

EN

BURNiT
by **SUNSYSTEM**

Wood-Gasifying Boiler PyroBurn Alpha PLUS series

TECHNICAL PASSPORT INSTALLATION and OPERATION MANUAL




Version i0.1.3


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1. EXPLANATION OF SYMBOLS AND SAFETY INSTRUCTIONS

1.1. Explanation of symbols

 **CAUTION!** - Important recommendation or warning concerning safety conditions during installation and operation of the heating boiler

 **DANGER!** - fault or improper use may cause injury or be hazardous to the life of humans or animals.

 **FIRE HAZARD!** - fault or improper installation and operation may cause fire.

 **INFORMATION** - Important information on the proper operation of the product.

1.2. Requirements to boiler installation room

This manual contains important information for the safe and correct installation, start-up and trouble-free service and maintenance of the heating boiler.

The heating boiler can be used for heating rooms only in the manner described in this manual.

Take note of the boiler type information indicated on the factory sticker and the technical data provided in chapter 12 in order to ensure proper operation of the product.


1.2.1. Instructions to boiler installer


During installation and operation, the country-specific requirements and regulations must be observed:

- local building regulations on the installation, air supply and exhaust gas extraction as well as chimney connection.
- regulations and norms concerning the

fitting of the heating installation with safety devices.


 **Use only original BURNiT parts**

 **DANGER of intoxication, suffocation.**
Inadequate inflow of fresh air in the boiler room may result in dangerous leak of exhaust gases during boiler operation.
 - Make sure the air inlets and exhaust gas outlets are not clogged or closed.
 - If faults are not remedied immediately, the boiler must not be operated, and the user must be provided with written instructions on the fault and the hazard it entails.

 **DANGER of fire when burning flammable materials or liquids.**
 - Flammable materials/liquids must not be left in immediate proximity of the heating boiler.
 - Indicate to the installation user the allowed minimum clearances from surrounding objects.

Customer must undergo boiler operation/maintenance training by authorized installer/service shop.

1.2.2. Instructions to installation user

 **DANGER of intoxication or explosion**
Toxic gases may be discharged when burning waste, plastics, liquids.
 - Use only the fuels indicated in this manual.
 - In case of danger of explosion, ignition or discharge of exhaust gases in the room, stop the heating boiler from operation.

CAUTION! Danger of injury / damage of installation due to incompetent operation.
 -The heating boiler must be serviced only by persons familiar with the operation manual.
 -As a user, you are only allowed to start the boiler up, adjust the temperature of the boiler, shut the boiler down and clean it.
 -Unattended children must not be allowed to access a room housing a running boiler.

It is mandatory to assure a backup power generator of corresponding rated power! (see 12.3)

Customer must undergo boiler operation/maintenance training by authorized installer/service shop.

The minimum distance from the heating boiler or exhaust gas pipe to objects or walls must be at least 200 mm.

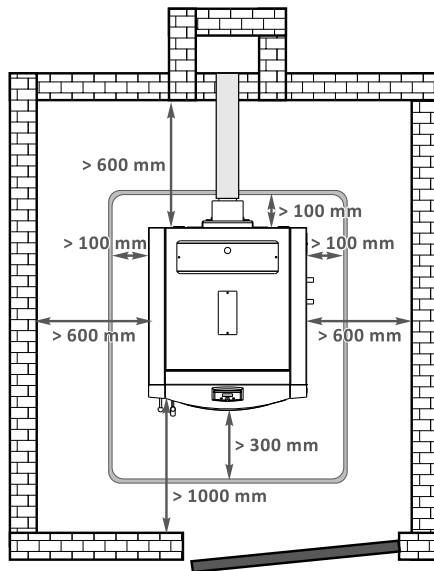


Diagram 1
Recommended clearances between the boiler and walls.

For general safety considerations, we recommend that the boiler be placed on a foundation with height of 100 mm made of class A material , see table 1.

Safety rules for user operation:

- Operate the heating boiler at a maximum temperature of 85°C, and to that end you must regularly inspect the boiler room.
- Do not use flammable liquids to ignite the fire or increase boiler's output .
- Collect the ash in a fire-proof container with a lid.
- Clean the heating boiler surface using non-flammable agents only.
- Do not place flammable objects onto the heating boiler or in its proximity. (see diagram 1 for the minimum clearances)
- Do not store flammable materials in the boiler room.

1.2.3. Minimum clearances for installation and combustibility of building materials

The applicable minimum clearances in your country may differ from the ones specified bellow. Please, consult your installer.

Table 1

Combustibility of building materials

Class A – non-combustible	Stone, bricks, ceramic tiles, baked clay, solutions, plaster free of organic additives.
Class B – hard combustible	Gypsum board panels, basalt fiber needled felt, fiberglass board, AKUMIN, Izomin, Rajolit, Lignos, Velox, Heraklit.
Class C1/C2 Medium combustible	Wood beech, oak Wood softwood, layered wood
Class C3 – easy combustible	Asphalt, cardboard, cellulose, tar, fiberboard, cork, polyurethane, polyethylene.

2. PRODUCT DESCRIPTION

PyroBurn Alpha PLUS boilers are designed to burn solid fuel – wood or wood briquettes class B on the principle of wood gas generation using a fan. The body of the boiler is manufactured as welded sheet-steel structure. It comprises a loading chamber which in its lower part is equipped with ceramic nozzle with longitudinal slot through which passes the wood gas produced. Below it is the combustion chamber where the wood gas burns, lined with ceramic refractory pieces. On the front, in the upper part of the boiler is located the upper door for loading the upper chamber with wood, and in the lower part is the combustion chamber door. The upper chamber houses a flue damper (opens and closes manually by a lever mechanism located on the side of the door). The boiler body is heat-insulated on the outside with mineral wool inserted under the housing. A PID controller is located in the upper part of the boiler.

- **Design.** Boiler body is made of high-quality boiler steel sheets with thickness of 6 mm for the combustion chamber and 4 mm for the water jacket. The built-in refractory ceramic pieces help ensure the uniform transfer of the heat produced to the water jacket and protect the steel walls from the high temperatures (up to 1200 °C).

- **Pyrolytic combustion.** Wood in the loading chamber burns (above 580°C) and releases wood gas rich in carbon compounds. When combined with the primary air it forms a burnable mixture and is then routed to the nozzle in the combustion chamber. In the nozzle the mixture is enriched with secondary air and is self-ignited in order to reach the combustion chamber at 1200°C. Before leaving the boiler body, flue gases pass

through flue pipes where they lose their heat and cool down to 150°C. Pyrolytic combustion helps achieve efficient wood burning with minimum production of ash.

- **Effective.** Thanks to the pyrolytic principle of wood burning, the boiler achieves efficiency of more than 90%. The water jacket envelops the entirety of the combustion chamber in order to utilize maximum amount of the heat produced. On the outside, the boiler body is insulated by means of 50 mm layer of mineral wool thermal insulation.

- **Microprocessor PID controller for control.** The PyroBurn boiler has intuitive controls, adjustable output and reliable safety mechanisms. The built-in PID microprocessor controller monitors and controls the burning process to achieve optimal, efficient and eco-friendly operation. The controller is capable of controlling the circulation pumps of the heating installation and DHW installation. It has two main modes of operation. When the Z-PID mode is active (factory preset), the controller modulates the fan output depending on the current temperature of the boiler and the exhaust gas temperature according to the maximum temperature setting for the boiler. When the Z-PID mode is deactivated (selectable by the installer upon customer's request), the controller turns the draught fan on or off depending on the temperature of the boiler and the maximum temperature setting for the boiler.

The microprocessor control is able to control one heating circuit and one DHW circuit through the built-in terminals for connecting circulation pumps and DHW sensor.

- Cleaning system
- Fuel loading door
- Cleaning door (combustion chamber)
- Air flaps for feed-in air adjustment
- STB – emergency thermostat
- Flue gas sensor
- Safety heat exchanger.
- Flue damper
- Safety devices of the boiler

The boiler is equipped with 3 independent overheating protections.

1. Upon reaching 95°C the control turns the fan off and sounds a signal .
2. An independent STB thermostat shuts down the fan upon reaching 99°C.
3. Emergency cooling coil integrated in the top section of the water jacket allows the connection of thermostatic valve.

3. FUELS

The heating boiler can utilize only natural and untreated wood. Log length should be up to 330 mm. (for model PB 20 Alpha PLUS) and up to 500 mm (for models PB 30 / 40 Alpha PLUS).

Fuel moisture content must not exceed 5% - 20%.

For maximum utilization of the wood heating value we recommend to use wood which has dried over a period of 1.5-2 years . High moisture content of the wood decreases its heating value which in turn reduces boiler output.

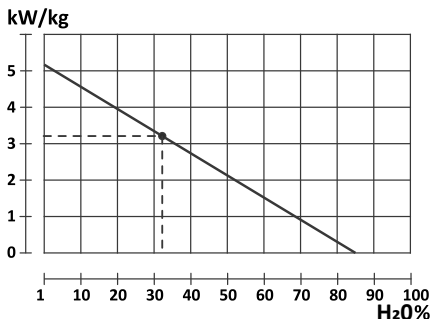


Diagram 2
Relation between wood heating value and water content.

Table 2
Heating value of the most common wood species

Wood species	Energy contained in 1 kg		
	kcal	kJoule	kWh
Spruce	3900	16250	4,5
Pine	3800	15800	4,4
Birch	3750	15500	4,3
Oak	3600	15100	4,2
Beech	3450	14400	4,0

4. TRANSPORTATION OF THE BOILER

We recommend to transport the heating boiler to the installation site in its packaging placed on the pallet. During transport and installation, depending on the weight, suitable safety devices should be used in accordance with Directive 2006/42/EC.

When transporting items weighing more than 30 kg, the use of pallet jack, fork truck or other hoisting devices is a must. The boiler is safely secured by means of anchor fittings to a wooden pallet of sizes A, B, C. It has then been stretch-wrapped to protect the housing from scratching and dust buildup. The last element of the packing is a height D cardboard box. The cardboard box protects the boiler from ambient conditions during transport.

Important: When installing the boiler, the wooden pallet onto which the boiler is placed must be removed by unscrewing the bolted connections using flat ring wrench S13.

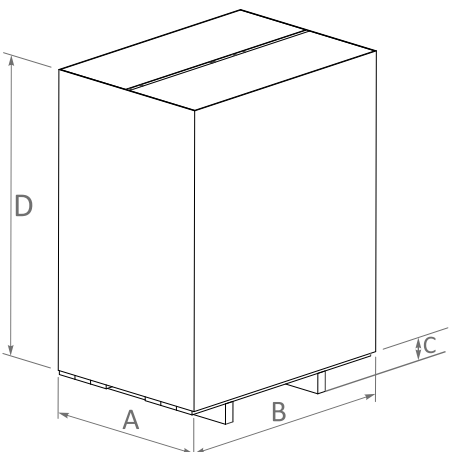


Diagram 3

Model	A	B	C	D	kg
PB 20 Alpha PLUS	740	1055	120	1370	413
PB 30 Alpha PLUS	850	1200	120	1470	462
PB 40 Alpha PLUS	850	1200	120	1540	613

5. DELIVERY OF THE BOILER

- Inspect the integrity of the packaging upon delivery.
 - Check whether all components have been delivered to you. Boiler scope of delivery includes:
 - 1) Boiler body with boiler doors
 - 2) Safety valve 3 bar.
 - 3) Ash pan
 - 4) Cleaning brush for flue pipes
 - 5) Installation and operation manual
 - 6) Service booklet and Warranty card
- If any of the above items are missing, contact your supplier.

- You must remove the polystyrene blocks placed in the combustion chamber prior to putting the boiler into operation.

6. ASSEMBLY OF THE HEATING BOILER

The assembly, installation and set-up of the boiler must be performed by a technician authorized for such operations. Installer must indicate to the user of the installation the minimum clearances from flammable materials and liquids.

6.1. Requirements:

- Boiler room must be frost-proof;
- Boiler room must allow for continuous access of air necessary to maintain combustion;
- Boilers must not be placed in inhabitable rooms;
- All boiler rooms must have correctly calculated vent depending on the boiler output. The vent must be protected by means of a net or grate.

The size of the vent is calculated according to the formula:

A = 6,02*Q - where:
A – area of the vent in **cm²**,
Q – boiler output in **kW**

- Remove the packaging without polluting the environment;
- Observe building supervision instructions, in particular the existing Ordinance on combustion devices and storage of combustion materials, on building requirements applicable to installation sites and on ventilation;
- The boiler must be placed on a foundation whose surface area is larger than the base of the heating boiler according to diagram 1;
- The boiler must be placed in a position which allows for the easiest possible

cleaning and servicing;

- Installation must be carried out according to installation diagram 1 which shows the boiler housing;
- No objects made of flammable materials or liquids may be placed on/near the boiler;

7. INSTALLATION OF THE HEATING BOILER

7.1. Connecting the boiler to a chimney

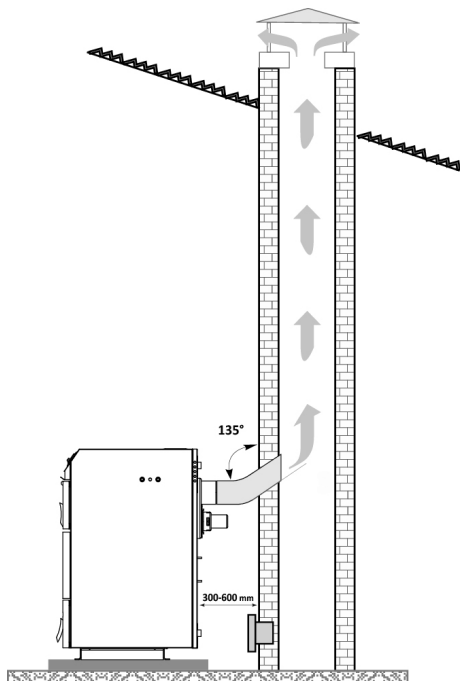


Diagram 4

Boiler-to-chimney connection must always comply with the existing standards and rules. The chimney must provide sufficient draught for evacuation of the smoke under any conditions.

The proper functioning of the chimney requires adequate sizing of the chimney itself since the draught it produces affects

combustion, boiler's output and life span. The draught created by the chimney is in functional relation to its cross-section, height and the roughness of its interior walls. No other appliance may be connected to the chimney serving the boiler. Chimney diameter must not be smaller than the flue outlet of the boiler. Flue outlet must be connected to the chimney opening. In terms of mechanical properties, the flue outlet must be sturdy and properly sealed (to avoid gas leak) and allow for easy access for cleaning on the inside. The inner section of the flue outlet must not be greater than the effective section of the chimney and must not narrow. Avoid using elbow joints.

Table 3

Recommended minimum chimney heights

Model	Chimney diameter	Recommended height
PB 20 Alpha PLUS	Ø 160 mm	At least 8 m
	Ø 180 mm	At least 8 m
	Ø 200 mm	At least 7 m
PB 30 Alpha PLUS	Ø 160 mm	At least 9 m
	Ø 180 mm	At least 9 m
	Ø 200 mm	At least 8 m
	Ø 220 mm	At least 8 m
PB 40 Alpha PLUS	Ø 180 mm	At least 11 m
	Ø 200 mm	At least 10 m
	Ø 220 mm	At least 10 m



Data in the tables are for indicative purposes.

Draught depends on the diameter, height, uneven sections along the chimney surface and differences in temperature of combustion products and outside air. We recommend that you use chimney fitted with flue terminal. Heating specialist must calculate the precise sizing of the chimney.

7.2. Connecting the boiler to the mains power supply



Such connection must be performed by a technician / service shop authorized for such operations.



Caution! ELECTRIC SHOCK HAZARD!

- Before opening the unit: switch off the voltage and secure the unit against accidental restart.
- Observe installation instructions.

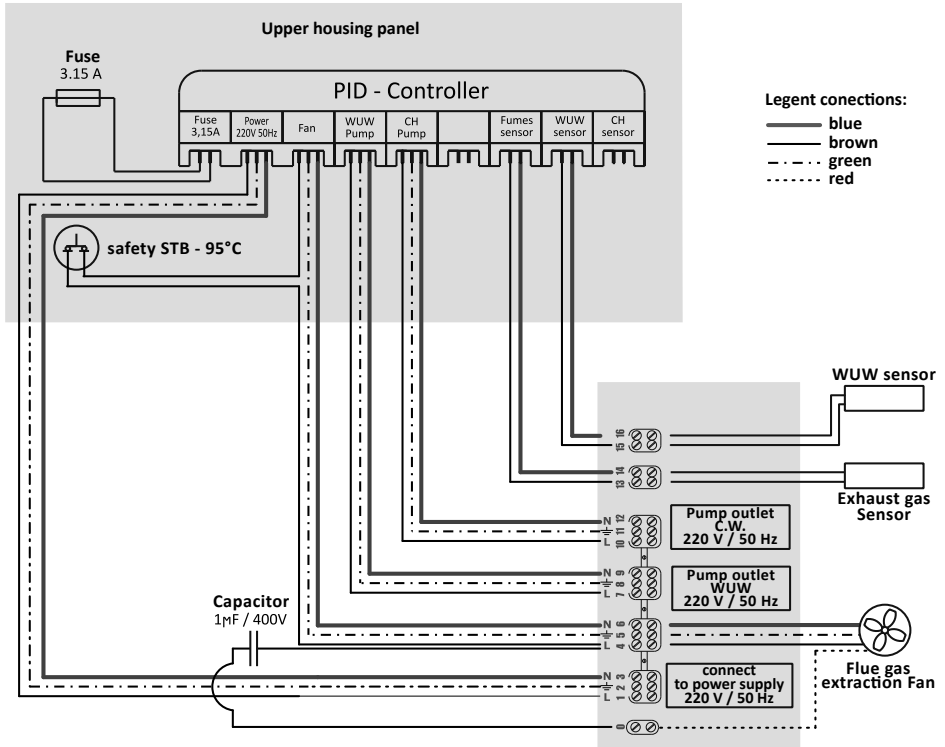


Diagram 5



Connection of capacitor must be done for model PB 20 Alpha Plus only!

The boiler must be connected to a 220V / 50Hz mains using a cable and a plug. The boiler must be placed in a position which allows for unobstructed access to the power supply plug. Dismount the inspection cover on the back side of the housing.

Using a screw driver, connect the power supply and the external components

(pump for the heating circuit and domestic hot water pump). Make sure you have connected the external components properly according to the enclosed wiring diagram.

Create solid connection with the electrical mains which complies with the local regulations.

Table 4

Problem	Prevention
Fire hazard! Hot parts of the boiler may damage electrical conductors	Make sure all conductors are placed in the required cable guides and pass over the thermal insulation of the boiler.

7.3. Connecting the boiler to the heating installation.

	Such connection must be performed by a technician / service shop authorized for such operations.
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When the boiler is connected to a heating system, it is mandatory to install a 3 bar relief valve and expansion vessel.

	It is necessary to provide for safety valves, pressure valves and a expansion tank in order to prevent water from boiling in the central heating system.
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No shut-off fittings may be installed between the relief valve, expansion vessel and boiler.

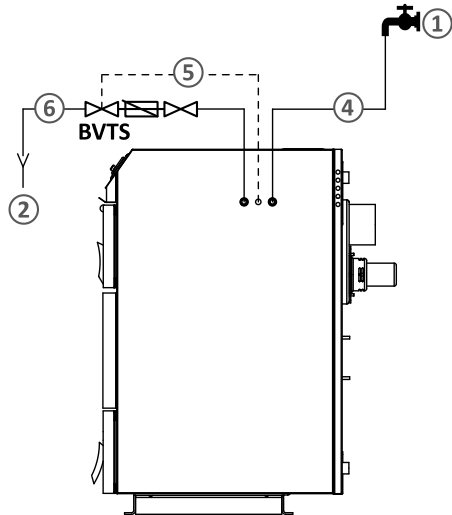
	It is mandatory to install a three-way valve (Laddomat or similar) or a four-way mixing valve which to ensure that the temperature of the heating medium fed into the boiler from the heating installation is at least 65°C.
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7.4. Connecting the safety heat exchanger

	Such connection must be performed by a technician / service shop authorized for such operations.
--	---

The heating boiler is equipped with safety heat exchanger (cooling circuit). It connects to the water system through a thermostatic valve. In case of overheating,

the thermostatic valve feeds in cold water from the water mains which passes through the heat exchanger and absorbs the heat in the boiler.



1. Water supply network (pressure 6-10 bar water temperature 8-15 °C)
2. Drainage (sewerage)
3. Boiler PB Alpha PLUS
4. Safety heat exchanger inlet
5. BVTS valve sensor
6. Safety heat exchanger outlet

Diagram 6

The water is then discharged into the sewage system. This arrangement ensures safe evacuation of the excess heat without the need for additional energy. This guarantees that the water in the boiler will not exceed the maximum safe level of 95°C.

The minimum operating pressure of the cooling water in the safety heat exchanger must be within the range 2 - 10 bar. A flow rate of at least 12 l/min is required. Connect the safety heat exchanger according to the hydraulic diagram using thermostatic valve. Install a filter on the inlet before the thermostatic valve.

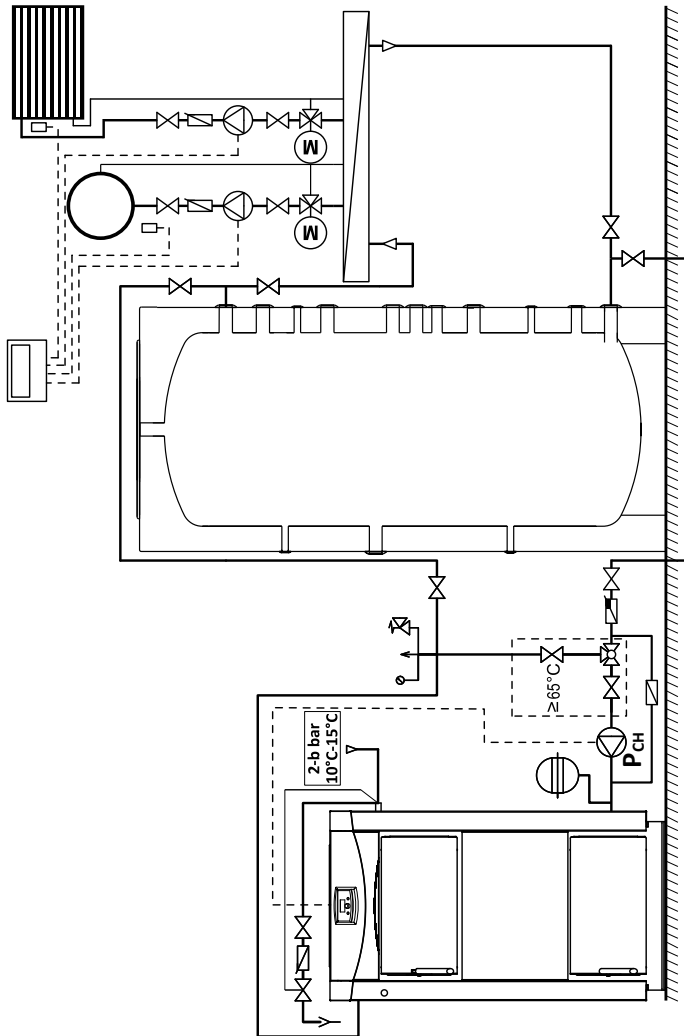


Diagram 8

Connection of PyroBurn Alpha PLUS boiler to P type buffer tank and three-way valve

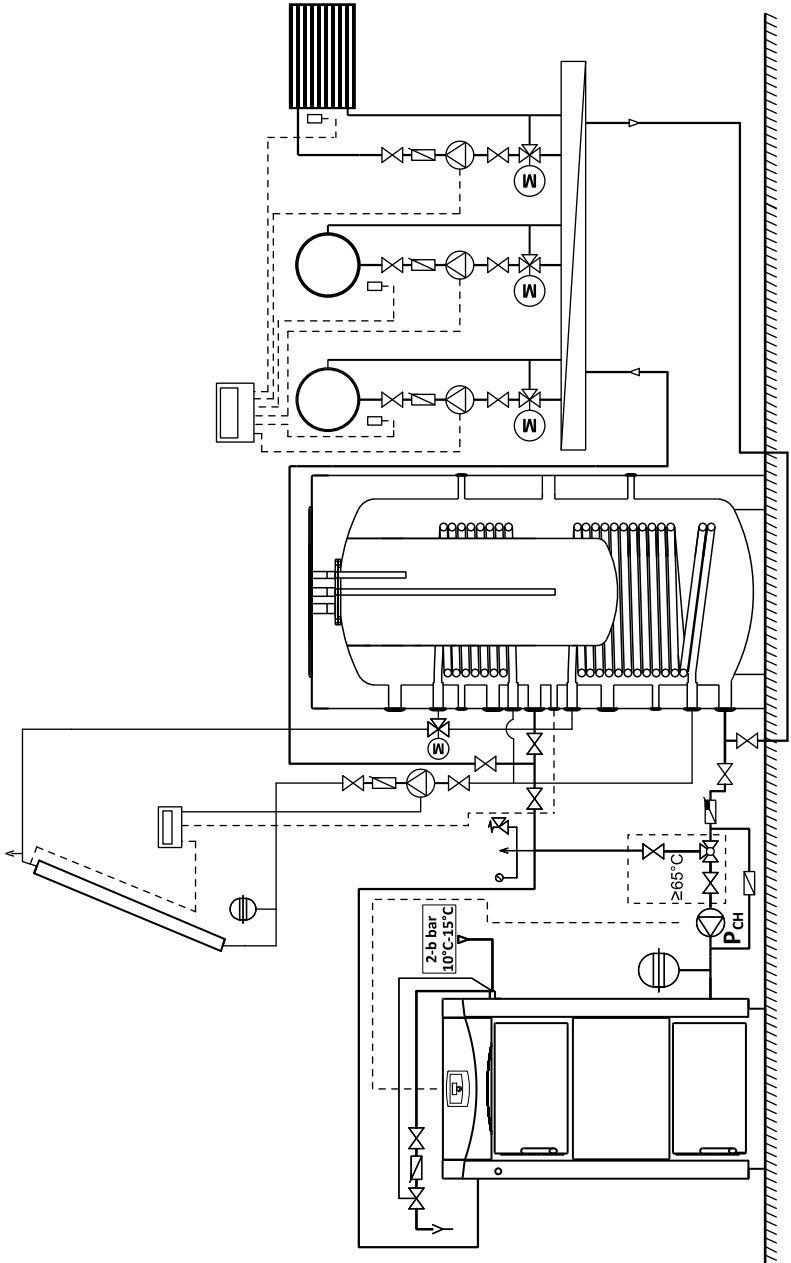


Diagram 9
Connection of PyroBurn Alpha PLUS boiler to combi tank KSC2,
flat plate collector PK and three-way valve

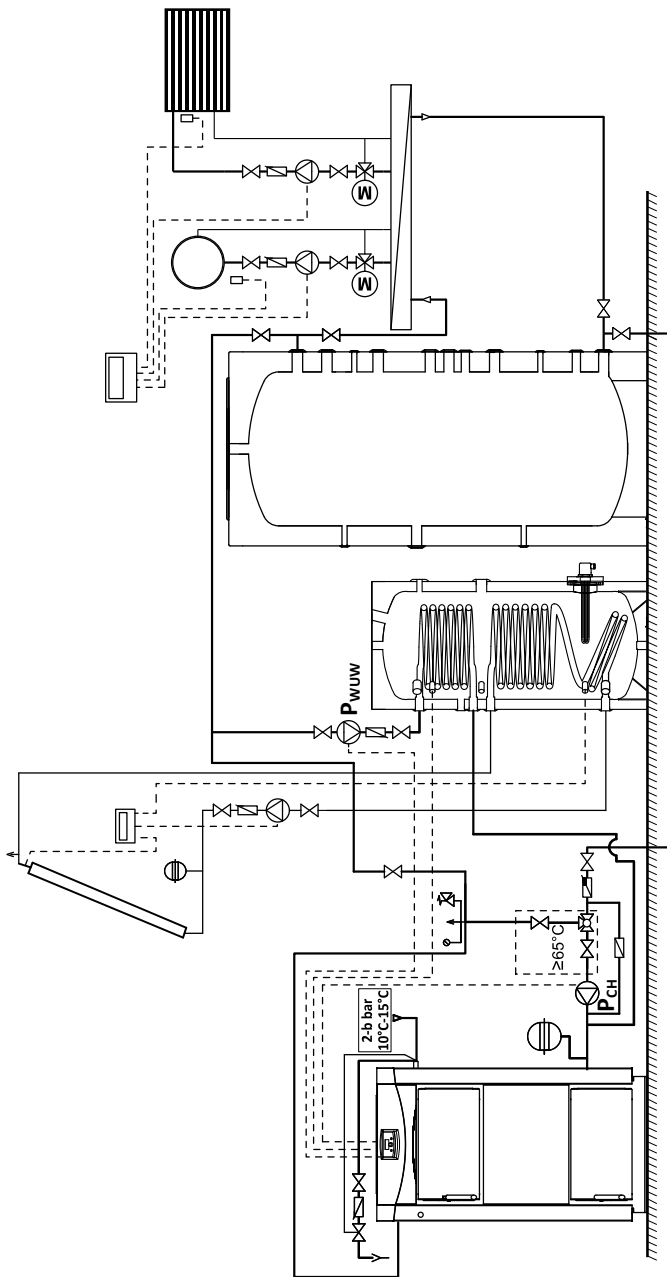


Diagram 10

Connection of PyroBurn Alpha PLUS boiler to solar tank SON, buffer tank P, flat plate collector PK and three-way valve

8. FILLING THE HEATING INSTALLATION

Table 5

Problem	Prevention
Possible installation damage due to strains in the material caused by temperature differences.	Fill the heating installation only in cold conditions (inlet temperature must not exceed 40 °C).
Danger of installation damage due to accumulation of deposits Condensate formation and tar deposits may shorten boiler's operational life.	<ul style="list-style-type: none"> - Do not operate the heating boiler for a long period of time in partial load mode - The temperature at the boiler inlet must not be less than 65°C, boiler water temperature must be between 80 and 85 °C. - Use the boiler for a short period to heat warm water in the summer.

9. BOILER OPERATION

9.1. Loading and lighting the boiler

When lighting the boiler for the first time, a condensate is formed which is later drained (this is not a fault in the boiler).

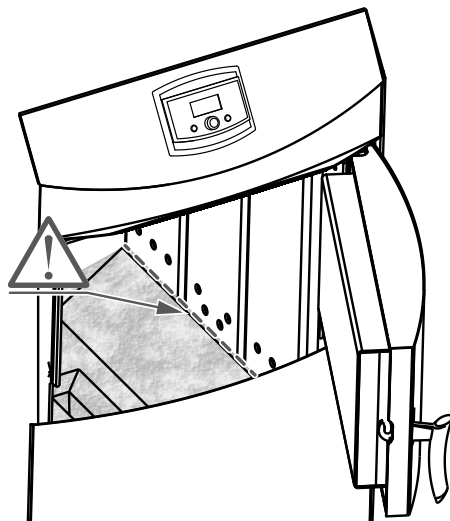
When burning moist wood, the boiler stops working effectively and fuel consumption increases significantly, desired output is not achieved and the operational life of the boiler body and the chimney is shortened.

Fuel is loaded in the upper combustion chamber and it is recommended is to load logs of length equal to the combustion chamber length and stack them tight inside with least possible air gaps.

Recommendations for fuel loading:

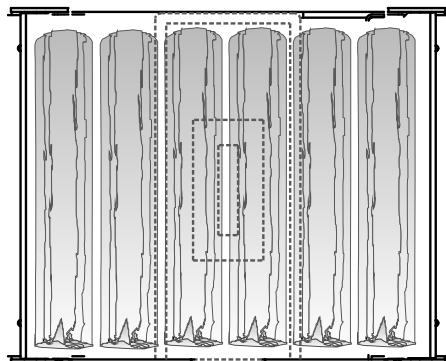
1. Keep air openings (upper chamber) clean from ash.

Clogging of air openings may affect boiler operation.



2. Stacking firewood in boiler chamber.

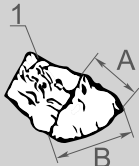
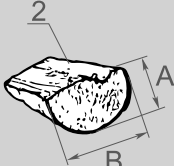
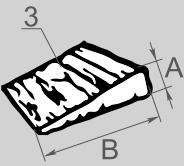
Wood in the chamber must be neatly arranged and not thrown, as is illustrated. This is a top plan view of the boiler chamber.



An important condition for the smooth running of the pyrolysis combustion is the upper chamber to be well tight with fuel, i.e. with minimal air gaps between the wood pieces.

When stacking the wood in the firebox keep clear the opening between upper and lower chambers. The entry of a large log in this opening can affect the pyrolytic combustion

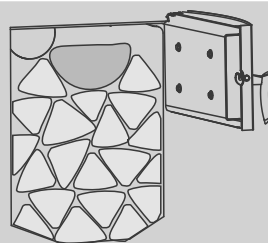
Recommended approximate dimensions of firewood:

Type of firewood			
A, cm	8 - 10	7 - 9	5
B, cm	12 - 15	13 - 16	20

3. Combustion of disproportionate firewood:

3.1. Loading of big and disproportionate firewood

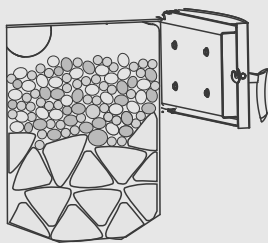
Place disproportionate firewood upon an already stacked standard size firewood at upper part of boiler chamber



3.2. Loading of small brushwood, pieces of wood and joiner waste.

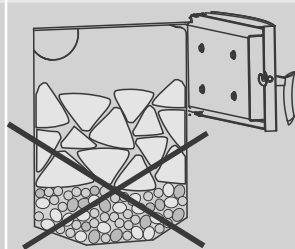
We recommend first to arrange standard sized firewood /at least 3 lines/ and then stack all the little pieces of wood and disproportionately on them. Stack the firewood tight inside with least possible air gaps.

Remember the rule: Smallest and fine pieces of wood should be placed last!

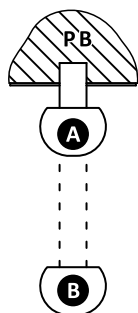


3.3. Never load small brushwood, pieces of wood and joiner waste in the lower part of chamber! Prohibited the burning of plastics and other paper packaging. This can affect to blockage of boiler.

Prohibited the burning of flammable substances or mixtures: diesel, gasoline, gunpowder, turpentine, paint and the like. Danger of explosion.



Bottom chamber door as well as all inspection openings must be closed and sealed. From the control menu select „Ignition” mode. The flue damper opens to ignite the boiler. In this position the flue gases will be suctioned out through the topmost part of the combustion chamber and then with the help of self-igniting additive and saturated kindling the firing of the wood is started. Once you get live embers, top-up the boiler fully with wood, close the flue damper and then the boiler will gradually enter into normal mode of operation.



PB - boiler

A - closed

B - open

1. Pull the lever (B)
2. Open boiler door
3. Load fuel
4. Close boiler door
5. Return the lever back in position (A)

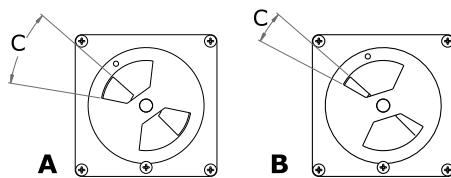
Diagram 11



Maintain operating temperature between 80°C - 85°C.

9.2. Combustion adjustment

The draught fan on the back of the heating boiler ensures that combustion air is fed through the air flaps (for primary and secondary air). Combustion quality depends on the correct setting of the air flaps. See diagram 12.



A
A – primary air

B
B – secondary air

Diagram 12

9.2.1. Adjustment of air flaps when burning wood with moisture content from 5% to 20%

- Primary air flap (A) must be opened at **20-25%** of the capacity of the primary air inlet. Distance „C” shown on the diagram must be approximately 15 mm.

- Secondary air flap (B) must be opened at **10-15%** of the capacity of the primary air inlet. Distance „C” shown on the diagram must be approximately 8-10 mm.

9.2.2. Adjustment of air flaps when burning wood with low heating value

- Primary air flap (A) must be opened at **50-75%** of the capacity of the primary air inlet. Distance „C” shown on the diagram must be approximately 25-35 mm.

- Secondary air flap (B) must be opened at **10-15%** of the capacity of the primary air inlet. Distance „C” shown on the diagram must be approximately 8-10 mm.




Important!!! Settings indicated in items 1 and 2 are indicative and have been determined experimentally by testing the product in laboratory conditions. The precise and correct adjustment of the primary and secondary air flaps must be carried out by an authorized service technician with the necessary equipment (gas analyzer).

Fuel loading must be carried out only with the fan turned on!

9.3. Cleaning of the boiler

9.3.1. Cleaning and maintenance by customer.

	<p>Caution! Hot surfaces. Before cleaning the boiler, make sure the fire in it has died out and the boiler has cooled down.</p>
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- Exploitation of the boiler and the type of used fuel determine how often have to clean the boiler residues from the combustion process.

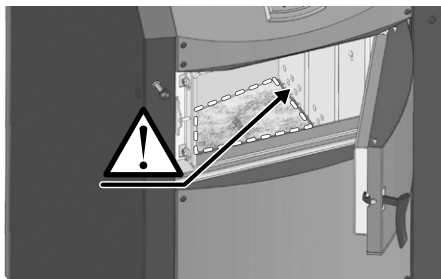


Diagram 13

- We recommend cleaning the ashes from the upper chamber of the boiler to be done every 3-4 days. In the case where ashes (1) has reached faster the level of primary air openings (2), then ashes must be cleaned immediately. Do not let the ashes clog these holes. (Diagram 13)
- The ash accumulates in lower chamber as well. Clean ash when its level reaches $\frac{1}{3}$ of lower chamber volume (Diagram 17). Uncleaned ash affects boiler operation. (Diagram 14)

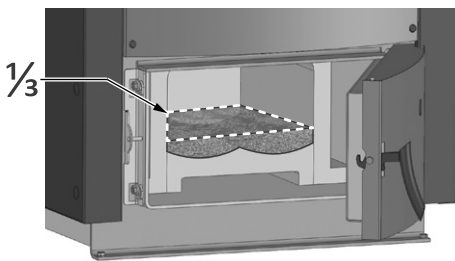


Diagram 14

9.3.2. Cleaning and maintenance by authorized installer / service

Boiler cleaning and maintenance must be performed by a technician / service shop authorized for such operations.

Before the beginning of heating season must be done inspection and maintenance of following boiler parts:

1. Adjustment of boiler doors again.

Make sure the doors seal well. If necessary, replace insulation rope at the door with a new one. Make sure that the new insulating rope is placed correctly, following exactly the geometry of channel. Pull the rope well to the door corners by using a screwdriver.

Tightly closing the doors is controlled by hexagonal plate (A) located under each hinge nut (B). (Diagram 15)

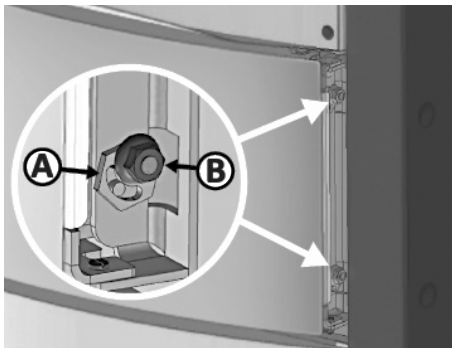


Diagram 15

2. Cleaning of the fan in back boiler part.

Use a switch S13 to remove the nuts (4 pieces) that secure fan plate. Disassemble the fan with plate. It is possible that the plate is stuck to the gasket. Thoroughly clean the fan turbine by using a brush. Remove the ash and soot accumulation in the place where the fan was mounted. Replace the plate gasket with new one. Assemble the fan back to the boiler.

3. Cleaning of boiler upper chamber.

Disassemble protective steel plates from the upper chamber and clean the area behind them.

Thoroughly clean the ash using a paddle brush and a vacuum cleaner (hoover). Assemble protective steel plates back to the upper chamber. Make sure they are properly seated.

Dismantling of the protective plates

1. The plate is rivet-mounted.
2. Slide the plate upwards so as to catch the rivet in the wide portion of the slot.
3. Pull the released plate away.

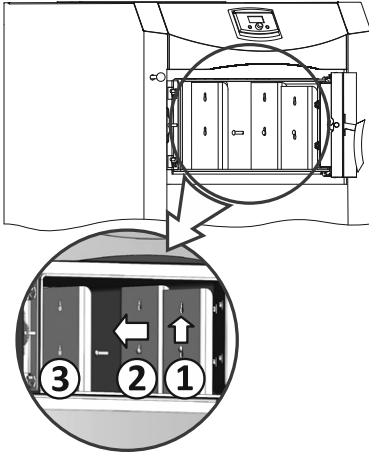


Diagram 16

4. **Cleaning of boiler lower chamber.** Disassemble ceramic elements from lower chamber. Follow the sequence of diagram.

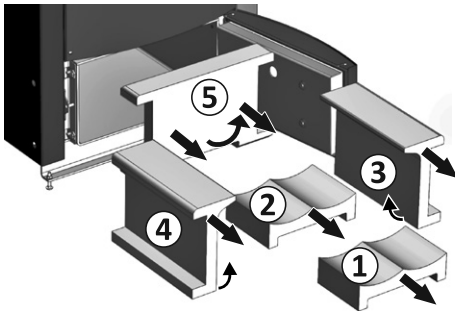


Diagram 17

- Disassemble the bottom ceramic part of combustion chamber (1 and 2).
- Disassemble both ceramic sides by smooth rotation of the detail (3 and 4).

- Disassemble back ceramic part: step one- pull the bottom part forward; step two -twist the detail and take it out (5).
- Thoroughly clean the lower chamber.
- Assemble the ceramic elements back into the lower chamber in reverse order – back (5), both sides (3 and 4) and bottom (2 and 1).

5. Cleaning of fume exhaust tubes of boiler.

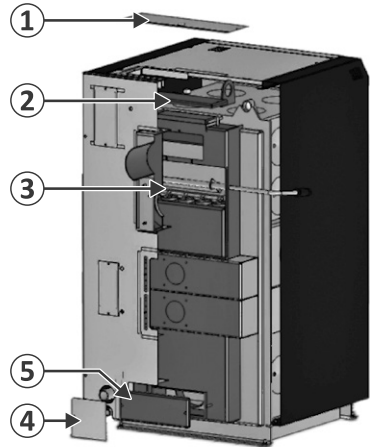


Diagram 18

- Upper cleaning opening is located on top of boiler. It is protected by two covers. Unscrew the two wing nuts. Disassemble the decorative lid of upper cleaning opening on boiler casing (1)
- Unscrew the two wing nuts. Disassemble the lid of upper cleaning opening on boiler body (2)

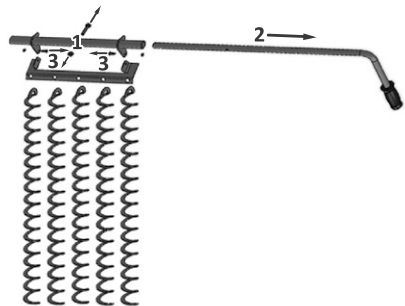


Diagram 19

- Remove the cleaning system (diagram 17) using a wrench S13 and pliers. Thoroughly clean fume exhaust tubes (3) of soot deposits. Use the brush from equipment delivery.
- Lower cleaning opening is located behind the boiler, low down. It is protected by two covers. Unscrew the two wing nuts. Disassemble the decorative lid of lower cleaning opening on boiler casing (4)
- Lower cleaning opening. Unscrew the two wing nuts. Disassemble the decorative lid of lower cleaning opening on boiler casing (5).
- Remove soot accumulation after the cleaning of fume exhaust tubes
- Assemble the lid of upper cleaning opening on boiler body (2). Make sure the lid is placed correctly and tight.
- Assemble the decorative lid of upper cleaning opening on boiler casing (1).
- Assemble the lid of lower cleaning opening on boiler body (5). Make sure the lid is placed correctly and tight.
- Assemble the decorative lid of lower cleaning opening on boiler casing (4).

9.4. Important recommendations for long-lasting and correct operation of the boiler

9.4.1. The allowed moisture content of the fuel used must not exceed 5% ÷ 20%.

9.4.2. Gas emission in the combustion chamber may result in the formation of tar and condensate (acids). Therefore, a mixing valve must be installed and it must be adjusted so that the minimum temperature of the water returning in the boiler is 65°C. This extends the life span of the boiler and its warranty. The operating temperature of the water in the boiler must be within the 80°C - 85°C range.

9.4.3. It is not recommended to operate the boiler for a long period of time at an output lower than 50%.

9.4.4. When using circulation pump, boiler operation must be controlled via a separate thermostat in order to ensure the prescribed rated temperature of the return water.

9.4.5. The eco-friendly operation of the boiler is realized at rated output.

9.4.6. It is recommended to install a storage/buffer tank and pump type group with thermostatic mixing valve to the boiler. The capacity of the storage tank is 55 L of water per 1 kW installed boiler power.

9.4.7. Maintenance and operation training for the boiler is conducted by an authorized installer.


	<p>Failure to observe the installation and operating requirements described in the manual and the service booklet voids the warranty.</p>
---	--

Table 6. TROUBLE-SHOOTING TABLE

Installation damage	
<i>Cause</i>	<i>Solution</i>
1. Due to unsealed connections	1. Install the connecting piping strain-free to the boiler connections. Connect the heating installation outlet to connection B. Connect the heating installation inlet to connection A. Mount the cock Y included in the set item. 11.4. at the drainage outlet
2. Due to accumulation of deposits. Condensate and tar formation may reduce the performance and life of the heating boiler. The temperature at the boiler inlet must not be less than 65°C, boiler water temperature at the outlet must be between 80 and 85°	2. It is mandatory to install a three-way thermostatic valve which will prevent the temperature dropping under 65°C at the inlet. - In order to increase the operational life of the boiler it is recommended to install a buffer vessel with capacity of 55 l per 1 kW of installed power
3. Due to freezing	3. If the heating installation, including the piping network, has not been built frost-proof, we recommend that you fill the heating installation with a liquid which has low freezing point and corrosion protection and antifreeze agent
Output is too low	

<i>Cause</i>	<i>Solution</i>
1. Insufficient draught	1. Check chimney condition and measure draught. (must be performed by an authorized service)
2. Heating value of the fuel is too low.	2. Make sure you use sufficiently dry fuel. When using fuel with high moisture content, after the reloading the boiler may burn for some time at significantly lower output level until the fuel in the combustion chamber has dried.
3. Presence of soot deposits and/or tar on the flue damper in the upper chamber which prevent its tight closure.	3. Clean the flue damper and make sure that when moving its closing/opening lever it provides adequate sealing of the flue gas outlet in the upper chamber. (must be performed by an authorized service)
4. Presence of soot deposits and/or tar in the flue pipes in water jacket in the back of the boiler	4. Clean the heat exchange surface of the flue pipes using the brush from the cleaning tools set. After the cleaning is completed, remove any soot through the inspection opening in the back of the boiler. Must be performed by an authorized service.

Boiler settings do not change. No pyrolytic combustion.

<i>Cause</i>	<i>Solution</i>
1 Boiler doors don't close well.	1. Check sealing rope and replace if necessary. Boiler doors must be closed by applying light pressure in order to ensure proper sealing. Item 6.2.
2. Secondary and primary air flaps are not adjusted correctly.	2. Adjust primary and secondary air flaps depending on the heating value of the wood in accordance with the instructions provided in item 9.
3. Significant soot and tar deposits on the fan turbine hinder its normal operation.	3. Contact authorized service to carry out the cleaning the fan and its turbine. Check that the boiler does not operate for an extended period of time in reduced output mode or burn fuel with high moisture content.

Boiler water too hot, heating bodies too cold

<i>Cause</i>	<i>Solution</i>
1. Hydraulic resistance is too high. 2. Air in the system 3. Inoperable circulation pump	Make sure the circulation pump has been properly selected and the heating installation is of the proper dimensions. (You must contact your installer.)

Fan not working

<i>Cause</i>	<i>Solution</i>
The boiler has reached the maximum set temperature.	Allow the boiler to cool off. After the temperature in the boiler has decreased, the draught fan restarts.
Significant soot and tar deposits on the fan turbine hinder its normal operation.	Contact authorized service for cleaning the fan and its turbine. Check that the boiler doesn't operate for an extended period of time in reduced output mode or burn fuel with high moisture content .
The STB safety thermostat has been triggered.	Upon reaching a temperature of 95°C, the thermostatic safety protection device is triggered and the fan is turned off. To resume protection, remove the black cap on the front panel of the boiler and press the button on the STB-thermostat. Contact your installer to determine the cause of protection triggering.

10. CONTROLLER

The ST-81i controller is intended for use with central heating boilers and is used for controlling the central heating water circulation pump, hot consumption water pump and blow (fan). The ST-81i is a PID-based controller using a continuous signal. In this type of controllers, the fan power is calculated based on boiler temperature and flue gas temperature measured at the boiler outlet. The fan runs continuously and its power depends directly on the measured boiler temperature and flue gas temperature as well as the difference between the two parameters and their setpoint values.

ATTENTION! HIGH VOLTAGE!
Make sure the regulator is disconnected from the mains before working on the power supply (cable connections, device installation, etc.)!

ATTENTION!
All connection works must only be carried out by qualified electricians.

ATTENTION!
Improper cable connections may damage the regulator!







ATTENTION!
The device may be damaged if struck by a lightning. Make sure it is unplugged during the storms.

10.1. Controller's view. Explanation of buttons and indicators.



Advantages of zPID controllers include their ability to maintain a stable setpoint temperature without unnecessary over-regulations and oscillations. By fitting the controller with a flue gas outlet sensor, you can save from a few up to several percent of fuel, and ensure a steady water temperature for a longer service life of your heat exchanger (boiler). Flue gas outlet temperature monitoring ensures reduced harmful dust and gas emissions. The thermal energy from the flue gases is used for heating instead of being wasted and disposed of through the funnel.

Explanation of buttons:

-  - Fan
-  - CH - Central Heating system pump
-  - HCW - Hot Consumption Water Pump
-  - Manual mode
-  - Encoder knob
-  - Standby

EXIT - Exit/Enter

You can change all parameters with an encoder knob. Turning the knob allows you to select a function or modify its value, while pressing the knob allows you to enter the function or confirm changed values. To leave any function, turn the knob until you reach the EXIT position and confirm your selection by pressing the knob.

10.1.1. Fire up. The cycle begins when you activate the fire up function in the controller's menu and is active until the central heating boiler temperature reaches 40°C (the default fire-up threshold), on condition that the temperature does not drop below this value for 2 minutes (the

default fire-up time). If these conditions are met, the regulator will switch to the duty mode and the manual operation symbol on the housing will be deactivated. If the controller fails to reach parameters required for entering into the duty mode within 30 minutes from activation of the fire-up function, the “Unable to fire up” message will appear on the display. In such a case, the fire-up cycle needs to be restarted.

10.1.2. Duty. Once the fire-up cycle is finished, the controller enters the duty cycle. The duty cycle is the basic functionality of the regulator. The blow is controlled automatically using the zPID algorithm and the temperature is close to its setpoint value. In the user menu, fan item will appear in place of the fire-up function. The fan can be deactivated when needed (e.g. while feeding fuel). If the temperature rises unexpectedly by more than 5°C over the setpoint value, the so-called Supervision Mode is activated.

10.1.3. Supervision Mode. The mode is activated during the Duty Cycle if the temperature rises by more than 5°C over the setpoint value. In such case, the controller is switched from the PID control to manual settings (according to parameters entered in the Fitter’s Menu) to reduce the temperature of the circulation water.

10.1.4. Damping. If boiler temperature drops by 2°C below the fire-up threshold and fails to rise above this value for 30 minutes (default damping time), the regulator will switch to the damping mode. While in this mode, the fan is deactivated and the display shows “Damping”. In case of voltage loss, the regulator ceases to operate. When power is restored, the controller returns to operation with

previously set parameters using its built-in memory. Lack of voltage does not cause the stored parameters to be lost.

10.2. Main page

42°C		55°C *
C.H.		SETPOINT

During normal operation, the LCD display shows the Main Page containing the following:

- Boiler temperature (to the left of the display).
- Setpoint temperature (to the right of the display).
- Fan stop. After manually stopping the fan while in the duty mode, the star symbol (*) will appear in the top right corner.
- Operation Mode. In the bottom right corner, the corresponding letter of the operation mode is displayed. Depending on the operation mode, the corresponding symbol is displayed:
D – house heating,
B – water heater priority,
R – parallel pumps,
L – summer mode.

Pressing the encoder will move you to the main menu. The display shows two options of the menu. To select a different option, turn the encoder knob.

10.3. Changing the central heating CH and hot consumption water HCW setpoint temperature

In order to change the setpoint temperature of the central heating (while in „C.H. screen“ main view), turn the encoder knob and (after setting a desired value) press it to confirm the change. In order to change the setpoint temperature of the hot consumption water (while in “H.C.W. screen” main view), turn the encoder knob and (after setting a desired value) press it to confirm the change.

10.4. Firing up

This function allows you to easily fire up the boiler. After igniting the boiler, you need to activate an automatic fire-up cycle. By selecting optimum parameters the boiler uses the zPID function to smoothly switch to the duty mode. If the boiler reaches the fire-up threshold temperature, the fan item will appear instead of the fire-up function. From now on, the option will be used to activate/deactivate the fan. This setting allows you to temporarily deactivate the fan at any time, e.g.

while feeding fuel. If during the fire-up cycle the boiler does not reach 40°C within 30 minutes, (default parameters), the following warning message will appear on the display:

38°C | 55°C *
UNABLE TO FIRE UP

To restore the boiler to operation, switch off the alarm by pressing the encoder and restarting the fire-up procedure.

10.5. Manual Mode

42°C | 55°C *
C.H. SETPOINT

In this mode each individual actuator is enabled and disabled independently of the other. In addition to the Manual Mode function, the Blow Force function has been provided. Blow force is appear in percentages.

BLOW FORCE
FAN

20%
BLOW FORCE

This function allows you to set the blow force of the fan while in the Manual Mode. Pressing the ENCODER activates the fan. The fan will operate until the ENCODER is pressed again.

BLOW FORCE
FAN

Press the ENCODER to enable / disable the central heating pump.

FAN
C.H.PUMP

Press the ENCODER to enable / disable the (water heater) hot consumption water pump.

C.H.PUMP
H.C.W.PUMP

Press the ENCODER to enable / disable the alarm.

H.C.W.PUMP
ALARM

10.6. Central Heating Pump Activation

With this function, you can set the temperature that will activate the central heating pump (the temperature is measured on the boiler). The pump will start if the setpoint temperature is exceeded. The pump will be deactivated when the boiler temperature drops below the activation temperature (minus hysteresis, e.g. 2°C). In this case, the pump will stop at boiler temperature of 33°C.

42°C | 55°C *
C.H. SETPOINT

FUEL TYPE
C.H.PUMP ACTIVATION

35°C
C.H.PUMP ACTIVATION

10.7. H.C.W. Pump Activation

With this function, you can set the temperature that will activate the hot consumption water pump (the temperature is measured on the boiler). Above the setpoint temperature (e.g. 40°C), the pump is activated and operates depending on the selected operation mode. The pump will be deactivated when the boiler temperature drops below the activation temperature (minus hysteresis, e.g. 3°C). In this case, the pump will stop at boiler temperature of 37°C.

42°C 55°C *
C.H. SETPOINT

C.H.PUMP ACTIVATION
H.C.W.PUMP ACTIVATION

48°C
H.C.W.PUMP ACTIVATION

10.8. Operation mode - by selecting one of four operation modes

42°C 55°C *
C.H. SETPOINT

H.C.W.PUMP ACTIVATION
OPERATION MODE

10.8.1. House Heating Priority

If you select this option, the controller will switch to the house heating mode. The central heating pump starts to run above the pump activation temperature (set to 35°C by default). Below this temperature (minus central heating hysteresis), the pump is shut off. While in the house heating mode, the letter D is displayed in the bottom right corner of the main screen.

HOUSE HEATING *
H.C.W.PRIORITY

10.8.2. H.C.W.PRIORITY

Activating the hot consumption water priority will cause the regulator to switch into the water heater priority mode. In this mode, the (hot consumption water) heater pump is activated until the set H.C.W. temperature is reached.

HOUSE HEATING
H.C.W.PRIORITY *

Then, the H.C.W. pump is shut off and the C.H. pump is activated. The central heating pump will run until the water heater temperature drops below the setpoint value (and the H.C.W. hysteresis); then, the C.H. pump is shut off and the H.C.W. pump is activated. In this mode, the fan is operated as long as the temperature is below 62°C to prevent the boiler from overheating. The hot consumption water priority function

consists in that the consumption water is heated up before heating up water in radiators. While in the H.C.W. Priority mode, the letter B is displayed in the bottom right corner of the main screen.



ATTENTION: The boiler should have non-return valves mounted on the central heating pump circuit and the hot consumption water pump circuit. A valve mounted on the hot consumption water pump will prevent hot consumption water from being drawn from the water heater.

10.8.3. Parallel Pumps

In this mode, the pumps start to run in parallel above the pump activation temperature (set by default to 35°C). These temperatures may, however, vary depending on user settings. This will cause irregular activation of the pumps. However, when both thresholds are exceeded, the pumps will operate simultaneously. The central heating pump runs continuously, while the hot consumption water pump stops after the setpoint temperature is reached in the water heater. While in the Parallel Pumps mode, the letter R is displayed in the bottom right corner of the main screen.

H.C.W.PRIORITY
PARALLEL PUMPS *

42°C 55°C *
C.H. SETPOINT



ATTENTION: In this mode, a non-return valve should be fitted to maintain different temperatures in the water heater and in the house.

After activation of the parallel pumps function, three items appear on the display. Starting from the left, these are: Boiler Temperature (C.H.); Water Heater

Temperature (H.C.W.) and Setpoint Temperature (C.H.).

10.8.4. Summer Mode

When the function is enabled, only the hot consumption water pump is running in order to heat water in the water heater. The pump is switched on above a predefined activation threshold (see the pump activation temperature function) and will run until the setpoint temperature has been reached. The pump will start again when the temperature drops below the set hysteresis. In the Summer Mode, only the setpoint temperature is set on the boiler that heats up water for the water heater (the temperature set for the boiler is also the temperature set for the water heater). While in the Summer Mode, the letter L is displayed in the bottom right corner of the main screen.

PARALLEL PUMPS
SUMMER MODE *

45 °C 43 °C 55 °C*
C.H. H.C.W. SET

10.9. Main Screen

OPERATION MODE
MAIN SCREEN

This function allows you to change the view of the main screen. The following views are available:

10.9.1. C.H. Screen

• C.H.SCREEN
H.C.W.SCREEN

44 °C | 55 °C*
C.H. SETPOINT

This screen displays the current and setpoint C.H. temperatures.

By turning the knob you can change the setpoint temperature.

After setting the appropriate value, confirm it by pressing the encoder knob.

10.9.2. H.C.W. Screen

C.H.SCREEN
• H.C.W.SCREEN

43 °C | 58 °C*
H.C.W. SETPOINT

This screen displays the current and setpoint H.C.W. temperatures.

By turning the knob, you can change the setpoint H.C.W. temperature.

After setting the appropriate value, confirm it by pressing the encoder knob.

10.9.3. Flue Gases Screen

H.C.W. SCREEN
• FLUE GASES SCREEN

45 °C 93 °C 80%*
C.H. FLUE FAN L

The following items are displayed, starting from the left: current C.H.

temperature, current flue gases temperature and blow power in percentages.

This view is used for monitoring current boiler parameters.

10.10. Language

With this function, you can select the language of your controller.

MAIN SCREEN
LANGUAGE

10.11. Factory Settings

The regulator has been pre-configured. However, it should be adjusted to your individual needs. It is possible to return to the factory settings at any time. By enabling the Factory Settings, all existing boiler settings will be replaced by settings made by the manufacturer. From then on, you can again set your own operating parameters for the boiler.

23 °C | 55 °C*
SETPOINT

FIXED C.H. PUMP
FACTORY SETTINGS

YES
NO

10.12. Controller protections

In order to ensure a safe and faultless operation, the regulator has been provided with numerous protections. In the case of

an alarm, an acoustic warning is sounded and the display shows a corresponding message. Press the encoder to restore the controller to operation. In the case of the C.H. Temperature Too High alarm, wait until the temperature drops below the alarm value.

Thermal protection. The boiler is protected with an additional bimetal sensor (located at the boiler temperature sensor) that disables the fan when the temperature exceeds the critical value: 85°C. This is to prevent water from boiling in the system when the boiler has been overheated or the controller is damaged. When the protective function is enabled and the temperature drops to a safe value, the sensor will automatically restart the device and the alarm will be deactivated. If the sensor is damaged or overheated, the burner, fan and feeder are disabled.

Automatic Sensor Check. When the temperature sensor of the central heating or hot consumption water is damaged, an alarm is sounded with an additional indication shown in the display, e.g.: „C.H. Sensor Damaged“.

ALARM
C.H. SENSOR DAMAGED

Blow is disabled and both pumps are activated simultaneously, regardless of then temperature. If the central heating sensor is damaged, the alarm will remain active until the sensor is replaced. If the hot consumption water sensor is damaged, pres MENU to deactivate the alarm and restore the single (house heating) pump mode. To be able to operate the boiler in all modes, it is necessary to replace the sensor.

Temperature Protection. The regulator features an additional protection in case the bimetal sensor is damaged. After the temperature exceeds 85°C, the alarm is

sounded with the display showing the following message:

ALARM
TEMPERATURE TOO

The current temperature is read from an electronic sensor and processed by the thermoregulator. When the alarm temperature is exceeded, the fan is shut off and both pumps begin to run in order to distribute hot consumption water throughout the system.

Anti-Boil Protection. This protective function is used only with the water heater priority mode. For example, when the water heater setpoint temperature is 55°C and the boiler temperature rises to 67°C (5°C over the so-called priority temperature), the controller shuts off the fan. If the boiler temperature reaches 80°C, the C.H. pump will be activated. If the temperature continues to rise, the alarm will be activated at 85°C. Such condition may appear when the water heater or the pump is damaged or when the sensor has been improperly installed. However, if the temperature drops, the controller will activate the fan at 66°C and it will remain in the duty mode maintaining the priority temperature of 62°C.

Monitoring the flue gas outlet temperature. This sensor constantly monitors the flue gas outlet temperature. If the sensor is damaged, disconnected from the controller or removed from the flue conduit, Flue Gas Sensor Damaged message will appear on the display. This will cause the controller to switch to the emergency mode. In such case, only boiler temperature is used. The controller is operated using only the boiler sensor and the zPID function remains active without the flue gas outlet sensor.

23 °C	98 °C	50%
C.H.	FLUE	FAN D

current ratings may cause damage to the controller.

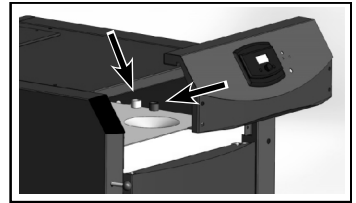
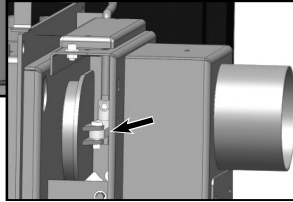
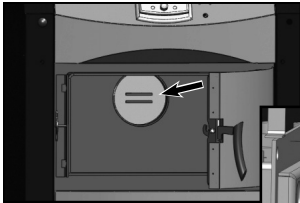
Fuse. The controller has a network protection WT 3.15 A tube fuse. Higher

10.13. Controller model ST 81i technical specifications

1.	Supply Voltage	V	230V/50Hz +/- 10%
2.	Power consumption	W	5
3.	Ambient temperature	°C	10 ÷ 50
4.	Circulation pump outlet load	A	0,5
5.	Fan outlet load	A	0,6
6.	Temperature measurement range	°C	0 ÷ 90
7.	Measurement accuracy	°C	1
8.	Temperature adjustment range	°C	45 ÷ 80
9.	Sensor thermal resistance	°C	- 25 ÷ 100
10.	Fuse inset	A	3,15

11. WARRANTY TERMS

The warranty terms are described in the Service booklet included in the supply.

12. TECHNICAL FEATURES WOOD GASIFYING BOILER PyroBurn Alpha PLUS**12.1. General features. Advantages:**

Here can be mounted Boiler sensor and Sensor of Safety heat exchanger

Fume extraction device on the upper combustion chamber keeps smoke from polluting the boiler room during reloading

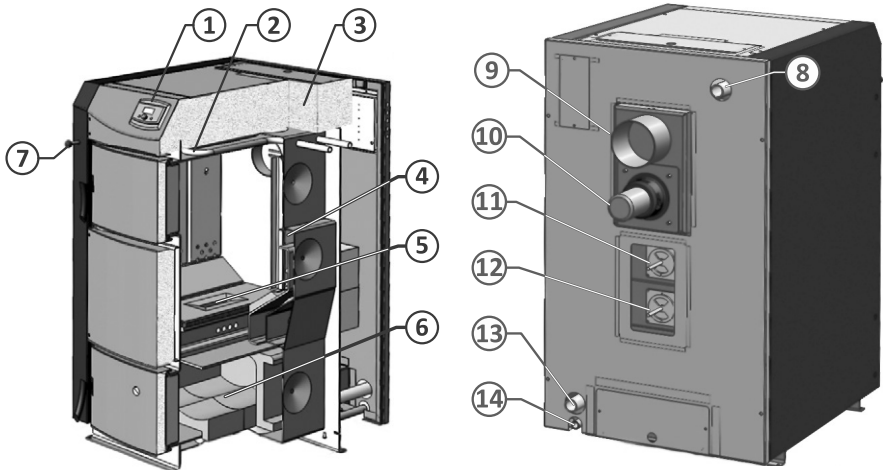


Diagram 20
Components of PyroBurn Alpha PLUS boiler

- | | |
|--|--------------------------------|
| 1. Microprocessor control; | 8. Hot water outlet |
| 2. Safety heat exchanger; | 9. Chimney flue; |
| 3. Thermal mineral wool insulation; | 10. Draught fan; |
| 4. Water jacket; | 11. Primary air flap; |
| 5. Fuel loading chamber; | 12. Secondary air flap; |
| 6. Gasification chamber; | 13. Cold water inlet |
| 7. Flue damper lever | 14. Drainage |

12.2. Components of the combustion chamber of PyroBurn Alpha PLUS boiler

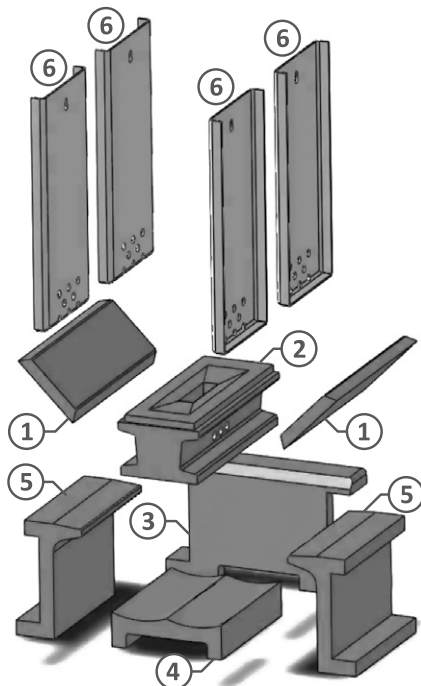


Diagram 21
Components of the combustion chamber of PB 20 Alpha PLUS

Table 7

No	code	Model PB 20 Alpha PLUS	pcs.
1	31080031000001	Side element of upper combustion chamber - 18 kW	2
2	31080031000018	Nozzle - 18 kW	1
3	89080031000030	Rear element of bottom combustion chamber - 18 kW	1
4	89080031000031	Bottom element of bottom combustion chamber - 18 kW	1
5	89080031000038	Side element of bottom combustion chamber - 18 kW	2
6	89081282000016	Protective steel plate	4

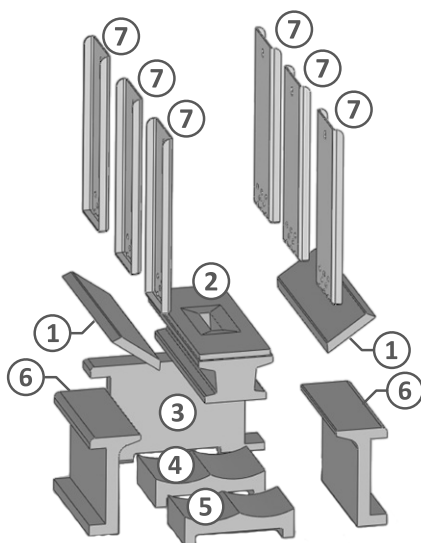


Diagram 22. Removable parts of the combustion chamber of PB 30 / 40 Alpha PLUS

Table 8.1

No	code	Model PB 30 Alpha PLUS	pcs.
1	31080031000002	Side element of upper combustion chamber - 27 kW	2
2	31080031000019	Nozzle - 27 kW	1
3	89080031000005	Rear element of bottom combustion chamber - 27, 40 kW	1
4	89080031000001	Bottom element of bottom combustion chamber – long - 27, 40 kW	1
5	89080031000002	Bottom element of bottom combustion chamber – short - 27, 40 kW	1
6	89080031000012	Side element of bottom combustion chamber - 27, 40 kW	2
7	89081282000014	Protective steel plate	6

Table 8.2

No	code	Model PB 40 Alpha PLUS	pcs.
1	31080031000002	Side element of upper combustion chamber - 40 kW	2
2	31080031000020	Nozzle - 40 kW	1
3	89080031000005	Rear element of bottom combustion chamber - 27, 40 kW	1
4	89080031000001	Bottom element of bottom combustion chamber – long - 27, 40 kW	1
5	89080031000002	Bottom element of bottom combustion chamber – short - 27, 40 kW	1
6	89080031000012	Side element of bottom combustion chamber - 27, 40 kW	2
7	89081282000015	Protective steel plate	6

12.3. Components of exhaust gas pipes cleaning system

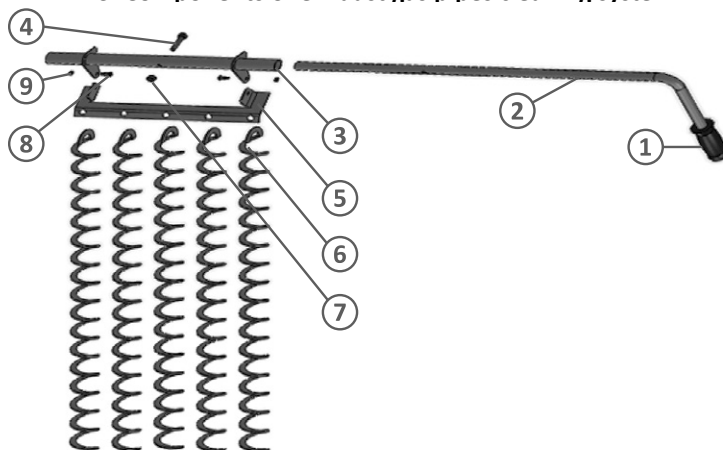


Diagram 23. Components of the cleaning system

Table 9.1

No	code PB 20 Alpha PLUS	Element	pcs.
1	31480031000001	Rubber handle	1
2	89081231000308	Axis of the cleaning system	1
3	89081231000304	Tube of the cleaning system	1
4	-	Bolt M8 x 35 DIN 933	1
5	89081200000373	Holder spirals	1
6	89081231000310	Spirals cleaning fume exhaust tubes	4
7	30481158000054	Nut M x 8 DIN 6923	1
8	30481156000015	Pin ø 8 x 20	2
9	30481257000203	Cotter pin ø 1.6	2

Table 9.2

No	code PB 30 Alpha PLUS	Element	pcs.
1	31480031000001	Rubber handle	1
2	89081231000211	Axis of the cleaning system	1
3	89081231000207	Tube of the cleaning system	1
4	-	Bolt M8 x 35 DIN 933	1
5	89081231000208	Holder spirals	1
6	89081231000215	Spirals cleaning fume exhaust tubes	5
7	30481158000054	Nut M x 8 DIN 6923	1
8	30481156000015	Pin ø 8 x 20	2
9	30481257000203	Cotter pin ø 1.6	2

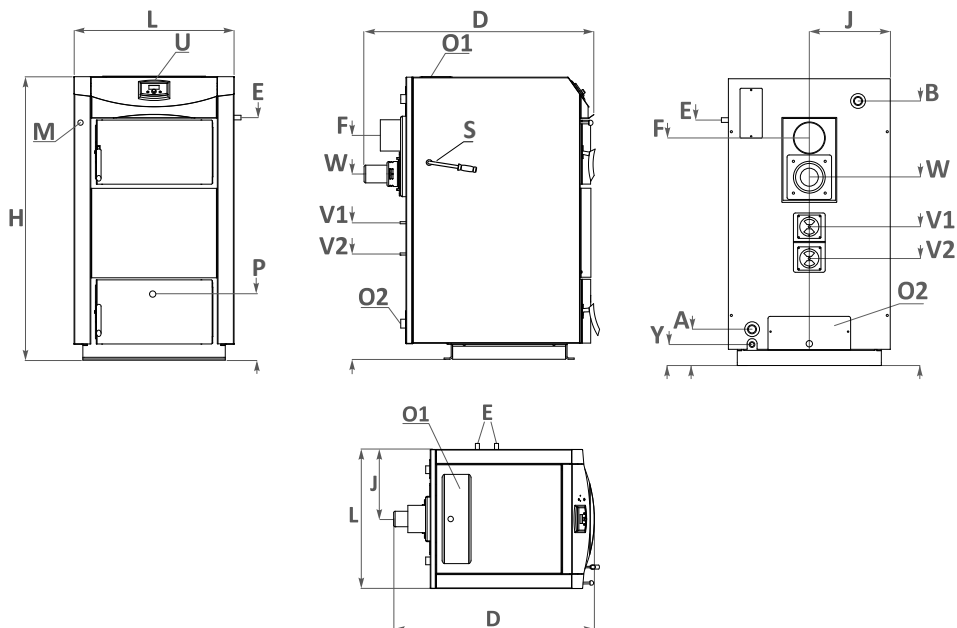
Table 9.3

No	code PB 40 Alpha PLUS	Element	pcs.
1	31480031000001	Rubber handle	1
2	89081231000345	Axis of the cleaning system	1
3	89081231000343	Tube of the cleaning system	1
4	-	Bolt M8 x 35 DIN 933	1
5	-	Holder spirals	1
6	89081231000215	Spirals cleaning fume exhaust tubes	8
7	30481158000054	Nut M x 8 DIN 6923	1

12.4. Technical parameters

Model		PB 20 Alpha PLUS	PB 30 Alpha PLUS	PB 40 Alpha PLUS	
Nominal heat output		kW	18.9	28.9	37.7
Min / Max heat output		kW	15÷20	27÷32	35÷42
Mass flow exhaust gases, Max. heat output		kg/s	0,017	0,0021	0,028
Efficiency		%	90%	90%	90%
CO emission	for 10% O ₂	mg/m ³	114	215	93
	for 13% O ₂	mg/m ³	83	156	68
Dust emission	for 10% O ₂	mg/m ³	11	11	11
	for 13% O ₂	mg/m ³	8	8	12
Class according to EN 303-5			5	5	5
Operating temperature range		°C	75÷85	75÷85	75÷85
Height H		mm	1255	1290	1430
Width L / Depth D		mm	676/930	765/1090	765/1160
Water mantle volume		Liter	62	89	115
Combustion chamber volume		Liter	76	132	162
Combustion chamber resistance		Pa/mbar	10/0.10	11/0.11	12/0.12
Required chimney draught		mbar	0.1÷0.2	0.1÷0.2	0.1÷0.2
Power consumption /supply		V/ Hz/ W	230 V / 50 Hz /100 W		
Loading door size		mm	400/220	490/260	490/260
Max. length of firewood logs		mm	330	500	500
Recommended fuel			wood, humidity 5% - 20%		
Fuel consumption for heating season		m ³	~14,4÷18	~20÷25	~32÷40
Burning time partial / full load		h	min 2h	min 2h	min 2h
Exhaust gas temperature (operat. mode)		°C	130÷150	130÷150	130÷150
Recommended size of buffer tank		Liter	1000	1500	2000
Operating pressure		bar	3	3	3
Weight		kg	395	541	591
Cold water inlet		A, mm	R1¼"/130	R1¼"/170	R1¼"/170
Hot water outlet		B, mm	R1¼"/1150	R1¼"/1250	R1¼"/1325
Sensor or safety valve		K	✓	✓	✓
Fume extraction device		M	✓	✓	✓
Safety heat evacuator inlet/outlet		E, mm	R½"/1070	R½"/1160	R½"/1235
Flue		F, mm	ø150/970	ø150/1075	ø150/1150
		J, mm	338	382	382
Cleaning opening		upper O1, mm	360/120	455/120	455/120
		lower O2, mm	325/142	350/140	350/140
Drain		Y, mm	G½"/60	G½"/100	G½"/100
Air intake		Primary air V1, mm	610	655	690
		Secondary air V2, mm	460	505	540
Fan		W, mm	790	890	970

Lever for cleaning smoke tubes	S	✓	✓	✓
Eyepiece for viewing the combustion	P	✓	✓	✓
Controller	U	✓	✓	✓

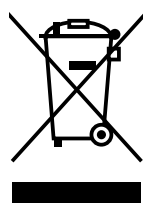


13. RECYCLING AND DISPOSAL

Submit all packaging material for recycling according to the local regulations and requirements.

At the end of life cycle of each product its components are due to be disposed of in conformity with regulatory prescriptions. According to Directive 2002/96/EC regarding electrical and electronic equipment waste, disposal thereof is required separately from the normal flow of solid household waste. Obsolete equipment shall be collected separately from other recyclable waste containing materials with adverse effect on health and environment.

Expired appliances must be collected separately from other recyclable waste containing substances hazardous to health and environment. Both metal and non-metal parts are sold out to licensed organizations for recyclable metal or non-metal waste collection. In any case they should not be treated as household waste.





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