



Greenflame Slim Wood Pellet Boiler 18kW Internal & External



Installation, Operation and Servicing Instructions

PLEASE NOTE:

This product MUST be commissioned by a T R Engineering Ltd approved engineer.

INSTALLER

**Have you been trained by T R Engineering Ltd to commission this appliance?
If you intend to commission and do not have a T R Engineering Ltd Cert No. Call now to
arrange training on 0114 257 2300**

Please read these instructions carefully before installing and operating this appliance.

TO BE RETAINED BY THE HOUSEHOLDER

Contents

1. Introduction	3	6.5 Lambda Control Panel Schematic	15
2. Warnings and Guarantee/Warranty Information	3-5	6.6 Auger Set-Up (Optional)	16
2.1 Safety Instructions	3	6.7 Vacuum System Set-Up (Optional)	17-18
2.2 Operating Warnings	4	6.7.1 Description	17
2.3 Guarantee/Warranty Information	4	6.7.2 Installation	17
2.3.1 Limitations	4	6.7.3 Controller Functions	17
2.3.2 Exclusions	4	6.7.4 System Menu	17
2.4 Clean Air Act 1993	5	6.7.5 Technical Data	18
2.5 Customer Handover	5	6.7.6 Assembly	18
3. After Sales Service Information	5-6	6.8 Water Connections	18
3.1 How to Report a Fault	5	7. Control System	19-23
3.2 Technical Assistance	5	7.1 System Menu	19
4. How your Greenflame 18kW Boiler Operates	6-10	7.1.1 Auger On Menu	19
4.1 OFF Mode	6	7.1.2 Combustion Fan Menu	20
4.2 Check-Up	6	7.1.3 Exhaust Fan Menu	20
4.3 Ignition	6-8	7.1.4 Thermostats Menu	20
4.3.1 Pre-Heating Phase	7	7.1.5 Timer Menu	21
4.3.2 Auger Pre-Load	7	7.1.6 Default Settings	21
4.3.3 Fixed Ignition	7	7.1.7 Enables Menu	21
4.3.4 Variable Ignition	7	7.1.8 Temperature Delta	22
4.3.5 Exit from Ignition	7	7.1.9 Water Pressure Sensor Threshold	22
4.4 Stabilisation	8	Menu	
4.5 Recover Ignition	8-9	7.1.10 Vacuum Regulator Control	22
4.5.1 Loss of Voltage	8	7.2 Lambda Menu	22
4.5.2 Restart in Extinguishing	9	7.2.1 Lambda Regulator Control	22
4.6 Work Mode	9	7.3 Counters Menu	22
4.7 Modulation	9	7.3.1 Counters	23
4.7.1 Exhaust Temperature Modulation	9	7.3.2 Error List	23
4.7.2 Water Temperature Modulation	9	7.4 Outputs Test	23
4.7.3 Ambient Thermostat HV and LV		8. Error Codes	23
Modulation	9	9. Boiler Operation & Maintenance	24
4.8 Standby	9-10	9.1 Turning ON & OFF the Boiler	24
4.8.1 Standby > Modulation	9	9.2 Emptying the Ash Pan	24
4.8.2 Standby > Extinguishing	10	9.3 Filling the Hopper with Fuel	25
4.9 Safety	10	10. Technical Data	25
4.10 Extinguishing	10	11. Maintenance Schedule	26
4.10.1 Extinguishing	10	12. Spares List	26
4.10.2 Final Cleaning	10	13. Service Log	27
5. Pre-Installation Considerations	10-12		
5.1 Pellets	10		
5.2 Considerations for Installation	11		
5.3 Operating Area	11		
5.4 Connection of the Flue	12		
5.5 Operating Problems caused by Draught			
Defects in the Flue	12		
6. Installation and Assembly	12-19		
6.1 Plumbing Connections	12		
6.2 Unpacking	13		
6.3 Preparing the Base	13		
6.4 Electrical Connections	13		
6.5 Boiler Control Panel Schematic	14		

1. Introduction

Dear Customer,

We wish to thank you for choosing this Greenflame wood pellet boiler product from T R Engineering Ltd. **In order to get the best performance from your appliance we recommend that you read this booklet carefully before lighting the appliance for the first time.**





While thanking you again, may we remind you that the appliance **MUST NOT** be used by children and that they must always be kept at a safe distance from it.

Revisions to the publication

In order to improve the product, to keep this publication up to date the manufacturer reserves the right to make notifications without any advanced notice. Any reproduction, even in part, of this manual without the consent of T R Engineering Ltd is prohibited.

Care of the manual and how to consult it

- Take good care of this manual and keep it in a place which can easily and quickly be reached.
- If this manual should be lost or destroyed, or if it is in poor condition, ask for a copy from your retailer or directly from the manufacturer, providing product identification data.
- Information which is essential or that requires special attention is shown in bold text.
- Italic text is used to call your attention to other paragraphs in the manual or for any additional clarifications.

	ATTENTION This warning sign indicates that the message to which it refers should be carefully read and understood, because failure to comply with what these notices say can cause serious damage to the boiler and put the user's safety at risk.
	INFORMATION This symbol is used to highlight information which is important for proper boiler operation. Failure to comply with these provisions will compromise use of the boiler and its operation will not be satisfactory.
	OPERATING SEQUENCES Indicates a sequence of buttons to be pushed to access menus or make adjustments.
	MANUAL Indicates that you should carefully read this manual or the related instructions.

T R Engineering Ltd

T R Engineering Ltd operates a policy of continuous development and improvements of our products and welcomes any feedback from our customers. Please forward your comments to:

T R Engineering Ltd
Unit 7, Newton Chamber Way
Thornccliffe Industrial Estate
Chapelton
Sheffield
S35 2PH

Tel: 0114 257 2300

Fax: 0114 257 1419

E-mail: info@trianco.co.uk

Web: www.trianco.co.uk

2. Warnings and Guarantee/Warranty Conditions

2.1 Safety Instructions



Installation of the boiler, making electrical connections, checking its operation and maintenance are all tasks which should be carried out by qualified and authorised personnel.

Install the boiler in accordance with the regulations in force in your local area, region and country.

For the correct use of the appliance and to prevent accidents, the instructions given in this booklet must always be followed.

Use, adjustment and programming must be carried out by adults. Errors or incorrect settings may cause hazardous conditions and/or poor operation.

Before beginning any operation, the user, or whoever is preparing to operate on the appliance, must have read and understood the entire contents of this instruction booklet.

All responsibility for improper use is taken entirely by the user and such use relieves T R Engineering Ltd of any civil or criminal responsibility.

Most of the surfaces of the appliance are extremely hot (the boiler door, the handle, smoke discharge pipes, etc.). avoid coming into contact with these parts, without adequate protective clothing or suitable implements which keep the hands cool.

Carefully explain this hazard to elderly people, disabled people and particularly to all children, keeping them away from the appliance while it is running.

Under no circumstances should the appliance be run with the door open.

Do not touch the appliance with wet hands, in view of the fact that it is an electrical appliance.

Before carrying out any cleaning or maintenance operation, make sure in advance that the appliance is isolated from the mains electricity supply, by removing the mains isolator fuse.

The appliance must be connected to an electrical system which is equipped with an earth conductor, as laid down in directive 73/23 EEC and 93/98 EEC.

The fuse must be of adequate rated capacity for the stated electrical power of the appliance.

Incorrect installation or faulty maintenance (not conforming to the requirements set out in this booklet) can cause harm to people, animals or property. In such cases T R Engineering Ltd is absolved from any civil or criminal responsibility.

Adhesive 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 were intended. The appliance contains no asbestos.

2.2 Operating Warnings

Shut the appliance down in the event of breakdown or bad running.

Pellets must not be fed manually into the burner.

Accumulated un-burnt pellets in the burner after repeated failed ignitions must be removed before re-lighting.

Do not wash the appliance with water. The water could get inside the unit and damage the electrical insulation and cause electrical shocks.

Do not put any fuel, other than wood pellets, in the hopper.

Install the appliance in a location which is suitable for fire-fighting and equipped with all services such as air and electricity supply and provision for discharging combustion gases.

If there is a fire in the flue pipe, extinguish the appliance, disconnect it from the power supply and never open the door. Then contact the competent authorities.

If the appliance is in storage, it should be in a place that is free of damp, and it should not be exposed to extremes of temperature.

It is inadvisable to base the appliance directly on a floor (if located indoors), and if the floor is made of flammable material, it must be suitably insulated.

Do not light the appliance with flammable materials if the ignition system breaks down.



Information

In case of any problems, get in touch with your dealer, or a qualified engineer authorised by T R Engineering Ltd and if a repair is necessary, insist on the use of original spare parts.

Use only fuel recommended by T R Engineering Ltd (ENplus-A1) may be used with the appliance.

Periodically check and clean the smoke outlet ducts (connection to flue pipe).

Accumulated un-burnt pellets in the burner after repeated failed ignitions must be removed before lighting.

Always keep the cover of the fuel hopper closed.

Keep this instruction manual safe because it must stay with the appliance throughout its working life. If the appliance is sold or transferred to another user, always make sure that the booklet goes with the product.

If it gets lost, ask T R Engineering Ltd or your authorised dealer for another copy.

2.3 Guarantee/Warranty Information

T R Engineering Ltd offers the following warranties on this appliance:

Leaks in the heat exchanger – 5 years

Faulty electrical components (motors, fan, controller) – 1 year

Pump, ignition element – 1 year

From the date of first ignition of the appliance as proved by a valid commissioning report which gives the name of the installer/commissioning engineer and the date on which the commissioning took place. The guarantee is conditional on the commissioning report being filled in and returned to the manufacturer within 10 days and requires that the product be installed and commissioned by an approved T R Engineering Ltd installer according to the detailed instructions given in the instruction booklet supplied with the product.

The term 'guarantee' is to be understood to denote the free of charge replacement or repair of parts only, recognised to have been defective at the start by reason of manufacturing defects.

2.3.1 Limitations

The above guarantee does not cover parts subject to normal wear such as gaskets, fibre board on doors and any parts which can be removed from the firebox such as burner pot, baffles and ash box. The replacement will be guaranteed for the remainder of the guarantee period starting from the date of commissioning of the product.

2.3.2 Exclusions

The warranty excludes all ancillary products associated with the system (e.g. flue pipes, external circulation pumps, bulk hoppers and augers, plumbing and electrical system). The warranty does not cover third party damage to the product or damage caused by the plumbing (an example would be an inappropriately sized expansion vessel) or electrical system. Warranty does not cover issues arising from pellets that do not conform to ENplus-A1.

Recommendations advised to the customer to be carried out during commissioning must be completed and advised to your local dealer in order to validate the warranty.

The requirement for the flue installation, particularly in relation to draught, is the responsibility of the system owner. Compliance with Local Building Regulations must be adhered to. The warranty does not cover misuse of the product or sabotage.

Any consequential damage caused by the failure of a component on this product is not covered.

T R Engineering Ltd refuses to accept the responsibility for any damage which may be caused, directly or indirectly, by persons, animals or things in consequence of the failure to observe all prescriptions laid down in the instruction booklet, especially those concerning warnings on the subject of installation, use and maintenance of the appliance.

Damage caused by transport and/or handling is excluded from the guarantee.

The guarantee will be invalidated in the event of damage caused by tampering with the appliance, atmospheric agents, natural disasters, electrical discharges, fire, defects in the electrical system and caused by lack of, or incorrect, maintenance in terms of the manufacturer's instructions.

Claims under the Guarantee



The request for action under the guarantee must be addressed to the dealer/retailer, who will forward the claim to T R Engineering Ltd's technical assistance service. **T R ENGINEERING LTD DECLARES THAT THE APPLIANCE WHICH YOU HAVE PURCHASED COMPLIES WITH THE EEC DIRECTIVE 2004/108 EC AND 2006/95/EEC AND SUCCESSIVE AMENDMENTS.**



T R Engineering Ltd refuses to accept responsibility in the event that the appliance or any other accessory has been improperly used or modified without authorisation. For all replacement of parts, only original T R Engineering Ltd spare parts must be used.

2.4 Clean Air Act 1993

Under the Clean Air Act 1993 local authorities may declare the whole or part of the district of the authority to be a smoke control area. It is an offence to emit smoke from a chimney of a building, from a furnace or from any fixed boiler if located in a designated smoke control area. It is also an offence to acquire an "unauthorised fuel" for use within a smoke control area unless it is used in an "exempt" appliance ("exempted" from the controls which generally apply in the smoke control area).

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

Further information on the requirements of the Clean Air Act 1993 can be found here: <http://smokecontrol.defra.gov.uk/>

Your local authority is responsible for implementing the Clean Air Act 1993 including designation and supervision.

2.5 Customer Handover

After every commission the customer **MUST** be provided with training by the commissioning engineer. The following is a list of items which should be covered during the product induction with the customer:

- Provide a general overview of the product and identify the main components and their function.
- Illustrate how to turn on and off the appliance and adjust water temperature through the user menu.
- Demonstrate where and how to fill the appliance with fuel and advise of the correct quality of fuel to be used.
- Demonstrate how to clean down the combustion chamber by removing and replacing the baffles, emptying the ash

containers in the main combustion chamber and lower ash chamber.

- Explain how to remove the burner grate and clear the air holes to ensure good combustion.
- Explain the various error codes that may appear and provide instruction on how to manage and clear messages. Provide warnings on which error codes are system critical codes and should not be reset by the customer.
- The customer must be warned of the safety implications when handling hot ash and that heat proof gloves should be used.

The product warranty must be explained to the customer and they shall sign the commissioning card confirming that they have received instructions on how to operate the appliance, understand the risks when handling hot ash and agree to the product warranty.

The warranty card and commissioning report shall be returned to T R Engineering Ltd by fax, email or post within 30 days from the commissioning date.

3. After Sales Service Information

A qualified field service engineer is available to attend a breakdown occurring during the boiler's guarantee period.

The boiler must be made available for attendance during normal working hours, Monday to Friday.

3.1 How to Report a Fault

Step 1

Contact your installation or service engineer, who should assess the unit and works carried out on the appliance prior to requesting the attendance of an engineer from T R Engineering Ltd.

Step 2

Please note that upon attendance by T R Engineering Ltd engineer, a charge will be made where:

- The engineer finds no fault with the boiler.
- The cause of the breakdown is due to parts of the system not manufactured or supplied by T R Engineering Ltd.
- The boiler has not been installed in accordance with these instructions.
- The boiler has not been commissioned by a qualified engineer.
- The boiler has not been serviced annually since installation.
- The breakdown occurs outside the guarantee period.
- The appliance has not been serviced annually since installation.
- The breakdown occurs as a result of work on the appliance by an unauthorised third-party.

Important:

Invoices for attendance and repair work by any third-party will not be accepted unless authorised in advance by T R Engineering Ltd.

3.2 Technical Assistance

A team of trained technical advisors are available to discuss any problem with the appliance. In many cases, the problem may be solved over the telephone, eliminating the need for an engineer's visit.

Before making contact, please have the following information ready:

- The appliance serial number or your unique customer identification number (issued upon registration of the appliance with T R Engineering Ltd).

- A description of the fault and any unusual behaviour by the boiler before the failure occurred.
- The installation and commissioning dates and the details of any annual services.

Appliance Serial No: _____
Cust. ID No: _____
Installation Date: ____/____/____
Commissioning Date: ____/____/____

Service Centre and Technical Support
Tel: 0114 257 2300 Fax: 0114 257 1419

Hours of Business
Monday – Thursday: 8:30am – 17:00pm
Friday: 8:30am – 14:30pm

4. How you Greenflame 18kW Pellet Boiler Operates

The Greenflame 18kW user interface has been designed to allow the user to carry out the basic operational and maintenance functions while an advanced digital control system operates in the background controlling combustion, temperature control and modulation within the pre-determined safety parameters. The combustion is regulated with function powers. Each power includes:

- Combustion fan speed
- Exhaust fan speed
- Auger ON and OFF
- Auger2 ON and OFF

Through these parameters it is possible to define the quantity of pellet and air used in every moment.

The collection of powers that regulate the controller's work is called combustion recipe. It is possible to select 3 combustion recipes; each one could be defined to manage a different type of pellet for example. The functioning states and the management of INPUTS and OUTPUTS are explained in this chapter.

1	OFF
2	CHECK-UP
3	IGNITION
4	STABILISATION
5	RECOVER IGNITION
6	WORK MODE
7	MODULATION
8	STANDBY (AUTO MAINTENANCE)
9	SAFETY
10	EXTINGUISHING (OFF MODE)
11	BLOCK

The system guarantees the security and alarms reading in each functioning phase.

4.1 OFF Mode

It is the OFF state. The controller enters in this phase in the following cases:

- At the end of the **extinguishing** phase with exhaust temperature under thermostat **TH01 Exhaust OFF** and light (of the flame) values under thermostats **L00 Light OFF**.

Display		OFF
Combustion Fan	OFF	
Exhaust Fan	OFF	
Auger	OFF	
Auger2	OFF	
Resistance	OFF	
Belimo Valve	OFF	

If the exhaust temperature is over the value **TH01 Exhaust OFF** or light is over **L00 light OFF**.

- The system starts again the **Extinguishing** phase.

4.2 Check-Up

The phase allows the staring cleaning before the **Ignition** phase. You can define the starting cleaning Timer. This phase starts in these cases:

- If you press button ON/OFF of the control panel and the controller is in OFF mode or in **extinguishing** mode and in menu enables parameter **A10 = 0**.
- If the ambient thermostat or ambient thermostat HV says ON (closes the contact) and the system is in OFF mode (if the system is in **Extinguishing** mode it ends this phase then start again and goes into **Check Up**, then into **Ignition**).
- At the end of the state of **Standby** (if water temperature and exhaust temperature are under thermostats (see paragraph 4.8)).
- If you have enabled one of the possible programming of the internal **Chrono** (for example programmed daily) and the actual time is the ON time of the programming.

Display		Check-Up
Combustion Fan	Prob	Message prob if the sensor test is good
	ON	To the speed UC22 – Check-Up
Exhaust Fan	ON	Enables A42 = 1 To the speed UA22 – Check-Up
	OFF	Enables A42 = 0
Auger	OFF	
Auger2	OFF	
Resistance	OFF	
Belimo Valve	OFF	At the beginning of Check-Up
	ON	After T50 seconds

In this phase the controller verifies the connected probes. If the controller reads a probe's value in excess with the admitted maximum or minimum range, the display shows Prob (note: 0°C means unconnected probe). This failure doesn't modify the boiler's functioning, it is only a warning. Verify the sensor's connections.

- To bypass this phase set parameter **T01 – Timer starting cleaning = 0**.

End of **Check-Up**:

- At the end of the timer the system goes into **Ignition** phase.

If the water temperature is greater than thermostat **TH25 Water Safety** or exhaust temperature is over thermostat **TH08 Exhaust Safety** the system goes into **Extinguishing** mode.

4.3 Ignition

Starts in the following cases:

- At the end of the phase **Check-Up**.

The Ignition phase is divided into four phases each with a programmable duration:

4.3.1 Pre-Heating Phase

The aim of the phase is to bring the heating resistance to the right temperature before the pellet loading in the burner pot. The duration is the value **T02 – Timer Pre-Heating**.

Display		Pre-Heating
Combustion Fan	ON	To the speed UC00 Ignition Fixed.
Exhaust Fan	ON	Parameter Enable A42 = 1 UA00 Ignition Fixed
	OFF	Parameter Enable A42 = 0.
Auger	OFF	
Auger2	OFF	
Resistance	ON	
Belimo Valve	ON	

To bypass this phase set the parameter **T02 – Timer Pre-Heating** = 0.

4.3.2 Auger Pre-Load

The aim of the phase is to load the pellet in the burner pot. The duration of this phase is **T03 – Timer Pre-Load**.

Display		Pre-Load
Combustion Fan	ON	To the speed UC00 Ignition Fixed
Exhaust Fan	ON	Parameter Enable A42 = 1 UA00 Ignition Fixed
	OFF	Parameter Enable A42 = 0.
Auger	ON	Continually
Auger2	ON	
Resistance	ON	
Belimo Valve	ON	

To bypass this phase set the value **T03 – Timer Pre-Load** = 0

4.3.3 Fixed Ignition

The aim of the phase is to start Ignition of the flame in the combustion chamber. The duration is programmable through the parameter **T04 – Time Fixed Ignition**.

Display		Ignition Fix
Combustion Fan	ON	To the speed UC00 Ignition Fixed
Exhaust Fan	ON	Parameter Enable A42 = 1 UA00 Ignition Fixed
	OFF	Parameter Enable A42 = 0
Auger	ON	C00 Ignition Fixed ON time
Auger2	ON	
Resistance	ON	
Belimo Valve	ON	

To bypass this phase set the parameter **T04 – Time fixed** = 0

4.3.4 Variable Ignition

The aim of this phase is to maintain the flame in the combustion chamber before the passage to the **Stabilisation** mode. The duration is programmable through the parameter **T05 Variable Ignition Timer**.

Display		Ignition
Combustion Fan	ON	<ul style="list-style-type: none"> Exhaust temperature < Thermostat TH04 UC00 Fixed Ignition Speed Exhaust temperature > Thermostat TH04 UC01 Variable Ignition Speed
Exhaust Fan	ON	Parameter enable A42 = 1 <ul style="list-style-type: none"> Exhaust temperature < Thermostat TH04 UA00 Fixed Ignition Speed Exhaust temperature > Thermostat TH04 UA01 Variable Ignition Speed
	OFF	Parameter enable A42 = 0
Auger	ON	<ul style="list-style-type: none"> Exhaust temperature < Thermostat TH04 C00 Fixed Ignition ON time Exhaust temperature > Thermostat TH04 C01 Variable Ignition ON time
Auger2	ON	
Resistance	ON	Exhaust temperature < Thermostat TH02
	OFF	Exhaust temperature > Thermostat TH02
Belimo Valve	ON	

4.3.5 Exit from Ignition

The thermo regulator controls the system combustion between the exhaust probe and the photo probe. Setting the parameter **P27** it is possible to select which control thermostats to use.

Parameter P27	Used Probe	Thermostat
0	Exhaust Probe ONLY	TH09 bypass ignition TH06 bypass variable ignition TH03 Exhaust ON
1	Photo Probe ONLY	L01 Light ON
2	Exhaust Probe AND Photo Probe	TH09 bypass ignition TH06 bypass variable ignition TH03 Exhaust ON L01 Light ON

During Ignition Phase

Case 1

In every Ignition phase if:

- The exhaust temperature is over the thermostat **TH09**.
- AND
- The photo probe reads a light over value **L01**
 - The system goes into **Run mode**.

Case 2

In Variable Ignition phase if:

- The exhaust temperature is over the thermostat **TH06** and delta **D42** is satisfied (at the beginning of the Variable Ignition phase the system stores the exhaust temperature, when it increases by an amount of **D42** the delta is satisfied).

AND

- The photo probe reads a light over value **L01**.
 - The system goes into **Stabilisation**.

Case 3

In every **Ignition** phase if **P27** = 1

- The photo probe reads a light over value **L01**.
 - The system goes into **Stabilisation**.

End Ignition

In the end of **Ignition** phase if:

Case 1

- Exhaust temperature > thermostat **TH06**
- D42** satisfied

AND

- The photo probe reads light over value **L01** – Light ON
 - The system goes to **Stabilisation**.

Case 2

- Exhaust temperature < Thermostat **TH06**
- D42** not satisfied

AND

- Photo probe reads a value under **L01** – Light ON
 - The system tries the **variable ignition** phase again until the parameter **P02** maxim number of Ignitions.

Case 3

- If water temperature > Thermostat **TH25 Water Safety**
 - The system goes into **Extinguishing** mode.

4.4 Stabilisation

The aim of this phase is to maintain the flame in the combustion chamber before the passage to the normal mode. The duration of the phase is programmable through the parameter **T06 – Timer Stabilisation**.

Display		Stabilisation
Combustion Fan	ON	To the speed UC02 - Stabilisation
Exhaust Fan	ON	To the speed UA02 - Stabilisation
Auger	ON	C02 Stabilisation ON time
Auger2	ON	
Resistance	OFF	
Belimo Valve	ON	

During **Stabilisation** phase if the exhaust temperature is over the Thermostat **TH09**.

- The system goes into **Work** mode.

Conditions to return in Ignition

Parameter P27	Condition
0	Exhaust temperature < TH06 and D42 not satisfied
1	The photo probe reads a light under value L01
2	Exhaust temperature < TH06 and D42 not satisfied AND The photo probe reads a light under value L01

At the end of **Stabilisation** phase.

- The system goes into **Work** mode.

4.5 Recover Ignition

The system goes into recover ignition in two different conditions.

4.5.1 Loss of Voltage

The controller is able to verify the duration of the loss of voltage and then decide how to proceed with the functioning. Below is the 3 different cases evaluated by the controller according to the duration of the loss of voltage.

	Duration	Old State	New State
1	Time <= 10 seconds	-----	OLD STATE The system restarts from the last saved status and loads the general timer value. If for example the system starts the Pre-Load (duration = 40 seconds), and after 10 seconds the power goes OFF for 5 seconds, when the power is ON again the system knows that it has the remaining time for the Pre-Load is 30 seconds (40 seconds – 10 seconds). When the system calculates which is the remaining time, i.e. how many seconds it has to do it doesn't consider the period during which the power was OFF (in the example 5 seconds), so that the effective duration of the Pre-Load doesn't change.
2	10 seconds < Time < T42	Check Up Stabilisation Work Mode Modulation Standby	IGNITION The system goes into Recover Ignition that is an extinguishing phase. During this time the system waits until the exhaust temperature is under thermostat L00 Light OFF , then makes the final cleaning (fans to the maximum speed), then automatically restarts (goes into Ignition).
		Ignition	If the system is in Ignition and the power goes OFF, when the power is ON again the system automatically goes into Variable Ignition and continues the Ignition phase. In this case even if the system was in Pre-Load when the power is ON again the system goes into Variable Ignition so that the duration of the Pre-Load is always the same and the system doesn't do a new Pre-Load .
	10 seconds < Time < T42	OFF Block	OFF
	10 seconds < Time < T42	Extinguishing	OFF If exhaust temperature is over S16 TH_OFF and light is over L00 Light OFF the system starts the Extinguishing (OFF) procedure again.
3	Time < T42	-----	OFF

NOTE: The controller saves the status and the General timer every 5 seconds, so when there is a loss of voltage you have to consider that could be a difference of 5 seconds between the real value of the duration (of loss of voltage) and the value calculated. For this reason the minimum value of duration to go into the last saved status is 15 seconds (so that in the best case well have as a minimum value 10 seconds and in the worst case well have 15 seconds). This value is fixed. You can only set the maximum value to recover the ignition before the loss of voltage the system was in **ON mode**.

4.5.2 Restart in Extinguishing

During the **Extinguishing** mode press the ON/OFF button to restart if:

- The parameter enable **A10** = 1
 - The system finishes the **Extinguishing** phase and then it starts a new ignition from **Check-Up** phase.

Display Visualisation	Recover Ignition
-----------------------	------------------

- The parameter enable **A10** = 0
 - The system starts a new ignition from **Check-Up** phase.

4.6 Work Mode

When the system goes into **Work** mode it automatically increases the Combustion Power to the functioning. If the parameter **A16** = 1 the combustion power will increase a delay of **T18** or **T17** seconds in every transition (depending if the system comes from ignition or not).

Display		Run Mode	
Combustion Fan	ON	A05 = 1 Maximum Power	A05 = 0 User Power
Exhaust Fan	ON	A05 = 1 Maximum Power	A05 = 0 User Power
Auger	ON	A05 = 1 Maximum Power	A05 = 0 User Power
Auger2	ON		
Resistance	OFF		
Belimo Valve	ON		

From Work mode state the system can go into:

- Modulation
- Standby
- Extinguishing

4.7 Modulation

The aim of this phase is to reduce the combustion to gradually reach the thermostat **TH24** or reduce the exhaust temperature. The phase starts in the following cases:

4.7.1 Exhaust Temperature Modulation

If the exhaust temperature is greater than thermostat Exhaust modulation **TH07**:

- Immediately the controller reduces the combustion power by one unit.
- Waits for two minutes.

If at the end of this timer exhaust temperature > **TH07** + **D41**:

- The controller decreases the combustion power by another unit.
- Waits for another two minutes.

This procedure continues until exhaust temperature > **TH07** + **D41**. The system exits from **Modulation** if exhaust temperature < **TH07** – **IH07**.

4.7.2 Water Temperature Modulation

If the water temperature is greater than thermostat Water temperature.

- The system goes into **Modulation**

*Water modulation = **Water standby TH24** – **Delta standby D08**

- Case 1: A05 = 1 Automatic Combustion**

The system automatically calculates the combustion power value according to water temperature with a temperature step of **D08/6°C** and it sets this until Power 1.

- Case 2: A05 = 0 Manual Combustion**

The system automatically manages the combustion power as explained below. The controller calculates the combustion value according to water temperature with a temperature step of **D08/6°C**.

The system sets the calculated power value if it is lower than user power, otherwise it maintains the user power. During this phase if **A13** = 1 and water temperature is greater than thermostat **TH24** + **D10** for a time greater than **T51**.

- The system goes into **Standby – Extinguishing**.

4.7.3 Ambient Thermostat HV and LV Modulation

If **A07** = 1 or **A64** = 1 and there is no sanitary request (flow switch open if **P35** = 0, 1, 5 or buffer temperature greater than **TH29** if **P35** = 2, 3 or 4) the system will go into Modulation. At the end of Modulation, the system sets the user power.

Display		Modulation
Combustion Fan	ON	According to set power combustion
Exhaust Fan	ON	According to set power combustion
Auger	ON	According to set power combustion
Resistance	OFF	
Belimo Valve	ON	

4.8 Standby

If water temperature is greater than thermostat **TH24**.

OR

Exhaust temperature is greater than thermostat **TH10**.

OR

The buffer tank temperature is greater than thermostat **TH29** (if **P35** = 4 or **P35** = 2, 3 and summer time selected).

OR

Ambient thermostat LV (if **A07** = 2) and/or HV (if **A64** = 2) open and there is not sanitary request (flow switch open if **P35** = 0, 1, 5 or buffer temperature greater than **TH29** if **P35** = 2, 3 or 4).

If the water temperature goes over thermostat **TH25 Water Safety**, the system extinguishes completely and waits for a decrease in water temperature.

4.8.1 Standby > Modulation

Setting the enable parameters if:

A13 = 0 (Standby for water temperature)

OR

A21 = 0 (Standby for exhaust Temperature)

- Modulation Power

Display		Modulation
Combustion Fan	ON	To the speed UC10 – Modulation
Exhaust Fan	ON	To the speed UA10 – Modulation
Auger	ON	C10 Modulation ON time
Auger2	ON	
Resistance	OFF	
Belimo Valve	ON	

4.8.2 Standby - Extinguishing

Setting the enable parameters if:

A13 = 1 (Standby for water temperature)

OR

A21 = 1 (Standby for exhaust temperature)

OR

P35 = 4 or **P35** = 2, 3 and summer time selected (standby for buffer thermostat)

◆ Extinguishing

Display		Standby
Combustion Fan	ON	To the speed UC11 – Extinguishing
Exhaust Fan	ON	To the speed UA11 - Extinguishing
Auger	OFF	
Auger2	OFF	
Resistance	OFF	
Belimo Valve	OFF	

The controller starts the **extinguishing** phase to extinguish the flame and decrease the residual heat until the exhaust temperature is under thermostat **TH01 – Exhaust OFF** and light is under **L00 Light OFF**, then the system goes into:

◆ Final Cleaning

The final cleaning of the burner pot has a duration of a programmable time **T16**.

Display	Stdby	It is showed the message Stby
Combustion Fan	ON	To the speed UC23 – Final Cleaning
Exhaust Fan	ON	Enables A41 = 1 to the speed UA23 – Final Cleaning
	OFF	Enables A41 = 0
Auger	OFF	
Auger2	OFF	
Resistance	OFF	
Belimo Valve	OFF	

End of **Standby**:

Water temperature under thermostat **TH24 – IH24** and exhaust temperature under Thermostat **TH10 – IH10** and buffer tank temperature under **TH29 – IH29** and ambient thermostat closed (if configured for **Standby**).

- The system goes into **Check-Up** (See. Check-Up 4.2)

4.9 Safety

When the system goes into **Safety** mode the timer **T15 Safety Timer** starts. This phase starts in the following cases:

- The water temperature is over thermostat **TH25 Water Safety**.
- The exhaust temperature is over thermostat **TH08 – Exhaust Safety**.

During this phase the system controls if safety conditions persist.

Display		Safety
Combustion Fan	ON	To the speed UC10 – Modulation
Exhaust Fan	ON	To the speed UA10 - Modulation
Auger	OFF	
Auger2	OFF	
Resistance	OFF	
Belimo Valve	OFF	

If the water temperature increases over thermostat **TH40 Water Alarm** then an acoustic alarm starts. End of Safety Mode:

- If timer **T15** is not expired
 - The system goes to the previous state.
- If timer **T15** expires.
 - The system goes into **Extinguishing** mode and then in **Block** mode.

4.10 Extinguishing

It starts in the following cases:

- **Manual Extinguishing**: Press the ON/OFF button on the control panel whatever is the actual functioning state.
- **Automatic Extinguishing**: If the light is under thermostat **PHOTO PROBE LIGHT OFF L00** (or exhaust temperature is under **TH03** with **P27** = 0).
- If an alarm occurs

The state is divided into 2 phases.

4.10.1 Extinguishing

To extinguish the flame and wait until the end of the remaining heating, until exhaust temperature is under Thermostat **TH01 – Exhaust OFF**.

Display		Extinguish
Combustion Fan	ON	To the speed UC11 Extinguishing
Exhaust Fan	ON	To the speed UA10 Extinguishing
Auger	OFF	
Auger2	OFF	
Resistance	OFF	
Belimo Valve	OFF	

4.10.2 Final Cleaning

For the final cleaning of the burner pot for a programmable time **T16 Final Cleaning**.

Display		Extinguish
Combustion Fan	ON	To the speed UC23 Final Cleaning
Exhaust Fan	ON	Enables A41 = 1 To the speed UA23 Final Cleaning
		Enables A41 = 0
Auger	OFF	
Auger2	OFF	
Resistance	OFF	
Belimo Valve	OFF	

To bypass the phase final cleaning set the value **T16 – Time Final Cleaning** = 0 and remember that also during **Standby** the controller doesn't make the final cleaning. End of the **Extinguishing** mode:

- At the end of the **Final Cleaning** the system goes into **OFF** mode.

5 Pre-Installation Considerations

5.1 Pellets

Wood pellets are manufactured by hot-extruding compressed sawdust which is produced during the working of natural dried wood. The compactness of the material comes from lignin which is

contained in the wood itself and allows the production of pellets without the use of glues or binders.

The market offers different types of pellet with characteristics which vary depending on what mixture of woods is used. The diameter varies between 6mm and 8mm, with a standard length in the range 5mm to 30mm. Good quality pellets have a density which varies between 600kg/m³ and 750kg/m³, with a moisture content which varies from 5% to 8% by weight.

Besides being ecological fuel (exploiting timber residues to the maximum and achieving cleaner combustion than is possible with fossil fuel), pellets also have technical advantages. While good quality timber has a calorific power of 4.4kW/kg (with 15% moisture, therefore after about 18 months seasoning), the equivalent figure for pellets is 4.9kW/kg.

To ensure good combustion, the pellets must be stored in an area that is free of humidity and protected from dirt. The pellets are usually supplied in 10kg bags, so storing them is very convenient. Good quality pellets ensure good combustion, thus lowering the emission of harmful agents into the atmosphere.

The poorer the quality of fuel, the more frequently intervention be necessary for cleaning the internal parts, such as the grate and the combustion chamber.

The main certifications of quality for pellets in the European market are ENplus-A1 these ensure respect of:

- ✓ **Calorific Power:** 4.9kW/kg
- ✓ **Water Content:** max 10% of weight
- ✓ **Percentage of Ashes:** max 0.5% by weight
- ✓ **Diameter:** 6mm
- ✓ **Length:** max 30mm
- ✓ **Contents:** 100% untreated wood, with no added bonding substances (bark percentage 5% max)
- ✓ **Packaging:** in sacks made from ecologically compatible or biologically decomposing material.



T R Engineering Ltd recommends using certified fuel in its appliances to ENplus-A1. The use of fuel of inferior quality or not conforming to the specification given above compromises the running of your appliance and can therefore lead to the termination of the guarantee and of the manufacturer's responsibility for the product.

T R Engineering Ltd domestic pellet appliances run exclusively on pellets with a diameter of 6mm. It is recommended that the brand of pellets used during commissioning are used during normal operation. If you change your pellet supplier or brand, re-calibration may be necessary and a call-out charge will apply.

The Greenflame 18kW slim has been recommended a suitable for use in smoke control areas when burning ENplus-A1 wood pellets.

5.2 Considerations for Installation

Important!

Installation and assembly of the appliance must be carried out by qualified personnel.

The appliance must be installed in a suitable position to allow the normal operations of opening and ordinary maintenance. The site must be:

- Capable of providing the environmental conditions for operation.
- Equipped with power supply 230V 50Hz (EN73-23).
- Capable of taking an adequate system for smoke discharge.

- Provided with external ventilation (if located indoors).
- Provided with an earth connection complying with CEI 64-8.

The appliance must be connected to a flue pipe or internal or external vertical duct conforming to current standards UNI129-7131 9515.

The boiler must be positioned in such a way that the power isolation fuse is accessible.



Important!

The boiler must be connected to a flue pipe or vertical duct which can discharge the fumes at the highest point of the building.

The fumes are however derived from the combustion of wood products and if they come into with or close to walls, they can cause smoke staining. Also take care because the fumes are very hot and almost invisible and can cause burns on contact.

5.3 Operating Area

For proper functioning, the appliance should be positioned in a location where it is able to take in the air necessary for combustion of the pellets (above 40m³/h must be available), as laid down in the standard governing the installation and in accordance with local national standards. All louvers on the external casing of the boiler must be un-obstructed at all times as these allow air for combustion and for cooling to enter the appliance enclosure. Heavy snowfall can also obstruct the air in-take louvers and cause the appliance to not burn clean. Smoke emanating from the flue is a symptom of this. Snow must be cleared from around the appliance at the earliest opportunity.



Where the appliance is to be installed indoors it is not permissible to install the appliance where another heating appliance is installed (fireplace, stove, etc.) which does not have its own independent air in-take. Locating the appliance in a room with an explosive atmosphere, e.g. workshop or tool shed. The floor of the room where the appliance is to be installed must be strong enough to take its weight.

If the walls are flammable, position the appliance with a clearance to the rear of 450mm, 300mm on the sides and 1500mm at the front.

If the flooring is made of wood, provide a floor protection surface in compliance with current national standards.

Service Clearances

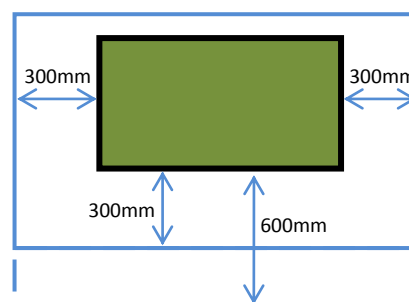
The minimum service clearances around the appliance are as follows:

Rear – 50mm Nominal

Ends – 300mm

Front – 600mm

Concrete plinth should extend 300mm past the front and ends.



5.4 Connection of the Flue

The proper draught conditions in the flue are critical for the efficient working of wood pellet boilers. The flue can exit the boiler house/garage through the roof or through the wall by using a bend on the flue. The combustion chamber works in negative pressure. The smoke duct for the discharge of fumes will also be under negative pressure when connected to an efficient flue pipe as directed.

All sections of the flue must be capable of inspection and removable to enable periodic internal cleaning.

Position the appliance bearing in mind all instructions and considerations above.

IMPORTANT!

THE FLUE IS AN INTEGRAL AND CRITICAL COMPONENT IN ANY SUCCESSFUL BIOMASS BOILER INSTALLATION. IN ORDER FOR YOUR BOILER TO OPERATE CORRECTLY EFFICIENTLY AND SAFELY IT HAS TO BE CONNECTED TO A FLUE SYSTEM WHICH IS SUITABLE, CORRECTLY DESIGNED AND INSTALLED.



INCORRECT FLUE CONNECTIONS CAN LEAD TO CONDITIONS BEING CREATED WHICH CAN BE UNSAFE, DAMAGING TO YOUR BOILER AND INVALIDATE THE WARRANTY.

- Check for adequate ventilation. This must be clear at **ALL** times. You must make the customer aware of the needs to avoid any obstruction of the air inlet facility. If an internal boiler is asked to operate without sufficient ventilation for fresh air it will lead to potentially dangerous and damaging consequences.
- Ensure that the flue installation meets all requirements in terms of the use of bends, tees and restrictions.
- Every flue **MUST** include draught stabilisation, explosion relief, condensate collection and the correct protective cowl or terminal as required.
- Commissioning – The flue draught must be checked under both full load and part load conditions to ensure that there is the correct amount of draw in both cases. It is essential that the correct draw is achieved for both specified flue gas temperatures and that a draught stabiliser is used to avoid over drawing of the flue. Correct setting of the draught stabiliser is critical.
- All flues must be correctly insulated. A poorly insulated flue can lead to issues during operation of the boiler which may be damaging.
- Flue termination must be in accordance with building regulations and pay attention to pressure zones which may be induced by the building and surrounding topography.

IMPORTANT!

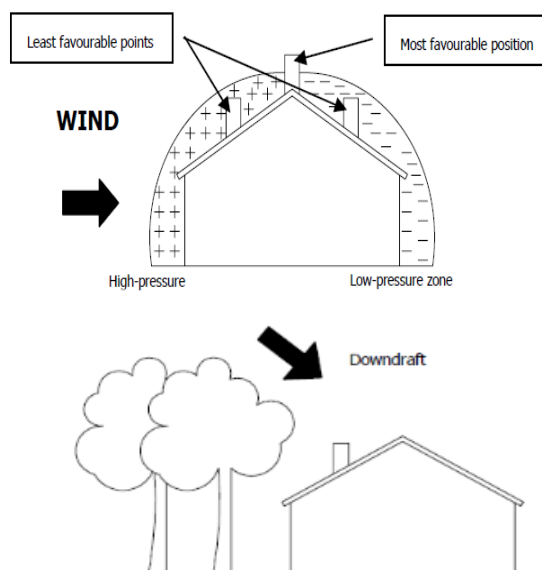
All 90° changes of direction in the flue pipe must be either removable or capable of inspection. For locating the boiler against a wall ensure adequate flue support using approved wall brackets.

THE FLUE PIPE RUN MUST NOT INCLUDE MORE THAN 2-3 METRES OF HORIZONTAL PIPE AND MORE THAN THREE 90° ELBOWS (INCLUDING T's). IT IS ALSO ADVISABLE NOT TO EXCEED 8 METRES IN LENGTH WITH THE PIPE DIAMETER OF 100mm.

5.5 Operating Problems Caused by Draught Defects in the Flue

Of all the weather and geographical conditions which affect the operation of a flue pipe (rain, fog, snow, exposure to sunlight, direction of facing), the wind is unquestionably the most decisive. In

fact, along with thermal depression caused by the difference in temperature inside and outside of the chimney, there is another type of depression or over-pressure; dynamic pressure caused by the wind. An up-draught always increases depression provided the cowl has been installed properly. A down draught always decreases depression, at times inverting it.



Besides the direction and force of the wind, the position of the flue and cowl with respect to the roof of the building and surrounding landscape is important.

The Greenflame air flow regulation system is equipped to deal with the conditions referenced above by regulating the air flow through the combustion chamber; an air flow sensor is mounted on the air in-take duct and measures the volume of air drawn through the burner pot by the exhaust fan. If down draught conditions are present and air flow increase, the exhaust fan increases speed to maintain the required air flow. The opposite reaction occurs in up draught conditions.

IMPORTANT!

In areas of extreme weather, especially wind, additional measures may need to be provided for, in consultation with T R Engineering Ltd.



6 Installation and Assembly

6.1 Plumbing Connections

IMPORTANT!

The connection of the boiler to the plumbing system must be carried out ONLY by specialised personnel who are capable of carrying out installation properly, in compliance with current standards in the country of installation.



If the installation of the boiler will involve interaction with another, pre-existing system complete with heating equipment (gas boiler, methane boiler, fuel oil boiler, etc), it is even more advisable to call in qualified personnel, who subsequently will be responsible for conformity of the system with current applicable law.

T R Engineering Ltd will not be held responsible for damage to persons or things in the event of failed or incorrect operation if the aforementioned warnings are not complied with.

Greenflame Slim Wood Pellet Boiler 18kW



For connection of the plumbing system to the appliance, the user should refer to Chapter 6, **Installation and Assembly** specifically, paragraph 6.7, **Water Connections**.



It is recommended that a suitable anti-freeze solution is added to the heating system to prevent the freezing of water within the boiler in case of a power outage. The boiler has an anti-freeze function which activates the pump in the event of the temperature in the boiler dropping below 5°C.

6.2 Unpacking

The Greenflame 18kW slim pellet boiler will come packaged on a single pallet. The flue will be packaged separately.

The materials which make up the packaging are 100% recyclable. Their storage or recycling is therefore the responsibility of the final user, in compliance with Local Regulations. Do not store the boiler without its packaging and bubble wrap and recycle in the appropriate manner.

When unpacking the boiler use the checklist below to ensure that all the required components to complete the kit have been supplied. In unlikely event of an omission you must notify the manufacturer within 48 hours of delivery. The manufacturer reserves the right to charge for items deemed lost after 48 hours.

Unpacking List

ITEM	LOCATION	RECEIVED (YES/NO)
Baffle Set – 2pcs	Combustion Chamber	
Burner Pot	Combustion Chamber	
User Manual Pack*	Combustion Chamber	
Stainless Flue Support Brackets x2**	Hopper	
Single - Twin Wall Flue Adaptor**	Hopper	
Rain Cap**	Hopper	
Flue Straight Lengths 1m x2**	Supplied in separate packaging	

*The user manual pack includes a user manual, quick step user instructions, commissioning report, keys for lockable doors and heat proof gloves.

**Flue components listed above may vary depending on where the boiler is being installed. Please check with the installer.

6.3 Preparing the Base

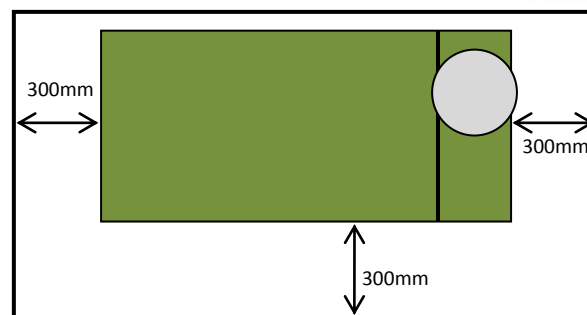
Careful planning at an early stage will greatly help the installation process and make sure that all required clearances are adhered to for servicing and that any potential issues with the routing of the flue can be resolved.

The Greenflame pellet boiler should be positioned on a concrete plinth at least 50mm high and should project a minimum 300mm beyond the sides and front of the appliance. The plinth must be capable of supporting the weight of the appliance when full with fuel and the plumbing system has been filled with water.

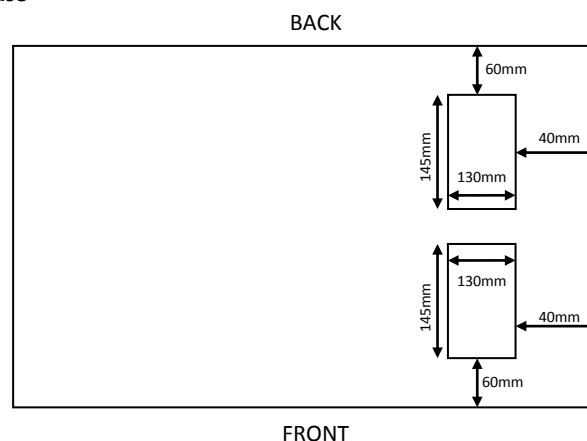
Use the template below for constructing the plinth and for positioning the flow and return pipe work and electricity supply.



Refer to the service and access clearances around the appliance on Page 7.



Base



FRONT

6.4 Electrical Connections

Electrical installations should only be carried out by suitably qualified and certified electricians. If in doubt on any issue relating to the electrical connections on the appliance contact T R Engineering Ltd technical support or your local dealer for guidance before carrying out any connections.

The Greenflame boiler must be supplied with a 230V 50Hz electrical supply via a two pole isolation switch rated for Overvoltage Category III and protected with a 6A circuit breaker. Also, the unit shall have a 30mA RCD installed into the mains supply. It is recommended that a power isolation switch is located adjacent to the boiler isolate the power during servicing and maintenance but also out of reach of the children and to prevent accidental turning off to the mains power.

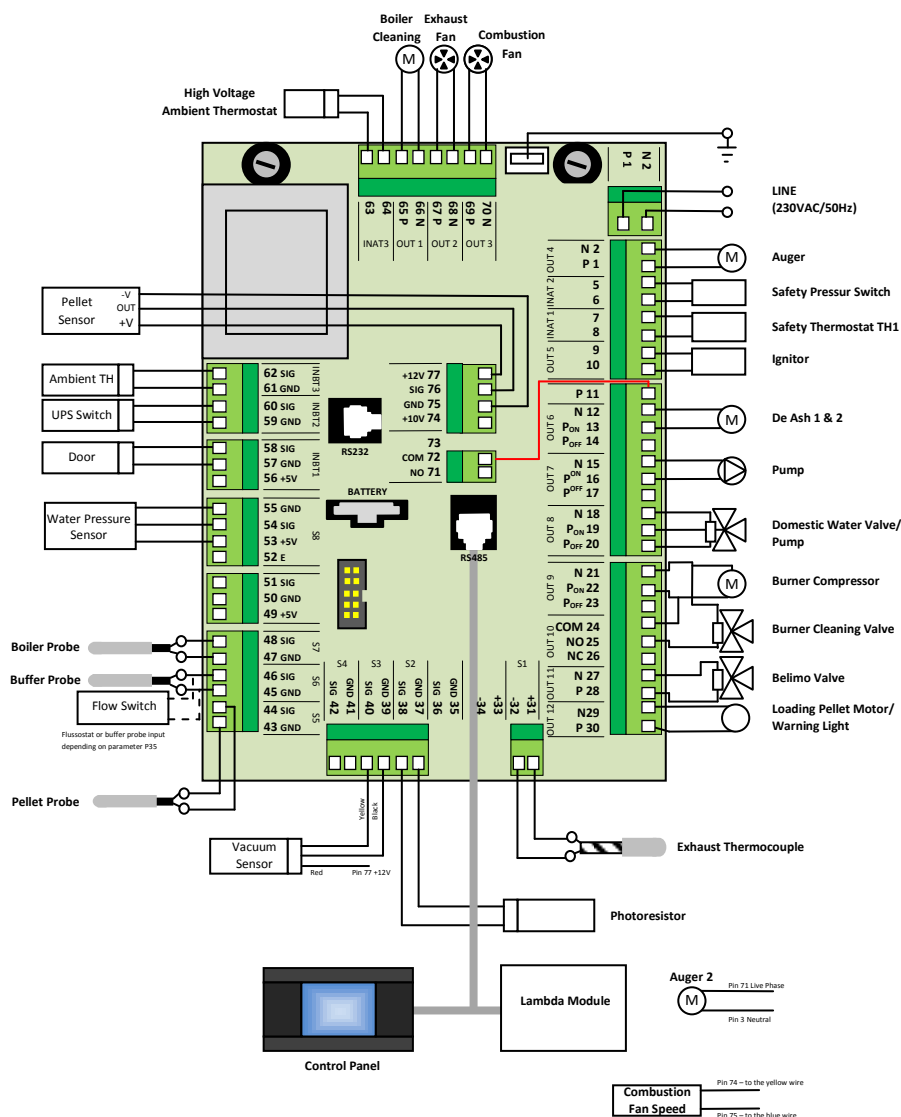
Room thermostats shall be supplied/controlled by safety extra low voltage.



Black – permanent live
Brown – Time clock control live
Blue – Neutral
Green-Yellow – Earth

Only authorised T R Engineering Ltd personnel may open the control panel on the boiler. Any interference with the wiring in the control panel will invalidate the warranty. The boiler and complete plumbing system must be adequately earthed and bonded in accordance with Local Building Regulations and Bye-Laws.

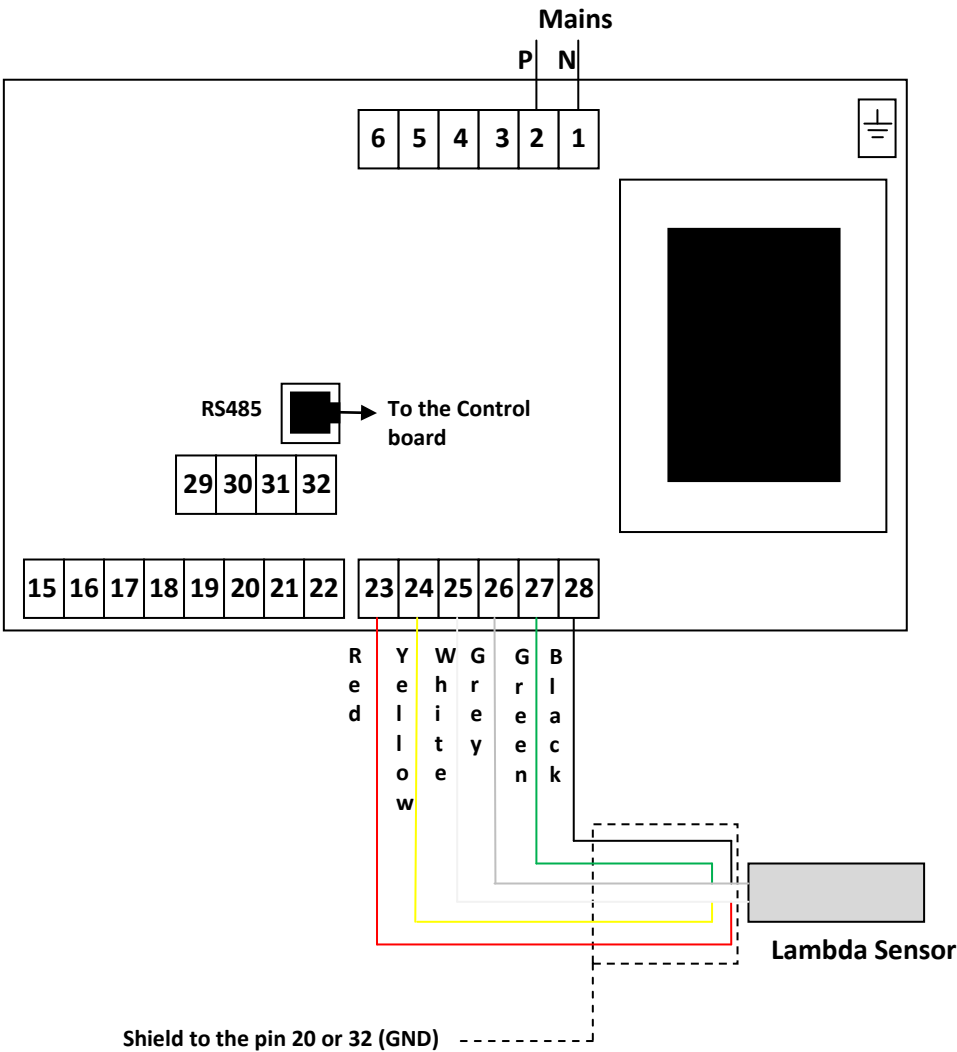
6.5 Boiler Control Panel Schematic



Connection	Functions
Earth	Always connect to earth
1-2	Line 230/110VAC $\pm 10\%$ 50/60Hz
3-4	Auger
5-6	High Voltage 2 (Safety Pressure Switch)
7-8	High Voltage 1 (Safety Thermostat)
9-10	Ignitor
11	Live Phase
12-13	De-Ash Motor 1 & 2
15-16	Pump
18-19-20	Sanitary Valve/Pump
21-22-23	Burner Compressor
24-25	Burner Cleaning Valve
27-28	Belimo Valve
29-30	Auxiliary Output (Warning Light/Loading Pellet Motor)
31-32	Thermocouple (Exhaust Probe)
37-38	Photo resistor Probe
39-40-77	Vacuum Sensor 39: Gnd (Blk) 40: Signal (Yellow) 77: +12V (Red)
41-42	-
43-44	Pellet Probe

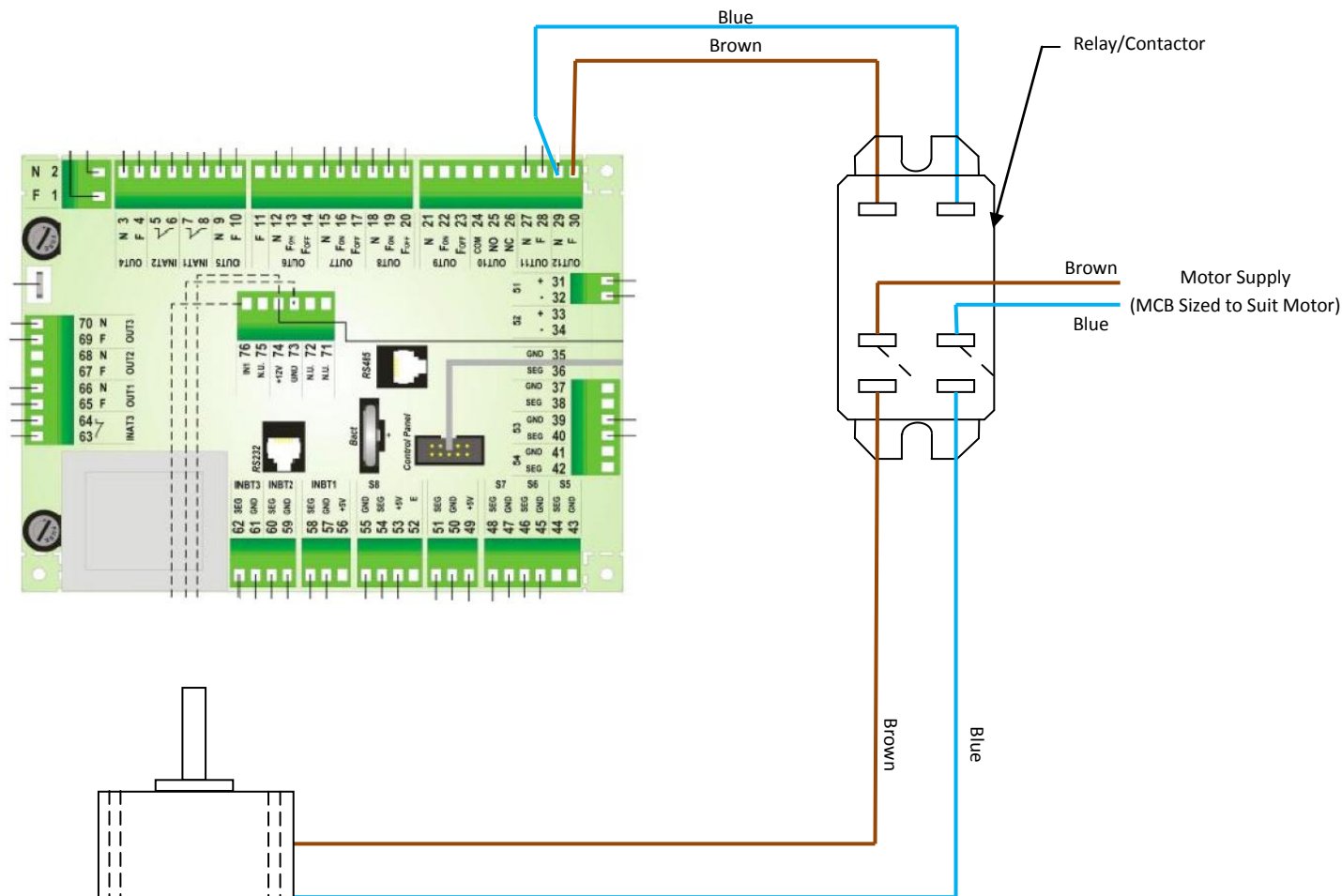
45-46	Buffer Tank probe
47-48	Boiler Probe
49-50-51	-
53-54-55	Water Pressure Sensor 53: +5V 54: Signal 55: GND
57-58	Door Switch
59-60	UPS Switch
61-62	Ambient Thermostat
63-64	High Voltage Ambient Thermostat
65-66	Boiler Cleaning
67-68	Exhaust Fan
69-70	Combustion Fan
71-72	Auger 2 Output
74-75	DAC Out (Combustion Fan DC Speed Control) 74: 0÷+10V dac Output 75: GND
75-76-77	Pellet Level Sensor 75: +GND 76: Signal IN 77: +12V
RS232	Connection to PC
RS485	Connection to RS485 device)Lambda module, Control Panel

6.6 Lambda Control Panel Schematic



Connection	Functions
Earth	Always connect to the Earth
1-2	Line 230/110VAC ±10% 50/60Hz
23-24-25-26-27-28	To the Lambda Sensor:
	23 RED wire
	24 YELLOW Wire
	25 WHITE wire
	26 GREY wire
	27 GREEN wire
	28 BLACK Wire
32	Shield Sensor (GND)
RS485	To Control Board

6.7 Auger Set-Up (Optional)



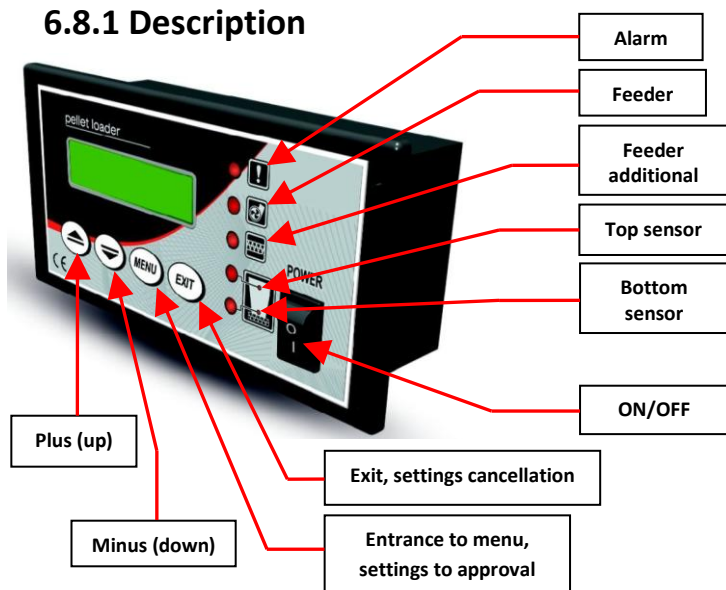
Configure Controller to Operate Motor

- In System Menu > Default Settings > set P50 = 2 to activate the Loading Motor Function.
- In System Menu > Timers > Set: T24 to 300 seconds.
- Set T23 to 600 for the amount of time to fill hopper.
- Re-set Er18 if showing on the display. Press and hold power button to re-set if required.
- Run outputs test on auxiliary output to prime auger. This will take several attempts due to maximum run time of 90 seconds per test. (Greenflame 25 wait 30 seconds for Belimo valve to open).
- Alternatively connect auger to temporary power supply and run until pellet appears at auger outlet.

Please ensure you check the grub screw is correctly fitted between the auger screw and motor!

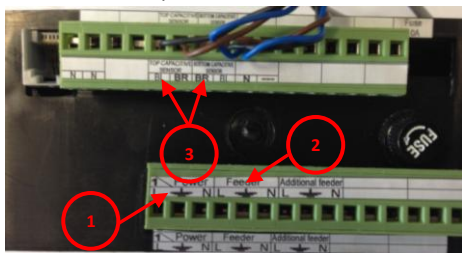
6.8 Vacuum System Set-Up (Optional)

6.8.1 Description



6.8.2 Installation

1. Remove 2 pin plug from power lead and connect to the power connections of the controller. The supply must come from a 13A switched fused spur.



2. Connect vacuum motor cable to feeder connections.
3. Using the sensor bracket and back nuts fit the low sensor 200mm above the boiler hopper sensor and the high sensor should be approximately $\frac{3}{4}$ up the hopper (high and low sensors can be identified from the controller connections).



4. Fit vacuum pipe supplied with the unit to the motor connection on the back of the unit.



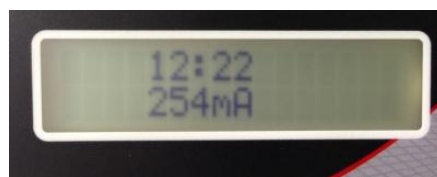
6.8.3 Controller Functions

Main Page

The main page is shown in the LCD display during normal operation with the following data displayed on it.

- Current time

- Feeder current (mA)
- Icon “(“ (if the night mode is active)

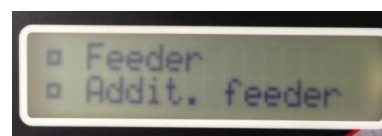


By pressing the MENU button the sub-menu is entered or the selected option is activated. Press the EXIT button to exit the menu or cancel the setting.

Manual Operation

The controller is equipped with the manual operation mode for user's convenience. When using that function, each is turned on/off independently from the others.

By pressing the **MENU** button of the selected unit (feeder, additional feeder or alarm) is activated and stays on until the **MENU** button is pressed again.



Clock

The user may define the current time by setting the clock. Clock setting is necessary for proper operation.

Day from...

This function is used to define the time when the controller will switch to the day mode.

Night from...

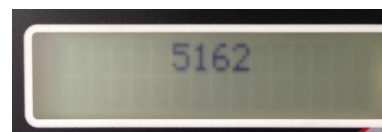
This function is used to define the time when the controller will switch to night mode. The controller will start the main hopper filling process half an hour before switching to the night mode.

Language

This function is used to select the language version of the controller menu.

6.8.4 System Menu

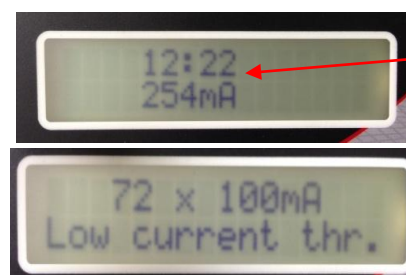
To access the system menu enter the password 5162.



Low Current Threshold

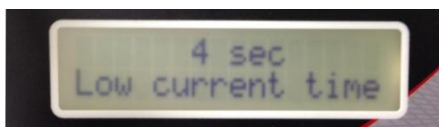
To set this, monitor manual operation and when the vacuum store is full, take note of the mA value on the main screen i.e. 7078mA (A). This needs to be set at 72 x 100 mA so that when the value drops below this vacuum will turn off after the low current time.

THIS IS ONLY AN EXAMPLE



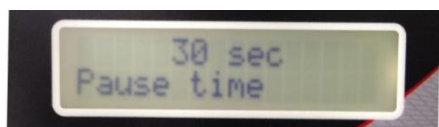
Low Current Time

This should be set at 4s so when the mA value drops below the threshold for 4 seconds the vacuum stops.



Pause Time

This should be set at 30s and is the time between cycles of the vacuum (this is when the vacuum store drops its pellets into the main hopper).

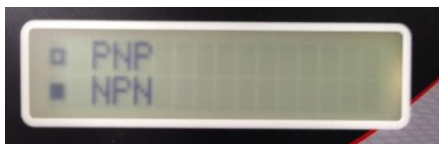


Protection Time

This should be set at 5 mins so if the vacuum does not turn off after this time an alarm will show (this is usually due to lack of pellet, **Feeder Protection**).

Lower and Upper Sensors

Both these values should be set to NPN.



Protections

To ensure safe and failure free operation, the controller is equipped with a number of protections. When an alarm occurs the buzzer goes off and a corresponding message appears on the display.

Feeder Protection

Where the auxiliary hopper is not filled for a long period (e.g. due to lack of pellet) the controller will turn the feeder off and an alarm will be activated.

Fuse

The controller is equipped with a 10A fuse to protect the controller. **CAUTION:** this must be protected by a 13A fuse from a switched fused spur.

Maintenance

The pellet loader controller must be checked for any damage to its wires before and during the heating season. You should also check the mounting of the controller; clean it of dust and other contamination.

6.8.5 Technical Data

Specification	Unit	
Power Supply	V	230V 50Hz ±10%
Max Power Consumption	W	2000
Ambient Temperature	°C	5-50
Feeder Output	A	7
Additional Feeder Output Load	A	1
Fuse Insert	A	10
Height	mm	600
Width	mm	400
Depth	mm	400
Weight	kg	25

6.8.6 Assembly

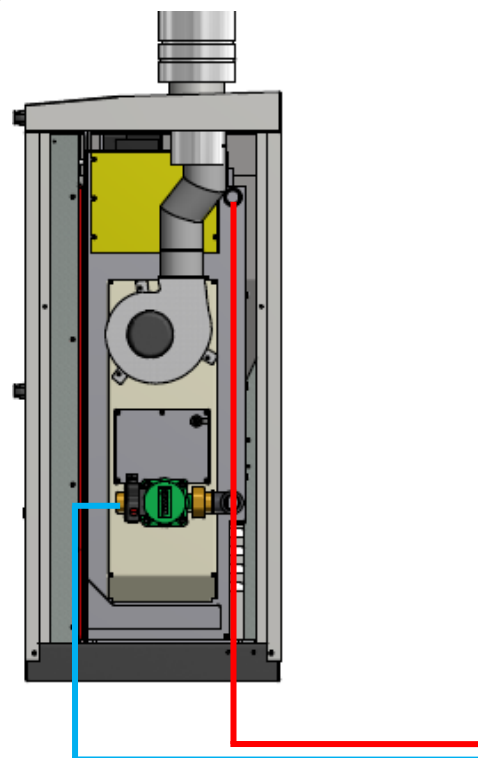
NOTE: Installation should be performed by a fully qualified engineer. **DO NOT** install the unit with the power on (make sure that the plug is disconnected from the mains supply).

NOTE: Incorrect wiring may damage the controller.

The controller cannot be operated in a closed central heating system. The installation must include safety valves, pressure valves and a buffer to protect the boiler from water boiling in the central heating system.

6.9 Water Connections

The diagram below indicates the plumbing connections at the rear of the boiler. The return connection is factory fitted with a 15/60 standard pump.



Incorrectly sized expansion vessel will invalidate the warranty. A minimum 18 litre is recommended for the boiler plus additional expansion for heating and domestic hot water system.



Ensure that the pre-charge in the vessel is equal to the initial system fill pressure of between 1-1.5bar.

The boiler can be plumbed into either an open vented system (the maximum static head of water permissible is 90ft. (27.44m) or a sealed system. If plumbed into a sealed system an appropriately sized expansion vessel should be used and installed as per manufacturer's instructions. The expansion vessel should be sized based on the water capacity in the boiler and the water in the entire heating system.

The pump is on the return pipe work just before the boiler. It is recommended that a by-pass pipe between the flow and return is used with a valve to regulate the temperature of the water returning to the boiler. Also, the system designed should ensure that there is adequate provision in the system for heat dissipation from the boiler during the shut-down/extinguishing phase. An automatic air vent and pressure relief valve must be fitted to the flow pipe work immediately outside the boiler. The pressure relief valve

should be piped to drain to prevent injury to the user or service technicians if it is activated. All unused connections should be sealed with blanking plugs. A non-return valve should be fitted to prevent back siphonage.

Once the plumbing has been completed the system should be fully flushed to clear any debris which may become lodged in the pipe work. **Any proprietary additives in the system will not have any adverse effects on the materials used in the manufacture of this product.**

The system should generally be filled from the lowest point on the system to force any air to the highest point where it can be vented. The flow pipe on the boiler is fitted with a manual air vent for venting air from the boiler. The system must then be filled and the pump can be run continuously for a few hours to completely de-aerate the system. Hold the ESC button on the controller for 3 seconds to activate the pump. Repeat the procedure to turn it off. Only when the system has been fully vented can the boiler be commissioned.

The installation and the design of the central heating system must be in accordance with BS EN 14336:2004: Heating systems in Buildings. Installation and Commissioning of Water based Heating Systems.

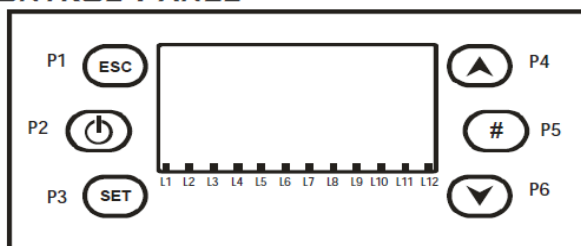
BS EN 12828:2003: Heating Systems in Buildings. Design of Water based Heating Systems.

BS EN 12831:2003: Heating Systems in Buildings. Method for Calculation of the Design Heat Load.

Always ensure that all connections are making a watertight seal.

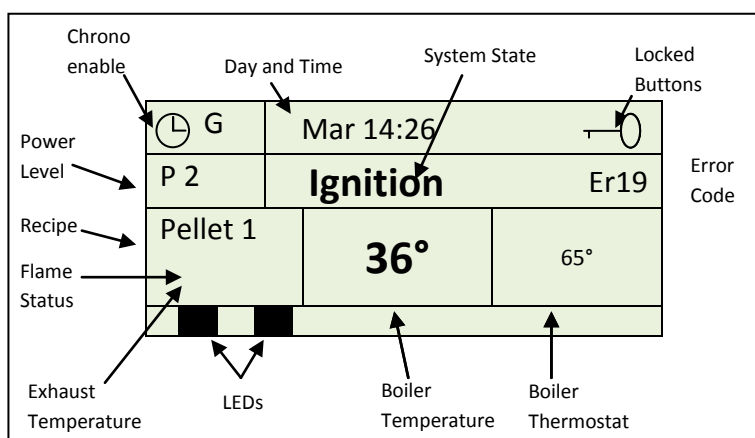
7. Control System

CONTROL PANEL



FUNCTION	DESCRIPTION	BUTTON
ON/OFF	Function: Ignition, extinguishing by pushing the button for 3 seconds until the acoustic signal.	P2
UNBLOCK	Function: Unblock. When the system is in block by pushing the button for 3 seconds until the acoustic signal.	
MODIFY VALUES INTO MENU	In modify mode change menu and submenu values.	P4
RUN ON MENU AND SUBMENU	In menu run or submenu and menu.	P6
ESC	Function: Exit managed by pushing the button if in a menu or submenu. Out of menu "Pump Test".	P1
MENU	Function: Enter in menu or in a submenu.	P3
MODIFY	Enter in modify mode into a menu.	
SET	Save data in a menu.	
ENABLE CHRONO PROGRAMMING	In Chrono menu -> Chrono Program: enables the selected program.	P5
KEYBOARD LOCK	To lock keyboard keys keep this button pressed for 3 seconds. To unlock repeat the same procedure.	

FUNCTION	DESCRIPTION	LED
Igniter	LED On: Igniter On	L1
Auger	LED On: Auger is On	L2
Pump	LED On: Pump On	L3
Electrovalve	LED On: Electrovalve On	L4
Auxiliary Output	LED On: Auxiliary Output On	L5
Auger2	LED On: Auger 2 On	L6
De Ash	LED On: De Ash On	L7
Lambda Status	LED On: Lambda Sensor On	L8
UPS	LED On: UPS Switch Contact Open	L9
Pellet Level	LED On: Lack of Pellet	L10
External Thermostat	LED On: Ambient Thermostat contact open OR High voltage ambient thermostat not supplied with 230VAC	L11
Flowswitch	LED On: Sanitary Water Demand	L12



7.1. System Menu

7.1.1 Auger ON Menu

This menu allows the installer to set the times of the **Auger On** inside the Auger Period. The values are referred to the current combustion recipe. Each value is a functioning power.

The display shows the time, in seconds, for Auger On associated to the function power. If a value is set to 0 seconds then the auger is disabled for the corresponding power. Auger regulation can be set with a step of 0.1 seconds.

Code	Description
C00	Fix Ignition Power
C01	Variable Ignition Power
C02	Stabilisation Power
C03	Power 1
C04	Power 2
C05	Power 3
C06	Power 4
C07	Power 5
C08	Power 6
C09	Power 7
C10	Modulation Power
C43	Power 1 Min Speed Lambda Regulator
C44	Power 2 Min Speed Lambda Regulator
C45	Power 3 Min Speed Lambda Regulator
C46	Power 4 Min Speed Lambda Regulator
C47	Power 5 Min Speed Lambda Regulator
C48	Power 6 Min Speed Lambda Regulator

C49	Power 7 Min Speed Lambda Regulator
C50	Modulation Power Min Speed Lambda Regulator
C63	Power 1 Max Speed Lambda Regulator
C64	Power 2 Max Speed Lambda Regulator
C65	Power 3 Max Speed Lambda Regulator
C66	Power 4 Max Speed Lambda Regulator
C67	Power 5 Max Speed Lambda Regulator
C68	Power 6 Max Speed Lambda Regulator
C69	Power 7 Max Speed Lambda Regulator
C70	Modulation Power Max Speed Lambda Regulator

7.1.2 Combustion Fan Menu

This is the menu to set values of the **Combustion Fan**. The values are referred to the current combustion recipe. Each value is a functioning power. The display shows the value of the Fan associated to the functioning power.

Code	Description
UC00	Fix Ignition Power
UC01	Variable Ignition Power
UC02	Stabilisation Power
UC03	Power 1
UC04	Power 2
UC05	Power 3
UC06	Power 4
UC07	Power 5
UC08	Power 6
UC09	Power 7
UC10	Modulation Power
UC43	Power 1 Min Speed Lambda Regulator
UC44	Power 2 Min Speed Lambda Regulator
UC45	Power 3 Min Speed Lambda Regulator
UC46	Power 4 Min Speed Lambda Regulator
UC47	Power 5 Min Speed Lambda Regulator
UC48	Power 6 Min Speed Lambda Regulator
UC49	Power 7 Min Speed Lambda Regulator
UC50	Modulation Power Min Speed Lambda Regulator
UC63	Power 1 Max Speed Lambda Regulator
UC64	Power 2 Max Speed Lambda Regulator
UC65	Power 3 Max Speed Lambda Regulator
UC66	Power 4 Max Speed Lambda Regulator
UC67	Power 5 Max Speed Lambda Regulator
UC68	Power 6 Max Speed Lambda Regulator
UC69	Power 7 Max Speed Lambda Regulator
UC70	Modulation Power Max Speed Lambda Regulator

7.1.3 Exhaust Fan Menu

This is the menu to set values of the **Exhaust fan**. The values are referred to the current combustion recipe. Each value is a functioning power.

Code	Description
UA00	Fix Ignition Power
UA01	Variable Ignition Power
UA02	Stabilisation Power
UA03	Power 1
UA04	Power 2
UA05	Power 3
UA06	Power 4
UA07	Power 5
UA08	Power 6
UA09	Power 7

UA10	Modulation Power
UA40	Fix Ignition Power Min Speed Vacuum Regulator
UA41	Variable Ignition Power Min Speed Vacuum Regulator
UA42	Stabilisation Power Min Speed Vacuum Regulator
UA43	Power 1 Min Speed Vacuum Regulator
UA44	Power 2 Min Speed Vacuum Regulator
UA45	Power 3 Min Speed Vacuum Regulator
UA46	Power 4 Min Speed Vacuum Regulator
UA47	Power 5 Min Speed Vacuum Regulator
UA48	Power 6 Min Speed Vacuum Regulator
UA49	Power 7 Min Speed Vacuum Regulator
UA50	Modulation Power Min Speed Vacuum Regulator
UA60	Fix Ignition Power Max Speed Vacuum Regulator
UA61	Variable Ignition Power Max Speed Vacuum Regulator
UA62	Stabilisation Power Max Speed Vacuum Regulator
UA63	Power 1 Max Speed Vacuum Regulator
UA64	Power 2 Max Speed Vacuum Regulator
UA65	Power 3 Max Speed Vacuum Regulator
UA66	Power 4 Max Speed Vacuum Regulator
UA67	Power 5 Max Speed Vacuum Regulator
UA68	Power 6 Max Speed Vacuum Regulator
UA69	Power 7 Max Speed Vacuum Regulator
UA70	Modulation Power Max Speed Vacuum Regulator

7.1.4 Thermostats Menu

This is the menu to set the temperatures of **Thermostats**.

Code	Description	Min (°C)	Max (°C)
TH01	Boiler off	5	901
TH02	Igniter off on Variable Ignition	5	901
TH03	Pre-Extinguishing thermostat for low flue gas temperature (only if P27 = 0)	5	901
TH04	Thermostat to use Variable Ignition power	5	901
TH06	Thermostat to bypass Variable Ignition	5	901
TH07	Thermostat on Flue gas to go in Modulation	5	901
TH08	Thermostat on Flue gas to go in Safety	5	901
TH09	Thermostat on Flue gas to go bypass Ignition (go in Normal)	5	901
TH10	Thermostat on Flue gas to go in Standby	5	901
TH50	Thermostat on Flue gas to switch On Lambda Regulator	5	901
TH51	Thermostat on Flue gas Min Lambda Regulator	5	901
TH52	Thermostat on Flue gas Max Lambda Regulator	5	901
TH18	Ice Thermostat	5	10
TH19	Heating pump thermostat	20	80
IH19	Activation Pump thermostat histeresys	1	20
TH20	Sanitary Min thermostat	30	85
TH21	Sanitary Max thermostat	30	95
IH24	Water Boiler thermostat histeresys	1	20
TH25	Boiler Safety thermostat	80	110
TH26	Boiler Thermostat minimum range	50	70
TH27	Boiler Thermostat maximum range	75	95
TH29	Buffer Thermostat	50	95
IH29	Buffer Thermostat histeresys	1	10
TH30	Differential Thermostat	1	30
IH30	Differential Thermostat histeresys	1	5
TH40	Water Alarm Thermostat	90	110
L00	Photo probe Light OFF	0	100
L01	Photo probe Light ON	0	100

The maximum value that the exhaust sensor can read is 900°C. So if you set 901°C for one thermostat automatically it will be disabled because the exhaust temperature will never reach this value.

7.1.5 Timer Menu

This menu allows the times associated to the different phase of functioning of the system to be set.

Code	Description	Min (°C)	Max (°C)	Unit
T01	Check up cleaning time	0	900	sec
T02	Preheating phase	0	900	sec
T03	Auger Preload	0	900	sec
T04	Fixed Ignition	0	900	sec
T05	Variable Ignition	0	300	min
T06	Stabilisation	0	900	sec
T07	Periodic cleaning repetition	5	300	min
T08	Periodic cleaning duration	0	900	sec
T09	High Voltage 1 (Safety Thermostat) delay	1	20	sec
T10	High Voltage 2 (Pressure Switch) delay	5	20	sec
T12	Increase Thermostat "Pump On" in Step management	1	900	sec
T14	Pre-Extinguishing	0	900	sec
T15	Extinguishing in Safety	0	900	sec
T16	Final cleaning time	0	900	sec
T17	Changing time Power	0	180	sec
T18	Changing time Power after Ignition	0	180	sec
T23	Pellet tank charging time over minimum level	0	3600	sec
T24	Pellet tank charging time to reach minimum level	0	3600	sec
T34	De Ash cleaning engineer OFF time	1	300	min
T35	De Ash cleaning engine ON time	0	900	sec
T42	TIMER – Max recover status time	16	60	sec
T50	Waiting time for pellet door opening in Check-Up	0	900	sec
T51	Timer delay to go in Standby from Modulation upper delta temperature	0	3600	sec
T71	Time – Stop – Start	0	3600	min
T72	Time Burner Cleaning Valve ON	0	600	sec
T73	Time to charge the burner cleaning compressor	0	900	sec
T75	Pump ON time under UPS	1	900	sec
T76	Pump OFF time under UPS	0	900	sec
T78	Time De Ash engines ON in Final Cleaning	0	900	sec
T80	OFF Auger 2 Delay	0	900	sec
T85	Time Boiler Cleaning Engine ON	0	900	sec

7.1.6 Default Settings

Code	Description	Min	Max	Unit
P02	Maximum number of ignition retry	1	5	nr
P05	Auger period	1	300	sec
P09	Pellet sensor level configuration	0	1	nr
P27	Thermocouple = 0; Photo probe = 1; Thermocouple & Photo probe = 2	0	2	nr
P35	Plumbing configuration	0	5	nr
P50	Auxiliary Output Config 0=OFF; 1= Warning Light; 2= Pellet Loading; 3=Backup boiler.	0	3	nr
P66	Enable Lambda Module	0	1	nr
UC11	Combustion fan speed on Extinguishing	0	99	%
UC20	Combustion fan minimum speed	0	99	%
UC21	Combustion fan speed in periodical cleaning	0	99	%

UC22	Combustion fan speed in Check-Up	0	99	%
UC23	Combustion fan speed in Final cleaning	0	99	%
UA11	Exhaust fan speed on extinguishing	0	99	%
UA20	Exhaust fan minimum speed	0	99	%
UA21	Exhaust fan speed in periodical cleaning	0	99	%
UA22	Exhaust fan speed in Check-Up	0	99	%
UA23	Exhaust fan speed in Final cleaning	0	99	%

NOTE:

- **P02:** after the maximum number of ignition attempts the boiler goes into block Error 12.
- **P09:** If P09 = 0 input pellet level sensor is N.C., if P09 = 1 input pellet level sensor is N.O.

7.1.7 Enables Menu

This menu allows the activation of different functions of the product.

Code	Value	Description
A05	0	Manual management of the combustion power
	1	Proportional management of the combustion power (proportional to the water temperature)
A07	0	Input Ambient Thermostat is disabled
	1	Input Ambient Thermostat is used to switch from Run Mode to Modulation
	2	Input Ambient Thermostat is used to switch from Run Mode to Standby
	3	Input Ambient Thermostat is used to block pump
A10	0	From Extinguishing state New Ignition directly from Check-Up
	1	From Extinguishing state New Ignition after Recover Ignition
A13	0	For water temperature >= Boiler Thermostat the system goes in Modulation
	1	For Water temperature >= Boiler thermostat the system goes in Standby
A14	0	Disable Water Pressure Sensor error management
	1	Enable Water Pressure Sensor error management
A16	0	Disable delay time on power changing management
	1	Enable delay time on power changing management
A17	0	Combustion Fan speed = 0 when door is open
	1	Combustion fan speed max when door is open
A19	0	Exhaust fan speed = 0 when door is open
	1	Exhaust fan speed max when door is open
A21	0	Standby for flue gas temperature over TH10 disable
	1	Standby for flue gas temperature over TH10 enable
A23	0	Pump management ON/OFF
	1	Pump on Step Modality Management
A41	0	Exhaust fan in final cleaning disable
	1	Exhaust fan in final cleaning enable
A42	0	Enable Exhaust fan in ignition disable
	1	Enable Exhaust fan in ignition enable
A52	0	BLOCK CODE DISABLED (the controller is always activate)
	1	ENABLE BLOCK CODE (the controller is initially in BLOCK and you need the unblock code to activate the system)
A64	0	Input HV Ambient Thermostat is disable
	1	Input HV Ambient Thermostat is used to switch from Run mode to Modulation
	2	Input HV Ambient Thermostat is used to switch from Run mode to Standby
	3	Input HV Ambient Thermostat is used to block pump
A67	0	Disable DC Speed Regulation Fan
	1	Enable DC Speed Regulation Fan

A68	0÷100	Number of Check-Up for burner cleaning
A69	0÷100	Number of Check-Up for boiler cleaning
A70	0÷100	Number of Check-Up of De-Ash cleaning

7.1.8 Temperature Delta

This menu allows you to regulate the temperature delta and some thermostats' hysteresis.

Code	Description	Min	Max
D06	Step to increase Pump Thermostat in Step Modality	0	10
D07	Delta under Water thermostat to put ON the pump	0	15
D08	Delta temperature for Modulation	0	15
D10	Delta temperature to go in Standby from Modulation	0	100
D41	Delta over thermostat TH07 for combustion power modulation	0	20
D42	Delta temperature to go in Stabilisation from variable Ignition	0	10

7.1.9 Water Pressure Sensor Threshold Menu

This menu allows the pressure sensor threshold to be set.

Code	Description	Min	Max
S01	Minimum water pressure sensor threshold	50	3000
S08	Maximum water pressure sensor threshold	50	3000

7.1.10 Vacuum Regulator Menu

This menu allows the necessary parameters for adjusting the speed of exhaust fan in the presence of the vacuum sensor being set.

Code	Description	Min	Max	Unit
PR00	Fix Ignition vacuum regulator setpoint	0	300	Pa
PR01	Variable Ignition vacuum regulator setpoint	0	300	Pa
PR02	Stabilisation vacuum regulator setpoint	0	300	Pa
PR03	Power 1 vacuum regulator setpoint	0	300	Pa
PR04	Power 2 vacuum regulator setpoint	0	300	Pa
PR05	Power 3 vacuum regulator setpoint	0	300	Pa
PR06	Power 4 vacuum regulator setpoint	0	300	Pa
PR07	Power 5 vacuum regulator setpoint	0	300	Pa
PR08	Power 6 vacuum regulator setpoint	0	300	Pa
PR09	Power 7 vacuum regulator setpoint	0	300	Pa
PR10	Modulation vacuum regulator setpoint	0	300	Pa
PR20	Fix Ignition vacuum regulator delta	3	30	Pa
PR21	Variable Ignition vacuum regulator delta	3	30	Pa
PR22	Stabilisation vacuum regulator delta	3	30	Pa
PR23	Power 1 vacuum regulator delta	3	30	Pa
PR24	Power 2 vacuum regulator delta	3	30	Pa
PR25	Power 3 vacuum regulator delta	3	30	Pa
PR26	Power 4 vacuum regulator delta	3	30	Pa
PR27	Power 5 vacuum regulator delta	3	30	Pa
PR28	Power 6 vacuum regulator delta	3	30	Pa
PR29	Power 7 vacuum regulator delta	3	30	Pa
PR30	Modulation vacuum regulator delta	3	30	Pa
PR70	Alarm threshold depression Min	1	300	Pa
PR90	Alarm threshold depression Max	1	300	Pa
A90	Enable vacuum regulator	0	1	nr

UA84	Exhaust fan step regulation	1	99	%
T69	Regulator period	1	300	Sec
T70	First regulation waiting time	1	300	Sec
T80	Delay before de-pressure alarm	0	900	sec

7.2 Lambda Menu

This is the menu for the calibration of the Lambda sensor and the setting of the Lambda regulator.

7.2.1 Lambda Regulator Control

This menu is for the Lambda regulator settings.

Code	Description	Min	Max	Unit
o03	Power 1 Oxygen level	0.5	21	%
o04	Power 2 Oxygen level	0.5	21	%
o05	Power 3 Oxygen level	0.5	21	%
o06	Power 4 Oxygen level	0.5	21	%
o07	Power 5 Oxygen level	0.5	21	%
o08	Power 6 Oxygen level	0.5	21	%
o09	Power 7 Oxygen level	0.5	21	%
o10	Modulation Oxygen level	0.5	21	%
o23	Power 1 Oxygen range	0.1	20	%
o24	Power 2 Oxygen range	0.1	20	%
o25	Power 3 Oxygen range	0.1	20	%
o26	Power 4 Oxygen range	0.1	20	%
o27	Power 5 Oxygen range	0.1	20	%
o28	Power 6 Oxygen range	0.1	20	%
o29	Power 7 Oxygen range	0.1	20	%
o30	Modulation Oxygen range	0.1	20	%
T62	Oxygen monitoring interval	5	300	Sec
T63	Maximum time regulator out of range	5	900	Sec
T64	Delay for the first regulation	0	900	Sec
P58	Lambda regulator enable	0	4	nr
P60	Lambda regulator error management	0	2	nr
P67	Combustion fan regulation direction	0	1	nr
P69	Auger regulation direction	0	1	nr
P70	Outputs regulation management	0	1	nr
UC81	Combustion fan regulation step	1	100	%
C81	Auger regulation step	0.1	99.0	sec

7.3 Counters Menu

This menu allows the control of the counters which is useful for the diagnosis of the boilers life.

Vacuum Regulator
Lambda
Counters
Outputs' Test
Default Parameters

Counters
Error List

7.3.1 Counters

This menu has different submenus which indicate different counters as indicated in the following below.

Submenu	Description
Auger ON time	Total number of hours during which the Auger is ON
Ignitions' Number	Number of Ignitions
Failed Ignition's Numbers	Number of Failed Ignitions
Errors' Numbers	Number of errors occurred
Counters Reset	Reset all counters:

7.3.2 Error List

This menu is a list of the last 30 errors which have occurred. To clear the list use the counters reset menu.

Er12 02/02/2015 09:32
Er18 02/01/2015 14:22

The list also shows the date and time of each error that has occurred.

7.4 Outputs Test

This menu allows you to test the different components within the boiler. The boiler has to be in the **OFF** position with any error codes reset.

Submenu	Description
Combustion Fan	Test Combustion fan
Exhaust Fan	Test Exhaust fan
Auger	Test Auger
Auger2	Test Auger2
De Ash	Test De Ash
Igniter	Test Igniter
Pump	Test Pump
Electrovalve	Test Electrovalve
Burner Cleaning	Test Burner cleaning
	0 – Test OFF
	1 – Compressor output ON
	2 – Compressor output + valve ON
Boiler Cleaning	Test Boiler cleaning
Belimo Valve	Test Belimo valve
Auxiliary Output	Test Auxiliary output
Auger Capacity	Test Auger capacity

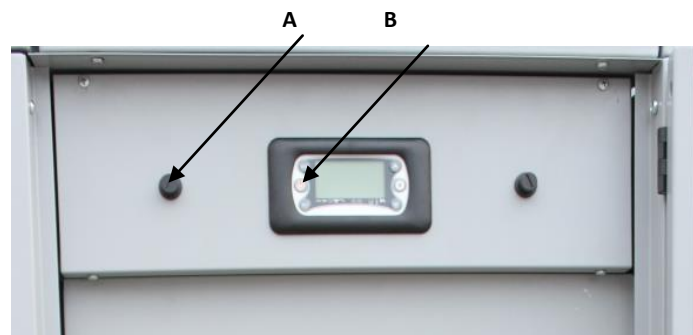
8. Error Codes

Description	Display
Error activation safety thermostat high voltage	Er01
Accidental extinguishing for low exhaust temperature	Er03
Water over-temperature	Er04
Exhaust over-temperature	Er05
Encoder Error	Er07
Error can occur for lack of encoder signal	
Encoder error	Er08
Error can occur in case of adjustment problems of rounds number.	
Water pressure low	Er09

Water pressure high	Er10
Real time clock error	Er11
Ignition failed	Er12
Error activation pressure switch (only with the exhaust fan ON)	Er14
Lack of voltage	Er15
Air flow regulator error	Er17
Extinguishing for lack of pellet	Er18
Burner cleaning system fault	Er33
Vacuum error below the minimum threshold	Er34
Vacuum error above the maximum threshold	Er35
Generic Error	EL00
Heated sensor shorted to earth	EL01
Heater sensor open	EL02
Heater sensor shorted to +12V	EL03
Lambda sensor shorted to earth	EL04
Heater supply voltage too low	EL05
Lambda sensor supply voltage too low	EL06
Heating sensor failed	EL07
Lambda sensor over temperature	EL08

In the unlikely event that the appliance fails to start or shuts down unexpectedly, then the error code shown on the display will give an indication as to the potential cause of the problem. Some of the errors can be cleared by the house holder and they are:

Er01 – Water Safety Thermostat – Press the reset button A and then hold button B for 3 seconds to clear the error from the controller.



Er04 – Water Over-Temperature – Hold button B for 3 seconds. If the problem persists contact your service engineer.

Er05 – Exhaust Over-Temperature – Check that the baffles are in position and clean inside the combustion chamber.

Er09 – Low Water Pressure – Contact your installer

Er10 – High Water Pressure – Contact your installer.

Er12 – Failed Ignition – Empty any un-burnt pellets from the burner pot and hold button B for 3 seconds to clear the error.

Er13 – Accidental Extinguishing for Low Exhaust Temperature – Empty any un-burnt pellets from the burner pot and hold button B for three seconds.

Er15 – Loss of Voltage – Usually occurs after a power cut. Empty any un-burnt pellet from the burner pot and hold button B for 3 seconds. Turn off the time clock for 10 seconds before switching on again.

Er18 – Lack of Pellet – When the pellets reach the pellet sensor in the hopper the system extinguishes to prevent having to re-prime the auger. Refill the hopper and hold button B for 3 seconds. Turn off the time clock for 10 seconds before switching on again.

Er34 – High Vacuum Pressure – Clear the error by holding button B for 3 seconds. Turn off the time clock for 10 seconds before switching on again.

Er35 – High Vacuum Pressure – Clear the error by holding button B for 3 seconds. Turn off the time clock for 10 seconds before switching on again.

9. Boiler Operation & Maintenance

The Greenflame 18kW slim has been developed to ensure that the user is able to carry out the most basic functions in a safe and convenient manner. Once the installation has been successfully carried out the user interaction is quite simple from a regular inspection on the combustion chamber to removing ash to filling the hopper with pellets.

9.1 Turning ON and OFF the Boiler

- It is recommended that your boiler is controlled by an external time clock. The time programs should be set to times that heat is required at different periods throughout the day. You should also make allowance for the ignition time of the appliance, i.e. the time it takes from when the time clock signals the boiler to stay until the flame has fully developed in the appliance (usually approx 10-20 minutes).
- When choosing your programs on your time clock it is recommended that you program the clock for long runs instead of short runs. This gives the boiler time to settle and match the heat demand of the property. It is also when the boiler is most efficient.
- If the boiler is not being controlled by a time clock then it can be turned on and off locally at the display on the boiler control panel. Hold the ON/OFF button for 3 seconds to start the boiler. Hold the ON/OFF button for 3 seconds to turn off the boiler.

9.2 Emptying the Ash Pan

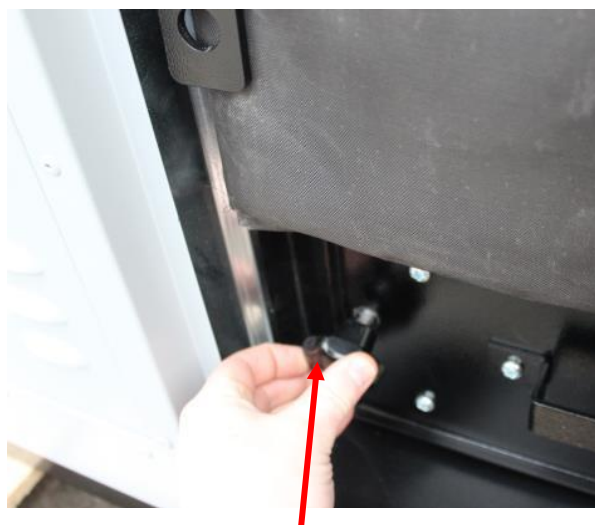
- The boiler contains two areas where ash needs to be removed at regular intervals.
- The primary ash pan is located in the main combustion chamber. The frequency of emptying the ash pan is determined by the length of time the boiler has been running under what load conditions. Once the ash in the ash pan has reached the top ten it should be emptied. A daily check during the first few days of operation will give an indication as to when it needs to be emptied.

Always make sure that before you open the main combustion chamber door that the boiler has been switched off and has been allowed to cool down sufficiently so as to not cause injury. Always empty ash into a metal container as ash which may appear cool could be hot in the centre. Never use plastic brushes or dust pans to clean ash from the boiler. Always use heat resistant gloves when handling the ash pan or cleaning the boiler.

When the combustion chamber door is opened, even with the boiler in the OFF position, the combustion fan will run at full power.



Always allow to cool down before opening the combustion chamber door.



Unscrew the two fixing knobs on the ash pan.



Carefully remove the ash pan and dispose of the ash into a metal container.



If the burner pot contains ash remove the pot for the holder and scrape the contents into a container. Also make sure that the air holes are clear. Carefully replace the pot ensuring that it is properly seated.



Failure to replace the pot correctly can cause damage and invalidate the warranty. Your installer will show you how to do this correctly.

9.3 Filling the Hopper with Fuel

- The boiler indicates when the level of pellets reaches a low level. The system will shut down and will wait for the hopper to be refilled.
- Open the pellet lid and carefully pour approved pellets into the hopper.
- Never fill the hopper above the guard mesh across the opening of the hopper.



Never allow foreign material to enter the hopper. This will lead to malfunction of the auger system and could cause damage to the appliance and invalidate the warranty.

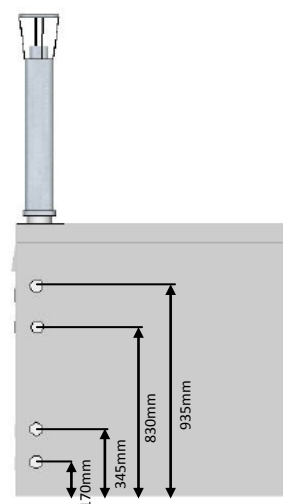
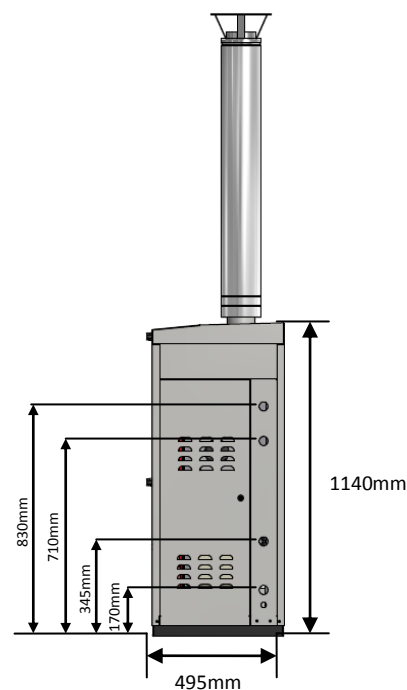
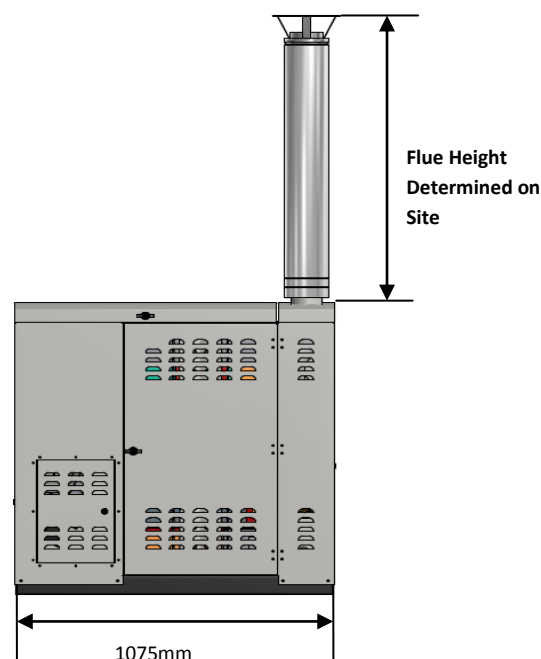
Always close the lid to the hopper once it has been filled with pellets.

Never leave the hopper lid open for prolonged periods as rain or moisture can affect the pellet.

Always supervise children when the hopper is open in case foreign material is placed into the hopper or children climb into the hopper.

10. Technical Data

Technical Data		Greenflame 18kW Slim	
Nominal Output	kW	4.6-18	
Nominal Heat Input	Kg/hr	1.1-4.0	
Efficiency Nominal output (EN 303-5)	%	90.7	
Smoke Temperature at Nominal Power	°C	120-140	
Smoke Temperature at Reduced Power	°C	70-90	
Min. Required Draught	Pa	10	
Exhaust Gas Mass Flow	g/s	3.3-10.6	
CO ² at Reduced and Nominal Power	%	10.8-12.7	
Water Operating Temperature Range	°C	50-85	
Maximum Operating Pressure	Bar/kPa	3/269	
Recommended Operating Pressure	bar	1.5	
Water Flow Connection	inch	1	
Water Return Connection	inch	1	
Boiler Drain	inch	½	
Boiler Safety Thermostat Setting	°C	105	
Boiler Class	Class	5	
Boiler Electrical Power Requirement		230V 50Hz	
Max. Electrical Consumption (Start-Up)	watts	448	
Avg. Electrical Consumption	watts	164	
Current on Start-Up	amp	2.5	
Current during Normal operation	amp	1.2	
Width	mm	495	
Height	mm	1140	
Length	mm	1075	
Fuel Hopper Capacity	kg	45	
Boiler Flue Diameter (I.D)	mm	100	
Boiler Dry Weight	kg	160	
Water Content	Litres	18	



11. Maintenance Schedule

Ensure that your Greenflame wood pellet boiler appliance is at its highest efficiency and trouble free operation it is essential that the following maintenance schedule is adhered to by a **QUALIFIED SERVICE ENGINEER:-**

- **Full System Service** – by Service Provider – Every 12 months or 1200 running hours, whichever comes first (recommended just before the heating season i.e. October).
- **Heat Exchanger Clean** – by Service Provider – 6 months after a full service (recommended March after winter season).
- **Emptying of Ash Containers** – by Operator – Weekly
- **Clean Down of Boiler Services** – by operator – every 2 weeks.

Full Service

- Remove baffles from main combustion chamber and clean down all heat exchanger surfaces.
- Remove turbulator cleaning mechanism from the boiler and clean heat exchanger tubes.
- Empty ash containers.
- Remove exhaust fan motor and clean flue gas passage ways to the flue outlet.
- Remove and clean the flue gas thermocouple.
- Remove the fans and check for dust. Never touch the wires and only clean with an air blow.
- Completely clean the flue through the inspection door.
- Remove the burner pot and remove any loose ash in the pot holder.
- Ensure all air-holes in the burner pot are clear and check the rope seal that it maintains a seal when replaced in the holder.
- Replace the ignitor and adjust accordingly.
- Check sealing rope and tape on the lower ash pan door and main combustion door that it maintains a good seal. Replace if necessary.
- Check the ceramic board on the combustion chamber door and replace if necessary.
- Disconnect and remove the auger motor.
- Remove the auger and clean out any debris. Refill with fuel and re-prime the auger.
- Check auger calibration.
- Check all outputs tests (as per commissioning guide).

Heat Exchanger Clean

- Remove and empty both ash containers.
- Remove baffles and completely clean down heat exchanger surfaces.
- Remove the burner pot and remove any loose ash in the pot holder.
- Remove turbulator cleaning mechanism from the boiler and clean heat exchanger tubes.
- Ensure all the air-holes in the burner pot are clear and check the rope seal that it maintains a seal when replaced in the holder.
- Check sealing tape and rope on the lower ash pan door and main combustion chamber door respectively and check that it maintains a good seal. Replace if necessary.

Emptying of Ash Containers and Clean Down of Boiler Surfaces

- Remove and empty the main ash container every week or more frequently if required.

- Clean down boiler surfaces when emptying main ash container.
- Remove and empty the secondary ash container every 2 weeks or more frequently if required. Ensure that the secondary ash pan door is fully secured and air tight.

12. Spares List

Part No.	Description	Quantity
400049	18kW Burner Grate	1
400204	18kW Auger Shaft	1
400227	Auger Motor	1
400228	Air Compressor Head	1
400229	Exhaust Thermocouple	1
400230	Ignitor	1
400231	Water High Limit Thermostat	1
400232	Water Pressure Sensor	1
400233	Pellet Level Sensor	1
400237	Exhaust Fan	1
400238	Combustion Fan	1
400239	Belimo Valve	1
400242	LCD Display	1
400243	Door Safety Switch	1
400244	Pellet Feed Pipe Safety thermostat	1
400248	Vacuum Regulator	1
400471	Turbulator Heat Gasket	1
400479	Combustion Chamber Door Insulation	1
400685	Lambda Probe	1
400687	Lambda PCB	1
400688	18kW PCB	1
400731	18kW Baffle	1
400732	18kW Ash Pan	1
98242	Combustion Chamber Door Rope Seal	3m

13. Service Log

<u>Date</u>	<u>Service Provided</u>	<u>Service Engineer</u>
<u>Date</u>	<u>Service Provided</u>	<u>Service Engineer</u>
<u>Date</u>	<u>Service Provided</u>	<u>Service Engineer</u>
<u>Date</u>	<u>Service Provided</u>	<u>Service Engineer</u>
<u>Date</u>	<u>Service Provided</u>	<u>Service Engineer</u>
<u>Date</u>	<u>Service Provided</u>	<u>Service Engineer</u>

T R Engineering Ltd
Unit 7, Newton Chambers Way
Chapelton, Sheffield, S35 2PH
Telephone: +44 (0)114 257 2300
Fax: +44 (0)114 257 1419
Email: info@trianco.co.uk
Web: www.trianco.co.uk

T R Engineering Limited is a company registered in England and Wales Registration no. 7321802



Copyright of all contents of this leaflet is vested in T R Engineering Limited. Any part may not be reproduced without permission.

The contents of this leaflet are accurate at the date of printing but, because T R Engineering Ltd has a policy of continual development, it may be superseded and should be disregarded if specifications or appearances are changed.

The statutory rights of the customer are not affected. E&OE's.

