



PELLET BOILER

PELLET COMPACT PLC

INSTALLATION AND USER MANUAL



VERSION: 3.2
UPDATE: 10.03.2021

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1. GENERAL INFORMATION

1.1. Proper use of the appliance

Before you make use of this appliance make sure you have read and fully understood the instructions included in this manual.

The installation and use of the appliance must be performed according to the instructions indicated in this manual in combination with the current national safety regulations.

The appliance is designed for use in pumped hot water central heating systems. Any other use is considered improper and is prohibited. THERMOSTAHL declines any responsibility for damages or injuries caused by improper use; in this case the risk is completely at the user's responsibility.

To ensure an efficient and flawless function of the appliance, it is strongly recommended that you have performed an annual service by a qualified technician.

1.2. Safety warnings

All installation and maintenance procedures must be carried out by professional and authorized personnel, in compliance with the indications in the present manual and national regulations. Any failure to correctly install this appliance could cause damage or injuries!

Do not make modifications to parts of the appliance, unless you have contacted the company and an authorized service contractor.

Only original accessories and spare parts must be used to ensure correct and safe function.

Make sure you respect the cleaning and maintenance procedures on the corresponding intervals. Failure to do so can cause malfunction to the appliance and possible damages.

The boiler is design to function on the fuels indicated in the corresponding paragraph. Any other fuel is prohibited. Do not use explosive or flammable substances! Do not store such substances inside the boiler room.

The working pressure varies according to the model. Make sure you use the appropriate water pressure. **Working in a pressure higher than the one indicated in this manual is strictly prohibited and dangerous!**

1.3. Data label

The data label of the appliance is placed on the boiler's side cover, on the external part. Make sure that it is properly placed and readable.

On the label it is indicated the serial number and the manufacturing year of the appliance.

1.4. Document information

This document is an integral and indispensable part of the product and must be retained in good condition by the user. Keep it in a safe place for future reference.

If the appliance is sold or transferred to another person, this manual has to always follow the appliance and handed to the new user or installer.

2. TECHNICAL FEATURES AND DIMENSIONS

2.1. Technical features

The boiler is made of steel, with horizontal construction, fire-tube type. The heat transfer from the exhaust gases towards the water is done primarily by thermal radiation in the first two passes, and in the third is done by thermal conduction. The return of the gases from the second way toward the third way is done in the door upper side.

PLC boiler is built in such a way so that all surfaces that are exposed to the flame are cooled by water, including the inferior side where the ash and the burning rest are collected. The unique construction, the great number of exhaust pipes and the stainless steel turbulators, big firebox volume and the water from the boiler, as much as the symmetric construction determines a high efficiency.

The PLC boiler is designed to work efficiently with an automatic pellet burner. The boiler can also be used with liquid or gas fuels, by mounting an appropriate burner respectively.

DESCRIPTION OF COMPONENTS

- Steel boiler body with horizontal tube exchanger
- Removable rear smoke box with inspection cleaning door and flange for exhaust fan installation
- Door for access to the fire chamber for cleaning the heat exchanger and the burner
- Ash box positioned on the lower part of the boiler
- Glasswool body insulation of 50 mm thickness
- Electrostatically painted external covers
- Automatic pellet burner with feeder
- Fuel tank

2.2. Function principle

The function of the boiler is based on the counter-pressure that is created by the returnable flame in the combustion chamber and by the transmission of heat with radiation. The burned gases reverse their course at the bottom of the fire chamber, surrounding this way the flame, which does not get into immediate contact with the surrounding walls.

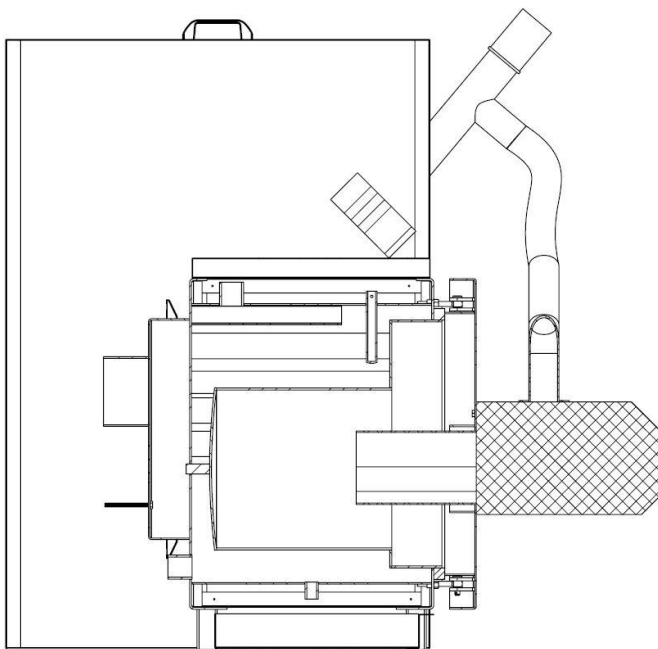


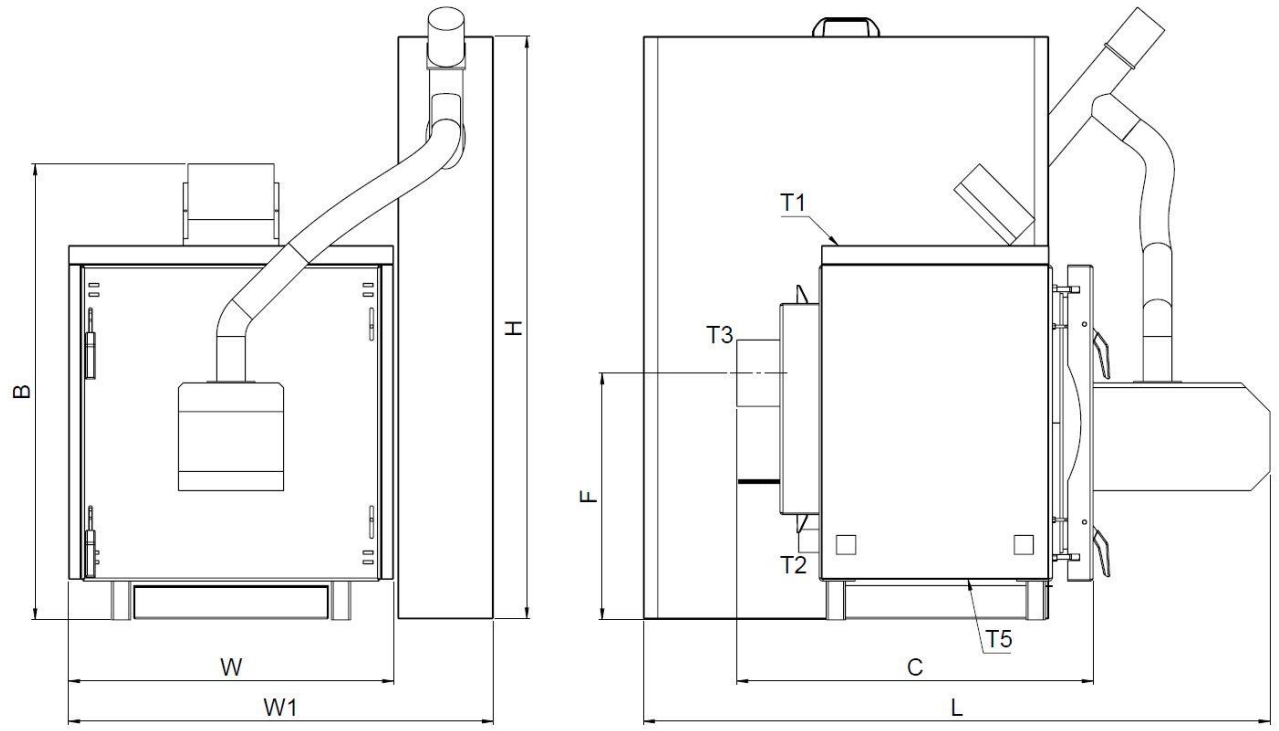
Fig 1. Boiler function scheme

The burned gases are then guided towards the smoke box through the fire tubes where the heat transfer is mainly through conductivity, and afterwards evacuated to the chimney. The smoke box is equipped with an inspection and cleaning door, which also actions as an explosion relief. The turbulators in the tubes create turbulence to the burned gases, so as to get into a continuous contact with the walls of the tubes and increase the heat transfer efficiency.

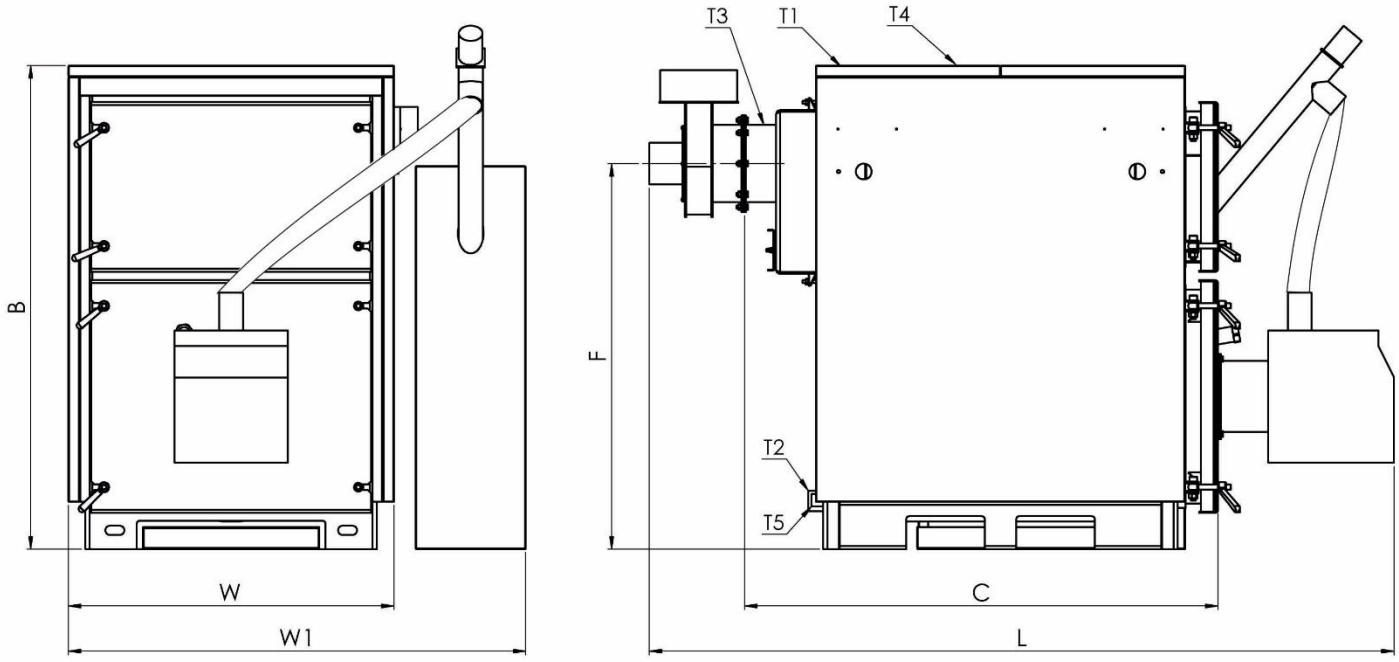
The door has an insulation cord to ensure air-tight closing. The door is equipped with a flange for burner mounting and an inspection eye for flame inspection.

2.3. Dimensions

PLC 25-80



PLC 150-250



TECHNICAL FEATURES AND DIMENSIONS

Boiler type	H	B	W	W1			F	C	L
				SLIM	MID	MAX			
<i>mm</i>									
PLC 25	1220	960	690	890	1040	1190	515	745	1310
PLC 35	1220	960	690	890	1040	1190	515	845	1310
PLC 50	1220	1250	850	1050	1200	1350	600	995	1310
PLC 80	1220	1250	850	1050	1200	1350	600	1095	1310
PLC 150	-	1540	1035	1305	1455	1605	1225	1505	2370
PLC 250	-	2180	1220	1430	1580	1730	1600	2080	3000

Boiler type	T1-T2	T3	T4	T5
	<i>inch</i>	<i>mm</i>	<i>inch</i>	<i>inch</i>
PLC 25	1 ¼"	Ø160	-	¾"
PLC 35	1 ¼"	Ø160	-	¾"
PLC 50	1 ½"	Ø200	-	¾"
PLC 80	1 ½"	Ø200	-	¾"
PLC 150	2"	Ø250	-	1"
PLC 250	DN80	Ø300	DN50	1"

2.4. Technical data

Boiler type		PLC 25	PLC 35	PLC 50	PLC 80	PLC 150	PLC 250
Nominal power	<i>kW</i>	25	35	50	80	150	250
Furnace power	<i>kW</i>	27	38	55	88	165	275
Efficiency	%	91					
Boiler class ²		5					
Max working pressure	<i>bar</i>	3					
Test pressure	<i>bar</i>	4,5					
Max working temperature	°C	90					
Exhaust gas temperature	°C	180-220					
Fuel consumption at max work ³	<i>kg/h</i>	5,51	7,76	11,22	17,96	30,61	51,02
Water pressure drop (ΔT 20K)	<i>mbar</i>	20	24	32	48	70	80
Water contents	<i>l</i>	80	100	140	220	810	850
Weight (empty)	<i>kg</i>	230	280	455	510	980	1485
Total power consumption (without optionals)	<i>kW</i>	0,45	0,45	0,50	0,53	0,69	0,69
Electrical connections	<i>V/Hz</i>	230 / 50					

1. Nominal power output is obtained with fuel type C, calorific power 4,9 kWh/kg according to standard EN 303-5:2012.
2. According to standard EN 303-5:2012, for fuel type C (wood pellets).
3. The values are calculated for fuel type C, calorific power 4,9 kWh/kg according to standard EN 303-5:2012.

2.5. Fuel

The PLC series is designed for pellet as fuel, with use of an automatic pellet burner. As fuel, it is recommended to use only premium quality wood pellet 6-8 mm diameter. Pellet of lower quality or agropellets can only be used if approved by the pellet burner manufacturer. Note that if lower quality pellet is used, the ash produced can be significantly bigger and the cleaning interval more often.

Pellet fuel characteristics	
Diameter	6-8 mm
Length	12-30,5 mm
Density	650-700 kg/m ³
Ash content	<1%
Calorific power	>4,8 kWh/kg
Humidity content	<8%

Table 1. Pellet fuel characteristics



The quality of the pellets, calorific power, humidity and ash content is very important for the boiler function and efficiency!

Normally, if using pellets with low ash content (DIN+ quality certification) the burner needs cleaning once every week. If low quality pellets are used this might be needed up to once a day.

The PLC boiler can work with liquid or gas fuel as an alternative solution. For this purpose, a corresponding burner must be mounted on the boiler's door with a special flange.



It is prohibited the use of processed wood pellets, or other chemical treatment.



It is prohibited the use of explosive, inflammable materials, plastic, domestic residues, etc.



NEVER BURN ANY TYPE OF CORN, CHERRY PITS, STICKS OR OTHER TYPES OF FUEL IN THE BURNER.



It is prohibited to manually feed solid fuel in the boiler!

3. BOILER MOUNTING

3.1. Transportation and delivery

The boiler is delivered on wood pallet, well positioned with metal plates. Remove them carefully by unscrewing the screws holding them in place.

The loading and unloading of the boiler must be performed with a forklift or a crane. A special hook is provided on the upper part of the boiler for lifting.



The boiler is heavy. Do not try to lift by hands or other unsuitable equipment. Danger of injury! Perform all moves with extreme attention and care.

Remove the boiler packaging with attention. **Keep the packaging material away from children since it can be dangerous.** After having unpacked everything, make sure that the appliance is intact and undamaged. In case of doubt do not use the appliance and inform the supplier.

The PLC boiler is delivered with the following equipment already fitted and mounted:

- Boiler steel body
- Glasswool insulation mounted on the boiler body and tightened with plastic tapes
- Metal covers mounted on the boiler body
- Pellet burner
- Fuel feeder
- Fuel tank
- Ash box
- Cleaning tools

In the documentation folder you will find:

- Technical manual
- Warranty leaflet
- Energy label

3.2. Boiler room

3.2.1. General requirements

The boiler must be installed in a special and separate room. This room must be chosen so that it offers easy access for fuel transport, air supply and exhaust gas evacuation. The doors of the boiler room must be metallic, open outwards, and have at least 0,9 m width.



The boiler installation is prohibited in rooms with extensive dust, dangerous gases, and moist spaces.

For the correct boiler function it is necessary that the boiler room has openings for natural ventilation and combustion air supply. It is recommended that two different openings are used for this purpose, positioned on opposite walls and diagonally to ensure good air circulation. The total surface of the openings must be at least 1/12 of the boiler room surface. Forced ventilation is prohibited in the boiler room.

The boiler room must be provided with a drainage channel. All safety devices must be connected to this channel.

The boiler room must have an appropriate fire extinguishing system, according to the regulations in force. In case that the building is designed with a fire alarm system, a smoke detector must be positioned on top of every boiler.

BOILER MOUNTING

The fuel storage is prohibited in the boiler room. If so, the storage must be separated from the boiler with a non-flammable wall, and proper distanced from the boiler.

3.2.2. Boiler room dimensions

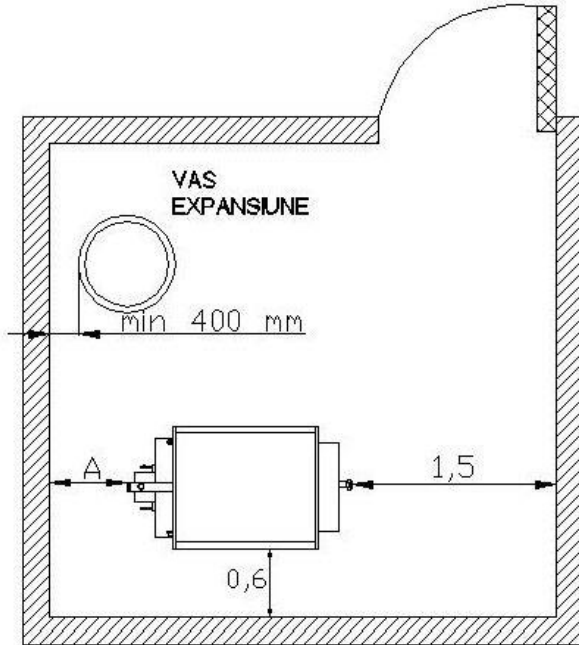


Fig 2. Recommended boiler room dimensions

The boiler must be placed on a horizontal plane, with adequate mechanical resistance to support the boiler's weight. The boiler must be positioned in the room in such a way so that it is easily accessible from all the sides. The following dimensions are recommended (see Fig 2)

Distance from the front wall (L1): at least 1,5m

Distance from the rear wall (L2): an adequate distance allowing easy access for verification and maintenance.

Distance from side wall (A3): at least 0,6m

Boiler room height (H1): at least 2,5m

3.3. Chimney

The chimney installation must supply sufficient draught, air tightness and protection against condensation.



The appropriate chimney installation is very important for the boiler's efficient and safe function!

The chimney must be positioned if possible in the interior of the building. It must be vertical, with no changes in the direction. The cross-section of the chimney can be round or rectangular. If the chimney is installed in the exterior, it must be insulated.

The horizontal part connecting the boiler's chimney pipe with the vertical chimney must have maximum length 2 m. If this distance is bigger, it is recommended to have a 15-30° inclination upwards. The connection with the boiler's chimney pipe must be air-tight.

The chimney must be equipped with a cleaning door at its base. Also cleaning doors are recommended where there are changes in direction and ash can be accumulated. Tactical cleaning is recommended (every 3 months) for efficient boiler function.

A chimney terminal must be installed at the end of the chimney for protection against weather effects and foreign objects entrance. In areas with strong winds a special anti-downdraught terminal is recommended.

The chimney height must exceed the roofline by at least 1 m. If there are other obstacles positioned on the roof, the chimney height must exceed them by at least 1 m. If there are multiple chimneys, minimum distance between them is 0,3m.

BOILER MOUNTING

Each boiler should be connected to an independent chimney. Connection of multiple boilers to the same chimney is not allowed.

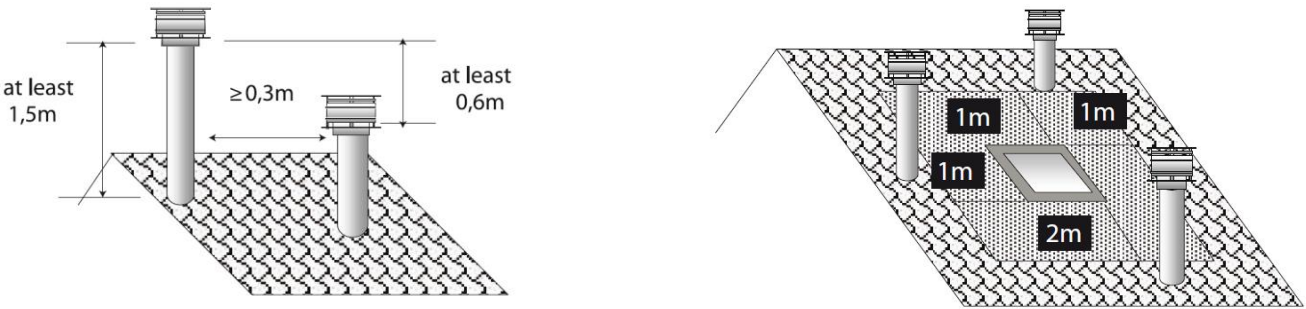


Fig 3. Chimney distances

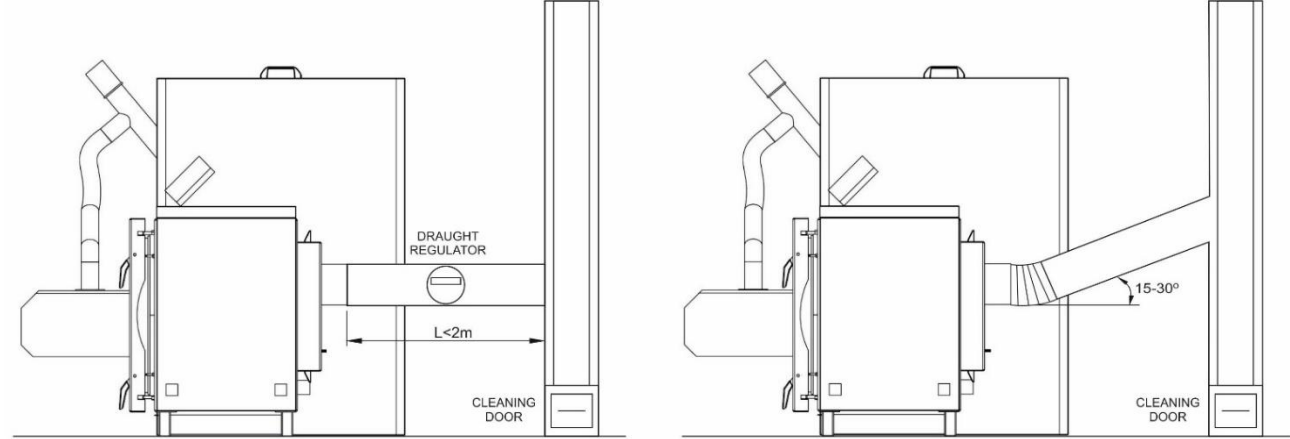
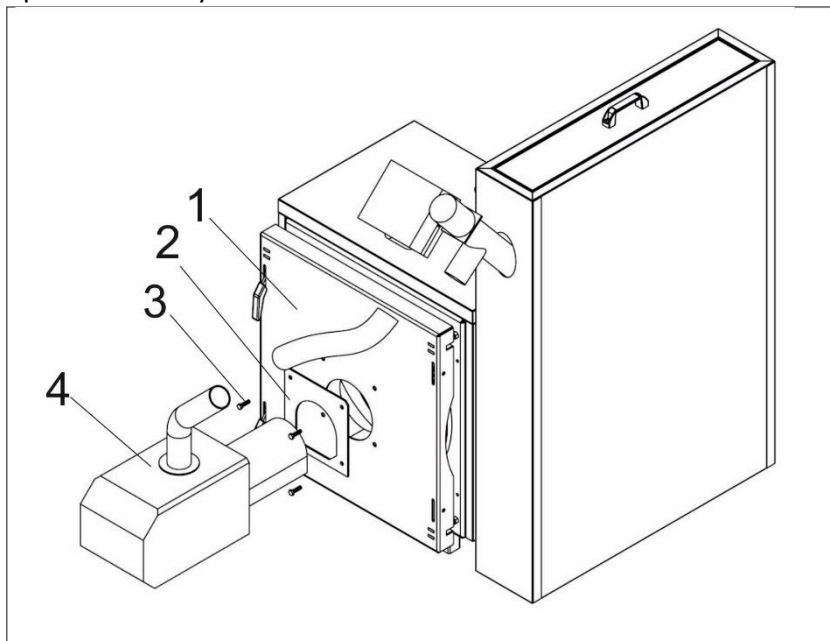


Fig 4. Chimney connection

3.4. Mounting the burner

The burner is mounted on the flange provided on the door of the boiler. First install the insulation cord and then fix the burner on the flange with the four screws provided, as shown on Fig 5. Pay attention so that the burner furnace is correctly positioned in the fire chamber and the door opens normally.



Legend

- 1 Mountin flange
- 2 Burner gasket
- 3 Fixing screws
- 4 Pellet burner

Fig 5. Mounting the burner

The pellet silo must be positioned normally from the right side of the boiler, so that the door opens easily. It must be positioned as close to the boiler as possible so that the feeder length will be sufficient.

The pellet feeder must be inserted in the silo before you fill it with pellets. The feeder must be positioned with inclination, optimum at 30-45° to the floor. **The pellet feeder cannot be positioned at angle more than 45°, nor vertically or horizontally!** After positioning secure it so that it doesn't move. The connection between the pellet feeder and the burner is done by a flexible hose. This hose must also have an inclination and be tightened so that it allows free fall of the pellets towards the burner. The connection of the hose with the burner and the feeder must be air-tight. Use the tighteners provided.



The positioning of the pellet feeder and the silo are very important to the burner's operation! If not positioned correctly it can cause malfunction and stop of the burner.

The burner controller is mounted on the given metal support, as shown in **Error! Reference source not found.** Fig 6. Firstly the metal support is fixed on the boiler top cover, then the controller is mounted on the support. For mounting use the provided screws in the accessories bag.

The safety thermostat is mounted in the interior of the top cover, through the given hole. The plastic cover is unscrewed and then fixed from the exterior. The safety thermostat must be electrically connected to the controller according to the electrical scheme, and the thermostat capillary must be introduced in the sensor bulb.

For models PLC 150-250 the controller and the safety thermsotat are mounted on the side cover of the boiler.



Wrong connection of the safety thermostat can lead to hazardous function and overheating of the boiler!

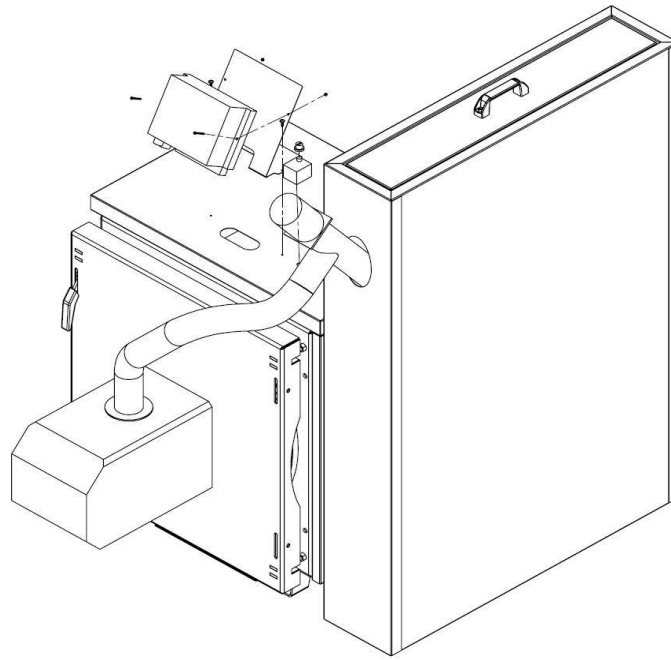
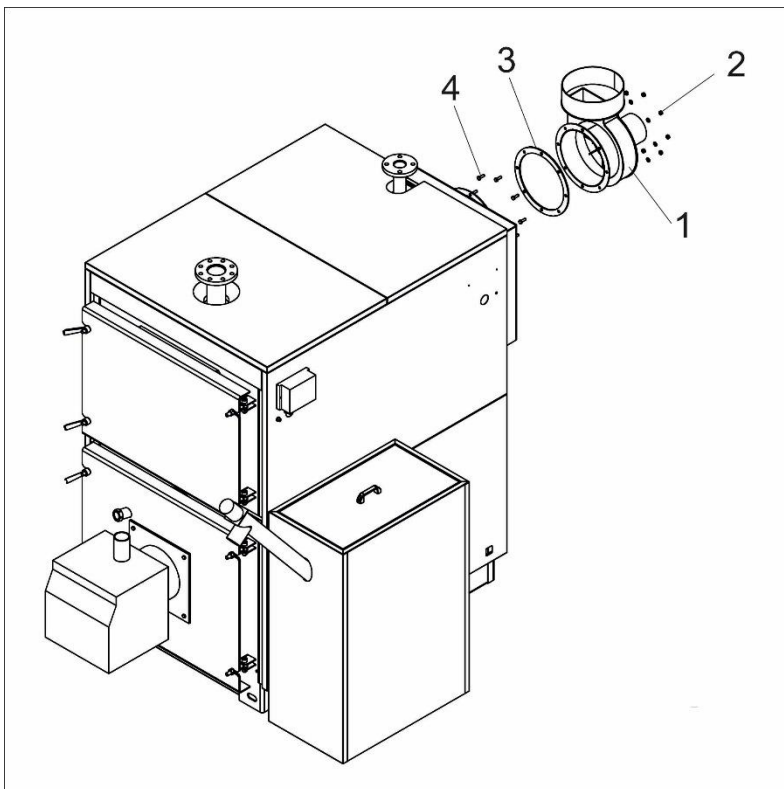


Fig 6. Controller mounting

3.5. Exhaust fan (optional)

For models PLC 150-250 installation of an exhaust fan is highly recommended (optional). This accessory helps optimize the combustion and draught stability, which is very important for correct function of the burner.

The exhaust fan is mounted on the chimney flange provided on the pipe T3. Install first the insulation gasket and then fix the exhaust fan with the 8 screws and nuts provided, as shown in **Error! Reference source not found..**



Legend

- 1 Exhaust fan
- 2 Fixing screws
- 3 Insulation gasket
- 4 Nuts

Fig 7. Mounting the exhaust fan

4. INSTALLATION

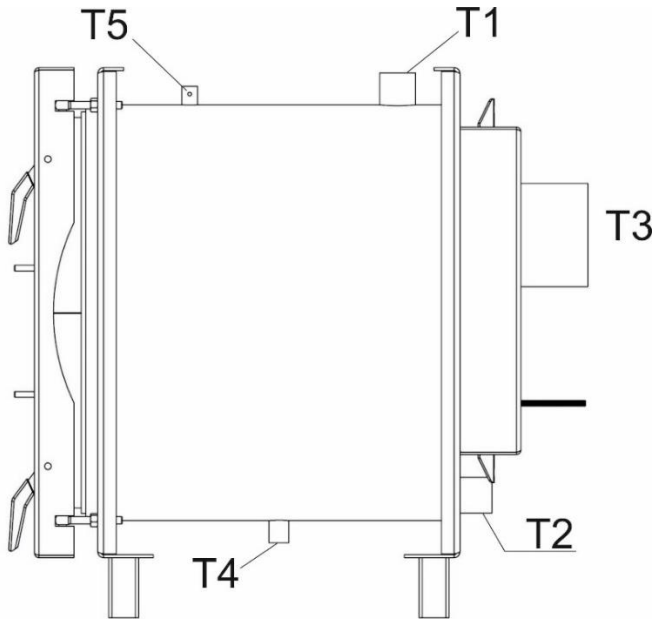
4.1. Hydraulic connections

The boiler is intended for connection with a closed expansion vessel network. The boiler is intended for maximum working temperature 90°C and maximum pressure 3 bar.

The expansion vessel must be connected on the return line. The discharge valve be connected through a pipe to the drainage.

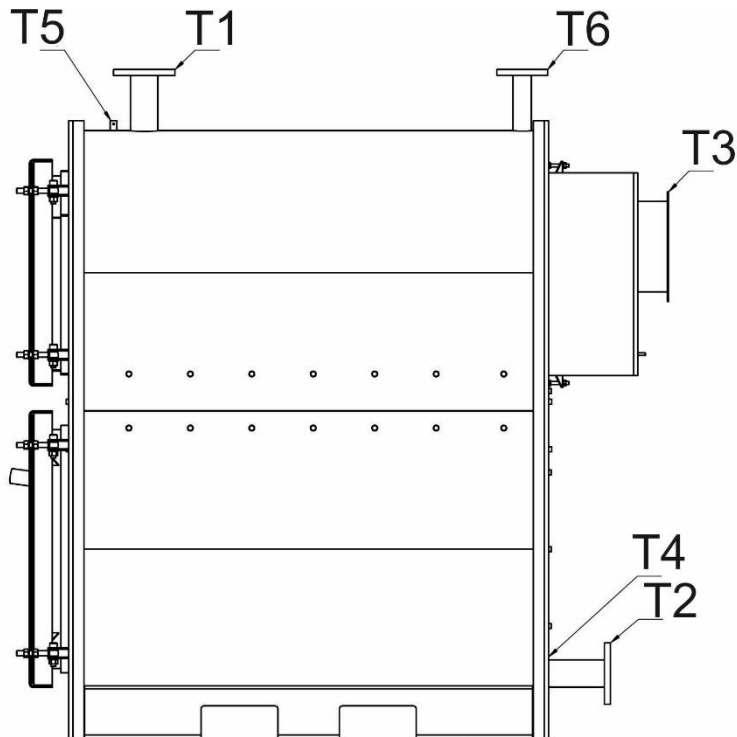
 **If a connection pipe is not used, it must be sealed before water fill!**

PLC 25-80



- Legend**
- T1 Outlet
 - T2 Return
 - T3 Chimney connection
 - T4 Drainage valve
 - T5 Sensors bulb
 - T6 Safety connection

PLC 150-250



4.2. Return temperature protection

For the correct function of the boiler and for protection against corrosion it is very important to ensure steady temperature at the return of the boiler of at least 55°C.

This can be ensured by installing a recirculation pump between the boiler outlet and return (see connection diagrams).

An alternative variation is by installing at the return of the boiler a three-way thermostatic valve.



Having a return temperature less than 55°C is very dangerous for the boiler long-life and can cause warranty loss!

4.3. Filling the system

After completing all the hydraulic connections, the circuit may be filled with water. After filling the system, open the radiators air valves to get rid of the air in the installation.

Verify that the installation pressure is according to the technical feature of the boiler. The pressure must be verified through the boiler's manometer. An additional manometer should be installed on the cold water inlet to verify the cold pressure, at the lowest point of the installation, at a point close to the boiler.

The whole installation must remain under nominal pressure for at least 10 minutes. During this period, check that all the connections are tight and there are no water leakages. Make sure that during this period no pressure drop appears.

After firing the boiler, make sure the network functions properly at working temperature and pressure.



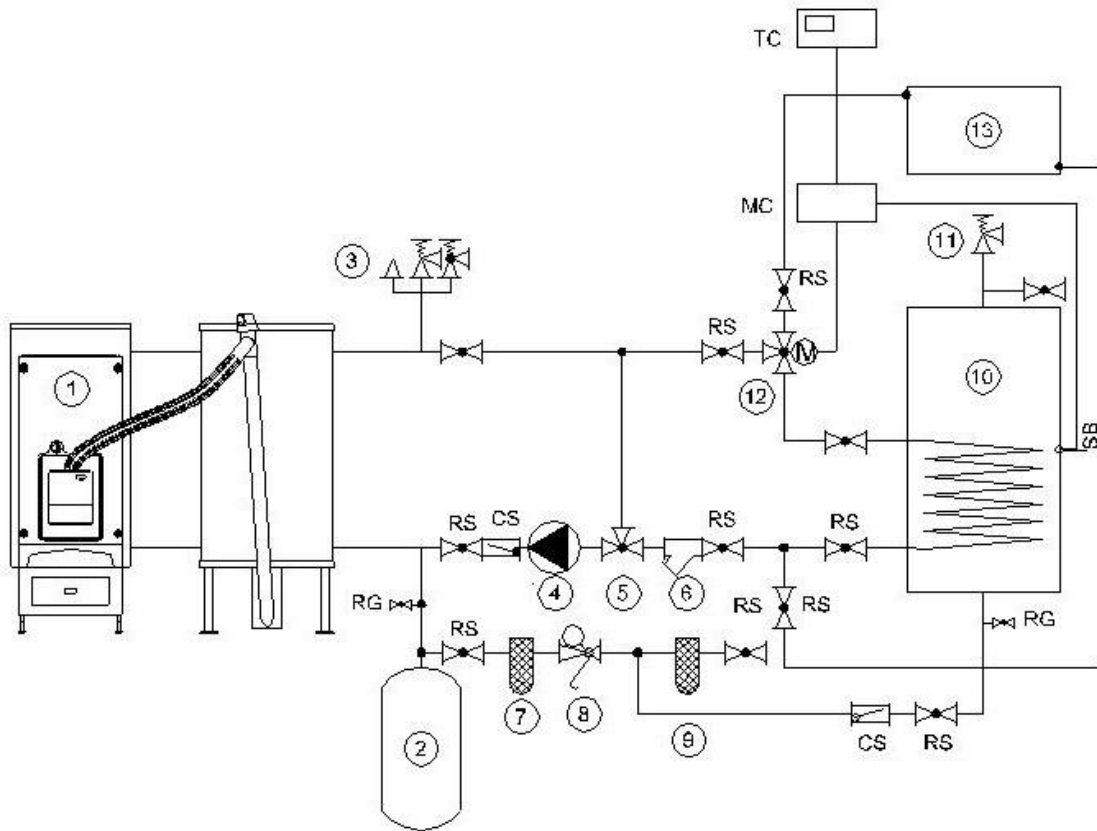
The hardness of the mains water supply affects the boiler's life span. It is recommended to use a water softener if water hardness exceeds 5°GH.



Do not fill the system at the working pressure! When the boiler will be heated, the water pressure will raise. Filling pressure must be at least 1 bar lower than working pressure!

4.4. Connection diagrams

4.4.1. Installation as single heating source



Legend

- 1. PLC boiler
- 2. Closed expansion vessel
- 3. Safety kit
- 4+5. Recirculation pump and 3-way thermostatic valve
- 6. Filter "Y"
- 7. Chemical phosphate filter
- 8. Automatic water filling valve
- 9. Mechanical filter with nylon "Ny"
- 10. Sanitary hot water boiler
- 11. Safety pressure valve for sanitary water circuit
- 12. Automation for sanitary water
- 13. Heating installation (outside the project)
- RS Ball valve
- CS One-way valve
- RG Drainage valve
- TC Room thermostat
- MC Controller module

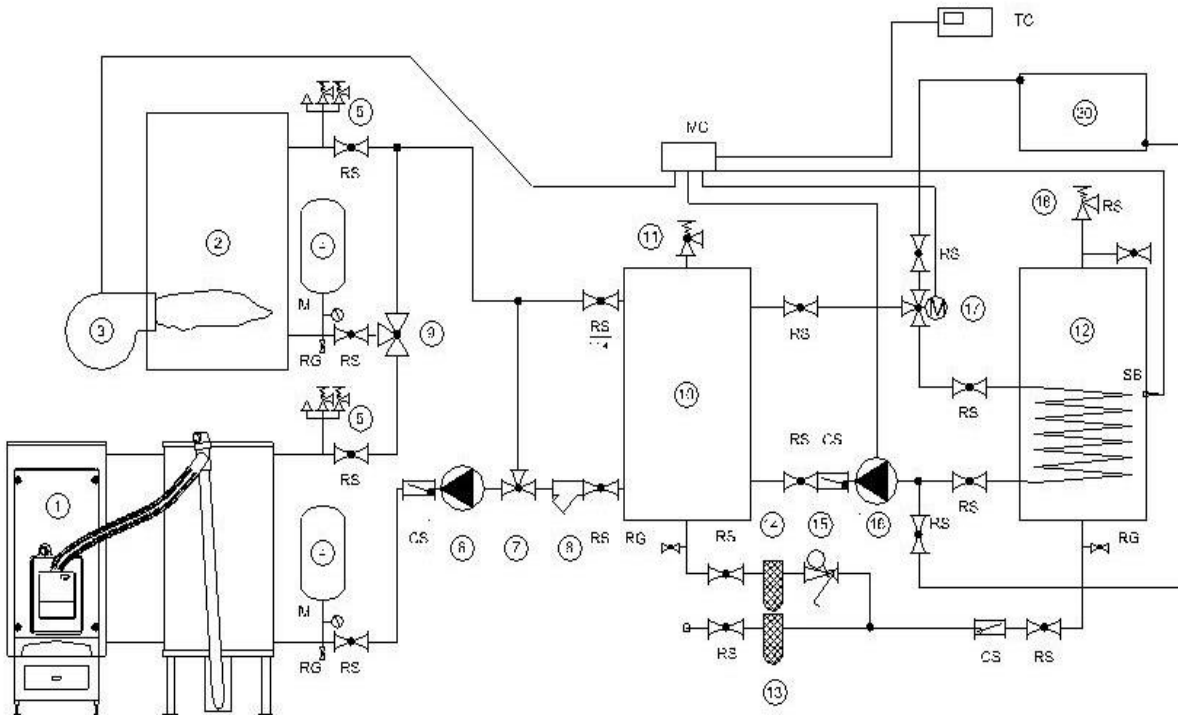
4.4.2. Installation with buffer tank



Legend

- 1. PLC boiler
- 2. Closed expansion vessel
- 3. Safety kit
- 4+5. Recirculation pump and 3-way thermostatic valve
- 6. Filter "Y"
- 7. Chemical phosphate filter
- 8. Automatic water filling valve
- 9. Mechanical filter with nylon "Ny"
- 10. Buffer tank-heat storage
- 11. Dual safety valve pressure/temperature
- 12. Circulation pump for heating & sanitary water
- 13. Automation for heating & sanitary water
- 14. Sanitary hot water boiler
- 15. Safety pressure valve for sanitary water circuit
- 16. Heating installation (outside the project)
- RS Ball valve
- CS One-way valve
- RG Drainage valve
- TC Room thermostat
- MC Controller module

4.4.3. Installation with an alternative heat source



Legend

- 1. PLC boiler
- 2+3. Alternative oil/gas boiler and burner
- 4. Closed expansion vessel
- 5. Safety kit
- 6+7. Recirculation pump and 3-way thermostatic valve
- 8. Filter "Y"
- 9. 3-way valve with servomotor
- 10. Buffer tank-heat storage
- 11. Dual safety valve pressure/temperature
- 12. Sanitary hot water boiler
- 13. Mechanical filter with nylon "Ny"
- 14. Chemical phosphate filter
- 15. Automatic water filling valve
- 16. Circulation pump for heating & sanitary water
- 17. Automation for heating & sanitary water
- 18. Safety pressure valve for sanitary water circuit
- 19. Heating installation (outside the project)
- RS Ball valve
- CS One-way valve
- RG Drainage valve
- TC Room thermostat
- MC Controller module

5. ELECTRICAL CONNECTIONS

5.1. General instructions

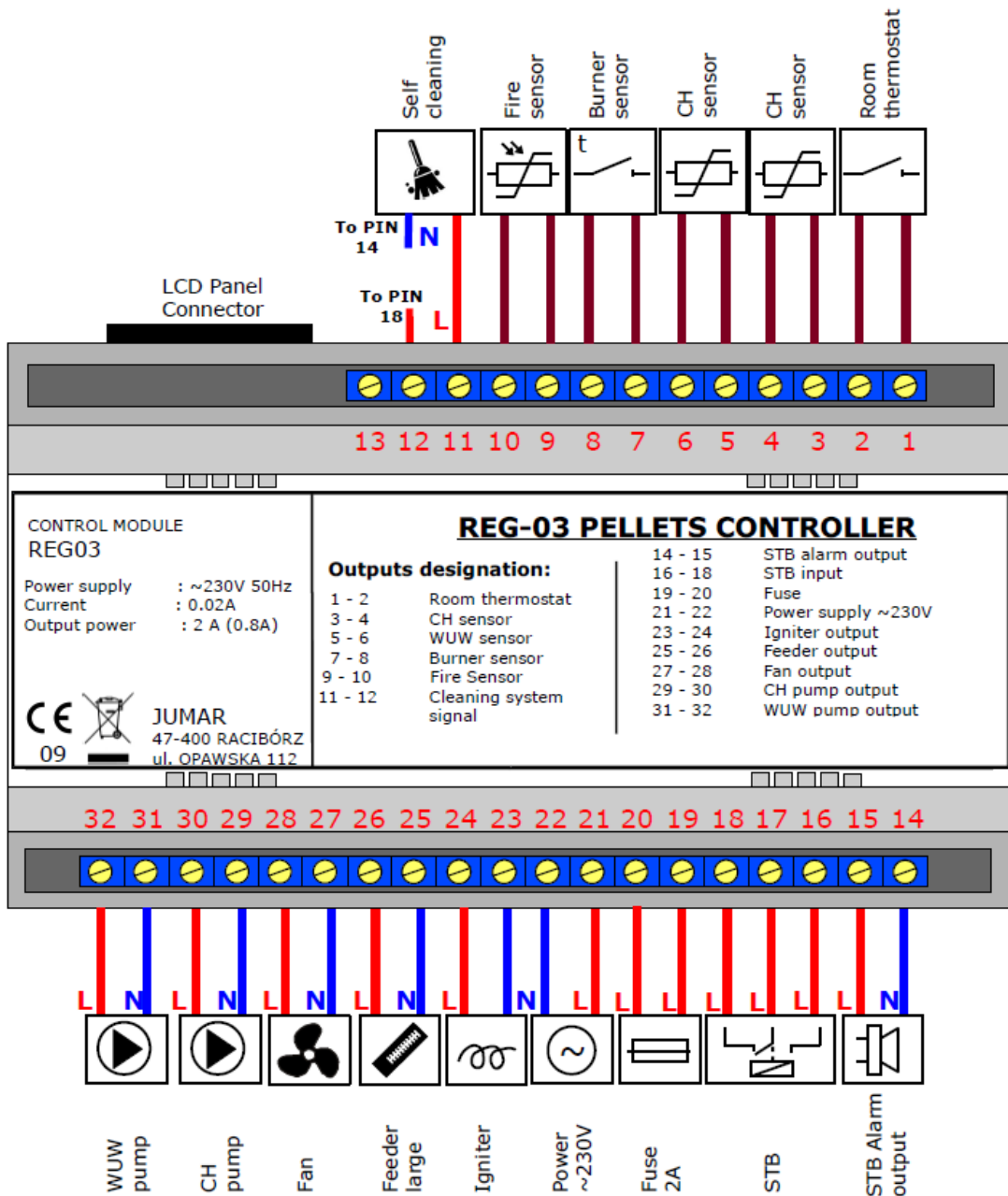
All electrical connection must be performed by an authorized professional, in conformity with the local regulations and the indications of this manual. Connections must be done according to norms EN 60529 and EN 60335-1, and protection norms IP 40 and IP 44.

All wiring must be waterproof insulated. Exposed cables should be protected within plastic channel. The main electrical supply of the boiler must be connected to an independent safety of max 16A. The boiler room lighting must be on a separate circuit.

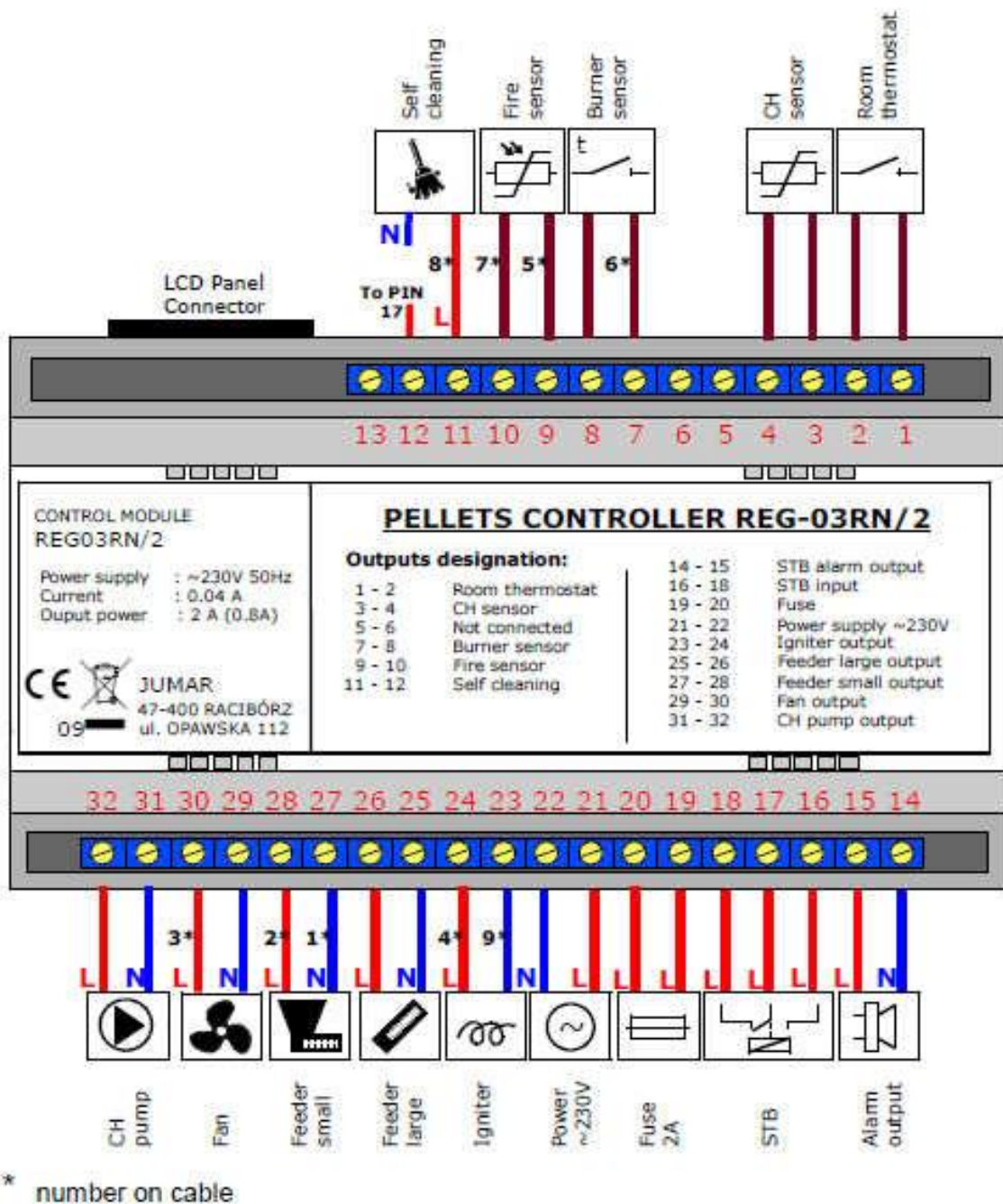


THERMOSTAHL is not responsible for accidents or malfunctions caused by wrong or bad electrical connections.

5.2. Electrical connection diagram PLC 25-80



5.3. Electrical connection diagram PLC 150-250



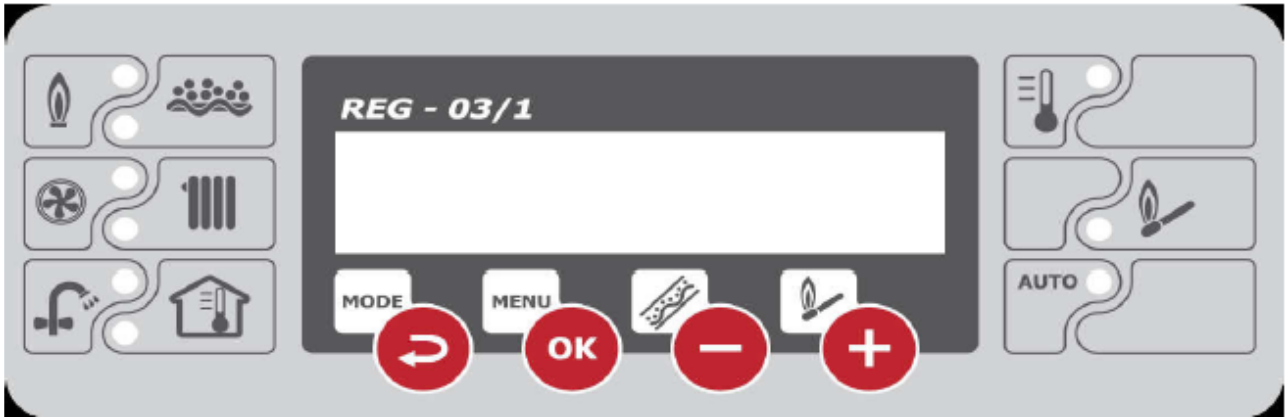
In case that an exhaust fan is installed on the boiler, this must be connected to the IEC electrical plug provided on the controller, which is supplied from terminals 31-32.

In this case, the boiler pump is not controlled anymore by the controller, this output being used for the control of the exhaust fan.

The boiler pump must be controlled by an independent source!

6. Controller





6.1. General description



Description:

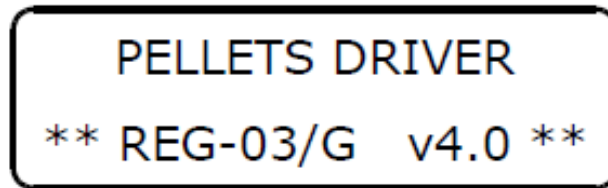
- Diodes signaling the status of outputs and the working mode of the driver,
- LCD screen used for communication between the device and the user,
- Buttons steering the driver's work.

6.2. Description of buttons

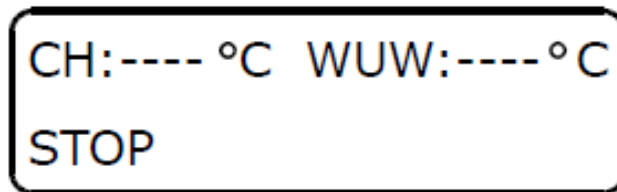
Button	Function	
	1	Changes the burner's working mode - " STOP ", " IGNITION ", " AUTOMATIC WORK ".
	2	Return to the previous menu
	1	Entry on the Menu's parameters
	2	Saves the change of a parameter
	1	In the Ignition MODE activates the feeder for the time specified on the parameter "Filling Feeder Time"
	2	Go to the previous menu or parameter Decreases the value of a parameter
	1	In the Ignition MODE activates the ignition procedure
	2	Go to the menu or parameter Increases the value of a parameter του καυστήρα.

6.3. Operation functions

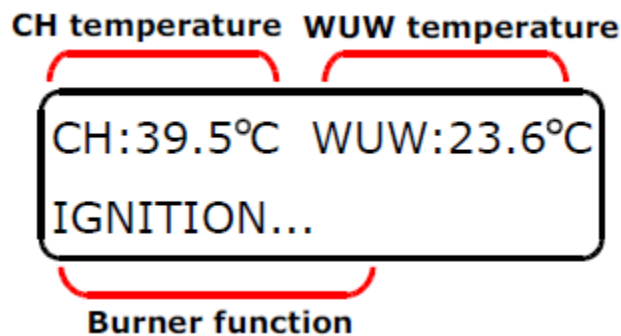
After switching the burner on, it is appeared on the LCD screen the program's logo defining the type of the driver and the version of the current software



While activating, the burner carries out a test of the connected sensors. In case of one lacking, on the screen appears an appropriate message (---). The work of the burner without a heating water temperature sensor (CH) is blocked and an emergency mode is activated (CH pump is still on).



Correct connection of sensors causes displaying of actual CH furnace's temperature and the temperature of useful warm water of the WUW buffer (if the function is active). On the screen appears which function is currently used by the driver.



The burner may work in three working modes ("STOP", "IGNITION", "AUTOMATIC WORK"). The mode changes when the "MODE/⏏" button is pressed. Activating the "STOP" mode is possible in all modes after pressing the "MODE/⏏" button for 3 seconds. When Stop is activated, the burner goes at "Burning off" process (if there is fire) and the at "Cleaning" process.

When the burner is activated for first time, it is on "Stop" mode. Every next time, its status is saved in the regulator's non-volatile memory. Activating the driver again, automatically causes switching on of the lately used working mode.

In the table beneath a short description of particular functions of the burner, activated depending on the working mode of the driver, is shown.

CONTROLLER

FUNCTION'S NAME	DESCRIPTION OF FUNCTIONS
STOP	Burner stopped.
FEEDER FILLING	Filling the feeder. Filling stops automatically after about 10 minutes.
IGNITION	The burner is on Ignition process, which mean that has fed with ignition dose of pellet, the heating element (igniter) and the air fan are working. The mode would be automatically changed after detecting a flame by the sensor.
CLEANING	The air fan works at full speed for one minute, to remove the remaining ashes from the burner's fire chamber. This function takes place also at the first minute of ignition
WORK	Heating the boiler up to the set temperature. Showing the actual power of the burner.
MAINTAIN	Sustaining the set temperature (if the burner's working mode is in the mode of continuous work)
BURNING OFF	Putting off the burner. Active in the "STOP" mode or in the temporal working mode of the burner.
STANDBY	Standby of the burner for the decline of the temperature of a hysteresis (if the burner's working mode is in the temporal mode).

6.4. Menu parameters

To move round the menu and to set particular parameters there are four buttons placed on the driver's panel: "MODE/⤵", "MENU/OK", "+", "-". The parameters chosen by the user are divided into four groups: (A) "CH FURNACE SETTINGS", (B) "WUW BUFFER SETTINGS", (C) "BURNER SETTINGS", (D) "DRIVER SETTINGS". The division of particular parameters in groups is shown in the "Settings table".

CH FURNACE SETTINGS (A)

FUNCTION NO.	FUNCTION NAME	SETTING UNIT	SETTING RANGE	MANUFACTURER SETTING
1	HEATING WATER TEMPERATURE	°C	35 - 85	65*
2	CH PUMP ACTIVATION TEMPERATURE	°C	20 - 60	35*
3	CH FURNACE HYSTERESIS	°C	1 - 20	5*
4	FURNACE MODE	---	Winter/Summer	Winter*

CONTROLLER

WUW BUFFER SETTINGS (B)

FUNCTION NO.	FUNCTION NAME	SETTING UNIT	SETTING RANGE	MANUFACTURER SETTING
1	WUW BUFFER TEMPERATUR	°C	20 - 80	40*
2	WUW SURPLUS TEMPERATURE	°C	5 - 20	10*
3	WUW PRIORITY	---	Yes/No	No*

BURNER SETTINGS (C)

FUNCTION NO.	FUNCTION NAME	SETTING UNIT	SETTING RANGE	MANUFACTURER SETTING
1	BURNER POWER (WORK)	kW	10 - 80	30*
2	BURNER POWER (MAINTAIN)	kW	2- 9	3*
3	BURNER MODE**	---	Continuous/ Single/Analogue	Continuous*
4	SELF CLEANING FREQUENCY TIME	Min	10-480	240
5	SELF CLEANING TIME	sec	0-60	0
6	BURNER FLAME MEASUREMENT	%	0-100	-----

**** Burner has 3 modes: continuous mode, single mode and analogue mode.**

Single mode: The burner reaches the desired "HEATING WATER TEMPERATURE" and burns off. Then, it starts its operation again when the temperature of the boiler goes down to the temperature "HEATING WATER TEMPERATURE - CH FURNACE HYSTERESIS". The CH FURNACE HYSTERESIS must be more than 10°C.

Continuous mode: The burner reaches the desired "HEATING WATER TEMPERATURE" and goes down at 3kW (maintain). When the boiler's temperature goes down to the temperature "HEATING WATER TEMPERATURE - CH FURNACE HYSTERESIS", the burner increases its power from 3kW (maintain) to the maximum burner power (i.e30kW). The CH FURNACE HYSTERESIS must be no more than 5°C.

Analogue mode: The burner reduces its power 1/3 (for example: from 30kW to 21kW) 10°C before the furnace reaches the "HEATING WATER TEMPERATURE". When the temperature of the furnace is 5°C before "HEATING WATER TEMPERATURE", the burner reduces its power again 1/3 (for example: from 21kW to 12kW).

DEVICE SETTINGS (D)

FUNCTION NO.	FUNCTION NAME	SETTING UNIT	SETTING RANGE	MANUFACTURER SETTING
1	LANGUAGE SETTINGS	---	Polish/ English/ German/Greek/ Serbian/Romanian	English*
2	FACTORY SETTINGS	---	Yes/No	---
3	ENABLE SERVICE MODE	---	000 - 999	---

7. BOILER START-UP

7.1. Initial lighting checks



Before you start the boiler, make the following checks:

- Check that all the hydraulic connections and make sure they are tight. Make sure there is no leakage or moisture on the pipes or other equipment.
- Make sure that the connection with the chimney is air-tight and the chimney installation is properly made.
- Check that the controller bulbs are well inserted and secured in the boiler's case.
- Make sure that the pressure in the network is correct.
- Check that the boiler pump and the central heating pumps function properly.
- Make sure that the connection with the expansion vessel is correct and the expansion volume is sufficient for the boiler. No valves should be installed between the boiler and the expansion vessel.
- Make sure the boiler's separation valves are open.
- Make sure that there is sufficient air supply and natural ventilation in the boiler room.



Do not store inflammable materials or fuel close to the boiler! Before you light the boiler make sure the boiler room is clear and safe.

7.2. Start-up the boiler

1. Ensure that the installation has been done according to this manual
2. Ensure that the plastic pipe **is not** connected to burner's feeding pipe
3. Fill the feeder up with wood-pellet, by following the direction of paragraph 16 (**Feeder's Filling Procedure**). The filling of the feeder lasts 8-15min depended on feeders incline.
4. Ensure that the feeder is full of pellet. Let the feeder working after the first pellets come out of the feeder for 10-15 minutes (locate a plastic bag at the exit of the feeder)
5. Empty the plastic bag and place it back at the exit of the feeder.
6. Make the feeder work again for 2 minutes, by pressing the button 
7. Weight the wood pellet which is in the bag (for example 0.4kg)
8. Multiply it by 30 minutes ($0.4 \times 30 = 12\text{kg/h}$). This is the **feeder's performance**
9. **Repeat the steps 4-8**, 2-3 times until you make sure that you weight the right quantity.
10. **Place this value (i.e 12kg/h) on manufacturer's settings menu, in the parameter "5. Feeder Performance"**
11. **"CHOICE FUNCTION-/+ " is written on the screen.**
12. By pressing the button "MODE/  " once, starts the automatic operation of the burner
13. When the maximum power of the burner is reached (from 10 to 35kW), then adjust the burners flame by calibrating the air.

The burning air is calibrated just by changing the value of "Overflow pellet's air" at Manufacturer's menu. The value must be between 0.20-0.7, depending on the maximum burner's power, pellet quality, boilers construction and chimney's draught.

7.3. Fuel loading

The fuel must be loaded in the fuel tank and is then supplied to the pellet burner through the pellet feeder. This is controlled directly by the pellet burner.

The first time the burner is started, the pellet feeder must be filled completely. This can take up to 15 minutes, depending the length of the feeder and the rotation speed of the motor.


When adding fuel to the silo, be careful for any big woods, plastics or metal items not to enter the silo. Such objects can block the pellet feeder or even damage it, and stop the burner operation. Fuel can be added at any time while the boiler is in function.

Do not leave the silo to reach completely empty, because the feeder will empty and will need to be filled again.



Do not load manually fuel to the burner directly! The burner loading must be done only through the pellet feeder!

7.4. Feeder filling procedure

1. Remove the plastic tube connection the burner with the feeder
2. Burner must be at stop mode. So, "Stop" appears on the LCD scree
3. By pressing the button "MODE/ " once changes the operation from "Stop" to "ignition".
4. "CHOICE FUNCTION-/+ " appears on the LCD screen

5. Press the button to start the feeder



6. Feeders operation lasts 11min (Manufacturer's setting / Feeder's filling time"

7. When the wood-pellet starts to come out of the feeder, press



8. Connect the feeder with the burner, by using the plastic pipe.

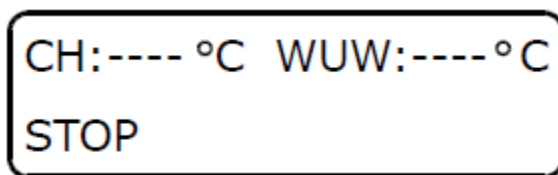
9. If the "Feeder's filling time" is not enough, press to start the feeder again





7.5. Operation mode

7.5.1. Starting the burner

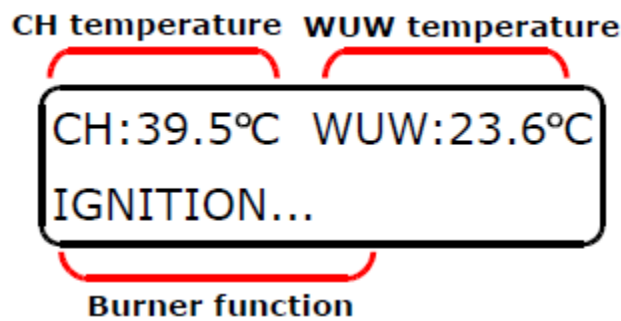
1. Activate the burner by connecting it with a power supply (230Volt, 50Hz)
2. It is written on the LCD screen the following



3. By pressing the button "MODE/ " once changes the operation from "Stop" to "ignition".
By pressing the button "MODE/ " changes the operation from "Ignition" to "Automatic".

BOILER START-UP

4. In "Automatic mode", starts the operation of the burner.



5. When the photo sensors detect fire, then the burner starts its "Work" by increasing its power gradually to the power it has been set (i.e. 30kW)

6. When the boiler's water temperature reaches the desired temperature "HEATING WATER TEMPERATURE", the power of the burner goes down to 3kW (**Maintain mode**)

7. The burner works at "Maintain mode" till the boiler's water temperature goes down to the temperature:

"HEATING WATER TEMPERATURE - CH FURNACE HYSTERESIS"

7.5.2. Stopping the burner

1. The burner can be either at "**Work**" or "**Maintain**" or "**standby**"
2. Press the button "**MODE**" continuously till "**STOP MODE**" appears on the screen.
3. It is written "*Burning off*" till the photo sensor stops to detect fire (3-5 min)
4. When the photo sensor stops to detect fire, "cleaning procedure takes place for few seconds."

7.6. Checks to carry after initial start-up

During the first start-up you need to carefully check the air-tightness of all the connections, especially the doors and the connection with the chimney.

Check that the thermostats function properly and devices operate accordingly. Wait for the boiler to reach the preset temperature and make sure the fan stops properly and the flame falls down.

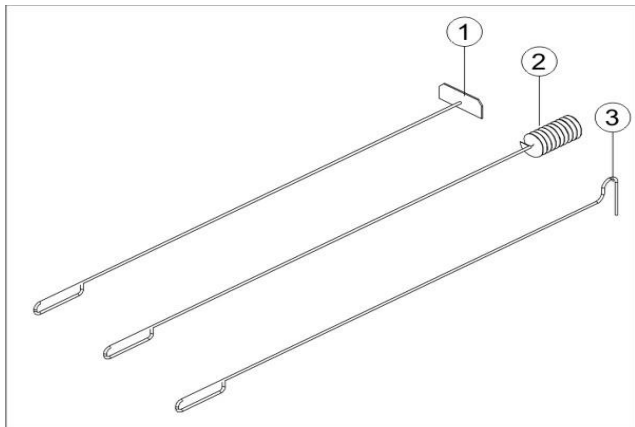
Check the temperature and pressure rise in the network. Make sure it is according to the indications. Check if there is any water leakage in the network.

After burning of the fuel is completed, check the situation inside the boiler. If the walls are too black, it means that there is insufficient air supply. If there is condensation forming on the boiler walls, it means that the pump operation starts at a low temperature or the fuel has too big humidity content. Make sure you set the pump according to the indications and you install a return temperature protection system as indicated.

8. SERVICE AND MAINTENANCE

8.1. Cleaning the boiler

Pellet boilers require regular cleaning in order to function properly and efficient. The boiler is equipped with three cleaning tools appropriate for the cleaning procedure of the boiler, as shown in Fig 8.



Legend:

1. Ash scraper
2. Tubes brush
3. Hook

Fig 8. Boiler cleaning tools



The boiler function must be stopped before cleaning! Make sure all the devices are stopped, and the boiler has cooled down. It is strictly prohibited to clean the boiler while in function!

Open the ash box situated at the bottom of the boiler. First clean the burner head and any other parts that need to be cleaned.

Open the door to have access to the heat exchanger. Remove the turbinators from the tubes, and clean the tubes with the brush. Afterwards clean the surfaces of the fire chamber with the the scraper, as shown in Fig 9. With the same tool, scrape the ash and any other remains from the walls of the boiler.

The hook can be used to remove the turbinators or other surfaces that might be hot or blocked.

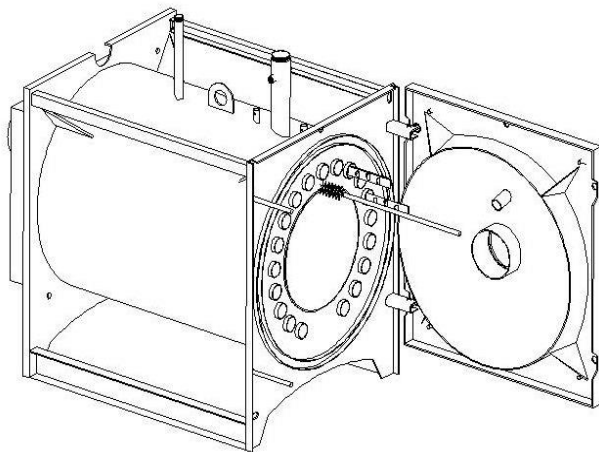


Fig 9. Cleaning of the boiler

When the ash box is filled with ash, dispose it. This interval can vary between 1-3 weeks, according to the quality of the pellets and the intensity of boiler function.



The ash must be disposed in an appropriate container! Do not throw the ash together with the domestic garbage. Be careful since ash might contain hot particles, even long time after stop.

8.2. Cleaning the chimney box

To ensure efficient and safe function of the boiler, you must clean the chimney box from ash residues **at least every 3 months**.

The ash box is equipped with a cleaning door for this purpose, as shown in Fig 10. In order to open the door, unscrew the wing nuts, remove the washers and springs that keep it in place.

Clean the interior of the chimney box and remove all the ash and residues.

Put back the door the same way as removed.



The springs must not be omitted! They act as safety in order of explosion of exhaust gases in the chimney box.

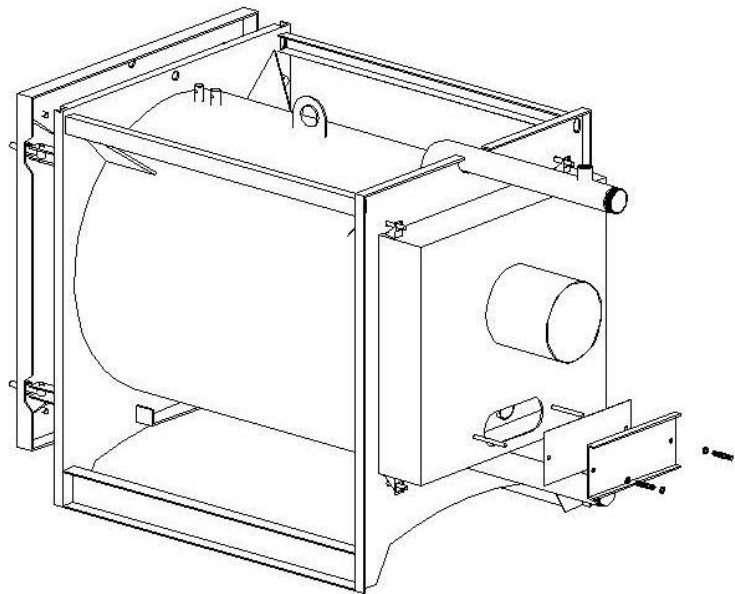





Fig 10. Cleaning the chimney box

8.3. Cleaning burner's chamber

1. The burner can be either at "**Work**" or "**Maintain**" or "**standby**"
2. Press the button "**MODE/**" continuously till "**STOP MODE**" appears on the screen.
3. It is written "**Burning off**" till the photo sensor stops to detect fire (3-5 min)
4. When the photo sensor stops to detect fire, "cleaning procedure takes place for few seconds.
5. When "**Stop**" appears on the LCD screen, waiting few minutes till the burner cools down.
6. Open the boilers door, clean the burners tube and close back the door.
7. By pressing the button "**MODE/**" once changes the operation from "**Stop**" to "**ignition**".
8. By pressing the button "**MODE/**" changes the operation from "**Ignition**" to "**Automatic**".

**** The frequency of cleaning burner's chamber is depended on wood pellet quality. If premium pellet is used, It is suggested the burner's chamber to be cleaned once a week.**

8.4. Maintenance intervals

8.4.1. Daily maintenance

The pressure of the network must be daily verified to be within the allowed limits. Make sure that all the safety devices and pumps function properly.

8.4.2. Weekly maintenance

The pellet burner must be cleaned according to the manufacturer's instructions, usually recommended once a week. The boiler must also be cleaned every 7-15 days, depending on the ash quantity accumulated on the boiler walls and in the heat exchanger. Cleaning procedure must be performed according to the instruction given in the corresponding paragraph.

Check the quantity of ash accumulated in the ash box. The ash disposal can be performed every 2-3 weeks, depending on the ash quantity formed.

8.4.3. Monthly maintenance

Check the doors and the sealing cord. Make sure the contact with the boiler is air-tight. If ash has accumulated on the sealing cord, clean it.

Remove the turbinators from the heat exchanger and check their condition.

It is recommended that you clean the chimney box of the boiler and the chimney pipes at least every 3-4 months, in order to assure efficient and safe function of the boiler.

8.5. Basic service procedures

8.5.1. Service after overheating

If overheating occurs, the safety valves of the boiler must open.

Make sure the boiler pump is working. In case of blackout open all the valves of the system to let hot water out of the boiler. In any case a blackout protection UPS is recommended to be installed on the boiler pump.

If the chimney damper is not fully opened, put it in fully open position.



All safety devices must lead to drainage! After overheating, make sure that all the water from the safety devices has drained, and the system has filled with cold water. Check the pressure and the temperature of the boiler.

At overheating, the safety thermostat will activate, and cut electrical supply to the fan. In that case, you need to manually reset the safety thermostat and put the system back in function. Unscrew the plastic cover of the safety thermostat and press the switch. Put the plastic cover back.



Verify the causes of the overheating! If it happens again, check the installation and function of the pumps and safety devices!

8.5.2. Restart the burner after an error

1. Turn off the burner by using the electric switch the burner is connected.
2. Open the boiler's door and check the burner tube.
3. Remove any ashes and impurities from burner fire chamber.
4. Close the door and switch on the controller by using the electric switch the burner is connected
5. By pressing the button "MODE/  " once changes the operation from "Stop" to "ignition".
By pressing the button "MODE/  " changes the operation from "Ignition" to "Automatic"

8.6. Maintenance after long stop

It is necessary to perform a general maintenance and cleaning of the boiler after the heating season. Clean thoroughly all the surfaces of the boiler as described in the corresponding paragraph. Also clean the chimney box, and all the chimney parts where ash might be deposited. After cleaning all the ash, empty the ash box and leave the boiler clean for the next winter season.

After long stop of the boiler, before you put in function you need to perform the following checks:

- Check the condition of the electric cables and the sensors. Make sure they are not damaged. Check that the thermometer indicates the correct temperature and all the thermostats function properly. Make sure the bulbs are properly positioned in the case.
- Make a general check of the chimney and make sure it is clean and free of obstacles.
- Verify the pressure in the heating network and the boiler.



Do not empty the water of the boiler and the heating installation after the heating season! It will corrupt all the installation and especially the boiler.

- Check that all the valves are working properly. Replace them if necessary. Pay special attention so that all the safety equipment of the boiler functions properly!
- Make sure all the ball valves of the boiler and other relative equipment are open.
- Check the function of the pumps. They might be blocked after long stop.
- Check that there have been no modifications to the installation and the boiler room (ventilation openings, chimney, doors).
- Check the fan and clean from dust. Turn it manually to ensure it is not blocked.

9. TROUBLESHOOTING

Indication	Description	Solution
<p>CH:!!!! WUW:!!!!!! STOP</p>	<p>Malfunction of the water temperature sensors</p>	<p>1. The driver starts up relevant emergency procedures for every sensor in order to prevent the boiler from working beyond the safe range for the installation of the central heating 2. When the boiler cools down, then restart the controller and set the burner on automatic mode.</p>
<p>"Furnace protect"</p>	<p>The temperature in the boiler is higher than 92°C. If the temperature is above 95°C, the STB sensor is activated and the feeder is turned off automatically (the light next to the STB sensor is ON). At any case the pumps are activated to avoid higher temperatures</p>	<p>1. Wait till the boilers water temperature goes down to 60°C 2. Reset the STB sensor, so the light next to it to be OFF. 3. Restart the controller and set the burner at automatic mode.</p>
<p>"Burner alarm"</p>	<p>The temperatures on burner's feeder pipe is higher than 70°C. (Back fire protection) This is happened either the chimney's draught is no the appropriate or the burner hasn't been cleaned.</p>	<p>If the temperature goes down to 60 °C and the photo sensor scans light, then the burner's operation continuous normally. If the temperature goes down to 60 °C and the photo sensor doesn't scan any light, then the signal "Burner alarm" is still on the LCD and you must restart the controller.</p>
<p>"NO pellet"</p>	<p>No pellet on the silo</p>	<p>1. Fill up the silo with pellet 2. Fill the feeder with pellet (Filling feeder procedure) 3. Set the burner at automatic mode</p>
	<p>The feeder doesn't work</p>	<p>If the light next to STB sensor is ON, it means that overheat of the boiler has occurred and STB has turned the feeder OFF. 1. Reset the STB sensor, so the light next to it to be OFF. 2. Restart the controller and set the burner at automatic mode.</p>
	<p></p>	<p>Check the cable from feeder to the controller</p>
	<p>3. Problem during ignition procedure</p>	<p>Burner's tube hasn't been cleaned properly 1. Clean the burner 2. Restart the controller and set the burner at automatic mode.</p> <p>Igniter doesn't work 1. Change the igniter inside the burner.</p>

DECLARAȚIE DE CONFORMITATE EC
CE DECLARATION OF CONFORMITY
(conform cu ANEXA IV din Directiva Europeană 2014/68/EC)
(in compliance with the Annex IV of the European Directive 2014/68/EC)

Producător / The Manufacturer's name:

THERMOSTAHL ROMANIA SRL

Adresa producătorului / Manufacturer's address:

Str. Drumul Osiei 57-59, sector 6, București, România

PRIN PREZENTA, DECLARĂ

Declares that the equipment

Tip: <i>Type:</i>	Cazan de apă caldă cu funcționare pe combustibil solid -încărcare automată <i>Heating boiler for solid fuel, automatically stocked</i>
Obiectul declarației: <i>Object of the Declaration:</i>	PLC Seria / Anul: <i>Serial Number / Year:</i>

ESTE CORESPUNZĂTOR CU CERINȚELE DIRECTIVEI 2014/68/EC-ECHIPAMENT SUB PRESIUNE
MEETS THE REQUIREMENTS PROVIDED BY THE 2014/68/EC DIRECTIVE-PRESSURE EQUIPMENT

ȘI A URMĂTOARELOR DOCUMENTE:
AND THE REQUIREMENTS OF THE FOLLOWING DOCUMENTS:

Produsul este conform cu următoarele standarde: <i>The product is in compliance with the following standards:</i>	
EN 303-5:2012	Cazane de încălzit. Partea 5: Cazane speciale care utilizează combustibili solizi, cu încărcare manuală și automată, cu puterea utilă mai mică sau egală cu 500 kW. Terminologie, cerințe, încercare și marcare <i>Heating boilers.</i> <i>Part 5: Heating boilers for solid fuels, hand and automatically stocked, nominal heat output of up to 500 kW</i> <i>Terminology, requirements, testing and marking</i>
Directive Europene aplicabile echipamentului <i>European Directives applied to the equipment</i>	
2014/68/EC	Directiva Echipament sub Presiune / Pressure Equipment Directive (PED)
2014/35/EC	Directiva Echipamente de joasă tensiune / Low Voltage Directive (LVD)
2014/30/EC	Directiva Compatibilitate Electromagnetică / Electromagnetic Compatibility Directive (ECD)

Informații suplimentare / *Additional information:*

Toate echipamentele care fac obiectul prezentei declarații au fost testate hidraulic la presiune de proba egală cu 1,5 ori presiune maxima de lucru, conform cu Anexa I – p. 7.4 a Directivei 2014/68/EC.

As provided by the Annex I - p. 7.4. of the 2014/68/CE Directive, all the equipment object of the present Declaration have been hydraulic tested to a test pressure equal to 1,5 times the maximum allowed working pressure.

Director General
General Director

Matsios Dionysios



România, București, 15 Octombrie 2018

**THERMOSTAHL ROMANIA
SISTEME TERMICE S.R.L.**

DRUMUL OSIEI 57-59, sector 6
București 062395, România
www.thermostahl.ro