BOILER OPERATION AND INSTALLATION MANUAL

BLAZE PRAKTIK 17

BLAZE PRAKTIK 25

BLAZE PRAKTIK 40

(EASY model)

BLAZE HARMONY s.r.o.

Trnávka 37, 751 31 Lipník nad Bečvou

Czech Republic

Email: info@blazeharmony.com, www.blazeharmony.com

<u>Dear Customer,</u>

Congratulations on choosing and purchasing the BLAZE PRAKTIK boiler in the EASY model. You are now the owner of a boiler with top-of-the-line specifications. To ensure that your boiler serves you well, reliably, and for a long time, please operate it in accordance with the instructions in the user manual, paying particular attention to chapters 6, 7, and 8.

We greatly appreciate the trust you have placed in us and would appreciate your feedback regarding the operation and maintenance of the boiler.

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Contents

1 Boiler usage and advantages

1.1 Boiler advantages

Low investment costs

- The boiler features **a patented integrated mixing system** that replaces the standard return water protection (return line); a mixing circuit with temperature control (e.g., Laddomat type) is not required.
- The boiler can be connected to a storage tank in a gravity-fed configuration. In this case, a pump and an emergency cooling system are not required.
- Excellent output controllability and long-term maintenance of a constant heat output allow for the same level of thermal and operational comfort even with a storage tank half the volume of what is required for boilers without controllability.

Low operating costs

- The automatic smoldering function controls boiler operation according to the combustion state. Boiler efficiency values under defined test conditions are specified in Table 3.
- Electricity savings in gravity-fed systems (without a pump or electric mixing valves).
- Savings on service and maintenance – advanced design features (e.g., split firebrick components made of high-quality ceramic) ensure low costs for wear-and-tear parts.

High-quality combustion

- **The patented radial nozzle** and **patented 3-zone air system** enable the efficient combustion of fuels of varying sizes.
- The boiler features a unique stoking chamber design with a compact insulating jacket. This prevents excessive cooling of the fuel, ensuring high-quality combustion even at low output and with fuels containing a higher moisture content.
- The controller evaluates the instantaneous output (based on flue gas and water temperatures) and maintains it within the range for high-quality combustion.

Long service life

- Wood gasification produces organic acids (acetic acid, etc.). In conventional boilers (made of steel sheets or cast iron), these acids condense on the walls of the feed chamber and cause chemical corrosion, which significantly shortens the service life. The compact insulating jacket of the combustion chamber completely eliminates this problem; the jacket walls have a higher temperature, so condensation does not occur. The service life of boilers of this design is significantly longer than that of wood-fired boilers without similar protection.
- The integrated water mixing system ensures that the water temperature in the boiler remains above the flue gas dew point (approx. 50°C) during operation. This protects the internal heat exchange surfaces from low-temperature corrosion.

User Comfort

- **The patented smoldering layer detection** accurately and reliably determines when the residual fuel layer is optimal for switching to smoldering standby mode. This ensures maximum time for the next fuel addition without the need for a new fire. If the fire does go out, an ideal ignition layer of charcoal remains in the boiler, which only needs to be lit (e.g., with a piece of paper) and then refueled. The need for conventional reignition (i.e., removing ash from the stoking chamber and reigniting with wood chips) is thus completely eliminated during operation.
- A sophisticated controller manages the heating system, DHW heating, etc.
- There is no need to remove ash from the bottom of the feeding chamber. The ash continuously slides into the combustion chamber.
- The horizontal stoking door facilitates operation and allows for easy feeding of loose fuels.
- Due to the high-quality combustion, ash removal is usually only necessary after 1 to 2 weeks of operation.
- Mechanical turbulators allow for easy and quick cleaning of the heat exchanger using a lever.
- The exhaust fan prevents smoke from filling the boiler room during stoking and firing, and reduces dust during ash removal and boiler cleaning.

- The insulation jacket of the stoking chamber ensures higher wall temperatures, preventing liquid tar from settling on the walls.
- A viewing window with ceramic glass allows the operator to easily monitor the combustion process.
- The boiler can be operated in emergency mode even during a power outage, relying solely on chimney draft (see chapter7.3).

1.2 Boiler Application

BLAZE PRAKTIK EASY-series wood-fired hot-water gasification boilers are designed for heating single-family homes, apartment units, cottages, office buildings, small businesses, and other structures. BLAZE PRAKTIK boilers in the EASY version are officially approved (certified) for installation and operation without a storage tank (they meet the requirement of the EN 303-5 standard for output adjustability from 30 to 100%). Connection without a storage tank is only possible in installations with sufficient heat demand (see sections 1.4 and 1.5).

Operation in an installation where the conditions for connection and operation specified in this document are not met will void the boiler warranty.

BLAZE PRAKTIK series boilers in the EASY version are manufactured and tested in accordance with applicable documentation and comply with the EN303-5+A1:2023 standard for central heating boilers.

1.3 Advantages and disadvantages of operation without a storage tank

The advantages of a system without a storage tank include cost savings (storage and expansion tank, connections) and space savings.

The disadvantages include lower thermal comfort in the heated building (fluctuating indoor temperature) and greater demands on boiler operation (stoking time, batch size, and output control must be adjusted to heat demand or outdoor temperature).

A responsible assessment of whether installation without a storage tank is feasible is relatively complex. In addition to knowledge of the building's thermal parameters, it also requires an assessment of thermal comfort requirements and operational feasibility; see the chapters at 1.4 and 1.5 .

Installing a boiler without a storage tank is always riskier than installing one with a storage tank, and therefore places greater demands on the installer's experience and professionalism.

1.4 Conditions for operating the boiler without a storage tank

Operation of the BLAZE PRAKTIK boiler in the EASY version without a storage tank is only possible in an installation where:

1. **The minimum load requirement is met: The boiler's rated output is always drawn for at least 1.5 hours, or 50% of the output for 3 hours** (corresponding to drawing the boiler's output at half the normal fuel rate).
   This condition can be met:
   A. The boiler is the sole heat source in the building with sufficient thermal capacity, and its heat loss is equal to or greater than **the minimum value** defined in Table 1.
   B. The boiler is connected to another heat source (heat pump, gas boiler, another wood-fired boiler, etc.), and output is regulated by shutting down individual heat sources or, if necessary, operating both simultaneously.
   C. The boiler heats a building with a special heating mode involving intermittent heating, e.g., workshops with shift operations, etc.
   D. The boiler is installed in a system where there is another heat load of sufficient capacity, e.g., process water heating, pool heating, greenhouse heating, etc.

2. **Users of the heated building tolerate lower thermal comfort (temperature fluctuations) within the building.**

3. **The operator is capable of stoking the boiler at the right time and in the right amount according to the needs of both the building and the boiler.**

If the seller is not sufficiently certain that the aforementioned conditions are met, a storage tank must be installed.

Reasons such as “there is no place to put the storage tank” or “the customer cannot afford it” are insufficient. If the seller determines that the tank is necessary and the customer still refuses it, the customer must assume the risks themselves. These risks cannot be borne by the seller or the manufacturer. Otherwise, it is better to decline the order. If an effort is made, an acceptable location for the tank can be found within the building (it may even be located away from the boiler—garage, attic, basement, outbuilding, a spare corner in the living area, etc.)

1.5 General Conditions for Installation and Operation (with or without a storage tank)

Operation of the BLAZE PRAKTIK boiler in the EASY version is only possible in an installation where (points 4–8):

4. **The condition for maximum heat output is met: The heat loss of the boiler-heated part of the building must not exceed the maximum value defined in Table 1, so that during very cold periods** (average daily temperature below -5°C … approx. 20 days per year), **four daily fuel additions are sufficient.**
5. **The installation is performed correctly (hydraulic connections, flue gas exhaust, electrical wiring, etc.).**
6. **Is the fuel suitable (e.g., logs of the correct length, appropriately split, dry)?**
7. **Is the boiler being operated correctly (starting up, stoking, adjusting, ash removal and cleaning, inspection)?**
8. **Is the boiler and related equipment (flue, heating system, etc.) in working order?**

Table 1: **Minimum heat loss** of a building where the BLAZE PRAKTIK boiler in the EASY version without a storage tank is possible, and **maximum heat loss** of a building where the BLAZE PRAKTIK in the EASY version is the sole heating source

Minimum* and **maximum** heat loss of a building where the **BP 17 EASY** as the sole heating source	lightweight construction aerated concrete wood, Ytong	standard construction 40 cm solid masonry solid blocks 40–50 cm	medium-weight construction solid masonry brick, stone 40–60 cm	heavy construction solid masonry brick, stone 60 cm and more
Briquettes	**battery required**	**8–14**	**6–14**	**5–14**
Hardwood (beech, hornbeam, acacia, …)**	**Battery required**	**8 – 12**	**6 – 12**	**5 – 12**
Medium (birch, mixed wood)**	**battery required**	**8–10**	**6–10**	**5 – 10**
Softwood (spruce, poplar, …)**	**battery required**	**8 – 8**	**6 – 8**	**5 – 8**

Minimum* and **maximum** heat loss of the building, where the **BP 25 EASY** as the sole heating source	lightweight construction aerated concrete wood, Ytong	conventional construction solid masonry 25–40 cm solid blocks 40–50 cm	medium-weight construction solid masonry brick, stone 40–60 cm	heavy construction solid masonry brick stone 60 cm and more
Briquettes	**battery required**	**14–24**	**10–24**	**8–24**

Hardwood (beech, hornbeam, acacia, …)**	**battery required**	**14 – 20**	**10 – 20**	**8 – 20**
medium (birch, mixed wood)**	**battery required**	**14–17**	**10 – 17**	**8 – 17**
Softwood (spruce, poplar, …)**	**battery required**	**14–14**	**10 – 14**	**8 – 14**

Minimum* and **maximum** heat loss of the building, where the BP 40 EASY as the sole heating source	lightweight construction aerated concrete wood, Ytong	conventional construction solid masonry 25–40 cm solid blocks 40–50 cm	medium-weight construction solid masonry brick, stone 40–60 cm	heavy construction solid masonry brick, stone 60 cm and more
Briquettes	**battery required**	**21–36**	**15–36**	**12–36**
Hardwood (beech, hornbeam, acacia, …)**	**battery required**	**21–30**	**15–30**	**12 – 30**
Medium (birch, mixed wood)**	**battery required**	**21–25**	**15–25**	**12 – 25**
Softwood (spruce, poplar, …)**	**battery required**	**21–21**	**15–21**	**12 – 21**

*** For large-capacity systems, the system's storage capacity can be included: Every 200 liters of water volume in the system reduces the minimum heat loss value by 1 kW (if there is a combi boiler in the radiator circuit, its volume is counted as one-third).**

** Applies to standard firewood, i.e., generally standard, regular logs that are smoothly de-limbed, with lengths of 25, 33, or 50 cm (depending on the boiler type). Irregular firewood (various lengths, curved pieces, logs with prominent branch protrusions, woodworking scraps, etc.) does not fill the boiler as well and therefore requires stoking 1.2x to 1.5x more frequently. For irregular firewood, the maximum heat loss for the given boiler **(shown in red)** must be divided by a factor of 1.2–1.5 (to ensure that refueling is not required more than 4 times a day).

2 Boiler Technical Specifications

Table 2. Boiler Dimensions and Technical Parameters

Boiler type		**BP17 EASY**	**BP25 EASY**	**BP40 EASY**
Weight	kg	245	330	440
Water tank capacity	l	32	40	55
Flue diameter	mm	150		
Firing chamber volume	dm^3	40	80	120
Boiler dimensions: width x depth x height	mm	504x960x1175	584x1040x1175	768x1040x1175
Feeding opening dimensions	mm	276 x 276	356 x 356	540 x 356
Maximum fuel length	mm	250	330	500
Maximum allowable operating pressure	bar	3.0		
Test pressure for type testing	bar	6.0		
Outlet water temperature control range	°C	70 - 95		
Maximum allowable operating temperature	°C	95		
Boiler hydraulic loss at ΔT = 20 K	mbar	1.42	1.65	1.51
Boiler hydraulic loss at ΔT = 10 K	mbar	5.82	6.14	5.74
Maximum noise level	dB	55		
Minimum operating draft of the chimney [1)]	mbar Pa	0.05 5		
Boiler connections: - heating water	Js	G 6/4”		
- return water	Js	G 6/4”		
Connection voltage		1 PEN ~230V / 0.5A / 50 Hz		
Environment		Basic AA5 / AB5		
Electrical protection		IP 20		
Energy efficiency class		A+		

Table 3. Thermal technical parameters of the boiler

Boiler type		**BP17 EASY**	**BP25 EASY**	**BP40 EASY**
Rated output	kW	17	25	40
Power adjustability in continuous operation	kW	5 – 17	7 – 25	12–40
Fuel consumption at rated output	kg/h	4.0	6.2	9.4
Burning time of a full fuel charge				
- at rated output during certification	h	2	2	2
- during normal boiler operation	h	2–6	2–6	2 – 5
Boiler class according to EN 303-5		5		
Ecodesign		Yes		
Flue gas temperature [2)]				
- at rated output	°C	160	160	160
- at minimum power (30%) [3)]	°C	110	110	110
Efficiency				
- at rated power	%	88.4	88.6	93.3
- at minimum power (30%) [3)]	%	92.5	91.5	94.5
Minimum return water temperature without an integrated thermostat	°C	50	50	50
Minimum return water temperature with integrated thermostat	°C	20	20	20

Mass flow rate of flue gases at the outlet at rated output	kg . s^{-1}	0.011	0.019	0.023
Mass flow rate of flue gas at the outlet at minimum output	kg·s^{-1}	0.004	0.008	0.007
Maximum electrical power consumption	W	75	75	75
Electrical power consumption at rated power	W	46	36	47
Power consumption at minimum output	W	26	18	25
Power consumption in standby mode	W	3	3	3
Required storage tank volume [3]	l	0 - 1000	0 - 2000	0 - 3000
Boiler operating mode		Non-condensing		
Boiler category		1		

[1] Chimney requirements are described in Chapter 5.8

[2] Applies to a clean heat exchanger (with normal fouling, the flue gas temperature is approximately 10 to 20°C higher)

[3] The boiler meets the controllability requirements according to EN 303-5 for installation without a storage tank

3 Prescribed fuels for the boiler

The guaranteed fuel for the BLAZE PRAKTIK boiler in the EASY version is listed in the table below. This is the fuel used during boiler certification.

Table 4. Guaranteed fuel for the BLAZE PRAKTIK boiler in the EASY version

Boiler		**BP17 EASY**	**BP 25 EASY**	**BP 40 EASY**
Fuel type		Wood		
Diameter	[mm]	max. 150		
Length	[mm]	max. 250	max. 330	max. 500
Water content	[%]	max. 20		
Ash content	[%]	max. 1.5		
Calorific value	[MJ/kg]	min. 14		

The fuel must comply with the requirements of the EN ISO 17225-5 (wood) standards.

WARNING! Unsuitable fuel can significantly negatively affect the boiler's performance and emission parameters.

For more useful information on fuel, see the chapter 8 .

4 Boiler description

4.1 Boiler design

The boiler design complies with the requirements of:

EN 303-5+A1:2023 - Central heating boilers – Part 5: Solid fuel central heating boilers with manual or automatic feeding, with a rated thermal output not exceeding 500 kW – Terminology, requirements, testing, and marking.

The BLAZE PRAKTIK in the EASY version is a gasification boiler whose main components are: the upper gasification (stoking) chamber (1), the lower combustion chamber (2), and the heat exchanger (3,4). The stoking chamber and the combustion chamber are connected by a nozzle (20).

The boiler body is welded from steel sheets with a thickness of 3 to 8 mm. The walls of the stoking chamber (1) are fitted with a steel protective shell (5) consisting of several segments, interconnected by interlocking joints. The bottom of the stoking chamber is funnel-shaped and lined with ceramic refractory blocks (21, 35, 45). The nozzle (20) consists of radially arranged slots in the bottom of the stoking chamber, which continue through sloped channels into a collector (40) opening into the combustion chamber. Secondary air inlets open into the nozzle (20).

The combustion chamber (2) is lined with ceramic blocks (27). The bottom of the combustion chamber is lined with ceramic blocks (60) and insulated with a two-layer insulation system with a total thickness of 55 mm.

The heat exchange surfaces of the boiler consist of the side walls of the combustion chamber (3) and the rear tube heat exchanger (4) with movable turbulators (31).

The boiler is equipped with 30 mm thick mineral fiber insulation. The outer surface consists of steel sheet covers. The lower door of the boiler features a viewing window (19) with ceramic glass.

An air distribution panel (30) is located in the front part of the boiler under the front cover. In its lower part, there are 3 combustion air inlet openings: primary (50), secondary (51), and pre-drying (52) with dampers (18). The openings (50, 51, 52) are equipped on the outside with a sliding damper (8) for regulating the ratio of secondary, primary, and pre-drying air.

A constant-heat detection sensor (36) is located beneath the balancing arm (44). The arm lock (53) is a mechanism consisting of a pressure arm and a compression spring. It presses the detection arm down when the door is opened so that it does not obstruct fuel feeding.

The water inlet pipe (15) leads into the internal distributor (38), from where water enters the boiler's water chamber through a number of small openings. The boiler water temperature control thermostat (33) is located in the inlet pipe (15).

The boiler is supplied with the bottom door mounted on the left side (hinges on the left side). The door can be repositioned to the right side as needed.

The exhaust fan (7) can be rotated so that the flue gas outlet (14) faces any direction.

The boiler is equipped with a cooling loop for emergency cooling, featuring an inlet (39) and outlet (37) pipe with 1/2" internal threads and a well (42) for the safety cooling valve sensor.

The upper stoking door is equipped with a safety latch (26) to secure any open position.

The controller's control panel (17) is located on the top door. The control unit (6) itself is located on the rear wall of the boiler. For easier access, the control unit (6) can be mounted on any side wall of the boiler or on the boiler room wall. The control unit (6) and the control panel (17) are interconnected via a data cable.

The controller included in the boiler's standard equipment allows for boiler control, charging of the storage tank and DHW tank, equithermal control of 1 mixed heating circuit, and switching of the backup boiler or DHW circulation pump. By connecting expansion module B, an additional 2 mixed heating circuits can be controlled. The standard delivery of the controller includes a flue gas sensor, a boiler temperature sensor, a DHW temperature sensor, a MIX temperature sensor, and a storage tank temperature sensor.

4.2 Function Description

Fueling is typically performed when the boiler is in standby mode (the fan is not running). By selecting the FUELING function on the display—see the separate controller manual—the exhaust fan (7) switches to full power. When the stoking door is opened, the detection arm (12) automatically tilts down via a pressure mechanism (53) so as not to obstruct the fuel being added.

The operator checks the layer of coal left over from the previous fuel charge. If this residual layer is still glowing, the operator simply adds fuel to the stoking chamber. If the residual layer has already cooled down, it serves as kindling, and a lit piece of paper, for example, is placed on top of it before adding fuel.

After adding fuel and closing the door, the fan creates a vacuum, causing combustion air to flow into the boiler.

Pre-heated air enters the distribution panel (30) through the opening on the right (52), rises through a channel in the distribution panel, passes through an opening in the upper part of the boiler body, and is fed above the fuel layer through a longitudinal opening (43). This accelerates the drying and ignition of the new fuel layer.

Secondary air enters the distribution panel (30) through the central opening (51), from there it flows through a circular opening in the boiler body beneath the bottom of the stoking chamber, from which it is fed through a series of openings into channels in the underside of the fittings (21), where it is preheated and enters the gas stream in the merging duct (40) of the nozzle (20).

Primary air enters the distribution panel (30) through the opening on the left (50); from there, it flows through an opening in the body behind the protective shell of the feeding chamber (5) and enters the lower layer of fuel. This causes primary combustion of the fuel (gasification). The resulting wood gas flows through the nozzle (20) into the mixer (40), where it mixes with secondary air. The gaseous components are then burned (secondary combustion) within the combustion chamber (2). The hot flue gases flow past the rear baffles (27) into the heat exchanger, where they transfer their heat to the water being heated. The cooled flue gases are drawn in by the exhaust fan (7) and expelled through the outlet (14) into the chimney.

Ash slides into the combustion chamber (2), from where it is removed by occasional cleaning.

The fan speed is controlled by a regulator based on the temperature of the water and flue gases and the current power demand.

Once the fuel has burned down to the base layer, the detection arm (12) stops pushing the fuel, and it tilts upward toward the stoking chamber, which is detected by the sensor (36), which shuts off the exhaust fan (7) via the controller. The boiler then switches to a steady-heat standby mode. Depending on the chimney draft, the type of fuel used, etc., the base layer maintains the heat for up to 8 hours.

The thermostat (33) limits the water flow to the internal distribution channels so that the temperature of the heat exchange surfaces remains above 60°C.

4.3 Boiler Dimensions

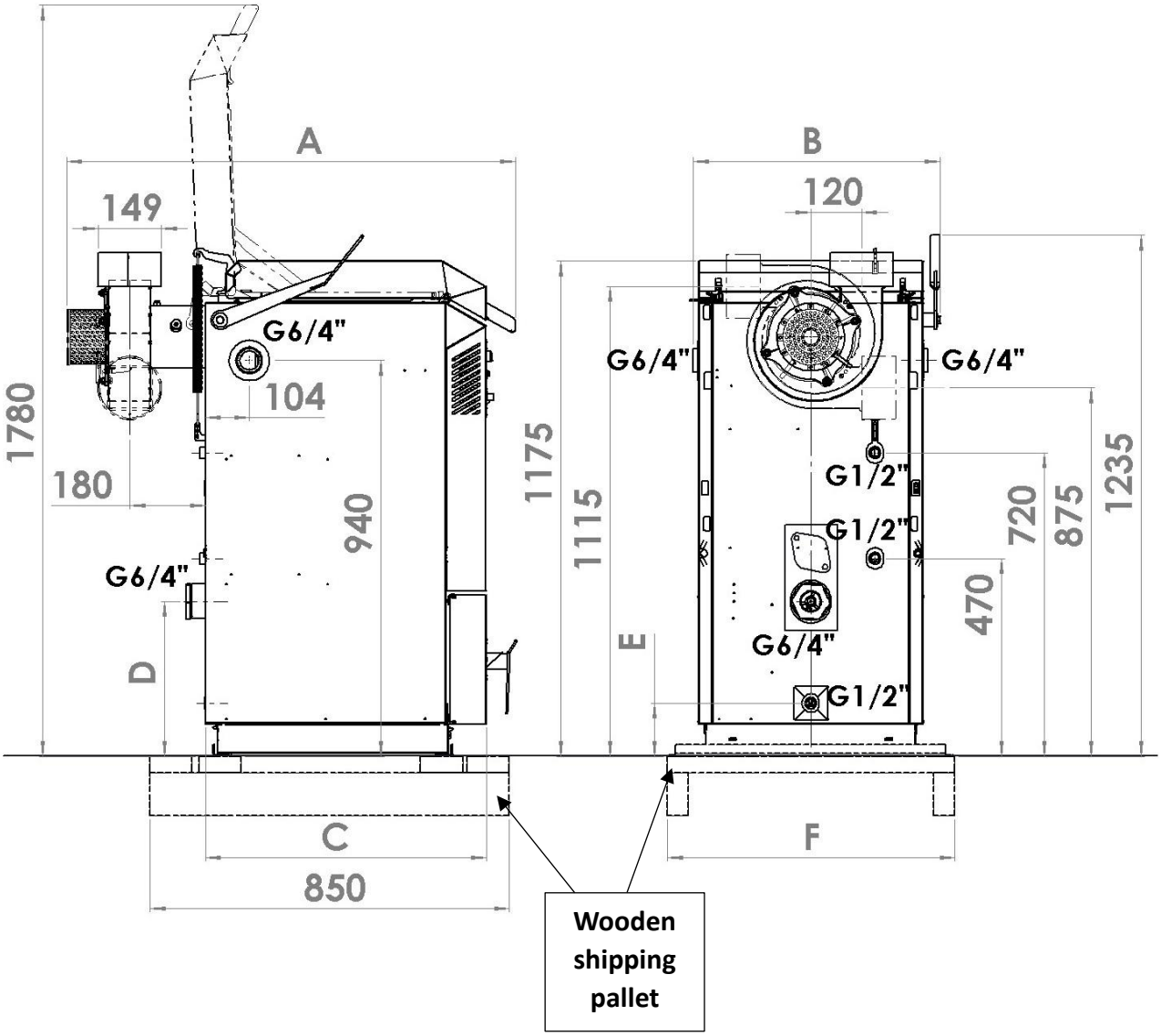
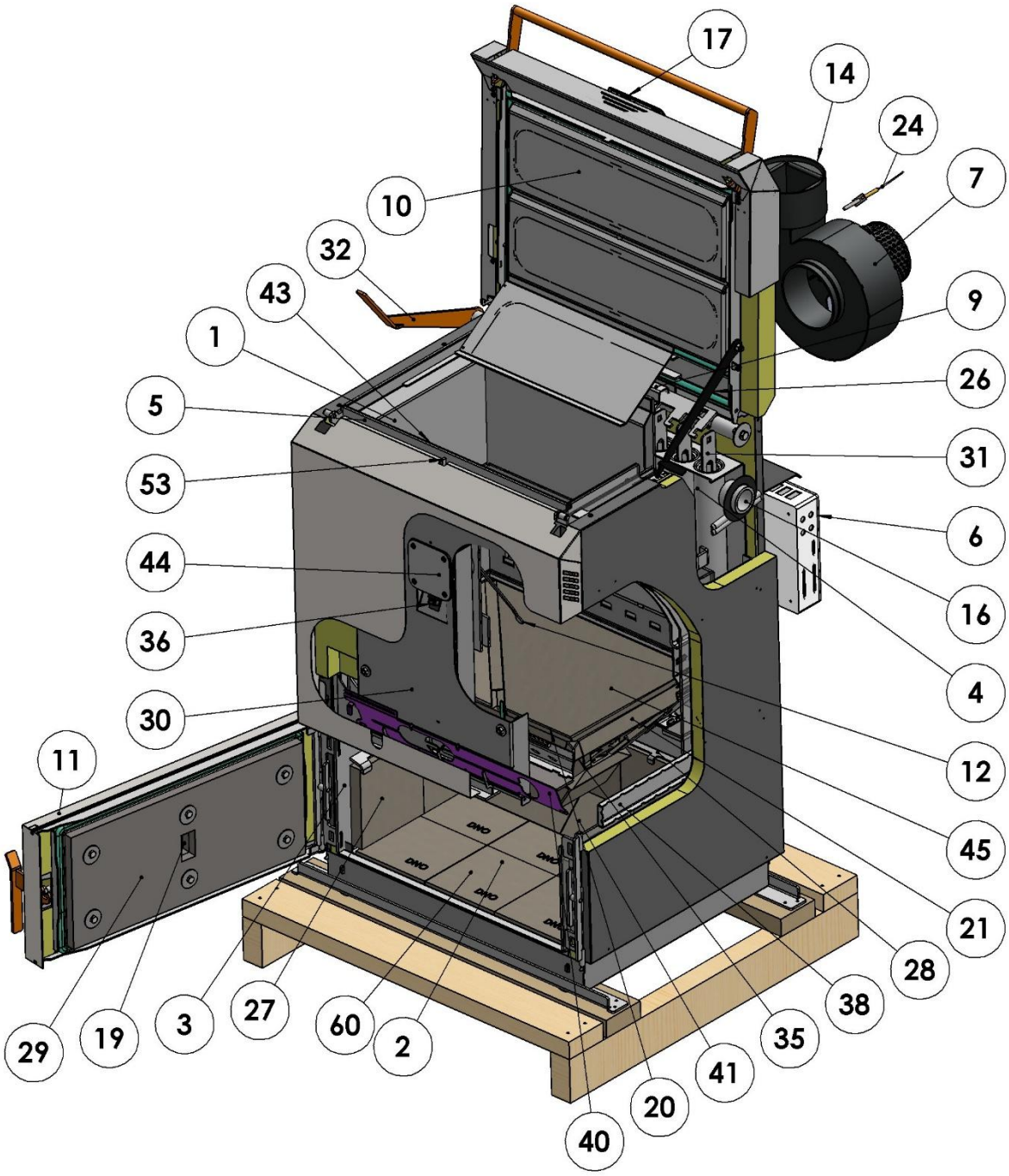


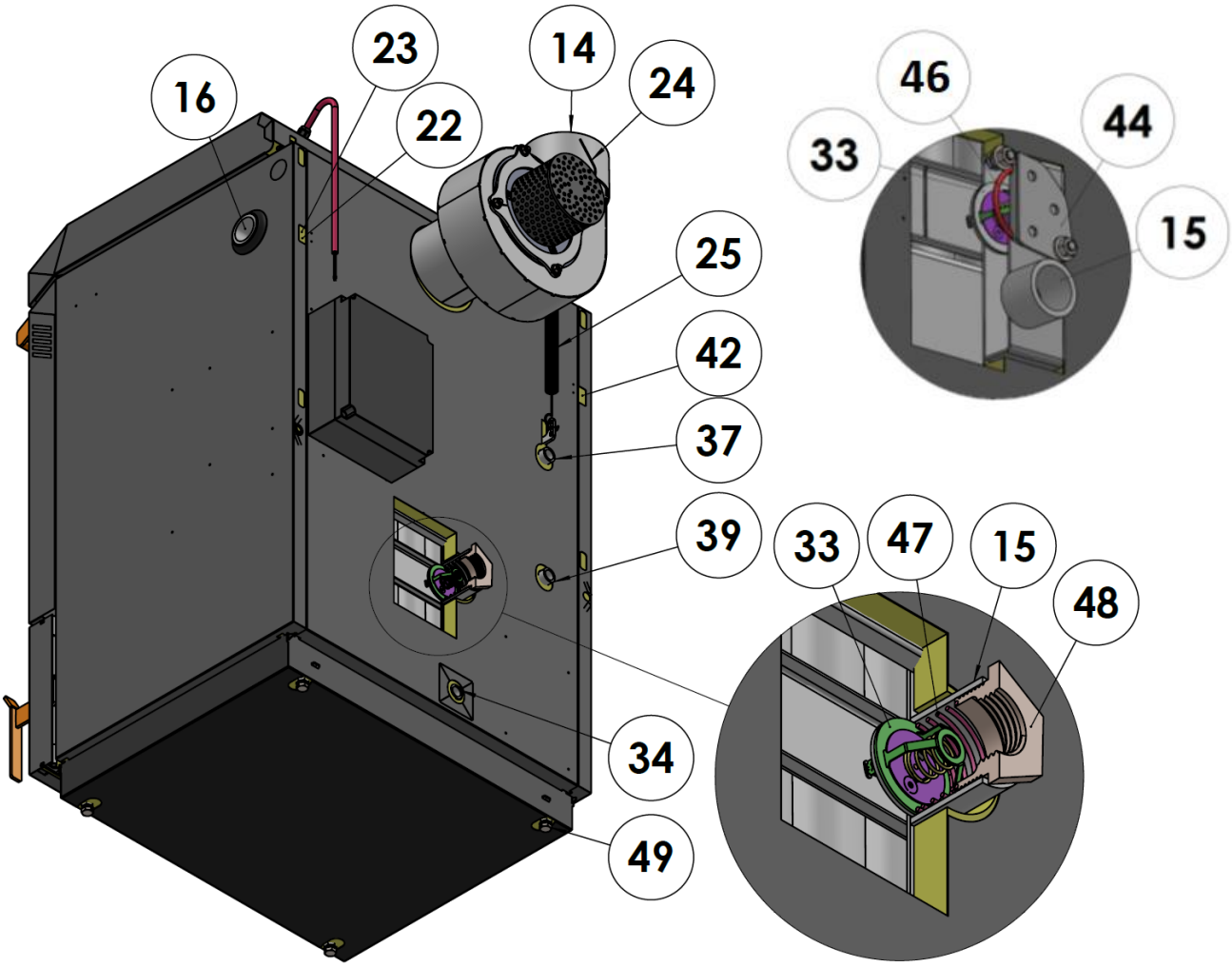
Table 5. Table of basic dimensions of the BLAZE PRAKTIK boiler in the EASY version

	BP17 EASY	BP25 EASY	BP40 EASY
A [mm]	960	1040	1040
B [mm]	504	584	768
C [mm]	594	664	664
D [mm]	275	370	370
E [mm]	95	130	130
F [mm]	680	680	870

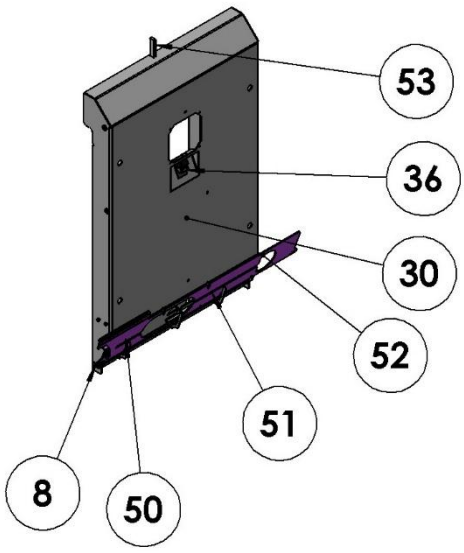
4.4 Boiler diagram



Boiler diagram – front view

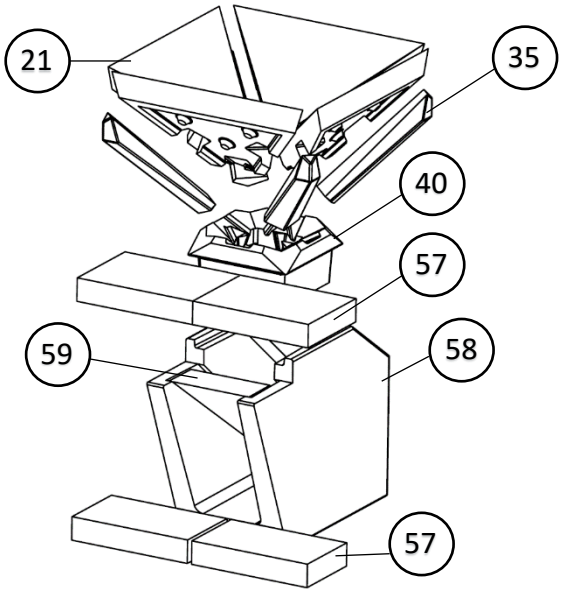


Boiler diagram – rear view

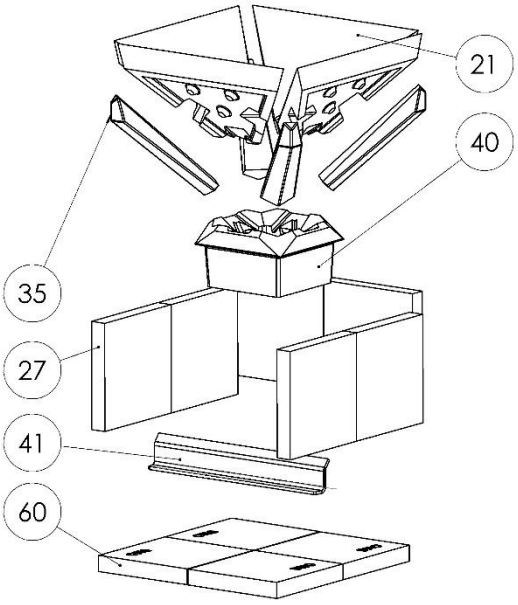


Boiler diagram – venting detail

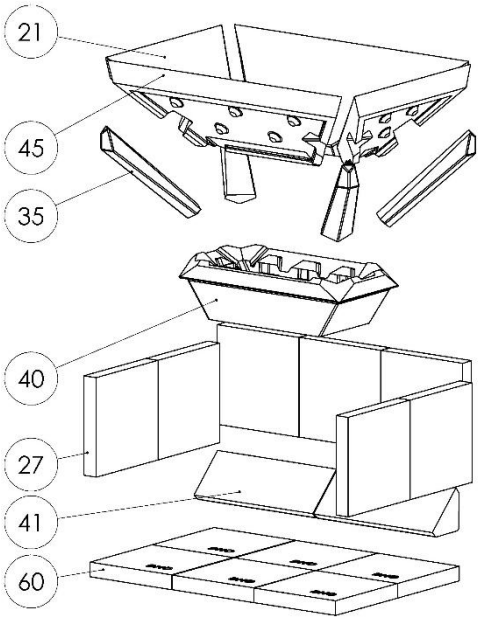
BLAZE PRAKTIK 17



BLAZE PRAKTIK 25



BLAZE PRAKTIK 40



Fitting layout by boiler type

Legend

1. Firing chamber
2. Combustion chamber
3. Side flue gas heat exchanger
4. Rear flue gas heat exchanger
5. Firing chamber protective casing
6. Boiler control unit
7. Flue gas exhaust fan
8. Secondary air regulator (sliding damper)
9. Upper heat exchanger plug
10. Upper door
11. Lower door
12. Constant heat detection arm
13.
14. Flue gas outlet
15. Inlet connection G 2 1/2" (internal)
16. Exhaust pipe G 6/4" (internal)
17. Controller panel
18. Air damper (3x)
19. Viewing window with ceramic glass
20. Nozzle (vent connecting the stoking chamber and combustion chamber)
21. Angled fitting (4x [1), 2)] ,2x [3)])
22. Emergency thermostat sensor
23. Water temperature sensor
24. Flue gas temperature sensor
25. Auxiliary spring for upper door
26. Locking strut
27. Combustion chamber fitting (6x [2)] ,7x [3)])
28. Rear fitting rail
29. Heat insulation for lower door
30. Air distribution panel
31. Turbulators (4x [1)] , 6x [2)] ,9x [3)])
32. Turbulator lever
33. Integrated mixing thermostat
34. 1/2" Drain and Fill Fitting
35. Elbow fitting (4x)
36. High-temperature layer detection sensor
37. Cooling water outlet
38. Internal water distributor
39. Cooling water inlet
40. Combiner fitting
41. Exchanger seal fitting (1x [2)], 2x [3])
42. Sensor well for aftercooling valve
43. Pre-drying air outlet
44. Balancing arm
45. Long fitting (2x [3)])
46. Thermostat cap O-ring (1x [1)])
47. Thermostat pressure spring
48. 2 ½" to 6/4" reducer
49. Boiler leg screw
50. Primary air inlet
51. Secondary air inlet
52. Pre-drying air inlet
53. Fuel detection arm lock
54.
55.
56.
57. Fitting plate (4x [1)])
58. Fitting – labyrinth (1x [1)])
59. Fitting – partition (1x [1)])
60. Combustion chamber fitting – bottom (4x [2)] , 6x [3)])

[1)] only for the BLAZE PRAKTIK 17 boiler in the EASY version

[2)] only for the BLAZE PRAKTIK 25 boiler in the EASY version

[3)] only for the BLAZE PRAKTIK 40 boiler in the EASY version

5 Boiler Assembly and Installation

During the assembly and operation of the boiler, all local regulations and regulations pertaining to national and European standards must be observed. Assembly and installation may only be performed by a qualified, authorized person.

5.1 Quality and completeness check

a) Check for any hidden damage that may have occurred during transport, even if the boiler packaging was not damaged. If damage is found, immediately send the information along with photographic documentation to the email address: info@blazeharmony.com.

b) Check the contents of the boiler package. The BLAZE PRAKTIK boiler in the EASY version includes:
   - complete boiler body with controller
   - a 2 1/2" to 6/4" reducer (only for BP25 and BP40 models in the EASY version)
   - exhaust fan
   - turbulator lever with connecting parts (screws, nuts)
   - cleaning tool set (2 pcs)
   - Integrated mixing thermostat + thermostat spring
   - CT10 sensor (3 pcs) (1 for MIX, 1 for DHW, and 1 for AKU)
   - CT2S flue gas sensor
   - connector for connecting 230V devices (4 pcs)
   - Boiler operating and installation manual and controller operating manual
   - warranty card

5.2 Unpacking the boiler for transport to the boiler room

The boiler is delivered on a wooden shipping pallet, which allows for handling with a pallet jack. The boiler is secured to the pallet via two steel crossbars using 4 M 12 bolts. After placement in the boiler room, the pallet is removed and the bolts are reinstalled (they are used to level the boiler). To reduce the boiler's weight, some of its parts can be removed according to the following procedure:

a) Remove the ceramic firebricks from the combustion chamber
   - Slide the side liners toward you

   - Tilt the rear liners toward you and remove the stainless steel strip. Then remove the rear liners.

   - Remove the bottom liners last

   (Arrangement of ceramic inserts in the combustion chamber – see chapter 4.4 .)

b) Removing the ceramic firebricks from the stoking chamber
   - Remove the bottom firebox liners

   (For the arrangement of ceramic firebricks in the stoking chamber, see the chapter 4.4 .)

c) Removing the boiler covers
   - It is necessary to remove the controller junction box and any cables entering under the boiler cover

   - We do not recommend removing the bottom cover. Without using a transport pallet, it may be damaged and it will not be possible to reinstall the covers.

   (The controller junction box is located on the rear wall of the boiler.)

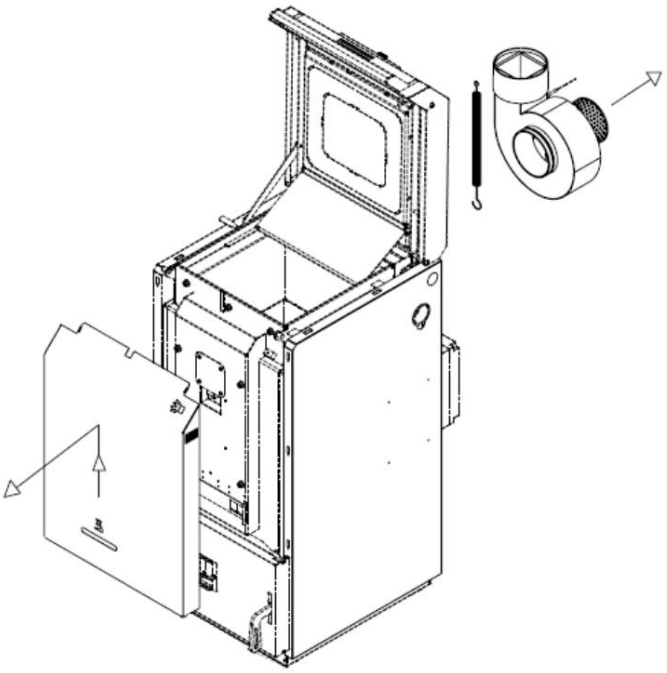
d) Removing the bottom door

- Before removing the bottom door, first remove the front cover.

- Open the door and slide it upward to release it from the hinge.

<u>When reassembling the boiler, follow the reverse procedure of disassembly. Caution! Do not confuse the combustion chamber components—bottom (chap.4.4 ., position 60)—with the side/rear combustion chamber components (chap. 4.4 ., position 27).</u>

1.



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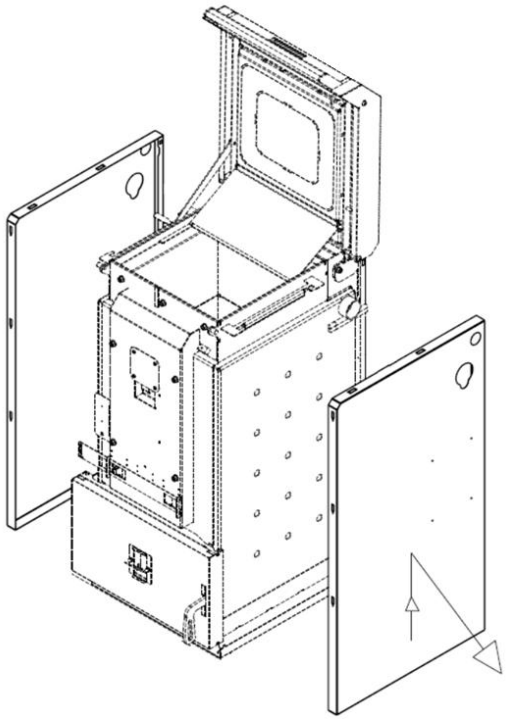

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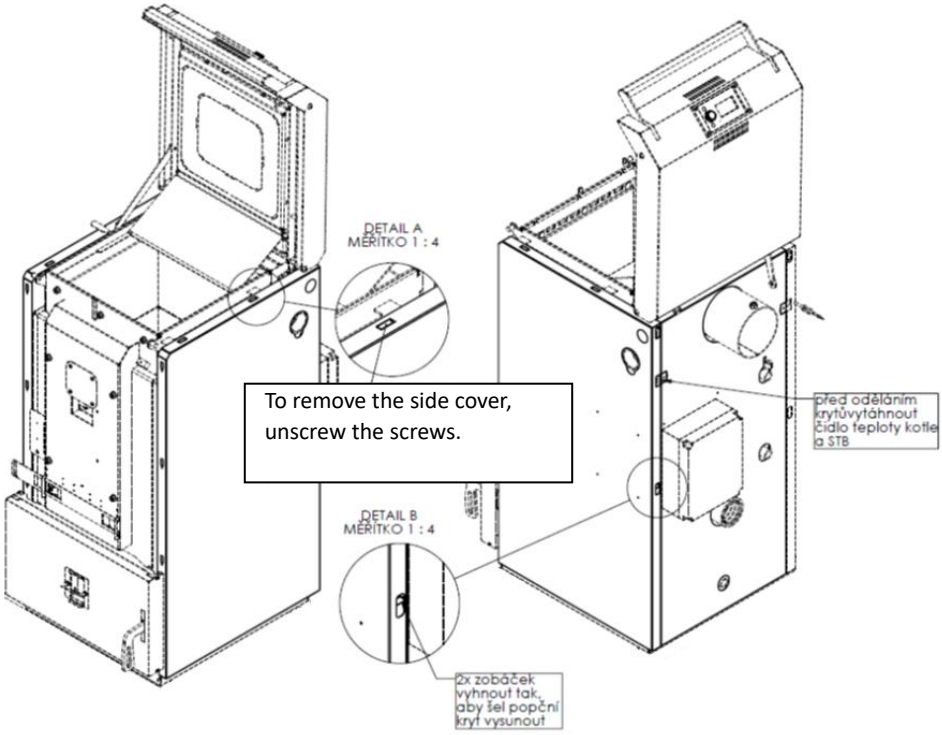
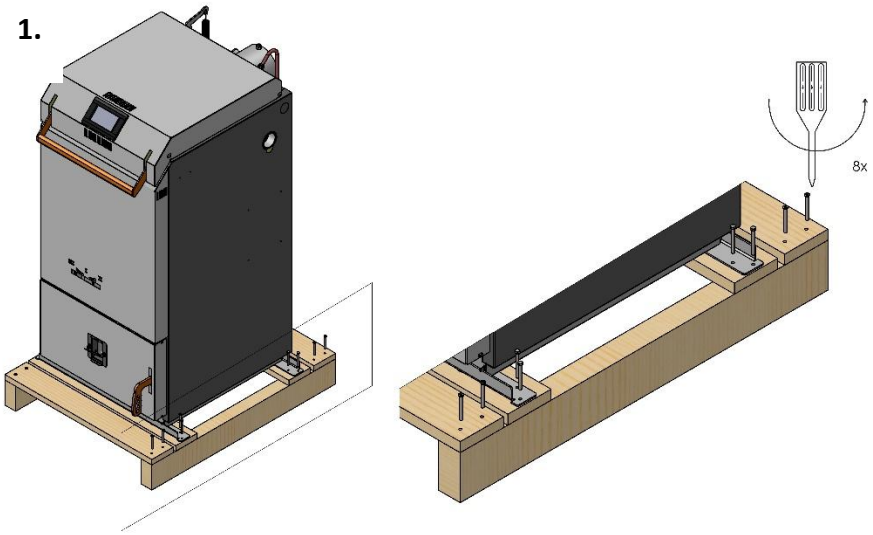


To remove the side cover, unscrew the screws.

5.3 Disassembly of the transport pallet

1.



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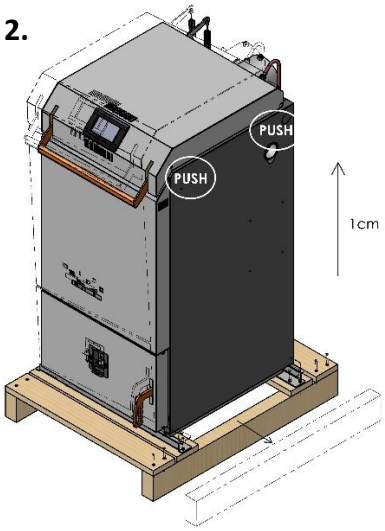

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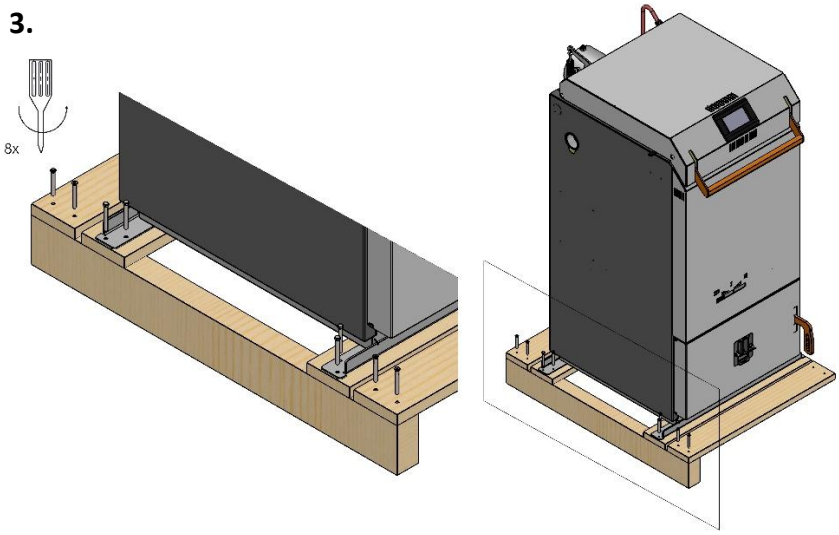

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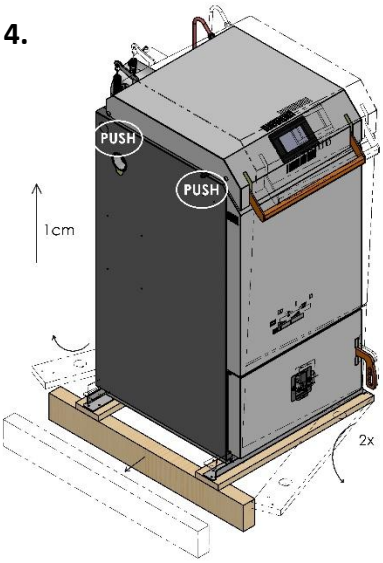

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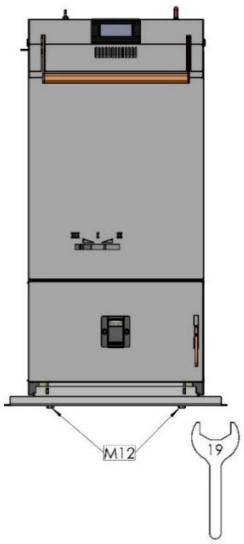

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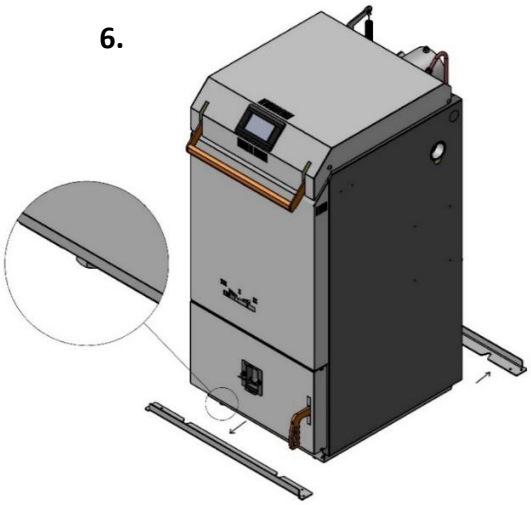
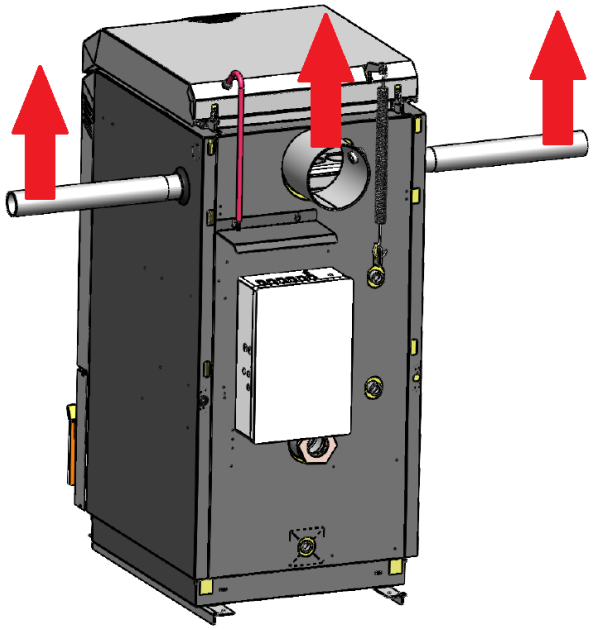


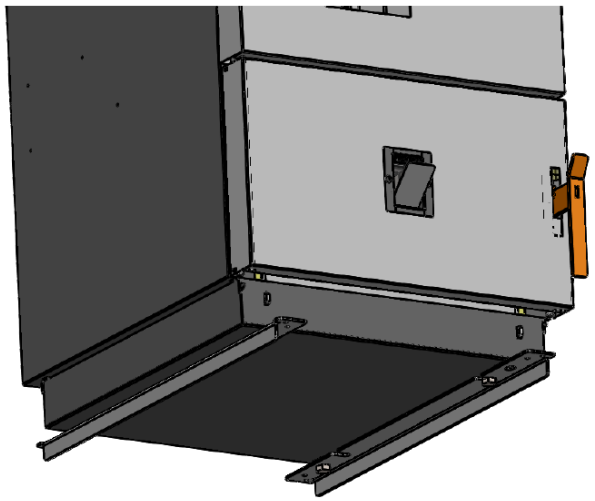
Procedure for disassembling the shipping pallet:

- Remove the crosswise protective boards (front and rear walls of the boiler).
- Unscrew the screws holding the crosswise steel rails (on the side wall of the boiler).
- Tilt the boiler to one side and slide out the longitudinal beam on the opposite side. Repeat on the other side.
- Tilt the boiler slightly backward and slide out the front cross support board. Do the same on the opposite side.
- Loosen the 4 M12 bolts (19 mm socket wrench) between the floor and the cross rails. It is not necessary to lift the boiler while loosening the bolts. Simply loosen the bolts by one full turn.
- Tilt the boiler slightly backward and slide the front rail sideways by about 20 mm. This will release it from the screw head and allow it to drop down. Repeat the same procedure on the opposite side.
- Use 4 M12 screws to secure the boiler in a stable horizontal position.

5.4 Handling the boiler

When handling the boiler during transport to the boiler room, we recommend using the 6/4" outlet sockets on the side walls of the body, into which standard steel pipes with a G 6/4" external thread are screwed (to a depth of at least 40 mm) – see the figure below.
Another suitable feature for handling the boiler is the flue gas outlet – see the image below on the left.





For moving the boiler across the floor, the transport rails used to secure the boiler to the pallet can also be utilized. By mounting them on the boiler in an inverted position—see the figure below—skids are created that facilitate the movement of the boiler across a horizontal floor.

This method of handling the boiler is only possible in situations where there is no risk of (or no issue with) floor damage.

Any other method of handling the boiler (by the door, casing, controller, etc.) poses a risk of damaging the boiler.

5.5 Placement of the boiler in the boiler room

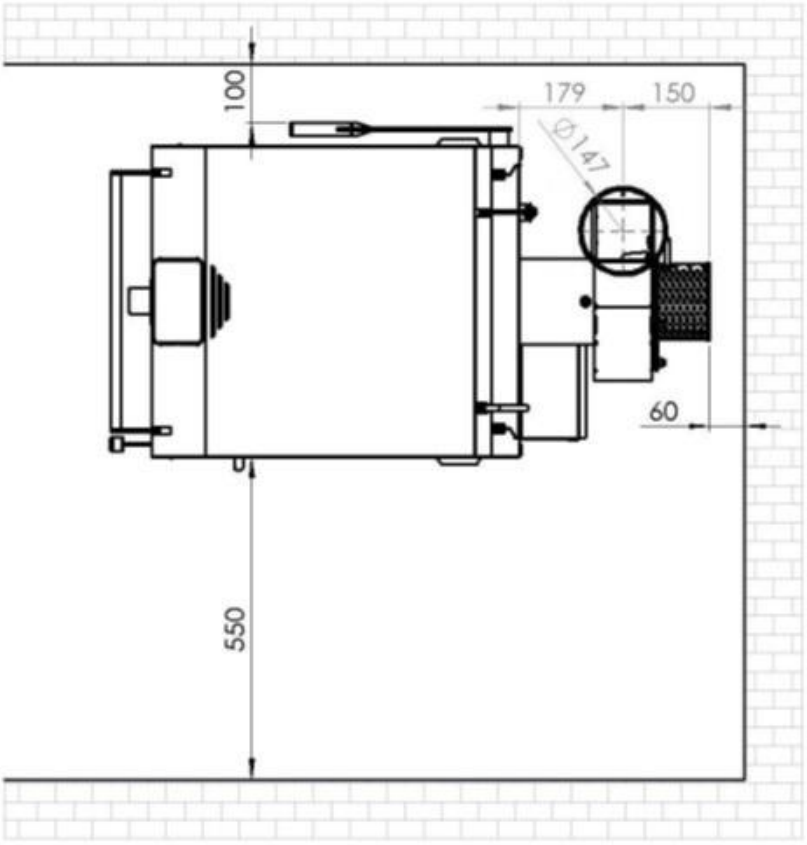
There must be a minimum clearance around the boiler (see figure below) to allow for operation, maintenance, or service.

To facilitate access to the control unit, it can be relocated from the rear wall of the boiler to a side wall or to a wall in the boiler room.

The boiler must be placed on a non-combustible, thermally insulating base that extends beyond the boiler's footprint by at least 300 mm at the front and at least 100 mm on the other sides.

The minimum permissible distance between the outer contours of the boiler and combustible materials (see EN 13501-1) must be at least 400 mm. No objects made of combustible materials may be placed on the appliance or within a distance less than the safe distance from it.

If there is no suitable space in the heated building, heating can be provided from a nearby structure (garage, barn, workshop), where the boiler and usually the tank are placed. Pre-insulated underground piping can be used to connect the structures.

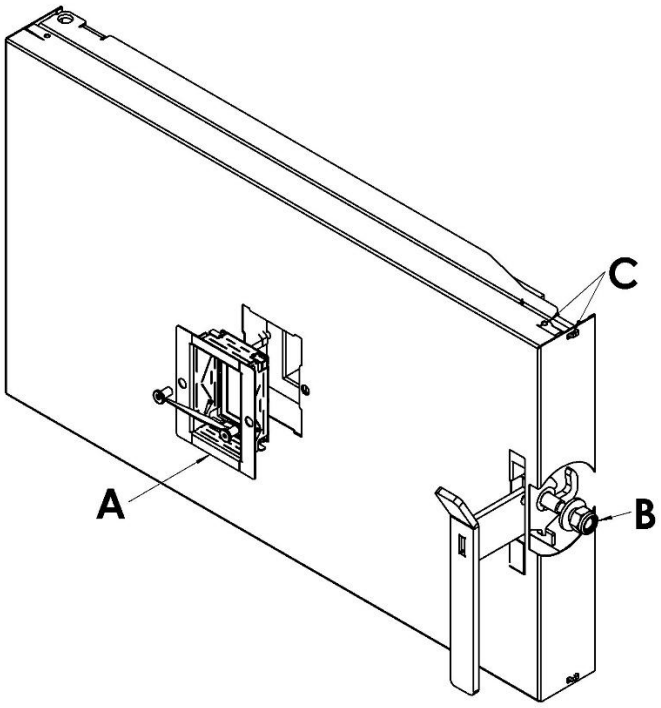


Minimum dimensions for boiler installation

5.6 Rotating the bottom door

If the standard configuration of the lower door (hinge on the left, handle on the right) is unsuitable, this configuration can be adjusted using the following procedure:

- Open the door.
- Remove the door from the boiler, i.e., lift the door upward, tilt it slightly (releasing the upper hinge), and slide it back down to release the lower hinge.
- Remove the viewing window (A) from the door, rotate it 180°, and reinstall it in the door.
- Loosen the nut (B), remove the handle from the door, rotate it 180°, and reinstall it using the reverse procedure. (If necessary, you can loosen the door cover by bending the tab and releasing it from the latch (C).)
- Rotate the modified door 180° and mount it on the hinges on the opposite (right) side.
- Finally, close the door properly.



5.7 Installation of the exhaust fan

The exhaust fan is supplied disassembled and is stored in the boiler's fuel chamber for transport.

- Loosen the hex screw on the boiler flue pipe.
- Slide the fan into place and select the desired position for the installation—see the chapter "4.3 ." Then secure it with the hex screw.
- Connect the exhaust fan cable (5-pin connector) to the boiler control unit.
- Place the flue gas sensor into the opening in the exhaust fan and secure it with a screw. Connect it electrically to the boiler control unit.

5.8 Connection to the chimney

The boiler must be connected to the chimney in accordance with the requirements of standards.

To properly commission the boiler for continuous operation, a chimney inspection is required, which is valid only if it consists of the following parts: an inspection report, a technical protocol, and a flue gas path calculation. Whether the existing chimney is suitable for the type of boiler used must be verified by a chimney sweep's calculation prior to boiler installation.

Since the boiler is equipped with an exhaust fan, the requirements for chimney draft are minimal. The flue cross-section must be large enough for the chimney to be able to exhaust a greater volume of flue gases during stoking and firing. With the door open, the boiler produces roughly twice the amount of flue gases than during operation at rated output.

Table 6. Chimney flue diameters for BLAZE PRAKTIK boilers in the EASY version

Boiler		BP17 EASY	BP25, BP40 EASY
Recommended chimney flue diameter	[mm]	160	180
Minimum chimney flue diameter	[mm]	150	150

We do not recommend using a chimney draft regulator for standard chimneys (with an operating draft of 10 to 30 Pa). They are a source of leaks and draw heat from the heated building into the chimney.

The flue must be securely assembled and fastened to prevent accidental or spontaneous loosening of its components. Flue sections longer than 2 m must be firmly anchored. All flue components must be made of non-combustible materials. We recommend sealing leaks in the flue (joints) with a suitable flexible sealant (silicone) or by taping them with aluminum tape.

We recommend insulating flue pipes longer than 1 m with suitable insulation, e.g., mineral fiber with an outer aluminum foil. In an uninsulated flue pipe, the flue gases cool down significantly. When operating at low power, there is a risk of moisture condensation in the flue gases.

The chimney door must be airtight. A seal can be achieved with an additional cover featuring a rubber gasket secured, for example, with screws.

We recommend that the chimney flue be sufficiently thermally insulated. A chimney located inside the building is ideal; outdoor chimneys experience greater cooling. The minimum permissible flue gas temperature 1 m below the upper edge (mouth) of the chimney is 90°C.

5.9 Ensuring Air Supply to the Boiler

The air required for combustion can be supplied to the boiler room directly from the outside or from the living space. Air supply from the living space is, in a sense, more advantageous because it provides ventilation while also utilizing the heat of the air that would be lost with conventional ventilation (heat savings are approximately 2%). At an output of 10 kW, air consumption is approximately 20 m³/h, which corresponds to the minimum air exchange rate required for a typical-sized apartment.

During stoking, when the door is open and the boiler fan is running at full capacity, air consumption is 100–200 m³/h.

If natural infiltration (micro-ventilation through windows and doors) does not provide a sufficient air supply, it must be ensured via an outdoor ventilation opening with an area of at least 150 cm².

Regulating grilles on the ventilation openings must be positioned so that they do not become clogged.

We recommend installing a carbon monoxide detector near the boiler.

5.10 Heating system design, connections, and boiler

5.10.1 Integrated mixing system

The boiler is equipped with an integrated mixing system, where the internal thermostat (original Blaze Harmony thermostat with order code 801/400242 – see Boiler Diagram, item 33), together with the system of internal mixing channels, ensures that the temperature of all heat exchange surfaces is higher than 60°C. This protects

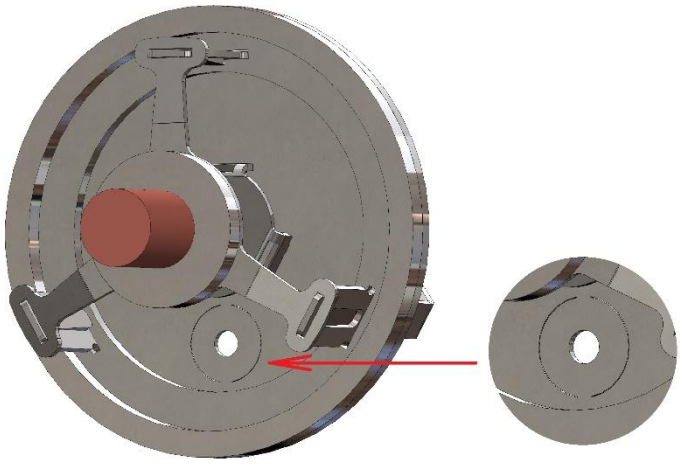
the boiler against low-temperature corrosion even when connected without a controlled mixing branch (with a temperature-controlled mixing valve). This mixing works very well even in a gravity-fed system. At return water temperatures below 50°C, the integrated mixing thermostat closes. The resulting reduction in flow is accompanied by an increase in the outlet water temperature. At very low return water temperatures (less than 20°C), the outlet water temperature may therefore exceed 90°C, and the transferred output is limited to some extent. At very low return water temperatures, the boiler must be started up gradually to prevent overheating.

If the boiler is connected to a circuit with return water control to the boiler (three-way or four-way valve with temperature-controlled mixing), the integrated mixing thermostat is not connected.

The integrated mixing thermostat valve contains an orifice to ensure minimum flow and venting. The orifice size must be set according to the type of circulation in the boiler circuit:

a) <u>Flap opening without adjustment:</u>

Used when the boiler circuit has fully forced circulation. These are boiler circuits where the circulation pump is connected directly in the boiler circuit or in a bypass with a valve.

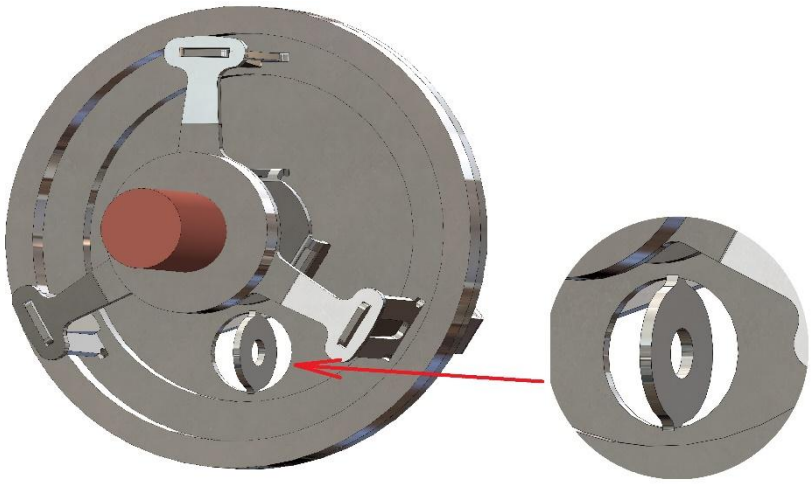


The damper with an unmodified opening is used in hydraulic diagrams 3, 4, 5, 6, 9, and 10 (see Chapter 5.11).

b) <u>Flap opening with an enlarged cross-section:</u>

The disc in the damper is tilted by 90° (e.g., using a screwdriver).

It is used when the boiler circuit is gravity-fed or equipped with a pump that contributes to circulation through the boiler indirectly (via the injector effect). These are boiler circuits without a circulation pump or with a pump in a bypass without a damper (with an injector).



A damper with an enlarged cross-section opening is used in hydraulic diagrams 1, 2, 7, and 8 (see chapter 5.11).

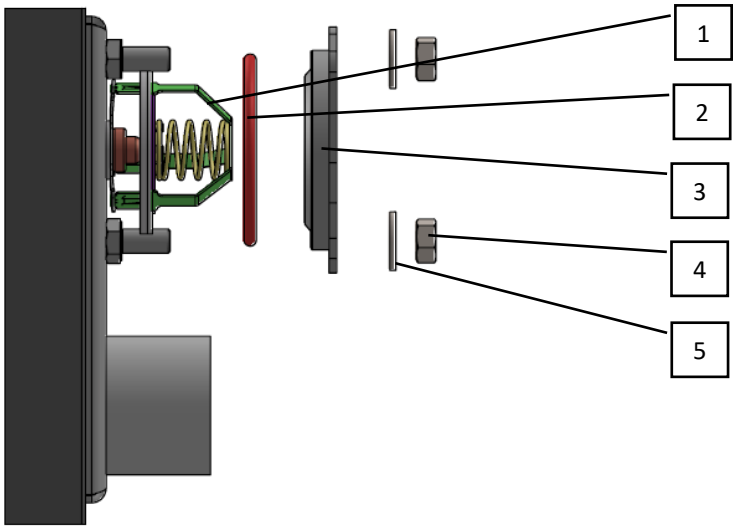
5.10.2 Installation of the integrated mixing thermostat

a) <u>BLAZE PRAKTIK 17 boiler in the EASY version:</u>

The integrated mixing thermostat is already installed in the boiler as part of the standard delivery.

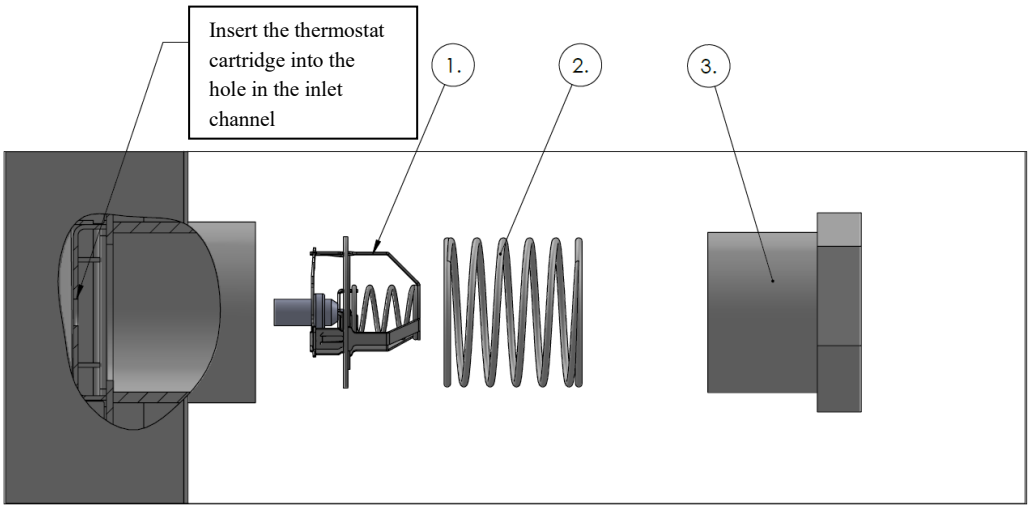
If you need to remove or replace the integrated mixing thermostat, proceed as follows:

- Unscrew the M10 nuts (items 4, 5) on the rear wall of the boiler and remove the cover with the O-ring (items 2, 3).
- Insert or remove the integrated mixing thermostat (item 1) into the opening.
- Reinstall the cap with the O-ring (items 2, 3, 4, 5).



b) <u>BLAZE PRAKTIK 25 and BLAZE PRAKTIK 40 boilers in the EASY version:</u>

- Insert the integrated mixing thermostat (item 1) into the 2 ½" socket on the rear wall of the boiler.
- Insert the pressure spring (item 2).
- Fit the 2 ½" to 1 ½" reducer (item 3) with a threaded gasket and screw it into the pipe socket.



5.10.3 Size of the storage tank

The volume of the storage tank should allow a depleted tank (i.e., cooled to 30–40°C) to absorb the energy of an entire fuel charge (heating by 50°C)—see Table 7. If the tank volume is smaller, boiler operation becomes more demanding (during boiler operation, the corresponding amount of heat must be removed by the heating system, or it is not possible to load full batches of fuel).

Table 7: Required storage tank volume

Boiler		**BP17 EASY**	**BP25 EASY**	**BP40 EASY**
Recommended minimum storage tank volume for softwood	[l]	450	750	1200
Recommended minimum storage tank volume for hardwood	[l]	750	1250	1850
Recommended maximum storage tank capacity	[l]	1000	2000	3000

For a gravity-fed "boiler–storage tank" system, the minimum storage volume must be increased by 10–20%.

We do not recommend using storage tanks with a larger volume than the specified maximum due to disproportionate financial costs and significant heat loss.

5.10.4 "Boiler – storage tank" system with gravity circulation (without a pump)

Where the storage tank is located near the boiler, we recommend implementing the “boiler–storage tank” circuit as a gravity-fed system (without a pump, using larger-diameter pipes)—see wiring diagram No. 1 (chapter 5.11.1). The initial costs are comparable to those of a forced-circulation system (the higher cost of piping is offset by savings on the pump and accessories). The advantages of a gravity-fed system include reliability, operational savings (on electricity), and maintenance-free operation.

The disadvantage of a gravity-fed system is that the circulation rate (transfer capacity) decreases proportionally as the tank fills; consequently, toward the end of the tank’s filling cycle, the boiler cannot operate at full capacity (the tank reaches 80–90% of its capacity). We therefore recommend that the tank volume be 10–20% larger for a gravity-fed system.

The gravity-fed “boiler–storage tank” circuit must be designed to transfer the boiler’s rated output at a temperature drop of 90/60°C. This is achieved, for example, when the following conditions are met:

- The total pipe length is up to 4 m.
- The pipe diameter is 40 mm (including the tank connection fittings).
- The number of elbows does not exceed 3, or the number of bends does not exceed 6.
- The boiler and tank are on at least one level (floor). The tank inlet is at least 50 cm (boiler up to 25 kW) or 80 cm (40 kW boiler) above the boiler outlet. If ceiling height allows, it is advantageous to place the tank higher (by 10 to 50 cm).
- If there is a check valve in the circuit, its pressure drop must be less than 0.3 mbar at rated output and a temperature difference of 60/90°C (Kv < 3 m^3/h). This requirement is met, for example, by a gravity-operated valve specially developed for this type of boiler and supplied by BLAZE HARMONY – see chapter 5.10.15 . A standard horizontal (floating) valve is unsuitable due to high pressure loss.

Table 8: Conditions for gravity-fed connection of a boiler with a storage tank

Model	A – minimum height of the storage tank inlet from the floor	Pipe diameter between the boiler and the storage tank
BLAZE PRAKTIK 17 EASY	160 cm	6/4" (Cu 42 mm)
BLAZE PRAKTIK 25 EASY	180 cm	6/4" (Cu 42 mm)
BLAZE PRAKTIK 40 EASY	200 cm	6/4" (Cu 42 mm)

- It is essential to comply with the conditions for gravity-fed installation.

5.10.5 “Boiler – storage tank” connection with forced circulation (with a pump)

Where the location of the storage tank allows for at least partial gravity circulation (the tank and boiler are at the same elevation), we recommend placing the boiler circuit pump in the bypass branch—see connection diagram No. 2 (chapter 5.11.2).

The advantage of this configuration is improved integrated mixing and better natural circulation (the pump does not restrict flow). The recommended pipe diameter is 26–33 mm (Cu 28–35). With this configuration, circulation is gravity-fed for most of the operation. The pump only activates when the boiler temperature exceeds, for example, 85 °C. We recommend installing a pump with lower power (approx. 25 to 40 W).

The check valve in this configuration must allow for gravity-fed circulation—see chapter 5.10.15 .

Where the location of the storage tank does not allow even partial gravity-fed circulation (the tank is located far away or at a lower elevation than the boiler), the boiler circuit pump is installed “directly” in the return pipe from the tank to the boiler – see wiring diagrams No. 3 (chapter 5.11.3), No. 4 (chapter 5.11.4) and No. 5 (chapter 5.11.5). The check valve in this configuration may not allow for gravity circulation.

5.10.6 Boiler residual output

The system must be designed to ensure the dissipation of residual boiler power, e.g., due to a power outage.

In the event of a power failure, the exhaust fan shuts off and the combustion air supply damper closes. This reduces the boiler output. However, the hot fuel bed and the boiler lining continue to release heat for approximately 1 hour. To prevent the boiler from overheating, this residual heat must be reliably dissipated— see sections 5.10.7 and 5.10.8 .

The amount of residual heat is 5–10 MJ, depending on the boiler's instantaneous output and the type of fuel burned.

5.10.7 The most suitable method for dissipating residual heat

If possible, we recommend connecting the boiler so that the dissipation of residual heat is ensured by gravity-fed circulation into a storage tank or the heating system (see recommended connections). The standard circulation pump has a bore size of approximately 3/4", which allows for sufficient gravity-fed circulation to dissipate the residual heat. Any filters and check valves must not have excessive pressure loss (*∑Kv ≥ 10 m³/h).*

With a 1,000-liter storage tank, the boiler's residual output causes the temperature in the tank to rise by approximately 2–4°C.

5.10.8 Other methods of dissipating residual heat

If gravity circulation into the heating system or a storage tank cannot be used to dissipate residual heat, another method must be selected, e.g.:

1. Install **an automatic cooling system** (see the chapter 5.12).
2. Connect the boiler via a gravity-fed branch to a combined DHW storage tank, which will absorb excess heat output in the event of a power outage. The DHW tank capacity should be at least 120 L, with the boiler's residual output causing it to heat up by 10 to 20 °C. Due to the risk of scalding, it is recommended to equip the DHW tank outlet with a thermostatic mixing valve or to use thermostatic faucets.
3. Use **a backup power source** for the circulation pump. A power source with a sinusoidal supply voltage must be used.
4. Use **a** properly connected **open expansion tank**. In the event of a power outage, excess heat will be dissipated through evaporation.

5.10.9 Water

We recommend using soft water that is free of mechanical impurities and chemically inactive to fill the boiler. The designer may suggest suitable additives for the water in the heating system.

5.10.10 Open expansion tank

If the system includes an open expansion tank, it must be located so that it does not freeze. Oxidation can be limited by a thin layer of oil on the surface. The volume of the expansion tank must be at least 5% of the total water volume in the heating system.

5.10.11 Connecting the Boiler to the Existing System

If the boiler is installed in place of another type of boiler and the existing mixing valve for return protection remains in the circuit, the overall functionality of the connection must be assessed in terms of residual heat

dissipation, and, if necessary, a suitable safety device must be installed in accordance with the chapters 5.10.7 and 5.10.8 . The integrated mixing thermostat (original Blaze Harmony thermostat – see Boiler Diagram, item 33) is not installed in this case.

5.10.12 Boiler connection with a storage tank

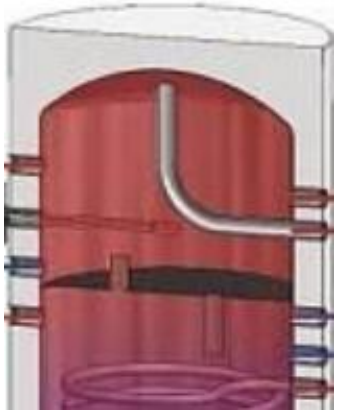
If possible, it is better to have one large tank rather than two small ones. It is less expensive, saves on floor space, and reduces heat loss due to surface cooling; installation is also simpler. With two tanks, a branched system is typically used (to ensure even flushing); with more than two tanks, the Tichelmann system is used.

If necessary, the tank can be placed in another part of the building or on a different floor.

If there is no suitable space in the heated building, heating can be provided from a nearby building (garage, workshop), where the boiler and usually the tank are located. Pre-insulated underground piping can be used to connect the buildings:

An automatic air vent valve located directly on the top outlet of the tank can be a source of problems. Any water leakage is difficult to detect, and moisture in the insulation can cause corrosion of the tank body.

We recommend connecting the outlet to the heating system to the tank's top connection; otherwise, at least 10% of the tank's capacity will remain unused. This is not necessary for tanks equipped with an internal pipe as shown in the figure:



5.10.13 Connecting the boiler without a storage tank

The boiler can be connected to a system with forced or gravity circulation.

Connection without a storage tank is only possible if the installation meets the conditions in the chapter 1.4 .

5.10.14 Condition of system non-disconnectability

In a connection without a storage tank, the heating system must be designed to allow for the withdrawal of at least 50% of the boiler's rated output. For example, it is not possible to use master control with a room thermostat or a system with thermostatic heads. Control elements (valves of individual branches or radiators) must not be closed in a way that excessively reduces the system's ability to draw heat output from the boiler.

5.10.15 BLAZE HARMONY Gravity Damper

Application:

The BLAZE HARMONY gravity valve prevents backflow in the “boiler–storage tank” circuit.

A damper can be installed in the “boiler–storage tank” circuit to prevent backflow from the “storage tank–boiler” circuit when the tank is heated and the boiler has been idle for an extended period. The heat loss to the boiler room is relatively small because the air supply to the boiler is closed by a damper during shutdown (100–300 W depending on the temperature in the tank). In boiler rooms located within the building, this heat is used for heating, so a check valve is not necessary.

Description:

The damper’s outer housing consists of a welded steel body with access covers on both sides. The damper itself is mounted in a “self-aligning” edge-mounted bearing. The closing force of the damper is generated by the weight of an offset counterweight (gravity principle). Both the damper housing and the seating ring (seat) are made of stainless steel. The damper operates only in a position where the outlet opens vertically upward.

Parameters:

Weight: 3 kg

Dimensions:	155 x 145 x 80 mm
Inlet:	6/4" (male thread)
Output:	G 6/4" (internal thread)

Pressure loss diagram:

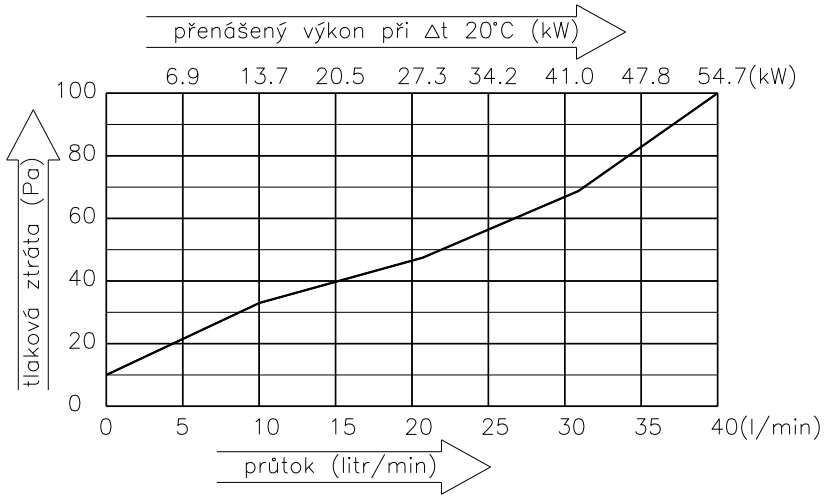
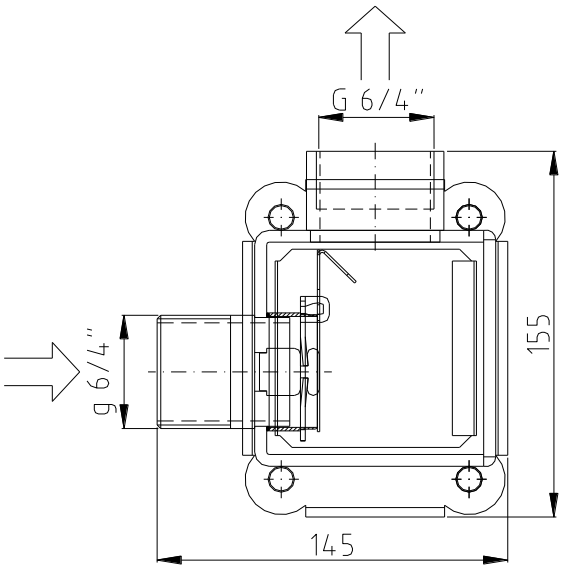


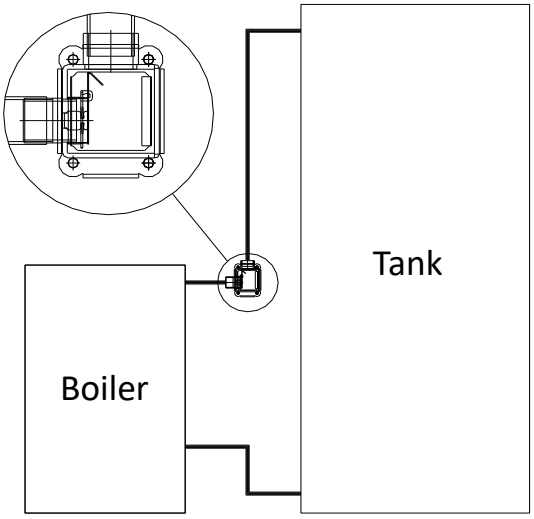
Diagram:



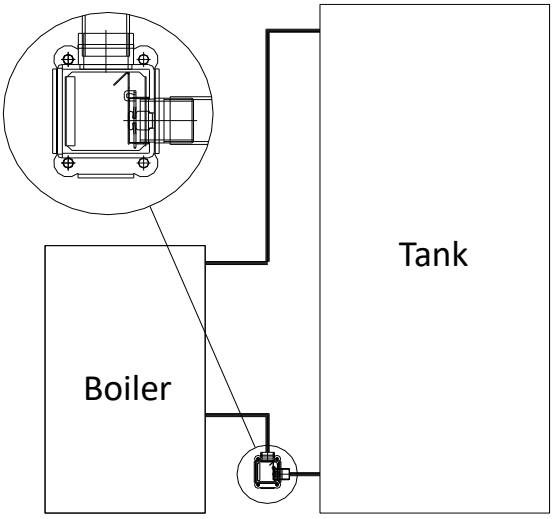
Installation:

1. The damper must be installed on the duct so that its outlet points straight up.
2. The damper can be connected directly to the boiler's outlet pipe.
3. The damper can be installed on both the return and outlet pipes—see connection examples:

Connection to the boiler outlet pipe



Connection to the boiler inlet pipe



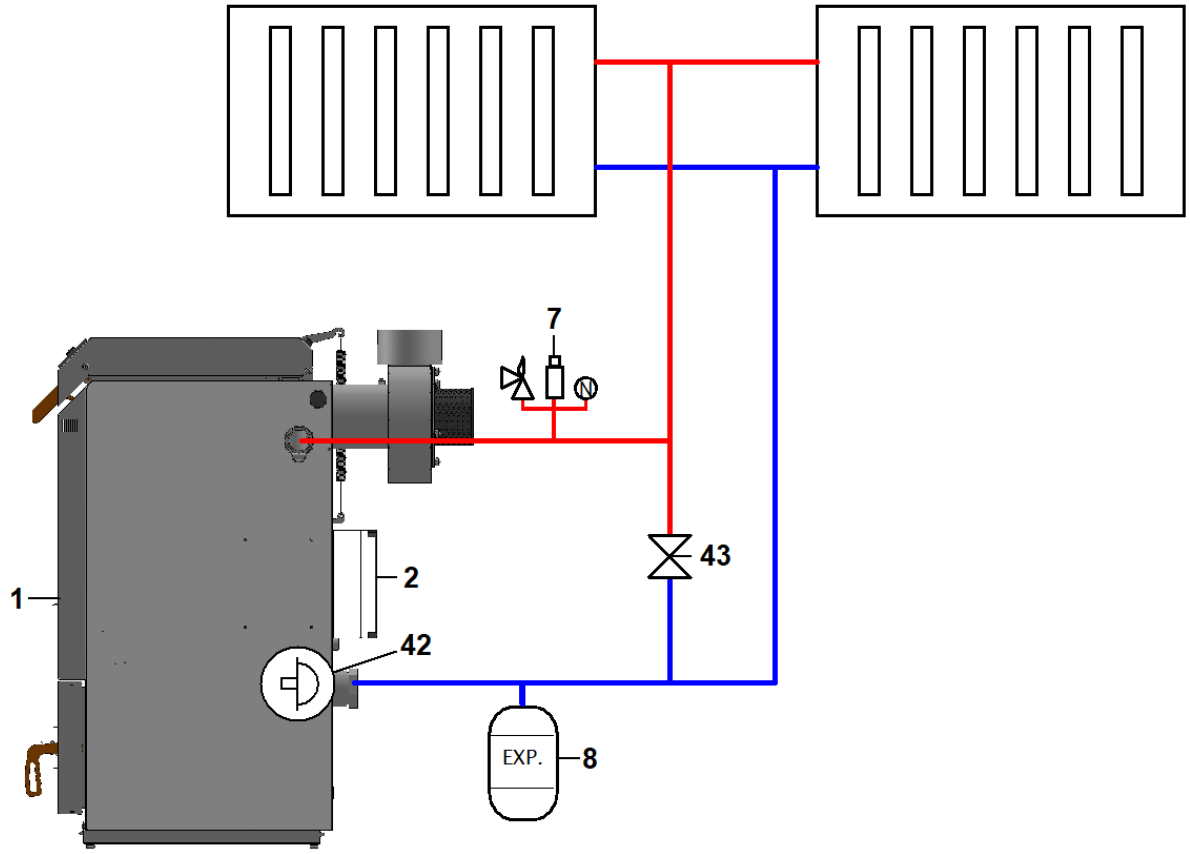
Maintenance, Function Check:

The damper requires no maintenance. Proper function is indicated by the boiler cooling down after shutdown, even though the storage tank remains heated. If the boiler is heating up due to heat from the tank, we recommend draining the water, removing the damper cover, and checking whether debris or a foreign object is preventing the damper from seating properly on the ring (seat). If necessary, contact a service technician.

5.11 Hydraulic Wiring Diagrams

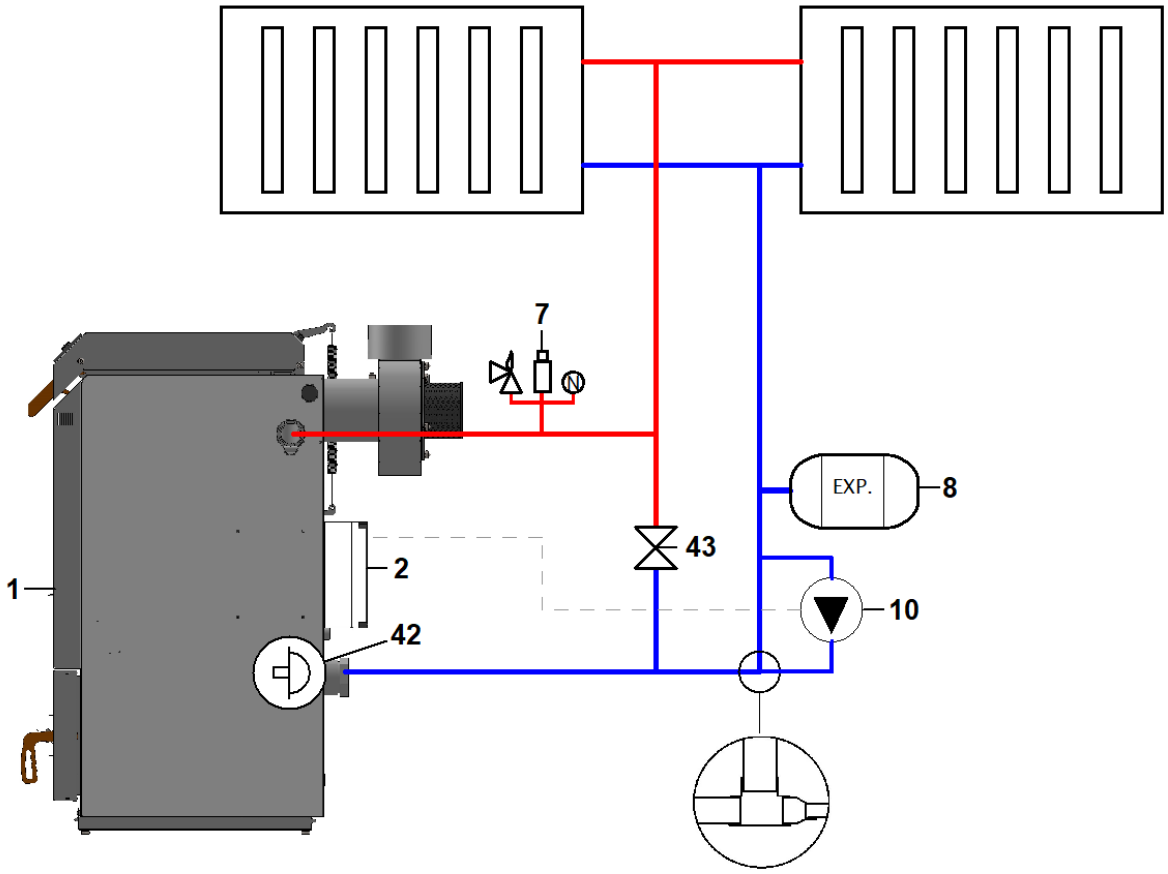
All hydraulic connection diagrams shown here are for informational purposes only and do not replace a heating system design! Such designs are prepared by a qualified heating system designer.

5.11.1 Diagram No. 1 – Gravity-fed system



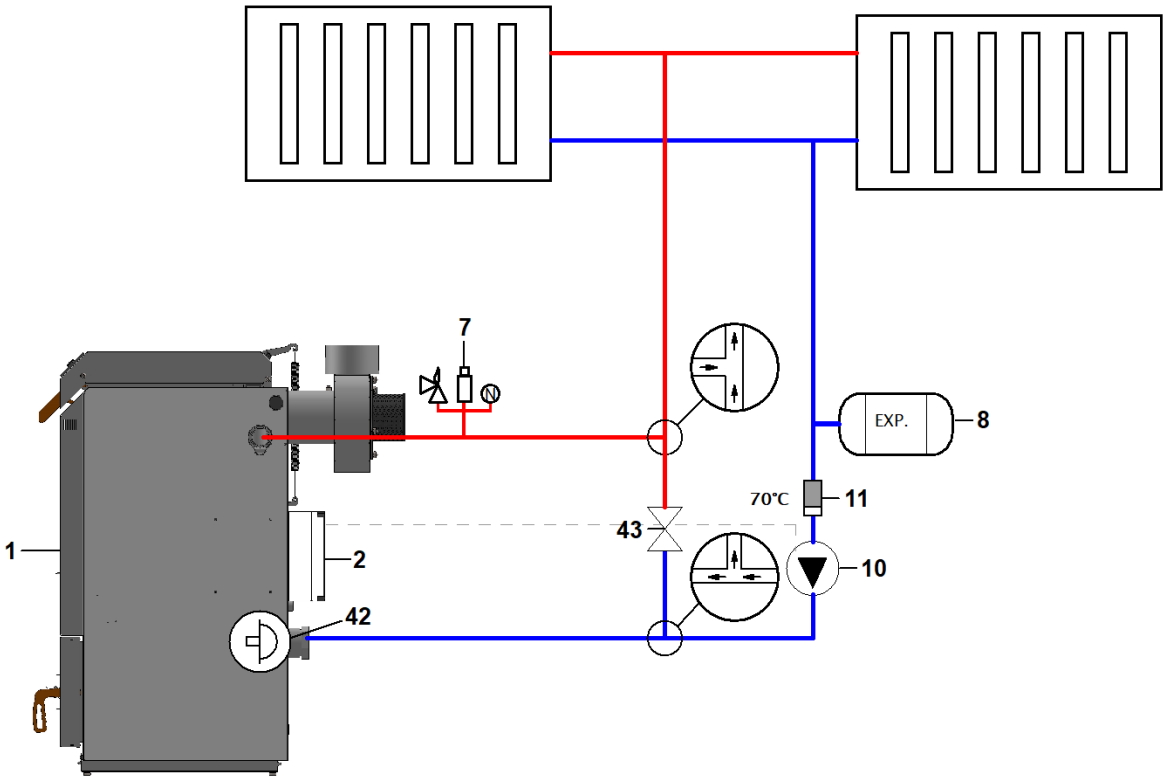
1 – BLAZE PRAKTIK boiler in the EASY version
2 – controller
7 – safety group (air vent, pressure gauge, safety valve)
8 – expansion tank
42 – integrated mixing thermostat
43 – balancing ball valve

5.11.2 Wiring diagram no. 2 – combined connection with a pump in the gallery with an injector



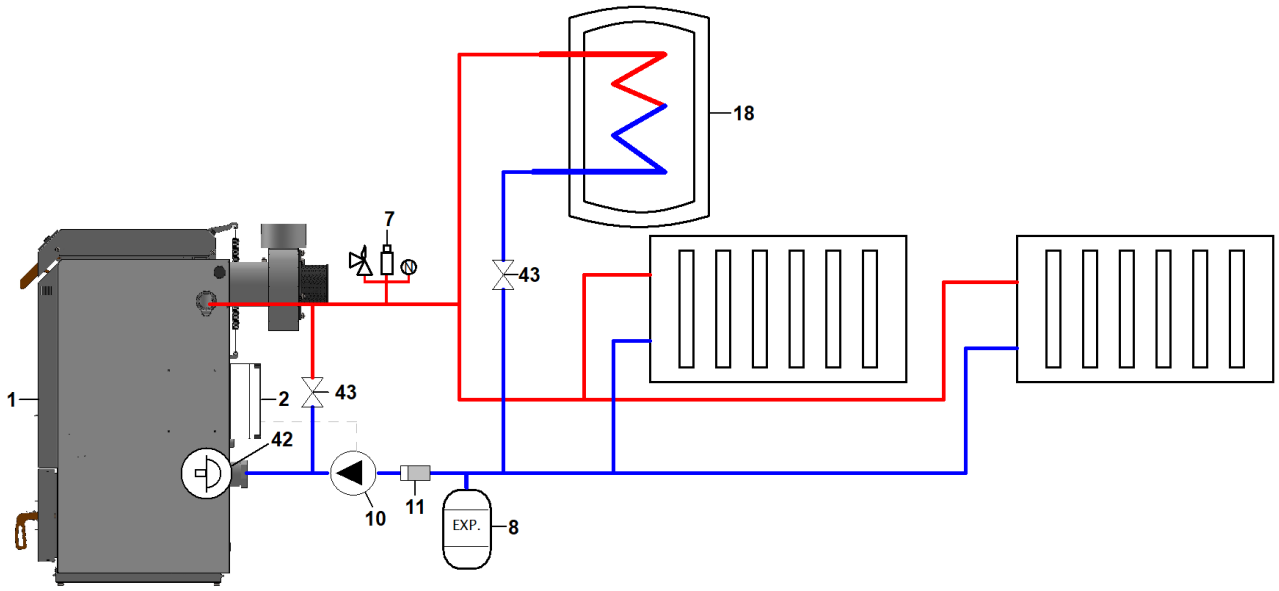
1 – BLAZE PRAKTIK boiler in the EASY version
2 – controller
7 – safety group (air vent, pressure gauge, safety valve)
8 – expansion tank
10 – boiler pump
42 – integrated mixing thermostat
43 – balancing ball valve

5.11.3 Wiring Diagram No. 3 – forced connection with gravity-fed cooling to the heating system



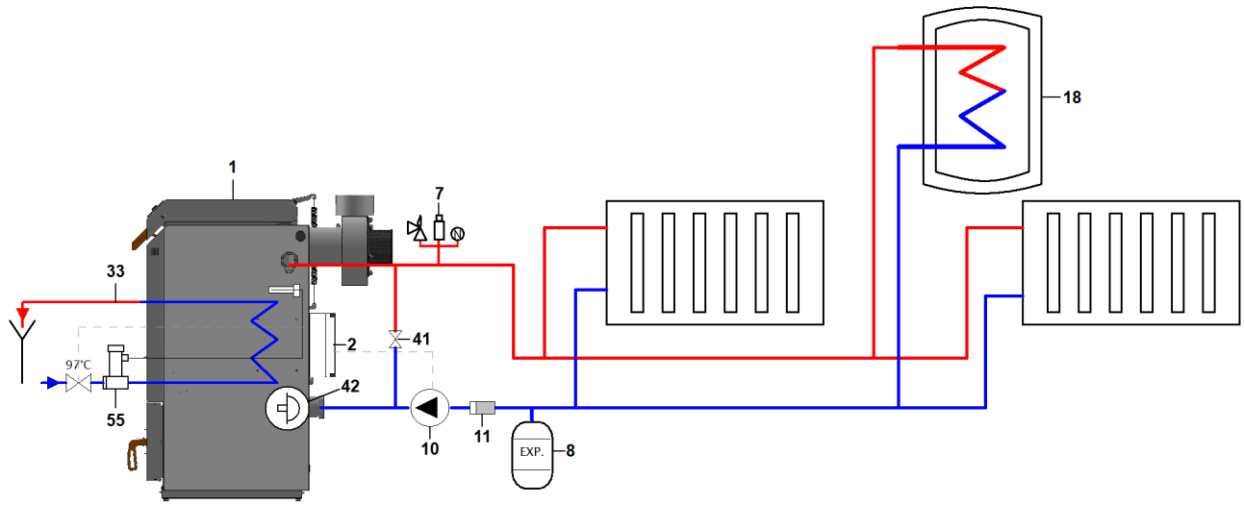
1 – BLAZE PRAKTIK boiler in the EASY version
2 – controller
7 – safety group (air vent, pressure gauge, safety valve)
8 – expansion tank
10 – boiler pump
11 – filter
42 – integrated mixing thermostat
43 – balancing ball valve

5.11.4 Wiring diagram no. 4 – forced connection with gravity-fed cooling to the DHW tank



1 – BLAZE PRAKTIK boiler in the EASY version
2 – controller
7 – safety group (air vent, pressure gauge, safety valve)
8 – expansion tank
10 – boiler pump
11 – filter
18 – DHW tank
42 – integrated mixing thermostat
43 – balancing ball valve

5.11.5 Wiring Diagram No. 5 – Forced Circulation System with Emergency Cooling

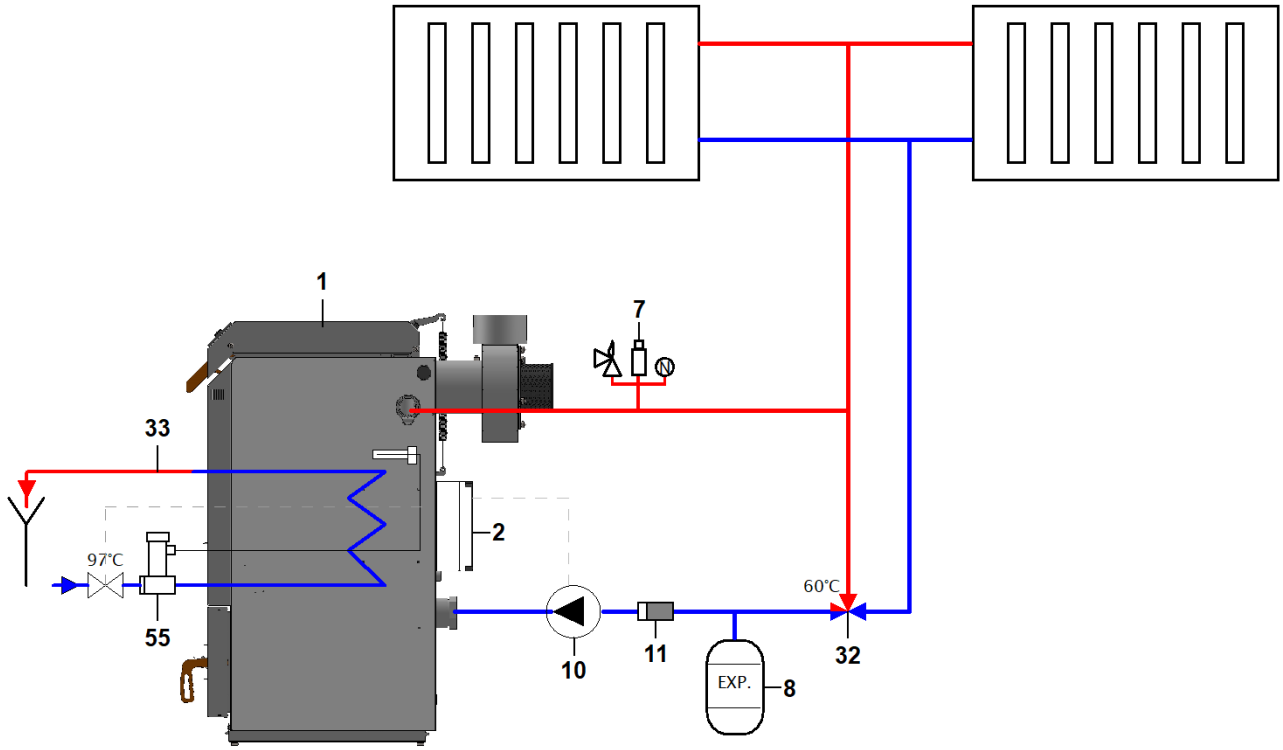


1 – BLAZE PRAKTIK boiler in the EASY version
2 – controller
7 – safety group (air vent, pressure gauge, safety valve)
8 – expansion tank
10 – boiler pump
11 – filter
18 – DHW tank
33 – automatic cooling system
42 – integrated mixing thermostat
43 – balancing ball valve
55 – cooling thermostatic valve

5.11.6 Wiring Diagram No. 6 – Forced connection with a thermostatic mixing valve and emergency cooling

Example of connection to an existing circuit where return protection has already been implemented (e.g., with a Ladomat, three-way thermostatic mixing valve, etc.). The integrated mixing thermostat must be removed from the boiler.

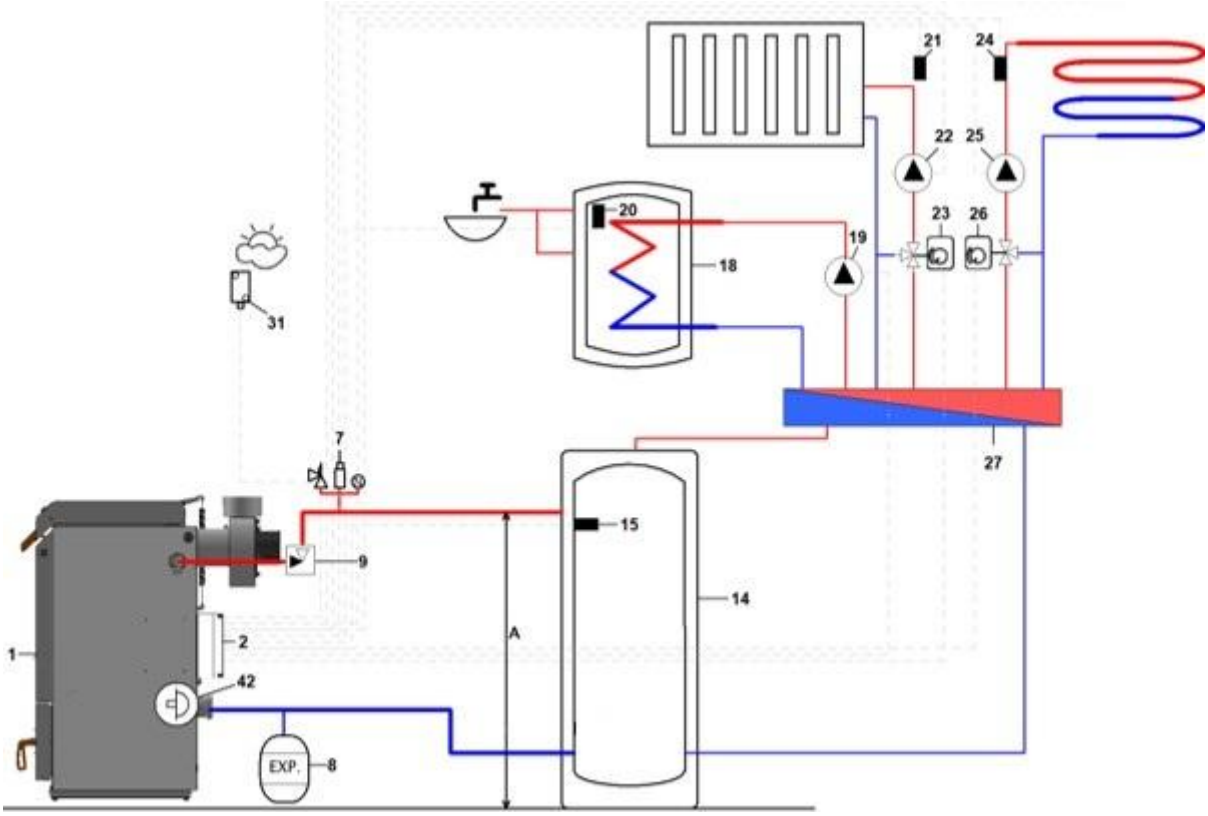
The automatic cooling system (33) for dissipating excess heat is connected.



1 – BLAZE PRAKTIK boiler in the EASY version
2 – controller
7 – safety group (air vent, pressure gauge, safety valve)
8 – expansion tank
10 – boiler pump
11 – filter
32 – thermostatic mixing valve
33 – automatic cooling system
55 – cooling thermostatic valve

5.11.7 Wiring diagram No. 7 – gravity-fed system with storage tank

The automatic cooling system for removing excess heat is not connected.



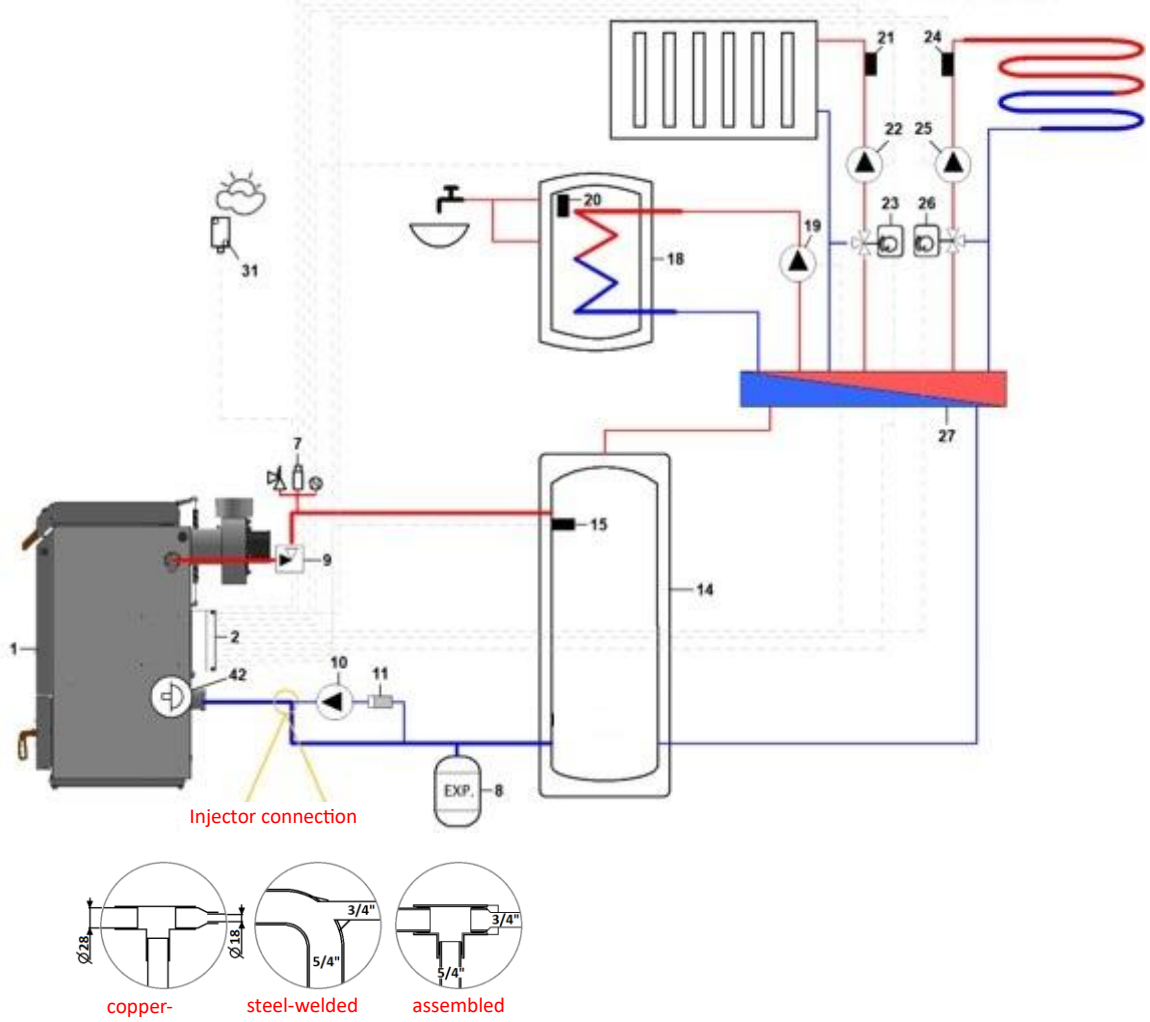
1 – BLAZE PRAKTIK boiler in the EASY version
2 – controller
7 – safety group (air vent, pressure gauge, safety valve)
8 – expansion tank
9 – Special gravity-operated check valve
14 – storage tank
15 – Upper storage tank sensor (CT10)
18 – DHW tank
19 – DHW pump
20 – DHW temperature sensor (CT10)
21 – MIX 1 temperature sensor (CT10)
22 – MIX 1 pump
23 – MIX 1 mixing valve actuator
24 – MIX 2 temperature sensor (CT10) (part of module B)
25 – MIX 2 pump (part of module B)
26 – MIX 2 mixing valve actuator (part of module B)
27 – manifold
31 – outdoor temperature sensor (CT10-P)
42 – integrated mixing thermostat

Table of conditions for gravity-fed boiler connection with a storage tank – see Chapter 5.10.4 .

5.11.8 Wiring diagram No. 8 – combined connection with a storage tank and an injector

Used where conditions do not allow for sufficient gravity-fed circulation between the "boiler and storage tank." Gravity-fed circulation is capable of charging the tank to only 50–70% of its capacity, for example.

The automatic cooling system for removing excess heat is not connected.

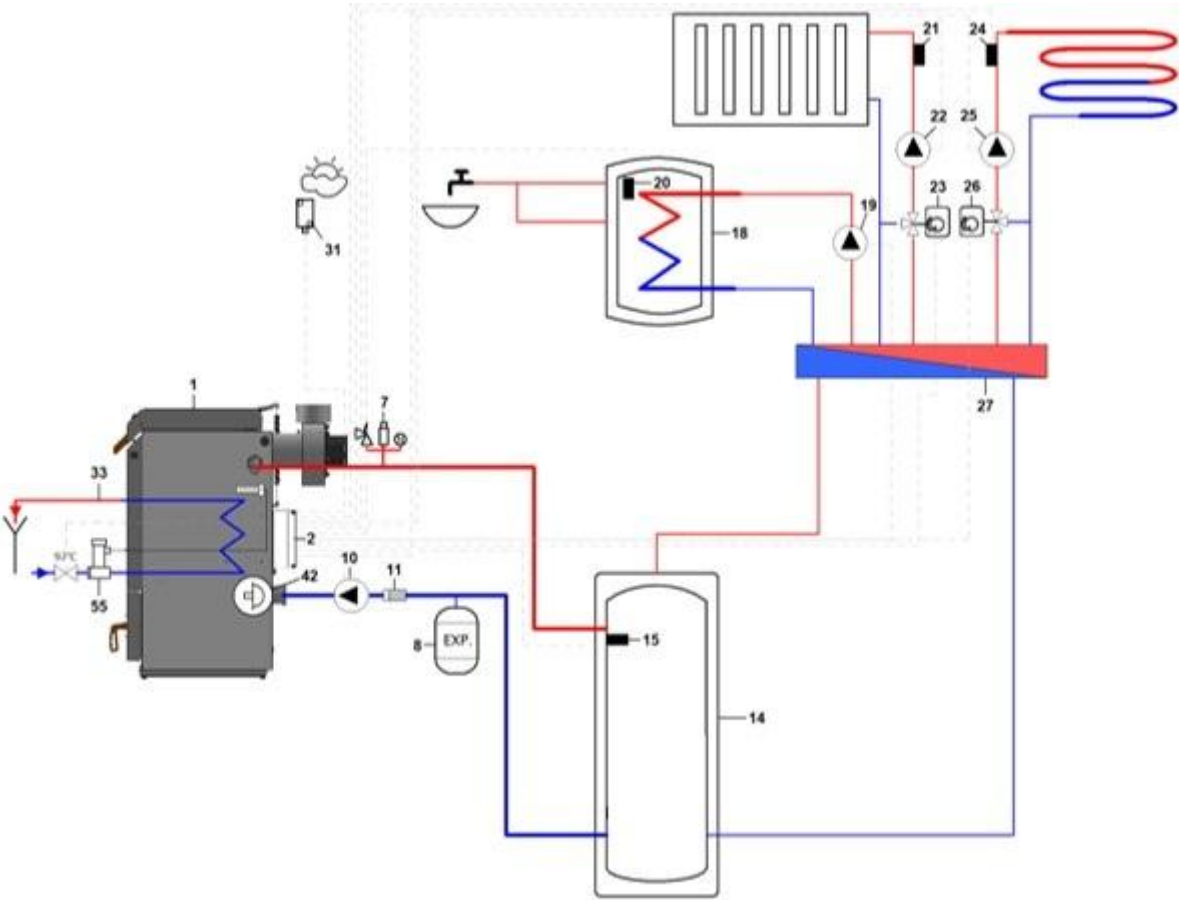


1 – BLAZE PRAKTIK boiler in the EASY version
2 – controller
7 – safety group (air vent, pressure gauge, safety valve)
8 – expansion tank
9 – Special self-closing check valve
10 – boiler pump
11 – filter
14 – storage tank
15 – Upper storage tank sensor (CT10)
18 – DHW tank
19 – DHW pump
20 – DHW temperature sensor (CT10)
21 – MIX 1 temperature sensor (CT10)
22 – MIX 1 pump
23 – MIX 1 mixing valve actuator
24 – MIX 2 temperature sensor (CT10) (part of Module B)
25 – Mix 2 pump (part of Module B)
26 – MIX 2 mixing valve actuator (included in Module B)
27 – manifold
31 – outdoor temperature sensor (CT10-P)
42 – integrated mixing thermostat

5.11.9 Wiring diagram No. 9 – forced circulation with storage tank

Used where conditions do not allow even partial gravity-fed circulation between the "boiler and storage tank."

The automatic cooling system for removing excess heat is connected.

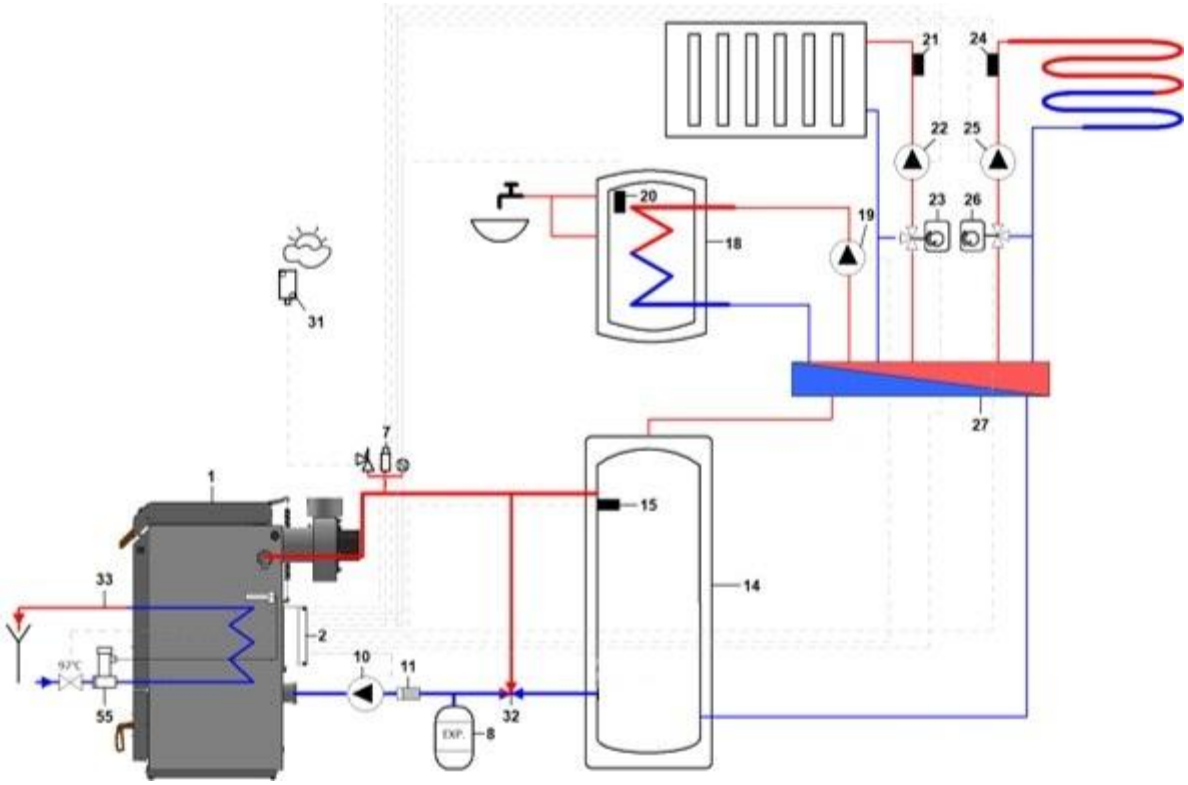


1 – BLAZE PRAKTIK boiler in the EASY version
2 – controller
7 – safety group (air vent, pressure gauge, safety valve)
8 – expansion tank
10 – boiler pump
11 – filter
14 – storage tank
15 – Upper storage tank sensor (CT10)
18 – DHW tank
19 – DHW pump
20 – DHW temperature sensor (CT10)
21 – MIX 1 temperature sensor (CT10)
22 – MIX 1 pump
23 – MIX 1 mixing valve actuator
24 – MIX 2 temperature sensor (CT10) (part of Module B)
25 – Mix 2 pump (part of Module B)
26 – MIX 2 mixing valve actuator (part of module B)
27 – manifold
31 – outdoor temperature sensor (CT10-P)
33 – automatic cooling system
42 – integrated mixing thermostat
55 – cooling thermostatic valve

5.11.10 Wiring diagram No. 10 – forced connection with a thermostatic mixing valve, storage tank, and emergency cooling

Example of connection to an existing circuit where return protection has already been implemented (e.g., with a Ladomat, three-way thermostatic mixing valve, etc.). The integrated mixing thermostat must be removed from the boiler.

The automatic cooling system (33) for removing excess heat is activated.



1 – BLAZE PRAKTIK boiler in the EASY version
2 – controller
7 – safety group (air vent, pressure gauge, safety valve)
8 – expansion tank
10 – boiler pump
11 – filter
14 – storage tank
15 – Upper storage tank sensor (CT10)
18 – DHW tank
19 – DHW pump
20 – DHW temperature sensor (CT10)
21 – MIX 1 temperature sensor (CT10)
22 – MIX 1 pump
23 – MIX 1 mixing valve actuator
24 – MIX 2 temperature sensor (CT10) (part of Module B)
25 – Mix 2 pump (part of Module B)
26 – MIX 2 mixing valve actuator (part of module B)
27 – manifold
31 – outdoor temperature sensor (CT10-P)
33 – automatic cooling system
55 – cooling thermostatic valve

5.12 Automatic cooling connection

Service water from the municipal water supply with an inlet pressure of 2–4 bar and a temperature up to 25°C is used for cooling. At higher pressures, a pressure-reducing valve must be installed. The water supply must not depend on an electrical power supply; that is, a domestic water pump cannot be used. As a safety valve for the cooling loop, for example, the WATTS STS 20 type with an opening temperature of 97°C can be used.

The cooling water inlet is connected to the lower socket (39) via a safety valve, and the cooling water outlet is connected to the upper socket (37). The temperature sensor of the cooling valve is screwed into the sump (42). The outlet from the cooling loop is drained into the sewer system, e.g., using a hose. We recommend installing a filter on the cooling loop inlet.

If the water temperature in the boiler exceeds 97°C, the safety valve opens and water from the municipal water supply begins to flow through the cooling loop. The residual boiler output is thus discharged into the sewer system.

CAUTION!!! It is important to ensure that the safety valve is correctly connected to the cooling water INLET of the heat exchanger.

The safety cooling heat exchanger MUST NOT be under constant pressure, otherwise it may be damaged.

5.13 Electrical Connection

Information on the electrical connection is provided in a separate document, “Operating and Installation Instructions for the Controller,” which is supplied with the boiler.

6 Boiler Operation by the User

To ensure reliable and safe operation of the boiler, the operator must strictly follow the instructions provided in this boiler operating manual and in the controller operating manual (separate document).

6.1 Initial Commissioning

When the boiler is first put into operation, the heat exchange surfaces are metallically clean, resulting in more intensive heat transfer. As a result, the flue gas outlet temperature is lower than under standard conditions.

Because the boiler controller calculates the output based on the flue gas temperature, the actual boiler output during the initial startup is approximately 50% higher than the setting on the controller.

As a result, the burn time of the fuel charge is proportionally shorter. Within 2 to 5 days of operation, the heat exchange surfaces will be covered with a standard layer of soot, and the value shown on the display will correspond to the actual output.

During initial commissioning, we recommend setting the desired output to 50% and the maximum water temperature to at least 90 °C.

The situation described above is not a malfunction.

6.2 Firing

Before heating, it is necessary to check and, if necessary, ensure the following:

- Ensure that the heated building (and any storage tank) can utilize the generated heat (see chapter 5.10.6).
- The functionality of the heating system (circulation pumps, water volume, water pressure, venting, no freezing, etc.).
- Tightness of the upper and lower doors.
- Functionality of the flue pipes (condition, tightness, etc.).
- Functionality of the stoking and combustion chambers (condition, correct assembly of ceramic components, etc.).
- Check that the side and rear heat exchangers, as well as the combustion and stoking chambers, are not excessively clogged.
- Check for foreign objects inside the boiler.
- Functionality of the control and safety components of the boiler and heating system (safety valves, boiler water temperature controller, thermostats, etc.).
- Boiler connection to the electrical grid (230V/50Hz).

Link to video – first firing

The actual firing up of the boiler is performed as follows:

1) Turn on the STOKING function on the display – see the separate controller manual – and wait until the exhaust fan starts running at full power.
2) If there is a sufficient layer of charred residue at the bottom of the boiler (at least 20 cm), it is usually enough to light a piece of paper and toss it onto the layer of coals. Immediately after, add a few pieces of fuel. This ensures that the flames do not shoot upward but flow through the layer of coals, thereby igniting them.
3) If there isn't a sufficient layer of charred residue at the bottom of the boiler, stack smaller logs in the stoking chamber. Arrange them so there are gaps between them (crossed over each other). This layer should roughly fill the lower, tapered part of the stoking chamber. Place small wood chips or scraps on top of this layer. Place a crumpled piece of lit paper on top of the chips. It is best if the paper covers the entire surface of the fuel. Then add more logs on top of the lit paper so that the flames do not shoot upward but instead flow downward through the layer of wood.
4) Close the top door so that it remains slightly ajar by 1 to 2 cm. This is achieved by closing the door while pressing down on the closing handle. Allow the fire to burn for about 5 minutes as needed.
5) Once you are sure the fire has caught (by looking through the viewing window or by the rise in flue gas temperature), load the boiler with fuel (see chapter6.3) and close the door properly. If the fire is lit correctly, the boiler will reach its rated output in about 30 minutes. If the flame goes out or dies down,

you can briefly open the top door to help it reignite.

6)

After ignition, the controller maintains the boiler output at a higher level to ensure the fuel burns sufficiently and the lining heats up. It then automatically switches to the value set by the operator.

It is prohibited to use flammable liquids for ignition. During operation, it is prohibited to exceed the boiler's rated output in any unauthorized manner.

No flammable objects may be stored near the boiler. Ash must be stored in non-flammable containers with lids.

Especially before the first start-up of the boiler, but also after cleaning it, check that the ceramic parts in the combustion chamber are correctly assembled. Incorrect assembly impairs combustion quality, causing the boiler and chimney to become excessively clogged. It is also important to place a plug under the rear fittings; otherwise, the boiler may be damaged.

6.3 Fueling

1) When you activate the STOKING function on the display—see the separate controller manual—the exhaust fan switches to full power and extracts any wood gas from the stoking chamber. After ensuring that there is no thick smoke in the stoking chamber and that there is no risk of it igniting suddenly, we can open the door fully.
2) Refill the stoking chamber with fuel. If the base layer is thin, place a few smaller pieces of fuel on top of it.
3) Close the top door. After a certain period of time, the regulator will automatically switch to the IGNITION or OPERATION mode, depending on the current flue gas temperature.
4) If no flame appears in the combustion chamber or if it goes out after a while, open the top door slightly again and let the fuel burn for a few minutes.

Do not rake or compress the hot base layer to prevent the nozzle from becoming clogged.

Stack **the logs** in the feeding chamber close together so that there is as little empty space between them as possible. The first logs should be smaller so that the fuel load ignites more easily. The last logs should also be smaller, as they will break down more easily into the base layer.

To prevent **smoke from escaping while adding** fuel, wait until the previous load has burned down so that only glowing embers—the base layer—remain in the firebox.
You can add fuel by first opening the door only partially and adding just 3 to 4 logs. This covers the glowing layer and prevents it from releasing as much smoke. Then open the door fully and add more fuel.
If smoke enters the boiler room during stoking, check whether the flue gas path (flue pipe, chimney) is blocked and whether there is sufficient air supply to the boiler room. If necessary, open the window in the boiler room slightly while stoking.
After adding fuel and closing the stoking door, clean the rear heat exchanger by moving the turbulator lever. It is always necessary to move the turbulator lever to both extreme positions. Leave the lever in the lower position (unless it drops on its own due to the weight of the turbulators) . Clean the heat exchanger using the lever after each stoking.

Do not open the lower door while the boiler is in operation. This will interrupt combustion and may cause smoke to enter the boiler room.

6.4 Amount of fuel added, stoking intervals

Usually, the fuel chamber is filled to capacity. **However, if heat demand from the heating system is low and the storage tank is hot, it is necessary to extend the refueling intervals or add smaller amounts of fuel.** However,

we do not recommend adding less than half the volume of the fuel chamber. With a small fuel dose, the burning time may be shortened to such an extent that a high-quality steady-burn layer cannot form. The residual fuel is then not fully carbonized and smolders. In the case of a smaller fuel dose, turn off the automatic steady-burn function.

Do not add fuel if the storage tank is full and unable to absorb the released heat! There is a risk of overheating and an emergency shutdown of the boiler.

If the heating system is unable to absorb the heat from the fuel charge, overheating (water temperature above 95°C) will occur, leading to an emergency shutdown of the boiler with unburned fuel. Unburned fuel smolders during the shutdown, and the boiler's flue and air passages become clogged with moisture and tar. This jeopardizes proper operation, reduces the service life of the boiler and chimney, and pollutes the air.

Overheating poses a risk of the turbulators becoming blocked by tar.

The time the boiler spends in an overheated state is recorded and stored in the controller's memory. If it exceeds 200 hours, the boiler warranty becomes void.

A continuous firing shutdown occurs with a base layer of carbon residues that contains no volatile combustibles or moisture.

6.5 Setting the desired output of the

Boiler output can be controlled by two parameters set on the controller:

- Maximum water temperature (70–95°C)
- Desired boiler output (30 – 100 %)

We recommend setting the *"Maximum water temperature"* parameter to 95°C and regulating the boiler output by adjusting the *" Desired boiler output "* parameter.

Do not operate the boiler at a higher output than necessary! This unnecessarily shortens the operating time and prolongs downtime. We recommend setting the *"Desired boiler output"* parameter to a value between 50 and 70%, and if the output is insufficient during periods of higher heat demand (in the winter months), increase it as needed.

The controller always primarily maintains the set boiler output. If the desired boiler output is too high and the water temperature rises to the "Maximum water temperature" value, the controller will automatically begin to reduce the boiler output.

6.6 Automatic smoldering

The boiler is equipped with an “automatic smoldering” function, which allows the fan to be turned off even before the fuel charge has completely burned out. A glowing base layer remains in the boiler for another 6 to 10 hours, so it is not necessary to reignite the fire. Detection of the base layer burning out is ensured by a movable detection arm in the front wall of the stoking chamber. After stoking, this arm is pressed against the wall by the fuel. During operation, the fuel level gradually drops and the arm is gradually exposed. When the fuel level drops below the end of the detection arm, the arm is released and, under the action of a counterweight, tilts into the stoking chamber. This activates a sensor in the air panel, which informs the controller that the boiler contains a base layer at the maximum set size (100%).

An empty square symbol  appears on the controller display in the section showing boiler output information. If the *“Size of the steady-burning layer”* parameter is set to 100%, the controller switches the boiler to steady-burning standby immediately after the detection arm tilts. If the size of the hot bed layer is set to a lower value (90% to 10%), the boiler continues in OPERATION mode for a certain period of time so that the remaining fuel can burn out and the hot bed layer reaches the desired size.

After the next stoking, the detection arm is again pressed against the wall by the fuel, and a solid square symbol appears on the display  .

When the stoking door is opened, the clamping mechanism linked to the door presses the detection arm against the wall of the stoking chamber so that it does not obstruct fuel loading. When the door is closed, the clamping mechanism releases the detection arm again.

The boiler can only be shut down permanently after *the* "*Minimum operating time*" has elapsed since fuel was added. During this time, the solid square symbol is crossed out  . This feature prevents unintended boiler shutdown during firing when there is only a small layer of fuel in the boiler.

The size of the base (constant-heat) layer can be set as a user parameter on the boiler controller.

The optimal base layer should roughly fill the lower, tapered part of the stoking chamber. The base layer must not contain smoldering fuel residues, as these clog the boiler with tar during shutdown.

The boiler is equipped with a “MAINTENANCE RUN” function, which ensures that the base layer remains hot during downtime and that ignition is not required when refueling. In STOP mode, this function switches the fan on at regular intervals. The intensity of MAINTENANCE OPERATION can be adjusted. During longer shutdowns (over 8 hours), we do not recommend using this function, as it leads to an excessive reduction in the size of the bed (for restarting, a sufficient bed—even if extinguished—is more valuable than a small bed, even if glowing).

If the automatic embers function is turned off (the square symbol is not displayed), the boiler will shut down only after the fuel has completely burned out and the flue gas temperature drops below the set value (service parameter).

Further information on the automatic pilot flame is provided in the separate operating manual for the boiler controller.

6.7 Checking and Adjusting Combustion

During operation, ensure that combustion is as complete as possible. Incomplete combustion reduces boiler efficiency and produces excessive amounts of harmful substances (hydrocarbons, particularly tar), which pollute the atmosphere and clog the boiler and flue pipes. The quality of combustion is not determined solely by the

type and moisture content of the fuel; it can also be significantly influenced by how the fuel is fed and how the output is regulated.

We can assess the quality of combustion by looking at the flame through the viewing window. Smoke emerging from the chimney during high-quality combustion is not visible at all. Light white smoke that dissipates immediately is not a problem; it is caused by water vapor produced by combustion.

Do not confuse smoke with steam. Combustion gases contain water vapor, which condenses above the chimney and creates a mist (similar to gas heaters). Usually, unless it is very humid, the mist dissipates (evaporates) within a few meters.

The key to efficient combustion is the correct amount of secondary air.

An excess of secondary air causes a large portion of the air to not participate in combustion, cooling the flame and carrying heat uselessly up the chimney. The flame is sharp, flickering, or non-existent. The carbon residues in the combustion chamber, which the flame is hitting, have a light yellow color at the edges. **It is necessary to reduce the amount of secondary air, i.e., move the damper to the left**.

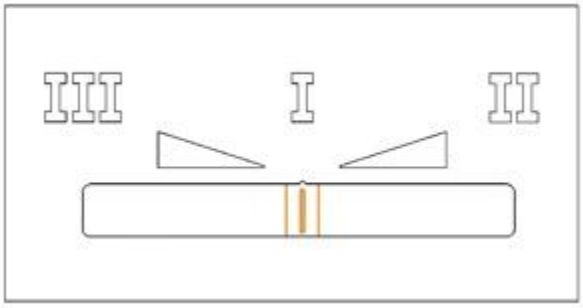
A lack of secondary air causes part of the fuel to remain unburned and escape into the chimney. The flame is long and sometimes smokes. The carbon residues in the combustion chamber, onto which the flame strikes, have the same color across their entire surface. Smoke emerges from the chimney and does not dissipate, even when the air humidity is lower. **It is necessary to increase the amount of secondary air, i.e., move the damper to the right**.

Pre-drying air (the right half of the damper range) is intended only for fuel that burns very poorly when the damper is set to the middle position, e.g., soft wood, unsplit logs.

Incorrect use of the pre-drying air (with high-quality fuel) can cause the chamber walls and the stoking door to overheat and become damaged.

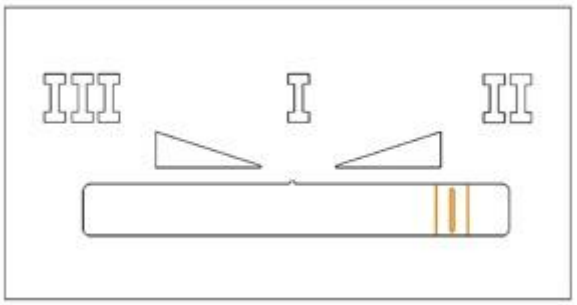
The amount of secondary air is adjusted using a sliding damper (see Boiler Diagram, item 8).

Approximate secondary air settings by fuel type:



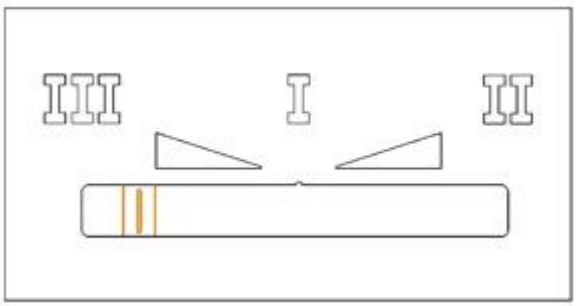
Diaphragm in the middle

- Standard wood – damper in the middle



Diaphragm on the right

- Hardwood (beech, oak) – higher amount of secondary air – damper to the right



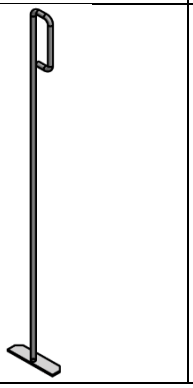
Diaphragm on the left

- Softwood, unsplit logs – minimal secondary air (maximum primary and pre-drying air) – damper on the left

6.8 Boiler cleaning

Ash removal from the boiler is performed either when the boiler is cold or after the boiler is shut down due to fuel detection prior to refueling. Regular cleaning of the boiler will result in higher efficiency and thus lower fuel consumption. For more convenient cleaning, an ash vacuum cleaner can be used. Ash must be stored in non-flammable containers with lids. When cleaning, we recommend keeping the exhaust fan on (set it to the FIRE-UP mode, where the fan will start running at full power after a few seconds).

The boiler comes standard with the following cleaning tools:

1.	2.
Rake	**Hook**
	

Tubular heat exchanger:

The boiler is equipped as standard with mechanical turbulators, which are used to clean the rear flue gas heat exchanger. Cleaning is performed after each stoking and closing of the stoking door by moving the turbulator lever. It is always necessary to move the turbulator lever to both extreme positions. Leave the lever in the lower position (unless it drops on its own due to the weight of the turbulators). Clean the heat exchanger using the lever after each stoking.

Poor combustion leads to excessive clogging of the exchanger and risks blocking (seizing) the turbulators. Subsequent restarting can be very labor-intensive. It requires opening the exchanger cover, removing the movable comb assembly, pulling out the individual turbulators, cleaning them, and then reassembling them.

If the turbulators move stiffly and operating the lever is difficult, this is evidence of poor combustion. The usual cause is operator error; see the chapter 6.11 .

Firing chamber:

At least once a week, check to see if an excessive layer of ash has accumulated at the bottom of the stoking chamber. This is particularly likely with fuel containing a high proportion of bark or tailings. An excessive layer of ash can block the lower primary air intake openings (just above the funnel-shaped bottom) and thus interfere with proper boiler operation.

If there is a layer of ash more than 2 cm thick at the bottom of the feeding chamber, it must be loosened with a rake and swept into the lower combustion chamber. For fuels that produce more ash, we recommend turning off the slow-burn function as needed (e.g., once a week), allowing the fuel to burn out completely, and removing ash deposits from the bottom of the stoking chamber.

A slightly roughened surface of the components (up to 5 mm) caused by small ash deposits is not a defect.

The side walls, the hinged smoke baffle, and the stoking door do not need to be cleaned. Any deposits (soot and dry tar) are not a problem. We only check to ensure that the pre-drying air intake openings in the upper part of the front wall of the stoking chamber are not clogged.

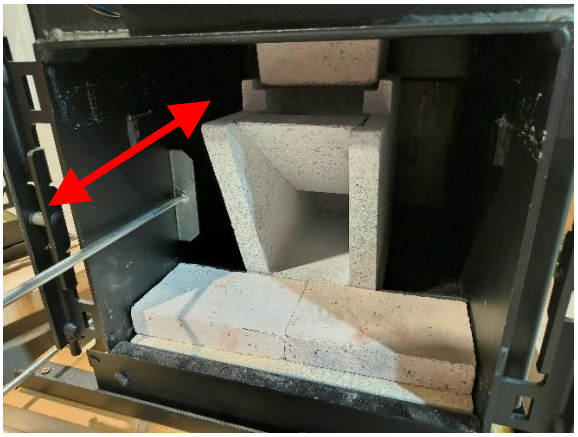
Link to video – cleaning the stoking chamber and door

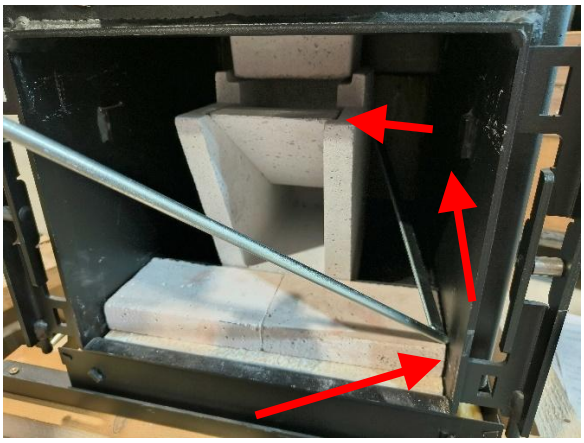
Lower combustion chamber:

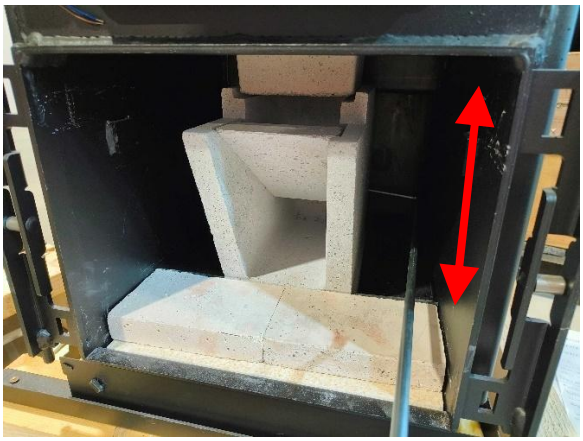
The combustion chamber is cleaned through the bottom door using the "Rake" and "Hook" cleaning tools. Every 2 weeks, it is necessary to remove the heat exchanger plug (see Boiler Diagram, item 41) and clean the bottom of the combustion chamber, including the space under the tube heat exchanger.

Procedure for cleaning the combustion chamber of the BP17 boiler in the EASY version:

- Remove the two upper pieces of the "Shaped Plate" component (see Boiler Diagram, item 57).
- Using the "Scraper" cleaning tool, remove deposits from the walls of the combustion chamber and the area beneath the rear heat exchanger.
- Then, using the "Hook" cleaning tool, clean the rear wall beneath the tube heat exchanger behind the "Fitting – Labyrinth" component (see Boiler Diagram, item 58).
- Remove all scraped-off ash and deposits accumulated at the bottom of the combustion chamber and in the space below the tube heat exchanger from the boiler using the "Rake."
- Then return the 2 upper pieces of the "Fitting Plate" component (see Boiler Diagram, item 57) to their original position in the combustion chamber.

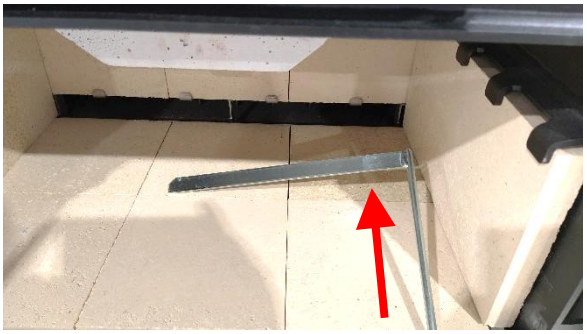


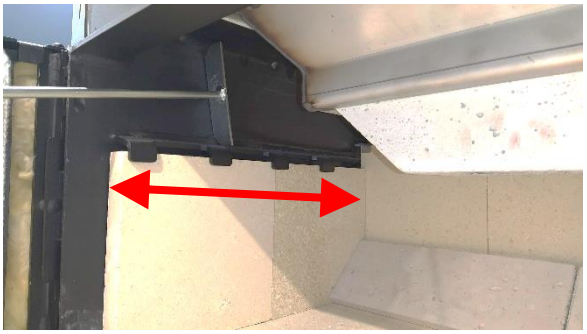




Procedure for cleaning the combustion chamber of BP25 and BP40 boilers in the EASY version:

- Remove the heat exchanger plug.
- Using the “Rake” cleaning tool, remove deposits from the walls of the combustion chamber, the ceiling (around the nozzle), and the area under the rear heat exchanger.
- Then, using the “Hook” cleaning tool, clean the area and walls behind the rear fittings.
- Remove all scraped-off ash and deposits accumulated at the bottom of the combustion chamber and in the space below the tube heat exchanger from the boiler using the “Rake.”
- Then return the plug to its original position in the combustion chamber.





Video link – cleaning the combustion chamber:

Exhaust fan:

The exhaust fan should be cleaned at least once a year or if it becomes excessively noisy. Cleaning is performed using a putty knife and a wire brush.

Procedure for cleaning the exhaust fan:

- Disconnect the power cord from the fan.
- Unscrew the 4 nuts and remove both flanges (half-moons) from the fan.
- Remove the motor with the impeller from the fan housing.
- Scrape deposits from the inner walls of the fan housing.
- Remove (vacuum out) any loose ash and deposits from the fan housing.
- Remove the impeller from the fan motor. **CAUTION! The fan impeller nut has a left-hand thread!**
- Carefully clean the fan impeller and motor flange with a wire brush and a putty knife.
- Reassemble the exhaust fan in the reverse order.

Video link – Cleaning the exhaust fan:

It is recommended to replace the start-up capacitor on the exhaust fan once a year. This replacement may only be performed by a qualified person (service technician). The boiler must be disconnected from the power supply at that time!

Regular cleaning and maintenance of the boiler is essential to ensure the equipment's long service life. If the boiler is not cleaned regularly and properly, all components are subjected to greater thermal stress, which may result in damage. Damage caused by neglected boiler maintenance is not covered by the warranty!

Wood ash should be handled and disposed of or used in accordance with applicable local requirements. Its suitability for use as a fertilizer depends on the fuel used, ash composition and applicable regulations. It contains mainly calcium and potassium. Any carbon residues can be separated using a sieve and added to the boiler along with the fuel.

6.9 Taking the Boiler Out of Service

When taking the boiler out of service for an extended period, we recommend cleaning its heat exchange surfaces and removing the ash from the boiler (see chapter 6.8).

Once per heating season, we recommend removing all firebricks from the combustion chamber, cleaning the boiler walls, and sweeping out the ash. When reassembling, we recommend rotating all firebricks so that they are exposed to the heat from the opposite side. This will extend their service life.

6.10 Operational Inspection and Maintenance

Boiler and Heating System

The operator is required to ensure ongoing inspection of the equipment and its necessary maintenance. No special qualifications are required for this activity; training provided during boiler commissioning is sufficient.

It is necessary for the boiler to be checked occasionally by the operator during operation. In particular, it is necessary to ensure that the outlet water temperature does not exceed 95°C. Furthermore, the water level (pressure) in the system must be checked.

The condition of the ceramic fittings and the tightness of both doors must be checked regularly.

Chimney and Flue Pipes

It is necessary to check the tightness and alignment of the flue pipe and the patency of the chimney flue. A layer of fly ash accumulates in the chimney during operation and cleaning. This must be removed through the chimney door to prevent the chimney flue from becoming blocked (at least once per season).

Leaks at the joints of the flue pipe and chimney doors can be sealed with sealant or by taping them with aluminum tape.

Door Seal

It is necessary to check the door seal. The edges of the stoking openings must be lightly pressed into the sealing cord. Re-sealing is performed by replacing the sealing cord . A proper seal (correct fit) can be identified by a smooth imprint of the sealing surface of the boiler body on the cord. If the imprint is rough and covered with soot and tar deposits, this indicates a leak. This is a particular risk with the sealing cord of the stoking door.

6.11 Poor combustion, common operator errors

Poor combustion is indicated by foul-smelling smoke, excessive fouling of the flue gas exchanger or flue, reduced output, and increased fuel consumption. The cause is usually improper operation, e.g.:

- **Incorrect loading of a clean boiler:** We recommend filling the hopper with pieces of fuel (well-dried, ideally hardwood) so that after ignition and closing the door, the flame remains stable. The flame may weaken, but it must not die down or go out.

- **Unsuitable fuel:** Large logs and significant gaps between them, excessive moisture in the fuel. Softwood, in particular, burns more slowly and must be dry and split (into pieces of approx. 15 cm). Pieces that are too long may get stuck in the firebox. Maximum log length – see chapter3 . Do not place large pieces of wood at the bottom of the firebox, as they will not break down in time and will get stuck above the funnel. Do not place large pieces on top of the load either, as they will not have time to form a steady-burning layer and will smolder after the fire is turned off. We recommend stacking irregular pieces on top of each other with minimal gaps.

- **Insufficient fuel charge:** We recommend always using a full charge of fuel. A half charge burns quickly and struggles to create a high-quality steady-burning layer.

- **Boiler output set too low:** Especially when combined with a clogged boiler or unsuitable fuel.

- **Operation with a clogged boiler:** An excessive amount of ash in the combustion chamber and heat exchanger flues is undesirable. The metal walls of the flue gas paths and the combustion chamber must be cleaned regularly—see the chapter 6.8 . Consider the clogging of the turbulators as a valuable warning that something is wrong with the boiler's operation.

- **Loading fuel when the required heat output is not ensured:** The building, or the storage tank, cannot absorb the heat from the fuel charge, resulting in a shutdown with smoldering fuel. Before adding fuel, it is necessary to determine the tank's available capacity (e.g., the threshold temperature in freezing conditions is approx. 60°C, and approx. 50°C when outdoor temperatures are above 0°C).

- **Improper interference with boiler operation:** Shutting down the boiler before the fuel has burned down to a stable layer, restarting the operating time via a selection on the control panel, or by looking into the stoking chamber.

7 Possible faults and their solutions

7.1 Boiler overheating

If the water temperature in the boiler **exceeds 95°C** (service parameter), the controller will shut down the boiler, i.e., turn off the fan.

If the water temperature in the boiler **exceeds approximately 98°C**, the independent STB emergency thermostat will cut off power to the fan. The display and other devices remain operational. To restart the boiler, unscrew the cover of the STB emergency thermostat switch on the boiler control unit panel (see Boiler Diagram, item 6) and press the STB thermostat button with a thin object. The emergency thermostat cannot be reset until the temperature in the boiler drops below approximately 80°C.

[Video link - Restarting the STB thermostat after overheating]

7.2 Power Outage During Operation

If the boiler's power supply is interrupted (e.g., power outage, main switch turned off), the exhaust fan will shut off and the combustion air intake damper will close. This reduces the boiler's output. If the boiler is not connected to a backup power source, all connected circulation pumps will also shut off. The hot fuel bed and lining continue to release heat for approximately 1 hour. To prevent the boiler from overheating, this residual heat must be reliably dissipated – see sections 5.10.7 and 5.10.8 .
The amount of residual heat is approximately 5–10 MJ, depending on the current output and the amount of fuel burned before shutdown.

7.3 Boiler operation without electricity

The boiler is capable of emergency operation using only chimney draft.

If the boiler's wiring allows for sufficient natural circulation, the boiler can be operated using chimney draft by moving the sliding damper to the left and ensuring that the air dampers remain open (similar to when checking the dampers' functionality). This prevents the boiler from becoming clogged by smoldering unburned fuel during an emergency shutdown, or the building from becoming too cold.

If the boiler is operated in this manner without electricity and the output or chimney draft is insufficient, the turbulators can be removed from the boiler's tube heat exchanger. This will increase the flue gas temperature and also increase the chimney draft. It is also possible to remove the bottom plug from the space below the heat exchanger.

At a chimney draft of 10 Pa, the boiler operates at 30% output; at a draft of 20 Pa, the output is approximately 75%.

A boiler operated in this manner must be under constant supervision. It is necessary to ensure (by stoking or partially closing the combustion air openings) that the water temperature in the boiler does not exceed 95°C.

7.4 Other faults and their solutions

Problem	Cause	Solution
The controller display is not working.	Blown internal fuse on the control module.	Replace the fuse (service technician, qualified electrician).
	Loose or disconnected display data cable connector on the panel or controller module, damaged cable.	Check the connector, replace the damaged part (service technician, qualified electrician).
	Damaged display.	Replace the display (service technician, qualified electrician).
	Damaged controller.	Replace the controller (service technician, qualified electrician).
The turbulator lever cannot be moved.	Poor combustion, irregular use of the turbulators. Frequent boiler shutdowns with excessive fuel (overheating).	Open the door, remove the heat exchanger cover. Commercially available tar-dissolving agents can be used to loosen it. It is also possible to remove the impeller and move the turbulators individually.
The fan does not rotate in OPERATION mode.	The water temperature is above the setpoint.	Change the set value.
	Boiler overheating and activation of the STB emergency thermostat.	Once the water temperature in the boiler drops below approx. 80°C, unscrew the emergency thermostat cover and press the switch with a suitable object (e.g., a pencil).
	Fan impeller jammed.	Remove the cause (foreign object, clogging).
	Blown regulator fuse.	Replace the fuse (service technician, qualified electrician).
	Motor malfunction.	Replace the motor (service technician, qualified electrician).
	Damaged controller.	Replace the controller (service technician, qualified electrician).

No residual heat layer remains in the boiler.	The “Automatic Constant Heat” function is turned off in the controller settings. Leak in the air intake dampers (see Boiler Diagram, item 18) under the front cover of the boiler. Damaged induction sensor (the red LED does not light up). The detection arm did not move due to being immobilized by tar buildup. This may be caused by frequent boiler shutdowns with a large amount of fuel (overheating).	Activate the “Automatic Constant Heat” function in the controller menu. Check the tightness of the dampers with the fan turned off; adjust the dampers if necessary (service technician). Replace the sensor (service technician). Remove the air panel and fix the problem.
The exhaust fan is making excessive noise.	The impeller is contaminated with tar. This may be caused by frequent boiler shutdowns with a large amount of fuel (overheating).	Remove the fan motor. Clean it and eliminate the cause of the clogging.
The boiler shuts down during operation with the message “stáložár”.	The detection arm is bent and is sending a signal that the boiler is out of fuel. Defective constant heat detection sensor.	Remove the front cover, remove the cover under which the arm counterweight is located. Check that the arm is tightened and that it is not mechanically bent. It should be L-shaped (opening the door should lift the counterweight). Replace the ember detection sensor (service technician).
The boiler is unable to increase output (after closing the stoking doors , the flue gas temperature drops to low values).	The boiler has no air supply or the flue gas path is blocked.	Check all 3 air intake dampers to ensure they are not stuck. Clean the entire flue gas path (behind the gasket and the rear firebrick wall in the combustion chamber; check that the turbulators are not clogged; inspect the fan, the flue pipe, and the chimney).

When troubleshooting, always disconnect the boiler from the mains power supply first! If the boiler unit also controls a backup heat source, it is necessary to disconnect it from the mains power supply as well.

To ensure proper function and safe operation, boiler repairs must be performed **exclusively** by **personnel from authorized service centers**.

Warranty and post-warranty boiler repairs are provided by BLAZE HARMONY s.r.o. through its **specialized service centers and contractual partners.**

8 Further Information

8.1 Properties of various types of fuel

We do not recommend burning damp wood. Burning undried wood reduces its effective calorific value, which results in increased fuel consumption. Furthermore, burning damp wood increases the water vapor content in the flue gases, thereby raising their dew point. This can result in moisture condensation and a shortened service life of the boiler or chimney. Proper natural drying of wood takes two years for softwood in split logs and three years for hardwood.

The calorific value of all types of wood is roughly the same, approximately 15 MJ/kg at 15% moisture content. Hardwood (with a high specific gravity) is more suitable if a longer burning time is desired.

Typical density of common wood species in kg/m³(cubic meter) at 15% moisture content:

acacia	750	hornbeam	680	alder	520
pine	500	ash	670	spruce	450
birch	630	maple	660	poplar	450
beech	670	linden	490	willow	440
oak	690	larch	590		

The specific weight of wood stacked in piles (cubic meter) is 60 to 80% of the specific weight of the wood itself (solid cubic meter).

8.2 Fuel consumption, frequency of stoking

Seasonal fuel consumption depends on many factors:

- the building's heat loss (the power required to heat the building at approximately -15°C)
- boiler operating efficiency (fuel quality, level of operation, and output control)
- the location of the boiler room (whether heat from the boiler surface and chimney contributes to heating the building)
- the temperature to which the building is heated (a 1°C increase in indoor temperature corresponds to an approx. 5% increase in fuel consumption)
- if the boiler is used for DHW heating, what is its consumption
- the average outdoor temperature during the heating season (differences can be ±20%)
- whether the entire building or only part of it is heated, how significant the heat loss through ventilation is, etc.

The typical seasonal consumption for a single-family home with a heat loss of 15 kW is approximately 10,000 kg of dry wood, which is approximately 30 m³(cubic meters).

Daily consumption is proportional to the outdoor temperature. Example of typical daily consumption for a single-family home with a heat loss of 15 kW during the heating season using a BLAZE PRAKTIK 25 boiler in the EASY version:

Number of days	outdoor temperature	average boiler output	daily fuel consumption	number of stoking sessions per day
5 days	-8°C	55%	75 kg	3 times
30 days	-5°C	45%	60 kg	2–3 times
30 days	-2°C	40%	50 kg	2 times
70 days	2°C	30%	45 kg	2x
50 days	6°C	20%	40 kg	1–2 times
50 days	10°C	10%	20 kg	1 time

8.3 Heat loss of a building, methods for determining it

- Heat loss is a parameter defined by standards. It corresponds to the heat output required to heat a building to a specified temperature (21°C for residential spaces) at a standardized design outdoor temperature. In the Czech Republic, this temperature ranges from -17°C to -12°C, depending on the building's location (lowlands, highlands).
- The heat loss value must be correctly determined based on the building's parameters (floor area, wall thickness, wall material, window type, design outdoor temperature, etc.). The calculation is performed by the designer, or a publicly available application can be used, e.g.: https://www.tzb-info.cz/tabulky-a-vypocty/107-vypocet-tepelne-ztraty-objektu-dle-csn-06-021.
- Heat loss can be roughly estimated based on the building's floor area. For a typical uninsulated single-family home in the Czech Republic's climate zone, heat loss is approximately 40 W per cubic meter; for an insulated home, it is approximately 20 W per cubic meter.
- Heat loss can also be roughly estimated based on the current fuel consumption per season:

Fuel consumption for various types of fuel per **1 kW of** a building's heat loss.

Fuel	Estimated overall efficiency	Seasonal consumption
Dry wood	70%	650 kg (1.5–2 m³)
Wood briquettes	70%	600 kg
Wood pellets (automatic boiler)	77%	550 kg
Coal (manually fed boiler)	70%	600 kg
Coal (automatic boiler)	77%	550 kg
Gas	85%	260 m³ (2,400 kWh)
Propane	85%	185 kg
Electricity	100%	2,000 kWh
District heating	100%	2,000 kWh (7,200 MJ = 7.2 GJ)

9 Safety Instructions

Only equipment that has been installed and commissioned in accordance with the documentation and is in proper technical condition may be operated.

Safety regulations must be observed when handling the product to its destination. For transport, only tools and transport equipment designed for this purpose with the appropriate load capacity may be used (the product's weight is specified in Chapter 2).

Inspection of flue gas paths and chimneys must be performed in accordance with applicable regulations. The flue pipe must be securely connected to the chimney flue. Flue pipes must be mechanically sturdy, airtight against flue gas leakage, and cleanable. The condition of the chimney must be checked regularly. The cleaning opening in the chimney must be thoroughly sealed to prevent flue gas driven by the fan from escaping into the surrounding area through leaks. Only one boiler may be connected to a single chimney flue. Connecting the appliance to the chimney flue must always be done with the approval of the relevant chimney sweep guild. Flue pipes must not be routed through utility or living spaces. The internal cross-section of the flue pipe must not be larger than the internal diameter of the chimney flue and must not taper toward the chimney flue.

With the exception of approved solid or liquid fire starters, it is prohibited to use flammable liquids (gasoline, oil, etc.) for kindling.

Repairs to the boiler may only be performed when the boiler is extinguished and disconnected from the electrical grid.

Tampering with the boiler or its electrical wiring is prohibited!

The boiler may only be connected to a suitable 230V/50Hz outlet or a distribution panel. After installation, the outlet or distribution panel must be accessible without restriction.

The boiler room must be adequately lit.

Work on the boiler's electrical components may only be performed by a qualified professional.

The installation and operation of the boiler (boiler room) must comply with applicable design, safety, and health regulations.

Boiler operation must follow the assembly, installation, and operating instructions.

The boiler operator must be a person over 18 years of age who is familiar with the manual and the operation of the appliance. Leaving children unsupervised near a boiler that is in operation is prohibited. The boiler must be under occasional supervision by the operator during operation.

Protective gloves and safety goggles must be worn during all activities related to boiler operation.

Flammable objects must not be placed on the boiler or near the fuel loading and ash removal openings. Ash must be disposed of in non-flammable containers with lids. Always take due care, as the outer surfaces of the boiler may be hot to the touch.

If there is a risk of flammable vapors or gases forming and entering the boiler room, or during work that creates a temporary risk of fire or explosion (such as installing floor coverings or painting with flammable paints), the boiler must be taken out of service in a timely manner before work begins.

The operator is required to inspect the boiler and safety equipment at least once a year and verify functionality according to local operating conditions. If the boiler is connected to a dedicated pressure vessel (e.g., an expansion tank), the operator is required to ensure inspections are performed in accordance with applicable regulations.

WARNING! The boiler may only be used for the purposes for which it is intended.

10 Disposal of shipping packaging

- Place the polyethylene cover film in the plastic recycling bin
- Disassemble the wooden shipping pallet and burn it

11 Disposal of the boiler at the end of its service life

- Clean the boiler and disassemble it into individual parts
- Take the metal parts to a scrap metal collection point
- Dispose of ceramic parts as household waste or use them as construction material
- Dispose of insulation boards and sealing cords as household waste

12 Related standards

Heating system

EN303-5+A1:2023	Boilers for central heating

Fire regulations

EN 13501-1	Fire classification of construction products and building structures

Electrical

EN 60445 ed. 2	Basic and safety principles for human-machine interfaces, marking, and identification – Marking of equipment terminals and ends of certain selected conductors, including general rules for the alphanumeric system
EN 60079-14-2	Electrical equipment for explosive gas atmospheres – Part 14
EN 60 446	Basic and safety principles for the operation of machinery – Color or numerical marking of conductors
EN 50 165	Electrical equipment of non-electrical household appliances. Safety requirements
EN 55 014-1	Electromagnetic compatibility – Requirements for household appliances – Part 1
EN 60335-1 ed.2 2003+1:2004+A11:2004+A1:2005+2:2006+A12:2006+A2:2007+3:2007+Z1:2007	Household and similar electrical appliances – Safety – Part 1: General requirements
EN 60335-2-102	Household and similar electrical appliances – Safety – Part 2

13 Warranty Terms

The BLAZE PRAKTIK series boilers in the EASY model are manufactured and tested in accordance with applicable documentation and comply with the EN 303-5+A1:2023 standard for central heating boilers.

The warranty period for the pressure-bearing parts of the boiler is 84 months.
The warranty period for consumable parts is 12 months.
The warranty period for other components is 24 months.
The warranty period begins on the date the boiler is first put into operation, but no later than 6 months after the boiler is shipped from the BLAZE HARMONY s.r.o. manufacturing plant.

The warranty applies only to boilers operated in accordance with the instructions in the assembly, installation, and operating manual and commissioned by an authorized company.
Consumable parts include ceramic fittings, sealing cords, and heat-resistant steel components in the lower combustion chamber.

If a defective boiler part needs to be replaced under warranty, the end user should contact the authorized service organization that commissioned the boiler, or another local company with valid authorization to commission and service BLAZE HARMONY s.r.o. boilers. That company will request a new replacement part from the service department of BLAZE HARMONY s.r.o. If the service department of BLAZE HARMONY s.r.o. determines that the claim is valid, it will immediately send the relevant replacement part to the service organization. The service organization will then replace the part on the boiler at the customer's location.

The warranty does not cover, among other things, malfunctions caused by:

- connecting the boiler to a water pressure greater than 300 kPa
- the use of fuel other than the recommended type
- incorrect operation (e.g., frequent shutdowns and overheating of the boiler)
- connecting the boiler to a power supply other than 230V/50Hz or to a faulty power supply
- untreated water (e.g., limescale buildup in the boiler)
- due to improper operation and mechanical damage to parts
- an improperly sized or improperly installed heating system
- rough handling, tampering with the boiler's structure, natural disasters, improper storage, or other reasons beyond the manufacturer's control
- boiler overheating and the resulting downtime. The warranty expires if the overheating count exceeds 200 hours
  (MENU => Information => Service Counters)

Failure to comply with the above will result in the loss of the warranty.
For warranty claims, contact the service and installation company that commissioned your product.
If the boiler is initially commissioned by an unauthorized person, the product warranty is void!
Immediately after commissioning the boiler, the manufacturer must be sent a properly completed and signed **"Warranty Certificate and Boiler Commissioning Checklist and Heating Test Report**." Without fulfilling this condition, the manufacturer cannot recognize the repair as covered by the warranty.
When reporting a defect, the following must be provided:

- the boiler's serial number
- date of installation
- the authorized company that commissioned the boiler
- circumstances of the malfunction (description of the malfunction)

The manufacturer reserves the right to make changes as part of product innovation that may not be included in the manual.

14 NOTICE!

Please send the properly completed warranty certificate for the BLAZE PRAKTIK boiler (EASY model) to the address below:

BLAZE HARMONY s.r.o.

Trnávka 37

751 31 Lipník nad Bečvou

Czech Republic

Or by email to: zarucak@blazeharmony.com

15 Record of repairs performed

Record of warranty and post-warranty repairs and product inspections			
Date of record	**Work performed**	**Contract service organization (signature, stamp)**	**Customer signature**

BLAZE HARMONY s.r.o.

Trnávka 37, 751 31 Lipník nad Bečvou

Czech Republic

Email: info@blazeharmony.com, www.blazeharmony.com

Date of last revision: 2026-09-18