PELLET BURNER
PV 20 / PV 30

INSTRUCTION MANUAL

v2.31

1 PRODUCT DESCRIPTION

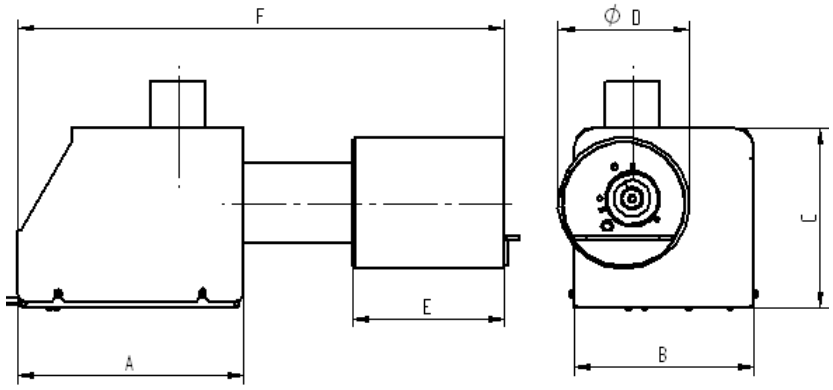
PV 20/PV 30 is a fully automatic burner that is intended to be used with 6 or 8mm wooden pellets. You cannot use any other fuel to run this burner.

The unique construction of PV 20/PV 30 allows it to be used with different liquid fuel, solid fuel and universal boilers.

The PV 20/PV 30 burner is connected to the boiler with a 90 mm flange (similarly to oil burners).

The unique electrical ignition and automatic choice of output level makes using this pellet burner very easy all year round. The burning process does not use pilot flame.

The burner is equipped with a safety thermostat and a melting chute for protection against back-burning.



	A [mm]	B [mm]	C [mm]	D [mm]	E [mm]	F [mm]
PV 20	250	200	200	146	170	540
PV 30	250	200	200	166	204	580

Table 1: Dimensions

2 SAFETY RULES

- Do not start the burner before it is connected to the boiler and the boiler is connected to the chimney.
- The negative pressure in the furnace must be at least 5 Pa while the burner is operating.
- The pellet burner is designed to work with 6-8 mm diameter pellets.
- The boiler room where the burner is installed must fulfil all rules and recommendations given by authorities.
- All electrical connections must be done by trained professionals.

- You must not store flammable materials near the burner.
- It is recommended to wear a respirator while handling pellets.

3 WARNINGS

- You must not change the construction of the burner without written permission from the manufacturer
- Use only spare parts provided or approved by the manufacturer in order to avoid any damage to the burner and dangers resulting from it
- Welding is allowed only after disconnecting the burner from electric supply. The circuit board must be removed from the burner.
- Do not open any boiler door while the burner is in operation.
- The electrical connections must be made by a qualified professional.

4 INSTALLATION INSTRUCTIONS

You will need the following tools in order to install the burner:

- Spanner no. 13 for fixing the flange of the burner to the boiler
- Spanner no. 10 for connecting the body of the burner with the burning camber
- Cross-head screwdriver for fixing the cover of the burner
- 4 mm hex wrench for fixating the boiler to the flange

4.1 BOILER REQUIREMENTS

In order to install the burner, the boiler must correspond to the following requirements:

- The door of the boiler must have a 90 mm opening (placement opening for the oil burner).
- The thickness on the door must not exceed 100mm
- The construction of the boiler must make it possible to open the door of the boiler with the burner connected and removing ash from the furnace. If the door of the boiler is too narrow for opening it with the burner, then extra hinges must be installed.
- If there is not sufficient (less than 5Pa) negative pressure in the furnace, a draught fan should be installed for the exhaust gases.
- The boiler room where the burner is installed must fulfil all rules and recommendations given by authorities.
- The boiler must be positioned in a way that there is enough space for cleaning the burner, the boiler and the smoke pipe and removing the ash.

4.2 PELLET CONTAINER

The burner, the auger and the pellet container are a common system. The size and the location of the pellet container depends of the needs and possibilities of the specific boiler room. While choosing the pellet container you must keep in mind that:

- If the pellet container is in the same room as the boiler, then the size of the pellet container must not exceed 500 litres (approx. 350kg).
- The container must be made of fireproof materials.
- The container must be positioned in a way that the raising angle of the feeding auger does not exceed 45°.
- It is advisable to use a container that can be closed with a cover.

4.3 INSTALLATION OF BURNER

In order to install the burner properly, you must go through the following steps:

1. Remove the cover of the burner by loosening 4 screws of the cover. There is no need to remove the screws.

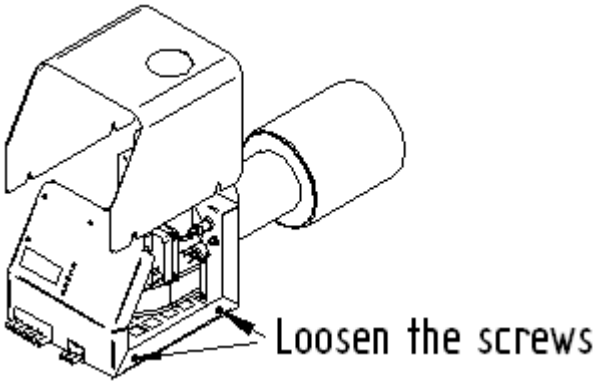


Figure 1: Removal of cover

2. Remove the burning chamber from the burner by releasing the M6 nut that connects the halves of the burner. Separate the halves of the burner by pulling the burning camber and slightly rotating it at the same time.

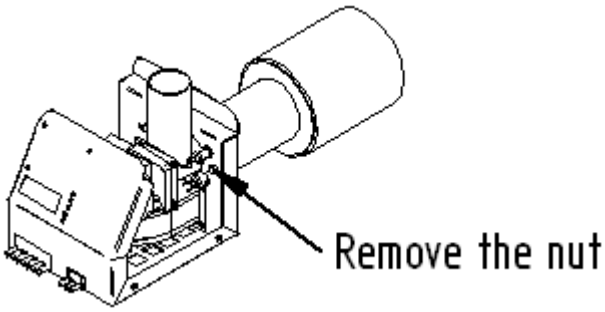


Figure 2: Removal of burning chamber

3. Fix the flange (2) of the burner to the door of the boiler (1). Make sure that the opening of the flange and the opening of the boiler door are aligned.

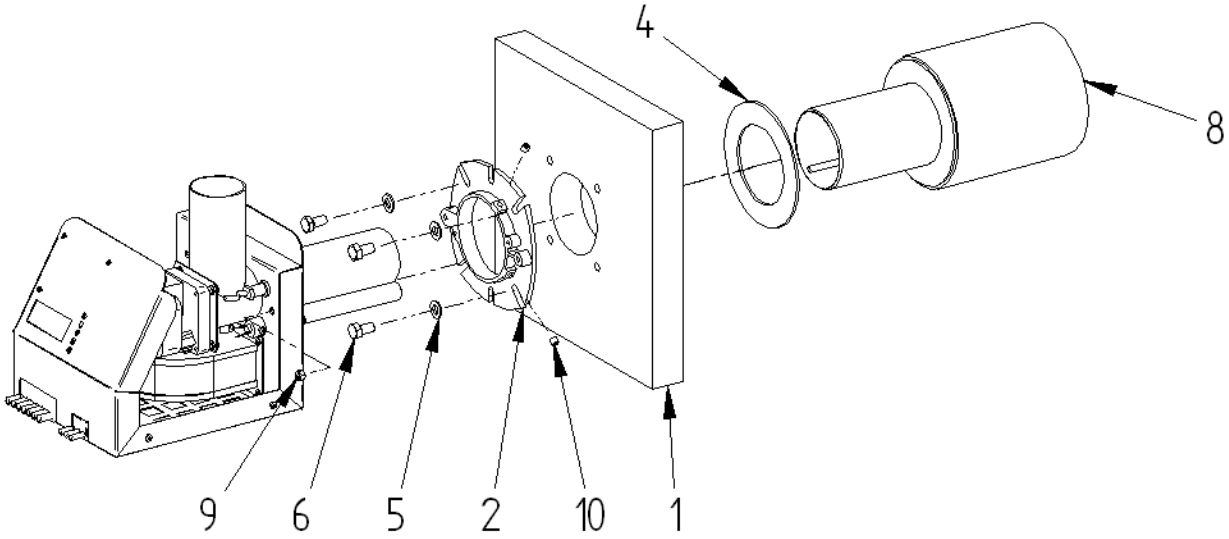


Figure 3: Installation

4. Fix the burning chamber (8). For that you need to put a ceramic seal (4) on the narrower side of the burning chamber and then put the camber through the door of

the boiler in a way that the rearward wall of the burning chamber would lean on the door of the boiler. Fixate the burning chamber with two grub screws (10) to the flange.

Caution! The burning camber must be placed in a way that the burning grate will be as horizontal as possible. The connection between the burner and the boiler must be tight in order to avoid any leakage of smoke gases.

5. Connect the body of the burner to the burning chamber like it was done before disassembling in step 2.

6. Fixate the halves of the burner with a M6 nut (9). The nut has to be rolled tight but not too hard. The halves of the burner are connected correctly when there is no space between the mark on the connecting tube (a line drawn on the tube with a dark marker) and the body of the burner.

7. Make sure that the halves of the burner are connected correctly. Make sure that when looking through the fire tube the igniter is in the middle of the ignition opening and the end of it is at the same level with the wall. The tube of the inner auger must reach through its opening.

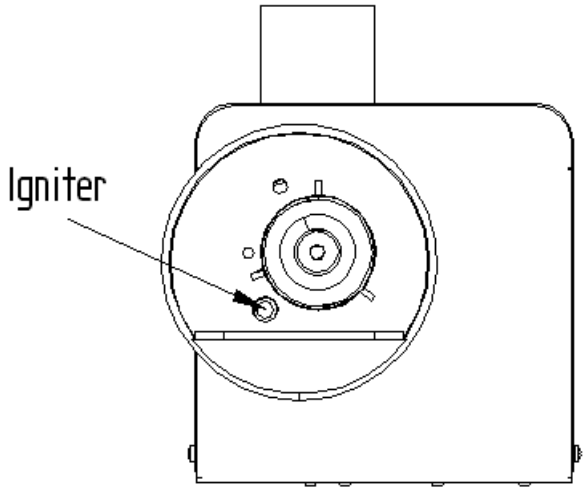


Figure 4: Check the igniter

8. All the burners are assembled together at the factory and you must pay attention to the line that is marked to the tube that connects the body of the burner with the fire tube.

Caution! After the installation of the burner always make sure that the end of the igniter is positioned through its opening and not stuck behind the dividing wall.

4.4 INSTALLATION OF FEEDING AUGER

A feeding auger transports pellets from the pellet container to the burner. The burner controls the work of the auger. The auger is connected to the burner with a special hose. The hose is made of melting material that acts as a safety measure against back-burning

The auger can be fixed to a storage or ceiling depending on the conditions at the installation site.

While installing the auger you must keep in mind that:

- The raising angle of the auger must be between 30° - 45°
- The end of the exit tube of the auger and the input of the burner must not be aligned. The recommended horizontal distance is 10-20cm.
- The distance between the input of the burner and the exit tube of the auger must be at least 25 cm vertically – recommended distance is 45-70cm.

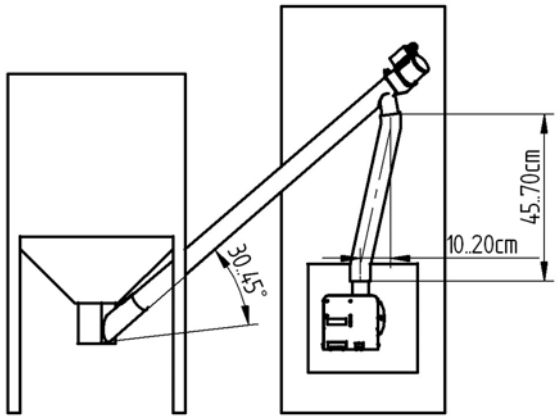


Figure 5: Installing the auger

4.5 ELECTRICAL CONNECTIONS

The burner is equipped with a standard oil burner plug that has 7 contacts. There will be different connection schemes used for different boilers. Usually the burner is connected to the boiler with a cable that has 5 wires. It is also possible to connect with a cable that has 4 wires.

CAUTION! All electrical connections of the burner must be made by a qualified professional.

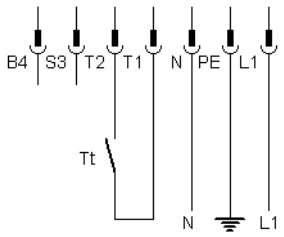


Figure 6: Connecting 5-wire cable

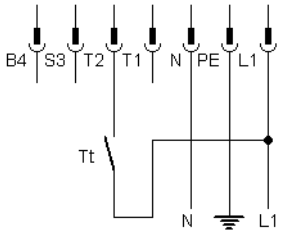


Figure 7: Connecting 4-wire cable

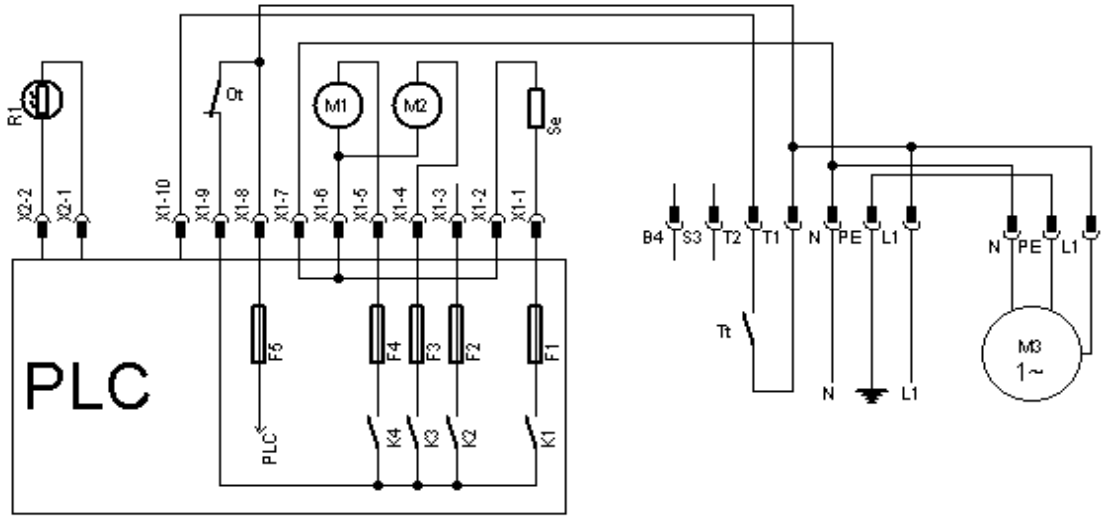


Figure 8: Burner electrical schematic

M1 – fan
M2 – internal screw
M3 – external auger
Ot – safety thermostat
R1 – flame sensor
Se – igniter
Tt – boiler thermostat

Fuse	Rating	
F1	3A	Igniter
F2	0.5A	External auger
F3	0.5A	Internal screw
F4	0.5A	fan
F5	0.1A	Controller

Table 2: Fuse ratings

There is a possibility to connect a draught fan to the burner. It enables automatic start-up and power control of the draught fan

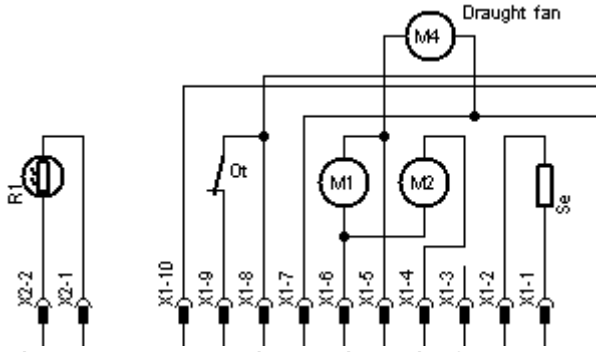


Figure 9: Connecting a draught fan

5 OPERATION

5.1 Safety system

The safety system of burner includes a safety thermostat and a melting hose between the auger and the burner. Thermostat cuts power supply when the temperature of inner auger rises abnormally high.

The hose melts in case of burning in inner auger (back burning). Therefore it is necessary to ensure that the burner and the auger are not aligned. The distance between the opening of auger and the burner should be between 10 – 20cm (see installation instructions).

5.2 FUEL AND REFILLING

Wood pellets are concentrated and homogenized fuel made from sawdust and cutter shavings. Pellets are pressed with high temperature. No extra materials are added, pellets are held together by a natural ingredient found in wood – lignin. Pellets are CO_2-neutral, renewable fuel.

Raw material	sawdust and cutter shavings
Calorific value	4700-5100 kWh/ton
Volume weight	ca 650-670 kg/m^3
Volume of 1 ton	1.5-1.6 m^3
Diameter	6-10 mm
Length	3-5 x diameter
Water content	8-10 %
Ash content	Ca 0.5%
To replace 1000 l light oil	ca 2 tons or 3 m^3

Should I use 6mm or 8mm pellets?

Pellet burner PV 20/PV 30 works equally well with 6mm and 8mm premium pellets. In case the size of pellets is changed, it is advisable to measure and insert again the productivity of the outer auger (check INITIAL START-UP chapter) as it can differ between different sizes of pellets.

Pellets must be stored in a dry and ventilated room. It is recommended to wear a respirator when handling pellets.

Only premium class pellets can be used with PV 20 / PV 30. Refilling must be carried out before the storage runs empty. In case it happened, the auger must be started manually until pellets start to drop from the auger continuously. For more information about starting the auger see chapter 5.5.

5.3 INITIAL START-UP

Prior to the initial start-up of the burner make sure that:

- The burner is connected to the boiler
- The boiler thermostat is installed and is functioning properly
- The feeding auger of the burner is installed and connected to the burner

- The smoke duct is connected to the chimney, the dampers for smoke gases are open and there is sufficient draught. When the burner is operating, the negative pressure inside the furnace must stay between 4-6 Pa

Before initial start-up:

- Fill the pellet container with pellets.

- Remove the plastic hose that connects the burner with the feeding auger from the burner and place it to some vessel or a plastic bag

- Fill the feeding auger with pellets either by connecting the electric plug of the auger to the electric plug of the burner or choosing from the control panel: Auger – On – OK (appears “Auger Off”). , in order to stop the auger choose: Auger – Off – OK (appears “Auger On”)

- When the feeding auger is filled with pellets (pellets are dropping through the tube steadily and without longer pauses), you let the outer feeding auger work for 5 or 10 minutes and collect the pellets to a plastic bag or any other vessel.

- Weigh the gathered pellets and find out the productivity of the auger in grams per minute.

- In order to stop the auger remove the plug from the socket or choose from the control panel: Auger – Off – OK (appears “Auger On”).
- Insert the productivity of the auger g/min using +/-/OK buttons on the control panel. Always round downwards the measured productivity. For instance when you have measured 178g/min, insert 170.
- In order to exit the menu Settings, press down the “+” and “–“buttons at the same time. The text “Stopped 0:00” appears. Press and hold down the “OK” button for 5 seconds. The text “Waiting 0:00” appears.

- Adjust the boiler thermostat to the desired temperature.

- The burner will start its usual working cycle: LOADING-IGNITION-PRE BURN-BURNING.

If flue gas temperature at the top of the chimney is less than 80C^{o}, there is a risk of condensation. In this case a pipe should be installed throughout the length of the chimney.

5.4 ADJUSTING THE BURNER

Note: It is recommended to use a flue gas analyser for adjusting the burner. The burner must be adjusted using the flue gas analyser also when you change the size or the quality of the pellets.

The SETTINGS menu contains control parameters of the burner. The STATUS menu displays the status of the burner and numbers showing the duration of that status (either “min:sec” or “h:min”).

In order to move into the Status menu, use buttons “+” and “-“. Up to 30 status lines with their durations are displayed. Power supply blackout will erase this memory.

Use buttons “+”, “-“ and “OK” to navigate the menu. “OK” button activates the parameter where the cursor is. The number will start blinking and by using the “+” and “-“ buttons you can change the value of the parameter and confirm it by clicking OK again.

Table 3: Parameter menu

Parameter	Unit	Default setting	Remarks
Burner	Start/Stop		Starts the burner. Status “Off” will turn to “On”.
Auger	Start/Stop		Starts the auger.
Auger	g/min	180	The productivity of the external auger is set separately for each device and is inserted in this line of the menu. This is the basis for the calculation of the duration of needed cycles.
Photocell	%	84	The sensitivity of the photocell is regulated usually between 80-95% from maximum in order to avoid it reacting too quickly.
Max power	kW	18/27	It is adjustable between 8-20/12-30kW, depending on boiler and the heating needs of the building. Usually is set to 16-20/27-30kW
Min power	kW	12/18	It is adjustable between 8-20/12-30kW, depending on boiler and the heating needs of the building. Usually is set to 12-14/16-18kW.
Power	kW	14/20	The level of power that the burner is currently working. Possible range between powers is set by Max and Min powers.
Air	%	37/40	Each level of power is set with a necessary amount of air for burning measured by % of fans rotation.
Base air	%	100	If it turns out to be necessary to increase or reduce the amount of air for all actions then by increasing/reducing the base air, it will influence all other air settings.
Ign.air	%	46	The amount of air at status IGNITION.
End air	g	30	The amount of air at status END BLOW.
Loading	s	230/250	Needed amount for ignition in grams.
Loading	s	125	The loading time of ignition amount to the burner in seconds.
Loading2	s	10	The time for second attempt of ignition in seconds.
Preburn	s	50/60	The time needed for pellets to start burning properly in the burner. Status “PRE-BURN”.

Language			It is possible to choose between different interface languages
Fact settings		LOAD	Restores all factory settings

5.5 STARTING, STOPPING, STATUS

Starting:
In order to start the burner, switch on the boiler. Then adjust the boiler thermostat to desired temperature (usually 60-80°C)

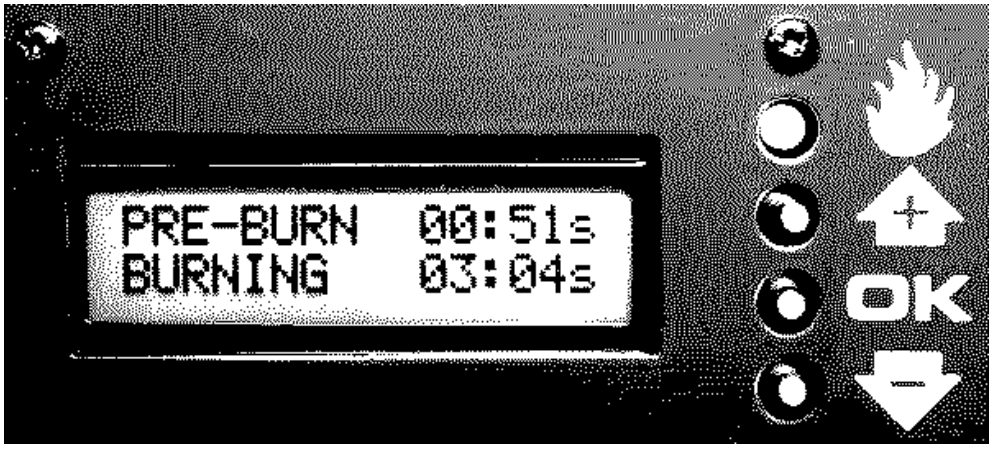
Stopping:
Adjust the boiler thermostat to a low temperature (adv. 0 °C).

Emergency stop:
Switch off the power supply.

NB! Never turn off a working burner from the main switch of the boiler. Use the thermostat switch for that purpose. In order to stop safely, let the burner burn empty. Do not leave the burner unattended when it has been necessary to use the emergency stop.

Manually start-stop auger:
Either by connecting the electric plug of the auger to the electric plug of the burner or choosing from the control panel: Auger – On – OK (appears “Auger Off”). , in order to stop the auger choose: Auger – Off – OK (appears “Auger On”)

The control panel of the burner consists of an illuminated LCD display that has two lines, a yellow LED indicator and three control buttons.



The display gives the user information about the status and adjustment of the burner. The burner has two menus and in order switch from one to another you have to press the “+” and “-“buttons simultaneously.

Table 4: Status menu

STATUS	**Time**	**Remarks**
STOPPED	-	The burner is not switched on.
WAITING	-	The burner is switched on and waiting for command from the thermostat of the boiler.
LOADING	125 s	Loading pellets for ignition of the burner after the command from boiler thermostat.
LOADING 2x	10 s	Second try if the first ignition was not successful.
IGNITION	Max 4min15s	Small amount of pellets are in the burner, ignitor and fan are working till photocell recognizes flame.
PRE-BURN	50 s	Only the fan is working, the ignitor is off. Pellets start burning properly.
BURNING	Max 4 hours	Status of normal working: External auger, internal auger and fan are working. Photocell must see the flame.
END BURN	Max 240 s	Boiler has reached an estimated temperature and boiler thermostat is switching off the burner. The external auger is stopped, the internal auger and fan are still working until all fuel is burnt.
END BLOW	120 s	When photocell doesn`t see any flame only the fan keeps on working with minimum speed in order to make sure there is no fuel in burner.
NO FLAME	-	The burner tried to ignite two times with no success or there is no flame in the burner more than 140 seconds during burning.
OVERHEAT	-	Temperature in inlet to internal auger has reached 95`C.

5.6 THE WORKING PROCESS OF THE BURNER

The burner checks the existence of two input signals during the working process:

- The order from the boiler thermostat
- The existence of flame in the burner

Depending on the existence or absence of these signals, the working process of the burner is divided into different statuses. The burner stores information about 30 last statuses (burner log). The last line of the log shows the current status of the burner and the duration of it. The burner can be in the following statuses:

- **STOPPED –** The burner is not switched on and does not respond to input signals. In order to start the burner you must switch on the burner from the menu Settings. The burner will also start when you hold down the “OK” button for 3 seconds.
- **WAITING –** The burner is switched on and waiting for the command from the thermostat of the boiler.
- **LOADING –** Loading pellets for ignition of the burner after the command from boiler thermostat. The inner auger will transport the pellets to the burning chamber.

- **IGNITION –** Small amount of pellets are in the burner, igniter and fan are working until the photocell recognizes a flame. When it does recognize the flame, the burner will go to status PRE-BURN.
- **LOADING 2x –** Second try if the first ignition was not successful. Only the inner auger will work. Status IGNITION will follow again. If the second attempt is also not successful, the burner will stop and go to status NO FLAME.
- **PRE-BURN -** Only the fan is working, the igniter is off. Pellets start burning properly.
- **BURNING -** Status of normal working. Both the external and internal augers are working in cycles, providing the burner with sufficient amount of pellets for adjusted power. The power of the fan will depend on the adjusted power of the burner.
  - If in this status the photocell does not recognise flame for more than 2 minutes, the burner will go to status NO FLAME.
  - If the thermostat of the boiler switches off (the boiler reached desired temperature), then the burner will go to status END BURN
- **END BURN -** The boiler has reached the desired temperature. The external auger is stopped, the internal auger and fan are still working until all fuel is burnt. When the flame disappears, the burner will go to status END BLOW.
- **END BLOW –** The burner still has a small amount of burning fuel and ash. Only the fan will be working with minimum speed. The burner will go to status WAITING after 2 minutes.
- **OVERHEAT-** The burner will go to this status when the temperature inside the inner auger has exceeded 95ºC. The safety thermostat will cut the power to the burner. Only the control panel will work. To restart the burner, check chapter ERRORS.

Note!
Always use the thermostat of the boiler for starting and stopping the burner. In order to start, switch the device to desired temperature. In order to stop, switch the device to 0.

5.7 Cleaning

Pellet burner PV 20/PV 30 requires systematic maintenance. The maintenance period depends on the quality of the pellets and heating intensity. The average maintenance period is 1 week. The burner needs cleaning when the ash layer on the grate is thicker than 1,5-2 cm. As even high quality pellets contain 0,3-0,5% ash, then the burning grate must be cleaned **at least once a week**. Depending on the quality of the pellets, it might be necessary to clean the burner more frequently.

To clean the burner:

1. Turn off the burner by turning the thermostat to 0.
2. Let the burner cool down for at least 1 hour.
3. Open the boiler's door to gain access to burning chamber
4. Remove the grate and clean it from any residue. Make sure all holes on the plate are clean.
5. Remove ash from burning camber
6. Clean the boiler. The frequency of cleaning the boiler depends on the type of the boiler and heating intensity. For more information about cleaning the boiler, please see boiler's user manual.

7. Put back the grate. Make sure the stopper of grate is touching the burning camber from inside. Misaligned base plate will interfere the air flow and reduce burning efficiency.
8. Close the boiler's door to finish the maintenance and turn the thermostat to desired temperature.

NB! The burner grate must be checked and cleaned once a week. This assures trouble-free and effective operation of the burner.

The connection between the boiler and chimney must be completely tight. There must not be any extra draught in the smoke draught of the boiler. All cleaning and maintenance openings must be closed with covers.

6 MAINTENANCE

Before carrying out any work on the burner, turn of the burner and let it cool and disconnect power supply.

Resetting thermostat

In case of overheating the burner flashes yellow indicator and displays message OVERHEAT. The safety thermostat must be resetted manually. Thermostat is located on the vertical tube of inner auger.

1. Make sure the burner has cooled down and disconnected from power supply.
2. Remove the cover by loosening 4 screws (2 on both sides)
3. Press small button on thermostat.
4. Connect power supply
5. Press OK for 5s
6. If indicator keeps flashing, you need to replace the thermostat.

You can restart the burner with the “OK” button only from the menu STATUS. If you are at the menu SETTINGS, then you must first change the menu by pressing the “+” and “-“ buttons simultaneously.

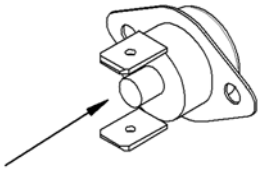
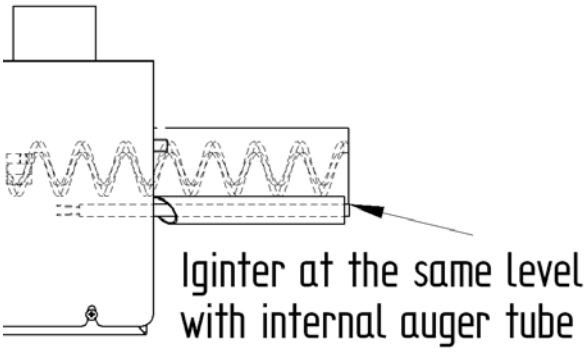


Figure 10: Resetting safety thermostat

Replacing igniter

You need to replace igniter if it has burnt out

1. Make sure the burner has cooled down and disconnected from power supply.
2. Remove the cover by loosening 4 screws (2 on both sides)
3. Disconnect igniter wiring
4. Loosen the screw holding igniter
5. Open boiler's door and remove the igniter trough burning camber
6. Install new igniter and ensure the the tip of igniter is on the same level with end of internal auger tube.



Replacing burning camber

The replacement of the burning camber is same as installing a new burner.

1. Make sure the burner has cooled down and disconnected from power supply.
2. Remove the cover by loosening 4 screws (2 on both sides)
3. Remove the M6 nut that is holding chassis.
4. Remove chassis
5. Loosen 2 set screws on flange to remove burning camber
6. Replace the camber with new one.
   Caution! The burning camber must be placed in a way that the grate will be as horizontal as possible. The connection between the burner and the boiler must be tight in order to avoid any leakage of smoke gases.
7. Connect the body of the burner to the burning chamber like it was done before disassembling in step 2

Cleaning the system regularly increases the lifetime of the camber and grate.

Replacing fuses

1. Make sure the burner has cooled down and **disconnected from power supply**.
2. Remove the cover by loosening 4 screws (2 on both sides).
3. Replace the fuse. Be sure the new fuse has the same rating (refer to table below)

Fuse	Rating
F1	3A
F2	0.5A
F3	0.5A
F4	0.5A
F5	0.1A

Table 5: Fuse ratings

More information about electrical connections can be found in installation manual.

6.1 Spare parts

PV 20 / 30 assembly is shown in figure 11. Parts with code (table 1) can be ordered from your local dealer as spare parts.

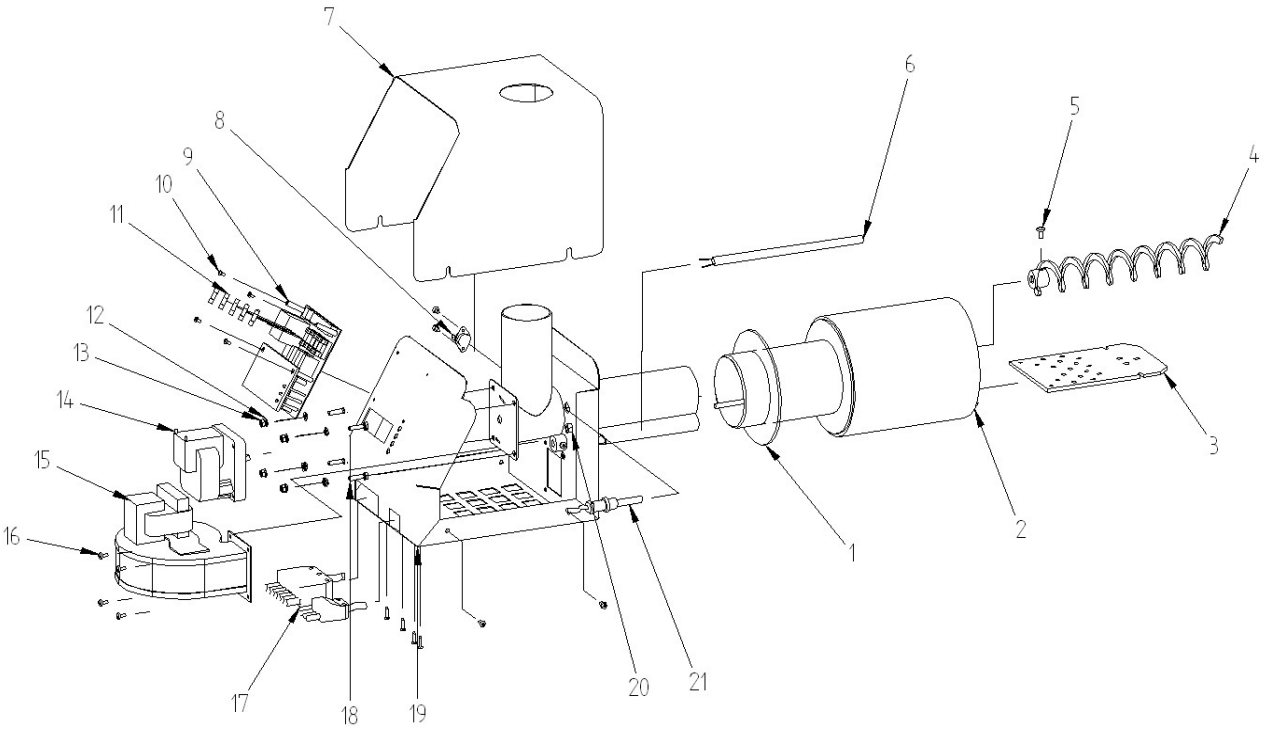


Figure 11: Assembly

Table 6: Part list

No	Item	Qty	Code	Description
1	Ceramic seal	1	BC20-6-1	Seal between the burning camber and door
2	Burning camber	1	BC20-1-1 (PV 20) / BC30-1-1 (PV 30)	
3	Grate	1	BG20-2 (PV 20) / BG30-2 (PV 30)	Grate inside the burning chamber
4	Auger	1	AS40-250-1	Internal auger
5	M5x10 screw	1	-	DIN 7985
6	Igniter	1	IGN200-500	Igniter 190mm 500W
7	Cover	1	BC20-2-1	
8	Safety thermostat	1	ST1	Manually resettable, 95Co
9	Controller	1	PCB2	Datanet 2006 ver1.2
10	M3x6 screw	4	-	DIN 7985
11	Fuses	5	-	See fuse ratings table
12	Washer 5,3mm	10	-	DIN 125
13	M5 nut	4	-	DIN 934

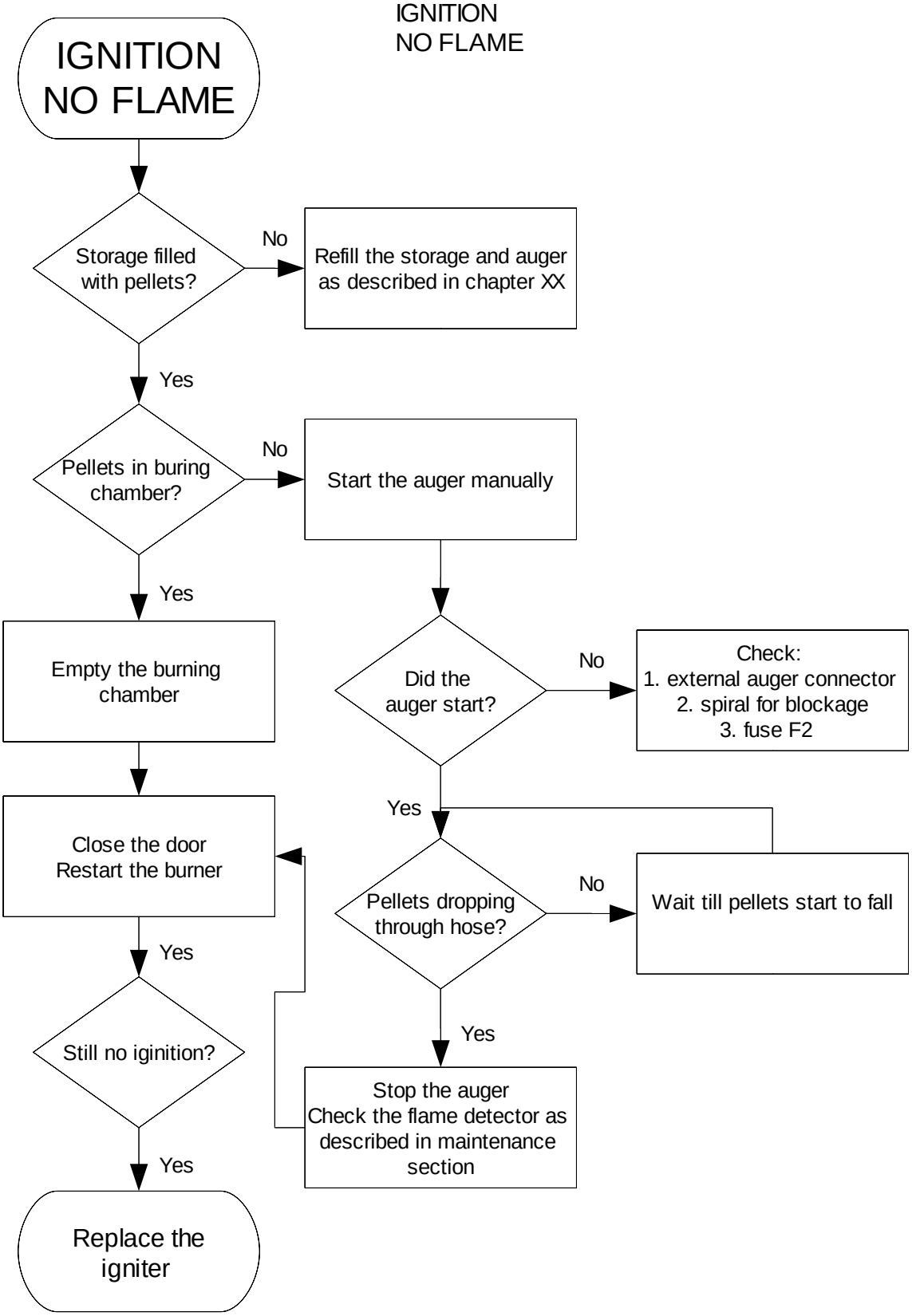
14	Gearmotor	1	GM70-000-7.5	Gearmotor for inner auger 7,5W 230V
15	Fan	1	FR1	
16	M4x8 screw	11	-	DIN 7985
17	Cable assembly	1	BC20-5-1	All connectors and cables
18	M5x20 polt	4	-	DIN 933
19	Chassis	1	-	
20	M6 nut	1	-	DIN 934
21	Flame detector	1	SPO1	

6.2 Trouble-shooting

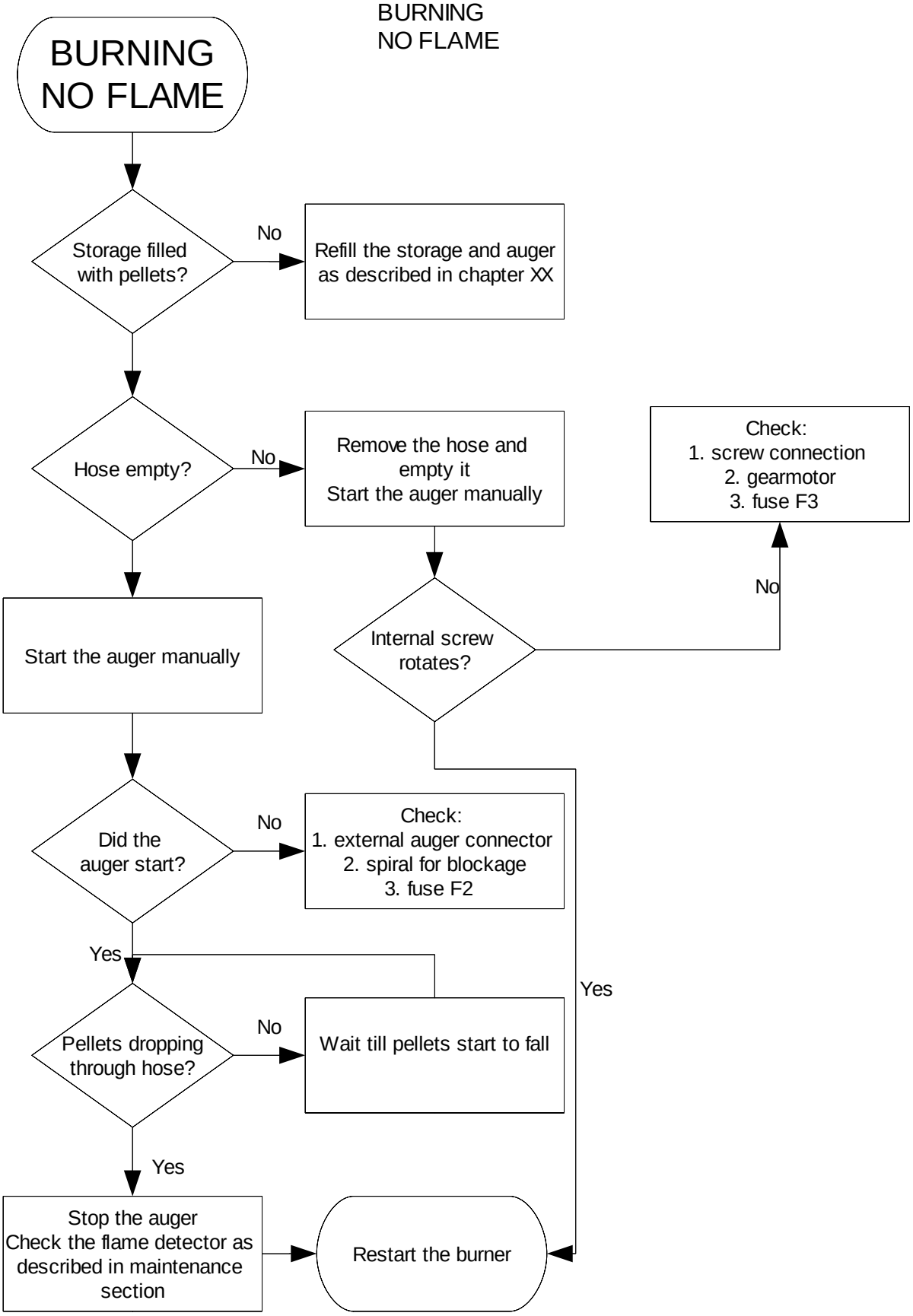
When the burner shows a sign NO PLLET or OVERHEAT, then after finding out and removing the cause you can restart the burner by holding down the “OK” button for 3 seconds. You can restart the burner with the “OK” button only from the menu STATUS. If you are at the menu SETTINGS, then you must first change the menu by pressing the “+” and “-“ buttons simultaneously.

In case of OVERHEAT you must manually restart the safety thermostat.
For that you must switch off the electricity of the burner, remove the cover of the burner and press the button on the safety thermostat. You will hear a light tick and then after that hold down the OK button.

Burner shows message
IGNITION
NO FLAME



Burner shows message
BURNING
NO FLAME



6.3 Specifications:

	PV 20	PV 30
Fuel	Wood pellets 6...8 mm	
Max. output power (kW)	20	30
Min. output power (kW)	8	12
Power supply	230V 3A	
Power – max. at ignition	570W	
Power – average at 20kW	65W	
Power – standby	4W	
Overall dimensions:		
Length (mm)	540	580
Width (mm)	200	200
Height (mm)	240	240
Burning chamber outer dimensions:		
Diameter (mm)	146	166
Length (mm)	172	206
Mounting tube diameter (mm)	88,9	88,9
Grate dimensions:		
Length (mm)	167	200
Width (mm)	110	125
Burner weight (kg)	11,2	12,2
Burner weight with package (kg)	12,7	13,7

Manufacturer:

PELLTECH LTD
Töökoja 1,
11313 Tallinn
ESTONIA
Tel: +372 6775 845
+372 6775 277
Fax: +372 6775 288
www.pelltech.eu
info@pelltech.eu