pellet feed tube thermostat	WP11	1	1
12	Pellet feed tube thermostat cover	WP12	1	1
13	Pellet feed tube	WP13	1	1
14	Pellet feed tube gasket	WP14	1	1
15	Burner mounting gasket	WP15	1	1
16	Ignition element housing	WP16	1	1
17	Photocell tube	WP17	1	1
18	Electrical connector 6 way male	WP18	1	1
19	Brazier chassis	WP19	1	1
20	M6 washer	WP20	8	8
21	M6 nut	WP21	8	8
22	Ignition element mounting plate	WP22	1	1
23	Photocell back plate	WP23	1	1
24	Burner fan gasket	WP24	1	1
25	Boiler water thermistor	WP25	1	1
26	Controls chassis left gable	WP26	1	1
27	Controls chassis back-plate & base	WP27	1	1
28	Main burner cover	WP28	1	1
29a	Flame hood 6-26	WP29A	1	-
29b	Flame hood 9-36	WP29B	-	1
30	Brazier flame plate set	WP130	1	1
31	M6 x 15 Coach bolt	WP31	8	8
32a	Grate enclosure (6-26)	WP32A	1	-
32b	Grate enclosure (9-36)	WP32B	-	1
33a	Brazier base assembly 6-26	WP33A	1	-
33b	Brazier base assembly 9-36	WP33B	-	1

12.2 Boiler Exploded view

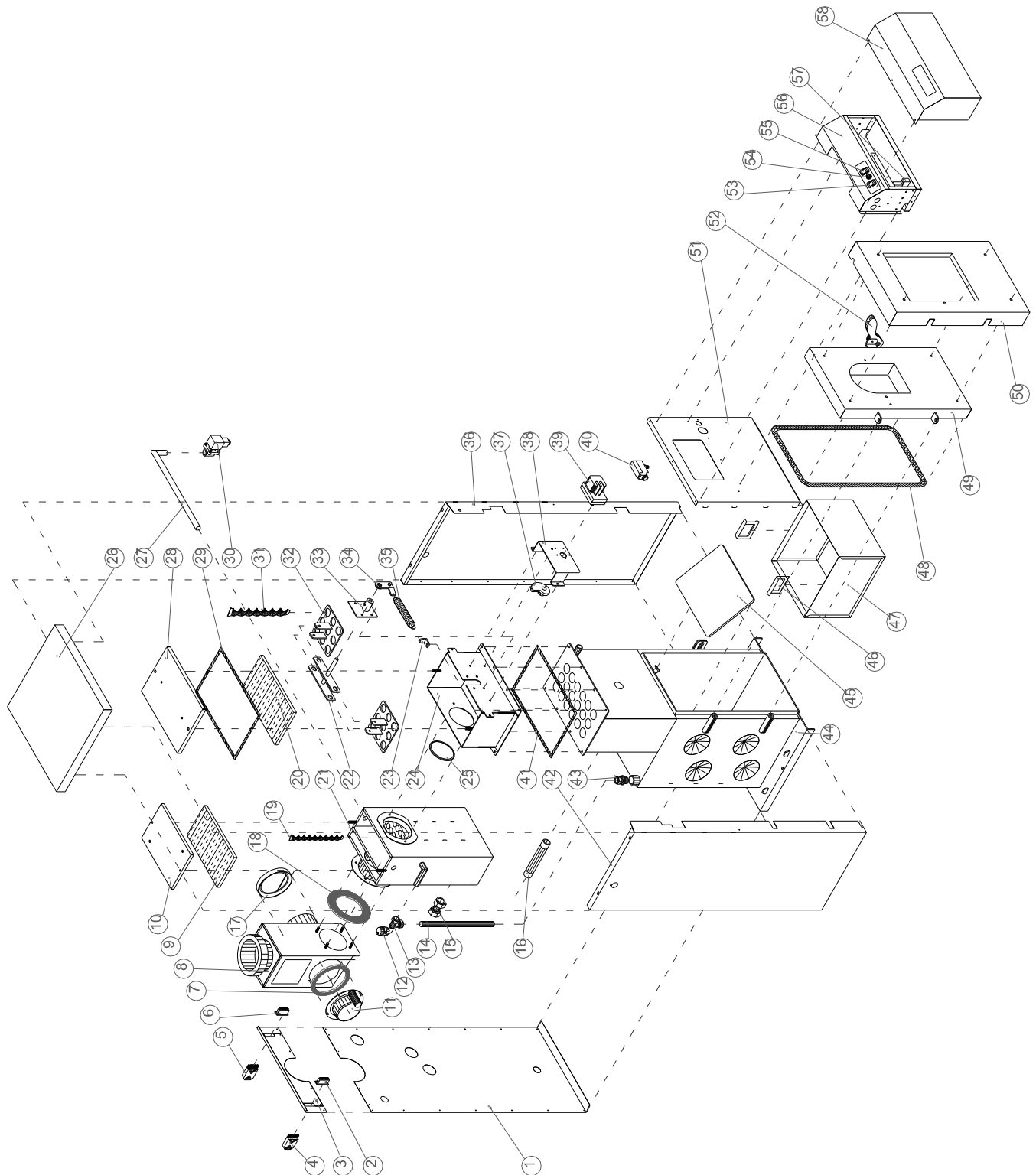


Fig 12.3 SPIRA 6-26 boiler displayed

Boiler parts list

Item	Description	Part No.	Quantity 6-26	Quantity 9-36
1	Rear lower panel	WP34	1	1
2	5 way mains connection –male fixed	WP 35	1	1
3	Rear upper panel	WP36	1	1
4	5 way mains connection –female detachable	WP37	1	1
5	5 way flue fan / cleaning solenoid connection –male detachable	WP38	1	1
6	5 way flue fan /cleaning solenoid connection – female fixed	WP39	1	1
7	Flue fan sealing gasket	WP40	1	1
8	Fan box	WP41	1	1
9	Cleaning door sealing gasket –secondary 6-26	WP42	1	-
-	Cleaning door sealing gasket –secondary 26-26	WP43	-	1
10	Cleaning door –secondary 6-26	WP44	1	-
-	Cleaning door –secondary 26-26	WP145	-	1
11	Flue fan	WP46	1	1
12	Air vent	MPCBS29	1	1
13	Air vent manifold	WP48	1	1
14	22mm Secondary to primary pipe 6-26	WP49	1	-
-	22mm Secondary to primary pipe 9-36	WP50	-	1
15	Return assembly 6-26	WP51	1	-
-	Return assembly 9-36	WP52	-	1
16	1" BSP Flow pipe 6-26	WP53	1	-
-	1 ¼" BSP Flow pipe 9-36	WP54	-	1
17	Draught Stabilizer	WP55	1	1
18	Fan box/secondary gasket	WP56	1	1
19	Secondary heat-exchanger spiral baffle	WP57	30	40
20	Cleaning door sealing gasket –Primary 6-26	WP58	1	-
-	Cleaning door sealing gasket –Primary 9-36	WP59	-	1
21	Secondary heat-exchanger 6-26	WP60	1	-
-	Secondary heat-exchanger 9-36	WP61	-	1
22	Shaker arm assembly 6-26	WP62	1	-
-	Shaker arm assembly 9-36	WP63	-	1
23	Spring anchor -fixed	WP64	1	1
24	Shaker chamber 6-26	WP65	1	-
-	Shaker chamber 9-36	WP66	-	1
25	Primary/secondary gasket	WP67	1	1
26	Top panel 6-26	WP68	1	-
-	Top panel 9-36	WP69	-	1
27	Cleaning pipe manifold 6-26	WP70	1	-
-	Cleaning pipe manifold 9-36	WP71	-	1
28	Cleaning door-shaker chamber 6-26	WP72	1	-
-	Cleaning door-shaker chamber 9-36	WP73	-	1
29	Fibre rope -shaker chamber door 6-26	WP74	1	-
-	Fibre rope -shaker chamber door 9-36	WP75	-	1
30	Solenoid valve	WP76	1	1
31	Secondary heat-exchanger spiral baffle	WP77	18	24
32	Spiral hanger 6-26	WP78	1	-
-	Spiral hanger 9-36	WP79	-	1
33	Shaker assembly mounting flange	WP80	1	1
34	Spring anchor -movable	WP81	1	1
35	Cleaning mechanism spring	WP82	1	1
36	Right side panel 6-26	WP83	1	-
-	Right side panel 9-36	WP84	-	1
37	Cleaning mechanism cam	WP85	1	1
38	Cleaning motor mounting flange	WP86	1	1
39	Cleaning mechanism motor	WP87	1	1
40	Door interlock	WP88	1	1
41	Shaker chamber mounting gasket 6-26	WP89	1	-
-	Shaker chamber mounting gasket 9-36	WP90	-	1
42	Left side panel 6-26	WP91	1	-
-	Left side panel 9-36	WP92	-	1
43	Brass fitting 1"BSP x 22mm 311	WP93	1	-
-	Brass fitting 1 1/4"BSP x 28mm 311	WP94	-	1
44	Primary heat-exchanger 6-26	WP95	1	-
-	Primary heat-exchanger 9-36	WP96	-	1
45	Combustion chamber baffle 6-26	WP97	1	-
-	Combustion chamber baffle 9-36	WP98	-	1
46	Ash pan handles	WP99	2	2
47	Ash pan 6-26	WP100	1	-
-	Ash pan 9-36	WP101	-	1
48	Combustion chamber cleaning door rope	WP102	1	1
49	Combustion chamber cleaning door	WP103	1	1
50	Combustion chamber cleaning door panel	WP104	1	1
51	Front panel	WP105	1	1
52	Combustion chamber cleaning door handle	WP106	1	1
53	On/Off switch	EFBS22	1	1
54	Limit stat	WP107	1	1
55	Momentary switch (double pole on/on)	WP108	1	1
56	Control panel chassis	WP109	1	1
57	Relay	MPCBS72X	1	1
58	Control panel cover	WP110	1	1
59	Plug (not show)			
60	Plug (not shown)			

Items not indexed are specific to the 9-36 model.

12.3 Intermediate Hopper -Exploded view (rear)

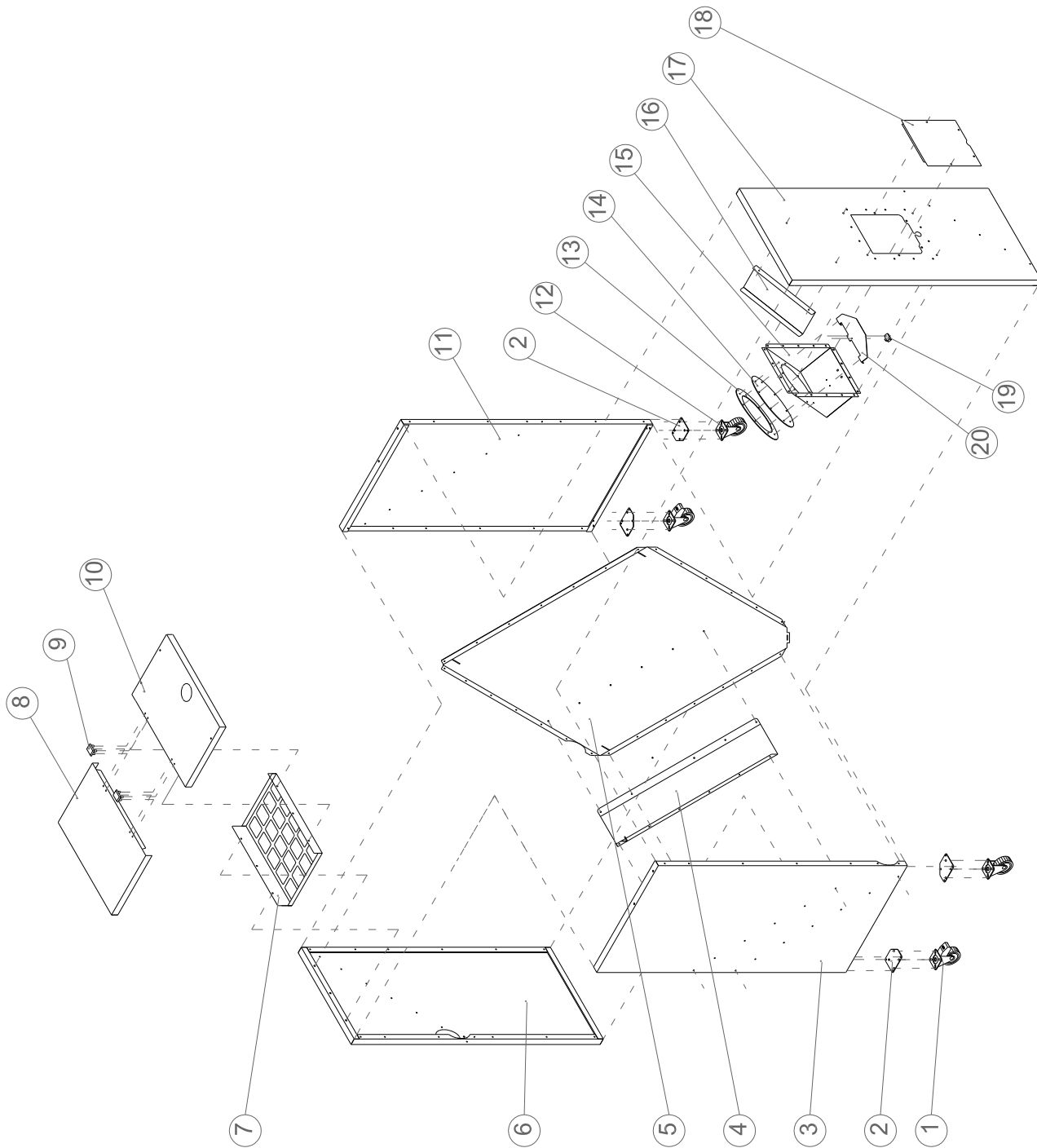


Fig. 12.4

Intermediate Hopper parts list

Item	Description	Part No.	Quantity 6-26 & 9-36
1	Castor Wheel (c/w brake)	WP146	2
2	Caster wheel flange	WP147	4
3	Right side panel	WP148	1
4	Pellet feed Auger shield	WP149	1
5	Base	WP150	1
6	Front panel	WP151	1
7	Grid	WP152	1
8	Top front panel	WP153	1
9	Door hinge	WP154	2
10	Top rear panel	WP155	1
11	Left side panel	WP156	1
12	Castor Wheel	WP157	2
13	Rubber diaphragm flange	WP158	1
14	Rubber diaphragm	WP159	1
15	Wiring centre	WP160	1
16	Pellet damper	WP161	1
17	Rear panel	WP162	1
18	Wiring centre access cover	WP163	1
19	Low level limit switch	WP164	1
20	Limit switch bracket	WP165	1

13. Health and Safety Information

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

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

The following other materials are present in the product;

13.1 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.

13.2 Sealant and adhesive

Material Types; Silicone elastomer.

Description; Sealant and adhesive.

Known Hazards: Irritation to eyes.

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

After handling always follow normal good hygiene practices.

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

First Aid; Eyes –Flush eyes with water for 15 minutes. See immediate medical attention.

Skin –Wipe off and wash with soap and water.

Inhalation –Remove to fresh air.

[illegible]



GRANT ENGINEERING (UK) LTD.

Hopton House,
Hopton Industrial Estate,
Devizes,
Wiltshire. SN10 2EU
UK

Telephone: 01380 736920

Fax: 01380 736991

Email: info@grantuk.com

Website: www.grantuk.com

GRANT ENGINEERING (IRL) LTD.

Crinkle
Birr,
Co. Offaly,
Ireland

Telephone: 057 9120089

Fax: 057 9121060

Email: info@grantengineering.ie

Website: www.grantengineering.ie