

Diagram 1. Recommended clearances between the boiler and walls

Table 1. Combustibility of construction materials

Class A - non-combustible	Stone, bricks, ceramic tiles, baked clay, solutions, plaster free of organic additives.
Class B - hard combustible	Gypsum board panels, basalt fiber needled felt, fiberglass board, AKUMIN, Izomin, Rajolit, Lignos, Velox, Heraklit.
Class C1/C2 - Medium combustible	Wood beech, oak Wood softwood, layered wood.
Class C3 - easy combustible	Asphalt, cardboard, cellulose, tar, fiberboard, cork, polyurethane, polyethylene.

2. PRODUCT DESCRIPTION

The BURNIT NWB PRIME boiler is with built-up controller and electric fan for forced air feed.

Designed to satisfy the heating demands of medium to large sized spaces. They are engineered for burning solid fuel only and provide the option for fitting pellet, oil or gas-fired burners.

This appliance complies with EN 303-5.

•**Design.** Boiler body is made of high-quality boiler steel sheets with thickness of 5 mm for the combustion chamber and 3 mm for the water mantle.

•**Built-up controller.** The electronic control unit controls the operation of the flue fan, the circulation pump of the central heating and the pump of the domestic hot water system (DHW). The power of the fan is regulated in relation to the fuel consumed and the momentary chimney draft.

•**Efficient.** The flue gas makes a three-pass movement around three water-filled barriers in the combustion chamber on its way to the chimney. This way the gas is cool when it leaves the boiler and its energy has been transferred to the water in the mantle. The water mantle embraces the combustion chamber in full to utilize the emitted heat most efficiently. To keep from losing heat into the ambience, the boiler is insulated on the outside by 50 mm high-temperature wool.

•**Reliable and safe.** The heat exchanging tubular grill is protected by a replaceable metal grate. A complex of safety devices provide for the safety of the appliance.

•**Versatile.** Adapting to other fuel types by mounting a gas-, oil- or pellet-fired burner on the specially designated flange located on the lower door.

•**Fuel loading door**

•**Cleaning door (combustion chamber)**

- Air flaps for feed-in air adjustment
- Draft regulating flap, mounted on flue end
- Safety heat exchanger
- Safety devices of the boiler

3. FUELS

The boiler is designed for burning sunflower eco-briquettes class "B", according to

BDS EN ISO 14961-1:2010

Table 2. Requirements to the fuel

Composition	Sunflower flakes
Caloric content	4 676.22 kcal/kg; 5.44 kWh
Moisture	5.02 %
Ash after burning	2.98 %
Sulfur	0.07 %
Diameter	8.5 mm

4. TRANSPORTATION OF THE BOILER

We recommend to transport the heating boiler to the installation site in its packaging placed on the pallet. During transport and installation, depending on the weight, appropriate safety equipment must be used in accordance with Directive 2006/42/EC.

When transporting items weighing more than 30 kg, the use of pallet jack, fork truck or other hoisting devices is a must. The boiler is securely fastened with fasteners to a wooden pallet.



Important: When installing the boiler, the wooden pallet onto which the boiler is placed must be removed by unscrewing the bolted connections using flat ring wrench S13.

Diagram 3. Overall dimensions of boiler body and pallet, model NWB PRIME

Table 3.

Model	A, mm	B, mm	C, mm	D, mm	Weight, kg
NWB PRIME 20	650	1050	125	1495	270
NWB PRIME 25	650	1050	125	1495	293
NWB PRIME 30	650	1050	125	1495	315
NWB PRIME 40	750	1100	125	1495	358
NWB PRIME 50	750	1100	125	1495	387
NWB PRIME 70	810	1300	125	1640	462
NWB PRIME 90	810	1300	125	1640	505
NWB PRIME 110	880	1300	125	1640	526

5. DELIVERY OF THE BOILER

- Inspect the integrity of the packaging upon delivery.
- Check whether all components have been delivered to you. Boiler scope of delivery includes:
 - 1) Boiler body with boiler doors
 - 2) Control unit
 - 3) Safety valve 3 bar
 - 4) Fire irons
 - 5) Cleaning brush for flue pipes
 - 6) Technical passport, Installation and operation manual
 - 7) Service booklet and Warranty card
 If any of the above items are missing, contact your supplier.

6. INSTALLATION OF THE HEATING BOILER

 The assembly, installation and setup of boiler must be performed by a technician authorized for such operations. Installer must indicate to the user of the installation the minimum clearances from flammable materials and liquids.

6.1. Requirements:

- Boiler room must be frost-proof;
- Boiler room must allow for continuous access of air necessary to maintain combustion;
- Boilers must not be placed in inhabitable rooms;
- All boiler rooms must have correctly calculated vent depending on the boiler output. The vent must be protected by means of a net or grate. The size of the vent is calculated according to the formula:

$$A = 6,02 \cdot Q$$
 where:
 A – area of the vent in cm²,
 Q – boiler output in kW
- Remove the packaging without polluting the environment
- Observe building supervision instructions, in particular the existing Ordinance on combustion devices and storage of combustion materials, on building requirements applicable to installation sites and on ventilation;
- The boiler must be placed on a foundation whose surface area is larger than the base of the heating boiler according to diagram 1;
- The boiler must be placed in a position which allows for the easiest possible cleaning and servicing;
- Installation must be carried out according to installation diagram 1 which shows the boiler housing;
- No objects made of flammable materials or liquids may be placed on/near the boiler;

6.2. Check door tightness

Open boiler doors. Place paper strips on the four sides of the doors and close leaving part of the strips protruding outside. Pull the paper strips. If the strips tear upon pulling, doors seal tightly.



Caution! Inadequate adjustment of the hinges may result in air being sucked in through the doors and the boiler burning uncontrollably.

7. SETUP OF THE HEATING BOILER

7.1. Connecting the boiler to a chimney

Boiler-to-chimney connection must always comply with the existing standards and rules. The chimney must provide sufficient draught for evacuation of the smoke under any conditions.

The proper functioning of the chimney requires adequate sizing of the chimney itself since the draught it produces affects combustion, boiler's output and life span.

The draught created by the chimney is in functional relation to its cross-section, height and the roughness of its interior walls. No other appliance may be connected to the chimney serving the boiler. Chimney diameter must not be smaller than the flue outlet of the boiler. Flue outlet must be connected to the chimney opening. In terms of mechanical properties, the flue outlet must be sturdy and properly sealed (to avoid gas leak) and allow for easy access for cleaning on the inside. The inner section of the flue outlet must not be greater than the effective section of the chimney and must not narrow. Avoid using elbow joints.

The chimney cleaning opening has to be in its lowest part. The chimney's wall has to be threeplied where the medium layer is from mineral wool. The thickness of the insulation is not less than 30 mm when the chimney is setting up inside the house and the thickness is 50 mm, when the setting up is outside.

The inner diameter of the chimney depends on its real height and the power capacity of the boiler (see diagram 4).

Please entrust choosing a chimney and its installation by a qualified professional. The required distance between the boiler and the chimney is 300-600 mm.

Diagram 4. Boiler size and chimney parameters



Data in the tables are for indicative purposes. Draught depends on the diameter, height, uneven sections along the chimney surface and differences in temperature of combustion products and outside air. We recommend that you use chimney fitted with flue terminal. Heating specialist must calculate the precise sizing of the chimney.

7.2. Connecting the safety heat exchanger



Such connection must be performed by a technician / service shop authorized for such operations.

The heating boiler is equipped with safety heat exchanger (cooling circuit). It connects to the water system through a thermostatic valve. In case of overheating, the thermostatic valve feeds in cold water from the water mains which passes through the heat exchanger and absorbs the heat in the boiler. The water is then discharged into the sewage system. This arrangement ensures safe evacuation of the excess heat without the need for additional energy. This guarantees that the water in the boiler will not exceed the maximum safe level of 95°C.

The minimum operating pressure of the cooling water in the safety heat exchanger must be within the range 2÷10 bar.

A flow rate of at least 12 l/min is required. Connect the safety heat exchanger according to the hydraulic diagram using thermostatic valve. Install a filter on the inlet before the thermostatic valve.

Diagram 5: Connecting the safety heat exchanger

1. Water supply network (pressure 6-10 bar)
2. Drainage (sewerage)
3. Boiler NWB Prime
4. Safety heat exchanger inlet
5. BVS valve sensor
6. Safety heat exchanger outlet

7.3. Connecting the boiler to the heating installation.



Such connection must be performed by a technician / service shop authorized for such operations.

When the boiler is connected to a heating system, it is mandatory to install a 3 bar relief valve and expansion vessel. No shut-off fittings may be installed between the relief valve, expansion vessel and boiler.



It is mandatory to install a three-way valve (Laddomat or similar) or a four-way mixing valve which to ensure that the temperature of the heating medium fed into the boiler from the heating installation is at least 65°C.

The three-way mixing valve should be used in any heating system, its task is to protect the product from temperature shock during cold installation, as well as the appearance of condensation and accumulation of tars. As for products working with fuel - wood, briquettes, the three-way valve must open at a minimum of 55 degrees.

Table 4. TROUBLE-SHOOTING TABLE

Cause	Solution
Installation damage	
1. Due to unsealed connections	1. Install the connecting piping strain-free to the boiler connections. Connect the heating installation outlet to connection B. Connect the heating installation inlet to connection A. Mount the cock Y included in the set.
2. Due to accumulation of deposits. Condensate and tar formation may reduce the performance and life of the heating boiler. The temperature at the boiler inlet must not be less than 65°C, boiler water temperature at the outlet must be between 80°C and 85°C.	2. It is mandatory to install a three-way thermostatic valve which will prevent the temperature dropping under 65°C at the inlet. - In order to increase the operational life of the boiler it is recommended to install a buffer vessel with capacity of 55 l per 1 kW of installed power.
3. Due to freezing	3. If the heating installation, including the piping network, has not been built frost-proof, we recommend that you fill the heating installation with a liquid which has low freezing point and corrosion protection and antifreeze agent.
Output too low	
1. Insufficient draught	1. Check chimney condition and measure draught. (must be performed by an authorized service)
2. Heating value of the fuel is too low.	2. Make sure you use sufficiently dry fuel. When using fuel with high moisture content, after the reloading the boiler may burn for some time at significantly lower output level until the fuel in the combustion chamber has dried.

3. Presence of soot deposits and/or tar on the flue damper in the upper chamber which prevent its tight closure.

4. Presence of soot deposits and/or tar in the flue pipes in water jacket in the back of the boiler

3. Clean the flue damper and make sure that when moving its closing/opening lever it provides adequate sealing of the flue gas outlet in the upper chamber. (must be performed by an authorized service)

4. Clean the heat exchange surface of the flue pipes using the brush from the cleaning tools set. After the cleaning is completed, remove any soot through the inspection opening in the back of the boiler. Must be performed by an authorized service.

Boiler water too hot, heating bodies too cold

1. Hydraulic resistance is too high.
2. Air in the system
3. Inoperable circulation pump

Make sure the circulation pump has been properly selected and the heating installation is of the proper dimensions. (You must contact your installer.)

Boiler temperature too high. Controller failure

Grid power fluctuations

It is mandatory to assure a backup power generator of corresponding rated power!

Power failure

7.4. Connecting the boiler to the mains power supply

ATTENTION! HIGH VOLTAGE!
Make sure the regulator is disconnected from the mains before working on the power supply (cable connections, device installation, etc.)! Make sure the electrical power grid is grounded.

Such connection must be performed by a technician / service shop authorized for such operations.

Improper cable connections may damage the regulator!

The device may be damaged if struck by a lightning. Make sure it is unplugged during the storms.

It is mandatory to assure a backup power generator of corresponding rated power! (see 12.2)

The boiler must be connected to a 220V / 50Hz mains using a cable and a plug. The boiler must be placed in a position which allows for unobstructed access to the power supply plug. Dismount the inspection cover on the back side of housing.

Using a screw driver, connect the power supply and the external components (pump for the heating circuit and domestic hot water pump). Make sure you have connected the external components properly according to the enclosed wiring diagram. Create solid connection with the electrical mains which complies with the local regulations.

Diagram 5. Connection of controller

Table 5

Problem	Prevention
Fire hazard! Hot parts of the boiler may damage electrical conductors	Make sure all conductors are placed in the required cable guides and pass over the thermal insulation of the boiler.

7.5. Connection diagrams

Such connections must be performed by a technician / service shop authorized for such operations.

Diagram 7. Connection of BURNIT NWB Prime boiler to three-way valve / see page 71/

Diagram 8. Connection of BURNIT NWB Prime boiler to P type buffer tank and three-way valve / see page 72/

Diagram 9. Connection of BURNIT NWB Prime boiler to combi tank HYG BR2, flat plate solar collector PK and three-way valve / see page 73/

Diagram 10. Connection of BURNIT NWB Prime boiler to solar tank SON, buffer tank P, flat plate solar collector PK and three-way valve / see page 74/

8. FILLING THE HEATING INSTALLATION

Table 6

Problem	Prevention
Possible installation damage due to strains in the material caused by temperature differences	Fill the heating installation only in cold conditions (inlet temperature must not exceed 40°C).

Danger of installation damage due to accumulation of deposits. Condensate formation and tar deposits may shorten boiler's operational life.

-Do not operate the heating boiler for a long period of time in partial load mode
-The temperature at the boiler inlet must not be less than 65°C, boiler water temperature must be between 70°C and 80°C.
-Use the boiler for a short period to heat warm water in the summer.

9. BOILER OPERATION

9.1. Loading and ignition the boiler

When ignition the boiler for the first time, a condensate is formed which is later drained (this is not a fault in the boiler).

Fuel is loaded in the upper combustion chamber and it is recommended to load logs of length equal to the combustion chamber length and stack them tight inside with least possible air gaps. Both boiler doors should be well closed and sealed. Switch ON the controller. Set Maximum boiler temperature. Use a gas analyzer to adjust the fan power (speed) and the chimney draught.

When burning moist wood, the boiler stops working effectively and this has the following consequences:

- significantly increases fuel consumption;
- not reach the desired power;
- lifetime of the boiler and chimney fall.

Maintain operating temperature between 65° C and 80° C.

9.2. Cleaning of the boiler

Caution! Hot surfaces.
Before cleaning the boiler, make sure the fire in it has died out and the boiler has cooled down.

Boiler cleaning must be carried out periodically and adequately every 3 to 5 days. Ash accumulated in the combustion chamber, condensed moisture and tar deposits significantly reduce the life span and performance of the boiler and result in deterioration of the properties of the heat exchange surface. In case of larger ash accumulation there is not enough space for fuel combustion which may result in damage of the boiler as a whole. Regular cleaning is important to ensure the optimal performance and long operational life of the boiler.

At the start of the new heating season is recommended cleaning the boiler by a competent service.

It is recommended that the ash-and soot-container be emptied and cleaned every 3 to 5 days depending on fuel used. Scrape the inside of flue pipes if

necessary. Use the scraper tool.

Caution! Ashes may contain smoldering charcoal. Dispose of ashes only in specially designated facilities. Disposing of ashes into public garbage containers may cause fire.

9.2.1. Preparing for the new heating season. Recommended boiler maintenance procedures:

- 1.Remove internal safety gates inside the boiler firebox (combustion chamber). Scrape thoroughly the firebox using the scraper brush from the boiler cleaning kit. Remove tar and soot deposits as they obstruct normal heat radiation.
- 2.Clean thoroughly water jacket ribs. Remove cinder and soot deposits using the scraper tool and brush from cleaning kit.
- 3.Remove inspection opening lid below the boiler flue opening and remove ash deposits in there.

Caution! Replace inspection opening lid gasket with a new item if its integrity is broken.

- 4.Clean well metal grill in the bottom part of the boiler. Check whether gaps between flue pipes are well cleaned. Tar deposits or residues of non-combustive materials inside the boiler firebox deteriorate normal combustion process.

Caution! If necessary, adjustment of boiler doors or replacing insulation rope, please contact in your installer.

- 5.Clean air distribution pipes located below boiler flue pipes. Ash deposits inside them obstruct the inflow of air into the firebox (combustion chamber). In case dismantling of air distribution pipes is needed use wrench S13. Once the ash is swept out mount them back in place.

- 6.Clean fan turbine. Use a vacuum cleaner unit to remove dust from inside the fan turbine.

9.3. Important recommendations for long-lasting and correct operation of the boiler.

- Carry out periodic maintenance of boiler following the prescriptions in Section 9.2.
- The allowed moisture content of the fuel used must not exceed 15% + 20%.
- Gas emission in the combustion chamber may result in the formation of tar and condensate (acids). Therefore, a mixing valve must be installed and it must be adjusted so that the minimum temperature of the water returning in the boiler is 65° C. This extends the life span of the boiler and its warranty. The operating temperature of the water in the boiler must be within the 65 + 80°C range.
- It is not recommended to operate the boiler for a long period of time at an output lower than 50%.
- When using circulation pump, boiler operation must

be controlled via a separate thermostat in order to ensure the prescribed rated temperature of the return water.

-The eco-friendly operation of the boiler is realized at rated output.

-It is recommended to install a storage/buffer tank and pump type group with thermostatic mixing valve to the boiler. The capacity of the storage tank is 55 L of water per 1 kW installed boiler power.

-Maintenance and operation training for the boiler is conducted by an authorized installer.

 Failure to observe the installation and operating requirements described in the manual and the service booklet voids the warranty.

10. CONTROLLER



EUROSTER 11WBZ is a state-of-the-art microprocessor-based controller designed for interoperation with Central Heating (CH) coal- and pulverized coal-fired boilers in systems equipped with furnace blowers and a domestic hot water (DHW) water heater.

The controller measures the temperature in the boiler and in the DHW water heater. Depending on these temperatures, it adjusts the air flow to the furnace and controls the operation of the CH and DHW circulation pumps.

EUROSTER 11WBZ controller is equipped with an Anti-Stop function that prevents the seizing of an idle pump rotor. It automatically turns the pumps on for 30 seconds every 14 days when the heating season is over. Keep the controller turned on to allow the function operation after the heating season.

10.1. Controller functions:

- * ensure smooth adjustment of the blower rotational speed
- * ensure optimum operation of the boiler
- * prevent boiler condensation (sweating)
- * maintain constant water temperature in

the tank

- * activate the DHW priority function
- * protect the water heater against cooling down
- * provide frost protection
- * provide the Anti-Stop function – protection of the blower and pumps against seizure
- * ensure comfortable presetting with a knob
- * perform operation tests of the pumps and of the blower
- * provide temperature readings correction

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10.2. Visible elements:



1. - Power switch
2. - LCD
3. - Knob
4. - Fuse

The display backlight turns off by default after one minute following the end of the controller operation. The controller enables turning permanent backlight on.

10.3. Controller installation.

	Prior to the commencement of any installation works read this manual carefully! Incorrect installation and improper use may lead to serious hazards to users or other persons and result in property damage!
	•Prior to mounting, dismantling or maintenance, make sure that the controller is de-energized. Connection and disconnection of temperature sensors must also be performed when the device is de-energized!
	Voltages hazardous to life may be present on the controller and its connections, therefore only qualified and authorized technicians may be entrusted with the installation of the controller.

	Do not install any controller showing signs of mechanical damage.
	The performed electric connections and cables used shall be adequate to the applied loads and must conform to all requirements. When connecting power cables, pay particular attention to the correct connection of PE conductors.
	The controller is not a safety component of the heating system. Additional protection devices must be used in the heating systems prone to the risk of damage due to failure of the control systems.
	Protect the controller against moisture, water and other liquids. Before each and every heating season, the controller must be cleaned of any dust and other dirt. The device is not intended for use by children!
	Should there be any problem with the proper operation of the thermostat, please contact your technician or the manufacturer!
	Failure to meet the safety and maintenance rules results in loss of warranty!

10.4. Controller connection:

a) b) fixing the sensors:

- do not immerse the sensors in liquids nor install them at flue gas outlets to the stack;

b) connecting power cables to the pumps:

- connect the yellow or yellow-green wire (protective cable) with the terminal;
- connect the blue wire to the terminal (N);
- connect the brown wire to the terminal (L);

c) d) connecting the power cable to the blower:

- connect the yellow or yellow-green wire (protective cable) with the terminal;
- connect the blue wire to the terminal (N);
- connect the brown wire to the terminal (L);

 Caution! Failure to meet the above requirements may result in malfunction of the thermal protection.

 Caution! The voltage of the cable is 230 V. In case of damage to the cable or its extension make sure to disconnect power supply from the controller.

d) checking the connection:

- check whether the cables have been connected correctly and tighten the covers of terminal boxes of the pumps and of the blower.

e) connecting the controller:

- after securing the cables against any accidental rupture, connect the power cable to a 230 V / 50 Hz socket with an earthing pin.

Ambient temperature in a place of the controller installation should not exceed 40 °C.

Sensor CH	Sensor DHW	Fan			Thermal protection	DHW Pump			CH Pump			Mains 230 V		
		PE	N	L		PE	N	L	PE	N	L	PE	N	L
														

* Use the knob to select the number (0 or 1) and confirm.

Selecting 0 enables to change screen backlight functions without restoring factory defaults. Selecting 1 restores factory settings.

* "bl" (Backlight) will be displayed and once the knob is released, 0 will appear.

* Use the knob to select the required number (0 or 1) and confirm. Selecting 0 results in automatic screen backlight switch off after 1 minute of finishing operating the controller, and selecting 1 results in permanent backlight of the display.

* Control and possibly correct the remaining controller settings.

In case of lack of confirmation within 5 seconds, the controller resumes operation without introducing changes.

10.8. Controller settings.

After being switched on the controller shows the system status. Turn the knob right to enter the setting preview and change mode.

The controller configuration is specified below: Turn the knob in order to choose the required parameter. The controller will show the value (at the top) and number (at the bottom). In order to change the value of the displayed parameter, push the knob (the parameter value will start blinking), set the required value and confirm the selection by pressing the knob. If the current value should not be changed (cancellation of changes), do not push the knob, but wait 10 seconds for the setting to stop blinking. Setting windows are numbered for convenient operation of the controller.

The user can change the following parameters:

1. Boiler target temperature for CH operation

It is the temperature of the boiler to be maintained by the controller. In case of operation in the DHW priority mode, the controller can maintain a higher temperature to heat up the tank.

2. Hysteresis of the blower operation

This is a temperature range in which the controller linearly adjusts the blower power. The narrower the temperature range, the smaller the system temperature fluctuations. However, a too narrow range may result in the temperature oscillation – the controller will alternately heat up and cool down the boiler.

At the time of installation, set the maximum hysteresis value. Wait for the installation temperature to reach a stable value. If, under such conditions, the blower operates at a power level between settings No. (3) and (4), the hysteresis may be reduced.

3. Minimum power of the blower

This is the lowest power at which the blower may operate. It should be set at minimum value at which the blower rotor starts to rotate. This value should be selected experimentally using the blower test

function (setting No. 16).

4. Maximum power of the blower

This is the highest power at which the blower may operate. The value should be selected experimentally so that the boiler temperature maintained by the controller is as close to the preset temperature as possible.

5. Blow-through time

This is a period of the blower operation in the blow-through mode. The blower is turned on in order to remove combustion gases from the boiler. The blow-through time should be long enough to effectively exhaust the gases via the stack and short enough to prevent the boiler temperature rise.

6. Time interval between successive blow-throughs

This is the time passing between the end of the blow-through cycle and the start of a new cycle. It should be set so that to prevent the boiler temperature rise, but on the other hand to avoid explosive combustion of the gases generated in the boiler.

7. DHW water heater temperature

This is an average DHW water heater temperature to be maintained by the controller.

ATTENTION: Maintaining a low temperature in the tank (at a level of 35-40 °C) facilitates the development of bacterial flora, including Legionella.

8. Hysteresis of the DHW water heater pump

Difference between the temperature at which the pump is turned off and turned on, provided that the boiler is hot enough to enable heating of the tank (taking setting No. 10.11. into account).

9. Boiler and water heater differential temperature

This is the value by which the boiler temperature should exceed the tank temperature (plus the constant parameter of 3 °C) to enable filling of the tank without a risk that it will chill out. Alternately, in case of increase of the DHW water heater temperature or decrease of the boiler temperature this differential value (minus the constant parameter of 3 °C) specifies the temperature at which the filling cycle will be interrupted.

10. DHW heating priority

Activation of the DHW priority results in faster heat up of the cold DHW water heater, by turning the CH pump off and increasing the boiler preset temperature.

After heating up of the tank to the desired temperature, the controller resumes to normal operation.

If the DHW priority is turned off, the DHW pump is started when the tank temperature is low and the boiler temperature is high enough.

11. CH pump operation temperature

The conditions of turning the pump on and off are specified in section 10.11.

12. CH pump hysteresis

This is a differential temperature at which the controller turns the pump on and off. The conditions of turning the pump on and off are specified in section 10.11.

13. Temperature readings correction – CH sensor

This is a value added to or subtracted from the measured temperature value. It enables to compensate for the difference in readings between the sensor placed on the pipe and the thermometer installed on the boiler.

14. Temperature readings correction – DHW sensor

This is a value added to or subtracted from the measured temperature value. It enables to compensate for the difference in readings between the sensor placed in the tank and the thermometer of the tank.

15. Shutdown temperature

This is a temperature below which the controller turns the boiler off (the boiler furnace is most probably shut down). A too high shutdown temperature preset may cause the controller to turn

the boiler off by mistake.

16. Blower operation / test

Displays the current status of the blower calculated by the controller (0-100 %).

Press the knob to activate testing of the output. Press the knob again or leave it inactive for 10 seconds to resume automatic operation.

17. DHW pump operation / test

Displays the current status of the pump calculated by the controller (0 or 1).

Press the knob to activate testing of the output. Press the knob again or leave it inactive for 10 seconds to resume automatic operation.

18. CH pump operation / test

Displays the current status of the pump calculated by the controller (0 or 1).

Press the knob to activate testing of the output. Press the knob again or leave it inactive for 10 seconds to resume automatic operation.



ATTENTION: In case the set values preclude the correct operation of the controller, the alarm icon will appear on the display, and the colliding settings will be displayed alternately. After a few seconds the last correct configuration is restored.

Settings		Value			
Nº	Process	Default	Min	Max	Unit
1.	Boiler target temperature	50	40	80	°C
2.	Hysteresis of the blower operation	6	2	10	°C
3.	Minimum power of the blower	45	30	100	%
4.	Maximum power of the blower	100	30	100	%
5.	Blow-through time (blower operation period)	10	0	120	s
6.	Time interval between successive blow-throughs	6	0	30	seconds
7.	DHW water heater temperature	60	20	70	°C
8.	Hysteresis of the DHW pump	4	2	10	°C
9.	Surplus (boiler and water heater differential temperature)	10	3	10	°C
10.	DHW heating priority	1 ¹⁾	0 ¹⁾	1 ¹⁾	-
11.	CH pump operation temperature	40	20	80	°C
12.	CH pump hysteresis	4	2	10	°C
13.	CH temperature readings correction	0	-5	5	°C
14.	DHW temperature readings correction	0	-5	5	°C
15.	Shutdown temperature	35	30	50	°C
16.	Fan operation / test	-	0	100	%
17.	DHW pump operation / test	- ²⁾	0 ¹⁾	1 ¹⁾	-
18.	CH pump operation / test	- ²⁾	0 ¹⁾	1 ¹⁾	-

1) 1 means on, 0 means off

2) Displayed value is calculated by the controller

10.9. Firing - up

During firing-up in order to heat up the boiler as fast as possible the blower is operated at its highest power level.

The firing-up procedure may be initiated exclusively when the controller is in the shutdown mode – the blower is not running and the flame icon is not displayed.

Firing-up can be initiated in two ways:

- turn the controller knob all the way to the left, then press it and hold down until the blower is started;

- turn the controller power off and on.

Firing-up is terminated if:

- the boiler temperature is lower than the set temperature (1) by at most a half of the hysteresis value (2);

- within 1 hour the boiler has not reached the set shutdown temperature (setting No. 15).

If for any reason the temperature of the shutdown boiler exceeds the set shutdown temperature (setting No. 15), e.g. by self-firing-up, then the controller will automatically resume the normal operation mode, i.e. the pumps will not be turned off.

10.10. Fueling.

Turn the blower off for the time the furnace is loaded with new fuel. For this purpose turn the knob all the way to the left while the controller is in operating mode (flame icon displayed), then press the knob and hold it down until the flame icon disappears. The blower icon and the hand icon are blinking alternately, which means that the blower was turned off manually; all other algorithms are operating normally.

Proceed as above to turn the blower on. After turning the blower on again, the controller initiates the firing-up mode in order to fire up the new batch of fuel as soon as possible. If the fire goes out, the controller will turn the blower off.



ATTENTION: The controller will not turn the blower on automatically if it was previously manually turned off by the user.

10.11. Blower control.

The boiler temperature is maintained by adjusting the amount of air blown and by controlling the pumps.

In the firing-up mode when the temperature is low and the boiler may sweat, the blower is operating with its full power (determined by setting No. 4). Thus the firing-up period is as short as possible.

If the boiler temperature is close to the set temperature, within the hysteresis range, the

controller adjusts the air flow smoothly. The range of the blower power control is limited by two settings: the minimum blower power (3) and the maximum blower power (4).

Exceeding the boiler temperature results in turning into the blow-through operation. In this operation mode the blower is started only to remove combustion gases out of the furnace. Blow-through cycle parameters should be set so that the boiler temperature drops to the level at which the blower operates with a linear rotational speed adjustment.

If the boiler temperature exceeds the alarm temperature, the blower is turned off permanently. Overheating is indicated by display blinking.

The boiler temperature drop below the shutdown temperature setting (setting No. 15) turns the blower off. The pumps operate according to the settings.

10.12. Pumps control.

The controller monitors the temperature in the tank and in the boiler on an ongoing basis.

The CH pump is turned on if the boiler temperature exceeds the preset value by a half of the set hysteresis $T_{\text{boiler}} \geq T_{\text{CH}} + H_{\text{CH}}/2$

The CH pump is turned off if the boiler temperature drops below the preset value by a half of the preset hysteresis $T_{\text{boiler}} \leq T_{\text{CH}} - H_{\text{CH}}/2$

Decision to turn the DHW pump on is made in two steps:

- The water heater should be heat up if the tank temperature is lower than the preset value by at least a half of the preset hysteresis, $T_{\text{water heater}} \leq T_{\text{DHW}} - H_{\text{DHW}}/2$. In this case, if the DHW heating priority is active, then the operation of the CH pump is stopped.

Heating up of the tank can be stopped if the water heater temperature is higher than the preset value by at least a half of the preset hysteresis, $T_{\text{water heater}} \geq T_{\text{DHW}} + H_{\text{DHW}}/2$.

- The pump can be turned on without a risk of cooling the water heater down, provided that the temperature of the heat source exceeds the water heater temperature by at least the value of the preset **Difference** (9) plus 3 °C, $T_{\text{boiler}} - T_{\text{water heater}} \geq T_{\text{difference}} + 3$.

The pump cannot be turned on without a risk of cooling the tank down, provided that the temperature of the heat source does not exceed the water heater temperature by at least the value of the preset **Difference** (9) minus 3 °C, $T_{\text{boiler}} - T_{\text{water heaters}} \leq T_{\text{difference}} - 3$.

Frost protection

The frost protection function is activated when the temperature of a given sensor falls to 4 °C. If the boiler sensor (CH) reaches such temperature, the CH and DHW pumps are activated and "AF" letters (Anti-Freeze) are displayed. For the (DHW) water heater sensor only the DHW pump is started. The protection is turned off when the temperature rises to 6 °C.

10.13. Power alarm temperature.

In case the temperature measured by the boiler sensor exceeds the alarm temperature (90 °C), the CH and DHW pumps are turned on irrespective of the priority, the blow-throughs are turned off, and additionally the thermal protection feature interrupts the blower power supply until the temperature drops to 60 °C.

10.14. Summer season operation.

In order to disable the CH system operation for the summer season, set the temperature of the CH pump operation (11) higher than the settings of the DHW tank and of the boiler, e.g. to 80 °C. This will enable the DHW tank to heat up quickly and the boiler will be protected against high temperature.

10.15. Function ANTI-STOP.

Each time the controller is turned on, the ANTI-STOP function immediately turns the pumps on for 30 seconds (also after restoring factory defaults or change of the backlight type); later the operation is repeated every 14 days. "AS" letters are blinking on the display while the function is active. Any alarm generated while the ANTI-STOP function is active (overheating or sensor damage) aborts the function operation.

10.16. Troubleshooting.

Device does not work

Burnt fuse or ROM failure – send the device to the service.

The display blinks along with the sensor icon, "Sh" or "OP" letters appear

Sensor circuit shorted (Sh) or opened (OP) – check the adequate sensor cable with the blinking icon or send the device along with the sensors to the service.

Pump or blower does not work

The device is turned off – make sure that the proper icons are displayed. If not – check the settings. Restore factory settings (section 8).

Wrong connection – check.

Thermal protection activation – wait for the

temperature decrease.

Blower operates continuously

Time interval between blow-throughs (setting No. 6) set at 0 – adjust the value.

Boiler is overheating

The blow-through time setting (5) is too long or the time interval between blow-throughs is too short (setting No. 6) – adjust the value.

The blower power too high – adjust the preset values of the power of the blower (3) and (4); throttle back the blower.

Controller emits a buzzing sound

Loose coils in the interference filter – does not impact the correct operation of the device.

Controller knob operates erratically

Pulse generator damage – send the device to the service.

10.17. Technical data

Controlled device	CH pump, blower, DHW pump
Supply voltage	230 V 50 Hz
Maximum pumps output load	2 A 230 V 50 Hz
Maximum blower output load	0.5 A 230 V 50 Hz
Maximum power consumption	1.6 W
Temperature measurement range from:	0 °C to +110 °C
Temperature adjustment range:	
CH mode:	from +20 °C to +80 °C
DHW mode:	from +20 °C to +70 °C
Boiler temperature adjustment range from:	+40 °C to +80 °C
Temperature adjustment accuracy	1 °C
Hysteresis range	from 2 °C to 10 °C
Visual signalization	backlit LCD
Operation temperature:	from +5 °C to +40 °C
Storage temperature:	from 0 °C to +65 °C
Ingress protection rating	IP40
Color	black
Weight of the controller with cables	0.44 kg
Length of cables:	- tank temperature sensor: 5 m - boiler temperature sensor: 1.5 m
Standards, approvals, certificates conformity to	EMC, LVD and RoHS
Dimensions (width / height / depth) mm	175/114/53

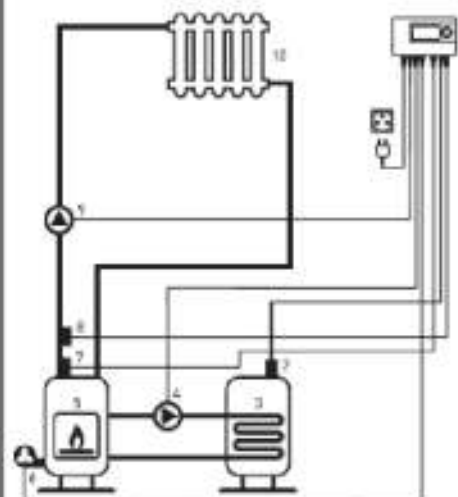
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It is recommended to use fans equipped with a reactive power compensation circuit. Feeding the controller (also in the emergency mode) with a non-sinusoidal voltage may result in increased energy losses in the pumps and in the fan, and contribute to malfunction of the whole system.

10.18. Connection diagram

The following diagram is simplified and does not cover all the elements necessary for the correct operation of the system.



1. Controller EUROSTER 11WBZ
2. DHW water heater temperature sensor
3. DHW water heater
4. DHW water heater filling pump
5. CH boiler
6. Blower
7. Thermal protection
8. Temperature sensor
9. CH pump
10. Heat consumer - radiator

11. WARRANTY TERMS

The warranty terms are described in the Service booklet included in the supply.

12. TECHNICAL PARAMETERS OF BOILER NWB PRIME

12.1. General features

- Electronic control unit controls the combustion by fan speed modulating. Optional control of circulation pumps for central heating and domestic hot water (DHW).
- Air feed fan optimizes the combustion and the fuel consumption rate.
- Water mantle embraces the combustion chamber in full to utilize the emitted heat most efficiently.
- Ribbed chamber surface and three-pass flue gas flow for improved heat exchange.
- Combustion chamber with large heat exchanging surface and low chamber resistance.
- Large firebox door ensures easy loading.
- Exchangeable metallic ash grate protects the pipe grid from the flame.
- Burner flange on lower door for fitting pellet, oil or gas burners (optional).
- Safety devices:

1. Pressure relief valve 3 bar
2. Safety heat evacuator a tap-water-filled line passes through the upmost part of the boiler body. In case of overheating it is triggered open by a thermostatic valve (not included) to evacuate the heat of the boiler.
3. STB - emergency thermostat - turn off the fan and stop the combustion process.
4. Air intake flap for the fan.

Diagram 11. Elements of NWB Prime boiler

1. Control unit
2. Housing
3. High efficiency thermal insulation
4. Safety heat evacuator (exchanger)
5. Three-pass flue gas flow
6. Water mantle
7. Combustion chamber
8. Metal ash grate
9. Ash-and-soot-container
10. Burner flange (option)
11. Flue
12. Air feed fan
13. Air intake flap

Diagram 12

12.2. Technical parameters

		NWB PRIME 20	NWB PRIME 25	NWB PRIME 30	NWB PRIME 40	NWB PRIME 50	NWB PRIME 70	NWB PRIME 90	NWB PRIME 110
Nominal heat output	kW	20	25	30	40	50	70	90	110
Min./Max. heat output	kW	15/20	20/25	25/30	30/40	40/50	50/70	70/90	90/110
Height H	mm	1235	1235	1235	1235	1235	1385	1385	1385
Width L / Depth D	mm	540/860	540/925	600/925	700/925	700/985	700/1105	760/1105	820/1105
Mantle volume	l	60	75	82	96	106	134	145	162
Combustion chamber volume	l	58	62	73	84	97	120	133	160
Mantle resistance $\Delta t=20, K$	Pa/ mbar	10/0.10	11/0.11	12/0.12	15/0.15	26/0.26	22/0.22	26/0.26	28/0.28
Required chimney draught	Pa/ mbar	16/0.16	20/0.20	21/0.21	23/0.23	24/0.24	38/0.38	47/0.47	56/0.56
Insulation	Boiler Doors	high-efficiency thermal wool high-efficiency thermal wool							
Average power consumption	W	60	60	60	60	60	110	110	110
Electric power supply	V/Hz	230/50	230/50	230/50	230/50	230/50	230/50	230/50	230/50
Recommended fuel	Sunflower eco-briquettes, humidity 20%								
Loading door size	mm	330/250	330/250	390/250	490/310	490/310	490/310	550/310	610/310
Operating temperature range	°C	65 - 80	65 - 80	65 - 80	65 - 80	65 - 80	65 - 80	65 - 80	65 - 80
Operating pressure	bar	3	3	3	3	3	3	3	3
Weight	kg	254	277	299	341	370	444	487	507
Cold water inlet	A, mm	R1½/232	R1½/232	R1½/232	R1½/232	R1½/232	R1½/232	R1½/232	R1½/232
Hot water outlet	B, mm	R1½/1265	R1½/1265	R1½/1265	R1½/1265	R1½/1265	R1½/1420	R1½/1420	R1½/1420
Safety line sleeve	K, mm	G½/1075	G½/1075	G½/1075	G½/1075	G½/1075	G½/1225	G½/1225	G½/1225
Safety heat evacuator inlet / outlet	E, mm	R½/1072	R½/1072	R½/1072	R½/1072	R½/1072	R½/1222	R½/1222	R½/1222
Flue	Ø	150	150	150	180	180	200	200	200
	F, mm	945	945	945	930	930	1065	1065	1065
	J, mm	270	270	300	350	350	350	380	410
Flue cleaning opening	D, mm	150/70	150/70	150/70	150/70	150/70	150/70	150/70	150/70
Drain	Y, mm	G½/232	G½/232	G½/232	G½/232	G½/232	G1/232	G1/232	G1/232
Air feed fan	W, mm	215	215	215	215	215	215	215	215
Burner flange (optional)	Z, Ø mm	176	176	176	176	176	176	215	215
Ash-and-soot container	X	✓	✓	✓	✓	✓	✓	✓	✓
Control unit	U	✓	✓	✓	✓	✓	✓	✓	✓

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13. RECYCLING AND DISPOSAL

Submit all packaging material for recycling according to the local regulations and requirements. Replaced heating installation components must be submitted for processing to an authorized factory which complies with the environmental protection regulation.

At the end of life cycle of each product its components are due to be disposed of in conformity with regulatory prescriptions.

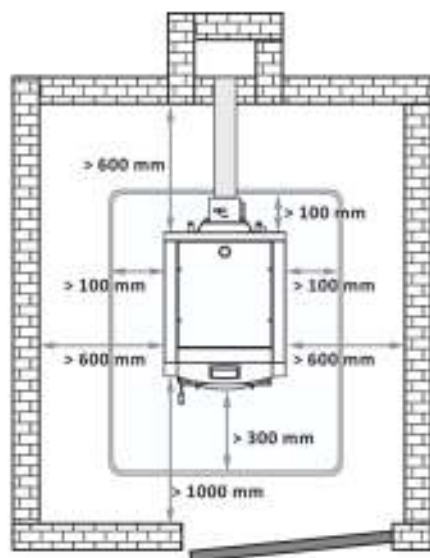
According to Directive 2002/96/EC regarding electrical and electronic equipment waste, disposal thereof is required separately from the normal flow of solid household waste. Obsolete equipment shall

be collected separately from other recyclable waste containing materials with adverse effect on health and environment.

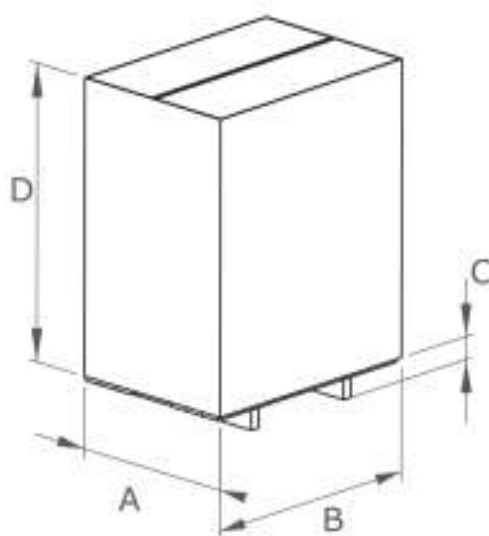
Expired appliances must be collected separately from other recyclable waste containing substances hazardous to health and environment. Both metal and non-metal parts are sold out to licensed organizations for recyclable metal or non-metal waste collection. In any case they should not be treated as household waste.



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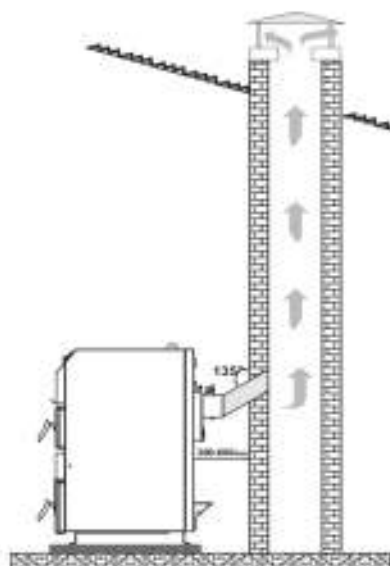
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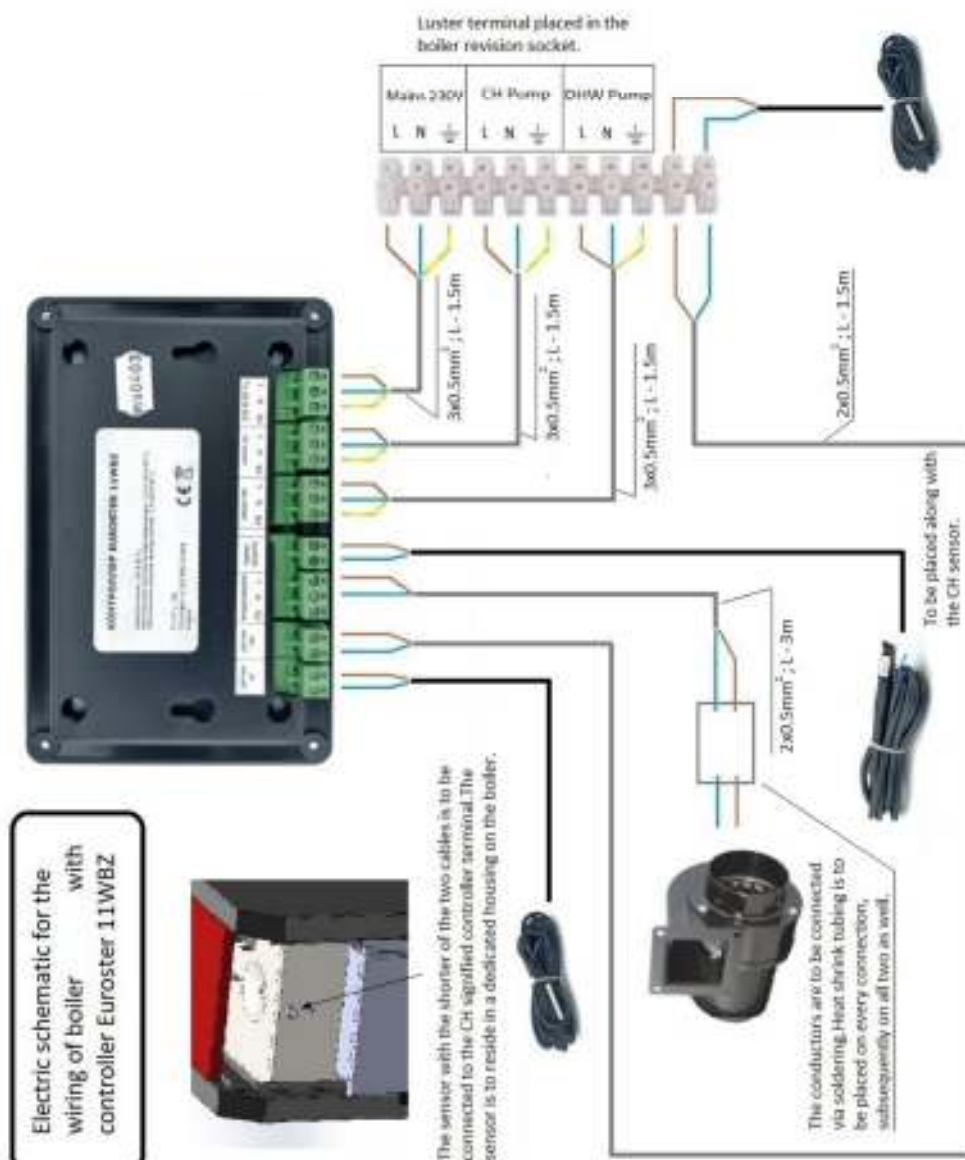
Table Required chimney height,
depending on boiler capacity and chimney diameter

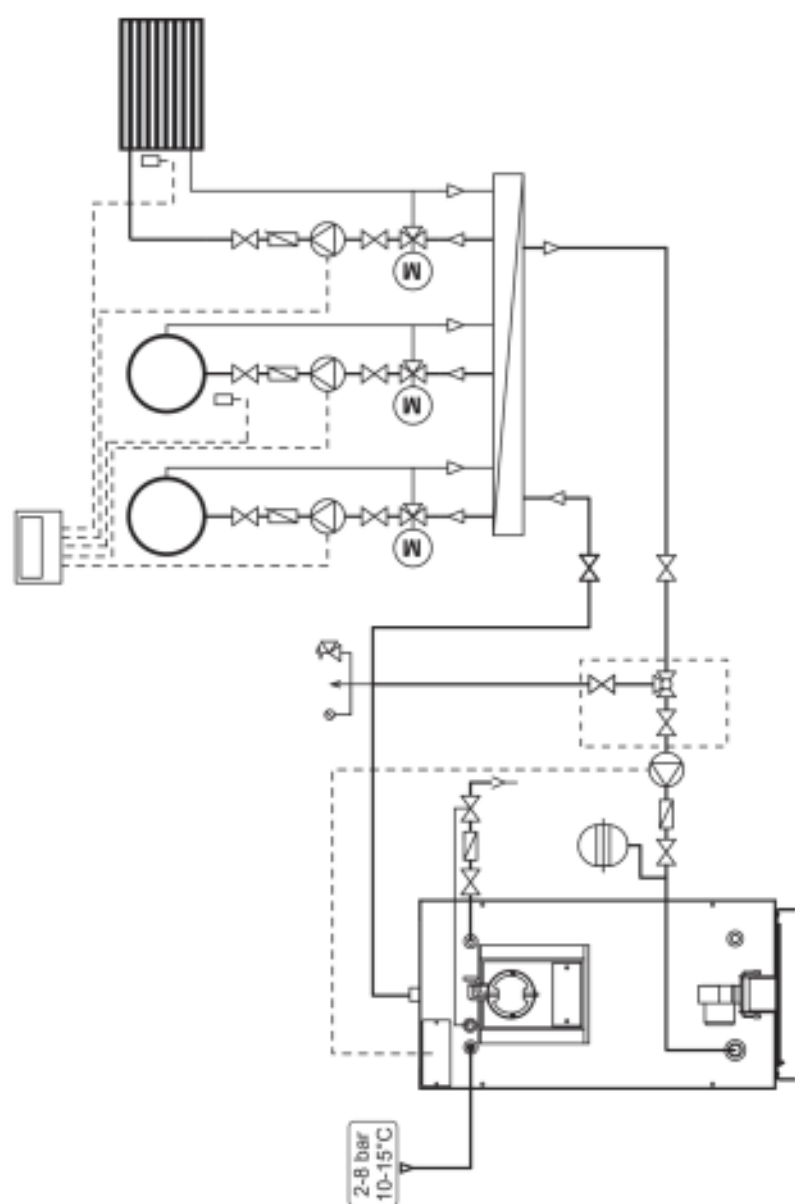
Boiler output	Diameter of boiler chimney	Chimney clear opening	Chimney minimum height
20 kW	Ø 150 mm	160 mm	≥ 5,5 m
25 kW	Ø 150 mm	160 mm	≥ 6 m
30 kW	Ø 150 mm	160 mm	≥ 7 m
40 kW	Ø 180 mm	180 mm / 200 mm	≥ 11,5 m / ≥ 8 m
50 kW	Ø 180 mm	180 mm / 200 mm	≥ 12 m / ≥ 10 m
70 kW	Ø 200 mm	220 mm	≥ 10 m
90 kW	Ø 200 mm	220 mm	≥ 12 m
110 kW	Ø 200 mm	220 mm	≥ 14 m

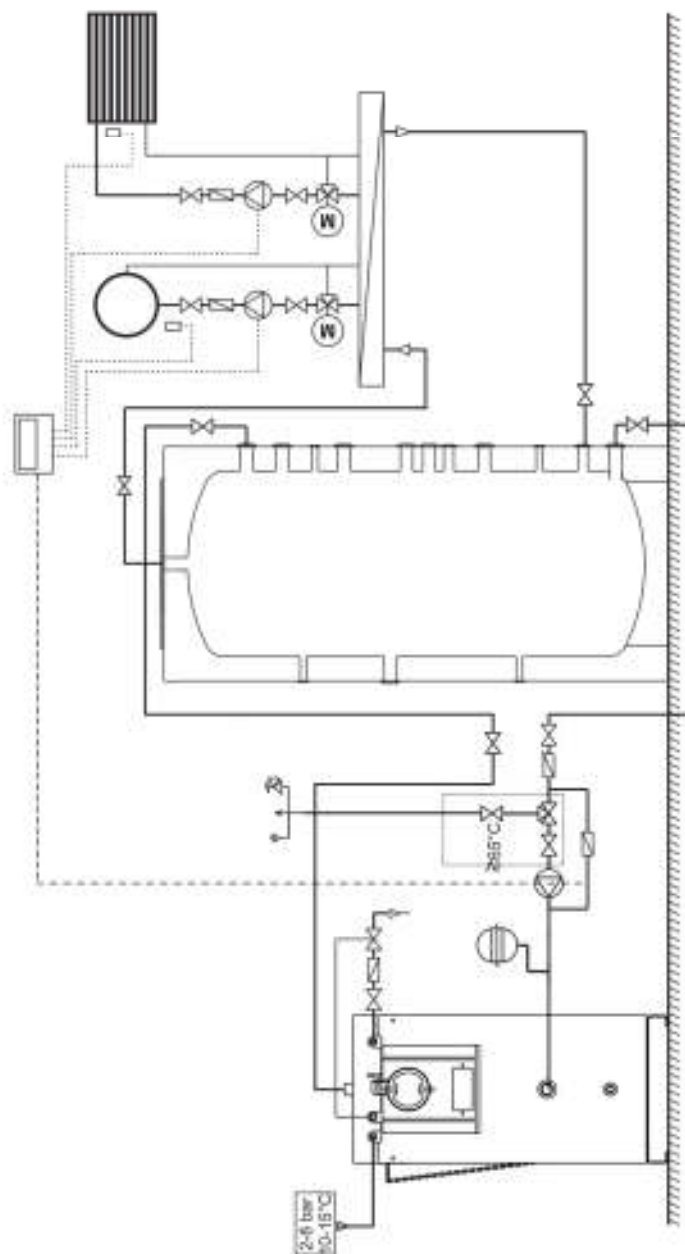


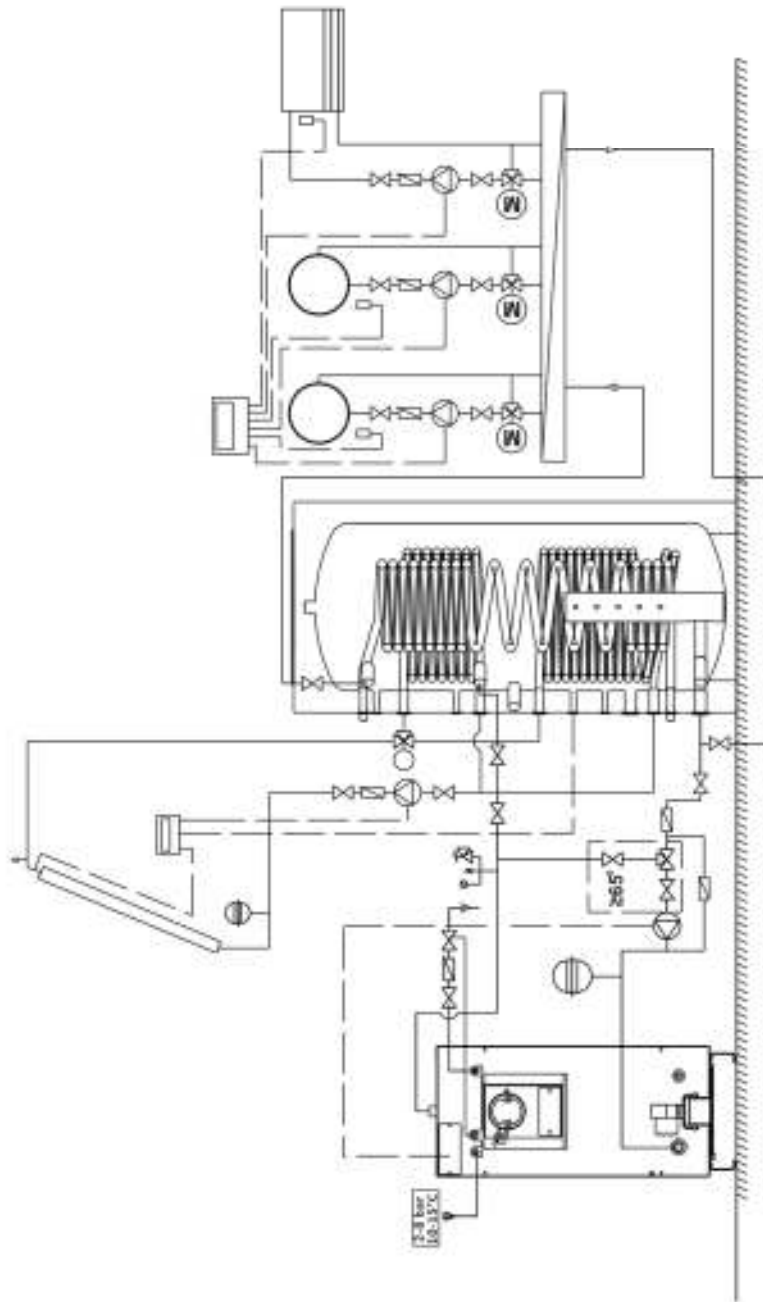


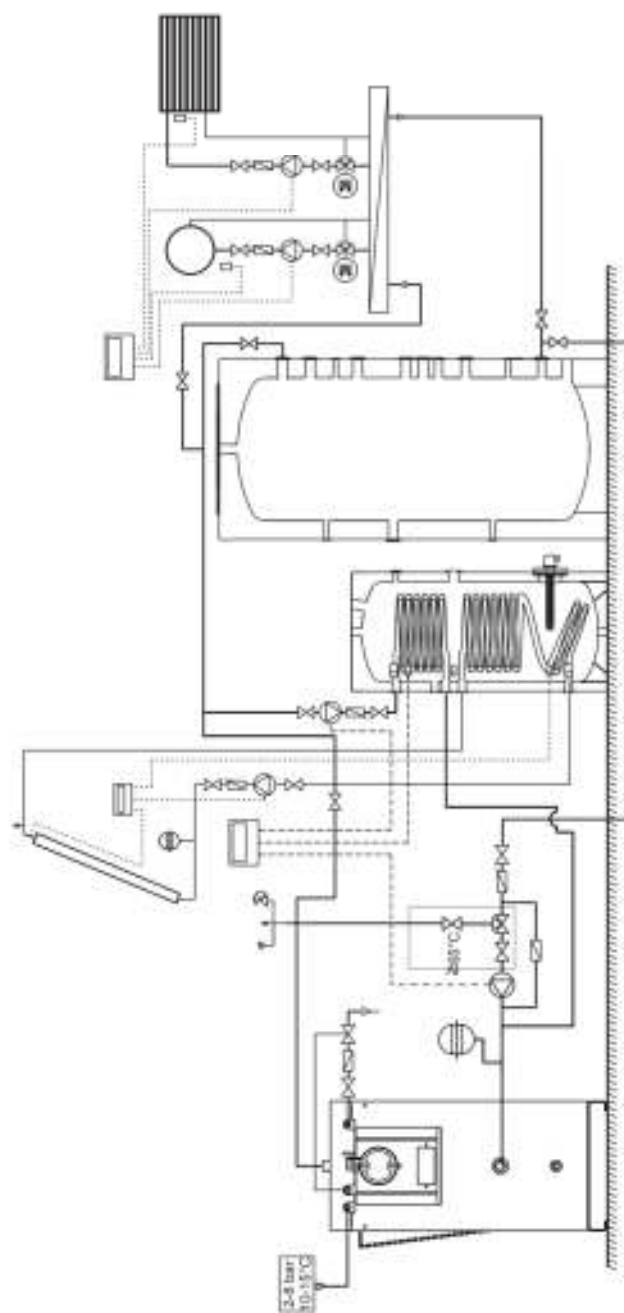
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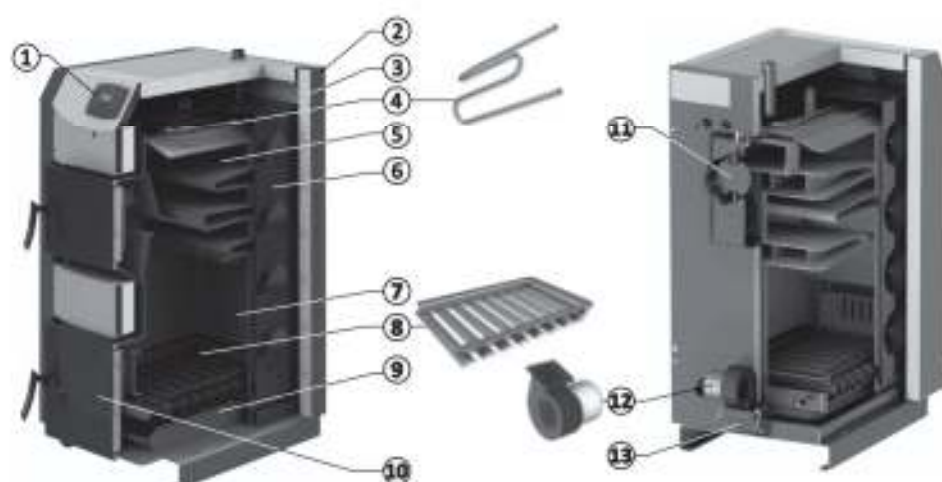




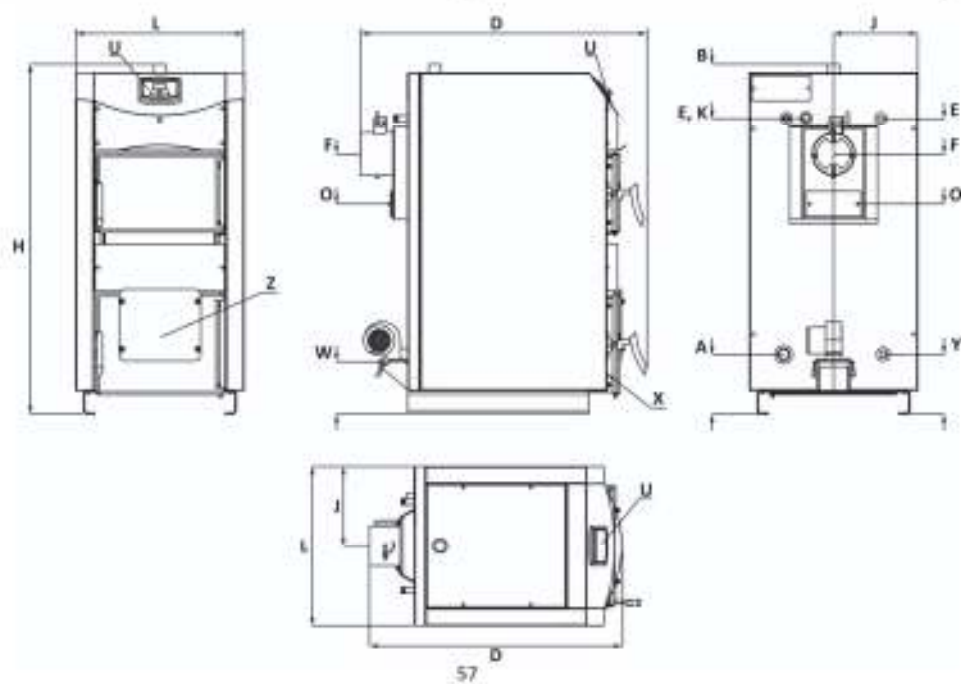




11.



12.









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Tel.: +359 700 17 343
www.burnit.bg