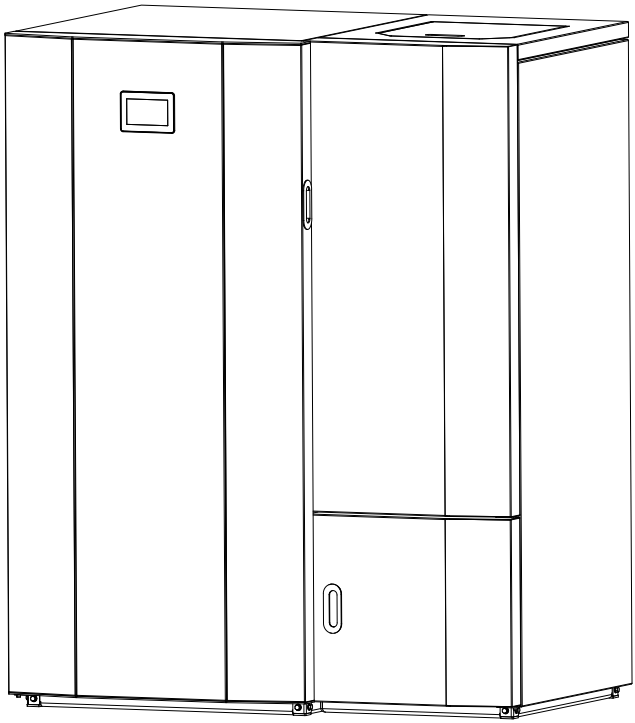
Mareli Systems

ECOPELLET STAR

Assembly and exploitation manual



Please read these instructions carefully before installing and/or lighting the appliance for the first time.
Keep this document near the appliance, in a place which can easily be reached.

INTRODUCTION :

Dear customer,
The biomass boiler with condensation technology sets the bar very high in terms of energy efficient while keeping the emissions levels low. This technology allows it to reach 106 % which is much higher then even the most high-end modern pellet boiler without this technology.

Condensation technology
As solid fuel is used (pellets) during the combustion process the moisture contained in the fuel is released. This product reuses the heat that usually is eliminated with the flue gases through the chimney in traditional boilers. Thus, the flue gas temperature of the ECOPELLET STAR boiler is below 50°C under condensation conditions. When the water temperature is between 30-50 C is when the boiler has it's highest efficiency. As the water temperature gets higher the condensation effect diminishes.
This boiler complies with current regulations and has been tested in external laboratories accredited for certifying this type of product. Installation of the boiler, checking and maintenance should be carried out by authorised personnel.

INSTRUCTIONS FOR SECURITY:

- This appliance is not intended for use by people (including children) with limited physical, sensory or mental abilities or lack of experience and knowledge. The installation must be performed by a qualified expert in the field of heating installations or authorized by "Mareli Systems' service. The place and way of connecting the boiler should be selected carefully in accord with the safety instructions. Install away from flammable objects!
- Before starting any operation, the user must read and fully understand the contents of this instruction manual. Incorrect setup may cause hazardous conditions and / or incorrect function of the boil;
- Do not wash the boiler with water. Water can get inside the fireplace and damage the electronics and cause an electric shock;
- Do not put clothes to dry on the boiler. Any clothes hangers and other objects must be located within a reasonable distance from the fireplace. Fire hazard;
- The user is fully responsible for the proper use of the product which exempts the company from liability of any users errors or misbehaviour or omissions;
- Any intervention or replacement that is made by unauthorized people or using non original spare parts for the product can be risky for the user and release the company from all liability;
- Most surfaces of the boiler are extremely hot (the door handle, glass, flue pipe, etc.). Avoid contact with these parts before assuring yourself that you us temperature resistant gloves as well as suitable temperature resistant instruments;
- Under no circumstances should the fire be ignited with the door open or broken glass;
- The product must be electrically connected to a system equipped with an effective earth conductor. (Must be grounded);
- Turn off the boiler in case of failure or malfunction;
- All unburned pellets in the burner after each unsuccessful attempt ignition must be removed before a new ignition;
- When installing the product all fire safety requirements must be respected

If there is a fire in the flue pipe, extinguish the boiler, disconnect the power cord and never open the door. Call competent authorized service technicians;

- Do not light the boiler with flammable materials if the ignition system failed;
- Periodically check and clean the smoke outlet ducts of the boiler (connection to the flue pipe);
- Pellet boiler is not a cooker;
- Always keep the cover closed;

SAFE DISTANCES:

When installing the product a safe distance of at least 600 mm must be respected. This distance applies to the product located near materials of B or C flammability level. The safe distance is doubled if the product is close to materials of C3 combustion level.

1. PURPOSE

The boiler is purposed to heat domestic and public premises by the means of pellets. The boiler is equipped with a steel water jacket designed for heating systems with water temperature up to 90° C at a maximum super pressure up to 0,15 Mpa. Tests are run at pressure of 0,3 Mpa.
The boiler is designed and manufactured to work with A-class pellets only
(DIN plus 51731) with the following characteristics:

The boiler consists of a boiler body, pellet hopper and a pellet burner. The burner can be fitted to the right of the boiler or left, upon request.
The boiler body is constructed of sheet steel, stainless steel and corrosion resistant materials throughout the flue gas circuit as well as all parts that may be in contact with condensate. Combustion chamber is cylindrical and the flue pipes are arranged around this chamber.
At the rear of the boiler there are placed hydraulic connections as well as flue gas pipe and condensate drain. The condensate discharges through a drain at the bottom of the boiler, where a water trap is installed.
The boiler includes an automatic cleaning system of the burner plate, which wipes ashes onto a manually removable ash drawer. It also includes an automatic water jet system for cleaning the heat exchanger flue gas pipes.

- Material 100% pure conifer or broad-leaf wood;
- Diameter Φ6/8 mm;
- Length 20-30mm;
- Calorie capacity 5.2 kW/kg;
- Ash content < 8%;

The use of pellets with characteristics different from the recommended may result in power decrease, unstable and inconsistent work of the boiler.

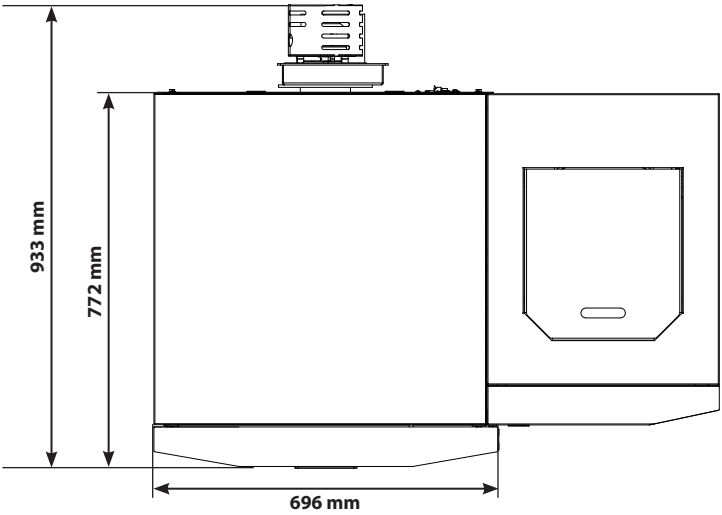
What are the pellets.
The pellets are produced by compressed wooden waste left from the production of various furniture, sawmills and others. This type of fuel is environmentally friendly because in the production process no agglutinate agents (glues, resins and others) are added. Actually, the integrity of the pellets is guaranteed by the lignite – a natural ingredient contained in the wood itself. While the wood has a calorie capacity of 4.4 kW/kg (15% humidity at 18 months drying), the pellets have 5.2 kW/kg.

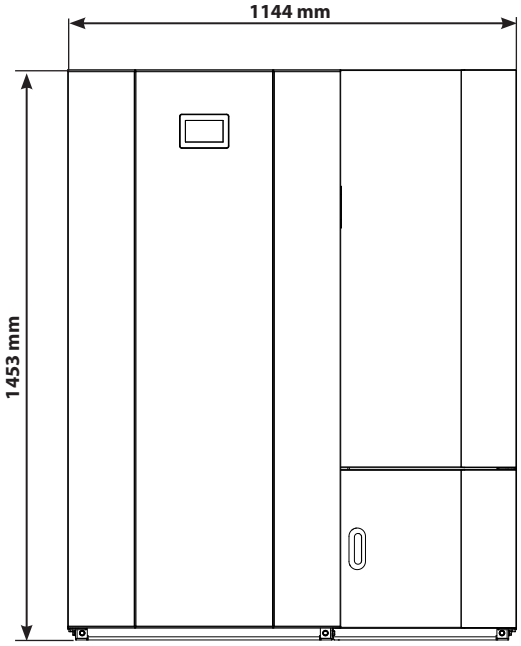
Info: To ensure the proper work of the boiler the pellets must be stored in a dry place!

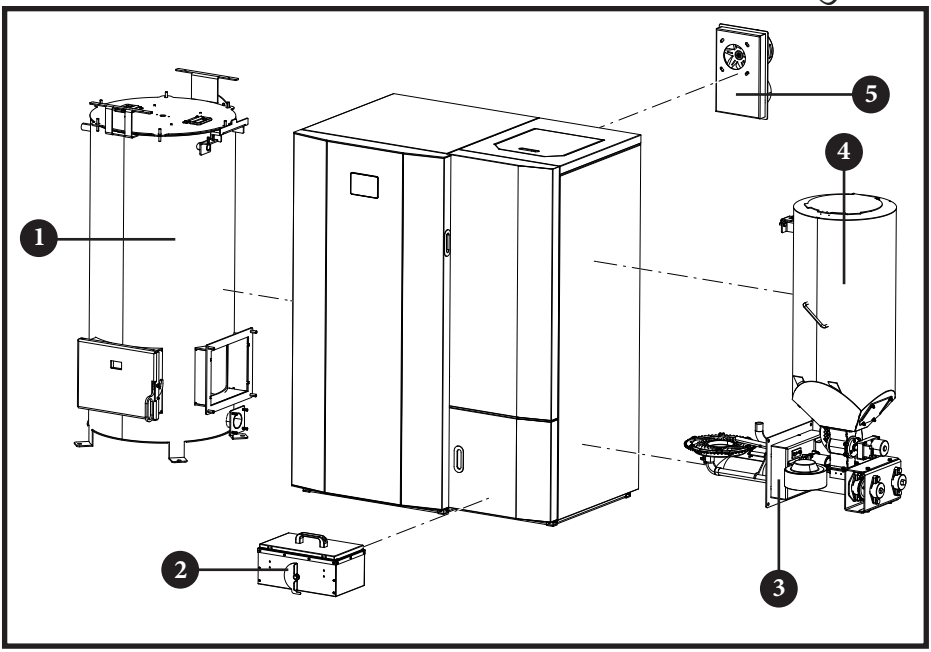
Recharging of pellets can be done during work, with the following sequence:
1. Open the bunker (located at the top of the product);
2. Fill the hopper, using non-combustible container;
3. Close the lid of the bunker;

Attention!!! Use gloves! Beware of hot surfaces!

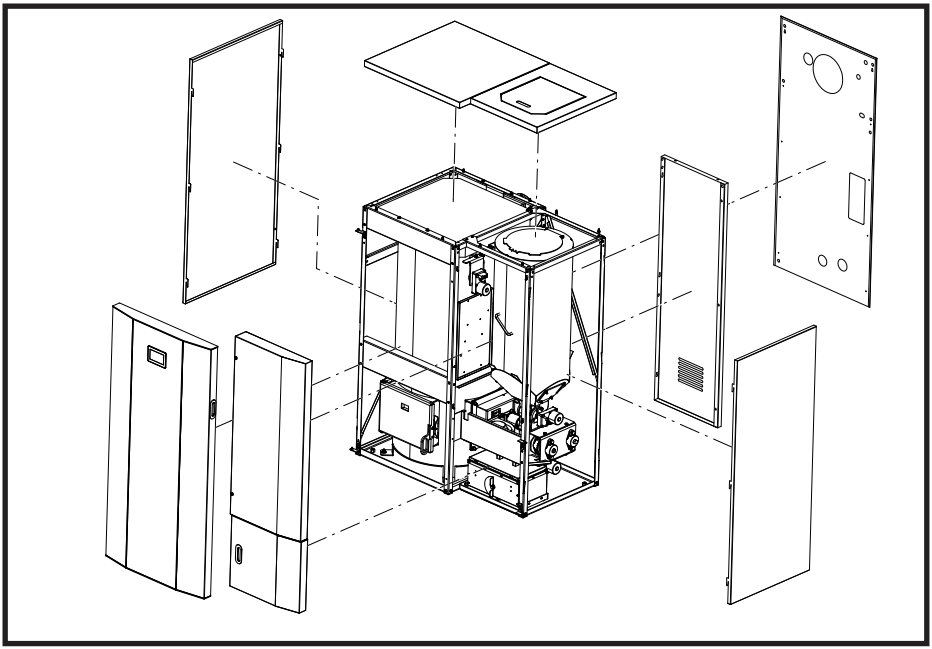
2. TECHNICAL DATA



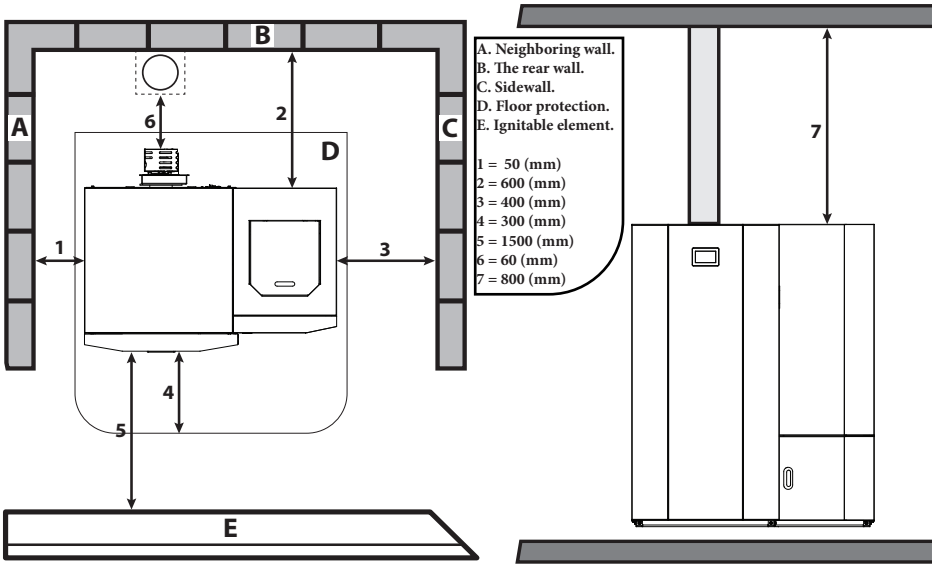


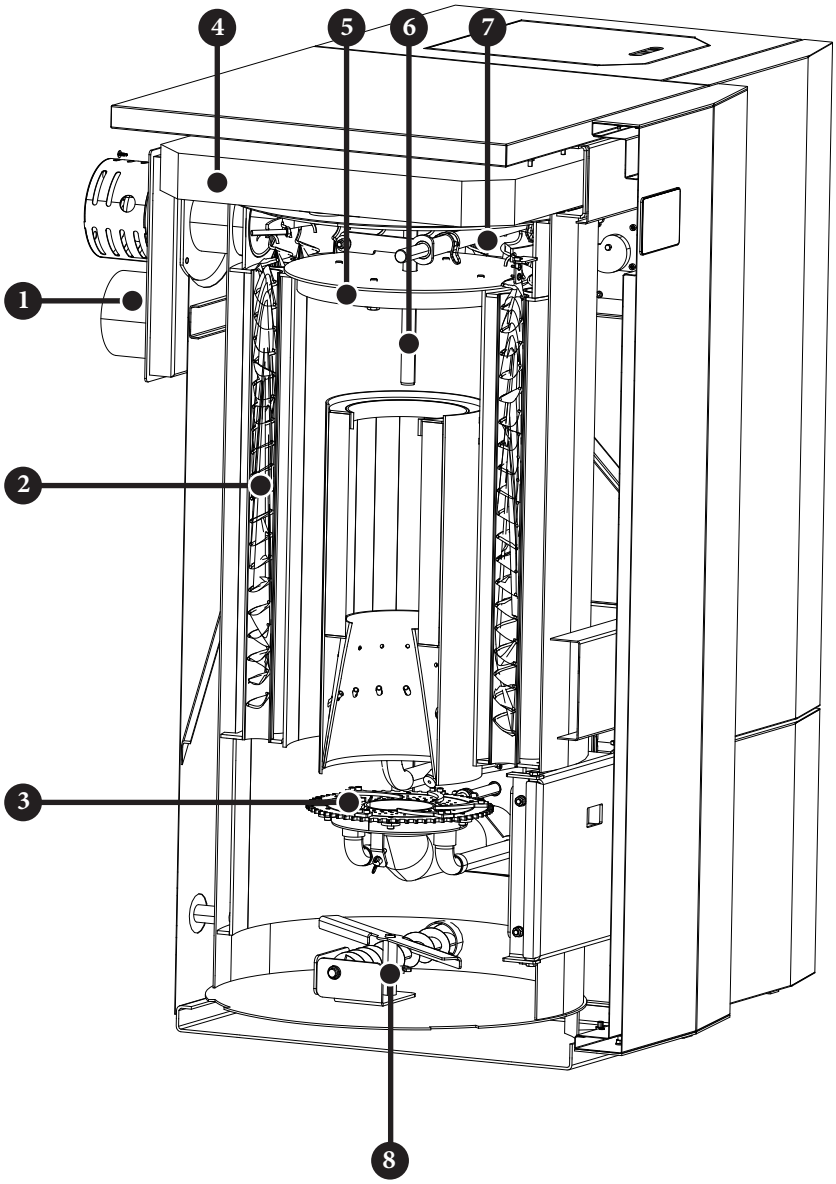


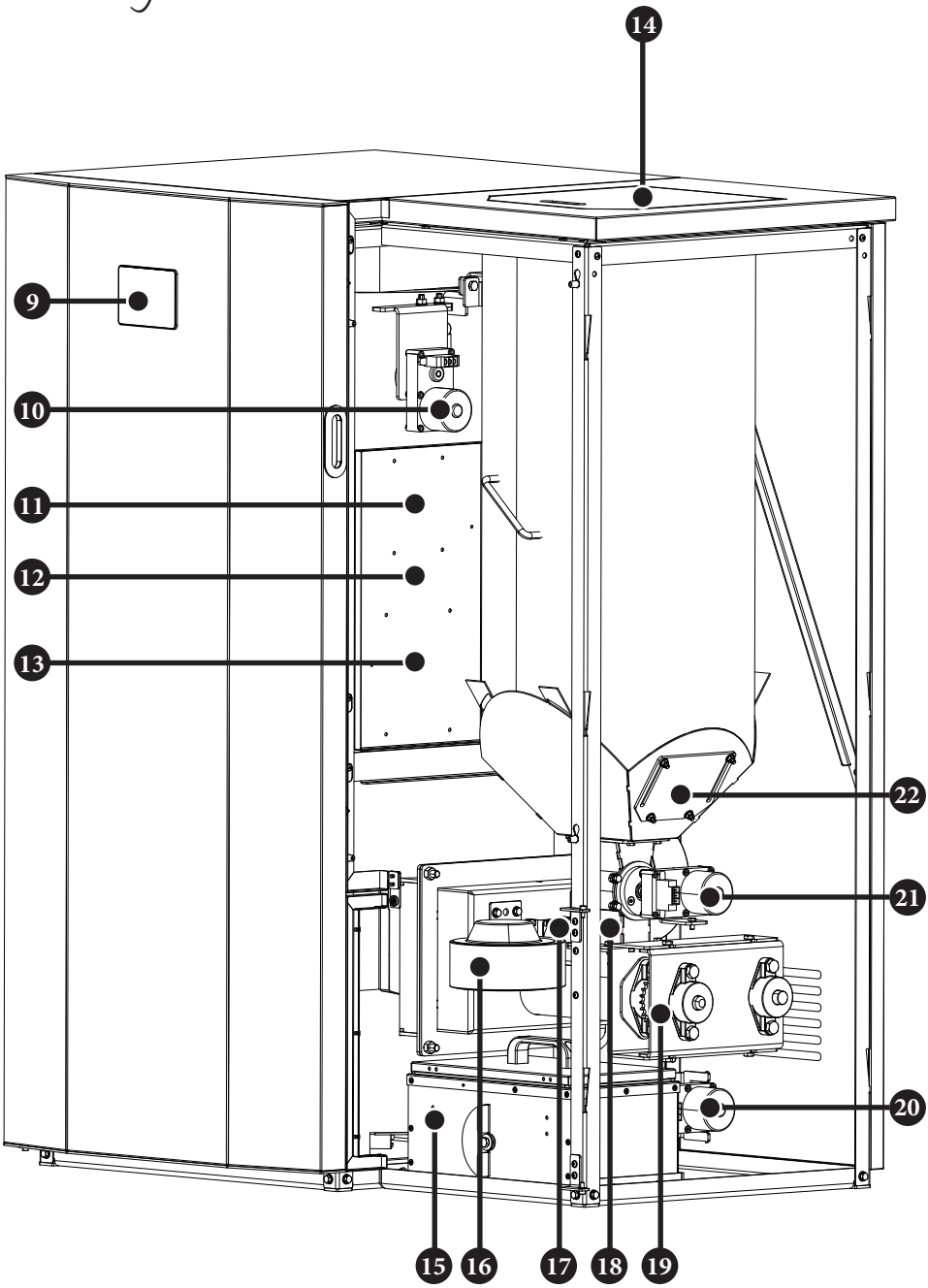
1	Boiler body	4	Pellet hopper
2	Ash box	5	Exhaust fan
3	Boiler burner		

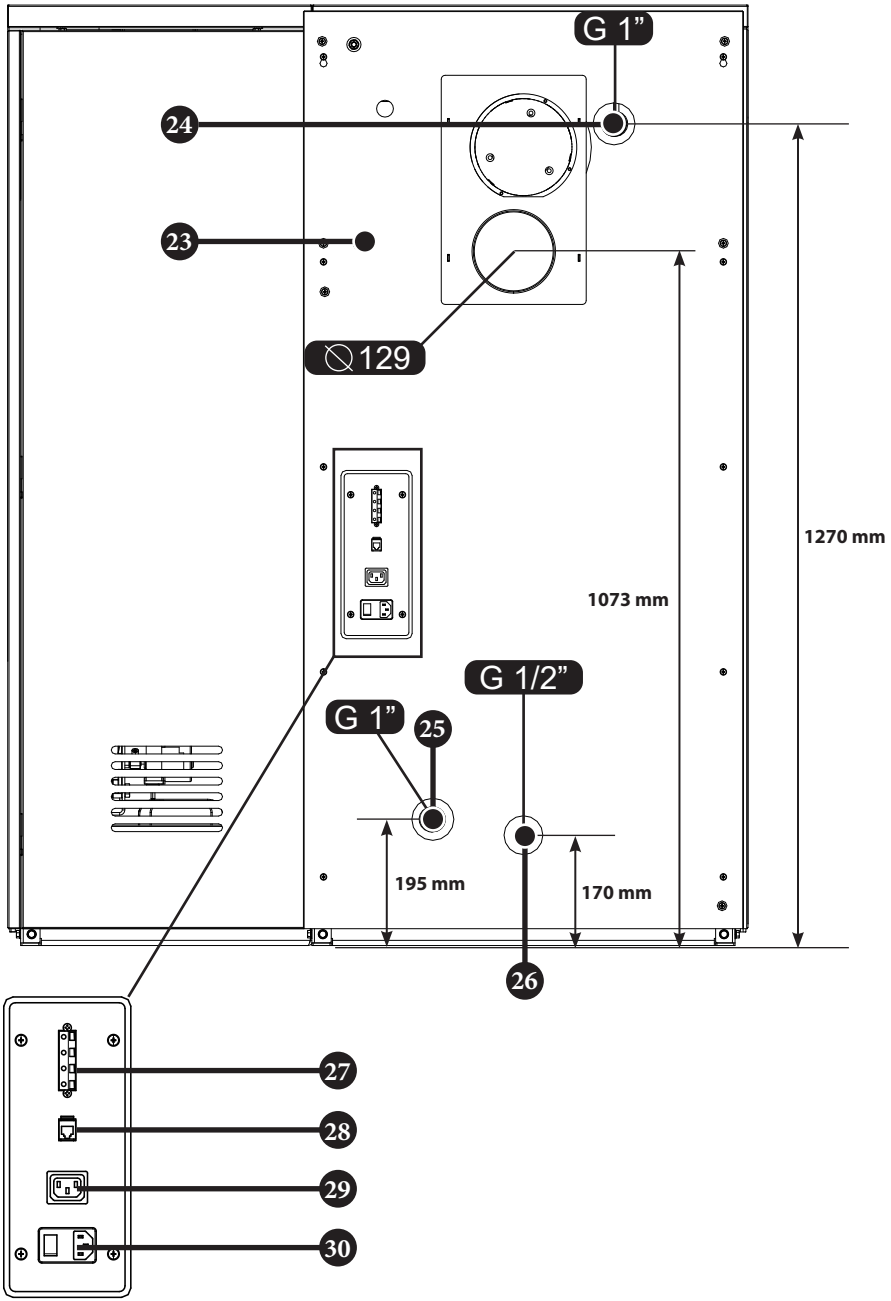


Maximum output	KW	18	24
Minimal output	KW	6	8
Heated area	m³	350	500
Pellet bunker volume	kg	60	60
Exhaust gas pipe	ϕ mm	80	80
Weight	kg	441	441
Weight + condensing unit	kg	511	511
Fuel type		Pellets Φ6-Φ8	Pellets Φ6-Φ8
The chimney draft	Pa	12	12
Electrical consumption	V/Hz	60/500	60/500
Electrical supply	V/Hz	230/50	230/50
Water jacket capacity	L	50	50
Working pressure	bar	0,5-2,0	0,5-2,0
Working at environment temperature	C	5-40	5-40
Humidity at 30° C environment temperature	%	85	85
Energy conversion efficiency	%	94	94
Energy conversion efficiency + condensing unit	%	99	99
Energy conversion efficiency + condensing unit (30 – 50 C)	%	106	106
Co Emissions	Mg/m3	<300	<300
Temperature of the flue gas	C	60	60
Max. water temperature	C	90	90




4
5
6
7
1
2
3
8


14
9
10
11
12
13
22
21
20
15
16
17
18
19


G 1”
24
23
⌀129
1270 mm
1073 mm
G 1/2”
G 1”
25
195 mm
170 mm
26
27
28
29
30

1	Exhaust Fan	16	Primary air fan
2	Combustion chamber spirals	17	Motor cleaning mechanism Burning pot
3	Burning pot	18	Secondary air fan
4	Thermal isolation combustion chamber	19	Auger Motor
5	Refractory plate combustion chamber	20	Motor cleaning mechanism Bottom
6	Combustion chamber temperature sensor	21	Auger Motor return flame protection
7	Combustion chamber cleaning mechanism TOP	22	Service door for pellet bunker cleaning
8	Combustion chamber cleaning mechanism Bottom	23	Water overheating safety
9	Touch screen display	24	Water outlet
10	Motor cleaning mechanism TOP	25	Water inlet
11	Lambda regulation	26	Water drainage connection
12	Vacuum regulation sensor	27	Buffer High / Low sensor
13	Main control-board	28	Service and diagnostics connection
14	Vacuum pump (Optional)	29	Circulation pump
15	Ash container	30	On / Off Switch (power supply 230 V)

3. ASSEMBLY

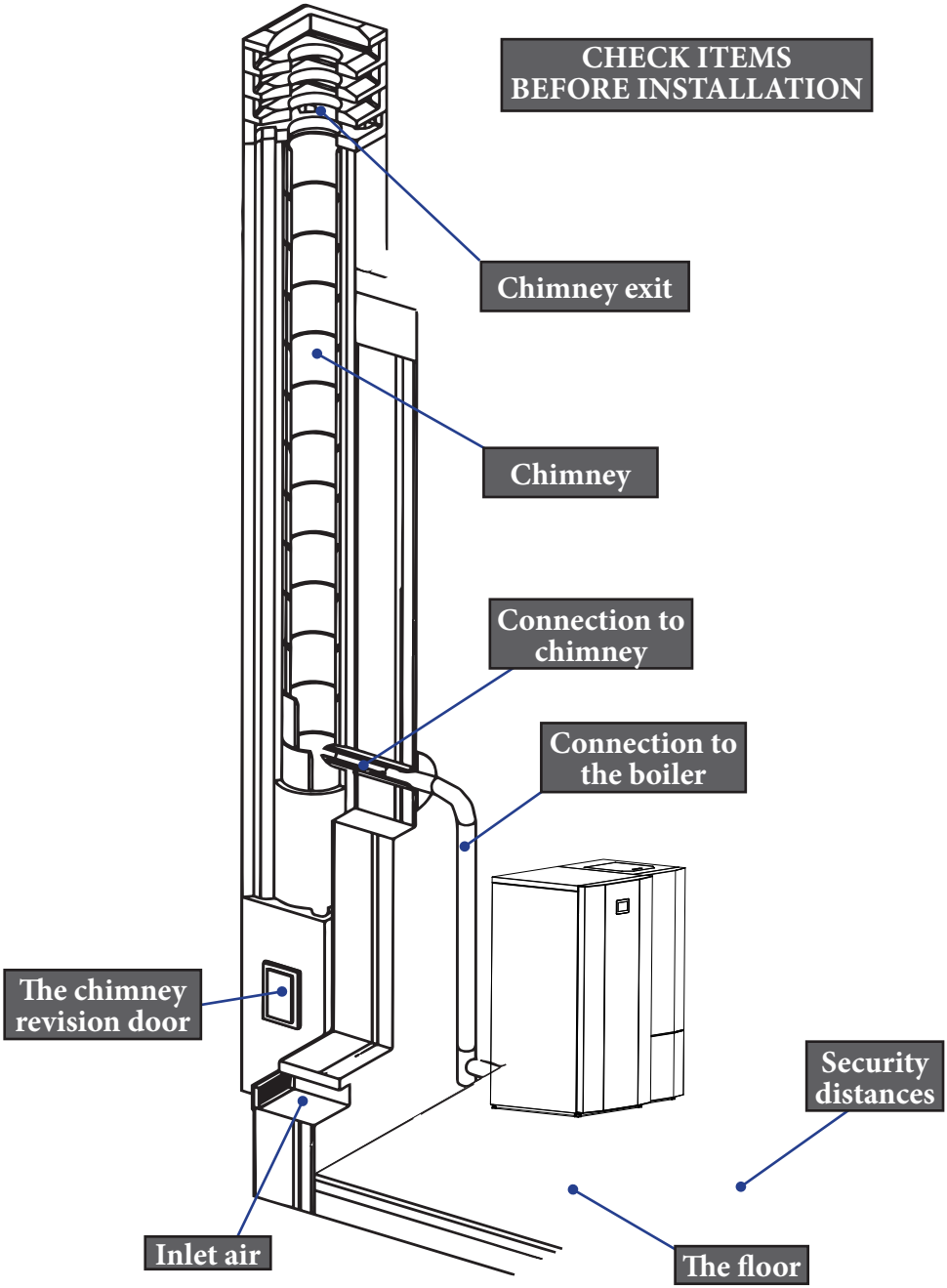
3.1 General conditions.

All national, regional and European requirements for safe operation of the appliance must be respected during installation and operation.Prior to installation, load capacity of the place where the boiler will be intended must be ensured. The weight of the boiler is specified in the technical data table.To ensure the correct and safe operation of the boiler, the following conditions must be met:

The installation of the boiler and its accessories must be carried out by authorized persons.The floor where the boiler is installed should be flat and horizontal, made of fire-resistant materials at least 1500 mm in front of the fireplace and not less than 400 mm on both sides and at the back of the wall.

Minimum distances from the wall to the boiler should be at least 400 mm. The minimum space in front of the fireplace should be 1500 mm. The minimal distance of the boiler from combustion materials should be no less than 1500 mm.The door of the fireplace should be closed tightly during the work process. Opening it during work is absolutely forbidden.When installing the boiler, the connections between the individual pipes and the chimney rooftop must be dense.

When the fire is first ignited, a smell occurs as a result of the paint being heated.
The fireplace is painted with heat-resistant paint, which achieves its ultimate resistance after repeated use of the boiler. THEREFORE KEEP OUTSIDE INTERACTIONS WITH THE COATING TO A MINIMUM in order not to damage it.


CHECK ITEMS BEFORE INSTALLATION
Chimney exit
Chimney
Connection to chimney
Connection to the boiler
The chimney revision door
Security distances
Inlet air
The floor

3.2 Basic rules and prescriptions.

The boiler with water jacket operates on water heating boiler principle.
The advantage of this type of heating system is the maximum utilization of the heat that is produced during the combustion process. With this method the heat from the combustion chamber is taken to remote and hard to reach for a normal heat exchange premises in order to maintain an even temperature and warmth comfort.

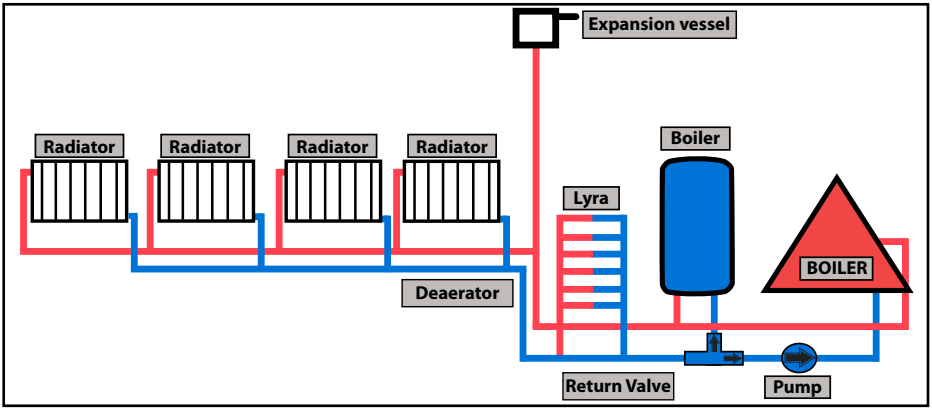
- Ensure that every branch and element of the installation is airtight at every single moment of its exploitation.
- All elements of the installation must be protected from freezing, especially if the enlarging pot or other parts are situated in non-heated premises.
- The circulation pump can be chosen by the capacity required by using the following formula:

G=0,043. P , (m^3/h), in which:
P, kW is the heat output of the water jacket. The circulation pump can be turned on and off by the means of a thermostat in combination with an electric switch.

- The first service cleaning of the pump's filter must be done immediately after testing the installation.
- If an old installation is going to be used it must be washed several times to ensure the removal of any accumulated dirt on the surfaces of the water jacket.
- Do not drain the circulating water of the installation during the non-heated season.
- Chemical treatment of the circulating water is not recommended.

"Mareli Systems" provides a warranty and out of warranty service and replacement of the water jackets. The warranty is not valid in case of a boiler with a swollen water jacket which is a result of pressure increase in the system and improper connecting. The water jackets are tested under pressure of 400 kPa (4 bar).

It is recommended that the assembly is performed by an authorized specialist.

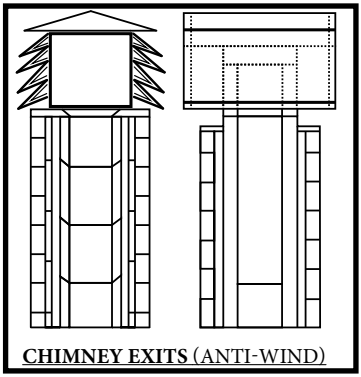


3.3 Assembly of the duct components.

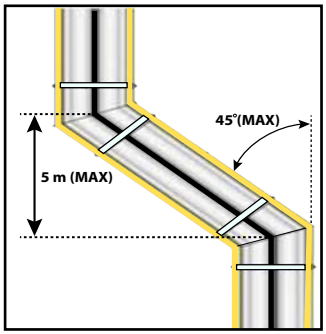
Duct components and pipes

For the assembly of the duct pipes the use of non-flammable materials, resistant to the flammable products and condensation is obligatory. The assembly must be performed in such a manner so it guarantees the airtight sealing and prevents condensation. If possible, avoid adding horizontal sections. Direction shift is done by using knee joints with a max angle of 45˚.
For heating devices equipped with a smoke ventilator, i.e all of the "MARELI" boilers, the following instructions must be observed:

- Horizontal sections must have a minimum incline of 3° upwards;
- The length of the horizontal sections must be as short as possible, but without exceeding 3 m;
- More than four direction shifts are forbidden, including the cases where a T-shaped element is used;
- The duct components must be airtight and to be insulated if extending outside the premises in which the fireplace is installed;
- The duct components must allow a soot cleaning;
- The duct components must have a constant section. A section change is allowed only in the chimney joint;



CHIMNEY EXITS (ANTI-WIND)



Chimney

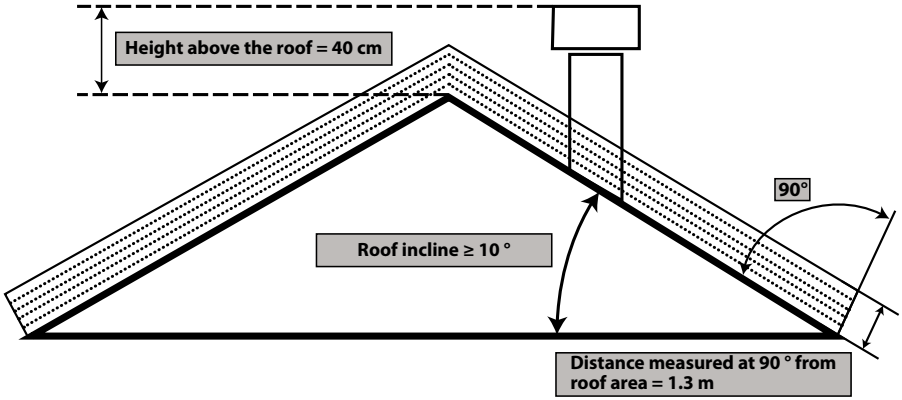
The chimney or the duct component must conform with the following requirements: to be airtight, waterproof and properly insulated, to be constructed with materials resistant to the normal mechanical wear and to the heat coming from the combustion products and condensation.

The chimney must be built out off a stainless steel material resistant to the aggressive action of temperature and combustion products.

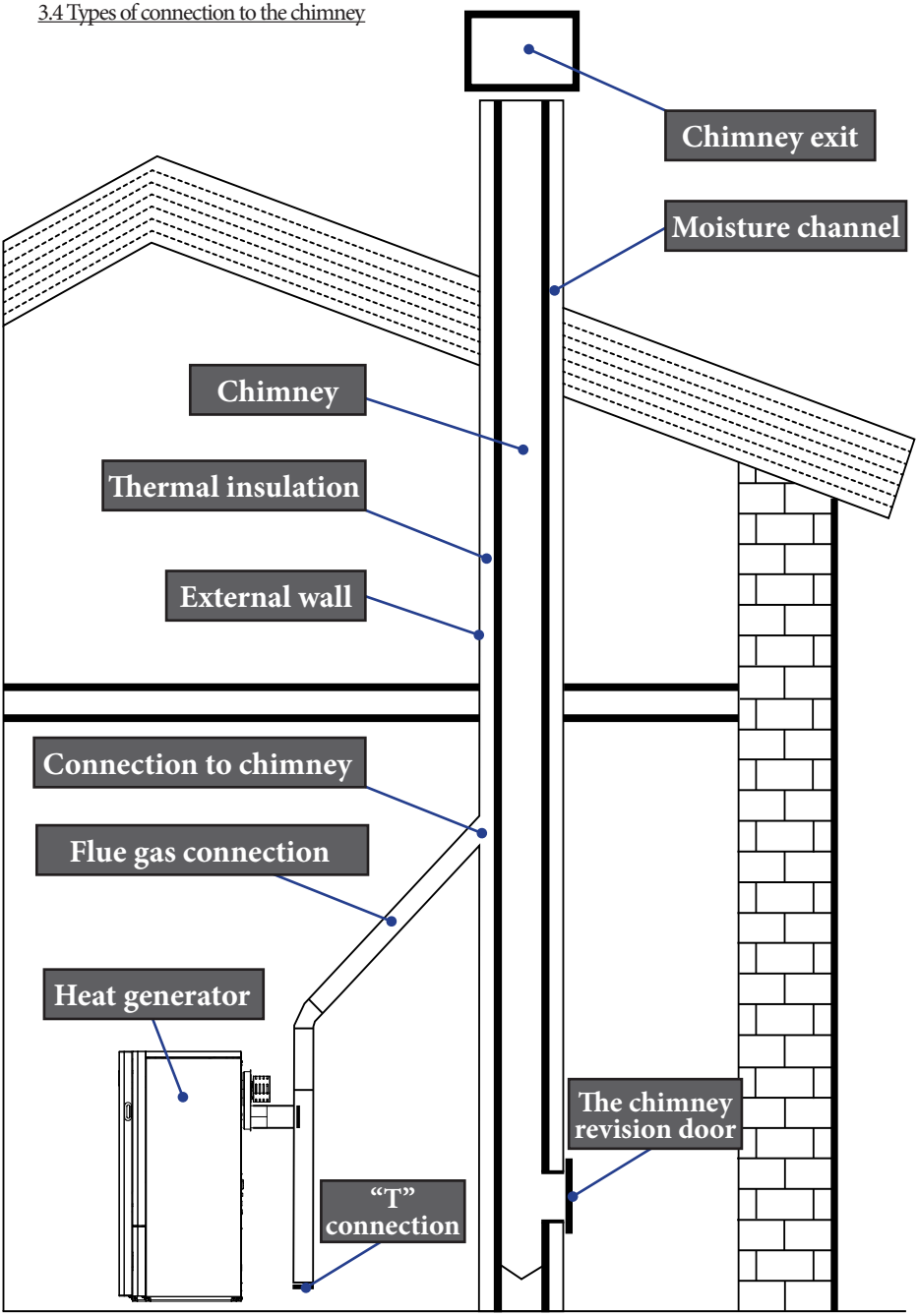
- To be kept away from flammable materials.

The recommended chimney draft at work - from 12-20 Pa.

Attention!!! In case of a fire hazard turn off the product from the display. This will stop the oxygen flow to the product.



3.4 Types of connection to the chimney



Attention!!! In order for the product to function efficiently the chimney must be built out of a stainless steel material resistant to the aggressive action of temperature and combustion products.

3.5 LAMBDA PROBE KIT

As an option, a lambda probe can be installed on the ECOPELLET STAR boiler.

The Lambda system improves the quality of combustion through the analysis of the exhausting smoke.

The system controls the devices regulating combustion, keeping it within optimal set-point parameters, by managing both secondary post-combustion and primary combustion.

3.6 VACUUM SENSOR

The Vacuum sensor is installed on all the ECOPELLET STAR boiler.

It's main function is to regulate the air pressure in the combustion chamber. Thus, the optimal conditions for best combustion are respected and maintained. In the cases when the chimney draft is no longer sufficient the vacuum sensor compensates for this by increasing the RPM of the exhaust fan.

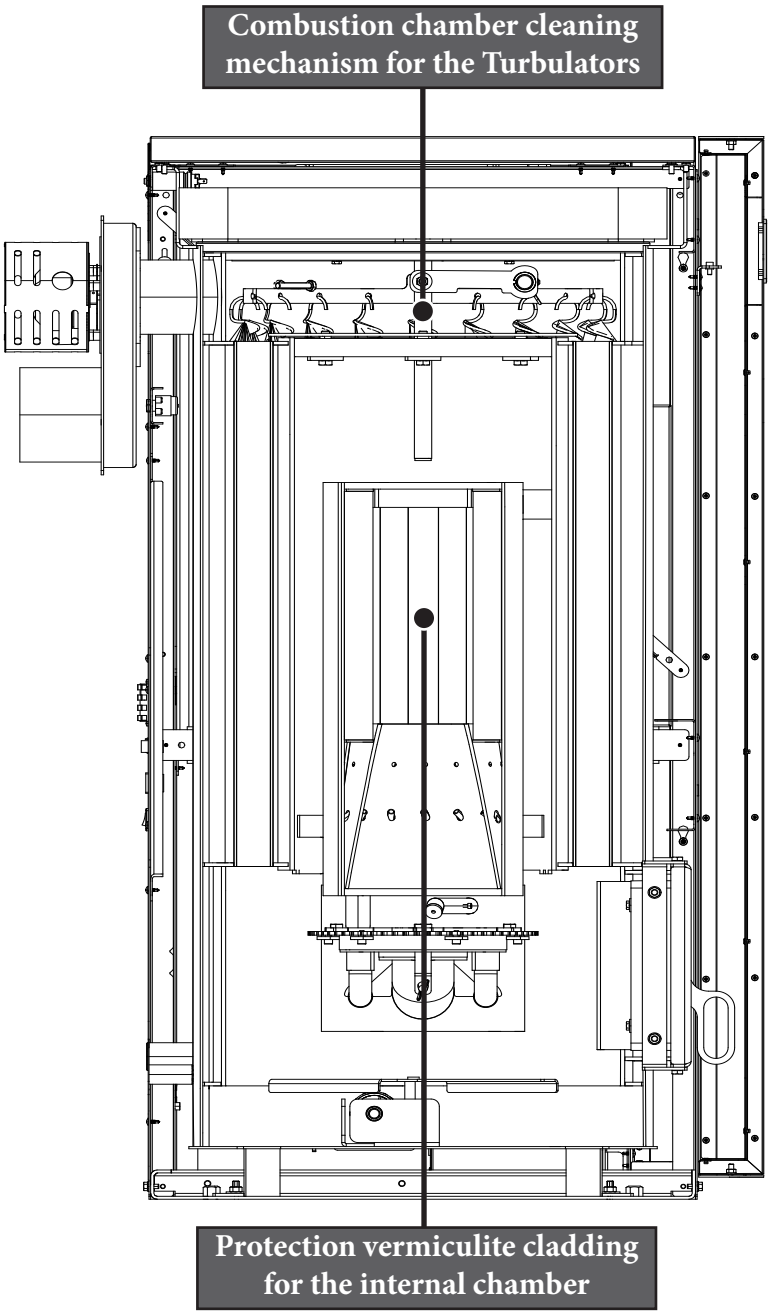
4. Cleaning

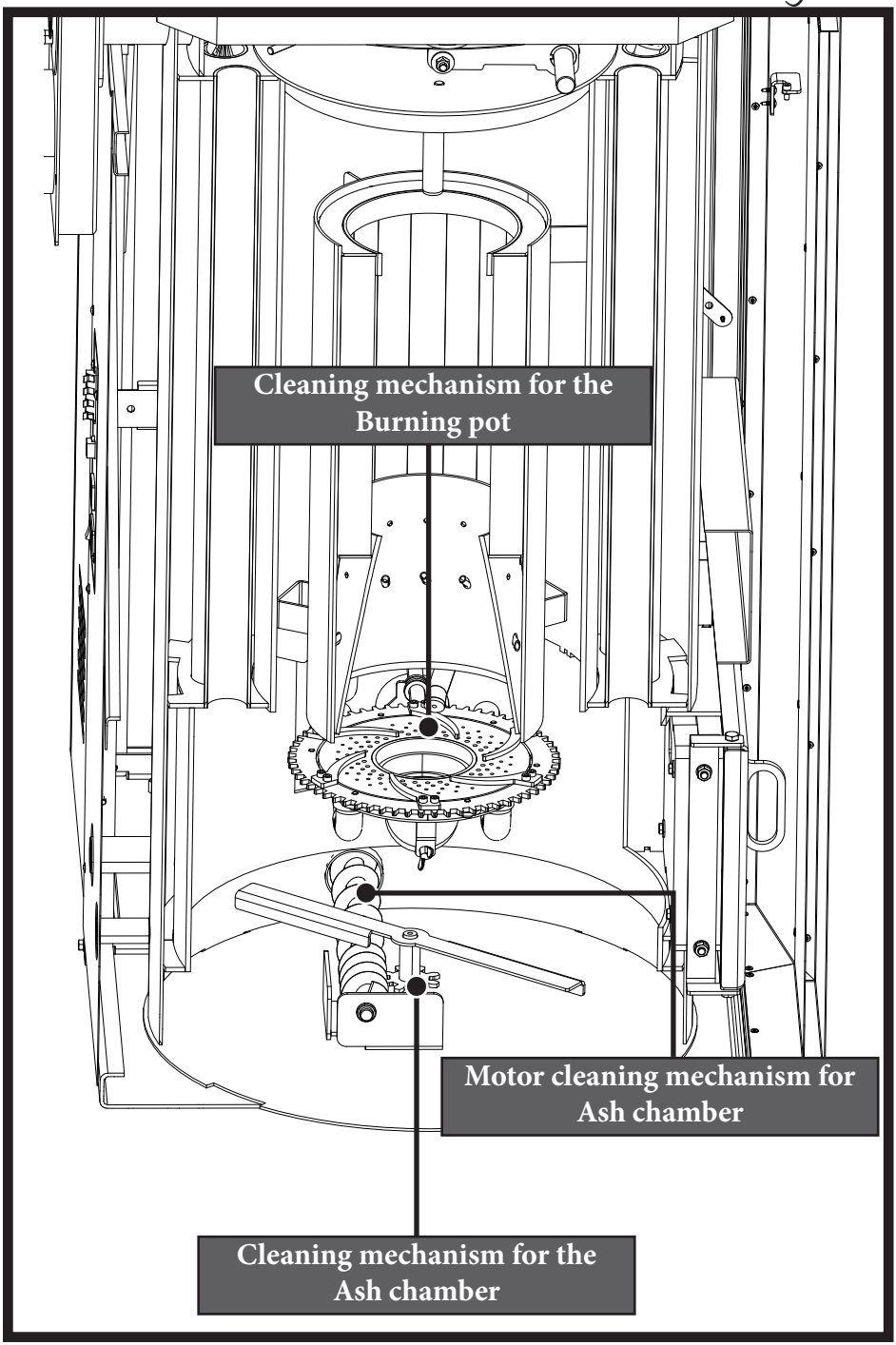
Cleaning the fireplace should be done only when cold. The cleaning of the combustion chamber must be carried out daily.

For this purpose, make sure the fireplace has ceased operation and is completely cold. Pull up the combustion pot and remove it from the boiler and then clean it from soot.

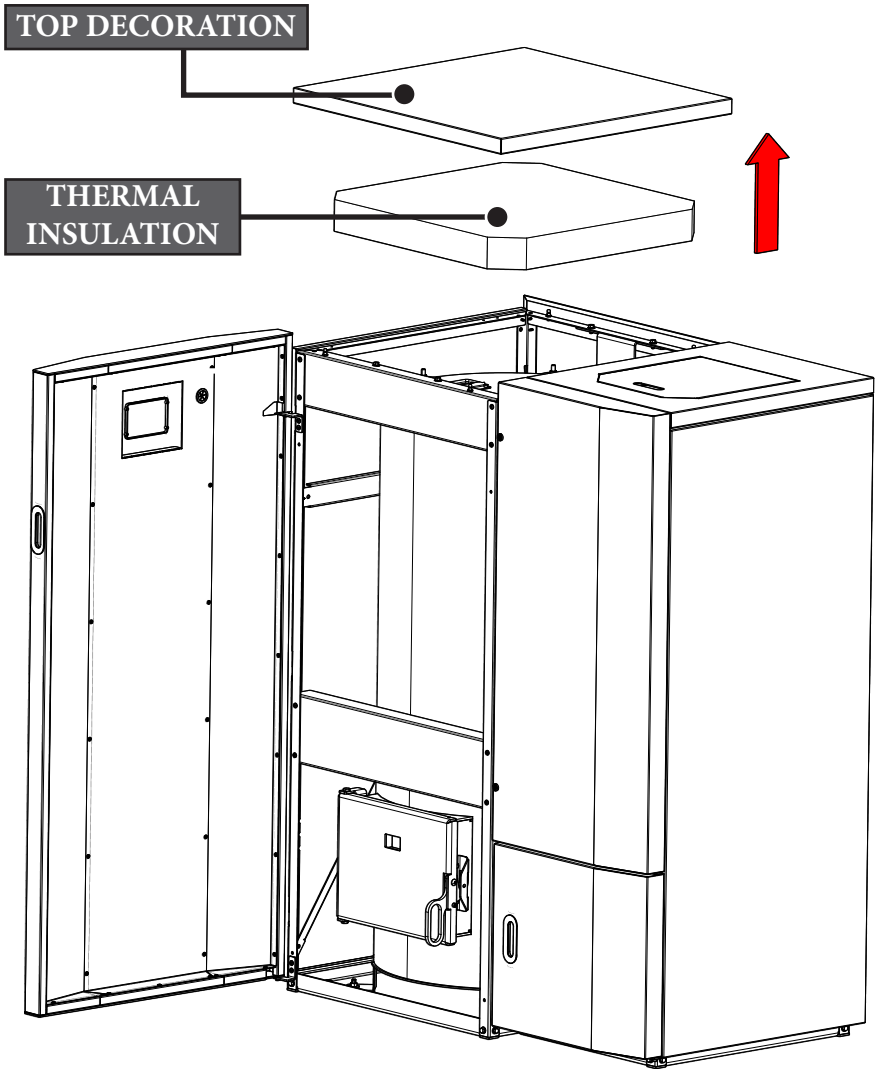
When removed fuel pot at the bottom of the combustion chamber opens a hole designed for the accumulated ash. Collect ashes in the ashtray and return fuel pot in place and then close the door. The fireplace is ready for operation.

Cleaning of flues and chimneys are conducted once every 1.5 tons of fuel used


Combustion chamber cleaning mechanism for the Turbulators
Protection vermiculite cladding for the internal chamber

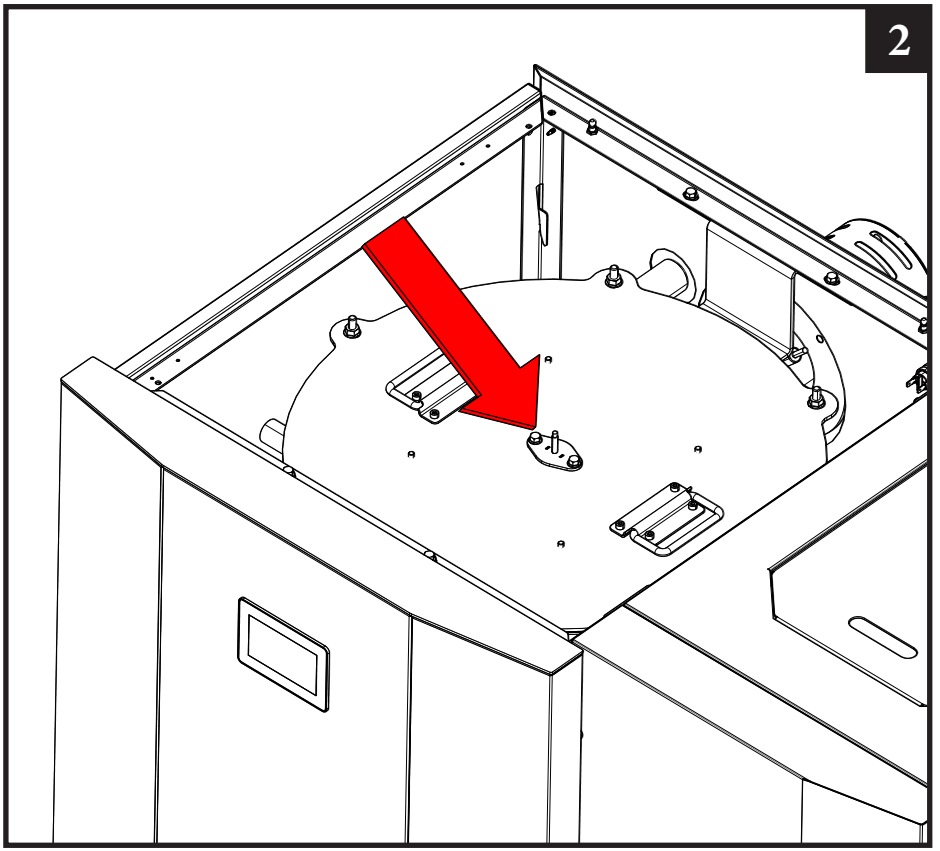

Cleaning mechanism for the Burning pot
Motor cleaning mechanism for Ash chamber
Cleaning mechanism for the Ash chamber

PROCEDURE FOR SERVICING THE BURNING CHAMBER



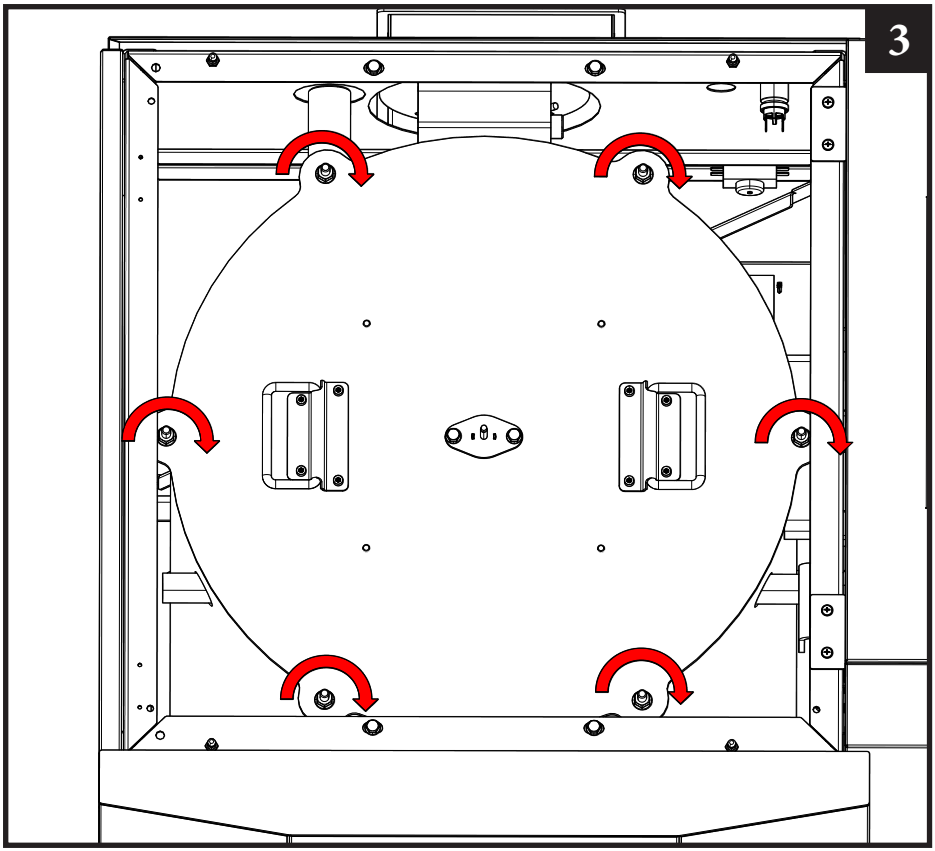
1

Remove the top decoration in order to access the top door of the burning chamber.



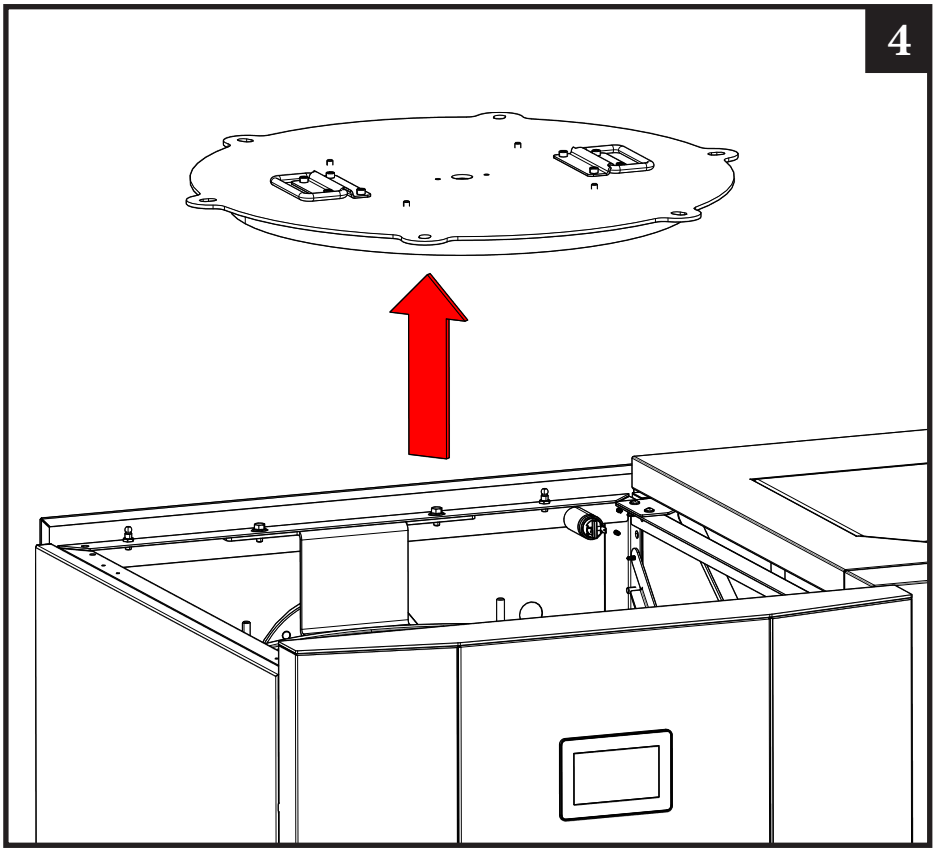
2

Remove the sensor for measuring the temperature inside the burning chamber.



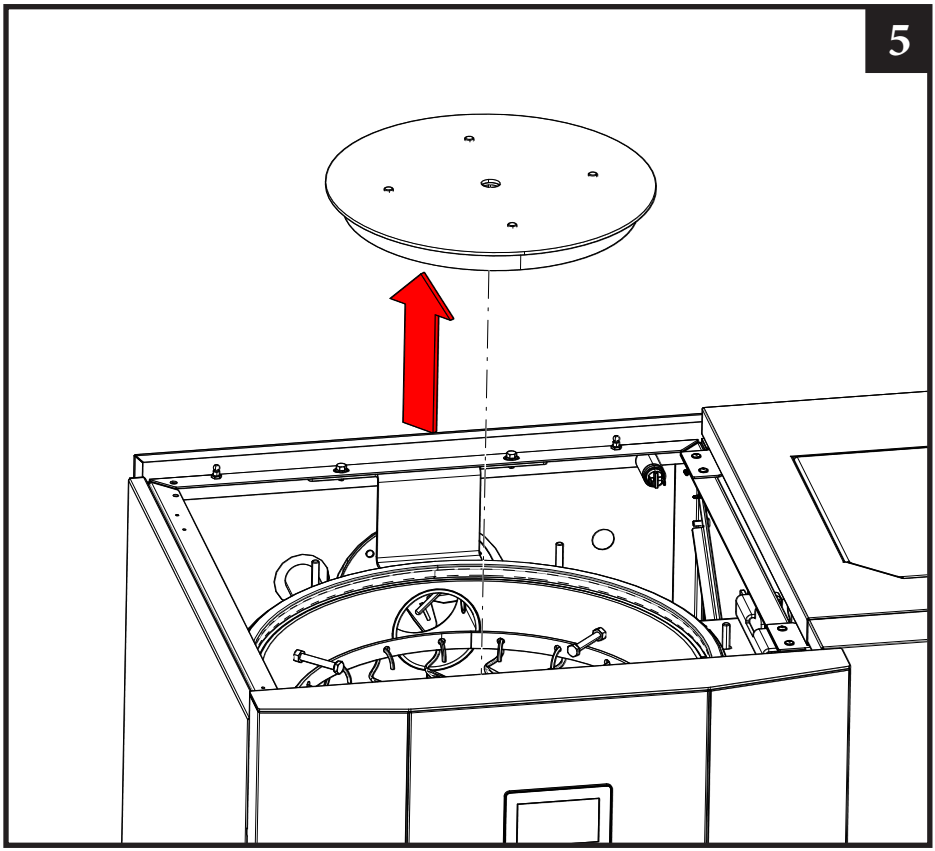
3

Remove the scrwos from each side of the combustion chamber door.



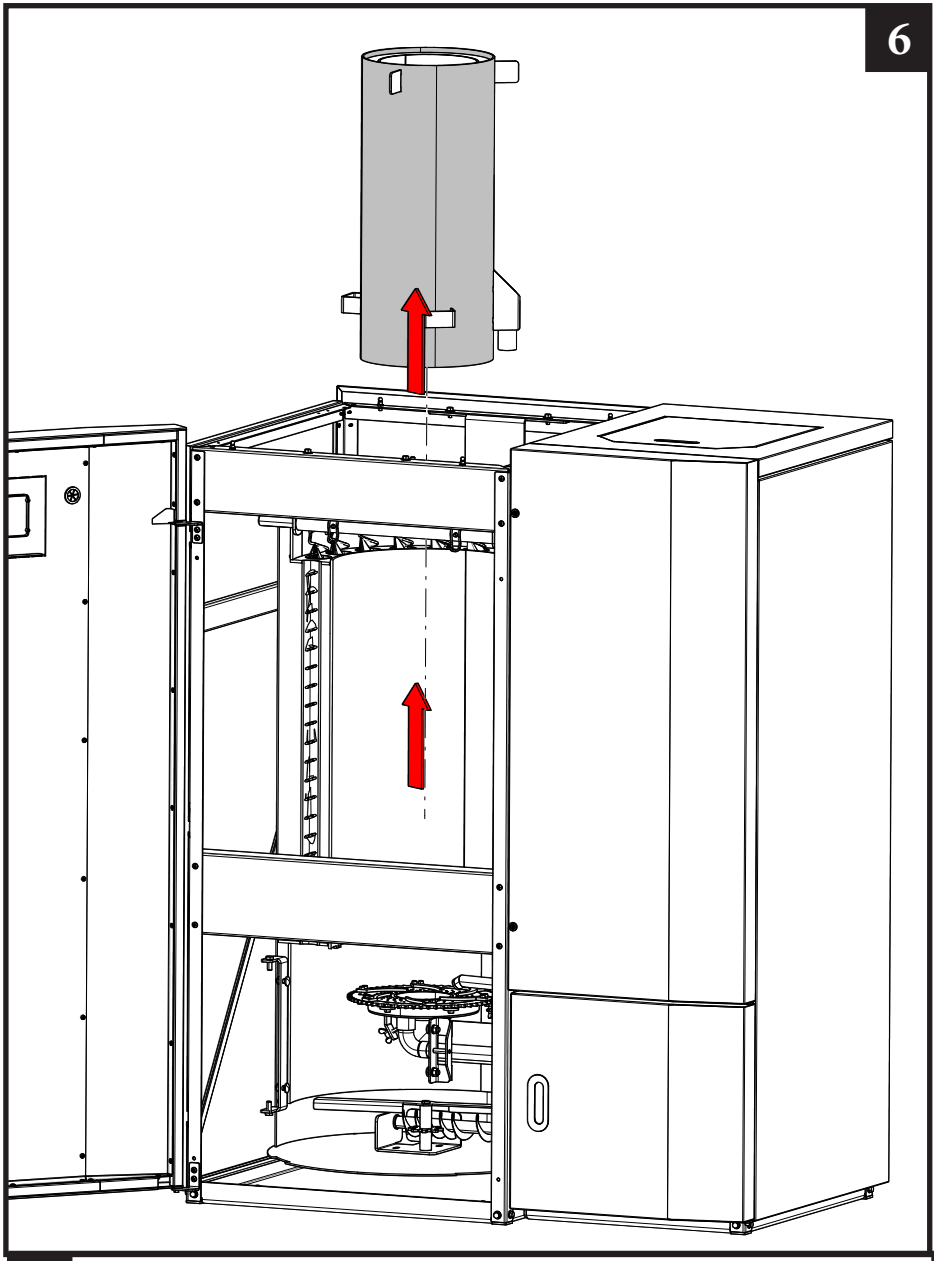
4

User the 2 handles in the center to remove the combustion chamber door. Here you have access to the automatic cleaning mechanism for the turbulators.



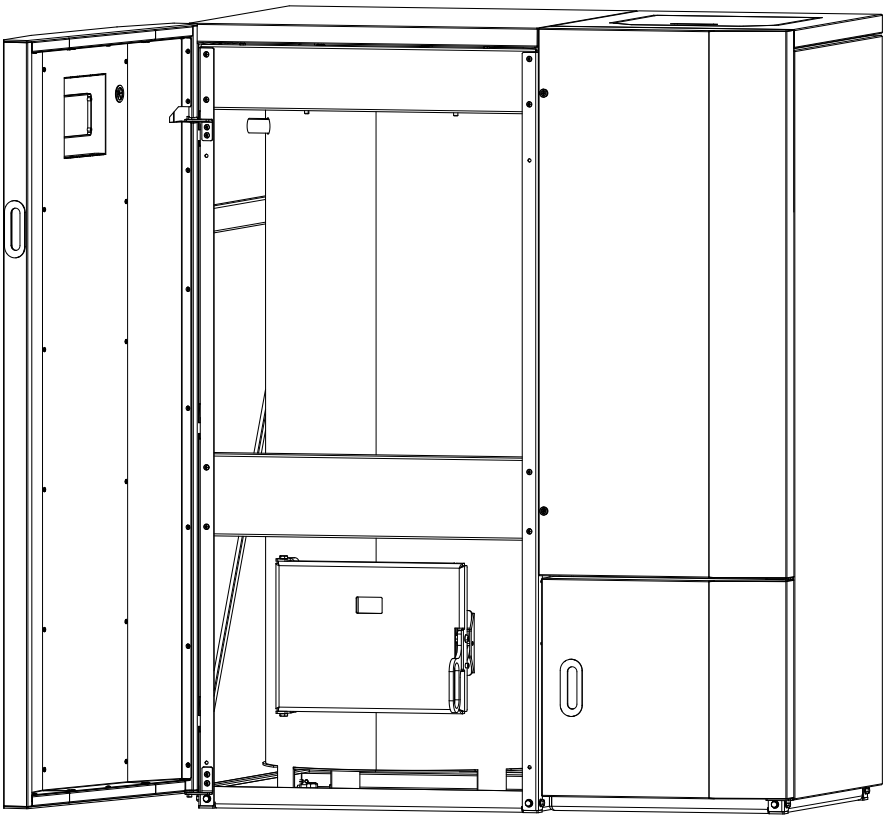
5

In order to access the main combustion chamber simply remove the inner-combustion chamber door.



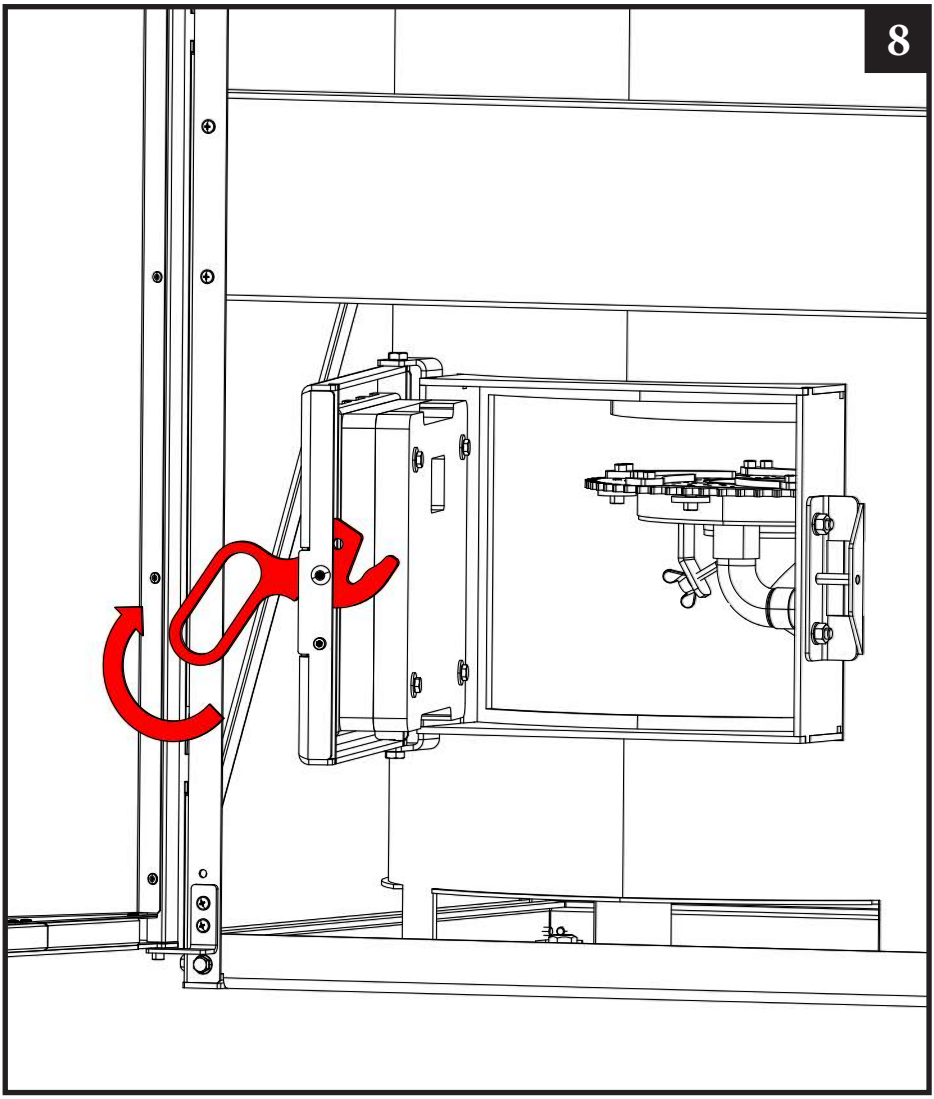
6 In case of maintenance you can remove the main combustion chamber by picking-up from the sides.

7



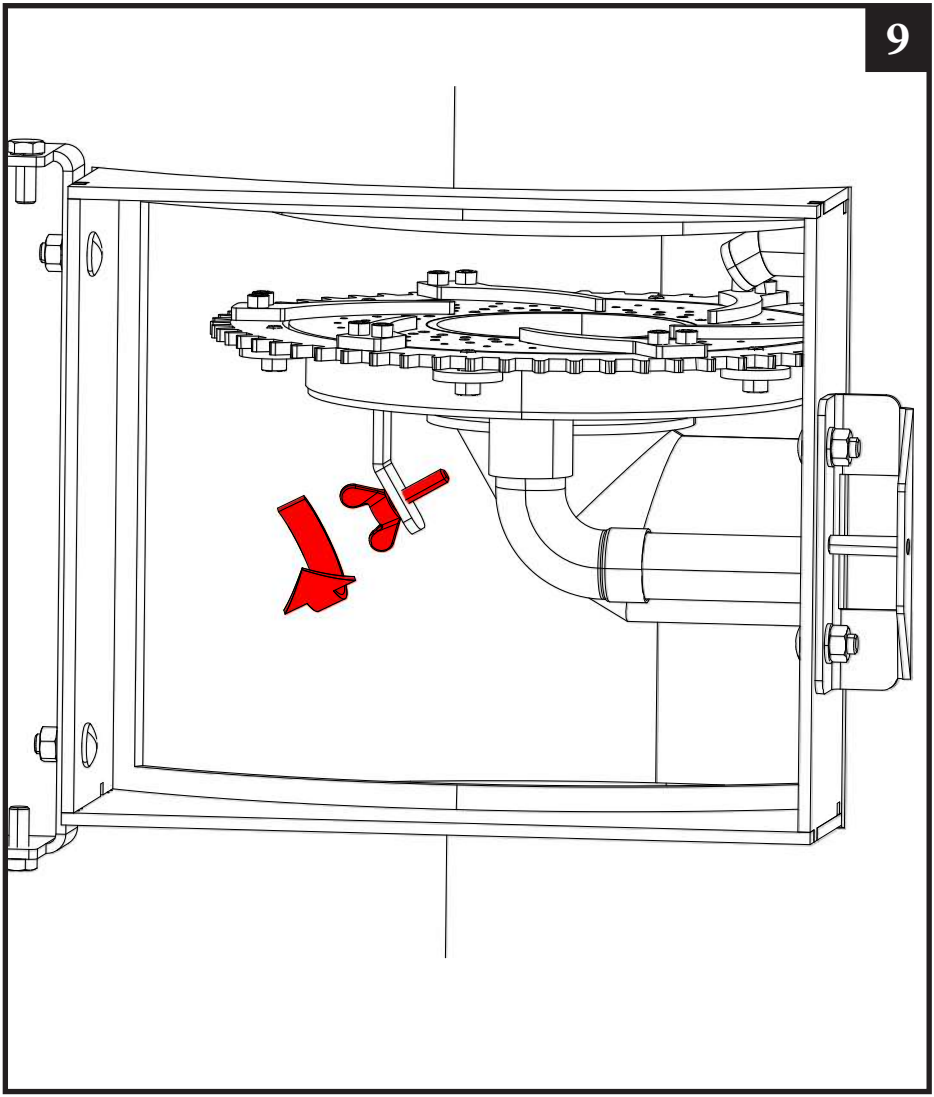
7

In order to access the lower combustion chamber open the exterior decorative door.



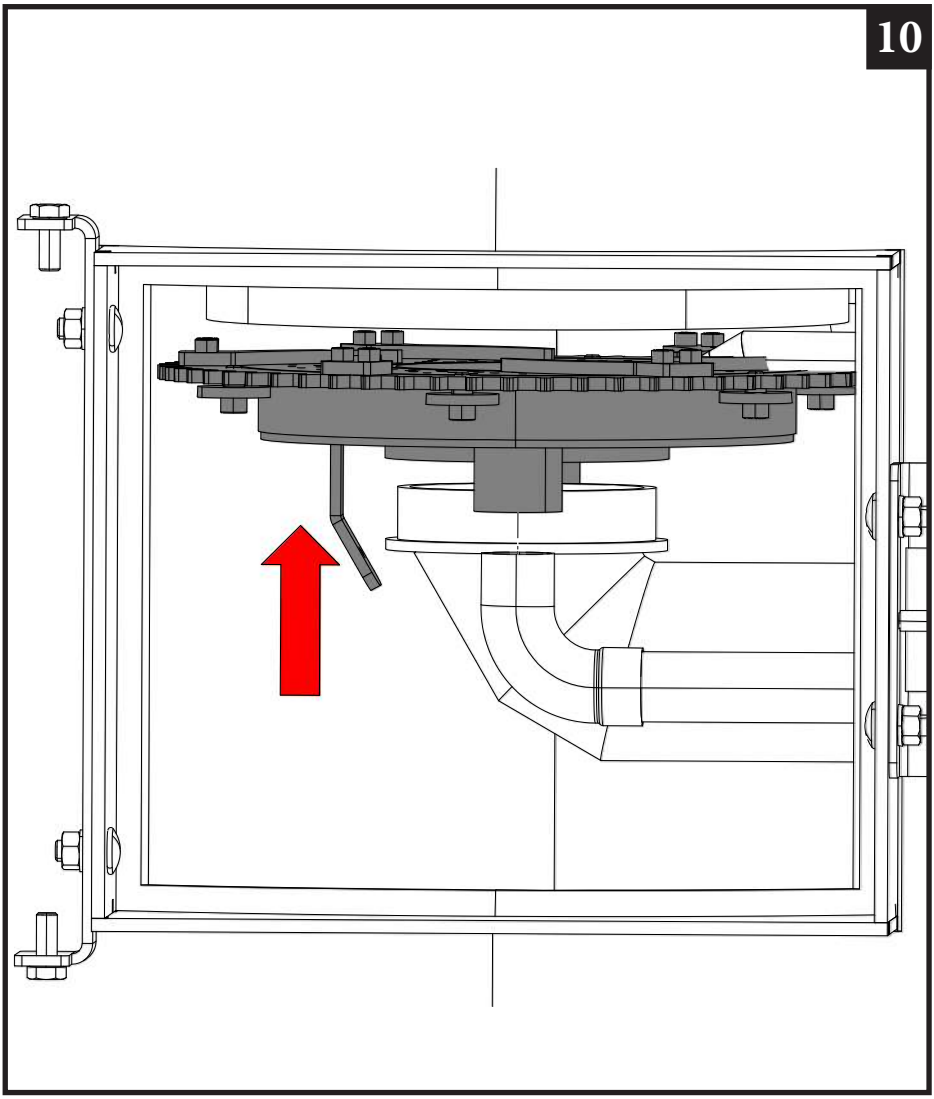
8

In order to access the lower combustion chamber open the interior door by pulling the lever in an upward manner.



9

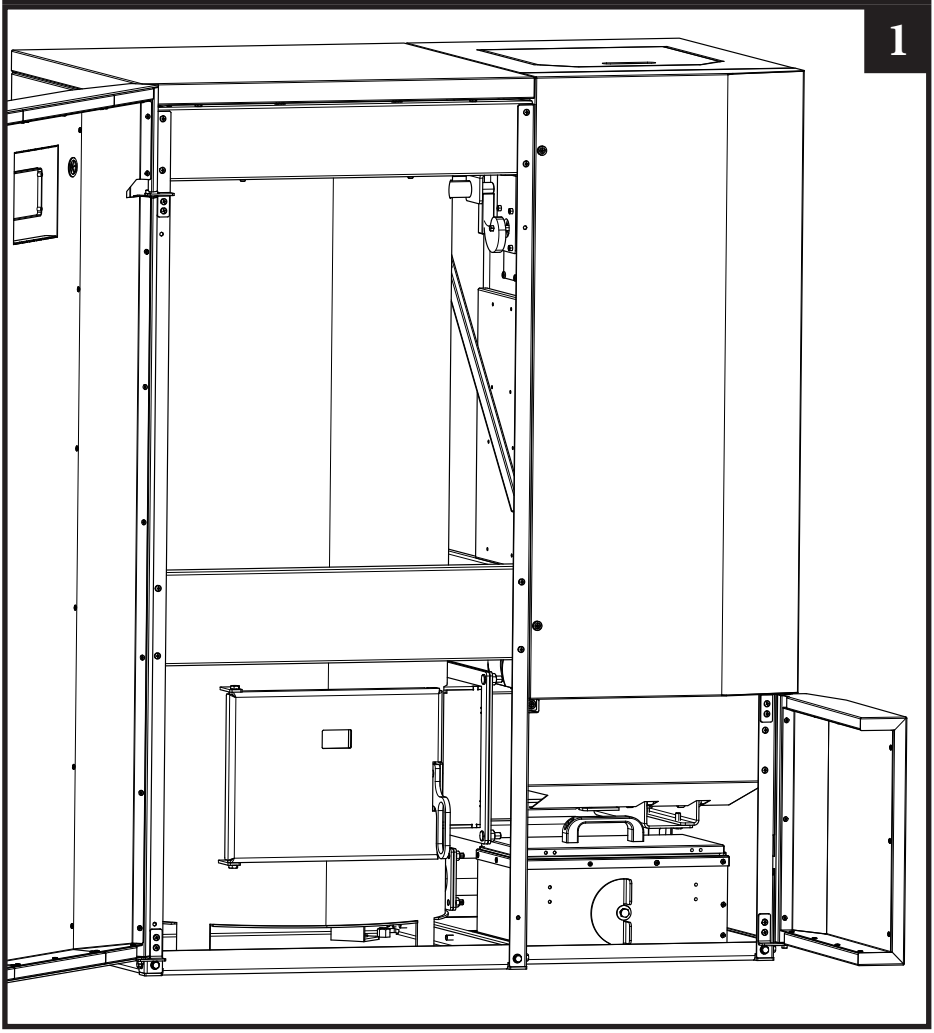
Remove the screw in order to free the combustion pot and it's cleaning mechanism.



10

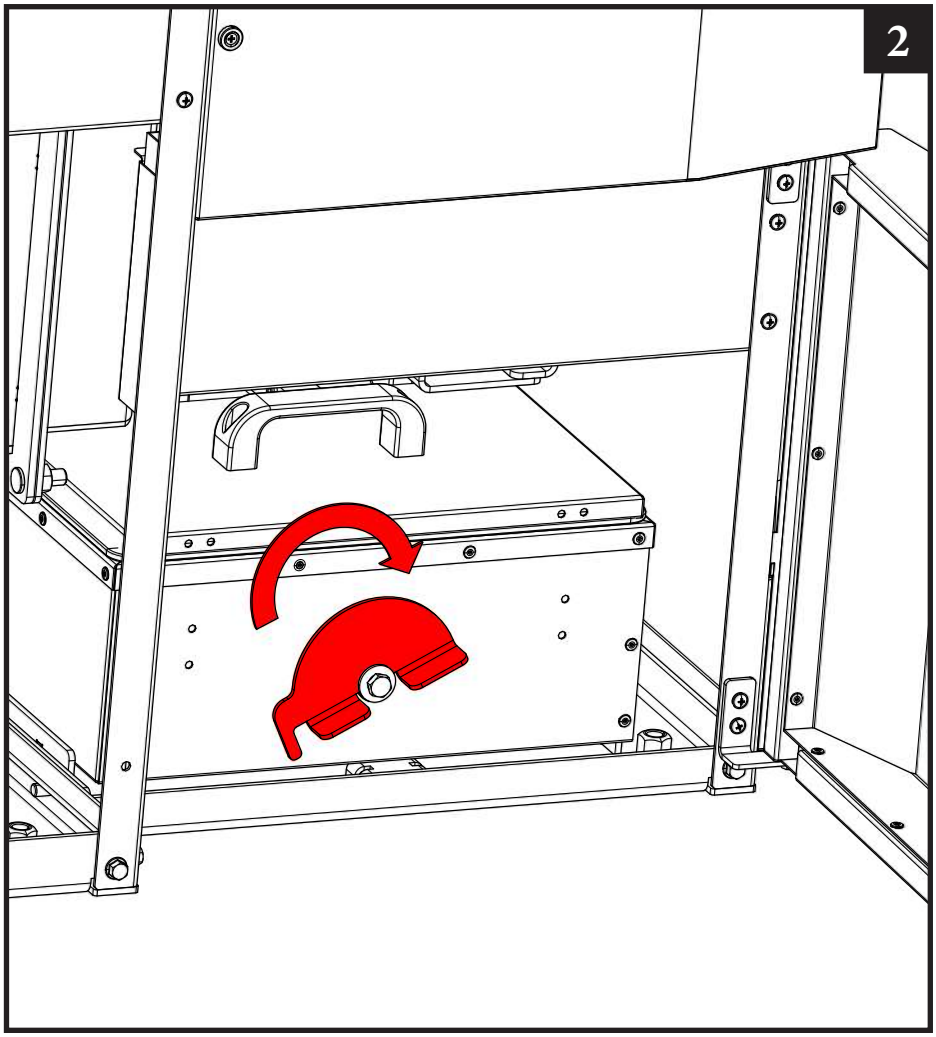
Once the holding screw is removed the combustion pot unit can be easily accessed for maintenance.

PROCEDURE FOR CLEANING THE ASH CONTAINER



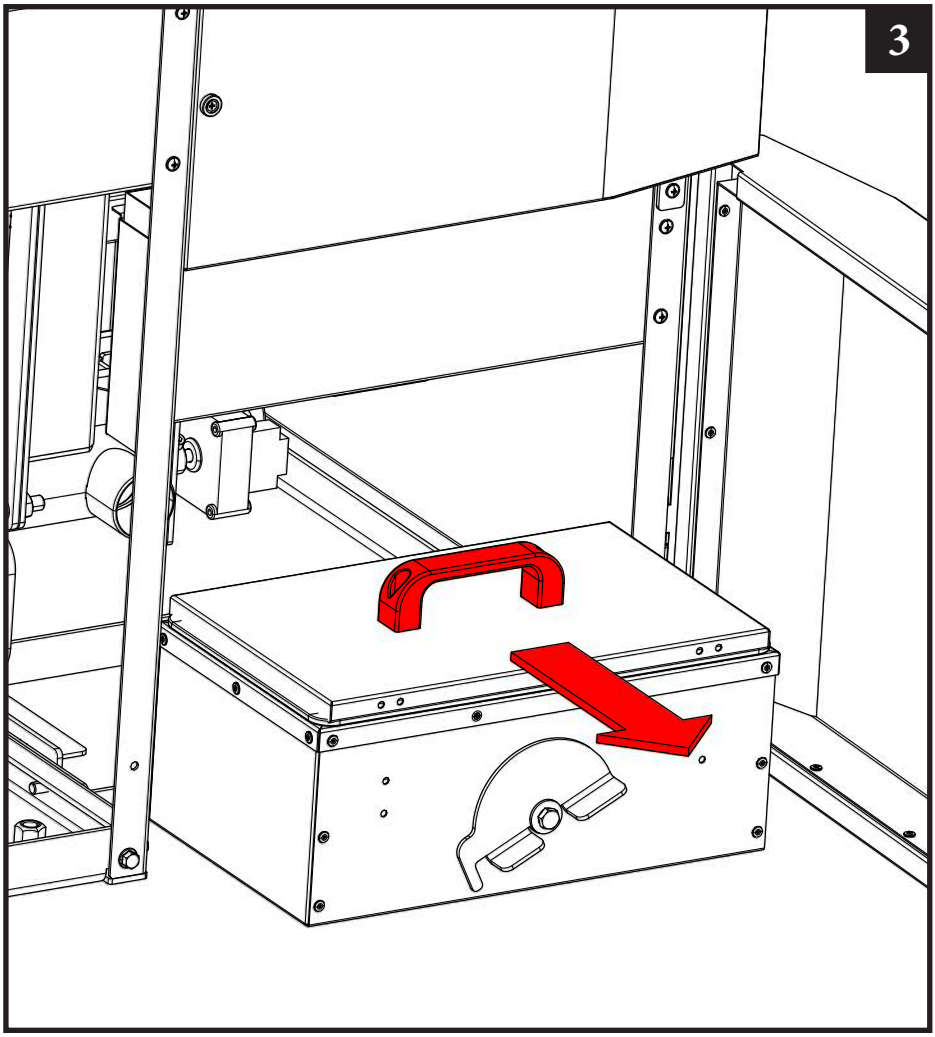
1

1. Open the main boiler door.
2. Open the bottom right decorative door



2

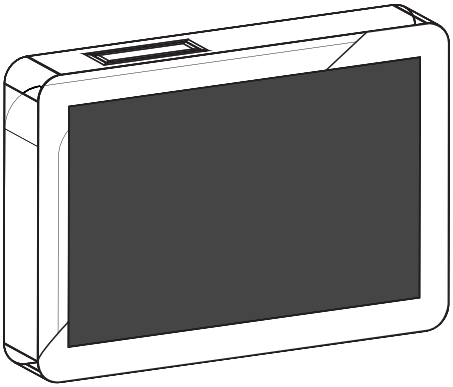
Turn the lever to free the ash container.



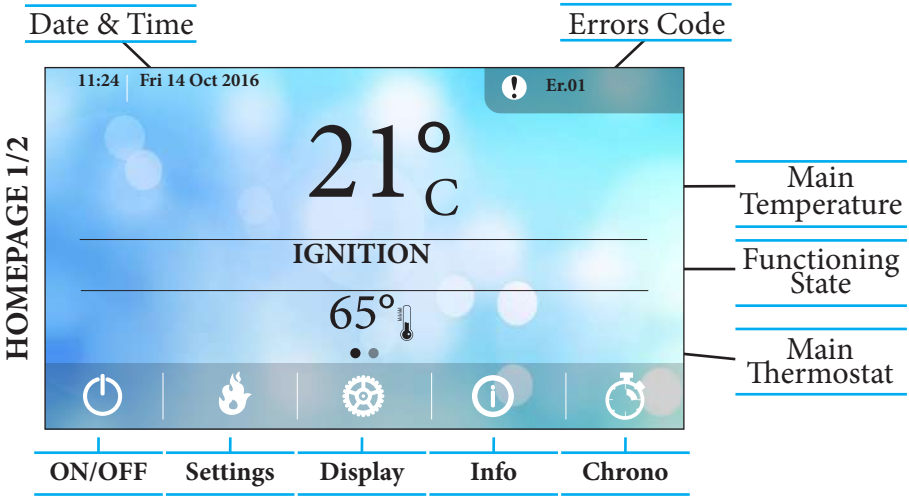
3

Pull the handle of the ash container to move it to an area dedicated for the ash disposal.

K400 TOUCH SCREEN DISPLAY



1. HOMEPAGE



Main Commands

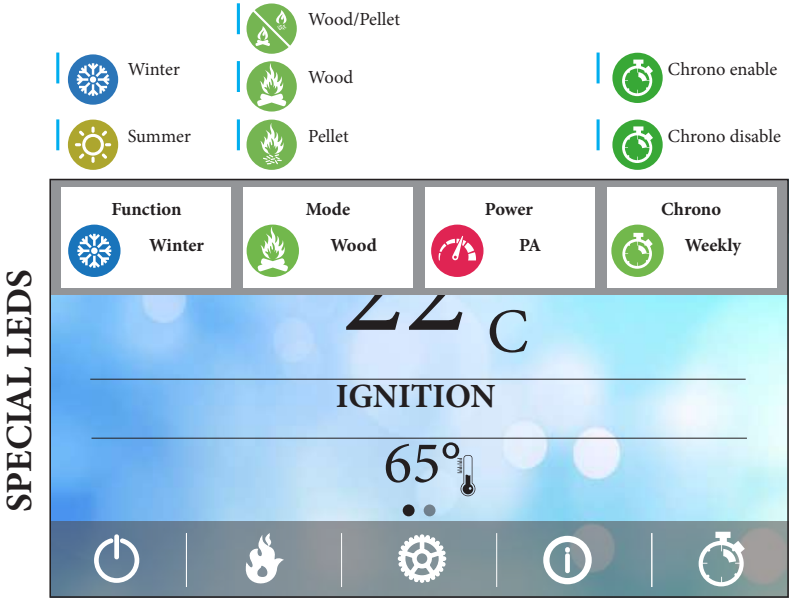
In order to go to Homepage 2 a horizontal swipe must be performed to the right side of the screen.

HOMEPAGE 2/2

System activity LEDS

The Quick visualization of the system main function is accessed through a vertical swipe to the top side of the screen.

SPECIAL LEDS



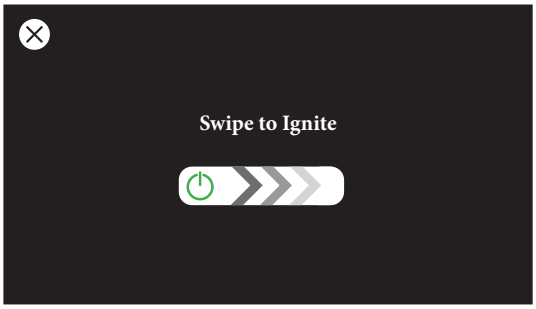
Quick visualization of the system main function

2. ERROR LIST

Blocking or non-blocking error is highlighted with a ! and the related error code. When pressed the error window opens

By clicking on (i) you can see the errors stored by date / time and description

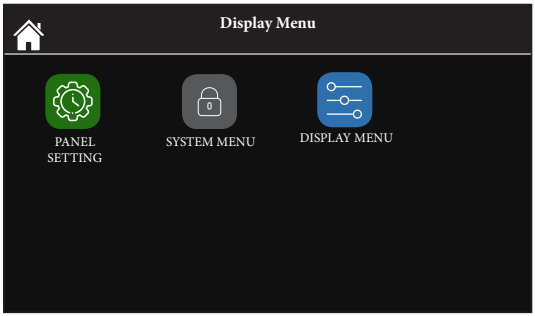
When this message is on screen this means that the product is in blocking mode and you can remove the error. You can do this by swiping to the right in the center of the screen.



ON/OFF Menu

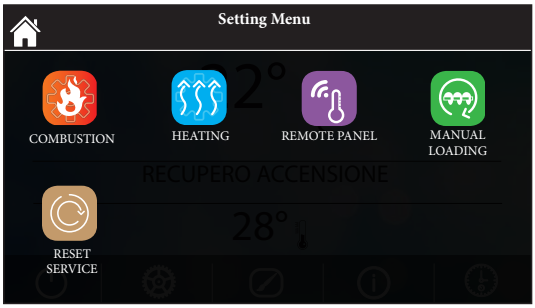
Screen image :

- System power ON
- System power OFF
- Alarms reset



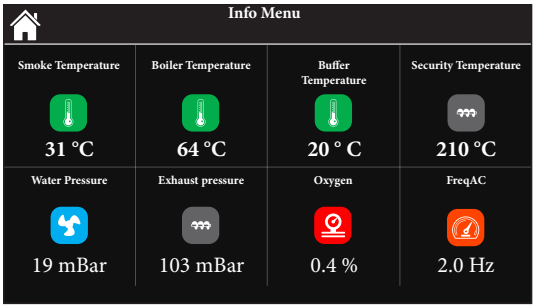
Display Menu

In this screen you can view all the variables of the control panel. Furthermore, it is possible to access the SYSTEM MENU which is reserved exclusively for technical personnel.



Settings Menu

From this screen it is possible to view all the variables for the proper functioning of the heating system.



Info Menu

From this screen it is only possible to display the values of all inputs and outputs.

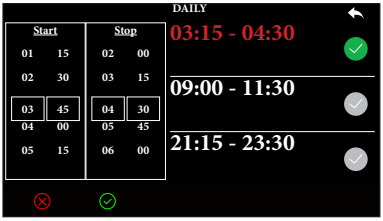
5. CHRONO

CHRONO

To select the desired CHRONO program, press on the respective tabs:
- Daily
- Weekly
- Weekend.

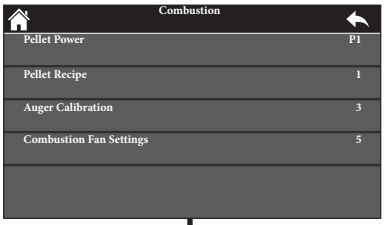
To change the chrono program, press on .
If the Chrono function is disabled all the tabs are grey.

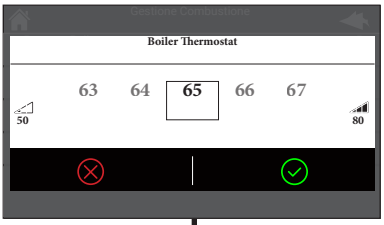
To edit the time slots, press on the corresponding Frame Time.



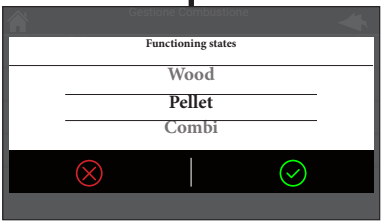
Scroll Up or Down to change the System on/off Time

5. INTERNAL MENU STRUCTURE





Here are the types of interface used to access, select and modify menu items.



5. INTERNAL MENU STRUCTURE

From the display Menu the user can access the panel settings and select one of 24 languages.

Brightness.

Minimum brightness: this function allows you to choose the minimum brightness level which the device automatically sets to after 30 sec. of inactivity.

Standby display: if enabled, this function will set the screen to standby after 1 minute of inactivity.

Control panel address: password-protected menu (1810) and used to set the control panel address.
In modbus, the address reserved for the local control panel is 16. The address of the first remote control panel is 17 and subsequently the others according to the number provided by the system.

Control panel restart: this function allows the control panel to be restarted.

Sound: this function allows the user to enable / disable the sounds emitted from the control panel.

Delete error list: this password protected function (the same as in the technical menu) allows the user to delete the list of errors recorded by the control panel. The errors recorded are 64.

Nodes list: this menu allows the user to view all the devices connected via Modbus, with their related firmware and revision.

Wallpaper: menu used to select wallpapers loaded in the device. 8 backgrounds are available.

Control panel info: this menu allows the user to view the firmware and revisions that make up the control panel in detail.

Errors

Er01 - Error Limit Thermostat 1 (might signal even when the system is off)
Er02 - Error Limit Thermostat 2 (might signal even when the system is off)
Er03 - Low Exhaust flue gas temperature or low flame Luminosity
Er04 - Water Over-temperature
Er05 - Exhaust flue gas Over-temperature
Er06 - Error Pellet Thermostat
Er07 - Error Encoder. The error can occur for lack of Encoder signal
Er08 - Error Encoder. The error can occur for problems in the regulation of the number of revolutions
Er09 - Low Water Pressure
Er10 - High Water Pressure
Er11 - Clock Error The error occurs for problems with the internal clock
Er12 - Extinguishing for Failed Ignition
Er14 - Pressure switch Error (might signal only if at least one Fan is On)
Er15 - Extinguishing for lack of Voltage supply for more thanT89
Er16 - Communication Error RS485
Er18 - Run out of Pellet
Er22 - Lambda Regulation Failed
Er23 - Boiler Probe or DHW Probe or Boiler Supply/Return Probe or open Buffer tank Probes
Er25 - Brazier Cleaning Engine broken
Er26 - Cleaning Engine 1 broken
Er27 - Cleaning Engine 2 broken
Er34 - Vacuum under minimum threshold
Er35 - Vacuum over maximum threshold
Er52 - Additional Module Error I2C
Er70 - Safety Probe Over-temperature
Er71 - Error Cleaning Water

Errors Lambda Sensor

EL00 - Generic Error: switch off and on the control board
EL01 - Heating sensor ground short-circuited: Switch off the board and check the Lambda sensor connections. Replace the sensor.
EL02 - Heating sensor open: Switch off the board and check the Lambda sensor connections. Replace the sensor.
EL03 - Heating sensor short-circuited at +12V: Switch off the board and check the Lambda sensor connections. Replace the sensor.
EL04 - Lambda Sensor ground short-circuited: Switch off the board and check the Lambda sensor connections. Replace the sensor.
EL05 - Heating voltage supply too low: Disconnect Lambda Module from 230Vac and check all the fuses of the board. Check that the line voltage is 230Vac + / - 20%.
EL06 - Lambda Sensor voltage supply too low: Disconnect Lambda Module from 230Vac and check all the fuses of the board. Check if there are short-circuits in the board due to dirt. Check that the line voltage is 230Vac + / - 20%.
EL07 - Heating Sensor failure: Check that the sensor is heated. Switch off and on the board and verify a new heating procedure.
EL08 - Lambda Sensor over-temperature: The sensor should not be exposed to flames or exhaust flue gas over 700 ° C. Move the sensor or lower the temperature.

Messages

Probes - Visualization of the state of temperature probes. The message is displayed during Check Up phase and shows that the temperature detected by one or more probes is equal to minimum or maximum value (depending on the considered probe). Check that the probes aren't open (minimum value of the temperature scale). or in short-circuit (maximum value of the temperature scale).
Service - It notifies that the planned hours of functioning have been reached (parameter T66). Call the Licensed Technical Service Centre.
Cleaning - It notifies that the planned hours of functioning have been reached (parameter T67). The stove or boiler needs to be cleaned.
Block - Message alternated to current state, it appears only if the system is turned off during Ignition (after Pre-load) by an external device: the system will stop only when it reaches the Run Mode.
Door - The door is open.
Night Mode - System in Night Mode.
Link Error - The Panel and the Control Board cannot communicate.
Transfer failed - The message is displayed if the transfer of a value of a modified parameter fails. Try again to modify the parameter.

DIAGRAM FOR ECOPELLET STAR

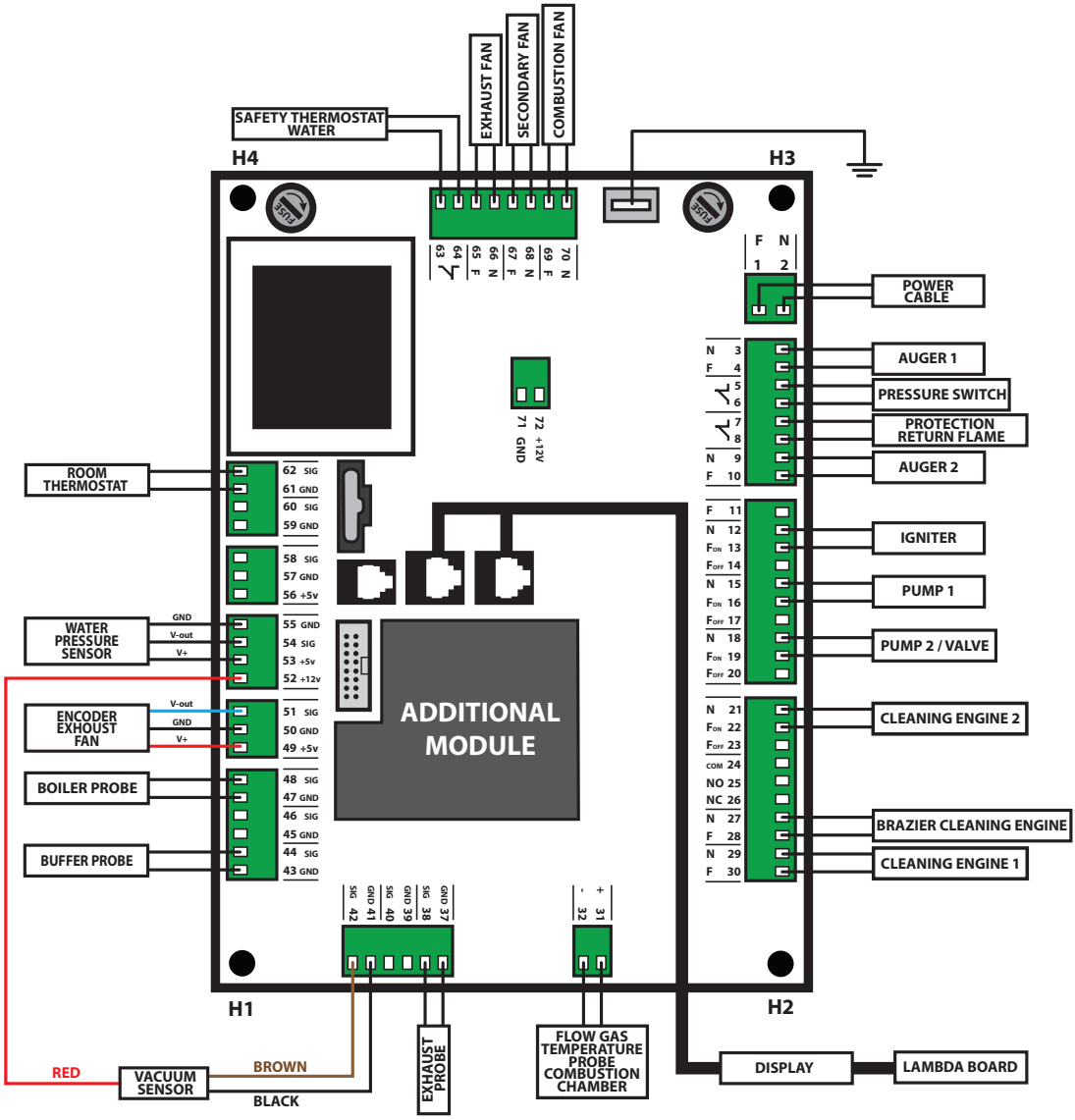
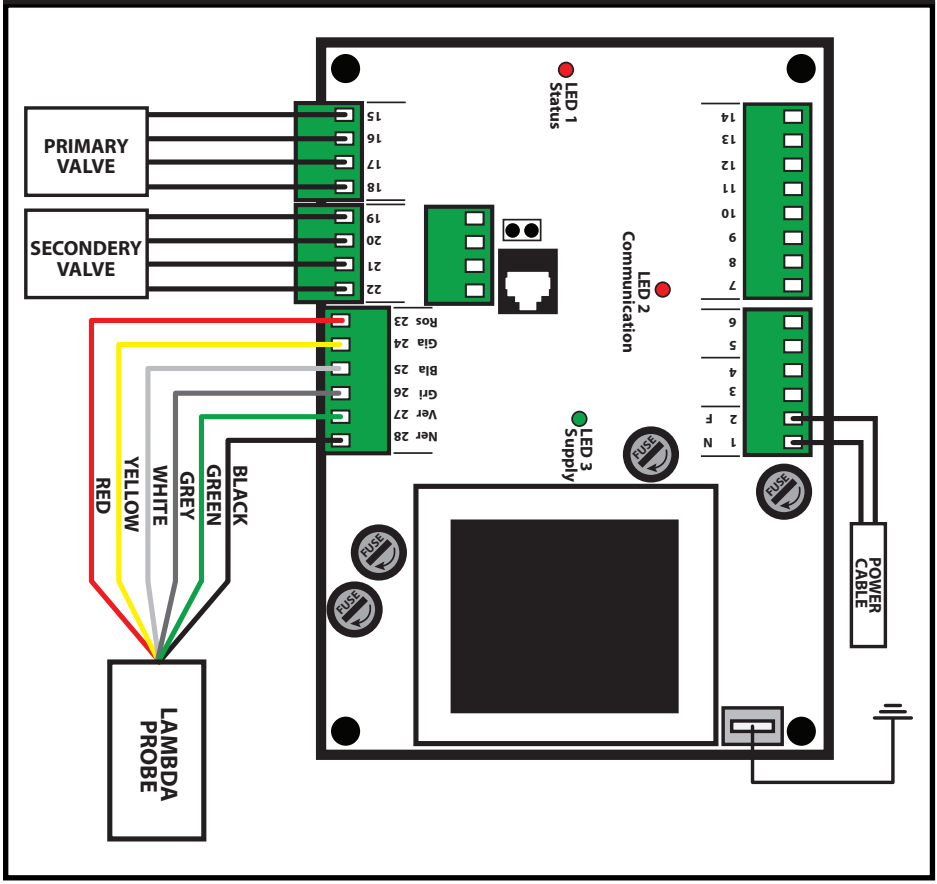


DIAGRAM LAMBDA BOARD



Mareli Systems

Mareli Systems
Industrial Zone
Simitli, 2730
Region Blagoevgrad
Bulgaria

info@mareli-systems.com
www.mareli-systems.com