



MULTIFUEL BIOMASS BOILER

ECOBIO

INSTALLATION AND USER MANUAL



VERSION: 3.3
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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 ROMANIA 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

ECOBIO is an automatic multifuel boiler, specially designed for use with pellet, carbon, olive husks, oats, and also manually wood. The furnace is specially designed for protection against fire return. The fuel transportation is performed with a feeder, driven by a motoreducer and the combustion air is delivered by a fan. Fuel is deposited into a silo of big capacity, which can ensure autonomy from 3 up to 5 days.

The boiler is equipped with a modulating fan and a digital controller. The boiler can also control the heating pump and the hot water pump.

The boiler is available in two versions: with manual fuel ignition and with automatic ignition (version ECOBIO-R).

The ECOBIO boiler is a product designed to operate in economy mode, providing a constant heating of houses or small industrial premises. It can be connected to radiators or heaters with hot water.

The boiler is made of steel, ideal material for thermal fluctuations, resistant to expansion and contraction with two passes of burned gases. Also this boiler is protected against thermal shock.

ECOBIO boiler is designed so that all surfaces that are in contact with the flame are cooled by water. The two flue ways at the top, the large number of flue pipes, large volume of the furnace and boiler water as well, and symmetrical construction causes a high yield.

DESCRIPTION OF BOILER COMPONENTS

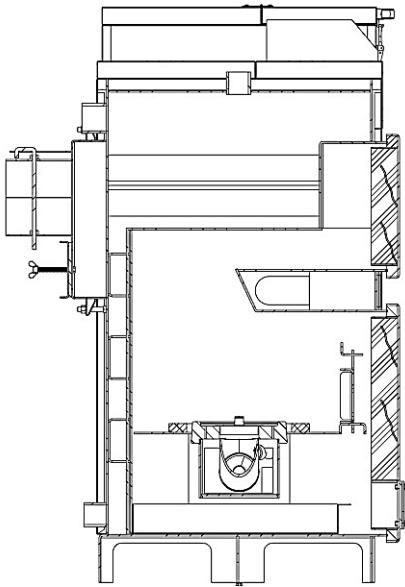
- Steel boiler body
- Removable rear smoke box with inspection cleaning door
- Upper door for heat exchanger cleaning
- Lower door for ignition, fuel loading and ash removal
- Ash box positioned on the lower part of the fire chamber
- Glasswool body insulation of 50 mm thickness
- Electrostatically painted external covers
- Safety heat exchanger (optional)
- Digital control panel

DESCRIPTION OF FURNACE COMPONENTS

- Steel furnace body
- Feeding auger welded to solid axis
- Combustion air fan
- Feeding motoreducer
- Transmission system with chain wheels
- Transmission system protection cover
- Cast iron combustion plate
- Cast iron wood grates
- Ignition element (optional)
- Fuel silo with shuttering lid

2.2. Function principle

2.2.1. Boiler



The function of the ECOBIO boiler is based on exhaust gas evacuation through the chimney. The combustion takes place in the fire chamber. During the combustion the flame comes in contact with the side walls of the fire chamber, which are surrounded by water. The fire chamber is of big volume in order to receive big dimension logs and to ensure a long autonomy.

The combustion air is supplied by the fan and distributed through the furnace plate. The fuel feeding is regulated through an auger which is moved by a motoreducer.

The exhaust gases are guided through the heat exchanger to the smoke box, and afterwards evacuated to the chimney. The smoke box is equipped with an inspection and cleaning door.

The doors have an insulation cord to ensure air-tight closing. Each door is equipped with a handle, which must always be well tightened during the combustion.

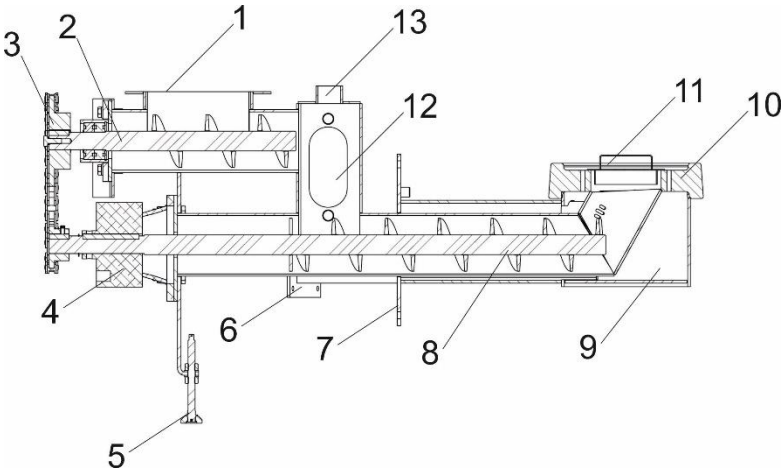
Fig 1. Boiler function

2.2.2. Furnace

The ECOBIO boiler is equipped with the innovative biomass furnace BIOFIRE. The system is consisted of two axes (BI-AX): the lower axis is the main one, feeding fuel to the furnace, while the upper is the secondary, transporting the fuel from the silo to the main axis. Between the two axes there is a safety DROPBOX device. This safety device has an air by-pass system which protects against smoke return to the silo. This way the danger of blockage and backfire is eliminated. The motoreducer is mounted on the lower axis, and the transmission is realized through chain wheels. A metal protection cover is placed around the transmission system.

The combustion air is supplied by the fan mounted on the furnace. In case the optional ignition system is installed, there is an ignition element mounted on the furnace.

A temperature sensor is installed on the furnace which supervises the feeder temperature. If the measured temperature exceeds the safety limit, the feeder motor is activated in order to push the fuel towards the furnace head and avoid fire back to the silo.

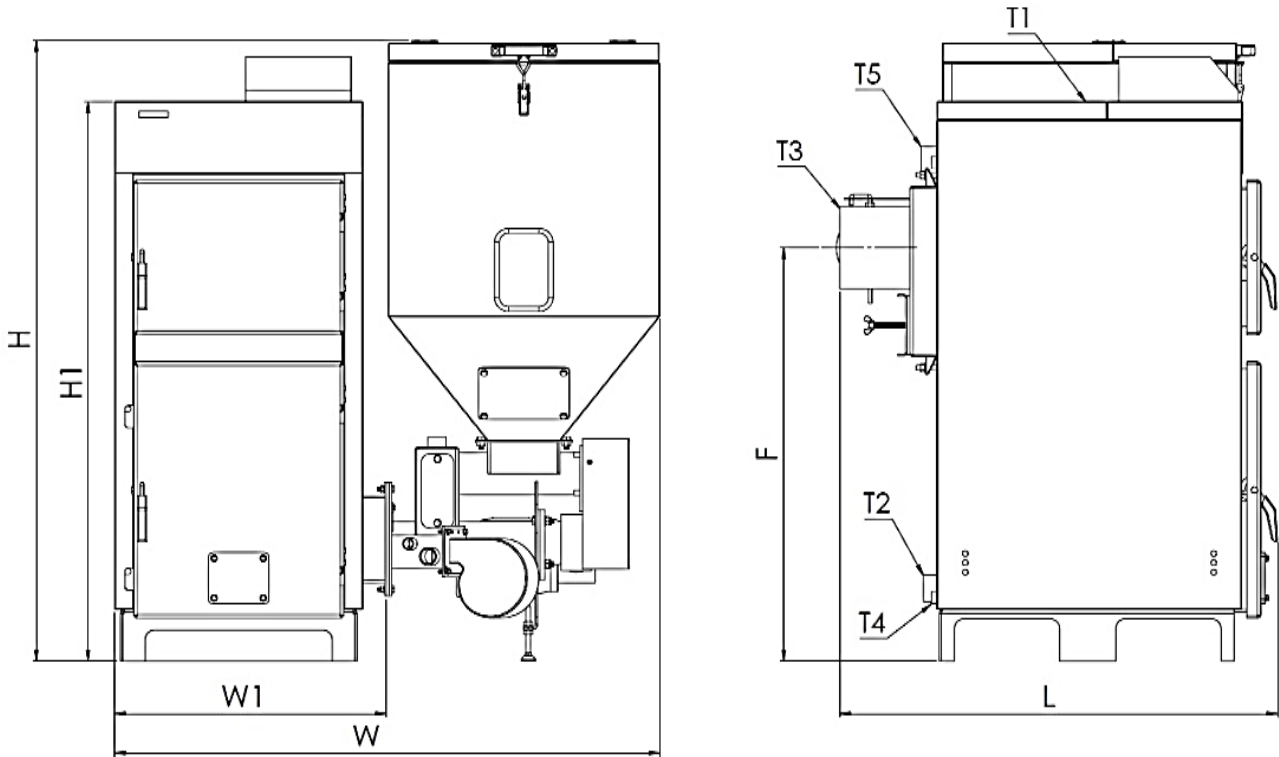


- Legend**
- 1 Silo flange
 - 2 Upper feeding axis
 - 3 Tansmission chain
 - 4 Motoreducer
 - 5 Support leg
 - 6 Fan
 - 7 Boiler flange
 - 8 Lower feeding axis
 - 9 Air chamber
 - 10 Cast iron combustion plate
 - 11 Funrnce protection cover
 - 12 Access door
 - 13 DOPBOX safety element

Fig 2. Furnace function

TECHNICAL FEATURES AND DIMENSIONS

2.3. Dimensions



Boiler type	Wood loading dimensions	H1	H	W1	W	F	L	T1-T2	T3	T4	T5
	mm	mm						inch	mm	inch	
ECB 25	340x250	1195	1325	580	1165	880	935	1½"	Ø180	¾"	2"
ECB 30	340x250	1195	1325	580	1165	880	1035	1½"	Ø180	¾"	2"
ECB 40	340x250	1195	1325	580	1165	880	1135	1½"	Ø180	¾"	2"
ECB 50	470x250	1310	1410	710	1300	1000	1035	1½"	Ø180	¾"	2"
ECB 60	470x250	1310	1410	710	1300	1000	1135	1½"	Ø180	¾"	2"
ECB 80	565x330	1650	1750	810	1395	1195	1385	2"	Ø200	¾"	2 ½"
ECB 100	565x330	1650	1750	810	1395	1195	1585	2"	Ø200	¾"	2 ½"

TECHNICAL FEATURES AND DIMENSIONS

2.4. Technical data

Boiler type		ECB 25	ECB 30	ECB 40	ECB 50	ECB 60	ECB 80	ECB 100
Nominal power ¹	<i>kW</i>	25	30	40	50	60	80	100
Furnace power	<i>kW</i>	29	35	46	57	69	91	114
Efficiency pellet / wood	%	88 / 83						
Boiler class ²		4						
Max working pressure	<i>bar</i>	3						
Test pressure	<i>bar</i>	4,5						
Max working temperature	<i>°C</i>	90						
Exhaust gas temperature	<i>°C</i>	180-220						
Fuel consumption at max work ³	<i>kg/h</i>	5,92	7,14	9,38	11,63	14,10	18,57	23,26
Silo volume	<i>l</i>	300	300	300	300	300	500	500
Boiler autonomy (at max work)	<i>h</i>	35	29	22	18	15	19	15
Water pressure drop (ΔT 20K)	<i>mbar</i>	20	24	32	48	52	58	62
Water contents	<i>l</i>	100	120	130	170	190	370	440
Fire chamber length	<i>mm</i>	480	580	680	580	680	850	1050
Weight (empty)	<i>kg</i>	322	348	376	439	475	785	870
Total power consumption (without optionals)	<i>kW</i>	0,65	0,65	0,65	0,66	0,66	0,66	0,66
Electrical connection	<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.

Furnace		ECOBIO 25-40	ECOBIO 50-60	ECOBIO 80-100
Fan	Type	RV-12RK	RV-05RK	RV-06RK
	Power <i>W</i>	70	85	85
	Air debit <i>m³/h</i>	240	400	480
	Pressure <i>Pa</i>	310	400	480
	El. Supply <i>V/Hz</i>	230/50	230/50	230/50
	Noise level <i>dB</i>	<60	<60	<60
	El index	IP 20	IP 20	IP 20
Motor	Type	EWM 30-50/300	EWM 30-50/300	EWM 30-50/300
	Power <i>W</i>	180	180	180
	El. Supply <i>V/Hz</i>	230/50	230/50	230/50
	El index	IP 54	IP 54	IP 54
Ignitor*	<i>W</i>	400	400	400

*Automatic ignition version

2.5. Fuel

The ECOBIO series is designed for automatic function with solid fuel of biogenic or fossil nature, with granulation up to 30mm and humidity up to 20%. The boiler is also able to be used on wood or other solid fuels with manual feeding, without any modification.

This means different types of biomass fuels, such as pellet, agropellet, olive husks, fruit kernels, cereals, granulated carbon. When the fuel used has characteristics that significantly vary from nominal (i.e. carbon, cereals, agricultural residues), they must be used in combination with pellet or agropellet at a 50:50 ratio. If you want to use solely carbon as fuel, please contact the manufacturer.

The fuel with the best quality, considering calorific power, ash content, humidity and standartization, is wood pellet. The less quality of the fuel, the more fuel supply must be provided to achieve the nominal power and of course the most the consumption and the ash remains.



The nominal characteristics of the boiler are calculated for use on wood pellet!

Fuel type	Calorific power	Max diameter	Max humidity	Ash content
	<i>kWh/kg</i>	<i>mm</i>	<i>%</i>	<i>%</i>
Pellet	4,8	6 - 8	<10	<1
Agropellet	4 - 4,2	6 - 10	<10	<5
Coal	5,3 - 6,5	3 - 25	<15	4 - 8
Lignite	1,6 - 3,8	3 - 25	<20	<10
Cereals (oat)	4,2	3 - 6	10 - 13	0,6
Wood chips	4,3	5 - 25	<20	4 - 6
Barks	2,6	5 - 25	<20	8 - 10
Wood	4 - 4,3	-	<20	4 - 8
Wood briquette	5,2	-	<10	<4

Table 1. Characteristics of different types of fuels

Every type of biomass fuel contains a significant amount of humidity, which highly affects its combustion behaviour and calorific value. Boiler output, efficiency and autonomy will significantly diminish as the humidity increases. The nominal data presented in this manual are calculated for humidity content 10%. Maximum allowable humidity content is 20%. If the fuel has bigger humidity, the combustion will be highly imperfect, causing problems to the furnace and the feeder.



In order for the feeding and combustion system to function properly the maximum allowed humidity of the fuel is 20%!



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



It is prohibited to manually feed solid fuel in the boiler simultaneously with the furnace function!



Use of cereals is allowed only in mix 50:50 with pellets!



Use of coke, hard coal, briquetted coal or brown coal is forbidden without consulting the manufacturer!

3. BOILER MOUNTING

3.1. Transportation and delivery

The boiler is delivered on wood pallet, well fixed with screws. Remove it carefully by unscrewing the screws. The loading and unloading of the boiler must be performed with a forklift or a crane.



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

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

- Steel body boiler
- Glasswool insulation mounted on the boiler body
- Metal covers mounted on the boiler body
- Furnace mounted on the side flange with all necessary equipment
- Silo for fuel with air-tight lid
- Cast iron grates for wood combustion
- Digital control panel
- Fan with gasket
- 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.

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

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 3):

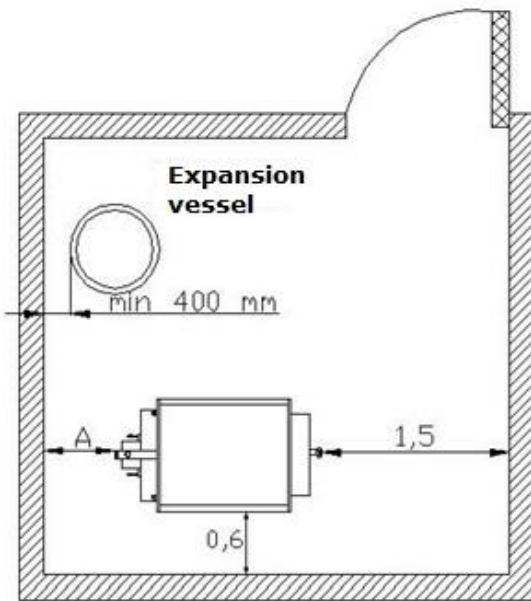


Fig 3. Boiler room dimensions

The distance between the boiler and the back wall - is the proper distance that allows easy access for inspection and maintenance.

The distance between the boiler and side wall - at least 0.6 m.

The height of the boiler room - at least 2 m.

Access in the boiler room of strangers to the operation of boilers and auxiliary installations is prohibited.

Access and service spaces of boiler room and hall doors paths will always be free.

In the boiler room will be displayed operating instructions, taking into account the specificities of the boilers mounted. Also, you will see internal instructions of staff and service duties.

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!

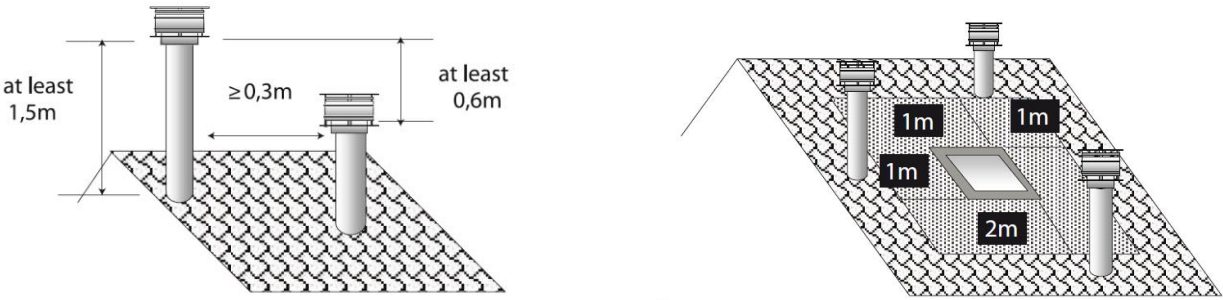


Fig 4. Chimney distances

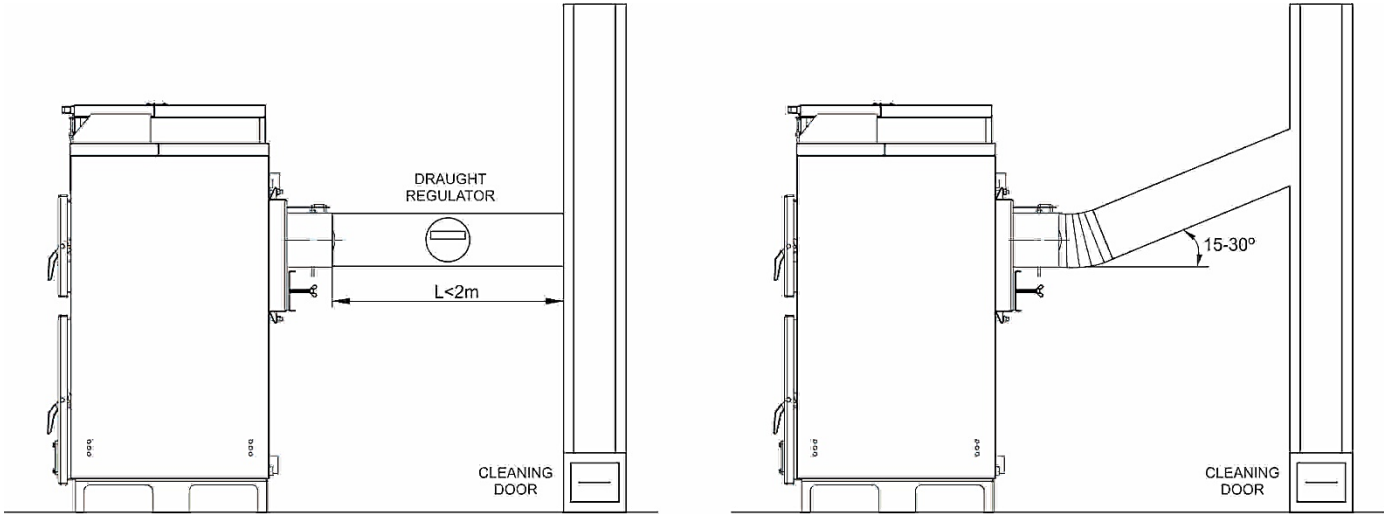


Fig 5. Chimney connection

4. INSTALLATION

4.1. Hydraulic connections

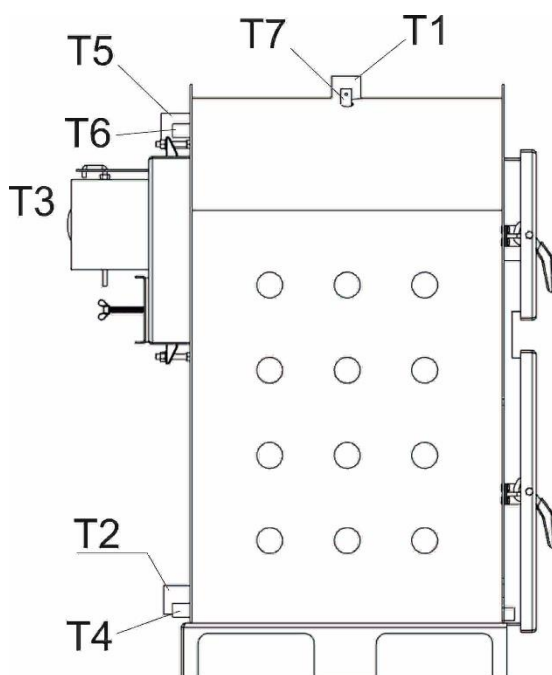
The boiler is intended for connection with an open expansion vessel network. The boiler can be connected also with closed expansion vessel, if it is equipped with a safety heat exchanger (optional).

The boiler is intended for maximum working temperature 90°C and maximum pressure 3 bars.

When connected with a closed expansion vessel, its volume must be chosen double to a similar installation on liquid or gas fuel.



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



Legend

- T1 Outlet
- T2 Return
- T3 Chimney pipe
- T4 Discharge connection
- T5 Safety heat exchanger connection
- T6 Safety heat exchanger sensor bulb connection
- T7 Boiler sensors bulb

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°G.



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. Automatic ignition system

As an optional, the furnace can be provided with an automatic ignition system. This consists of the following:

- Ignition element 400W
- Control panel Ecomax 800P
- Exhaust temperature sensor

The ignition element is installed in a special removable casing, positioned on the furnace flange. The cables are protected with a silicon layer, resistant to temperature up to 300°C. All the electrical connections are prewired.

The controller is equipped with an exhaust temperature sensor. This must be installed on the chimney, at a distance maximum 1m from the boiler.

4.5. Safety heat exchanger (optional)

As an optional, the boiler can be equipped with a safety heat exchanger. This is installed at the back side of the boiler on the T5 connection, and is introduced at the upper part of the fire chamber. **For the function of the safety heat exchanger a safety discharge valve must be installed.** The capillary bulb for the sensor of the valve must be installed on the corresponding connection, according to the following figure, and then the safety valve sensor must be introduced on this bulb.

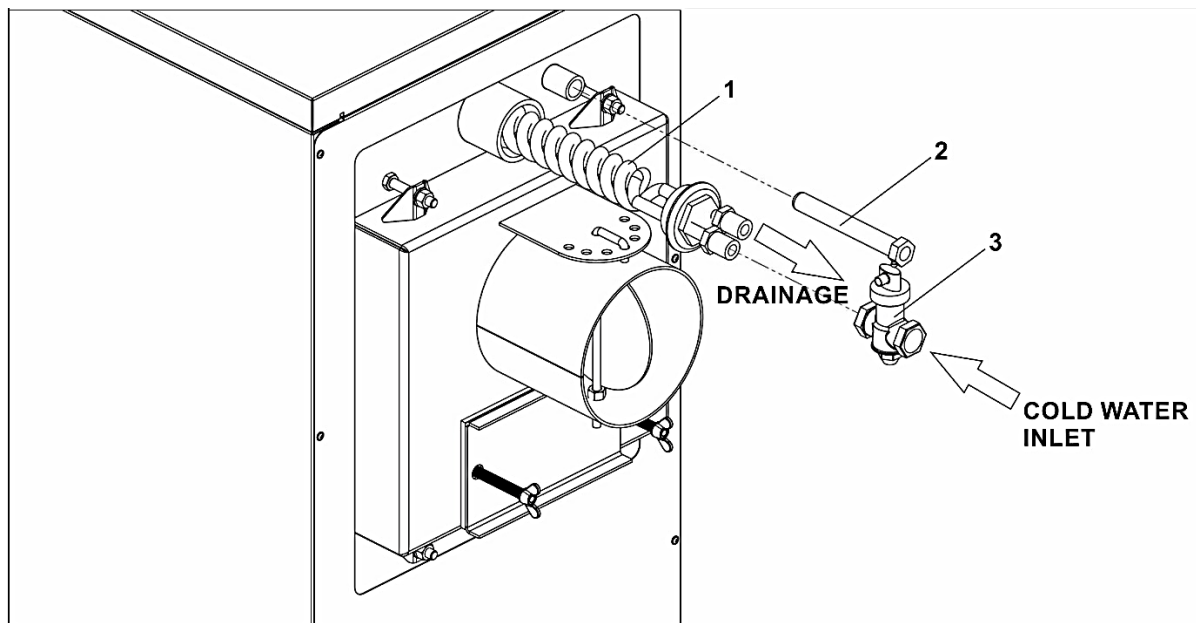


Fig 6. Connection of the safety heat exchanger

Legend

- 1 Removable safety heat exchanger
- 2 Capillary bulb for the sensor
- 3 Safety discharge valve

The safety valve can be installed on any connection of the heat exchanger. Pay attention to the direction of the water flow as indicated on the valve. The safety valve can be installed either on the cold water inlet or the hot water outlet. It is recommended to be installed on the cold water inlet.

For the protection of the safety valve, the installation of a water filter is required in the water feeding line.

The free connection of the heat exchanger must be connected to a drainage pipe.



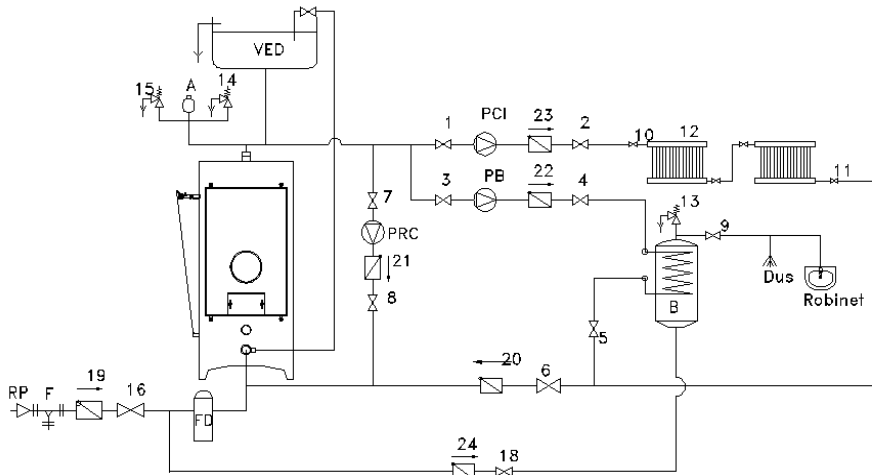
The correct function of the safety valve is essential for the safety of the boiler. Make sure of the valve function and replace it if defect.



To ensure the correct function of the safety heat exchanger, constant water supply or a water tank is required!

4.6. Connection diagrams

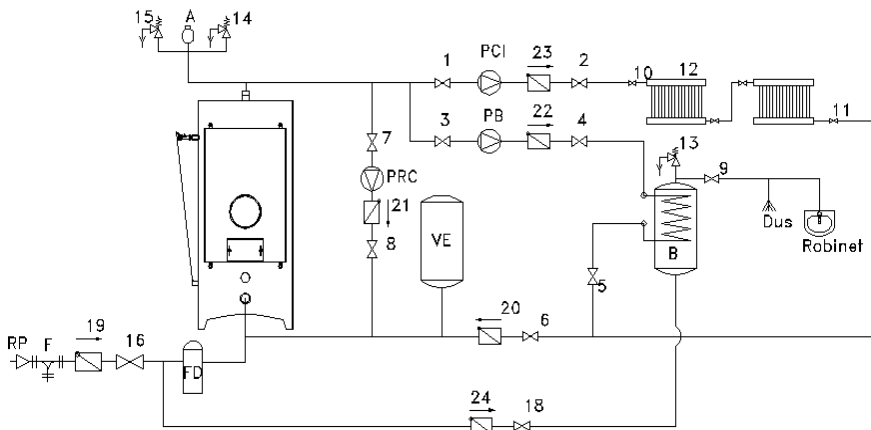
4.6.1. Open expansion vessel connection



Legend

- | | | | |
|--------|-------------------|-----|-----------------------|
| 1-9. | Separation valves | B | Hot water boiler |
| 10,11. | Radiator valves | VED | Open expansion vessel |
| 12. | Radiators | PCI | Central heating pump |
| 13-15. | Safety valves | PRC | Recirculation pump |
| 16. | Filling valve | RP | Pressure reducer |
| 17. | Drainage valve | F | Filter |
| 18. | Cold water valve | A | Air relief valve |
| 19-24. | One-way valves | FD | Water softener |

4.6.2. Closed expansion vessel connection



Legend

- | | | | |
|--------|-------------------|-----|-------------------------|
| 1-9. | Separation valves | B | Hot water boiler |
| 10,11. | Radiator valves | VE | Closed expansion vessel |
| 12. | Radiators | PCI | Central heating pump |
| 13-15. | Safety valves | PRC | Recirculation pump |
| 16. | Filling valve | RP | Pressure reducer |
| 17. | Drainage valve | F | Filter |
| 18. | Cold water valve | A | Air relief valve |
| 19-24. | One-way valves | FD | Water softener |

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.

The connecting wires must not come in contact with hot surfaces, which have a temperature higher than the allowed one.

The wire tips, especially on the power connection, must be protected with insulated clamping sleeves, as in the following figure:

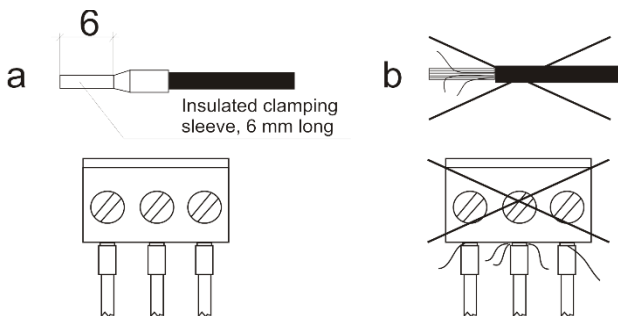


Fig 7. Wires electrical connection: a) correct, b) wrong

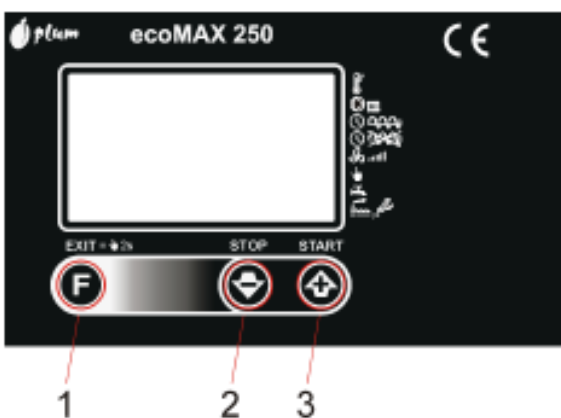
All grounding wires must be installed on the provided terminal marked with the symbol \oplus .



THERMOSTAHL ROMANIA SRL declines any liability for damage caused to people, animals and goods, due to defects caused by faulty electrical connections or lack of connecting the boiler to an efficient grounding system.

5.2. Version with manual ignition

5.2.1. Description of buttons and display



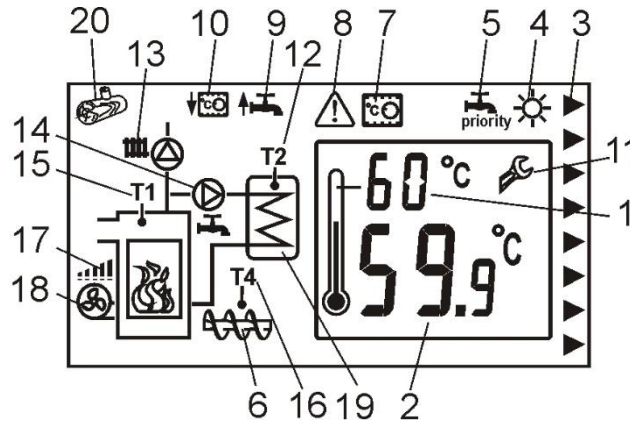
Legend

1. "F" button:
 - short press – access the menu
 - long press – exit submenu
2. STOP button:
 - short press – decrease value
 - long press – burning stop
3. START button:
 - short press – increase value
 - long press – starting the boiler











After turning the regulator on, the START and STOP buttons are used to enable and disable airflow respectively.

The regulator provides SUPERVISION function that is activated automatically.

5.2.2. Description of the main display screen

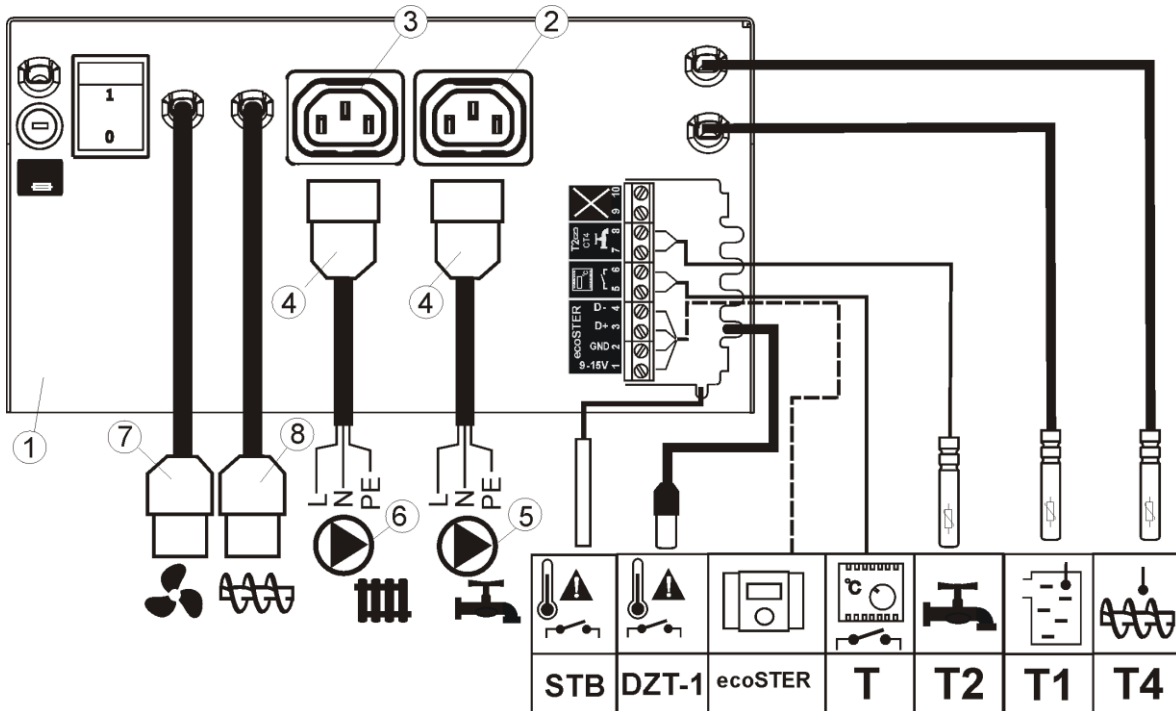


Icons:

- | | |
|---|--|
|  <p>Temperature settings:
1 – preset boiler temperature
2 – measured boiler temperature</p> | <p>7. Room thermostat - this symbol lights up when the temperature inside the room reaches the preset value (contacts are disconnected).</p> |
|  <p>Central heating pump starting temperature</p> | <p>8. Alarm symbol.</p> |
|  <p>Hot utility water pump starting temperature</p> | <p>9. Signal of increasing the preset boiler temperature due to hot utility water heating.</p> |
|  <p>Feeding time in OPERATIONAL mode</p> | <p>10. Signal decreasing the preset boiler temperature due to operation of the room thermostat.</p> |
|  <p>Break time in OPERATIONAL mode</p> | <p>11. Service menu symbol.</p> |
|  <p>Fan power in OPERATIONAL mode</p> | <p>12. Hot utility water temperature sensor.</p> |
|  <p>Manual control</p> | <p>13. Boiler pump symbol.</p> |
|  <p>Setting hot utility water mode operation:
1 – HUW priority,
2 – simultaneous operation of pumps,
3 – SUMMER mode,
4 – HUW pump off.</p> | <p>14. Hot utility water pump symbol (HUW).</p> |
|  <p>- Return to factory settings</p> | <p>15. Boiler temperature sensor.</p> |
|  <p>- Service menu symbol</p> | <p>16. Feeder temperature sensor.</p> |
| <p>Legend:</p> <p>1. Preset boiler temperature.</p> <p>2. Measured temperature of boiler.</p> <p>3. Signal arrow.</p> <p>4. SUMMER – hot utility water mode symbol.</p> <p>5. PRIORITY - hot utility water mode symbol.</p> <p>6. Feeder operation symbol.</p> | <p>17. Airflow power.</p> <p>18. Fan operation symbol: not visible – regulation is off; visible regulation is on; flashes – the regulator is in the SUPERVISION mode.</p> <p>19. Hot utility water tank symbol.</p> <p>20. Manual function on wood.</p> |

ELECTRICAL CONNECTIONS

5.2.3. Electrical connections



Legend

1. Control panel
2. IEC socket for power supply of hot utility water (230V~)
3. IEC socket for power supply of central pump (230V~)
4. IEC plug
5. Hot utility water pump
6. Central heating pump
7. IEC fan connector (230V~)
8. IEC feeder connector (230V~)
- T1. Boiler temperature sensor (type CT4)
- T2. Hot utility water temperature sensor (type CT4)
- T. Room thermostat (opened=no heating / closed=heating)
- ecoSTER200. Room panel with room thermostat function
- STB. Safety temperature limiter

Note: Do not use the ecoSTER room panel and room thermostat at the same time!

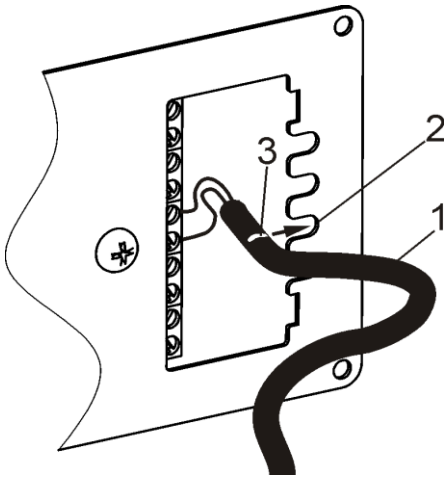
The regulator is designed to be fed with 230V~, 50Hz voltage. The electrical system should be three core (with protective wire), and in accordance with applicable regulations.

The connection wires should not have contact with hot surfaces (with temperature exceeding the nominal temperature of their operation). Terminals 1–10 are intended for connection with low voltage (<15V) devices.



Connecting mains supply 230V~ to terminals 1–10 will damage the regulator and creates risk of an electric shock!

ELECTRICAL CONNECTIONS

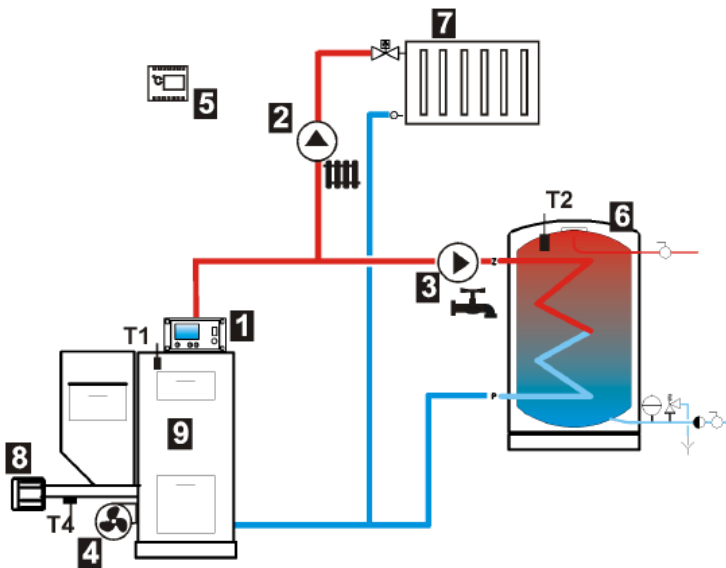


In order to connect the sensor or wire, take off the terminal cover and screw cores of cables into the terminal. Press in the sensor cable (1) into a pit (2). A slot (3) will be impressed on the cable. Do not insert any metal elements nor wires shielded with metal into the regulator. Maximum length of a cable inserted into the regulator should not exceed 60mm. To take off the cover just loosen the screw (4).



Electric cables cannot be close to nor touch hot elements with temperature higher than 70°C. Special attention should be paid to the distance between cables and chimney duct. Electric shock hazard!

5.2.4. Hydraulic function scheme



Legend

- 1. Regulator
- 2. Central heating pump
- 3. Hot utility water pump
- 4. Fan
- 5. Room thermostat
- 6. Hot utility water tank
- 7. Central heating system
- 8. Feeder
- 9. Boiler
- T1. Boiler temperature sensor
- T2. Hot utility water temperature sensor
- T4. Burner temperature sensor



The presented hydraulic diagram does not replace the central heating system design and it can be used for reference purposes only.

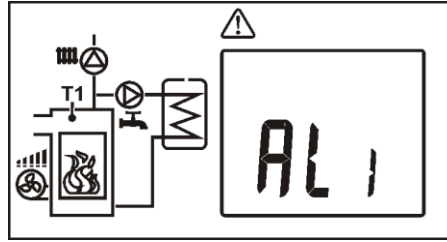
Brief description of the system functioning: after firing the boiler up, the central heating pump is activated after the boiler exceeds the *central heating pump activation temperature* (service parameter n0, by default n0=40°C). The hot utility water pump is activated when the tank temperature (6) drops below the preset value. If at this time the preset boiler temperature is lower than the preset hot utility water temperature, the regulator increases the preset boiler temperature in order to fill the hot utility water tank.

After filling the hot utility water tank, the hot utility water pump can continue work for a preset time, in order to collect heat from the boiler. After the room thermostat (5) operates, the regulator decreases the preset boiler temperature and/or temporarily disables the central heating pump (2).

5.2.5. Alarms description

No fuel AL1

After detecting a fuel shortage, the following message will appear on the display:



No sound signal will be activated.

Boiler temperature sensor damage AL2

This alarm will occur in the case of damage to the boiler sensor and after exceeding its measuring range. The alarm switches the central heating and hot utility water pumps into operation mode in order to cool the boiler down. A sound signal is also activated. The alarm is canceled after returning within sensors measurement range and after switching the regulator off and on via the mains switch. In such case, check the sensor, and possibly replace it.

Exceeding the maximum boiler temperature AL3

This alarm will occur after the boiler exceeds 95°C temperature. In such case, the fan is turned off and the central heating and hot utility water pumps are activated. Sound signal is activated. The hot utility water pump works only until the hot utility water tank temperature exceeds the Max.HUW temp. After the boiler temperature drops by over ten degrees, the regulator resumes normal operation.

Feeder sensor damage AL4

Feeder sensor damage results in analogical action as in AL5 alarm.

Alarm of exceeding maximum feeder temperature AL5

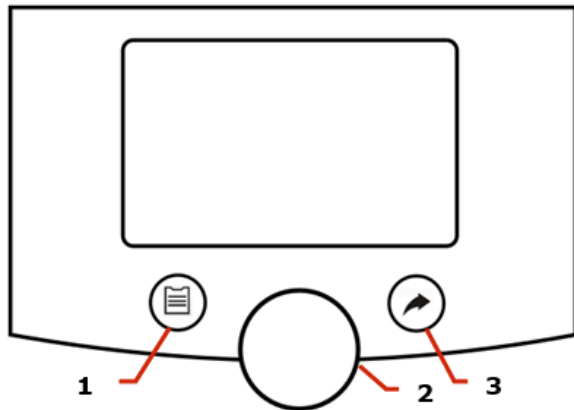
The alarm will occur if the feeder temperature exceeds the maximum feeder temperature. If the feeder temperature exceeds this value, the regulator will enable the feeder for feeder emergency operation time. During this time the airflow will be disabled and pumps will be enabled. After "forcing the fuel out", the regulator disables the feeder and does not enable it any more until the feeder temperature drops. The alarm disables when the temperature drops.



The protection of the „flame return“ will not work if the feeder is not connected to electricity!

5.3. Version with automatic ignition-ECOMAX 920P

5.3.1. Descriptions of buttons



Legend

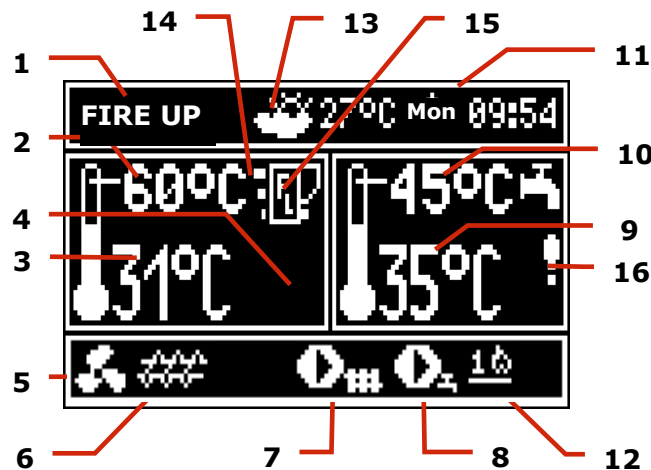
1. Menu button
2. TOUCH & PLAY knob:
 - rotate to change value
 - press for setting confirmation
3. Exit button

The „TOUCH and PLAY“ knob turning cause increase or decrease of edited parameter. It is a part of fast handling of the controller. Pressing the knob causes enter edition mode of chosen parameter or selecting its volume.

Pressing EXIT button causes exit selected menu

level and exit selected value of a parameter.

5.3.2. Main display description



Legend:

1. Regulator operation modes: FIRE UP, OPERATION, SUPERVISION, BURNING OFF, PAUSE, STOP

2. Preset boiler temperature

3. Measured boiler temperature

4. Field of factors influencing preset boiler temperature:

↓☐ - symbol of decreasing preset boiler temperature from opening of room thermostat contacts.

↓⌚ - symbol of decreasing preset boiler temperature according to decrease schedule.

5. Fan operation symbol

6. Fuel feeder operation symbol

7. Central heating pump operation symbol

8. Domestic hot water pump operation symbol

9. Measured temperature of domestic hot water


10. Preset temperature of domestic hot water tank


12. Symbol of active igniter and the digit next to it stands for a number of Firing-up attempts


13. Outside (weather) temperature


14. Current boiler output level


ELECTRICAL CONNECTIONS

 - symbol of increasing preset boiler temperature during filling hot utility water tank HUW.

 - symbol of increasing the preset boiler temperature to fulfill mixer circuit demands.

 - activation of weather control for boiler is active.

 - indicates active return protection.

 - raising the preset temperature in order to load the buffer.

15. Signalling activating Fuzzy Logic mode

16. Signalling HUW disinfection

Right window on the main screen is customizable, the user can decide what information is to be presented there. It is possible to choose setup presetings: mixer circuit motor or info of HUW by rotating the TOUCH and PLAY knob. Right window on the main screen may also display the fuel level view, providing that this parameter is set correctly.



5.3.3. Regulator activation

After the activation, the regulator remembers the state he was before the feeder disconnection. If the controller has not operated before it will start up in Stand-by mode. In this mode the screen is dimmed, actual time and information "Boiler Off" is displayed.



In Stand-by mode pumps protection functions are in operation. It is executed by temporary switching them on. Therefore it is advised to keep the electrical power to the controller on when the boiler is not in use. It is possible to start up the boiler by pressing the "TOUCH and PLAY" knob and selecting function mode of the burner *SYSTEM OFF / PAUSE / WORK*.

system off keeps the controller deactivated, PAUSE turns on the controller and all the heating plant settings, but burner is not active, WORK activates also the burner. In order to turn on the boiler and go into ignition, select *WORK* mode. After making sure that fuel is in the silo, and the silo hatch is closed the boiler can be switched on. After switching on, the boiler goes into Firing-up phase.



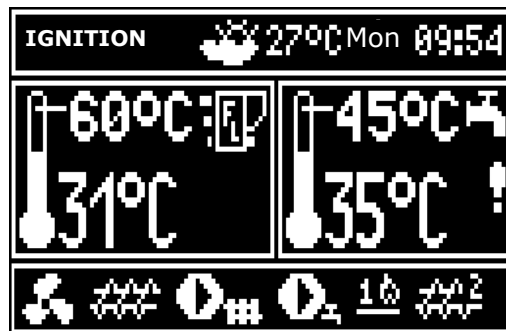
5.3.4. Setting boiler temperature

Preset boiler temperature can be set in the menu: **Boiler settings > Preset boiler temp.**

The value set as *Preset boiler temp.* is ignored by the regulator if the preset boiler temperature is controlled by weather sensor. Regardless of that, the preset boiler temperature is automatically increased in order to fill the hot utility water tank and feed heating mixer cycles.

5.3.5. Ignition

The FIRING-UP mode is used for automatic ignition of furnace in the boiler. Total duration of the ignition process depends on regulator settings (feeder operation time, heater operation time, etc.) and on the boiler's status before firing-up.

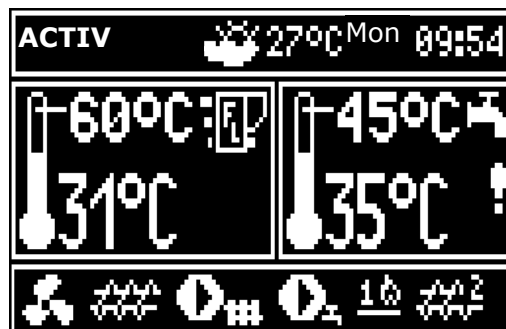


If the ignition fails, a new burner ignition test is performed, during which the fuel dose (*Feeding time*) is reduced to 10% of the first fuel dose.

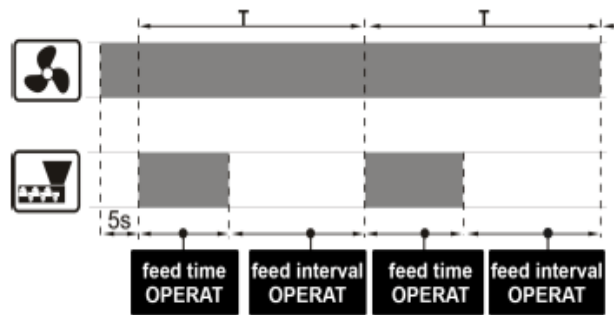
If ignition is unsuccessful, another attempts to fire the furnace up are made, during which the fuel dose (feeding time) is reduced to 10% of the first attempt dose.

After three unsuccessful attempts, an alarm *Failed firing-up attempt* is reported. In such case, the boiler operation is halted. Boiler operation cannot be continued automatically - service crew must intervene. After removing causes of impossibility to fire the boiler must be restarted.

5.3.6. Operation mode



In this mode the regulator operates automatically, according to the output settings. The fan operates continuously, while the feeder is activated cyclically. A cycle consists of feeder operation time and duration of feeding interval.



The controller is equipped with a boiler power modulation mechanism that allows the power to decrease gradually with the boiler temperature reaching the preset value. A 3-level indicator is displayed on the left side of the boiler icon, which represents the current level of the three available power levels. Parameters of output levels are in the menu: **Boiler Settings>Output Modulation**. Each of the levels - referred to as 100%, 50% and 30% - can be attributed either to a different fuel supply time and to a different air flow, which translates to a different power level of the boiler. When the boiler is assumed to operate at a specific power level, it is determined by the values called Hysteresis, H1 and H2, respectively. Each of these values refers to the measured boiler temperature difference from the preset value.

You can save up to 3 different combustion recipes through the menu: **Fuel type>P01 / P02 / P03**. After choosing the fuel, make the corresponding settings in the menu **Output modulation**.

5.3.7. Stop mode

In the STOP mode the boiler is being burnt off and awaits the signal to start operation. The following can be a signal to start operation:

- decrease of preset boiler temperature below preset temperature diminished by boiler hysteresis (*Boiler hysteresis Hk*),
- by boiler operation configuration with the buffer decrease of top buffer temperature below preset value (*Loading start temperature*).

5.3.8. Pause mode

This is a mode that allows the user to manually turn off the burner and leave working mixers of heating system.

5.3.9. Grate mode

This function enables manual work on wood. In order to change between automatic mode (Pellet) and manual mode (Grate), access the menu **Boiler settings>Boiler oper. Mode**.

In the grate mode fuel feeder is turned off. The combustion process is regulated by the blow-in fan. Fan power, when working with grate, is set in the menu: **Boiler settings>Output modulation>Blow-in output grate**.



Before loading wood in the fire chamber, cover the furnace plate with the protection cover! In other case, there is danger of destroying the feeder and fireback to the silo!



Manual loading is prohibited simultaneously with the furnace function!

5.3.10. Fuel level

To activate the fuel level display, you need to set the parameter Alarm level>0 (eg 10%): **Boiler settings>Fuel level>Alarm level**

In order to make the calibration process, fill the silo to the level which corresponds to full level of fuel, then set value of parameter to 100%:

Boiler settings>Fuel level>Fuel level calibration>Fuel level 100%

ELECTRICAL CONNECTIONS

In main window the indicator will be set on 100%. The calibration process is marked with a pulsating fuel level indicator. The indicator will pulsate until programming point referring to minimum fuel level. Decreasing level of fuel in the silo should be monitored constantly. When the level reaches the requested minimum, set the value of the parameter:

Boiler settings>Fuel level>Fuel level calibration>Fuel level 0%



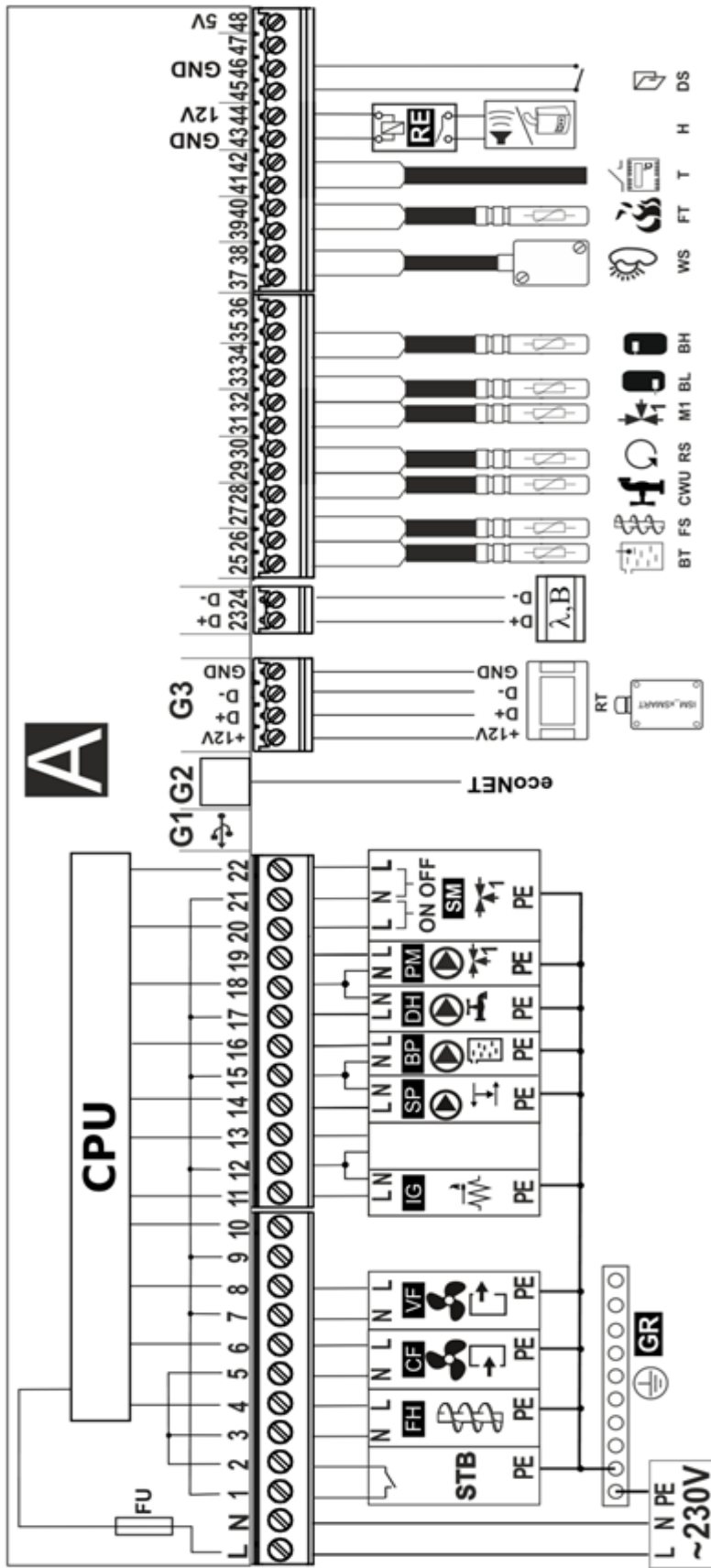
Each time when fuel silo is filled to required level, it is necessary to press and keep the knob in main window. Following info will appear:



After choosing and accepting *YES* fuel level will be set for 100%.

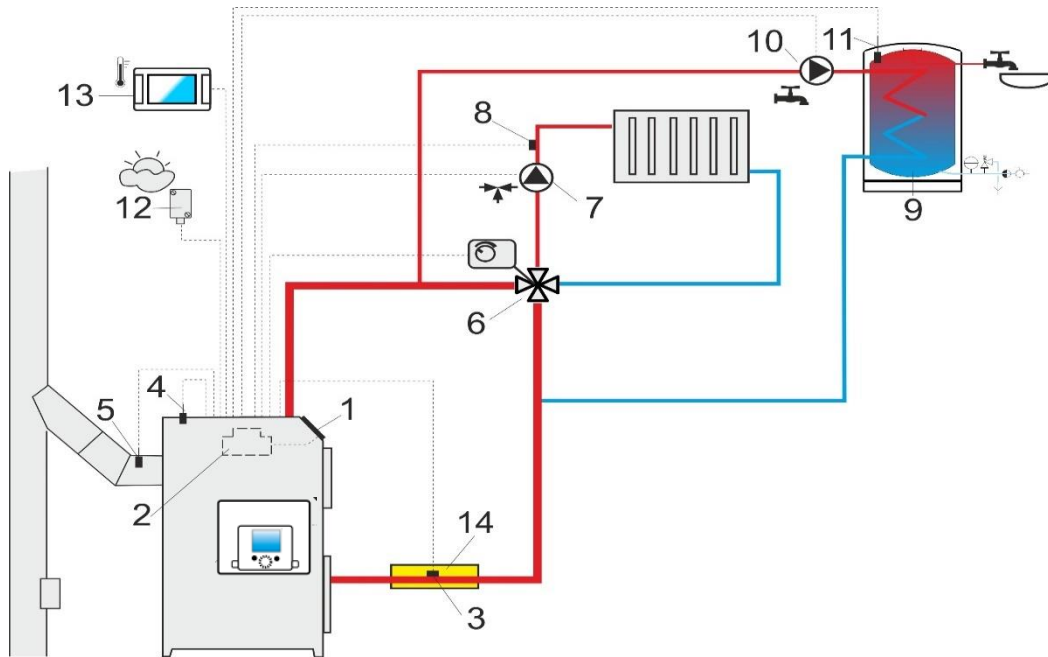
Fuel can be refilled anytime, that means it is not needed to wait till the silo is empty. However, fuel should be filled up to the level corresponding to 100% and set the controller level by pressing knob.

5.3.11. Electrical connections

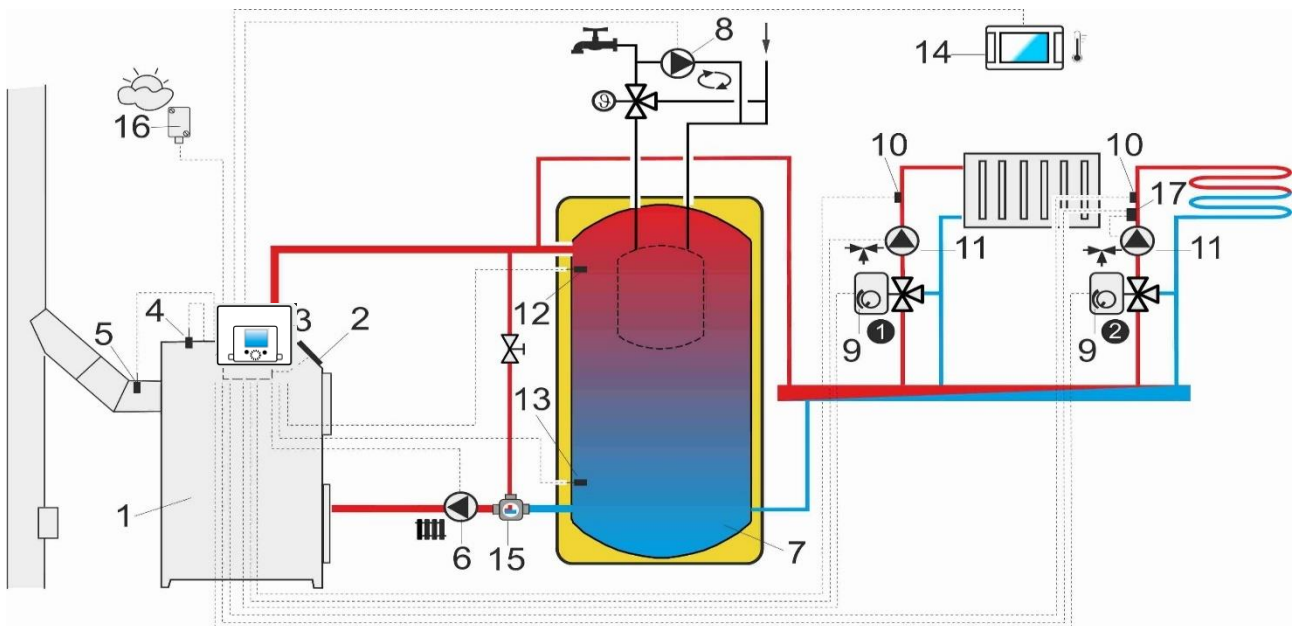


Scheme of electrical connections to the controller: **L N PE** - electrical power 230 VAC, **CPU** - controlling, **FU** - mains fuse, **STB** - connection to limiter of safety temperature, **FH** - main feeder, **CF** - burner fan, **VF** - exhaust fan, **IG** - igniter, **SP** - shunt pump (bypass pump), **BP** - boiler pump, **DH** - HUW pump, **PM** - mixer 1 pump, **SM1** - mixer 1 servomotor, **RT** - room panel with room thermostat feature or ISM_xSMART radio module, **lambda** - Lambda module, **B** - additional module, **BT** - boiler temp. sensor type CT4, **FS** - feeder temp. sensor type CT4, **CWU** - HUW temp. sensor type CT4, **RS** - boiler water return temperature sensor type CT4, **M1** - mixer 1 temp. sensor type CT4, **BH** - exhaust temp. sensor type CT4, **BL** - lower buffer temp. sensor type CT4, **WS** - weather temp. sensor type CT6-P, **FT** - exhaust temp. sensor type CT2S, **T** - standard room thermostat type NO-NC, **H** - voltage H output for alarm device or **R** reserve boiler, **RE** - relay 12 VDC, **DS** - boiler door opening sensor.

5.3.12. Hydraulic scheme



Scheme with 4 way steering valve controlling central heating circuit: 1 – boiler, 2 – controller, 3 – return temperature sensor, 4 – boiler temperature sensor, 5 – exhaust temperature sensor, 6 – servomotor of 4-way valve, 7 – mixer cycle pump, 8 – mixer cycle temperature sensor, 9 – HUW container, 10 – HUW pump, 11 – HUW temp. sensor, 12 – external temperature sensor, 13 – standard room thermostat or room panel, 14 – thermal insulation.



Scheme with heat buffer: 1 – burner, 2 – boiler, 3 – controller, 4 – boiler temperature sensor, 5 – exhaust temperature sensor, 6 – boiler pump, 7 – heating buffer, 8 – HUW pump, 9 – mixer valve actuator, 10 – mixer temperature sensor, 11 – mixer pump, 12 – upper buffer temperature sensor, 13 – lower buffer temperature sensor, 14 – standard room thermostat or room panel, 15 – thermostatic 3-way valve for return protection, 16 – outside temperature sensor, 17 – thermostat to turn off the pump, 18 – additional module B.



The presented hydraulic diagram does not replace the central heating system design and it can be used for reference purposes only.

The boiler regulator controls the central heating pump and the hot water pump according to the settings made. A room thermostat can be connected which will decrease the preset boiler

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temperature. By means of the external temperature sensor the weather control can be activated, which will modulate the boiler temperature according to the external temperature.

The regulator can be extended with two additional mixing modules (MODULE B-MODULE C), which enable the control of two mixing zones per module (a total of four mixing zones). Each mixing module contains a mixer servomotor, a mixer pump, a mixer temperature sensor and a mixer room thermostat.

5.3.13. User menu

1. Information

The information menu enables the user to read the temperatures and verify the status of active devices. Also, it gives information about the software version (display+module).



Additional information will appear after connection of additional devices.

2. Boiler settings

The boiler operating temperature and basic combustion parameters are set.

Nr	Menu	U.M.	Observations	Recommended values
2.1	Preset boiler temp.	°C	Setting the boiler temperature. When the boiler reaches the set value, it goes into supervision.	70-80
2.2	Weather contr.boiler	On/Of f	Activation of weather control	See settings in paragraph 5.6
2.3	Heating curve	-	Heating curve of the weather control	
2.4	Curve shift	°C	Shifting of the heating curve	
2.5	Output modulation (see paragraph 5.3.6)			
2.5.1	100% Feeder operation	S	It represents the boiler feed time when the boiler is at full power	See settings in paragraph 6.7
2.5.2	100% Feeder interval	S	It represents the waiting time between two burner feeds when the boiler operates at full power	
2.5.3	MAX Blow-in output	%	It is the value at which the fan works when the boiler is running at maximum power	
2.5.4	MED Hysteresis H2	°C	It represents the power reduction step from MAX to MED	
2.5.5	50% Feeder operation	s	It represents the boiler feed time when the boiler is running at medium power	
2.5.6	50% Feeder interval	s	It represents the waiting time between two burner feeds when the boiler operates at the power of the media	
2.5.7	MED Blow-in output	%	It is the value at which the fan works when the boiler is running at medium power	
2.5.8	MIN Hysteresis H1	°C	It represents the power reduction step from MED to MIN	
2.5.9	30% Feeder operation	kW	It represents the boiler feed time when the boiler is operating at minimum power	
2.5.10	30% Feeder interval		It represents the waiting time between two burner feeds when the boiler operates at minimum power	

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2.5.11	MIN Blow-in output	%	It is the value at which the fan works when the boiler is running at minimum power	
2.5.12	Boiler hysteresis Hk	°C	It is the difference in temperature at which the boiler will switch from the SUPERV to OPERATION mode	7-10
2.5.13	Min.boiler output FL	%	It is the minimum power % of adjustment at Fuzzy Logic mode	0
2.5.14	Max.boiler output FL	%	It is the maximum power % of adjustment at Fuzzy Logic mode	100
2.5.15	Feeder efficiency	kg/h	It is the fuel debit delivered by the feeder	Only for service
2.5.16	Feeder			
2.5.16.1	Efficiency test time	min	It is the feeder efficiency test time	Settings made by service technician
2.5.16.2	Feeder test	-	It starts the feeder test procedure	
2.5.16.3	Feeder filling	-	It activates the feeder for filling	
2.5.16.4	Fuel dose from test	g	The test result of feeder efficiency	
2.6	Boiler oper. Mode	-	Choose between automatic operation (pellet) / manual (grate)	Pellet / Grate
2.7	Regulation mode	-	Choose between Standard / Fuzzy Logic	See paragraph 5.3.6
2.8	Fuel type	-	Choose between 3 individual settings for 3 different fuel types P1, P2, P3	See paragraph 6.7
2.9	Fuel level (see paragraph 5.3.6)			
2.9.1	Alarm level	%	Level of fuel in % at which the alarm will be activated	10
2.9.2	Fuel level calibration	-	Calibrate the fuel level indication	
2.10	Burner cleaning	h	The interval at which the boiler will activate the burner cleaning	24

3. HUW settings

The device adjusts the HUW tank temperature only when the HUW temperature sensor is connected. When the sensor is disconnected, information about lack of sensor appears in the menu. **HUW settings>HUW pump mode** allow the user:

- deactivate feeding the HUW container, parameter *Off*,
- setting HUW priority, by parameter *Priority* – then CH pump is deactivated to feed the HUW boiler quicker,
- set simultaneous operation of CH and HUW pump with the parameter *No priority*.

The controller has a periodic heating function of the HUW tank up to 70°C. The purpose of this is to remove bacteria from the DHW tank. Once a week, on Monday at 2:00, the regulator raises the HUW tank temperature. After 10 minutes of holding the tank at 70°C, the DHW pump is switched off and the boiler returns to normal operation.



You must inform the inhabitants about the fact that the disinfecting function is activated, because there is a danger of hot water.

It is not allowed to activate disinfection functions with the disconnected HUW pump.

ELECTRICAL CONNECTIONS

Nr	Menu	U.M.	Observations	Recommended values
3.1	HUW preset temp.	°C	The temperature at which the HUW pump will be disabled	40-55
3.2	HUW operation mode	-	Off, Priority, No priority, Summer	Accordingly
3.3	HUW tank hysteresis	°C	Below this temperature (HUW preste temp. – HUW hysteresis), the HUW pump will be activated to load the HUW tank	3-5
3.4	HUW disinfection	-	On/Off	Off

4. Summer/Winter mode

Activation of the SUMMER mode allows feeding the HUW container during summer, without necessity to activate CH installation and mixers periods. This function can be activated automatically, on the basis of readings from weather sensor, **Summer/Winter>SUMMER/WINTER mode>Auto**




Do not activate the SUMMER function if the HUW pump is disconnected or damaged.

Nr	Menu	U.M.	Observations	Recommended values
4.1	SUMMER/WINTER mode	-	Winter-CH pump and HUW pump function Summer-Only HUW pump functions Auto-Automatically change between Summer/Winter based on weather sensor	Accordingly
4.2	Activ.temp.SUMMER	°C	Summer mode automatic activation external temperature	16-20
4.3	Deactiv.temp.SUMMMER	°C	Summer mode automatic deactivation external temperature	10

5.Night time decrease

In the regulator, it is possible to set time intervals for: boiler, heating circuits and HUW tank. Time intervals provide the possibility of adjusting the temperature drop set in a pet interval at night or when the user leaves the room (for example, by going to work). Due to this, the set temperature can be automatically reduced which improves thermal comfort and reduces fuel consumption. To activate the intervals, set the night-time decrease parameter for the given heating cycle.

Decrease of preset temperature is indicated by the symbol  on the main screen.

To activate time intervals, firstly set the function On through the menu On/Off, then set the parameter *Decrease* value, same for all time intervals. Night time decreases can be defined separately for every day of the week set *Schedule*. Select temperature reduction and beginning and end of respective time interval. The time intervals for 24 hours are fixed at 30 min.



ELECTRICAL CONNECTIONS

In the given example, the controller will set the decrease of preset temperature by *Decrease value* from 00:00 to 06:00, and will keep the preset value (without the decrease) from 06:00 to 09:00. Then, it will set the decrease by *Decrease value* from 09:00 to 15:00 and will keep the preset value (without the decrease) again from 15:00 to 22:00, and again will set the decrease by *Decrease value* from 22:00 to 23:59.



Attention, defining time periods during one day must be started at 00:00.



Time period is omitted by setting period reduction for value "0" even if scope of hours is set in it.

Nr	Menu	U.M.	Observations	Recommended values
5.1	Boiler		On/Off	
5.1.1	Decrease	°C	Temperature drop of the boiler	Accordingly
5.1.2	Schedule	-	Set schedule for each day of the week	Accordingly
5.2	Mixer 1		On/Off	
5.2.1	Decrease	°C	Temperature drop of the mixer circuit 1	Accordingly
5.2.2	Schedule	-	Set schedule for each day of the week	Accordingly
5.3	HUW tank		On/Off	
5.3.1	Decrease	°C	Temperature drop of the boiler	Accordingly
5.3.2	Schedule	-	Set schedule for each day of the week	Accordingly

6. Work schedule

In the controller is possible to switch on and switch off the boiler at defined intervals.

In the absence of demand for heat, e.g. in summer, one can disable the operation of the boiler at a certain time and thus reduce fuel consumption. To activate the time intervals, you must set the parameter Off, in menu **Work schedule** at YES. Switching on and off the boiler in the time interval can be set for all on separate days of the week in the Schedule.

Nr	Menu	U.M.	Observations	Recommended values
7.1	On/Off	-	Activation of the mode	Accordingly
7.2	Schedule	-	Set schedule for each day of the week	Accordingly

7. General Settings

In this menu you can set general settings of the device, as well as software update.

Nr	Menu	U.M.	Observations	Recommended values
8.1	Clock	-	Set the time and date	Accordingly
8.2	Screen brightness	%	Set the screen brightness	Accordingly
8.3	Screen contrast	%	Set the screen contrast	Accordingly
8.4	Sound	On/Off	Activate the sound when key press	Accordingly
8.6	Language	-	English / Romanian	Accordingly
8.5	WiFi	On/Off	Set the ecoNET modul (see paragraph Error! Reference source not found.)	Accordingly
8.6	Weather sensor	°C	Weather sensor correction	Accordingly
8.7	Radio module	-	Pairing of radio remote controller (see paragraph Error! Reference source not found.)	Accordingly
8.8	Software update	-	Here you can perform a software update by inserting an SD card	Accordingly

8. Manual control

The regulator offers the possibility of manual control of all devices, i.e. pump, motor, or fan. Thanks to this functionality it is possible to control whether the device is functional and connected correctly. The manual control menu can only be entered in SYSTEM OFF mode.

Manual control	
Fan	ON
Feeder	OFF
Boiler pump	OFF

Nr	Menu	U.M.	Observations	Recommended values
9.1	Feeder	-	ON/OFF	
9.2	Fan	-	ON/OFF	
9.3	Exhaust fan	-	ON/OFF	
9.4	Igniter	-	ON/OFF	
9.5	Shunt pump	-	ON/OFF	
9.6	Boiler pump	-	ON/OFF	
9.7	Centrl DWH pump	-	ON/OFF	
9.8	Mixer 1 pump	-	ON/OFF	
9.9	Mixer 1 Open	-	ON/OFF	
9.10	Mixer 1 Closed	-	ON/OFF	
9.11	Out H	-	ON/OFF	

9. Alarms

In this menu you will find the alarm history.

Alarm numbers displayed on the wireless room thermostat.

01	Boiler max. temp. exceeding
02	Burner max. temperature exceeding
03	Boiler temp. sensor damage
04	Feeder temp. sensor damage
05	Boiler max. temperature exceeding, STB open contact
06	Unsuccessful boiler firing-up attempt

Boiler max. temperature exceeding

Protection against boiler overheating is done in 2 steps. In the first step, after exceeding *Boiler cooling temp.*, the controller tries to reduce boiler temperature by dropping excess of heat to the HUW tank and by opening mixer servomotors (only when Mixer support = CH ON). If temperature measured by HUW sensor exceeds value *Max. HUW temp.* then HUW pump is deactivated, what is done to protect users against scalding. If boiler temperature decreases, then the controller returns to normal operation. If the temperature will still increase (reaches 95°C) then constant alarm will be activated for boiler overheating joined with sound signal. The alarm can be deleted by pressing „TOUCH and PLAY“ knob or activating and deactivating power to the controller



Please check carefully cause of overheating and solve immediately! Check that the boiler temperature sensor is well positioned inside the boiler bulb.

Burner max. temperature exceeding

Alarm appears after exceeding burner temperature above parameter *Max. burner temp.* If the burner temperature increases above this value the controller will begin burning off procedure.

The alarm can be deleted by pressing „TOUCH and PLAY“ knob or activating and deactivating power to the controller.

Boiler temperature sensor damage

Alarm appears by boiler sensor damage and by exceeding measuring range of this sensor. When alarm appears, the boiler is deactivated. The sensor is to be checked and replaced if necessary.

The alarm can be deleted by pressing „TOUCH and PLAY“ knob or activating and deactivating power to the controller.

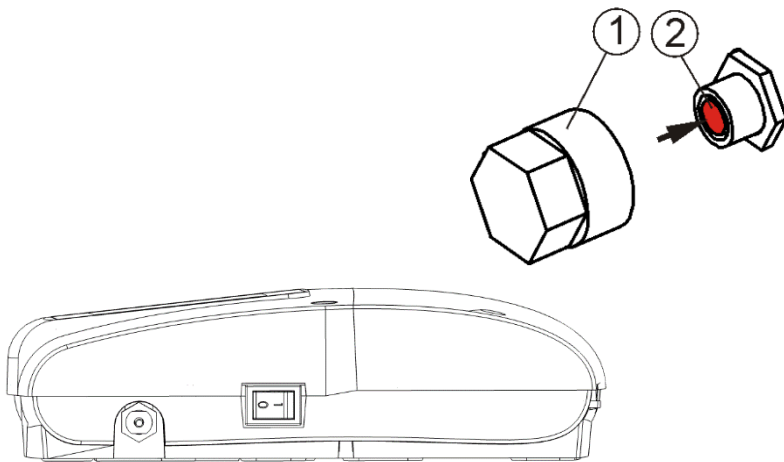
Feeder temperature sensor damage

Alarm appears when feeder sensor is damaged or by exceeding measuring range of this sensor. After alarm, the boiler goes in Bur-Off mode. It is necessary to check the sensor and replace it if necessary. The alarm can be deleted by pressing „TOUCH and PLAY“ knob or activating and deactivating power to the controller.

Boiler max. temperature exceeding, STB open contact

This alarm occurs after activation of STB safety thermostat that secures the boiler against overheating.

In case of exceeding water temperature in the boiler over 95°C the electrical power of the feeder and airflow fan is shut off by temperature safety limiter. Again switch on requires limiter to reset. To do so, unscrew the nut (1) covering the reset button (2) and press the button.



Resetting STB temperature limiter: 1 – covering nut, 2 – reset button.

The button can be pressed only after water temperature in the boiler drops. Fan and feeder power will be brought back.

Unsuccessful boiler firing-up attempt

Alarm will appear after third failed attempt of automatic furnace firing up. In case of alarm, all pumps are deactivated in order to avoid excessive cooling of the boiler. Deleting is done by activating or deactivating the controller. The cause of these alarms can be broken igniter or lack of fuel in the tank.

Open boiler door

This is a silent alarm, which will occur in case of activation of the boiler door opening sensor. If the boiler has no door sensor, between terminals 45-46 there will be a jumper. Please check the status and connections of this jumper. Cancellation takes place by closing the boiler door or by pressing „TOUCH and PLAY“ knob.

Power shorage

In case of power shortage, the controller returns to the operation mode in which it was before the shortage.

Antifreezing protection

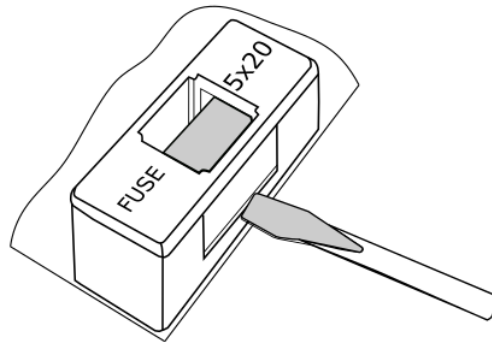
When temperature of the boiler decreases below 5°C (*Antifreeze temp.*), CH pump will be activated enforcing circulation of boiler water. It will delay the process of freezing water, however in case of very low temperatures or by lack of electrical power it may not protect the installation against freezing.

Pump protection function against stagnation

The controller does the protection function of CH, HUW, Mixer pumps against stagnation. It consists of a periodic switching on of the pumps (each 167h for several seconds). This protects the pumps from becoming immobile due to boiler scale build-up. Therefore, even when the boiler is not in use, it is recommended that the controller's power supply must be connected. The function is also performed with the controller switched off (controller in the "Boiler Off" state).

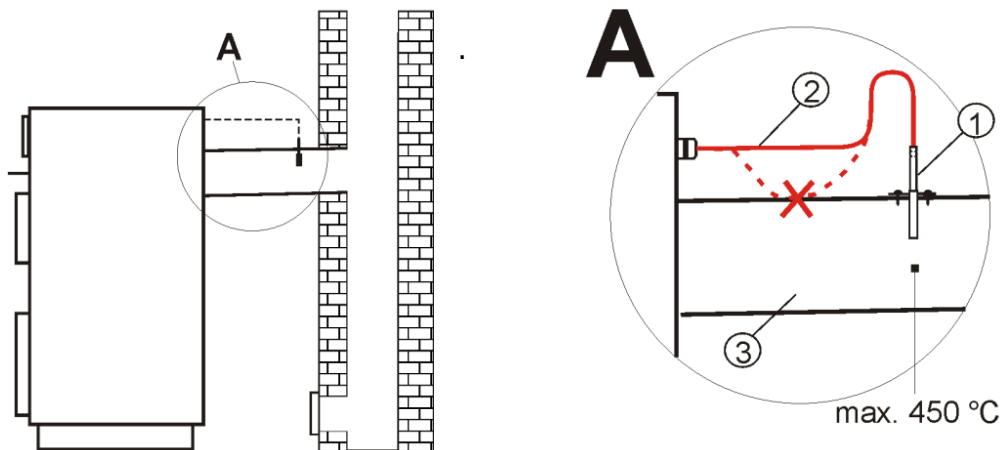
Network fuse replacement

Mains fuse is located under the housing cover, near mains terminals and protects the controller and the devices supplied by it. Porcelain fuses 5x20 mm and time-lag fuses with nominal current 6.3 A/ 230 VAC should be used. In order to remove the fuse lift the fuse holder with a flat screwdriver and pull out the fuse.



Mains fuse replacement.

5.4. Connecting exhaust temperature sensor



The emission sensor should be fitted in the boiler flue (3). The gap between the sensor and the flue should be sealed. The sensor should be installed by a qualified fitter, while observing regulations applicable for chimney systems. The emission sensor should be connected to the sensor terminals according to the electrical scheme. The emission sensor lead cannot touch hot elements of the boiler and the flue, the temperature of which exceeds 350°C. The emission sensor should be installed in such distance from the boiler at which it is not directly exposed to flames, and where the emission temperature does not exceed 450°C.

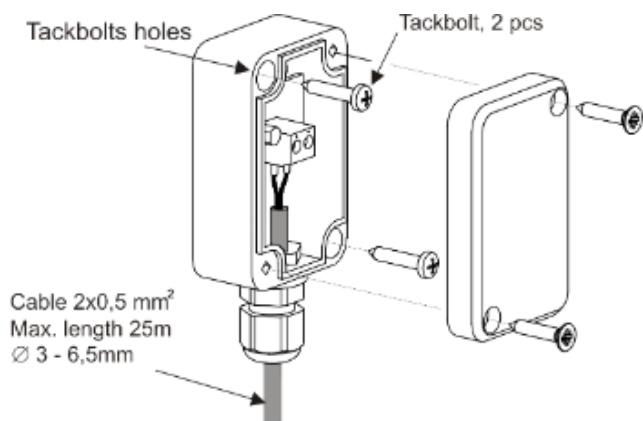
5.5. Connecting temperature sensors

The regulator is compatible only with sensors type CT4 (sensor of boiler and hot utility water) and CT2s (emission sensor). It is prohibited to use different sensors. Sensor leads can be extended with wires with section of at least 0,5mm². Total length of the sensor leads cannot exceed 15m. The boiler temperature sensor CT4 should be fitted in the boiler bulb pipe. Hot utility water temperature sensors CT4 - in the thermometric pipe welded into the tank.



The sensors must be secured against coming loose from the measured surfaces.

5.6. Connecting weather sensor



The regulator cooperates only with a weather sensor of the CT4-P type. The sensor should be installed on the coldest wall of the building, usually this is the northern wall, under the roof. The sensor should not be exposed to direct sunlight and rain. The sensor should be fitted at least 2 m above the ground, far from windows, chimneys and other heat sources which could disturb the temperature measurement (at least 1,5 m).

Connect the sensor using cable of 0,5 mm² cross-section, up to 25 m long. Polarity of the leads is insignificant. Connect the other end of the cable to the regulator, as shown in electric diagram.

Attach the sensor to the wall using tackbolts. To access the tackbolts holes, unscrew the sensor lid.

6. BOILER START-UP

6.1. Initial lighting checks

Before you start the boiler, make the following checks:

- Check 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 sensors 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.

6.2. Starting the boiler with wood

To correctly start up the ECOBIO boiler follow the next steps:

- Make sure the control panel switch is set to OFF and that fan does not function.
- Make sure the chimney damper is positioned in horizontal position (completely open).
- Make sure that the furnace pipe is covered with the metal protection lid provided.
- Open the upper door (fire chamber) and introduce a sufficient amount of small and thin pieces of wood.
- Using sheets of thin paper light the wood placed inside the boiler.
- Close the door of the boiler and open the lower door to assure airflow.
- Wait several minutes until the flame develops and produces some embers.
- After formation of embers, load the fire chamber with wood. Position them on top of the grate.
- Close the doors and secure them with the handles.
- Turn on the fan and set the required temperature. Fan begins operation. Make sure you deactivate the feeder.



It is prohibited to light the boiler with inflammable or explosive liquids.



If wood is used as main fuel a secondary fan might be necessary to be installed on the lower door of the boiler. In this case please contact the manufacturer.

6.3. Starting the boiler with pellet/biomass

When the boiler is equipped with an automatic ignition follow technical instructions in the control panel.

For manual ignition follow these steps:

		<p>Turn the control panel on from the general switch and enter the manual mode.</p>
		<p>Activate the motor to shift a portion of fuel towards the furnace. To do this, switch to the feeder icon by pressing "F" button and press "START". Fill it until the fuel level reaches the cast iron plate and covers a small part of it.</p> <p>After shifting the fuel, press "STOP" button and the feeder will switch off. Using sheets of thin paper or other ignition material, light the fuel placed in the furnace. Wait several minutes until the flame stabilizes and covers the entire plate surface.</p>
		<p>Close the door of the boiler. Switch to the fan icon by pressing "F" button. Enable the fan by pressing START. Airflow power can be altered by pressing "F" button for the second time. When the fuel starts burning, exit the manual control mode by pressing and holding "F" button.</p>



Do not leave the regulator in manual operation mode without supervision. There is a risk of flame retraction into the feeder and boiler overheat!

6.4. 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 temperature sensors 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 that pump is activated at the set temperature and functions properly.

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.

6.5. Manual fuel loading




In order to correct add fuel manually to the boiler follow the next steps:

- Stop the fan function by pressing the STOP button. Wait 30 seconds for the fume to exit the boiler.
- Open the upper door slowly to avoid leakage of smoke. Load a sufficient amount of fuel. Each loading should be regulated according to the boiler output and the heat demand. Never load too much to fuel to fill all the fire chamber volume! Maximum fuel should be 70-80% of the fire chamber volume.
- Close the door and secure with the handle.
- Start again the fan function by pressing the START button.



When loading fuel in the boiler do not throw them but position them carefully.

6.6. Operation mode

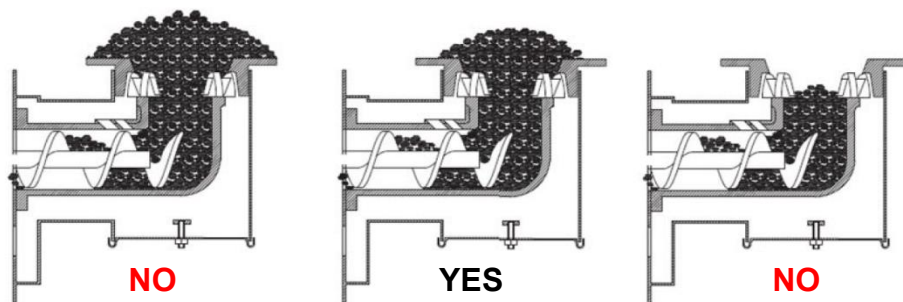
After firing the boiler up, switch the regulator to operation mode pressing "START" button in the main window. In this mode, the fan operates in a constant manner with a preset airflow power !!!!. However the feeder switches on cyclically for the TIME ON feeding time  ~~per~~ per TIME OFF feeding break time  ~~per~~.

After reaching the preset boiler temperature, the regulator automatically switches into the SUPERVISION mode. After automatic return to the OPERATION mode, the feeder starts its cycles from the OPERATION TIME OFF break time.

6.7. Combustion regulation

Biomass fuels vary significantly one from each other. For this reason, every time a different fuel is used, the combustion regulation must be repeated.

For a correct combustion regulation you need to set first the fuel debit, by setting the TIME ON and TIME OFF intervals of the feeder. The fuel must form a shape on the furnace plate according to the following scheme:



In order to increase the fuel debit you need to increase the TIME ON and decrease the TIME OFF. In order to decrease the fuel debit, process is exact inverse. These two timings must be changed together in order to have a constant flame.

During combustion, check the flame: it will have to occupy about two thirds of the fire chamber and quietly lick the cylindrical heat exchanger. Its shape must be fully developed and with not too many detachments at the flame end. Its color must be vivid orange-yellow, not too transparent.

GENERAL SUGGESTIONS

- The flame needs to have reasonable dimensions and fill up the fire chamber as told.
- The flame must not be too red (too low air supply).
- The flame must not have big detachments and sparkles (too high air supply).
- The flame must not be too small. If it is slow, easily influenced by air currents and the chimney draught, it means that the air supply is too low.

- The smoke at the chimney must be clear-grey. Black smoke means lack of air supply.
- If too much ash and big coal pieces fall down to the ash box reduce the air supply. The flame is too fast, dry, and might make a noise.

6.8. Supervision mode

After the boiler has reached the preset temperature, it will enter in SUPERVISION mode. Fan and feeder work independently and are enabled cyclically for short periods of time in order to prevent fire from going out and removing cumulated combustible gases from the fire chamber.

6.9. Stop mode

If the START button is not pressed, the device is by default in STOP mode. At this mode the device controls only the operation of pumps. Fan and feeder are disabled. Central heating and HUW pumps operate in accordance with their algorithm. Pumps are enabled if conditions to commence their operation are met.

6.10. Chimney damper adjustment

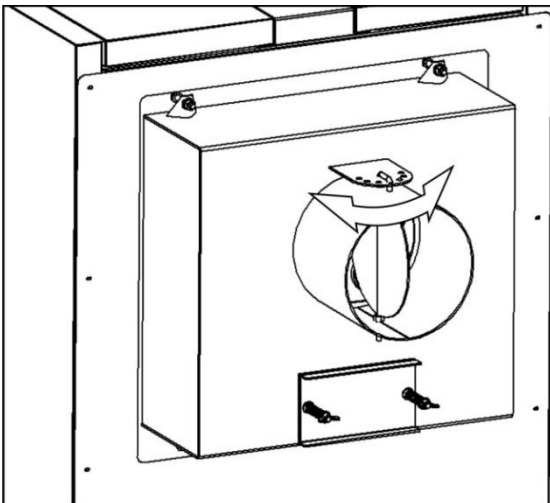


Fig 8. Chimney damper

The boiler chimney pipe is equipped with a damper. This can be set in various positions to throttle the exhaust gases.

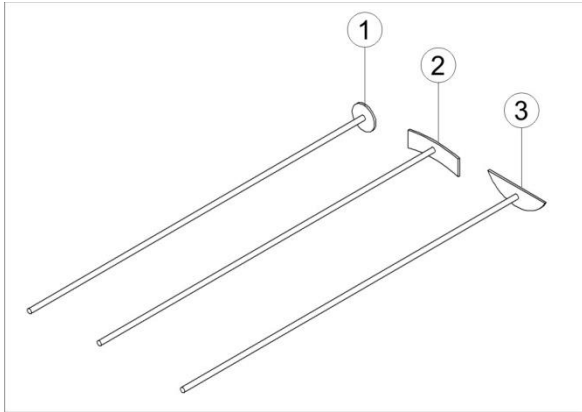
At nominal function of the boiler this damper should be normally open. Also it should always be at open position at boiler start-up.

If the chimney draught is too big and the gases are evacuated too fast, set this damper at a side position by inserting the positioner at a different hole.

7. SERVICE AND MAINTENANCE

7.1. Cleaning the boiler

Solid fuel boiler require regular cleaning in order to function properly and efficient. **Cleaning must be effected at least once a week.** The boiler is equipped with three cleaning tools appropriate for the cleaning procedure of the boiler, as shown in Fig 9.



Legend:

1. Tubes cleaning tool
2. Heat exchanger cleaning tool
3. Ash cleaning tool

⚠ 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!

Fig 9. Boiler cleaning tools

Open the upper door to have access to the heat exchanger. Remove the turbinators from the tubes, and clean the tubes with the appropriate tool. Afterwards clean the exterior surface of the cylindrical heat exchanger with the exchanger cleaning tool, as shown in Fig 10. With the same tool, scrape the ash and any other remains from the side walls of the boiler.

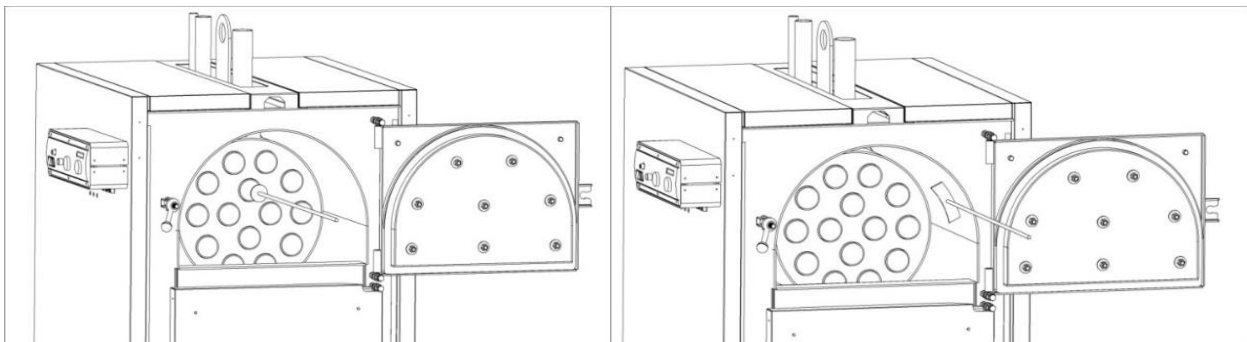
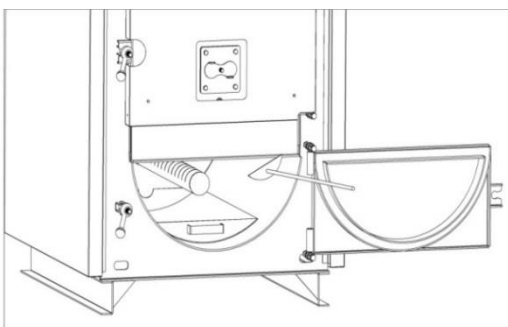


Fig 10. Cleaning of the heat exchanger



Open the lower door of the boiler and remove the ash box. Empty all the containing ash. With the ash cleaning tool you can scrape the lower surface of the boiler for any residues of ash.

⚠ 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.

Fig 11. Removing the ash

7.2. Cleaning the chimney box

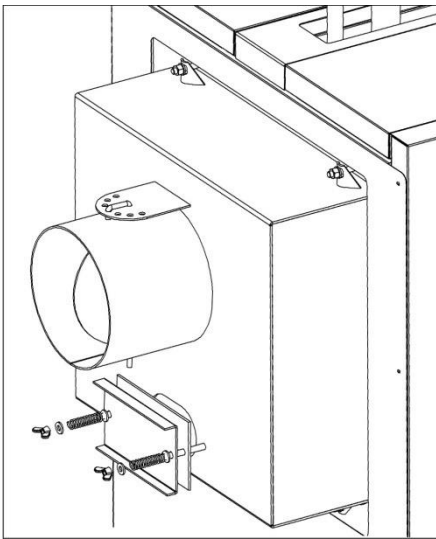


Fig 12. Cleaning the chimney box

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

The chimney box is equipped with a cleaning door for this purpose, as shown in Fig 12. 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.

7.3. Cleaning the furnace

The furnace should be regularly cleaned according to the ash deposits, but not less than once a week. To clean the furnace follow the next steps:

- Stop the furnace function by the control panel and leave it to cool down completely.
- Clean the surface of the cast iron plate from ashes and other deposits. Make sure the air holes are clean and free from obstacles.
- Clean the ashes and deposits at the perimeter around the plate.
- After you turn on again the furnace, ensure the fuel feeding is performed freely and the fuel is evenly distributed at the plate surface.
- Check the function of the motoreducer and the fan. Clean from dust if needed.

7.4. Maintenance intervals

7.4.1. 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.

7.4.2. Weekly maintenance

The boiler must be cleaned every 3-4 days or at least once a week, 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 1-2 weeks, depending on the ash quantity formed.

7.4.3. 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.

Check the fan and make sure it functions properly. Clean from dust and check that the air passage is clear of obstacles and dust.

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.

7.5. Boiler 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!

7.5.1. Service after power blackout

In case there is a power blackout, it is absolutely necessary to perform some checks and take some safety measures to avoid overheating. The solid fuel has all the time a certain amount of fuel in the fire chamber, which will not stop burning immediately.

- Turn the control panel to OFF.
- When the power is restored, turn on the control panel and make sure all the devices function properly.

7.6. Maintenance after long stop

7.6.1. Maintenance of the boiler

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.

7.6.2. Maintenance of the furnace

It is necessary to perform a general maintenance and cleaning of the furnace after the heating season. The maintenance of the furnace should only be done when the boiler is stopped, cool and the power deactivated. For easier maintenance it is recommended to leave all the fuel in the silo be consumed before you proceed to works. The maintenance procedure includes the following steps:



Do not attempt to do any maintenance or service to the furnace while working! There is serious danger of burning! Wait until the boiler is cool and deactivate from the electricity.

- Make sure the silo is empty. If not, empty manually the silo before proceeding to any works. Open the silo cleaning door if necessary to remove any remaining fuel.
- Remove the silo from the furnace body by unscrewing the bolts.
- Remove the motoreducer which is mounted on the lower axis.
- Check the motoreducer. Check the oil level in the reducer and add oil if necessary.
- Remove the two feeders. Check them and make sure they are in good shape and not deformed.
- Clean the tubes where the feeders are inserted. Remove any fuel or ash remains.
- Remove the cast iron plate of the furnace.
- Clean thoroughly the elbow underneath the plate, form where the fuel is provided. It is very important to be clean of any obstacles that could block the feeding.
- Clean very well all the holes on the plate surface. If they are blocked use a sharp tool to clean them.
- Put together all the pieces in the reverse order. Check all the sealing material between the connections. Make sure they are in good shape and provide an air-tight sealing. Tighten well the screws to ensure an air-tight connection.
- After putting together the axes and the chain wheels, make the chain has a good grip on the wheels and the rotation is performed freely. Grease carefully the chain and the wheels.



Attention: All the connections (boiler-furnace, furnace-silo, inspection doors, etc.) must be air tight! If not there is high danger of backfire to the silo!

8. TROUBLESHOOTING

Problem	Cause	Solution
The lamps of the control panel do not light	<ul style="list-style-type: none"> - no electrical supply to the lamp - the control panel is not connected to electricity - lamp defect - electric cable defect 	<ul style="list-style-type: none"> - check/replace the lamp - connect to electricity - check/replace the cables
The boiler does not reach set temperature	<ul style="list-style-type: none"> - fan blocked - air passages are blocked - boiler is not cleaned - incorrect boiler start-up - insufficient water in the system - too big pump debit - boiler under dimensioned - bad quality fuel used - insufficient chimney draught 	<ul style="list-style-type: none"> - check/replace the fan, check the function of the fan regulator and thermostat - clean the air passages - clean the boiler - start the boiler correctly - fill the system - regulate the pump speed - change the fuel used - check/clean the chimney
High temperature in the boiler, but low temperature at the radiators	<ul style="list-style-type: none"> - too high hydraulic resistance in the heating network - thermostatic mixing valve is connected wrong 	<ul style="list-style-type: none"> - increase the pump speed - check/replace the mixing valve
Condensation formation in the fire chamber	<ul style="list-style-type: none"> - too big boiler power - too low return temperature in the boiler - fuel with excessive humidity 	<ul style="list-style-type: none"> - load less fuel in the chamber - install a return protection system/thermostatic valve - change the fuel used
Smoke coming out of the doors	<ul style="list-style-type: none"> - boiler doors not regulated - defect sealing cord of the door - insufficient chimney draught - too high air supply by the fan 	<ul style="list-style-type: none"> - regulate the doors so that the sealing cord stays tight - check/replace the sealing cord - check/clean the chimney - reduce the air speed
The fan does not function or it makes a lot of noise	<ul style="list-style-type: none"> - set temperature reached - disconnected by safety thermostat - capacitor/motor defect - bad electrical connection of the fan 	<ul style="list-style-type: none"> - correct boiler function - reset manually - check/replace the fan - check the electrical connection of the fan

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>	ECOBIO
	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 presiunde 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

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