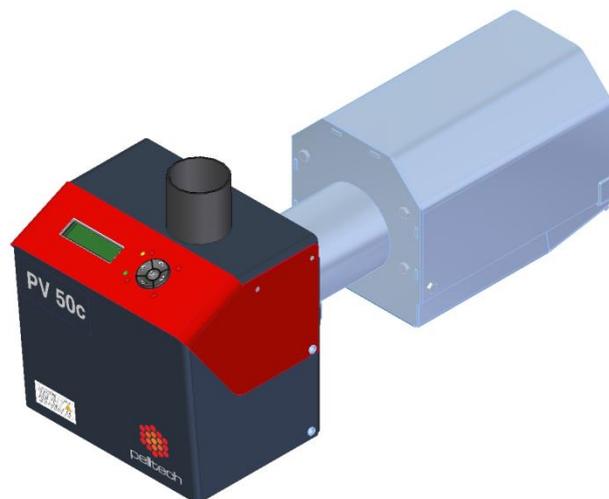




# PV50c pellet burner

User manual

DK9802C2



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## 1 General

This instruction manual is an integral and essential part of the product and must be kept by the user or system manager. The owner / user shall read and understand this manual before installation and operation of the boiler. This manual is intended for all users and contains general information, installation instructions and handling with PV50c burner.

**The manufacturer of the equipment, Pelltech OÜ, demands that the operator of the device is competent and has sufficient knowledge in the field. The manufacturer does not take responsibility any damage done to the equipment, personal injury, harm to animals or property damage if an incompetent person or persons performs work for which he is not qualified or if the person operating of the device fails to observe the instructions contained in the manual.**

***Note:** Operator is the person or persons responsible for the installation, operation, adjustment, maintenance, cleaning, repair or removal of the machinery.*

### 1.1 Unit description

PV50c pellet burner is designed for solid fuels combustion in form of pellets. The burner operates automatically and does not require supervision. The burner is designed to work with central heating boilers for solid fuels, as well as several models of gas or oil boilers with a combustion chamber enabling the collection of ash. The burner is an ecological device as it uses fuel from renewable sources. It also features a small demand for electricity.

Main technical data and dimensions are given in section Specifications. Main components of burner are depicted in Figure 4 and described in Table 2.

### 1.2 References to other documents

Following document is original user and installation manual for PV50c. In this document are references made to:

- **DK0391 - Software and problem handling manual for PV20...PV500**

## 2 Safety

Read and follow these directions carefully. Read the safety instructions carefully before installation. Always follow the safety instructions during installation and during maintenance.

Installation, operation, service and other work must be carried out by qualified personnel in accordance with local codes and regulations.

Proper installation of the burner is necessary for safe and efficient operation. Installing this product improperly may result to damage of the goods. Contact your local building inspector to obtain any necessary permits or inspection guidelines before installing the product. Contact local building or fire officials about restrictions and installation inspection requirements in your area. Contact your local authority (such as municipal building department, fire department, fire prevention bureau, etc.) to determine the need for a permit. A working smoke detector is required and must be installed in the same room as the boiler.

## 2.1 Safety instructions for installation, use and service

The owner / user shall read and understand this manual before installation and operation of the burner. For proper function and to avoid accidents and damage, these instructions must be followed. Wrong handling and incorrect settings can result in injury, damage and / or malfunction of the equipment.

Following instructions apply:

- Do not start the burner before it is connected to the boiler and the boiler is connected to the chimney.
- To guarantee the efficiency of the appliance and ensure that it functions correctly, it is vital that qualified personnel performs annual maintenance.
- When the burner is connected to the main power supply the burner casing must always be mounted
- Always make sure that the burner is unplugged from the main power supply before performing any cleaning or maintenance.
- Keep children away and do not touch the equipment during operation.
- Make sure that no flammable or liquid materials are stored in the boiler room or vicinity of the boiler.
- It is recommended to wear a respirator while handling pellets.
- The boiler room where the burner is installed must fulfil all rules and recommendations in accordance with local codes and regulations.
- All electrical installation, plumbing, chimney sweeping and service work shall be done by certified and qualified personnel in accordance with local codes and regulations.

## 2.2 Safety instructions regarding maintenance and cleaning

Touching live components can result in life threatening injuries. After switching the control unit off, there are still live components inside the control unit until enclosure:

- Switch OFF the power supply, e.g. at mains, and check the system is disconnected.

Hot surfaces and fluids can lead to burns:

- Before maintenance and cleaning work, switch OFF the system and let it cool down.
- Never touch hot surfaces on the boiler, burner, flue system or pipework.
- Wear suitable personal protective equipment.

Hot surfaces and fire from apertures can result in severe burns:

- Doors, covers and apertures fastened shut with screws must not be opened during heating operation.
- Allow hot components to cool down before removing.

When operating the ash container, there is a risk of fire and burns:

- Wear suitable personal protective equipments.
- Only dispose the hot ash in fireproof containers with covers.

Disposal of hot ash in an unsuitable vacuum cleaner creates a risk of fire from ignition of filters and plastics:

- Use an ash vacuum cleaner that is specially designed for this purpose.
- Never use domestic vacuum cleaners made of plastic with fabric/paper filters.

Wood dust, pellet dust, cinders and soot pose a risk to the eyes, skin and airways:

- Wear suitable personal protective equipment, especially breathing equipment and safety goggles.

**Note:** *Observe the country-specific regulations on the disposal of materials, waste and system components.*

## 2.3 Warnings

- Changing the construction of the burner without written permission from the manufacturer is forbidden.
- For personal and operational safety, use only spare parts provided or approved by Pelltech OÜ in order to avoid any damage to the boiler and dangers resulting from it. Use of spare parts not provided or approved by Pelltech OÜ will void the warranty.
- Welding is allowed only after disconnecting the burner from electric supply. The circuit board must be removed from the burner.
- Do not never open boiler door while the burner is in operation. Before carrying out any cleaning or maintenance operations, disconnect the appliance from the mains power supply using the system switch and/ or the relevant external components and let it cool down.
- The appliance must not be used by anyone with little experience and knowledge, unless they are supervised or have been instructed to use the appliance by the person in charge of its safety.

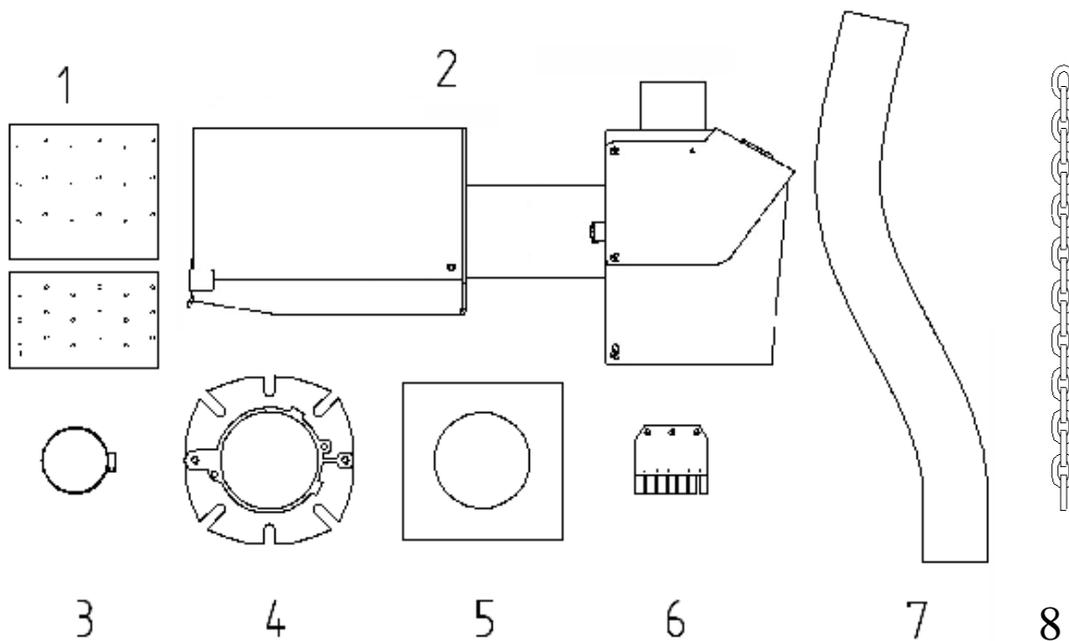
## 2.4 Notice

- Manufacturer of burners has right to make changes in burners constructions and its firmware.
- Present user manual is original user manual for PV50c pellet burner.

### 3 Set of components

The burner is shipped with following components included:

1. Grate (set of 2).
2. Burner
3. Brackets for hose 2 pc
4. Fixating flange
5. Ceramic seal
6. 7-pole boiler connector
7. Hose 1m
8. External auger's fixating chain 1m



### 4 Description

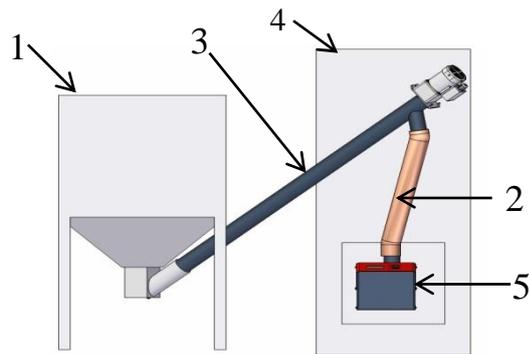
PV50c is wood pellet burner for heating of domestic, industrial and public buildings. Typical setup includes external pellet storage, external auger with hose to transport pellets from storage to burner, boiler (4) and PV50c burner mounted to the boiler's door.

Unique construction of PV50c allows using it in many boilers working in light oil or solid fuel or universal boilers. Unique electric ignition and automatic choosing of per-set power levels make using the pellet burner easier through the whole year.

Only wood pellets with diameter 6 or 8mm can be used to run the burner. Using other fuel is forbidden. The PV50c burner is connected to the boiler with a standard 90 mm oil burner flange.

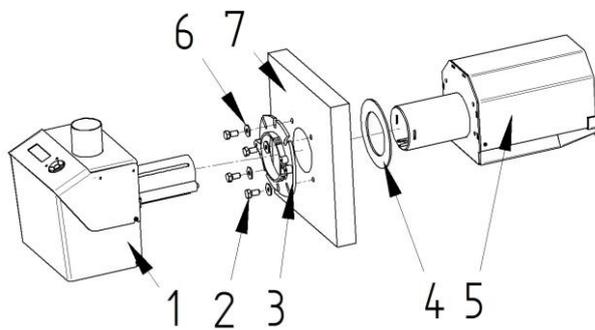
The burner is equipped with a safety thermostat, a melting hose, temperature sensor and back up battery for protection against back-burning.

Setup components are depicted in Figure 1.



1. Container
2. Melting hose
3. External auger
4. Boiler
5. Burner

Figure 1 Typical setup



On Figure 2 are depicted main components for installation:

1. Case of burner
2. Flange fixating M8 screws 4 pcs\*
3. Flange
4. Ceramic seal
5. Burning chamber
6. Washers M8 4 pcs\*
7. Boiler's door

Figure 2 Main installation components

\*Not in set

## 4.1 Principal function

The PV50c burner is meant to be installed in a boiler and fuelled with wood pellets. The burner starts always the operation by running a self test to ensure everything is working correctly. The burner is equipped with a controller which is responsible monitoring and regulating all the processes of the burner. Then a command is given to external auger which transports the pellets from a pellet storage unit to the burner and from burner into the combustion chamber. After the delivery of fuel, the igniter ignites the pellets. The air necessary for the combustion of the fuel is supplied by fan. Ash from combustion in the burning chamber will be cleaned periodically by moving grates.

The burner will start and stop itself automatically according to the requirement of the heat. The burner is equipped with several security features that protect it against overheating and that deal with other risks that may arise during the operation.

The burner starts burning when the boiler temperature cools down and boilers thermostat switches on. Burner runs until the pre-set maximum boiler's temperature (switch-off temperature) has been reached. After that burner stops safely burning procedure and goes to waiting status.

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## 4.2 Safety devices

The burner will be in every moment monitored by controller board to ensure safe and faultless operation. Back-burning is the biggest danger risk at burners working procedure. Back-burning appears when usual pressure or draught conditions have changed in boiler's combustion chamber.

In order to secure operational and fire safety, PV50c burner is equipped with following safety devices:

- **Burners controller board:** Controller is always monitoring burners work. If any kind of abnormal activities should occur that would obstruct normal operation, the burner will make controlled shutdown.
- **Flame sensor:** The flame sensor monitors that the unit is burning after the start sequence begins and during operation mode.
- **Temperature sensor:** Monitors the temperature of the pellet feeding tube. In case of higher temperature than normal, the burner will automatically go into end cycle of burning process.
- **Back up battery:** If mains supply is lost, the burner runs on backup battery power and feeder auger transports pellets from feeder's tube to the burning chamber. Battery voltage is checked always at startup and continuously monitored during the operation.
- **Safety overheat thermostat:** Switches off the main power supply if the burner is overheated. Feeder auger is unloaded by using battery power. Thermostat is triggered at 65°C and has to be reset manually.
- **Melting hose:** The external auger is connected to the burner with a special hose, which is made from easily melting polyurethane material. Such measurement avoids entrance of the flame from burner into external auger and pellet container.

### 4.3 Specifications

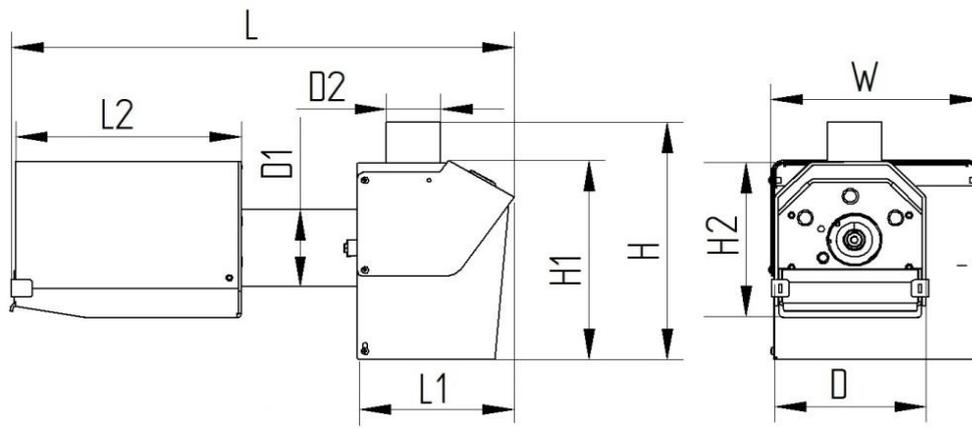


Figure 3 Burners main measurements

Table 1 Burner's main measurements

Description	Unit	Value
<b>L</b> total length	mm	560
<b>L1</b> burner housing length	mm	175
<b>L2</b> burning chamber's length	mm	260
<b>D</b> burning chamber's width	mm	180
<b>∅D1</b> burning chamber's neck diameter	mm	90
<b>∅D2</b> internal feeder inlet diameter	mm	60
<b>H</b> total height	mm	275
<b>H1</b> burner housing height	mm	230
<b>W</b> total width	mm	240
<b>Mass</b>	kg	17
<b>Supply voltage</b>	VAC	220-240
<b>Power max</b>	W	570
<b>Power average</b>	W	25 - 40
<b>Power at standby</b>	W	7
<b>Noise</b>	dB	52
<b>Emission class (EN 15270)</b>	-	5
<b>Operating temperature</b>	C°	0-60
<b>Nominal heat input</b>	kW	50
<b>Min heat input</b>	kW	20

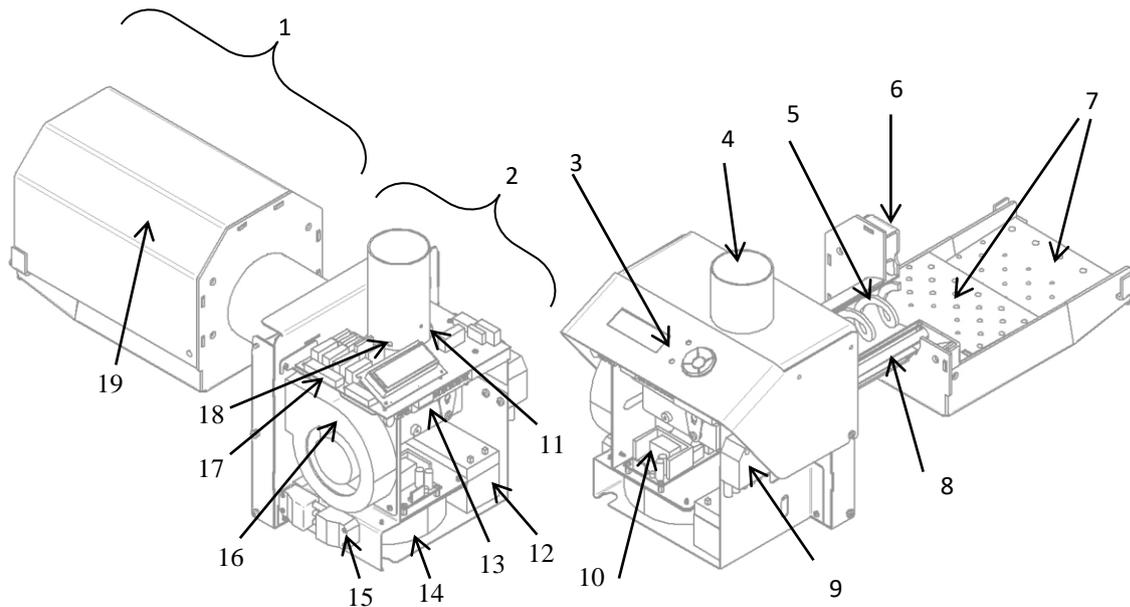


Figure 4 Main components of burner

Table 2 Main components list

No	Name	Description
1	Burning chamber	Place where pellets are burnt. Burning grates are made of cast iron.
2	Burner housing	Part of the burner that is located outside the boiler. Incorporates internal auger, fans, controller etc.
3	User interface	2-row LCD screen, LED indicators display burner statuses and other info. Navigation buttons enable to make changes in burner's settings.
4	Feeder auger inlet tube	External fuel supply line (hose) is connected here.
5	Feeder auger feed spiral	Is connected with motor and transports pellets from inlet to the burning chamber. Internal auger is controlled by controller board.
6	Burning chamber back wall	Replaceable stainless steel wall that separates hot and cold surfaces and reduces heat transfer through boiler door.
7	Grates (set of two)	Cast iron grates of burning area. Air is supplied through holes in grates. Lower grate is moved by motor.
8	Ceramic igniter (heating element)	Electric heating element to heat up air and ignite pellets in burning chamber.
9	7-pole burner's plug	Plug for connecting power supply, flue gas fan, ERR output and working thermostat
10	Power supply	AC-DC converter to supply internal controller board, feeder motor, fans and sensors.
11	Burners temperature sensor	Feeder's tube temperature sensor to stop burner when back burning.
12	Battery	Backup battery to enable safe shut down in case of supply mains interruption.
13	Feeder motor	Rotates feed spiral and gives feedback of amount pellets delivered into burning chamber.
14	Primary fan	Blows air down the grates in burning chamber according to power level.
15	External auger's plug	For connecting external auger.
16	Secondary fan	Blows air into burning chamber.
17	Controller board	Electronic control unit to turn on/off burner and external auger, regulate combustion air supply etc.

18	Fuel level sensor	Optical sensor to detect the presence of pellets in internal auger inlet. Normally, external auger is switched on, if no pellets detected.
19	Burning chamber cover	Replaceable cover to retaining combustion quality.

## 4.4 Pellets

Wood pellets are an environmentally-friendly biofuel type. The advantages of the pellets are the significantly lower prices compared to other fuel varieties, simplicity and convenience. Wood pellets are a product made by compressing renewable biomass - generally residuals from the wood and/or agricultural products industry. Pelletized biomass is a high density, low moisture product with a high heating value that burns cleanly, consistently and efficiently.

**Only wood pellets according to EN 14961-2 (ENplus-A1, ENplus-A2, EN-B) can be used in PV50c burners.**

**Table 3 Wood pellets key data**

Raw material	Sawdust, cutter shavings, stem wood, logging residues, bark, chemically untreated wood
Calorific value	4700-5100 kWh/ton
Bulk density	ca 650-670 kg/m <sup>3</sup>
Volume of 1 ton	1.5-1.6 m <sup>3</sup>
Diameter	6 or 8 mm
Length	3,15-40 mm
Fines content (<3,2 mm)	< 1%
Moisture content	< 10 %
Ash content	< 3%
Ash fusion	> 1100 °C
To replace 1000 l light oil	ca 2 tons or 3 m <sup>3</sup>

NOTICE: Nominal power of the burners is given for the use of pellets produced in accordance with DIN or DIN Plus Specifications. For pellets with other combustion parameters, in particular with a different calorific value, ash level and moisture – the power of the burner may be different, usually smaller.

Burner, external auger and container form a common system. Size and location of the container depends on needs and possibilities of boiler room or boiler house. When choosing container note that:

1. The volume of pellets container in same room with boiler doesn't exceed 500 liters (ca 350 kg)
2. Container is made from fireproof material
3. Container is placed in the way that rising angle of external auger doesn't exceed 45°. See Figure 12.
4. Container should be closable with cover.
- 5.

## 4.5 Pellet quality

Not all wood pellets make good fuel. It is always a good idea to review the pellet's analysis and try some before committing to several tons. Higher pellet quality allows for more efficient operation. Many variables contribute to the quality of a wood pellet. Many of these have been identified and are regularly tested for by most pellet manufactures and distributors.

**Pellet material:** Pellets should be made of softwood or hardwood or some combination of the two. Pellets should smell like wood. If not, then other materials may have been used in their manufacturing process. Examples are cardboard and paper that produce excessive ash and require chemical binders to hold the pellets together. All wood pellets (100% wood) don't require binders and rely on the lignin in the wood to hold the pellets together. A few all wood pellets dropped in a glass of water should swell up quickly. If they don't swell up, this may be an indication that the pellets are not entirely made of wood.

## 5 Requirements

### 5.1 Requirements to the boiler and boiler room

If you are not using a boiler provided by us, then it is important to check that the combustion chamber in the boiler is big enough to ensure that the flame does not come in contact with the water-cooled walls. Verify that the boiler's capacity range complies with the burner. There must be enough space for the ash to accumulate. The exhaust gas channels should not be so narrow that they can easily be clogged with ash.

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

- It is recommended to use three pass boilers.
- The door of the boiler must have a 90 mm opening (placement opening for the oil burner).
- The thickness of the boiler door must be less than 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 5- 20Pa) draught in the furnace, a flue gas fan should be installed to improve the draught of 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.
- If flue gas temperature at the top of the chimney is less than 80C° a metal pipe should be installed throughout the length of the chimney.

Pellet burners need regular cleaning and therefore boiler construction must allow the door to be opened without removing the burner. The minimum boiler opening radius depends on the position of door hinges and opening. Figure 5 below illustrates the situation. Point C is critical.

In order to keep door width minimum and boiler opening small, a double hinge solution can be used. As double hinges add another degree of freedom, door must be fastened on both sides. Slide-out doors with guide rails is also an option.

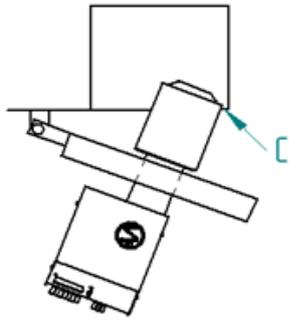
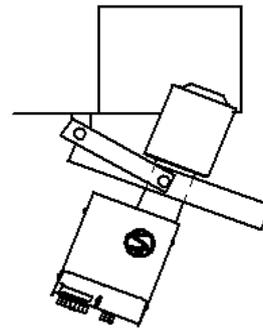


Figure 5 Critical point



Double hinges

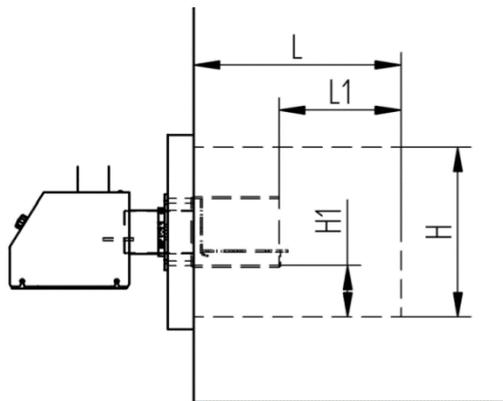


Figure 6 Boiler firebox requirements

Model	PV50c
Min. furnace total length – L	520
Min. furnace diameter – H	400
Min. distance under the burning chamber – H1	100

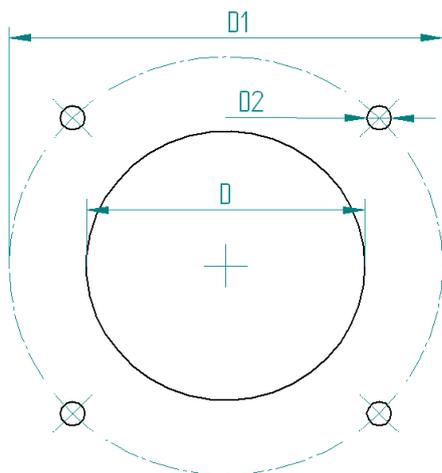


Figure 7 Mounting holes with supplied flanges for boiler door

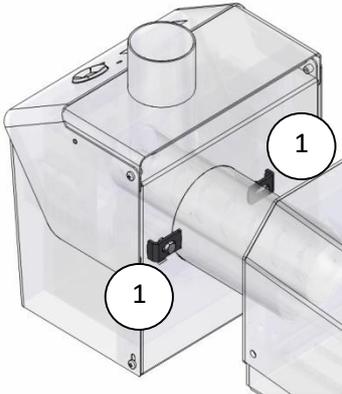
Dimension	Unit	Value
ØD hole for burning chamber neck	mm	90
ØD1 flange bolt ring diameter	mm	130..150
ØD2 bolt holes	mm	8..9

Table 4 Dimensions of fixing holes

## 6 Installation of the burner to the boiler

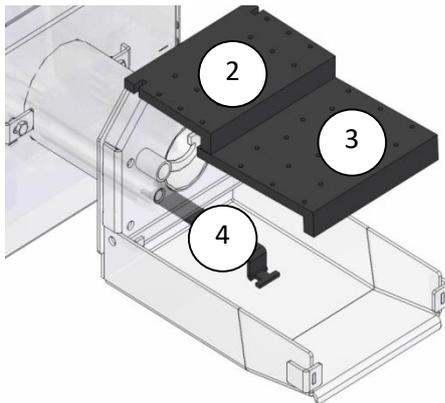
Following tools are needed in order to install the burner:

- Spanner no. 13
- Spanner no. 10
- Cross-head screwdriver
- 4 mm hex wrench



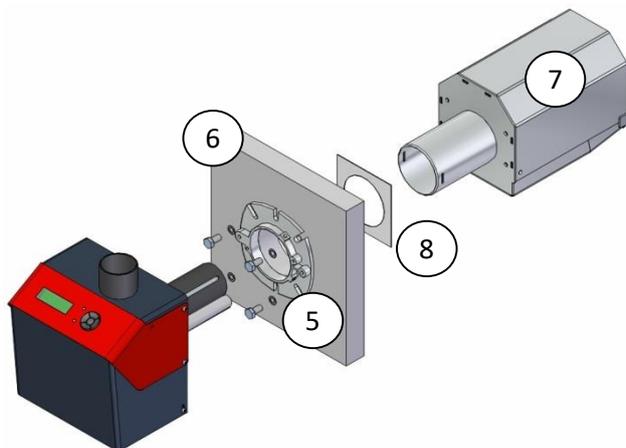
1. Remove burning chamber from the burner housing by loosening burning chamber bracket bolts (1). There is no need to remove brackets or bolts completely.
2. Remove burning chamber by pulling and slightly rotating it. At the same time motor of grate lever and its power screw are releasing from fast joint.

Figure 8 Brackets to move



There is no need to remove grates when connecting PV50c burner with its burning chamber. Grates and grate lever may stay on their places. They are connected to burners housing via fast joint. If there is need to remove grates anyway, e.g. for cleaning firstly remove the upper grate (2) by lifting it up and then lower grate (3) by releasing it from power screw's motor rod(4) Figure 9.

Figure 9 Removing grates



3. Fixate the flange (5) with bolts the door of the boiler (6). Make sure that the opening of the flange and the opening of the boiler door are aligned.

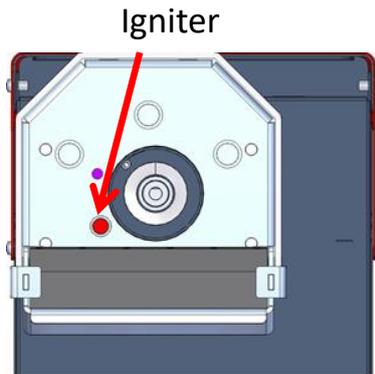
4. Fixate the burning chamber (7). For that place a ceramic seal (8) on the tube of the burning chamber and pull tube through the door in a way that chamber leans on the door of the boiler. Fixate the burning chamber with two hex grub screws to the flange Figure 10.

5. Connect the housing of the burner to the burning chamber like it was done before disassembling in step 1.

Figure 10 Fixating elements

6. Make sure that the end of burners feeder auger tube and rear wall of the burning chamber were in one level and brackets (1) would enter freely to its nests. If not so, turn the power screw of linear motor clockwise and try again. Make sure when connecting burners housing with burning chamber that fast connection joint of linear motor and grate moving bar are connected i.e. stud on motor side and the slash on power screw are in one line and connected.

7. Remount both grades in right order and right directions. Make sure that lower grade is connected to linear motor rod's power screw and fixing slots of upper grade are placed onto fixating studs in back side burning chamber.



**Caution!** Make sure, that after mounting the igniter's end tip was at same level with the burner's rear wall and don't reach out or hasn't got stuck behind the rearward wall Figure 11.

Figure 11 Right placement of igniter

## 6.1 External auger

The external auger transports pellets from the pellet container to the burner. The burner controls the work of the external auger. The external auger is connected to the burner with a special  $\varnothing$  60mm hose. The hose is made of melting polyurethane material and acts as a safety measure against back-burning. External auger can be fixed to a ceiling or container depending on conditions at the site. Figure 12 shows correct placement for external auger.

External auger must be installed as described below:

- Hang auger to ceiling or fixate it to the boiler in the way mentioned below.
- Install hose between auger and burner. Fixate hose with 2 brackets from both ends.
- Connect auger's cable to burner. Make sure that plug is surely connected with socket.

Make sure that:

- The vertical distance between the output of external auger and burner is 400 – 700 mm.
- The horizontal distance between the output of external auger and burner is 100 – 200 mm. It ensures that the hose will melt incase of back-burning.
- The raising angle of the auger doesn't exceed 45° to ground, otherwise the auger doesn't manage to transport enough pellets.
- In order pellets can fall freely into burner, the falling angle must be between 50° and 85°.
- Plug of the external auger is surely connected with burner's socket.

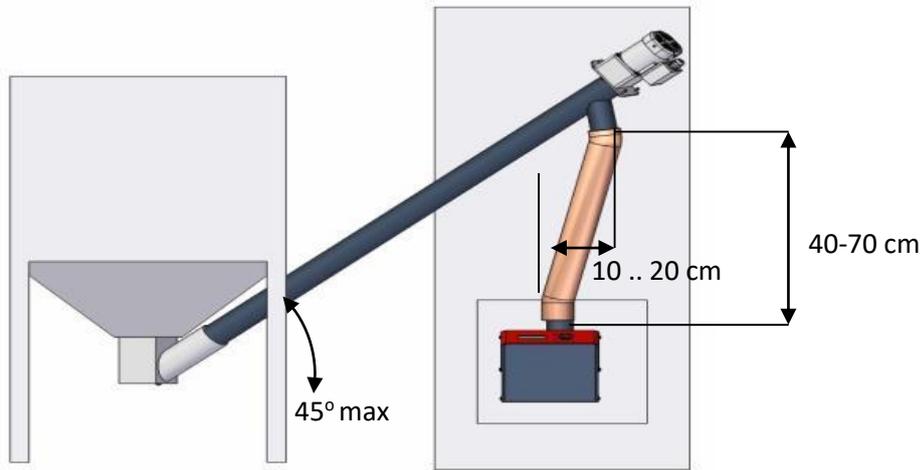


Figure 12 External auger installation

## 6.2 Electrical connections

The burner is equipped with a standard oil burner plug that has 7 contacts. There are different connection schemes used for different boilers. Usually the burner is connected to the boiler with a 5-wire cable or 4-wire cable Figure 13. In both cases connection of the boiler's thermostat is different. There are depicted plug connections of the external auger, flue gas fan and boiler in Figure 14.

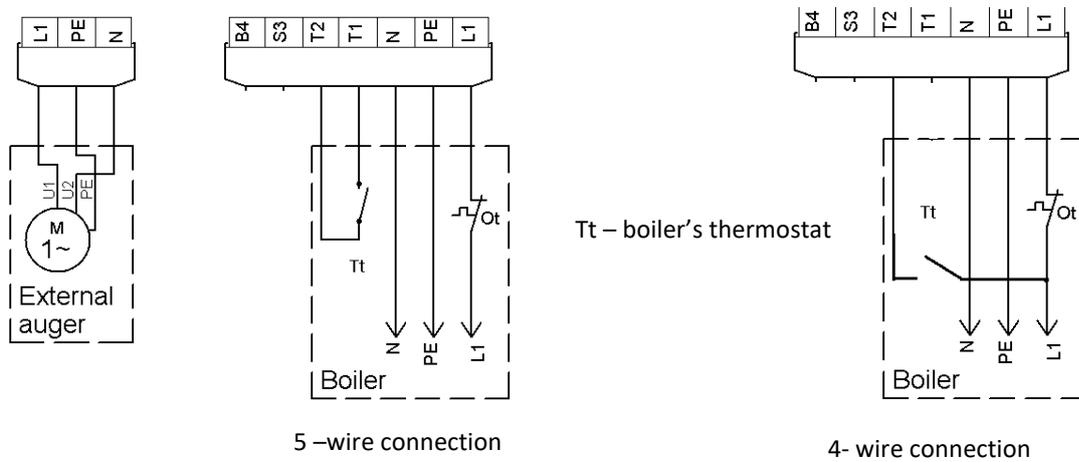


Figure 13 Boiler connections

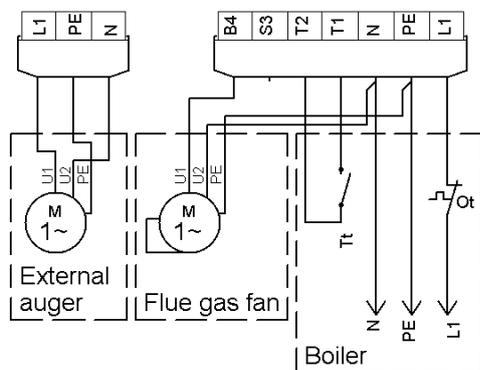


Figure 14 Boiler connections

**Notice!** All electrical connections of the burner must be done by a qualified personnel.

## 6.3 Initial start up

Before starting the burner for the first time up, make sure that:

- Burner housing and burning chamber are securely connected by brackets.
- The neck of burning chamber sits correctly in burner's housing.
- Both grates are correctly installed in burning chamber.
- Igniter can be seen from burning chamber and it is not stuck behind back wall of the burning chamber.
- Boiler thermostat is connected to the burner and works correctly.
- Boiler thermostat is set to lowest temperature.
- External auger is connected to burner and auger is installed according to requirements.
- Boiler is connected to chimney, dampers are opened and there is enough draught. When burner is operating, the underpressure inside the boiler should stay between 4-6 Pa.
- Boiler's air hatches are closed and all combustion air goes through the burner.
- Electrical plugs of external auger and boiler are pushed completely into sockets.

## 7 Operation and service

### 7.1 User interface

The burner is controlled by user interface on the front panel. The burner is controlled via user interface on the front panel. LCD screen (1) displays settings menu, event log and momentary status and error messages of the burner. Yellow LED (2) shows the presence of flame in burning chamber. In case it blinks, the burner is out of normal operation. Momentary state of burner is displayed in STATUS menu's lower row. To reach the lower row, push "down" (↓) button up to reaching requested row. Green LED (3) indicates existence of fuel in the burner. To move in menus and set parameters use "up" and "down" (↑↓) buttons. To approve parameters changes press OK. To go back to STATUS menu, press "ESC" button. See Table 5.

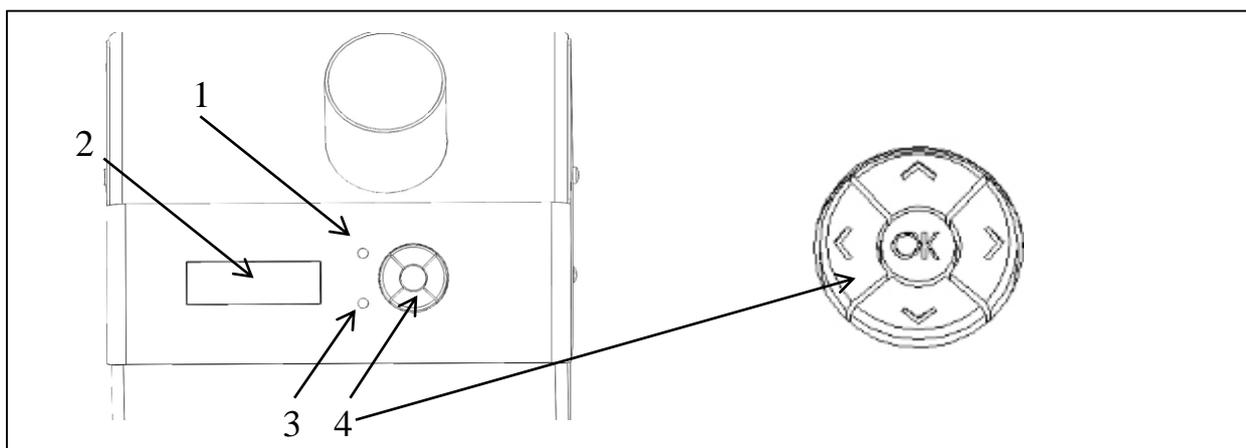


Figure 15 User interface

Table 5 User interface control buttons

Button	Pressing the button time	Action
OK	Less than 3 seconds	Entering into sub-menu Confirming setting (when blinks)
OK	More than 3 sec	Resetting error status and turning burner ON
OK	More than 3 sec in INFO menu's submenu COUNT	Resetting pellets interim counter
OK	More than 3 sec in NO POWER status	Switching burner and battery OFF
ESC	Less than 3 seconds	Moving back in menu. Cancelling setting (when blinks)
ESC	More than 3 seconds	Turning burner OFF
OK + ESC	More than 3 seconds	Burner's reset
OK + $\Lambda$ or $V$	More than 3 sec in INFO menu's U=... I= ... submenu	Moving burners grate forward $\Lambda$ or back $V$ . (Since software 3.91.18)

## 7.2 Starting and stopping

### To turn on the burner:

- turn on the boiler's main switch. If burner displays STOPPED, set in main menu BURNER from OFF to ON or push OK button more than 3 seconds
- turn boiler's thermostat to desired temperature

### To stop the burner:

- turn boiler's thermostat to lowest temperature or
- set in main menu BURNER from ON to OFF or
- push ESC button more than 3 seconds

In all cases the burner stops working when all pellets in burning chamber are burnt and turns safely to STOPPED status.

**Warning!** Never turn off working burner from boilers main switch. Use the boilers thermostat for that. In order to complete burning procedure safely let the burner to burn all fuel in burning chamber. Never leave burner unattended when you had to stop boilers work by turning boiler off from mains switch in any reason.

## 7.3 Refilling the container

Fuel can be added at any time during the operation. If the container runs empty before new fuel is added, pour more fuel into container and restart the burner by pressing OK button down for 3 seconds or switching from main menu BURNER ON. Starting will take more time because external auger has to be loaded as in initial start up.

## 7.4 Log description

Log screen STATUS menu displays last and actual events (burner statuses). Burner displays in STATUS menu last row actual status or error message and their duration. Statuses that remain upper of last row are in historical sequence and start from down to up. Use "up" ( $\uparrow$ ) button to move back in history. Burner changes its statuses based on received input signals from sensors and parameters set by user.

Table 6 Burner status description

Status message	Description
<b>STOPPED</b>	The burner is turned off from main menu.
<b>WAITING</b>	Burner is turned on and waits for boiler's thermostat to switch on. There are no time limit for WAITING status. Feeder auger works periodically at WAITING time and makes ½ rotations after every 2 minutes. When thermostat switches on, burner goes to TESTING.
<b>TESTING</b>	At this state burner will run a short self-test to ensure everything is working normally. Any failure will turn off the burner and will require attention.
<b>CLEANING</b>	In the end of TESTING burner starts the CLEANING procedure, during what the burning grates are moved back and forward in order to remove ash out of burning chamber. Lower grate moves with the help of motor down the upper grate. Ash falls to front of lower grate and is pushed out of burning chamber. Cleaning takes place: <ul style="list-style-type: none"> <li>• Always after switching burner on or resetting error state</li> <li>• At interrupted work after time set in PAR48 after first testing</li> <li>• At uninterrupted work after reaching double time set in PAR48. Burner will be stopped to perform cleaning</li> </ul> Time between two cleaning cycle can be set from PAR48. If PAR48 is set to "0" no cleaning takes place.
<b>LOADING</b>	At this state internal feeder will feed the pellets to burning chamber. Maximum load time is limited to 5 minutes in normal conditions and 20 minutes when burner has been STOPPED or run empty of pellets. Igniter is pre-heated in the end of LOADING cycle. Igniter is switched on for max 1 min in order to save its lifetime. At the LOADING time, external auger holds permanent fuel level in the feeder tube. Depending on the level sensor signal, the external auger is turned on or off.
<b>LOADING2</b>	If flame is not detected after 4 min 10 sec second small amount of pellets according to PAR25 is delivered to burning chamber. New attempt of ignition. If flame is not detected in second IGNITION, E24IGNITION is displayed.
<b>IGNITING</b>	he pellets are in burning chamber ignited. Igniter and fan are working until photocell recognizes the flame. To avoid overheating igniter works 50 second cycles, staying on time defined in PAR85. In ignition mode the fan blows hot air according to rotations set in PAR8. If flame is not detected for 4 min 10 sec then the burner will do LOADING2 .
<b>PRE-BURN</b>	The purpose of pre-burn mode is to fully ignite the pellets that were loaded for ignition. Only fan blows, igniter is switched off. Pellets start to burn. Pre burn consists of 1-4 cycles with duration 30-80seconds each. Little amount of fuel is added between cycles. PRE-BURN time and number of igniting cycles is pre-set with PAR41 and PAR42.
<b>BURNING</b>	This is the main operation status in burner operation. Burner can operate on 11 different power levels. There are 6 main power levels, which can be selected and adjusted and 5 virtual power levels between main levels that can't be adjusted or selected. For every power level fan speed is fixed with PAR1...6. The fan speeds for virtual levels are calculated as average from previous and next main level speed. External auger is holding permanent fuel level in the feeder tube during BURNING state. The auger is controlled by fuel level sensor in following manner: <ul style="list-style-type: none"> <li>• External auger is started after level sensor does not recognize fuel in burner and internal feeder has done 1/2 rotations set in PAR81.</li> <li>• External auger is stopped when level sensor recognize fuel in burner for more than ½ seconds, set in PAR82.</li> </ul> Burner will enter E28LEVEL fault condition in following cases: <ul style="list-style-type: none"> <li>• Fuel loading timeout (no signal for specified period of time).</li> <li>• Fuel unloading timeout (signal lasts longer than specified period of time).</li> </ul>

<b>HOLD FLAME</b>	<p>HOLD FLAME mode purpose is to avoid burner start-up procedures when BURNING cycle is much longer than WAITING status. In HOLD FLAME mode, minimum fuel and air amount is delivered into burning chamber. HOLD FLAME mode can be switched from burner main menu to ON, OFF or AUTO. When HOLD FLAME is selected as AUTO then burner will turn the mode on or off depending of WAITING time:</p> <ul style="list-style-type: none"> <li>• If time between two sequential WAITING states has been shorter than set in PAR11, then HOLD FLAME mode is switched on.</li> <li>• If HOLD FLAME time has been longer than set in PAR12 (30-90 min), HOLD FLAME mode is switched off.</li> </ul> <p>AUTO status lasts time set in PAR12 and ends with END BURN cycle. In HOLD FLAME cycle, burner is fed pellets every 127 seconds and air is blown as set in PAR10.</p>
<b>END BURN</b>	Boiler has reached estimated temperature and boiler thermostat has switched burner off. No fuel is added in this state. External auger is stopped, feeder and fan work until all fuel is burnt.
<b>END BLOW</b>	Photocell doesn't recognize flame in the burning chamber, fan keeps on working with speed set in PAR9 up to all pellet coal is burnt. That state lasts time set in PAR27, after flame disappearance.

## 7.5 Output power levels

Burner has 6 pre-set output power levels. For every level, the program calculates correct fuel amount what depends on fuel's calorific value and burner's internal feeder productivity. The feeder productivity for normal, light and heavy pellets can be changed from main menu. Calculated amount of fuel is divided into periodic feeding cycles. In every cycle internal feeder makes half rotation. If the calculated cycle comes too short, then the cycle length is doubled and fuel is fed with by full rotation of feeder. For every power level there is different pre-set fan rotation speed. (PAR1...PAR6).

Burner selects the output level between pre-set min and max powers. If burning time has lasted more than set in PAR15, in next burning cycle burner will increase one power level up. If burning time has been less than set in PAR16, in next burning cycle burner decreases one power level down.

## 7.6 Main menu and settings

To enter main menu press OK button. Use "up" or "down" (↑↓) buttons to move in menus. Press OK to enter for changing set up values or see burner's information. The existing burner's value or info is displayed. To change settings value press OK again. Existing value starts to blink. Using "up" or "down" (↑↓) buttons select new value and confirm the choice by pressing OK. Pressing ESC takes you back to STATUS menu.

Table 7 Main menu

Menu nr	Sub menu ENG	Description	Default settings	Options
1	STATUS->	Submenu with status and error info		
2	INFO->	Burner's technical info		
3	BURNER	Turning burner ON/OFF	OFF	ON/OFF
4	HOLD FLAME	Hold flame activated	OFF	ON/OFF/AUTO
5	PELLETS	Fuel quality options	NORM	NORM/LIGHT/HEAVY
6	POWER	Power level selection	AUTO	AUTO/20/26/32/38/44/50
7	BASE AIR	Fan speed change at once for all power levels	0	-2/-1/0/+1/+2/+3/+4/+5
8	LANGUAGE	Language options	ENG	<i>Annex 5 List of languages</i>
9	PARAMETERS	Parameters menu		

**STATUS** menu displays last events (burner states) and their duration. All durations are described in form mm:ss ('m' in the middle) or hh:mm ('h' in the middle). Last row of the log shows current state. Last row of the log shows burner's current state. All burner's statuses are described in Table 6 .

**PRE-BURN 02m10**  
**BURNING 03h:24**

**INFO** menu displays main burner's indicators like:

- VER 4.91.18 7877 - Software version
- U=13.6V - Battery voltage
- I=0.2 A 1.2/0.1A - Feeder motor maximum/actual current
- Tin=23°C - Burner input tube's temperature
- Tot= 6t 555.9kg - Total amount of pellets burnt in tons and kilos
- Cnt= 5110.9kg - Pellets burnt since last counter reset in kilograms (resettable from INFO menu)
- F=52/51±1 54/53 - Primary and secondary fan's speed (Primary and secondary fan's speeds (24 rps of 25 set, ±1 added base air rotations, 33 rps of 35 set).
- -2Pa 28% - Draught level and fluegas fan speed in percentage
- P=26/32 kW - Actual/target power
- T=0.0°C / TMP1 - External sensor's temperature

Menu **BURNER** enables to turn burner safely ON or OFF.

The main idea of **HOLD FLAME** function is to reduce permanent ON-OFF cycles. This function is useful if burner's BURNING time is much longer than WAITING time. For an example 1 hour of BURNING time and 10 minutes of WAITING time. In HOLD FLAME state the burner work on 2kW power, its fan rotates slowly (PAR10) and small quantities of fuel are added to burner.

If **HOLD FLAME** is switched ON from main menu the burner goes to HOLD FLAME always after BURNING for time set in PAR11. If boilers working thermostat switches on before time set in PAR11, burner goes back to BURNING state. If boiler working thermostat doesn't switch on before time set in PAR11, the burner finishes burning with END BURN and END BLOW states. The length of HOLD FLAME can be

changed in PAR12. If HOLD FLAME is set to AUTO in main menu, then HOLD FLAME will be activated if two sequential WAITING times have been shorter than set in PAR11. The length of state in this situation is with PAR12.

Menu **PELLETS** enables to select between 3 pre-set fuel quality options. Depending on fuel quality, the weight of pellets and its caloric value may differ in same volume. Normal weight for pellets is 650...670 kg/m<sup>3</sup>. If pellets density is smaller i.e they are lighter (less than 600 g/l), then with one rotation less pellets will be delivered into burning chamber. Such mistake may to be compensated by selecting LIGHT from PELLETS menu. Now burner delivers more pellets into burning chamber. If pellets are heavier than normal (more than 700g/l) HEAVY has to be selected in PELLETS menu. Now burner delivers fewer pellets into burning chamber. In general case there is no need to make changes in PELLETS menu. **Notice:** Weight of pellets can be manually changed in PAR21...PAR23.

Menu **POWER** determines caloric productivity of burner in kilowatts. Power is calculated by reading the rotations of the feeder auger, taking into account average caloric value of 1kg of pellets. It is possible to pre-set particular power level value or AUTO - automatically selected value. In AUTO status burner selects necessary power level depending on time when is needed to achieve pre-set temperature. Burner changes its capacity that is determined by parameters MIN POWER (PAR13) and MAX POWER (PAR14). If burner cannot achieve pre-set temperature in certain time (PAR15) it will rise its power automatically one level up and continues rising power up until reaching maximum level (PAR14) or boiler has achieved pre-set temperature. If boiler achieves pre-set temperature faster than set in PAR16 burner will work one power level lower in next cycle. Power will be reduced as long as burner has reached minimal power level (PAR13).

Menu **BASE AIR** increases or decreases speed of fans in all power levels by same number of rotations according actual need for combustion air.

Menu **LANGUAGE** enables user to select between 17 different languages.

Menu **PARAMETERS** gives overview of burner's default, min and max settings. The menu enables fine tuning of the particular burner. Short description of parameters is given in "DK0391 - Software and problem handling manual for PV20...PV500".

## 7.7 Regular maintenance

Pellet burner PV50c needs regular maintenance. The frequency of it depends on quality of pellets and intensity of heating. Average frequency is once a month or after every 2 months. Despite burner has ash removing system, the ash collects under and on the grates. Depending on pellets quality the maintenance frequency may vary.

**Notice!** The power screw of lower grate has to be cleaned and lubricated once a year.

To clean the burning chamber:

1. Turn the burner off by turning boilers thermostat to zero or switching from main menu BURNER to OFF.
2. Let the burner cool down for one hour.
3. Open boiler door.
4. Remove ash from up side of grates.
5. Remove grates and clean them. Make sure that all the holes in grates are clean.

6. Remove ash from down side of grates.
7. Place back all removed parts as they were.
8. To end the cleaning shut the boilers door and turn thermostat to required temperature and turn burner ON.

Despite burner has self-cleaning system the boiler has to be cleaned from collected ash and burning residues.

**ATTENTION! MANUFACTURER OF PELLET BURNERS DON'T PRESCRIBE TIME PERIOD OF BOILER CLEANINGS. BOILER HAS TO BE CLEANED FROM ASH AND NON-BURNING RESIDUES BEFORE THEY GET TOUCHED WITH BURNERS BURNING CHAMBER.** The ash and non-burning residues are perfect heat insulators. If burning chamber is surrounded with ash and non-burning residues its normal ventilation is distracted. It causes fast overheating, out-burning and deformation of the burning chamber.

**ATTENTION! DEFORMATION AND OUT-BURNING OF BURNING CHAMBER CAUSED BY NOT-IN- TIME MADE CLEANING IS NOT MANUFACTURING DEFECT AND IS NOT WARRANTY OBJECT.**

**Notice!** From time to time the container has to be cleaned from sawdust collected into its bottom. If there is too much saw dust, the external auger can't reach to pellets and burner gives E04PELLETS error message.

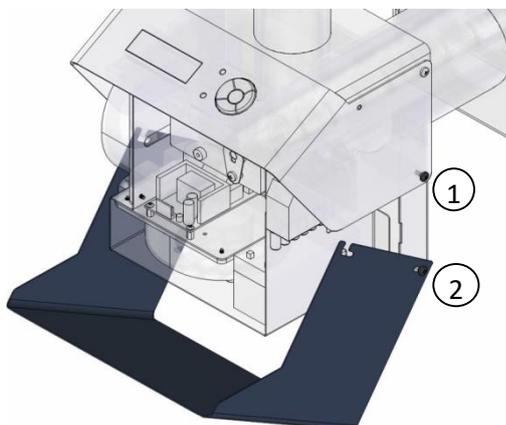
## 8 Replacing the components

Except replacing the igniter, it is recommended to turn to specialist when other components need replacing.

**Notice!** When disconnecting from controller wires or plugs make sure that when connecting them back they will be connected to right connectors or sockets. E.g. when to connect buttons plug into programming socket, the burner starts to make restarts when holding OK button down and doesn't start usual working procedure.

**Warning!** Unplug burner from supply mains before making any replacements or maintenance.

**Warning!** Follow the polarity when connecting battery. Wrong connecting can damage the controller and is danger to people nearby.



1. To open burner lower cover, loosen burner cover's middle (1) and bottom (2) screw on both sides. There is no need to remove screws

Figure 16 Opening of the lower cover

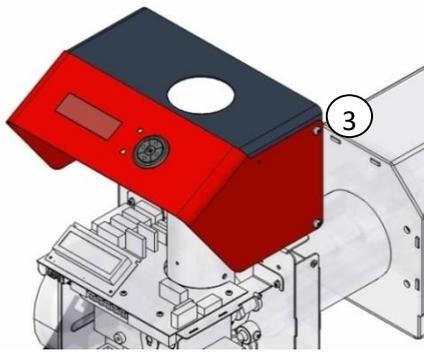


Figure 17 Removing upper cover

2. In order to remove burner's upper cover, firstly open burner's lower cover. Then remove upper cover's screws (3) 2 pcs. Pull the cover upwards.

**Notice!** It might be necessary to remove user interface buttons from the controller board to complete removing upper cover from the burner.

## 8.1 Replacing the igniter

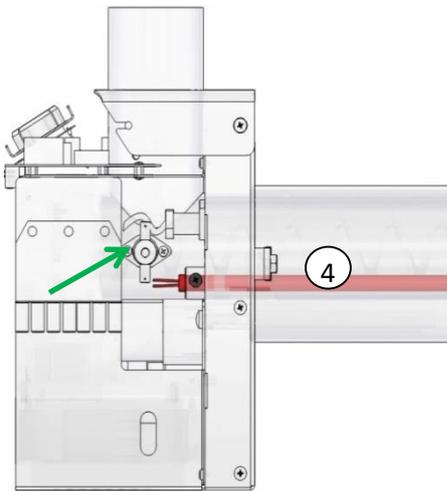


Figure 18 Igniter and safety thermostat

1. Disconnect burner from the mains supply.
2. Open burner covers.
3. Disconnect igniter wiring from the control board X1, connector 1 and 2.
4. Loosen igniter fixation screw (4) with cross-head screwdriver.
5. Remove igniter from its housing.
6. Install and connect new igniter.
7. Make sure, that igniter's end is on the same level with rear wall of burning chamber.

**Caution!** When igniter's end is out of its housing, it is in touch with direct flame and will burn out very fast.

## 8.2 Resetting safety thermostat

The green arrow Figure 18 shows the location of safety thermostat on burner. When burner is overheated the safety thermostat powers it off. Overheating may arise when draught in boiler is in wrong direction. Thermostat is located on the horizontal tube of feeder auger.

The safety thermostat (Figure 19) has to be reset manually:

1. Make sure the burner has cooled down and disconnected from mains.
2. Remove burner's covers.
3. Press small button on thermostat. See arrow Figure 19.
4. Put covers back.
5. Connect mains supply.
6. Turn on the burner.
7. If flame indicator keeps on flashing, replacement of thermostat is needed. If mains supply returns but the message NO POWER remains in screen, restart burner by holding OK and ESC buttons down more than 3 seconds.

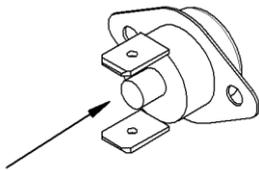


Figure 19 Safety thermostat

### 8.3 Replacing fuses

Burner's controller is protected against the errors of external devices with electrical fuses. Fuses may burn out in case a foreign object gets into the fan or motor and blocks their work. Fuses are located in the controller's plate and are labelled as F1...F11.

Replacing:

1. Make sure the burner is removed from mains supply.
2. Remove burner covers.
3. Remove the fuse and check its state with a tester or looking it against the light.
4. Replace the fuse with an equivalent one if necessary. The plastic cover of the fuse holder must be placed back directly not skewed. Otherwise the cover might push the holder's contacts far from each other and break the connection.
6. Put covers back.
7. Connect mains supply.

In case the fuse burns out again, the component which is connected to the fuse probably needs replacing.

### 8.4 Replacing fuel level sensors

Fuel level sensor consist of two parts – transmitter and receiver, which are located on vertical part on opposite sides of feeder auger's vertical tube. See Figure 4. Most common error to level sensors is getting dirty. At first you may try to clean them. When cleaning, try to avoid scratching or making lenses opaque. Remember that lenses of sensors are made from plastic! Lens get dirty when draught in boiler is weak and smoke moves throught feeder tube back to burner. The soot and heat of the flue gas covers the surface of the sensor with an opaque layer. Sensors should not be replaced before you are absolutely sure that E28LEVEL error is caused by sensors. Sensors cleaned too often without direct need will get damaged sooner.

If in any reason you can't reach lenses inside the burner's tube you may take them out for cleaning. To do that release screws fixing sensors and pull sensors out from sockets on controller board.

Sensor's replacement:

1. Make sure that burner is disconnected from mains.
2. Remove burner's covers.
3. Unscrew sensor's fixing screw from feeder's tube.
4. Remove sensor by pulling it out of green socket.
5. Plug new sensor to socket. Fix it with screw to feeder's tube.
6. Make sure that in reconnecting: TRS is dark sensor and RSV is transparent sensor.

## 8.5 Replacing flame sensor

Flame sensor may get dirty or melt in case of back burning. Flame sensor consists of light sensitive resistor and transparent plastic housing. Housing is situated inside of black rubber nest. For replacement small screwdriver is needed.

For checking and replacing:

1. Make sure that burner is disconnected from mains supply.
2. Remove burner's covers.
3. Pull the sensor with rubber cover out of its nest and clean its transparent part with soft cloth.
4. If sensor is melted unroll its wires out of X4 connector and replace the sensor.
5. Reconnect the wires. The polarity is not important. Screw terminal must be tightened so hard that when pulling the wires, they would not come out from under the screw.
6. Place back burner's covers and connect burner to mains supply.

## 8.6 Replacing feeder augers motor

The condition of the feeder auger's motor is crucial for safety. Failed feeder auger motor may cause back-burning therefore the motor must be replaced after every 2000 working hours or after 30 tons of pellets are burnt. Roughly calculated amount of pellets burnt (in tons and kg) is accessible from INFO menus submenu COUNTER.

**Notice!** Please read through description below. If you find that replacement could turn out more complicated than expected, please turn to specialist.

In order to replace motor middle size crosshead screwdriver and 4mm inner hex wrench is needed.

To replace feeder auger motor:

1. Remove burner's covers.
2. Loosen and remove 4 tin screws from burner's body frame and 1 left lower fan screw. See Figure 20.
3. Release from terminal X3 feeder motors wires and rotation sensor from FDR socket.
4. Remove body frame.
5. Loosen and remove 4 bolts M4 what hold feeder motor.
6. Remove feeder's spiral.
7. Mount spiral to new motor.
8. Place new motor to it place and fasten the bolts.
9. Fasten 4 tin screws and 1 left lower fan screw.
10. Connect back motor's wires and sensors plug.
11. Place back burner covers

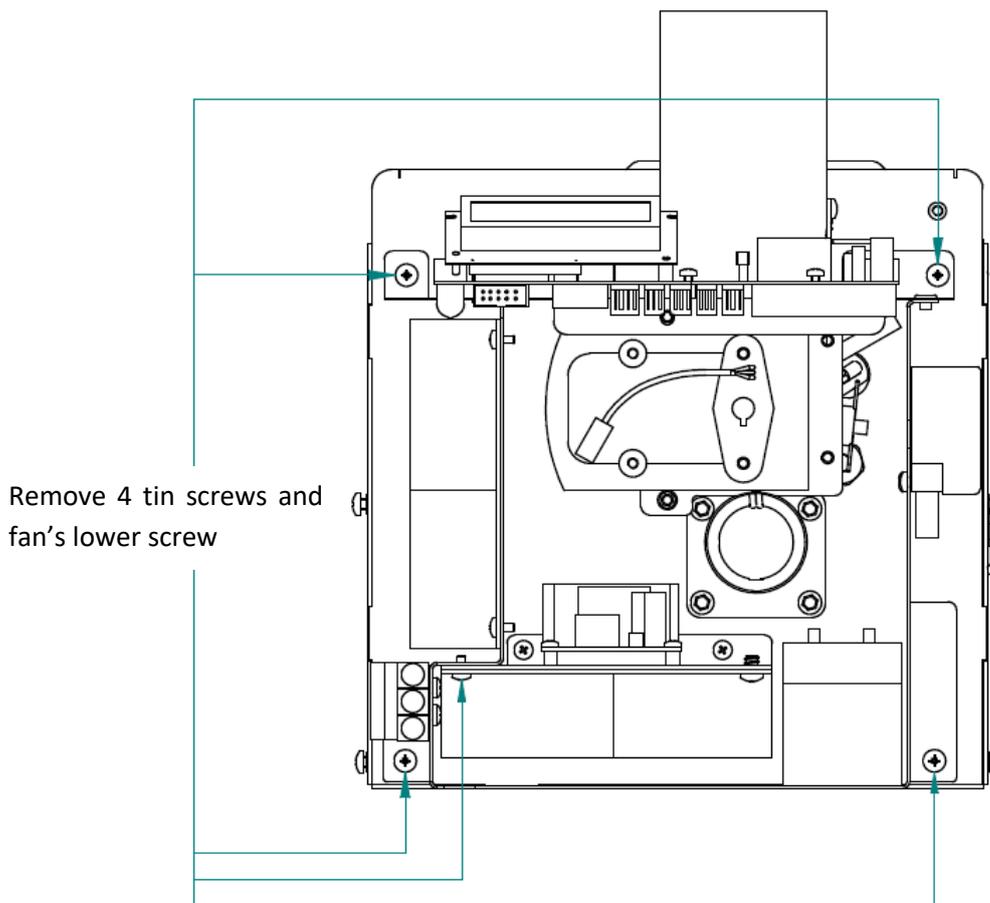


Figure 20 Removing the screws

## 8.7 Replacing battery

Battery has to be replaced when burner displays permanently E48BATTERY.

As battery is safety element the burner checks permanently its running order and doesn't start next working cycle when battery's voltage is lower than 11V. Low battery might be result of power interruption. Let the battery to charge at least one hour.

When after charging voltage is below 11V battery has to be replaced.

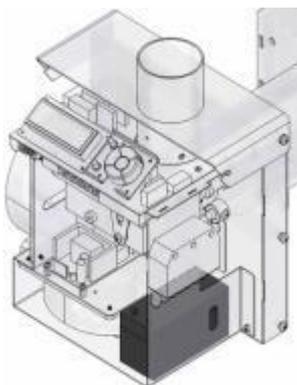


Figure 21 Battery's location

To replace battery:

1. Disconnect burner from the supply mains.
2. Remove burner covers.
3. Disconnect wires from battery contacts.

Battery is fixed to burner's body with two sided tape and needs some power to pry off

4. Glue new two sided tape to battery and fix it to burner's body. Redo wiring, place back burner's cover and connect burner to mains supply.

**CAUTION! ALWAYS CONNECT RED WIRE WITH RED BATTERY CONTACT (+) AND BLACK WIRE WITH BLACK BATTERY CONTACT (-). WRONG CONNECTION WILL DAMAGE THE CONTROLLER AND MAY BE DANGER TO PEOPLE NEARBY.**

## 9 State change logic

Table 8 State change logic

State	Next state	Change conditions
WAITING	TESTING	Boiler thermostat has been turned on.
TESTING	LOADING	All tests have been successfully completed.
	CLEANING	Tests were successfully completed and CLEANING times is fulfilled.
	E36 FEEDER	Feeder didn't make full turn in 10 seconds.
	E40 FAN	Primary fan didn't reach testing speed.
	E42 FAN	Secondary fan didn't reach testing speed.
	E45 DRAFT	Draft higher than draft error level.
	E48 BATTERY	Battery voltage lower than 11V.
CLEANING	LOADING	CLEANING was completed successfully and previous state was TESTING.
	PRE BURN	CLEANING was completed successfully and previous state was HOLD FLAME.
	BURNING	CLEANING was completed successfully and previous state was BURNING or HOLD FLAME.
	E12 GRATE	Grate end position not recognized in 97 seconds.
	E14 GRATE2	Maximum CLEANING time of 250 seconds reached.
LOADING	END-BURN	Flame indicated and last cycle didn't end successfully.
	IGNITION	LOADING time reached.
	E04 PELLETS	Maximum LOADING time reached.
	E25 IGNITION	Feeder has been on 3 seconds longer than LOADING time (if no power at LOADING state).
LOADING 2	IGNITION	LOADING 2 time reached and previous state was IGNITION.
	PRE-BURN	LOADING 2 time reached.

IGNITION	LOADING 2	IGNITION time reached and flame not recognized, LOADING 2 hasn't been done.
	PRE-BURN	Flame recognized.
	E24 IGNITION	IGNITION time reached and flame not recognized, LOADING 2 has been done.
PRE BURN	LOADING2	There was less than 10 seconds of flame and LOADING 2 hasn't been done.
	BURNING	PRE BURN cycle finished with more than 10 seconds of flame and HEAT UP is set OFF.
	E18 FLAME2	There was less than 10 seconds of flame and LOADING 2 is already done.
	HOLD FLAME	Thermostat signal has been lost and hold-flame is auto or on.
	END BURN	Auger has been on for more than 4 minutes without getting level. Will continue with end-blow and finish with E05 pellets error. Thermostat signal has been lost and hold-flame is off.
BURNING	CLEANING	CLEANING time reached for second time and cleaning type is BURNING.
	HOLD FLAME	Thermostat signal is OFF, HOLD FLAME is ON or HOLD-FLAME is set AUTO, last WAITING state was shorter than HOLD FLAME ON time.
		CLEANING time reached, burner is working on 1. power level and CLEANING type is HOLD FLAME.
	END BURN	Level hasn't disappeared within 20 rotations of feeder working . Will continue with END BLOW and finish with E28 LEVEL ERROR.
		Auger has been on for more than 4 minutes without getting level. Will continue with END BLOW and finish with E05 PELLETS ERROR.
Thermostat signal has been lost, HOLD FLAME is set OFF.		
	CLEANING time reached for second time and CLEANING TYPE is END BURN.	
E16 FLAME	Flame hasn't been recognized for more than 2 minutes.	
HOLD FLAME	CLEANING	State has lasted for 1 minute, CLEANING TYPE is not OFF or END BURN and CLEANING timer is fulfilled.
	PRE BURN	Thermostat signal is ON.
	END BURN	State has lasted longer than HOLD FLAME OFF time. (PAR12)
Auger has been on for more than 4 minutes without getting level. Will continue with END BLOW and finish with E05 PELLETS error.		
END BURN	BURNING	Thermostat signal is ON and feeder has worked for less than 4 rotations.
	END BLOW	Feeder has worked for more than 32 seconds and 40 seconds has passed after that.

END BLOW	WAITING	Flame is not recognized during END BLOW TIME (par27) and BURNER is set ON.
	STOPPED	Flame is not recognized during END BLOW TIME (par27) and BURNER is set OFF.
	P08 FLAME	State has lasted for more than 20 minutes.
STOPPED	WAITING	BURNER is set ON.

## 10 Error messages and solutions

Error messages, error codes, their descriptions, explanations and ways of their elimination are described in “DK0391 - Software and problem handling manual for PV PV20...500 burners”.

## 11 Restoring factory parameters

In order to restore factory /default settings select PAR99 and click OK, model of burner starts to blink, click OK again.

## 12 Additional devices for PV burners

Additional devices what is possible to install to PV serial burners are described in document “DK0009 - Additional devices for PV burners”.

It is possible to install following devices to PV burners:

1. Flue gas fan
2. Multipurpose ERR relay output
3. External boiler temperature sensor
4. External boiler pressure sensor
5. Internet module

## 13 Table of parameters

Closer description of parameters is given in “DK0391 - Hardware and problem handling manual for PV PV20...500 burners”.

# 14 Annex 1. Electrical diagram

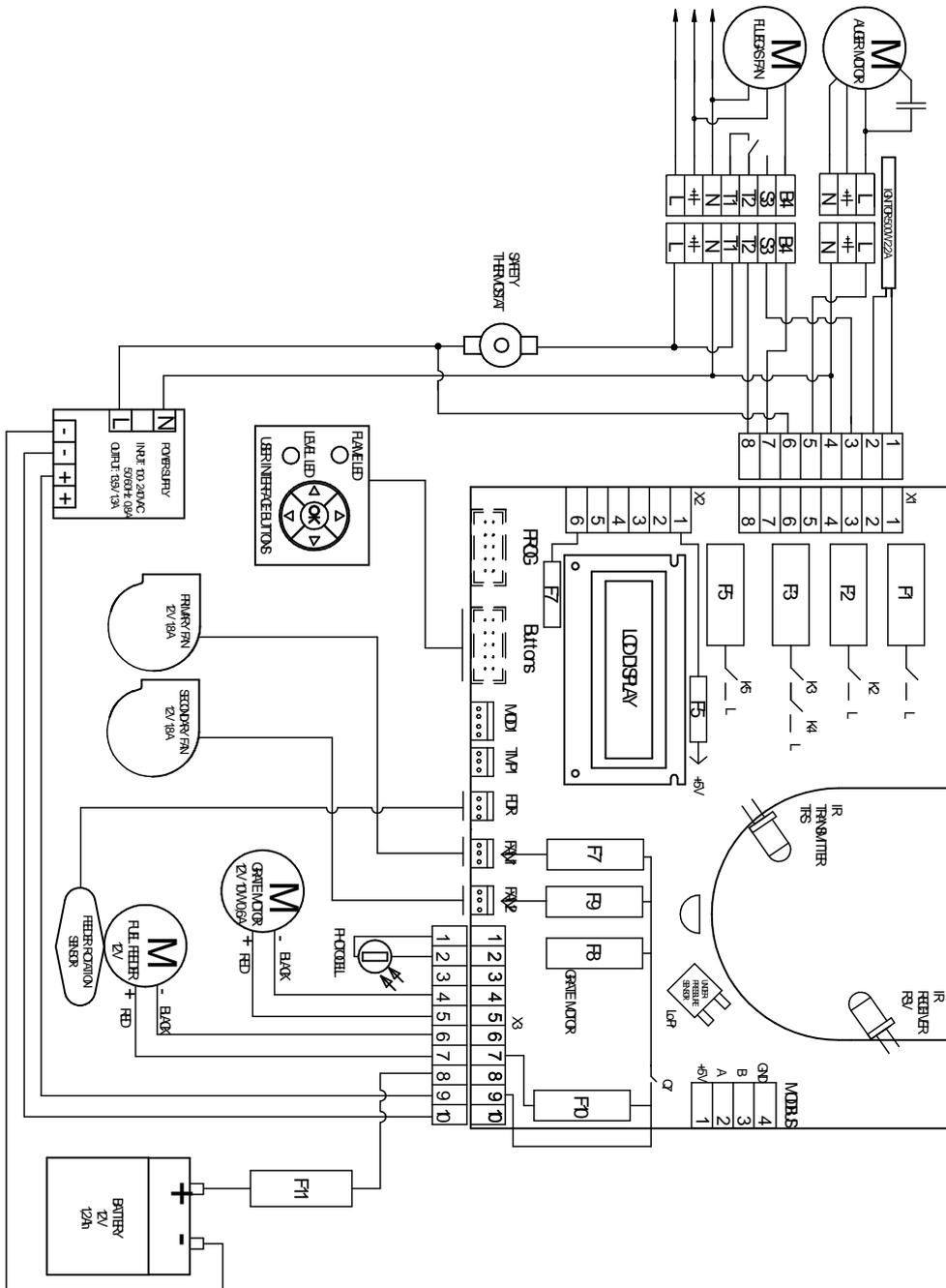


Figure 22 Electrical diagram

## 15 Annex 2. Screw connectors

<b>X1 230 VAC devices</b>	
<b>X1-1</b>	Igniter
<b>X1-2</b>	Igniter
<b>X1-3</b>	Err relay output
<b>X1-4</b>	External auger N
<b>X1-5</b>	External auger L
<b>X1-6</b>	Mains supply L
<b>X1-7</b>	Flue gas fan L
<b>X1-8</b>	Boiler's thermostat

<b>X2 Various signals</b>		
<b>X2-1</b>	Supply voltage output through F5 (mA sensor supply)	0.1A max
<b>X2-2</b>	mA / 10VDC input	24VDC max voltage input
<b>X2-3</b>	PT100 input	
<b>X2-4</b>	Ground (PT100)	
<b>X2-5</b>	DAC 0-10V output	10mA max
<b>X2-6</b>	Open collector output. Fused through F7	0.1A max

<b>X3 12V devices</b>		
<b>X3-1</b>	Flame sensor (photocell)	
<b>X3-2</b>	Flame sensor's (photocell's) ground	
<b>X3-3</b>	Open collector output /digital input, fused through F9	0.1A max / 24VDC max
<b>X3-4</b>	Grate motors -	2A cont / 10A 100ms
<b>X3-5</b>	Grate motor's +	2A cont / 10A 100ms
<b>X3-6</b>	Feeder motor's - (switch to ground)	2A cont / 10A 100ms
<b>X3-7</b>	Feeder motor's +	Fuse F8
<b>X3-8</b>	Battery +	
<b>X3-9</b>	Power supply input +	
<b>X3-10</b>	Battery -, power supply input -	

### 16 Annex 3. Controller board EP0001B3

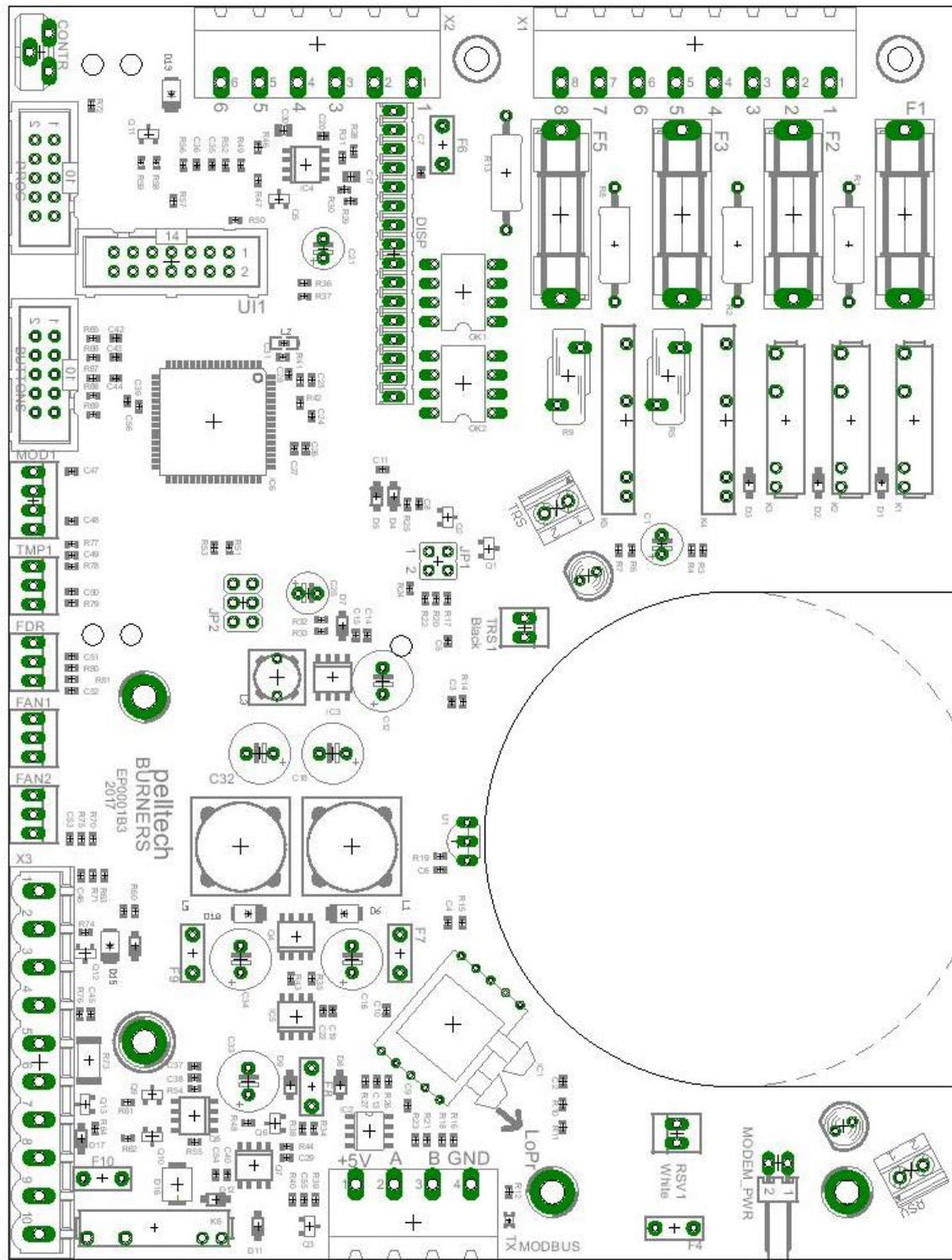


Figure 23 Controller EP0001B3

## 17 Annex 4. Controller's connectors

MODBUS		Modbus interface
MODBUS-1	+5V output, unfused	
MODBUS-2	Signal A	
MODBUS-3	Signal B	
MODBUS-4	Ground	

FANx			Primary and secondary air fans
FANx-1	Fan power, PWM	5A cont / 25A 100ms	
FANx-2	Fan ground		
FANx-3	Speed feedback digital input	1p/rot from open col. output	

FDR		Internal auger feedback
FDR-1	Feeder auger speed feedback sensor power +5V	
FDR-2	Feeder auger speed feedback sensor ground	
FDR-3	Feeder auger speed feedback sensor signal	

TMP1		Temperature sensor
TMP1-1	Sensor power +5V	
TMP1-2	Sensor ground	
TMP1-3	Sensor signal	

MOD1		Modem interface
MOD1-1	+5V output, unfused	
MOD1-2	Rx input	
MOD1-3	Tx output	
MOD1-4	Ground	

RSV		Fuel level sensor receiver
RSV-1	IR diode cathode	
RSV-2	IR diode anode	

TRS		Fuel level sensor transmitter
TRS-1	IR LED anode	
TRS-2	IR LED cathode	

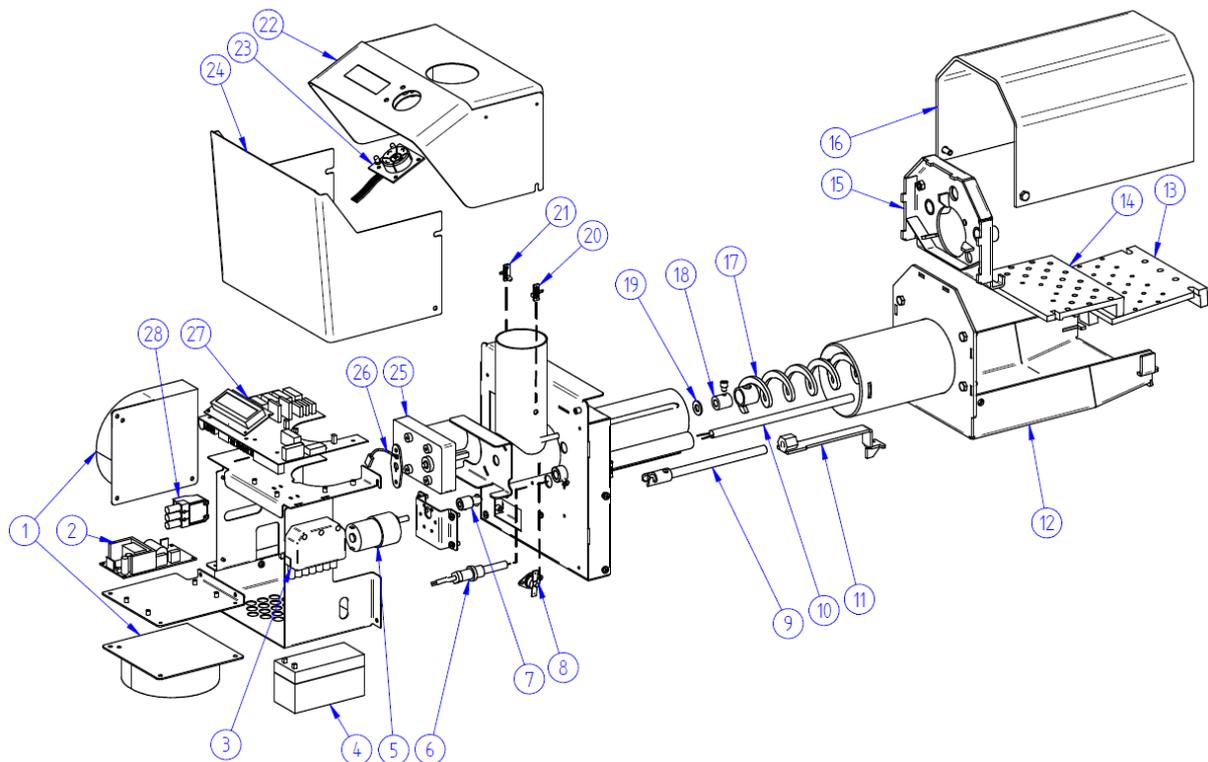
JP1		mA / 10VDC input selection (on – jumper mounted)
1 off, 2 off	10VDC input	
1 off, 2 on	Illegal	
1 on, 2 off	Illegal	
1 on, 2 on	mA input	

## 18 Annex 5. List of languages

Table 9 List of languages

Language	
ENG	English
ESP	Spanish
EST	Estonian
FIN	Finnish
FRA	France
GER	Germany
GRE	Greece
HRV	Croatian
LIT	Lithuanian
LAT	Latvian
NED	Dutch
POR	Portuguese
RUS	Russian
SLO	Slovenian
SRB	Serbian
SVK	Slovakian
SWE	Swedish

## 19 List of spare parts



<b>Pos</b>	<b>Product code</b>	<b>Description</b>
1	MF0002	Fan for PV50bc
2	ET0001	Power supply for PV50c
3	EU0008	Connector 7 pin (female)
4	EA0001	Battery 12 V, 1,2 Ah for PV20/30/50/100/180
5	MM0002	Linear motor for PV50bc
6	AL0002	Photo cell with rubber case for PV20/30/50 (cable 15 cm)
7	UP9802	Linear motor's bunt
8	EF0008	Safety thermostat 65°C for PV20/30/50/100/180/250
9	UK9802	Threaded rod with locker for PV50bc
10	ER0005	Ceramic ignitor 300 W
11	LT9808	Linear actuator lever for PV50bc
12	LT9811	Burning chamber for PV50bc
13	BR9802	Lower grate for PV50bc
14	BR9801	Upper grate for PV50bc
15	LT9804	Back wall for PV50bc
16	LT9807	Burning chamber cover for PV50bc
17	US9901	Spiral for PV20/30/50
18	UP9804	Bunt for PV20/30/50 feeder spiral
19		M8 bronze washer
20	AO9802	Level sensor for PV50bc (receiver)
21	AO9801	Level sensor for PV50bc (transmitter)
22	LK9808	Front panel with class for PV50bc
23	ES9801	Buttons for PV50bc
24	LK9808	Lower panel for PV50bc
25	MM9902	Feeder motor with sensor for PV50bc
26	AR9801	Feeder sensor for PV50bc
27	EP0001	Controller for PV50bc
28	EU0007	Connector 3 pin (male)

## 20 Declaration of conformity



### DECLARATION OF CONFORMITY

We, Pelltech OÜ  
Sära tee 3, 75312 Peetri, Rae vald, Estonia  
[www.pelltech.eu](http://www.pelltech.eu)

Declare under sole responsibility that the machinery described as

#### **Pellet burner, Type: PV50b, PV50c**

to which this certificate applies, is in conformity with the provisions of the following directives and regulations.

2006/42/EC	Machinery directive
2014/30/EU	EMC Directive
2014/35/EU	Low Voltage Directive

#### **Applied standards:**

EN 15270:2008  
EN 298:2012  
EN 60335-1:2012  
EN 60335-2-102:2016  
EN 60730-1:2016  
EN 60730-2-5:2015  
EN IEC 61000-6-1:2019  
EN 61000-6-3:2007

Tallinn 15.05.2020

Aavo Isak, CEO, member of board

## Warranty

Warranty objects in this context are pellet burner PV50c, external augers PA15XX or PA 20XX.

Producer gives 2 years warranty from the date of sales for the PV50c burners and PA15XX and PA20XX augers.

Warranty is valid only in country where the burner is bought from.

2-year warranty for burning chamber is valid only in case when burning chamber and boiler are cleaned with sufficient care from ash and non-burning residues in the way that they cannot cause deformation and out-burning of burning chamber.

Exception is ignition element (igniter), for this item warranty is 1 (one) year.

The warranty does not apply if defects have occurred:

- by wrong mounting, incorrect operation of the product or defects caused by incorrect maintenance
- during transport and / or handling by the user
- improper installation by the installer
- misuse of the device
- unauthorized changes to the device design
- irregular cleaning and maintenance or failure to clean and maintain due to disturbances or interruptions caused by the external environment

Warranty is valid when user has not made changes in the construction and setup of the burner.

Warranty is valid only if the lower half of the warranty ticket is filled in and sent or brought to the office of Pelltech OÜ Sära tee 3, Peetri, Rae vald, 75312 Harjumaa ESTONIA

Ph..+3726775277

[www.pelltech.eu](http://www.pelltech.eu)

info@pelltech.ee

**Warranty ticket**

Burners model **PV50c**

Product number .....

Sales date .....

Installation/commissioning date .....

Owners contacts **Installers name and signature**

Name .....

Phone nr .....

City/village .....

Street/ House .....

---

**Warranty ticket**

Burners model **PV50c**

Product number .....

Sales date .....

Installation/commissioning date .....

Owners contacts **Installers name and signature**

Name .....

Phone nr .....

City/village .....

Street/ House .....

Warranty is valid only if the bottom half of the warranty ticket is filled in and sent or brought to the office of Pelltech OÜ Sära tee 3, Peetri, Rae vald, 75312 Harjumaa ESTONIA

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