

Bio Max

Industrial boiler



User manual Maintenance and installation

Bio Max

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Safety provisions



During the use of the boiler, its individual parts: chimney, door, individual points of the body – can heat up and cause burns if touched.



Do not allow children to touch or use the boiler without adult supervision.



The boiler can be operated by a capable adult who has carefully familiarized himself with this instruction.



Only a qualified specialist can install the boiler and connect it to the heating and electrical systems.



If you suspect that the boiler has malfunctioned, please contact the organization that installed the boiler or the manufacturer's representative. Do not under any circumstances use a malfunctioning boiler.



Improperly connected and used boiler can cause injury or death.

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1. Introduction

1.1 General information

The boiler heat exchanger is characterized by exceptional durability and with low requirements for chimney drafts. Maintenance is simple - the control elements consist of a draft valve and a draft regulator, which controls the air supply to the boiler. The enlarged loading opening makes it possible to load larger firewood.

Before connecting the boiler to the heating system, read this manual carefully and check for proper operation of all boiler components and equipment.

Boilers are designed for heating private residential houses, commercial and auxiliary premises. The boilers belong to the so-called low-temperature boilers category, i.e. the average temperature of the heat carrier cannot exceed 90° C, and the maximum operating pressure - 1.5 bar.

The manufacturer reserves the right to make minor changes that do not significantly affect the quality of the combustion process and the operation of the boiler.

1.2 Standards and regulations

The boiler must be installed and operated in compliance with the legal requirements of the country to which it is supplied. It must be installed in accordance with the requirements of the maintenance and installation instructions.

Otherwise, the manufacturer assumes no responsibility and does not guarantee repair for any defects.

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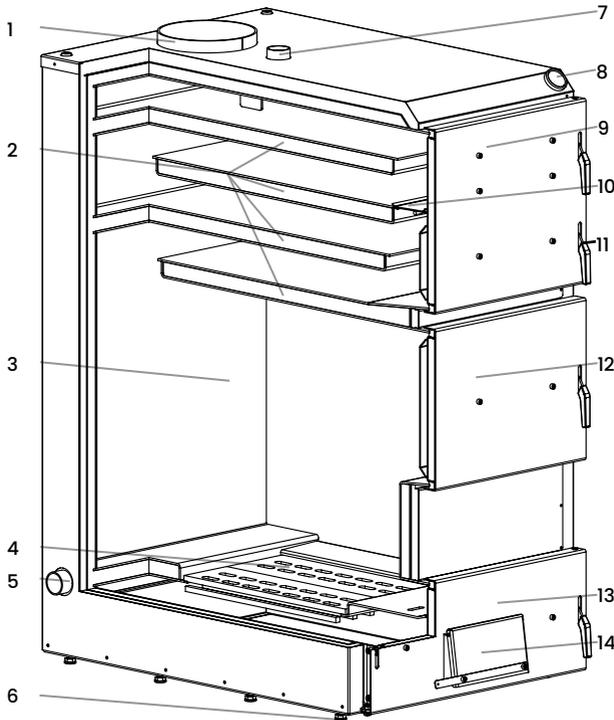
2. Technical parameters

Models and power output		50 kW	70 kW	100 kW
Heated area	Max m ²	500	700	1000
Combustion chamber load	l/dm ³	240	380	550
Combustion chamber depth	mm	600	800	1000
Combustion chamber opening size	cm	40x50	40x60	40x70
Heat exchanger area	m ²	5	7,1	10
Number of horizontal heat exchangers	pcs	4	4	4
Volume of water in the boiler	l	130	180	235
Weight	kg	420	570	800
Chimney inner-outer diameter	mm	200/210	220/230	250/260
Hydraulic connections size		G2 inch		
Lowest operating temperature		60° C		
Highest operating temperature		90° C		
Heating efficiency		83%		
Highest operating pressure		1,5 bar		
Required draft in the chimney		>20 Pa		

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3. Construction

3.1 Boiler components



- 1. Chimney
- 2. Heat exchanger
- 3. Combustion chamber
- 4. Cast iron grates
- 5. Return pipe
- 6. Adjustable legs
- 7. Feed pipe

- 8. Thermometer
- 9. Cleaning door
- 10. Ignition flap-valve
- 11. Door handle
- 12. Fuel loading door
- 13. Service door
- 14. Air supply valve

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3. Construction

3.2 Boiler

The boiler heat exchanger consists of three main zones. Four horizontal heat exchangers (2) are placed in the area of the upper door. The upper door (9) is used when it is necessary to clean the surface of the heat exchanger. The area of the middle door (12) is the solid fuel combustion chamber. Through this door, the fuel is loaded into the combustion chamber. The middle and lower chambers are separated by cast iron grates (4). An ash box is installed in the area of the lower door (13) for ash removal. A thermometer (8) and a draft regulator are installed in the boiler. The internal heat exchanger body is made of bent and welded heat-resistant steel sheets, and the finish is made of powder-coated sheets. An insulating layer of glass wool is installed under the boiler finish, which protects against heat loss through the external walls of the boiler. The double doors are sealed with heat-insulating material and painted with heat-resistant paint. Gases generated during combustion are removed through the chimney pipe (1) installed in the upper part of the boiler. The boiler works on the principle of direct combustion, so it is possible to burn moist fuel.

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4. Boiler installation

4.1 General information

Bio Max boilers are delivered ready for operation. Before connecting the boiler to the heating system, read this manual carefully and check that all boiler components and equipment are working properly. Bio Max type boilers are delivered to the buyer fully assembled, but the thermoregulator, thermometer and chain mounting plate are not installed in order to avoid damage during transportation. They come packed in an ash box.

4.2. Boiler location and position

The boiler must stand on a hard, smooth and non-flammable dry surface. It is forbidden to place the boiler near flammable materials. The minimum safe distance (from flammable materials) for **Bio Max** boilers is 100 cm.

Provide good access to the boiler for service personnel. Also ensure good access from all sides of the boiler so that nothing interferes with fueling and cleaning the boiler, it is convenient to access the ash collector, liner, connections and chimney.

The boiler room must be equipped with adequate air supply and smoke extraction ventilation. Minimal active ventilation channel's cross-sectional dimensions are specified for the country's regulatory acts in which it is operated.

To prevent a reduction in draft and uncontrolled smoke emission, do not install mechanical smoke removal equipment (smoke extractors) in the boiler room.

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4. Boiler installation

4.3 Connecting the boiler to the chimney

The chimney must be installed to meet the requirements of the country where it is installed. The recommended chimney draft is 15–20 Pa. The minimum chimney liner recommended by the boiler manufacturer are these dimensions:

Diameter of round insert – 150 mm;

Dimensions of the square insert – 140x140 mm.

The boiler flue pipe must be connected to the flue itself with a rigid steel connection of suitable cross-section, shape and thickness. The connection of the solid fuel boiler to the chimney must be properly insulated to prevent burns.

4.4. Connecting the boiler to the central heating system



Dedicate the work of connecting the boiler to properly qualified specialists.

In order to extend the service life of the boiler and to ensure adequate comfort of use, it is necessary to follow such an installation scheme that ensures the maintenance of the working temperature of the boiler not below 60°C.

With the help of a specialist, make sure that the condition of the boiler, the tightness of the plumbing connections and the flue and the components are working properly. The closed heating system must have a thermal expansion compensation vessel of adequate capacity (at least 10% of the total liquid volume in the system).

The use of safety valves or valves that limit the flow in a closed heating system is prohibited.

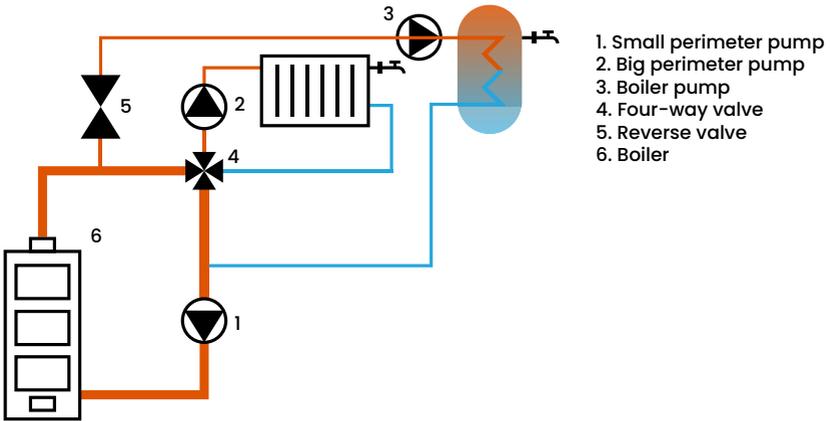
Recommended connection schemes are presented in subsection 4.5.

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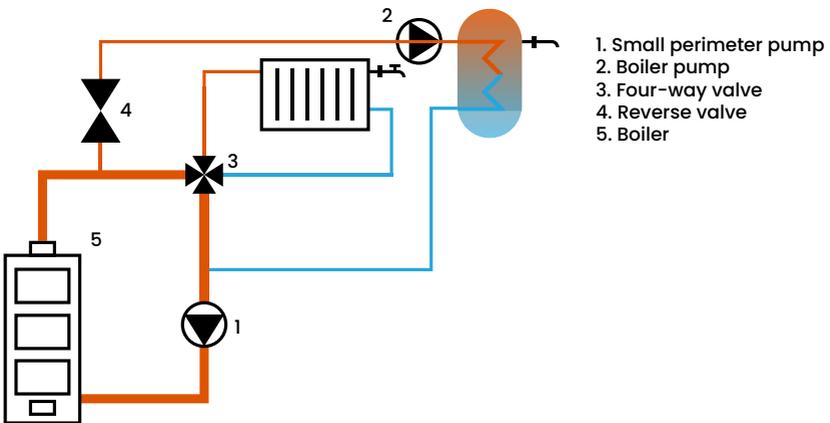
4. Boiler installation

4.5 Recommended connection diagrams

With four-way valve



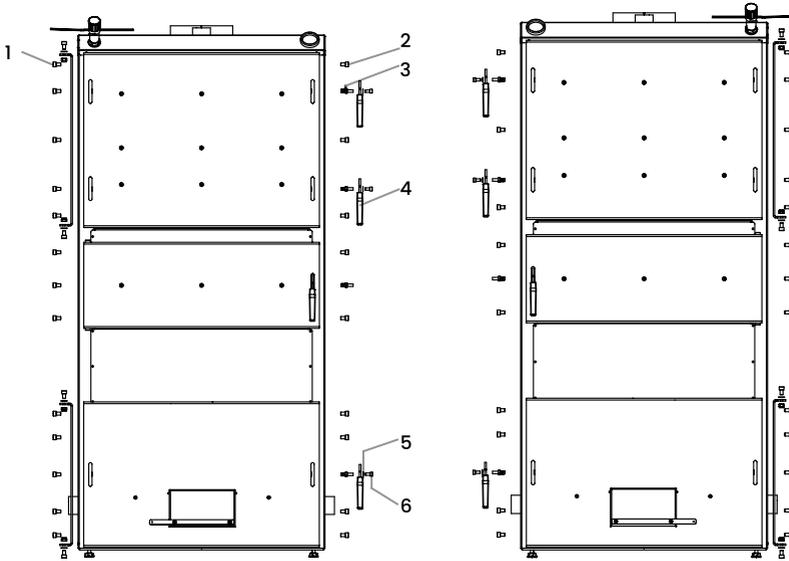
With 4-way valve for older (gravity) systems:



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4. Boiler installation

4.6 Changing the door direction



1. Screw DIN 912 M10x16
2. Screw DIN 912 M10x12
3. Eccentric M10

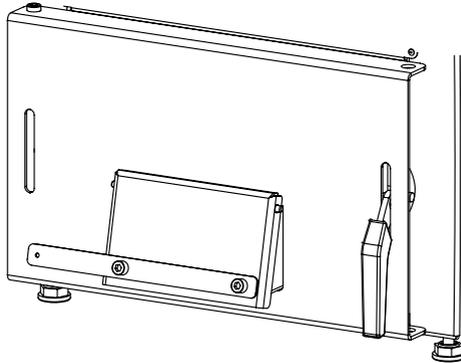
4. Door handle
5. Spring washer
6. Screw DIN 912 M8x14

The direction of the middle door is changed by turning the door together with the hinge (hinges) away from the boiler body and screwing it on the opposite side of the boiler. The door handle is unscrewed, turned over and screwed back. The direction of the lower and upper doors is changed by turning the door away from the hinge. The hinge is unscrewed from the boiler body and screwed on the opposite side of the boiler. The door is screwed to the hinge, and the door handle is unscrewed from the door and screwed back to the opposite side of the door. The draft regulator is fixed at the top of the boiler depending on the direction of door opening. The chain mounting plate is mounted on the hinge side.

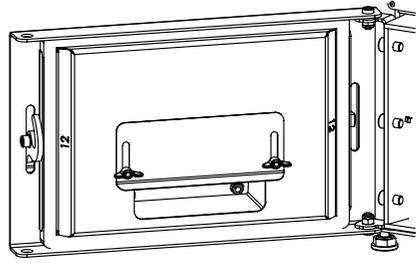
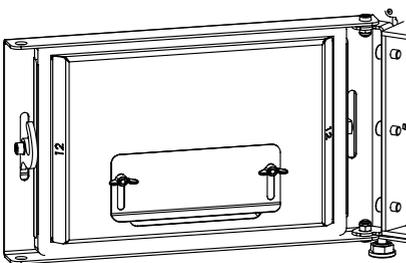
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4. Boiler installation

4.7 Adjusting the air supply valve



The draft regulator automatically operates the air valve in front of the lower door by chain. During combustion, when the temperature rises, the damper is closed, and when it drops, it opens. Check the operation of the shutter - it must move freely. On the inner side of the lower door, a valve limiting the maximum power is installed, which is locked in the desired position depending on the desired power, and more accurate air supply settings are made with the help of the draft regulator.



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5. Using the boiler

5.1 General information and safety



Use the boiler safely and follow the basic safety and boiler operation rules.

- Check the operation of the safety valve (max. 1.5 bar) and open the shut-off valves between the heating boiler and the heating system.
- Check the water pressure in the system.
- The heating system must be filled with water and bled.
- Do not use flammable liquids such as gasoline, paint thinners etc. when igniting solid fuel.
- Do not burn plastic, rubber and other air-polluting waste.
- The smoke extraction system must be reliably connected and tight.
- Unmaintained chimney, insufficient draft can cause Carbon monoxide poisoning.
- Carry out maintenance work on the boiler only after it has cooled down.

5.2 Boiler fuel

Wood. In order for the boiler to reach the power specified in the technical parameter table, it is necessary to burn wood with a moisture content of no more than 20%. However, the **Bio Max** design allows you to burn wetter wood as well. The duration of burning depends on the amount of charged fuel, its quality, outdoor and indoor temperature, the thermal resistance of the building, the working capacity of the boiler and compliance with the recommendations of the user manual (connection and adjustment of the boiler, heating water flow and temperature maintenance).

Coal. Black coal mixture: medium and fine coal (50/50%).

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5. Using the boiler

5.3 Ignition

- 1) Check the water pressure and tightness of the boiler and system.
 - 2) Check the draft and the condition of the smoke channels.
 - 3) Clean the boiler ash grates, smoke channels and internal side walls of the boiler.
 - 4) Put fuel through the middle door.
 - 5) Fully open the foundation shutter and close the middle door.
 - 6) Fueling is done through the bottom door. After lighting the fuel the door must be closed.
 - 7) After the fuel ignites, the establishment valve is closed.
 - 8) If the boiler works too intensively, the power can be reduced with the power limiting valve (See 4.7.).
 - 8) The recommended working temperature of the boiler is 80–85 °C.
 - 9) If the operating temperature of the boiler is exceeded, adjust the draft regulator with the help of the chain.
- If a specialist installs the boiler for the first time, he must familiarize the user with the instructions for using the boiler.



Before starting to burn solid fuel, make sure that the cast iron grates are in the correct position (“VVVVVV”). When stacked in reverse, wood fractions and ash fall, clogging the gaps. In this case, the boiler loses its traction and power, the grates fold.

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5. Using the boiler

5.4 Boiler operation

- 1) Depending on the heat demand – burning intensity, refuel periodically.
- 2) When leaving the boiler to operate during the night, the air supply valve can be set – thereby reducing the boiler power. But after reducing the air supply too much, it starts to accumulate soot on the walls of the boiler and the efficiency of the boiler decreases.
- 3) All doors must be closed during operation.

5.5 Maintenance

Ashtray. Clean the ashtray as needed, depending on the type of fuel used. Overfull ashtray prevents the proper combustion of fuel – improper air distribution occurs, so the fuel burns unevenly along the entire length of the boiler.

Cleaning the boiler. It is recommended that all combustion waste and slag would be cleaned before each new ignition. The heat exchanger is easily cleaned through the upper door. The combustion chamber is cleaned through the middle door. Cleaning of cast iron pans and ashtray is done by pulling out the components through the bottom door.

Recommendations. The tar layer formed inside the boiler can be reduced by burning aspen or black alder wood at maximum temperature.

Periodically inspect the boiler and heating system.

6. Warranty conditions

When selling the boiler, the seller must familiarize the buyer with the terms of the warranty:

1. The manufacturer provides:
 - 4-year warranty for the tightness of the boiler heat exchanger.
 - 2-year warranty for the included parts.
2. The boiler installation scheme must ensure a return water temperature of at least 60°C.
3. Boiler installation must be performed only by a qualified specialist.
4. During the warranty period, the manufacturer undertakes to carry out free of charge elimination of malfunctions, if they occurred due to the fault of the manufacturer.
5. The warranty does not apply to:
 - Failure to submit purchase documents.
 - Violation of installation, operating instructions or warranty conditions requirements.
 - In case of mechanical damage to the boiler.
 - After determining that the boiler has been repaired by an outsider.
 - In case of natural disasters.
6. Defects detected during the warranty period will be eliminated within 21 working days from the date of the complaint.
7. Costs related to service calls and repairs, if it is determined that the warranty conditions have been violated, are covered by the buyer.