



## Greenflame Indoor & Outdoor Wood Pellet Boiler 28kW



## Installation, Operation and Servicing Instructions

**PLEASE NOTE:**

**This product MUST be commissioned by a T R Engineering Ltd representative.**

**Please contact T R Engineering Ltd to arrange the commission immediately after install.**

**Please read these instructions carefully before installing and operating this appliance.  
TO BE RETAINED BY THE HOUSEHOLDER**

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## 1. Introduction

Dear Customer,

We thank you for choosing this Greenflame pellet boiler 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 modifications without any advance notice. Any reproduction, even in part, of this manual without the consent of the manufacturer 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.

	<b>ATTENTION</b> This warning 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.
	<b>INFORMATION</b> This symbol is used to highlight information which is important for proper boiler operation. Failure to comply with these provisions will compromise the use of the boiler and its operation will not be satisfactory.
	<b>OPERATING SEQUENCES</b> Indicates a sequence of buttons to be pushed to access menus or to make adjustments.
	<b>MANUAL</b> 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 improvement of our products and welcomes any feedback from our customers. Please forward your comments to:

T R Engineering Ltd  
 Unit 7, Newton Chambers Way  
 Thorncliffe Industrial Estate  
 Chapeltown  
 Sheffield  
 S35 2PH

Tel: 0114 257 2300

Fax: 0114 257 1419

E-mail: [info@trianco.co.uk](mailto:info@trianco.co.uk)

Web: [www.trianco.co.uk](http://www.trianco.co.uk)

## 2. Warnings and Guarantee/Warranty Information

### 2.1 Safety Instructions

**Installation of the boiler, making the 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, 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 setting 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 from 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 keeps 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 directives 2006/95 EC and 2004/108 EC.

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 a breakdown or bad running.

Pellets must not be manually fed into the burner.

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

Do not wash the inside of the heat exchanger with water.

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

Periodically check and clean the smoke outlet ducts (connection to the 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 T R Engineering Ltd 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 auger, 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 loss or damage caused by the failure of a component on this product is not covered.

T R Engineering Ltd refuses to accept responsibility for any damage which may be caused, directly or indirectly, by persons, animals or things in consequence of the failure to observe all the prescriptions laid down in the instruction booklet, especially those concerning warning 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 any 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 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 a 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 maintained correctly.
- The breakdown occurs due to use of the boiler not sanctioned by these instructions.
- 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: __/__/__
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### Service Centre and Technical Support

Tel: 0114 257 2300 Fax: 0114 257 1419

### Hours of Business

Monday – Thursday: 8:30am – 17:00pm

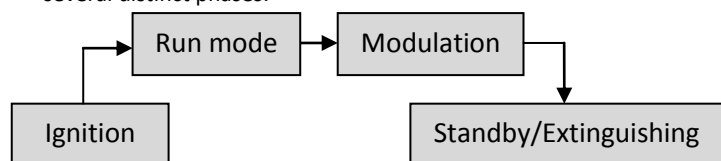
Friday: 8:30am – 14:30pm

## 4. How Your Greenflame 28kW Pellet Boiler Operates

The Greenflame 28kW 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. Each operational 'cycle' has several distinct phases:



**Ignition** – Ignition is the phase where the initial ignition of the fuel takes place and develops a fire bed with enough heat and intensity to enter run mode. Sub-stages within the ignition stage are:

**Pre-Heating** – During this stage the heating resistance heats up to a temperature to ignite the fuel.

**Pre-Load** – A starting charge of fuel is introduced into the burner.

**Variable Ignition** – Ignition of the fuel is attempted by directing hot air at the fuel. If a flame is detected by the end of this stage it enters the last stage of ignition.

**Stabilisation** – This final ignition stage aids further development of the flame before allowing the system to enter run mode.

**Run Mode** – The system runs at full power until it reaches a pre-determined water temperature below the set-point. Once it exceeds the temperature it enters the modulation phase.

**Modulation** – This phase allows the system to slow down and find the optimum running conditions and temperature to match the heat load of the property. Once the water temperature finally reaches the set point the system enters standby stage.

**Standby/Extinguishing** – Standby is reached when there is no further heat demand by the property and extinguishing of the fire bed is required to stop further heat generation. Once the fire bed has been extinguished the system waits in standby until such a time as the water temperature drops below a pre-determined level below the set point. Once this temperature is reached the cycle is repeated.

## 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/m<sup>3</sup> and 750kg/m<sup>3</sup>, with a moisture content which varies from 5% to 8% by weight.

Besides being an ecological fuel (exploiting timber residues to the maximum and achieving cleaner combustion than is possible with fossil fuels), pellets also have technical advantages. While good quality timber has a calorific power of 4.4kW/kg (with 15% moisture, 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 will be necessary for cleaning internal parts, such as the grate and the combustion chamber.**

The main certification of quality pellets in the European market is ENplus-A1 these ensure respect of:

- ✓ **Calorific Power:** 4.9kW/kg
- ✓ **Water Content:** max 10% of weight
- ✓ **Percentage of Ashes:** max 0.5% of 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 28kW has been recommended as 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 (EN 73-23).
- 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 an internal or external vertical duct conforming to current standards UNI7129-7131 9614.**

**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 a 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 contact with or close to walls, they can cause smoke staining.

**Also take care because the fumes are very hot and almost invisible and cause burns on contact.**

It is recommended that Carbon Monoxide monitors are located in living areas and within the room containing the heating appliance (in the case of indoor models).

### 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 (about 40m<sup>3</sup>/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 air 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 intake. Locating the appliance in a room with an explosive atmosphere, e.g. workshop or tool shed, is prohibited. 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 keep a minimum distance of 450mm at the rear, 300mm on the sides and 1500mm at the front.



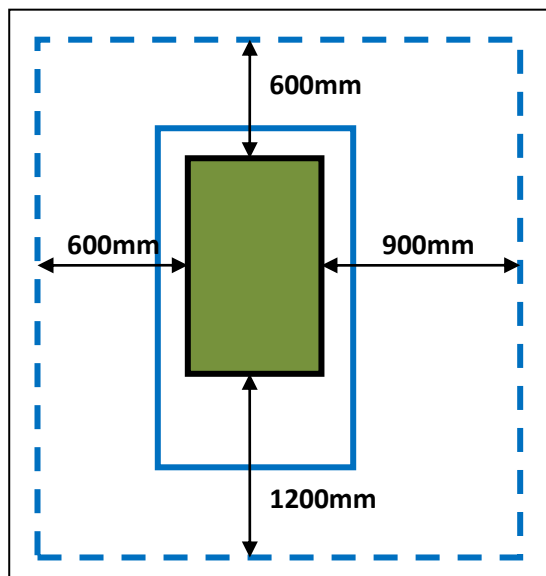
If the flooring is made of wood, provide a floor protection surface in compliance with current national standards.



#### Service Clearances

The minimum service clearances around the appliance are as follows:

Rear – 600mm  
Side (lid hinge side) – 600mm  
Side (lid open side) – 900mm  
Front – 1200mm



### 5.3 Connection of the Flue

A full range of straight, offset, elbow and 'T' elements is available to overcome any obstruction which the flue should avoid. 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 a negative pressure. The smoke duct for 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 the instructions and considerations above.



#### IMPORTANT!

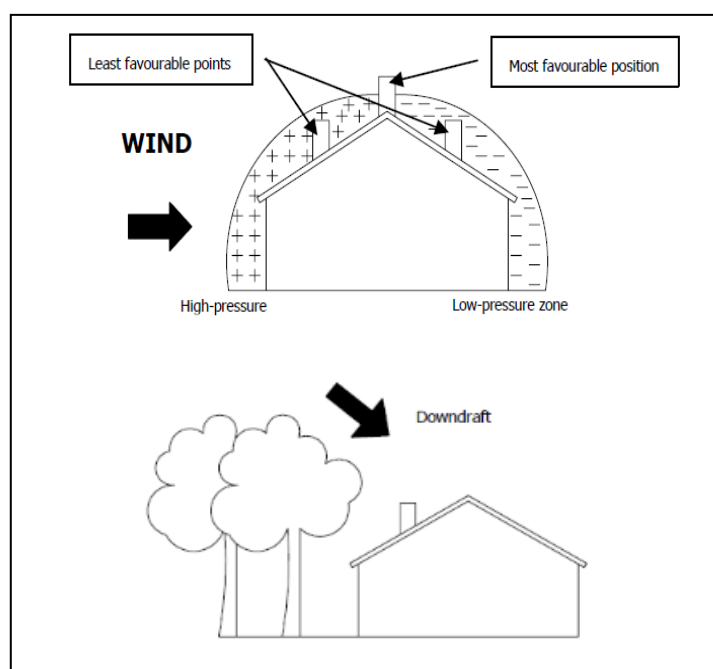
All 90° changes in direction in the flue pipe must be either removable or capable of inspection.

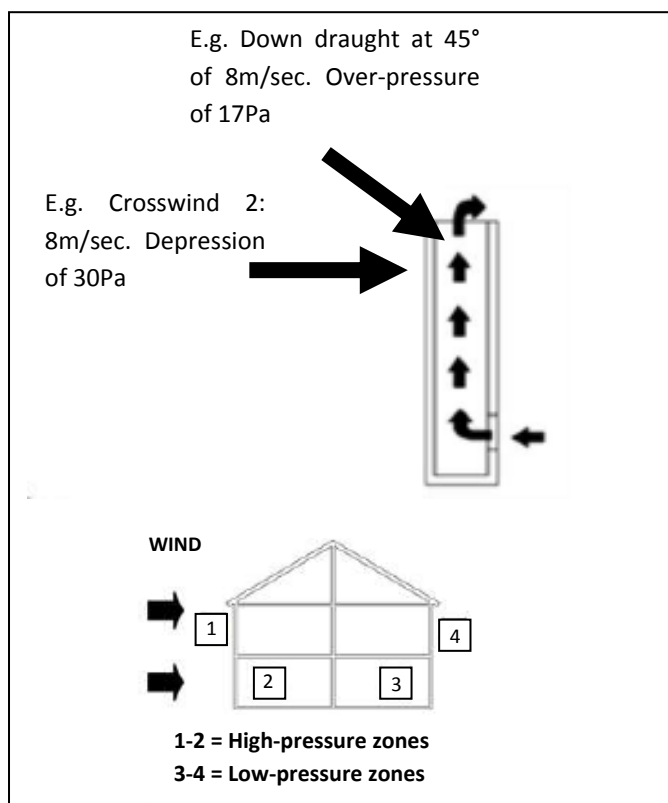
**THE FLUE PIPE MUST NOT INCLUDE MORE THAN 2-3 METRES OF HORIZONTAL PIPE AND NOT MORE THAN THREE 90° ELBOWS (INCLUDING T's). IT IS ALSO ADVISABLE NOT TO EXCEED 8 METRES IN LENGTH WITH THE PIPE Ø 100mm.**

The flue connection on the boiler is 80mm. T R Engineering Ltd recommends the use of 100mm flue for use with this appliance, so an 80mm to 100mm adapter is needed.

### 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, altitude a.s.l, 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 the chimney, there is another type of depression or over-pressure; dynamic pressure caused by the wind. An up draught always increases depression and hence draught. A crosswind increases depression provided the cowl has been installed properly. A downdraught always decreases depression, at times inverting it.





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. Remove the nylon strapping, cardboard 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 the unlikely event of an omission you must notify the manufacturer within 48hrs of delivery. The manufacturer reserves the right to charge for items deemed lost after 48hrs.

ITEM	LOCATION	RECEIVED (YES/NO)
Baffle Set – 3 pieces	Combustion Chamber	
Burner Pot	Combustion Chamber	
User Manual Pack*	Combustion Chamber	
Boiler Flue Support Brackets x 2	Hopper (External Model Only)	
Stainless Flue Support Brackets x 2	Hopper (External Model Only)	
Single – Twin Wall Flue Adaptor	Hopper (External Model Only)	
Flue 90° Elbow	Hopper (External Model Only)	
Rain Cap	Hopper (External Model Only)	
Flue Straight Lengths 1m x 2	Supplied in separate packaging (External Model Only)	

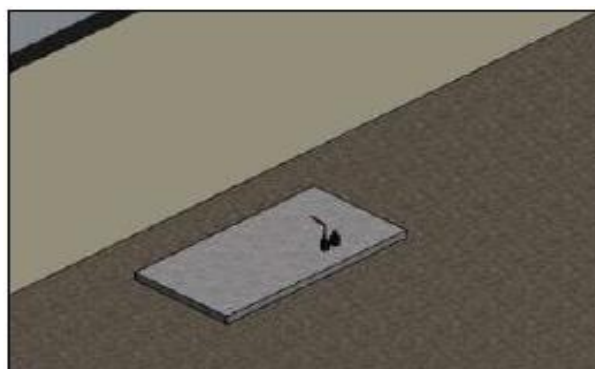
\*The user manual pack includes a user manual, quick step user instructions, commissioning report, keys for lockable doors and a heat proof glove.

## 6.3 Preparing the Base

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

The Greenflame 28kW pellet boiler should be positioned on a concrete plinth at least 50mm high and should project a minimum of 100mm beyond the sides and rear of the appliance and at least 600mm to the front. 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 electrical supply. Refer to service and access clearances around the appliance on page 7.



### IMPORTANT!

The operation of the pellet boiler is noticeable sensitive to the conformation and position of the flue which is adopted. Hazardous conditions can only be overcome by suitable setting-up of the boiler carried out by qualified T R Engineering Ltd personnel.

## 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.

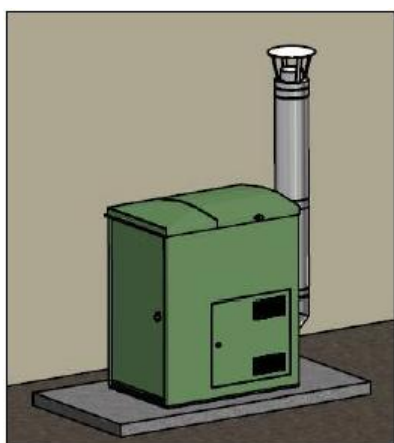
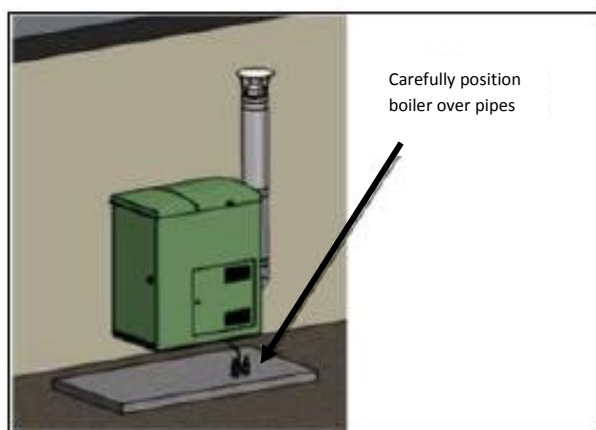
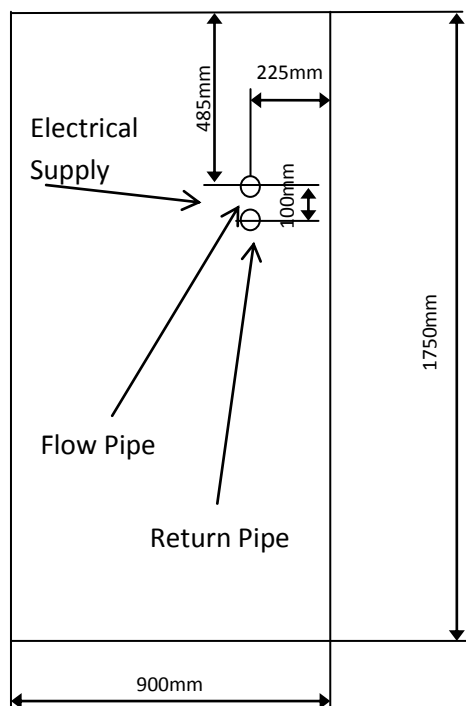
If installation of the boiler will involve interaction with another, pre-existing system complete with heating equipment (gas boiler, methane boiler, fuel oil boiler, etc.), it is even more advisable to call in qualified personnel, who subsequently will be responsible for conformity of the system with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

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

### 6.2 Unpacking

The Greenflame 28kW pellet boiler will come packaged on a single pallet. The flue will be packaged separately.





## 6.4 Electrical Connections

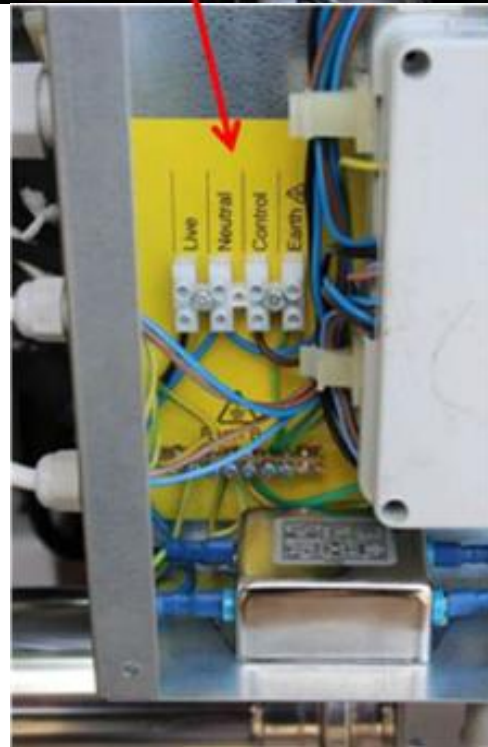


Electrical installations should only be carried out by suitably qualified and certified electricians. If in doubt on any issue relating to the electrical connections on the appliance contact T R

**Engineering Ltd's technical support or your local dealer for guidance before carrying out any connections.**

The Greenflame 28kW 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 to isolate the power during servicing and maintenance but also out of the reach of children to prevent accidental turning off to the mains power.

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

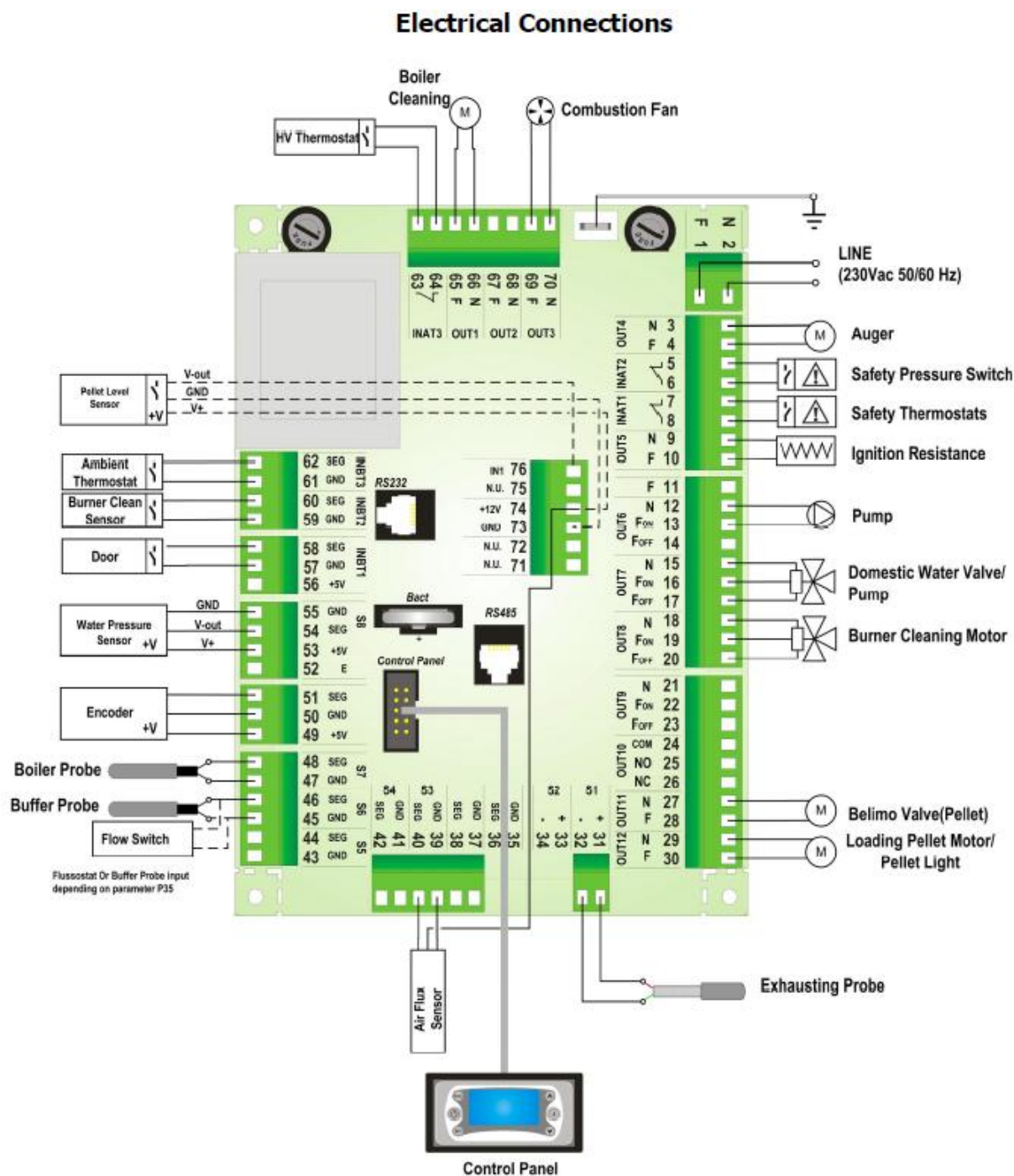


Brown – Time Clock Control Live  
Black – Permanent Live  
Blue – Neutral  
Green/Yellow - Earth

**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

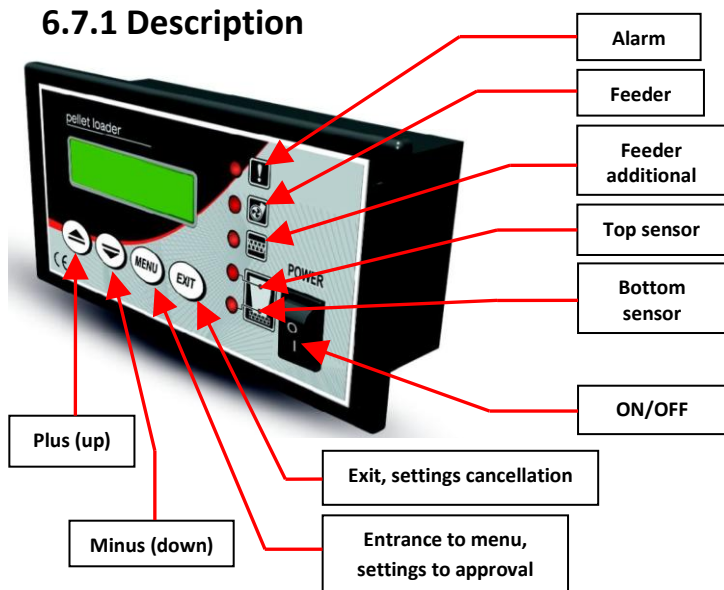


Only authorised T R Engineering Ltd personnel may open the control board. Any tampering with the PCB will immediately invalidate the warranty.



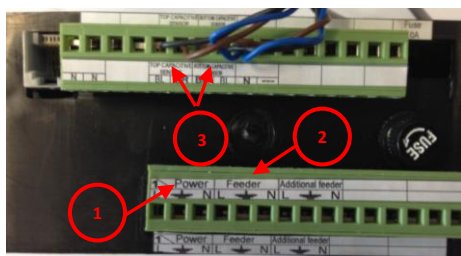
## 6.7 Vacuum System Set-Up (Optional)

### 6.7.1 Description



### 6.7.2 Installation

1. Remove 2 pin plug from power lead and connect to the power connections of the controller. 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 lower sensor 250mm from the bottom of the hopper and the high sensor should be approximately half way 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.

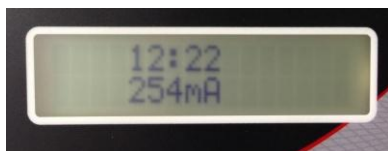


### 6.7.3 Controller Functions

#### 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)

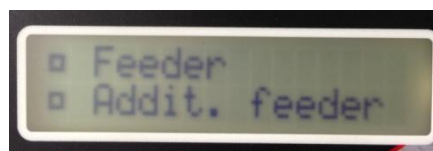


By pressing the **MENU** button the sub-menu is entered or the selected option is activated. Press the **EXIT** button to exit the menu or cancel the setting.

#### 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 a motor 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...

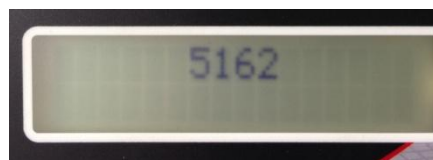
This function is used to define the time when the controller will switch to night mode. The controller will start the main hopper filling process half an hour before switching to the night mode.

#### Language

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

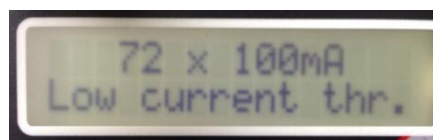
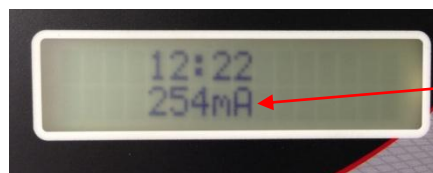
### 6.7.4 System Menu

To access the system menu enter the password 5162.



#### Low Current Threshold

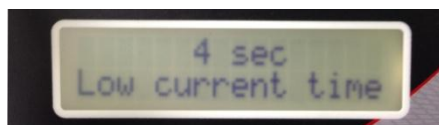
To set this, monitor manual operation and when the vacuum store is full, take note of the mA value on the main screen (**A**) i.e. if the main screens shows 7078mA then this needs to be set at 72 x 100mA so that when the value drops below this the vacuum will turn off after the low current time.





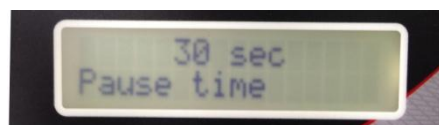
### Low Current Time

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).

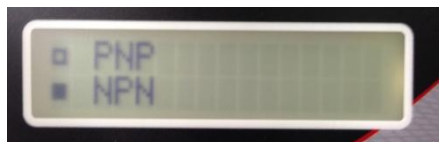


### Protection Time

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 of 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 fuse spur.

### Maintenance

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

## 6.7.5 Technical Data

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

## 6.7.6 Assembly

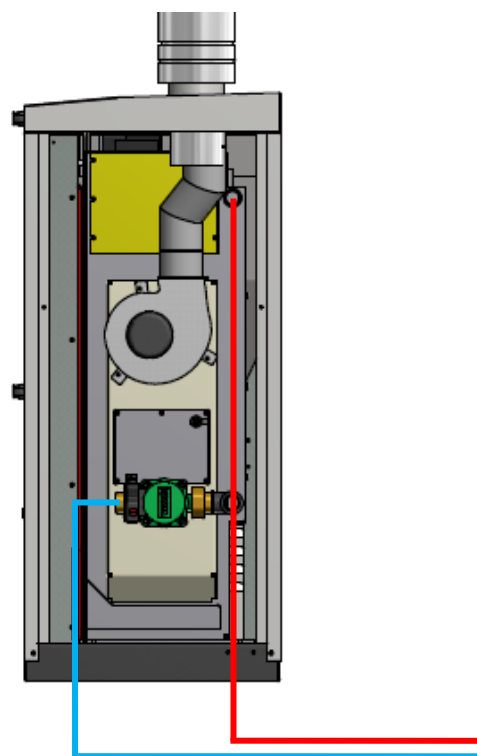
**NOTE:** Installation should be performed by a fully qualified engineer. **DO NOT** install the unit with the power on (make sure that the plug is disconnected from the mains supply).

**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 tank to protect the boiler from water boiling in the central heating system.

## 6.8 Water Connections

The diagram below indicates the plumbing connections at the rear of the boiler. The return connection is factor 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 [re-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. 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 flue 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. Installations and Commissioning of Water Based Heating Systems.

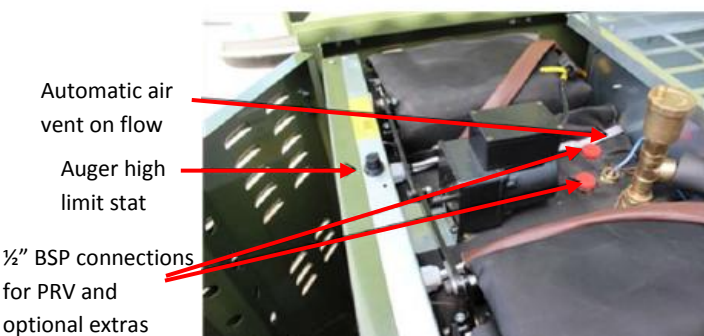
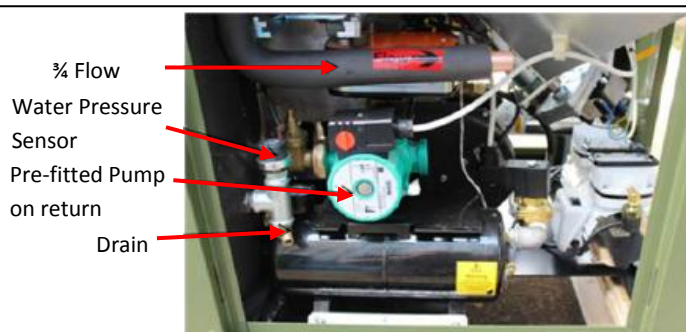
BS EN 12828:2003: Heating Systems in Buildings. Design of Water Based Heating Systems.

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.

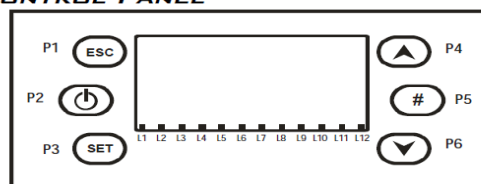
If a buffer probe is being used to control the boiler then no other external controls can be used and P35 should be set to 4 in the 'System Menu' under 'Default Settings'.

If a system is a Y plan or S plan and external controls will be used to control the boiler then P35 should be set to 1.

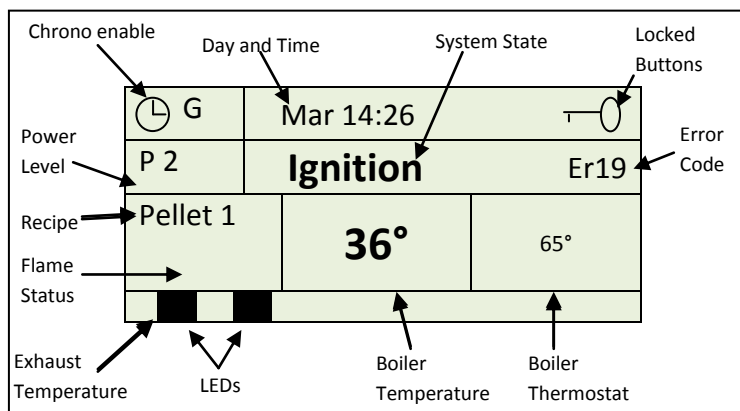


## 7. Control System

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 menus and submenus values.	P4 P6
RUN ON MENU AND SUBMENU	In menu run on submenu an men.	
ESC	Function: exit managed pushing the button if in a menu or a 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.	P5
ENABLE CHRONO PROGRAMMING	In Chrono menu -> Chrono Program: enables the selected program.	
KEYBOARD LOCK	To lock keyboard keys keep this button pressed for 3 seconds. To unlock repeat the same procedure.	

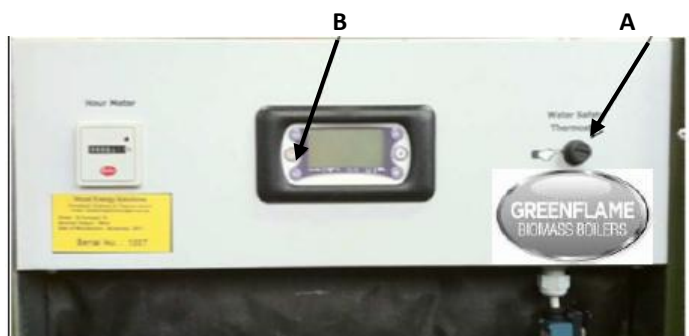


### 7.1 Error Codes

ERROR CODES	
DESCRIPTION	DISPLAY
Error activation safety thermostat high voltage.	Er01
Accidental extinguishing for low exhaust temperature or flame light	Er03
Water over-temperature	Er04
Exhaust over-temperature	Er05
Water pressure low	Er09
Water pressure high	Er10
Real time clock error	Er11
Ignition failed	Er12
Error activation pressure switch (only with exhaust fan)	Er14
Lack of voltage	Er15
RS485 communication error	Er16
Extinguishing from lack of pellets	Er18
Lambda regulator (not applicable)	Er22
Vacuum error below the minimum threshold	Er34
Vacuum error above the upper threshold	Er35

In the unlikely event that the appliance fails to start or shuts down unexpectedly, then error codes 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 householder 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.



**Er03 – Accidental Extinguishing for Low Exhaust Temperature** – Empty any un-burnt pellets from the burner pot and hold button B for three seconds.

**Er04 – Water Over-Temperature** – Hold button B for three seconds. If the problem persists contact your service agent.

**Er12 – Failed Ignition** – 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 three seconds.

**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.



Other errors can appear on the display but these may only be cleared by service personnel.

**ERROR CODES MUST BE NOTIFIED TO THE SERVICE PERSONNEL IN ORDER TO DIAGNOSE THE PROBLEM.**

## 8. Boiler Operation & Maintenance

The Greenflame 28kW 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 remove ash to filling the hopper with pellets.

### 8.1 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 the 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 start 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.

### 8.2 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 and under what load conditions. Once the ash in the ash pan has reached the top then 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 the boiler to cool before opening the combustion chamber door.

Ash pan full. Carefully remove ash into a metal container.



Carefully remove the grate and dispose of any un-burnt pellet.

The secondary ash pan is located under the main combustion chamber. This needs to be emptied less frequently.



Secondary ash pan



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

### 8.3 Filling the Hopper with Fuel

The boiler will indicate when the level of pellets reaches a low level. The system will shut down and wait for the hopper to be refilled. Open the pellet hopper 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 any foreign material to enter the hopper. This will lead to the malfunction of the auger system and could cause damage to the appliance and invalidate the warranty.

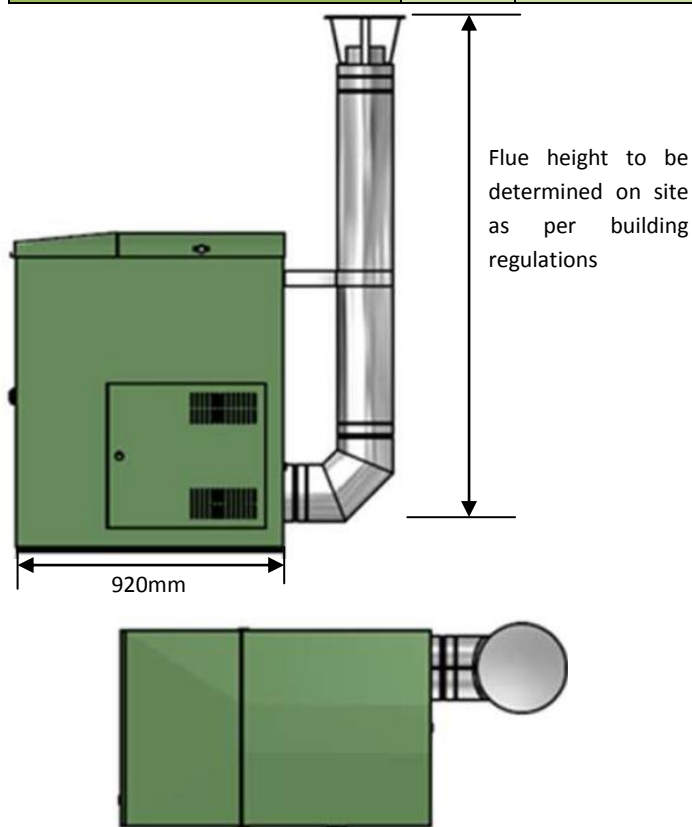
Always close the lid to the hopper once it has been filled with pellets.

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

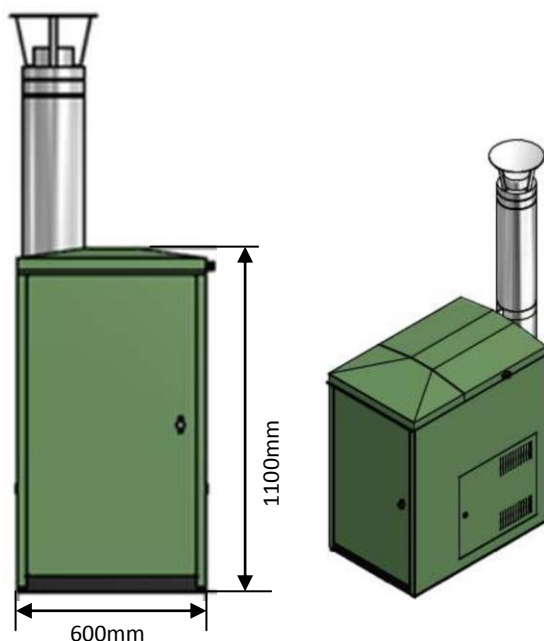
Always supervise children when the hopper lid is open in case foreign material is placed into the hopper or children climb into the hopper.

## 9. Technical Data

Technical Data	Greenflame 28kW	
Nominal Output	kW	8-28
Nominal Fuel Input	kg/hr	2-6.6
Efficiency Nominal Output (EN303-5)	%	90.2
Seasonal Efficiency	%	81.9
Smoke Temperature at Nominal Power	°C	140-160
Minimum Required Draught	Pa	10
Exhaust Gas Mass Flow	g/s	7.6-15.8
CO <sup>2</sup> at Reduced and Nominal Power	%	8-15
Water Operating Temperature Range	°C	50-85
Maximum Operating Pressure	Bar/kPa	3/269
Recommended Operating Pressure	bar	1.5
Water Flow Connection	mm	22mm
Water Return Connection	mm	22mm pump valve
Boiler Drain	inch	½"
Boiler Safety Thermostat Setting	°C	105
Frost Thermostat Adjustable (4-10)	°C	Factory set at 4
Boiler Class	Class	Class 3
Boiler Electrical Power Requirement		230V 50Hz
Maximum Electrical Consumption	Watts	<500
Average Electrical Consumption	Watts	164
Line Voltage Fuse Protection	Amp	6
PCB Fuse Protection	Amp	1
Width	mm	600
Height	mm	1100
Length (Excluding Flue)	mm	920
Fuel Hopper Capacity	kg	110
Boiler Flue Diameter	mm	80
Boiler Dry Weight	kg	205
Water Content	litres	28

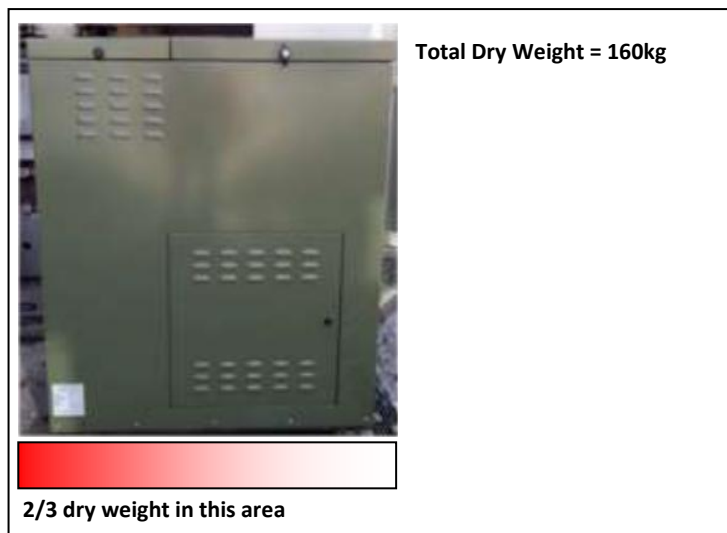






## 10. Boiler Handling

One of the key features of the Greenflame 28kW is its size and ability to be transported to and located in confined spaces. Care should also be exercised when manoeuvring the appliance into position. The illustration below indicates the weight distribution of the appliance.



Always protect the appliance when transporting on trolleys or hand carts.

Only persons who have been trained in manual handling techniques should attempt to move the appliance. Incorrect lifting techniques can cause serious injury.

## 11. Maintenance Schedule

To ensure that your Greenflame wood pellet boiler appliance operates 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 – six months after a full service (recommended March after winter season).
- **Emptying of Ash Containers** – by Operator – Weekly
- **Clean Down of boiler Surfaces** – 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 passageways 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 burner pot and remove any loose ash in the pot holder.
- Ensure all air-holes in the burner pot are clean 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 lower ash pan door and main combustion chamber door that it maintains a good seal. Replace if necessary.
- Check the ceramic board on the combustion door and replace if necessary.
- Disconnect and remove the auger motor.
- Remove the auger and clear 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 burner pot and remove any loose ash in the pot holder.
- 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. Service Log**

DATE	SERVICE PROVIDED	SERVICE ENGINEER
DATE	SERVICE PROVIDED	SERVICE ENGINEER
DATE	SERVICE PROVIDED	SERVICE ENGINEER
DATE	SERVICE PROVIDED	SERVICE ENGINEER
DATE	SERVICE PROVIDED	SERVICE ENGINEER
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DATE	SERVICE PROVIDED	SERVICE ENGINEER



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**400002 August 2014**