

Centrometal

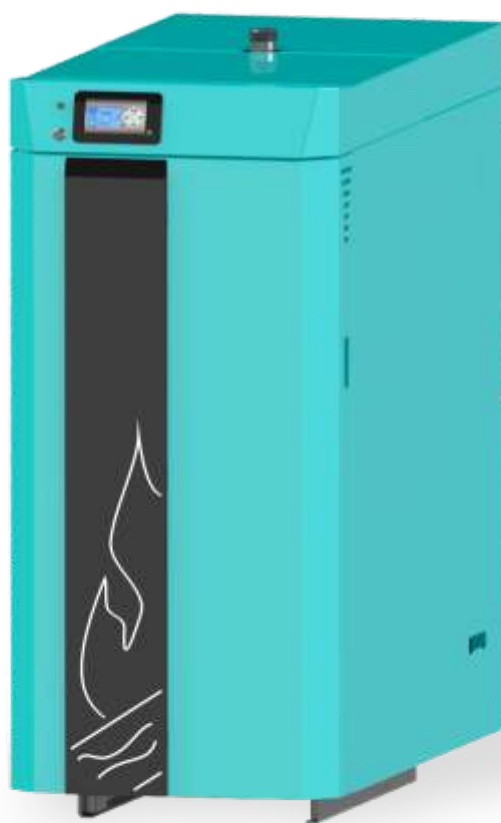
HEATING TECHNIQUE

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ENG

TECHNICAL INSTRUCTIONS

for installation, use and maintenance
of hot water boiler



THE FIRST START-UP MUST BE DONE BY AUTHORIZED PERSON
OTHERWISE PRODUCT WARRANTY IS NOT VALID

BioTec-C 25/31/35/45

Important

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**READ THESE INSTRUCTIONS CAREFULLY BEFORE
INSTALLING THE BOILER TO HEATING SYSTEM!**



Boiler must not operate in flammable and explosive environment.



Boiler must not be used by children or disabled persons (either physically or mentally), as well as by person without knowledge or experience, unless they are under control or trained by a person responsible for their safety. Children must be supervised in the vicinity of the product.



Before any work on the boiler it must be switched off and power supply must be disconnected.

TECHNICAL DATA

TYPE:		BioTec-C 25	BioTec-C 31	BioTec-C 35	BioTec-C 45
Useful heat output at rated heat output - P _n (kW)		25	31	35	45
Useful efficiency at rated heat output (Net calorific value "NCVar") (%)		91.2	91.0	91.0	91.5
Useful efficiency at rated heat output (Gross calorific value "GCVar"- η _n) (%)		83.0	83.1	83.1	83.2
Boiler class		5			
Required chimney underpressure (mbar)		0.08			
Water amount in boiler (l)		115	130	130	150
Exhaust gas temp. at nominal heat output (°C)		100-180			
Exhaust mass flow at nominal heat output (kg/s)		0,019	0,020	0,022	0,027
Minimum operating time at rated power (nominal Q _N) (h)		3,5	4	4	4
Min. inlet water tem. at the boiler supply water connection (°C)		60			
Cold water temp. and pressure for safety heat exchanger (°C/bar)		10-15°C / 2 bar			
Setting range for temperature controller (°C)		75-90			
Boiler resistance on water side at nominal output (mbar)		0.09	11	0.11	0.14
Fuel size (L x W x H) (mm)		(450-550) x 70 x 50			
Fuel loading chamber volume (l)		90	144	144	176
Fuel loading chamber dimensions (L×W×H) (mm)		600×250×600	600×400×600	600×400×600	600×400×735
Combustion chamber type		underpressure			
Boiler should operate with a hot water st. tank of a vol. of at least (l)		1004	1274	1454	1904
Nominal electrical power input (W)		285			
Auxiliray power requirements at Q _N (W)		110	116	116	122
Standby el. power (W)		5			
Supply voltage (V~)		230			
Frequency (Hz)		50			
Current type		~			
Total mass - (boiler with casing and accessories) (kg)		517	604	604	675
Max. operating overpressure (bar)		2,5			
Test pressure (bar)		5,5			
Max. operating temperature (°C)		90			
Flue gas tube - external diameter (mm)		150	160	160	180
Number of turbolators (pcs.)		8	10	10	10
Boiler connections	Flow and return pipe (male thread) (R)	6/4"			
	Filling/draining (female thread) (R)	3/4"			
	Heat exchanger connector (male thread) (R)	3/8"			
	Connector of exchanger sensor (female thread) (R)	1/2"			
Heating appliance working		with fan			
Heating appliance working		under non-condensing conditions			
Firebox dimensions (width x height) (mm)		250 x 240	400 x 240	400 x 240	400 x 240
Max. current power (A)		1,1			
Stoking mode		Manual			
Condensing boiler		no			
Solid fuel cogeneration boiler		no			
Combination boiler		no			

Technical data

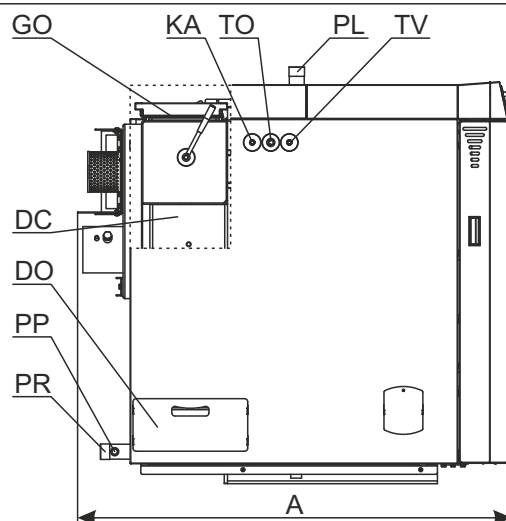
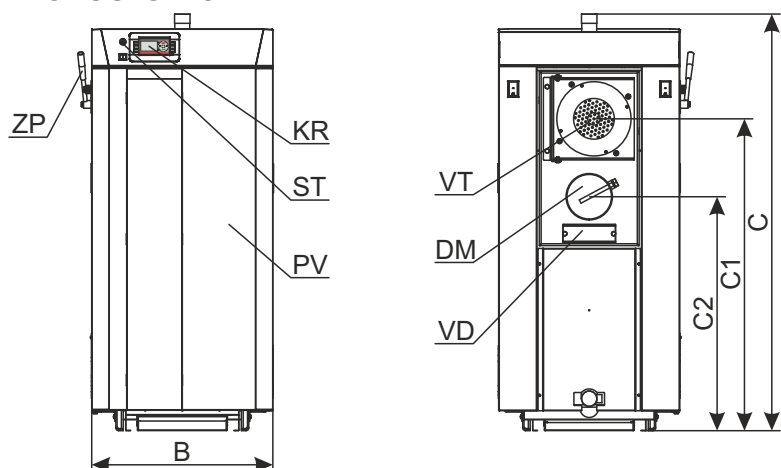
TYPE:		BioTec-C 25	BioTec-C 31	BioTec-C 35	BioTec-C 45
Preferred fuel		WOOD: A - EN 303-5:2012, B - EN ISO 17225-5:2014-09			
Moisture content for preferred fuel (%)		≤ 25			
Seasonal space heating energy efficiency - η_s (%)		80			
Seasonal space heating emissions for preferred fuel (*)	PM mg/m ³ (10% O ₂)	22	22	22	22
	OGC mg/m ³ (10% O ₂)	11	10	10	8
	CO mg/m ³ (10% O ₂)	158	146	138	117
	NO _x mg/m ³ (10% O ₂)	131	139	144	157
Additional electricity consumption	Atrated heat output - $e_{l_{max}}$ (kW)	0,050	0,055	0,058	0,065
	Incorporated secondary emission abatement equipment (kW)	Not applicable			
	In standby mode - P_{SB} (kW)	0,005			

(*) PM = particulate matter, OGC = organic gaseous compounds, CO = carbon monoxide, NO_x = nitrogen oxides

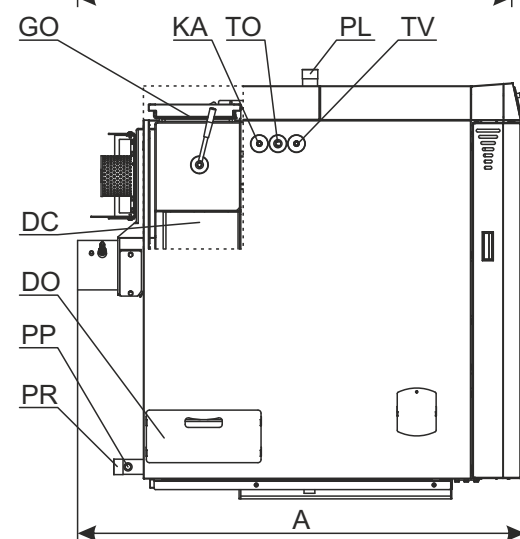
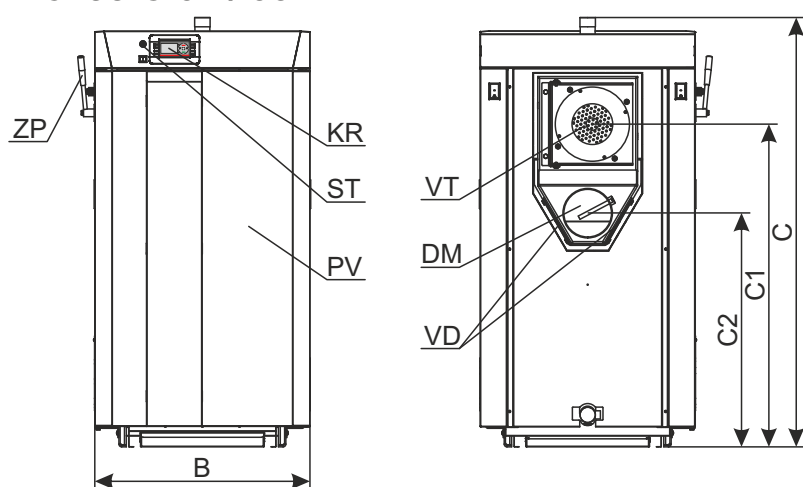
Contact details:

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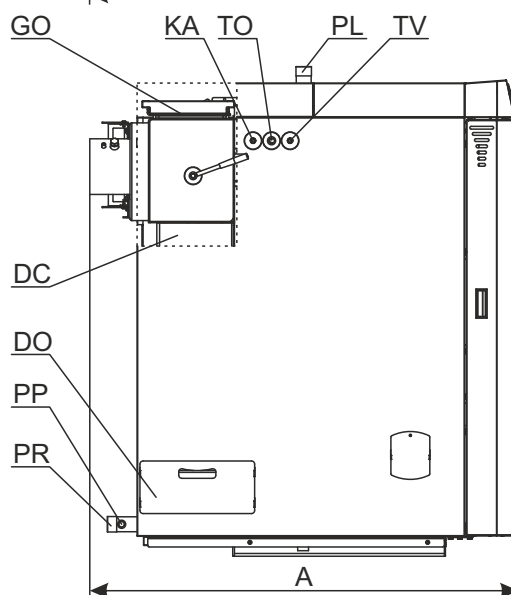
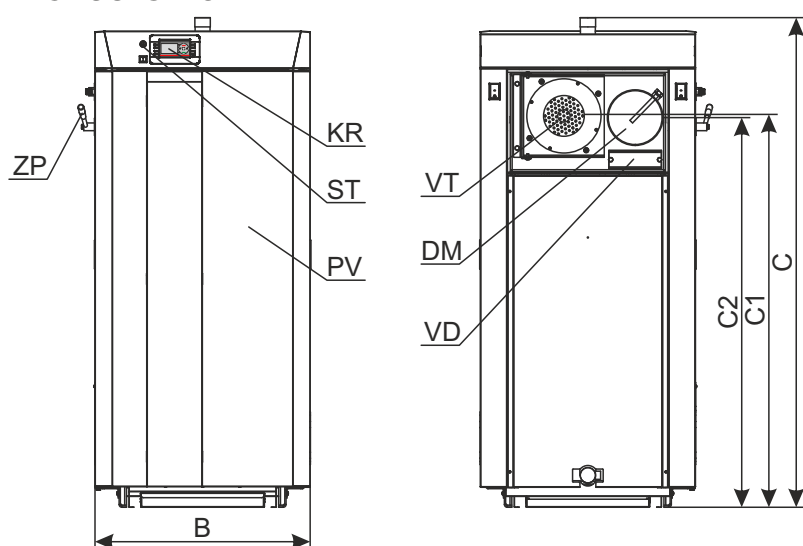
BioTec-C 25



BioTec-C 31 / 35



BioTec-C 45



Boiler dimensions

BioTec-C 25

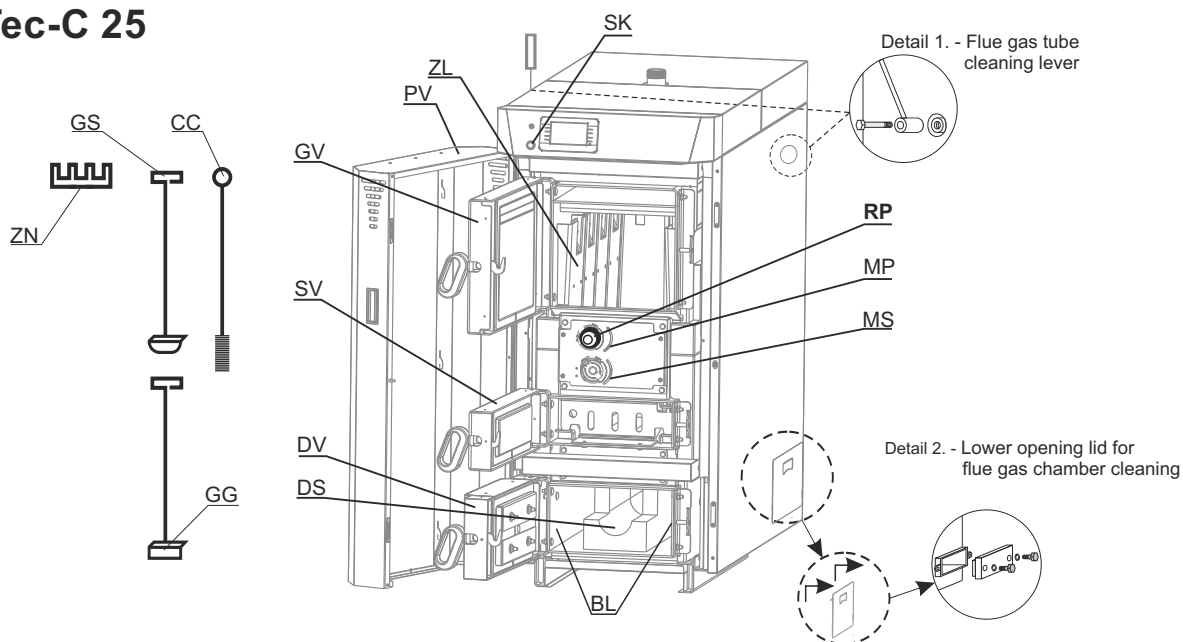
BioTec-C 31/35

BioTec-C 45

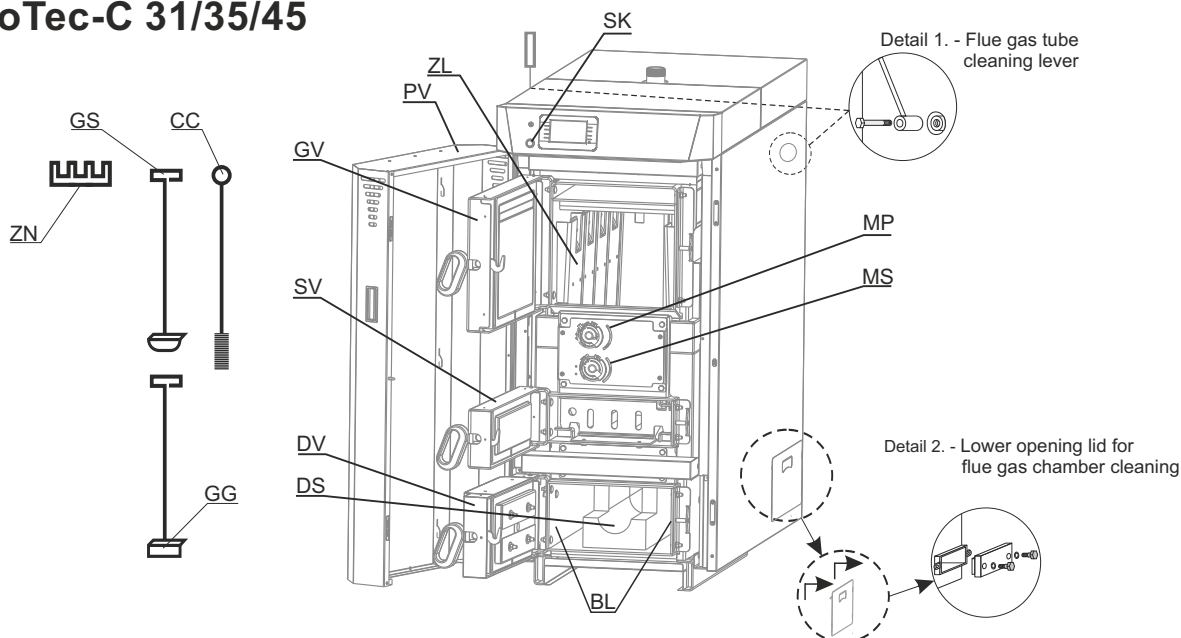
Depth (A)	1400	1445	1385
Width (B)	590	700	700
Height (C) + Extraction of turbulators	1375* + 1000	1420* + 1000	1615* + 1000
Height (C1)	1040*	1075*	1295*
Height (C2)	785*	785*	1290*

* adjustment possibility +10/-10 mm

BioTec-C 25



BioTec-C 31/35/45



LEGEND:

BL - Lateral sides of bottom combustion chamber
 CC - Flue gas tubes cleaning brush
 DC - Flue gas chamber with tubes and turbulators
 DM - Flue gas tube connection
 DO - Cover of lower openings of the flue gas chamber
 DS - Lower refractory stone (2 parts)
 DV - Lower boiler door
 GG - Scraper for upper refractory stone and flue gas channels cleaning
 GO - Upper opening for flue gas tube cleaning
 GS - Scraper for cleaning of the lower refractory stone
 GV - Upper boiler door
 KA - Heat exchanger connection
 KR - Digital boiler controller
 MP - Primary air intake
 RP - **Primary air intake regulation (only BioTec-C 25)**

MS - Secondary air intake
 PL - Main flow
 PP - Filling / draining
 PR - Return flow
 SK - Main switch
 ST - Safety thermostat
 SV - Middle boiler door
 TO - Thermal safety valve sensor connection
 TV - Heat exchanger connection - thermal safety valve connection point
 VD - Opening for cleaning the flue gas chamber
 VT - Fan
 ZL - Sheet metal protecting covers
 ZN - Holder for cleaning set
 ZP - Flue gas tube cleaning lever (can be installed on the left or right boiler side)
 PV - Cover door

1.0. GENERAL

Steel hot water boilers **BioTec-C**, nominal heat output 25, 31,35, 45 kW, are designed for **wood log** firing, for heating of small and middle sized premises. The wood gasification principle enables a complete fuel burning. Logs up to 550 mm long can be inserted into the large combustion chamber. The burning period of a single fill of logs is up to 4 hours, depend about nominal heat output. The boiler can keep the glow even 8 hours, which means that in this period it is not necessary to fire up the boiler in order to keep the heating process. Boiler operation is controlled with inbuilt boiler control unit using the flue gas sensor and modulating underpressure fan on flue gases outlet from boiler. The boiler must be connected to the central heating system with an appropriate volume of the CAS water accumulation tanks.

1.1. CHARACTERISTICS OF THE BioTec-C BOILER

The BioTec-C boiler is produced in compliance with the EN 303-5:2012 norm, which enables the required level of functioning and minimal environmental pollution, through the firing with wood logs. The boiler is aimed for firing with wood logs. The system of flue gases conduction and their additional burning out, enables its high efficiency, which makes this product extremely economical. Widely sized fuel loading door enables firing with large pieces of wood logs and very simple and easy cleaning and maintenance. One filling of logs lasts up to 4 hours, depend about nominal heat output. There is also a possibility of prolonging the firing process to the entire day, if the heating requirement is decreased. The boiler can keep the glow up to 8 hours, during which period it is not necessary to repeat the start firing process. The flue gas passages are good optimized. The boiler must be connected to the central heating system with return flow protection and with CAS water accumulation tanks. Boiler operation is managed with inbuilt boiler control unit using flue gas sensor and modulating underpressure fan on flue gases outlet from boiler. Boiler controll unit can run return flow protection pump and 3-way mixing valve with actuator and return flow temp. sensor (between boiler and buffer tank), buffer tank management and DHW water heater tank pump. With boiler BioTec-C it is easy to handle, integrated control unit assures reliable and simple boiler operation. With installed accumulation (buffer) tank excess of produced heat is accumulated into the tank and can be consumed when needed. Because of accumulation tank, firing can be planned in a reasonable time, and in the case of mild outside temperature, space heating and DHW heating without firing boiler is also possible for several days. The boiler is delivered together with thermal insulation, covered by a metal casing and it is pre-wired.

Concerning the specific need of sanitary hot water, the BioTec-C boiler can be connected to one of water heaters produced by our company. We suggest the combination with wall hanged SKB Digi or LKB Digi water heaters, as well as with floor standing TB water heaters or STB solar water heaters, if the future connection to the solar system has been planned and also CAS-B or CAS-BS, combination of accumulation buffer tank and stainless steel DHW tank, and solar heat exchanger. The boiler is tested and certified according to the European standard EN 303-5:2012 and meets **Class 5**. It is manufactured in compliance with ISO 9001/2015 and ISO 14001/2004 standards.

1.2. WOOD GASIFICATION COMBUSTION PROCESS

Combustion process is carried out in double combustion chamber in several phases. After filling the upper chamber with logs, glow dry the logs, and at temperature 100-300°C logs are being gasified. The gases created in such process are mixed with the oxygen from air and burn out completely with high temperature.

Fuel: wood logs with moisture content up to 20% (max. 25%), minimum size must be bigger than a nozzle in refractory stone of the upper chamber. This demand for moisture content is fulfilled with wood dried on air at least 12 months.

1.3. DELIVERY PACKAGE

Delivery package include:

- Boiler BioTec-C (covered with casing with thermal insulation) on wood pallet
- With inbuilt and pre-wired:
 - display control unit
 - flue gas sensor
 - boiler sensor
 - flue gas rpm modulating fan
 - STB safety thermostat
- Additional sensors in basic delivery:
 - accumulation tank sensor (2x)
 - DHW tank sensor
 - return flow sensor
- cleaning brush, two scrapers and holder for cleaning set, legs with the plastic slipper (x4)

1.4. ADDITIONAL EQUIPMENT

Additional equipment is not included in basic delivery. **Obligatory additional equipment must be** purchased separately. Other additional equipment **can be purchased optionally**.

OBLIGATORY ADDITIONAL EQUIPMENT:

- **accumulation tank** for heating system (CAS (min. volume 50 lit/kW or according to local regulation))

- **return flow protection:**

option A: 3-way mixing valve with actuator and return flow sensor (60°C) - **recommended**

option B: 3-way thermostatic valve (60°C) (like ESBE VTC 512, VTC 531, LTC 261, LTC 271)

Recommendations for the VTC valve, circulation pump and water accumulator CAS - according to the boiler output:

Heat output range (kW)	Connection VTC 512 (outer thread)	Connection VTC 531 (internal thread)	Circulation pump type		Volume of CAS accumulation tank for BioTec-C wood gasification boilers
			Grundfos	Wilo	
25	5/4"	6/4"	Alpha1 32-40	Yonos PICO 30/1-4	Minimum 50 litres / kW of boiler
31/35	5/4"	6/4"	Alpha1 32-60	Yonos PICO 30/1-6	
45	5/4"	6/4"	Alpha1 32-80	Yonos PICO 30/1-8	

Recommendations for the LTC units and the water accumulators CAS - according to the boiler output:

Heat output range (kW)	Connection LTC 261 (internal thread)	Connection LTC 271 (internal thread)	Volume of CAS accumulation tank for BioTec-C wood gasification boilers
25, 31, 35	5/4"	--	Minimum 50 litres / kW of boiler
45	--	6/4"	

For closed heating systems:

- Thermal safety valve
- Safety-airvent group (2,5 bar)
- Expansion vessel for closed heating systems (size according the volume of heating installation, including buffer tank volume)

For open heating systems:

- Open expansion vessel (size according the volume of heating installation, including buffer tank volume)

NOTE: this equipment is not in standard boiler delivery

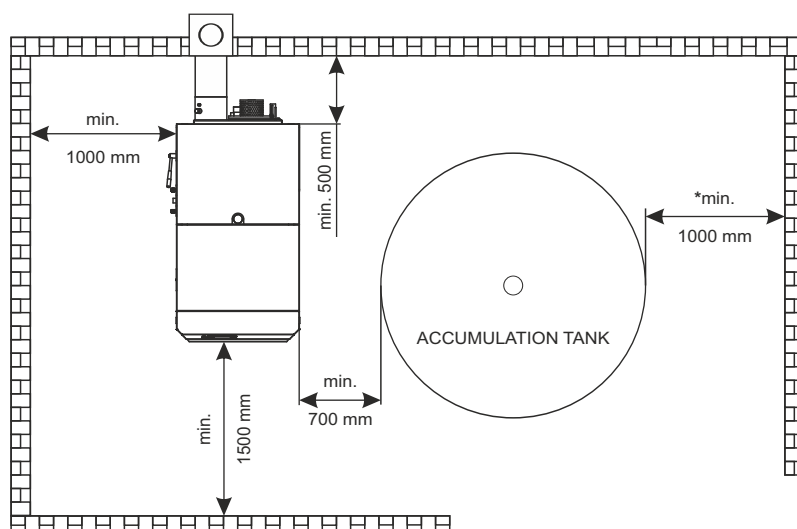
2.0. BOILER / ADDITIONAL EQUIPMENT POSITIONING AND ASSEMBLY

The positioning of the boiler has to be carried out the authorized person. We suggest the positioning on the solid concrete basis, which height is between 50-100 mm. The boiler room has to be absolutely protected from freezing and properly ventilated. The boiler has to be positioned in order to enable its connecting to the chimney (see point 3.) and heating installation as well as its service during the functioning process, cleaning and maintenance (Figure 1). The connection of the boiler to the central heating system is obligatory with the one or more **CAS water accumulation buffer tanks**, depending of the boiler's power. It is recommended to connect minimum **50 liters water accumulation to each 1 kW boiler power** (i.e. for the 45 kW boiler minimal water accumulation should be 2250 liters). The boiler should not be used without being connected to the water accumulation tank. It must be connected to the CAS water accumulator obligatory with **return flow protection** through an 3-way mixing valve with actuator and return flow sensor (60°C) or 3-way thermic valve (like ESBE VTC 531 (60°C), LTC141(60°C) or Laddomat 21 (63°C).

WARNING!

Flammable items must not be placed on the boiler and within the minimum distances shown in Figure 1.

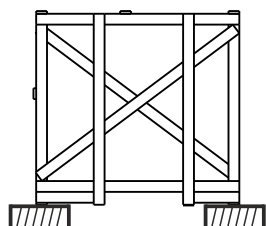
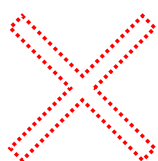
Figure 1. Minimum distance from the boiler room walls



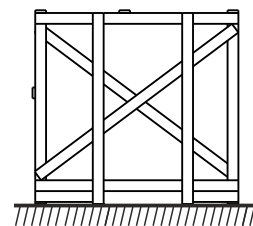
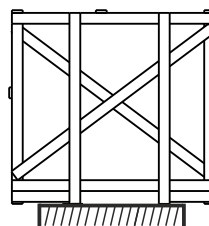
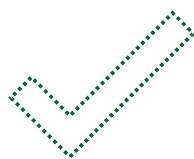
*valid for closest tank to the wall

2.1. INSTALLATION OF DELIVERED PARTS

FORBIDDEN!



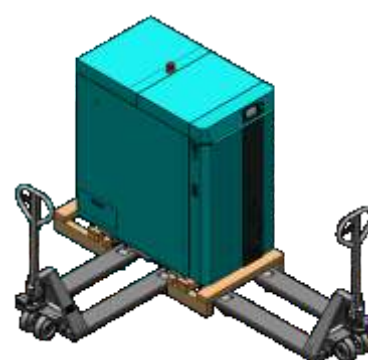
ALLOWED!



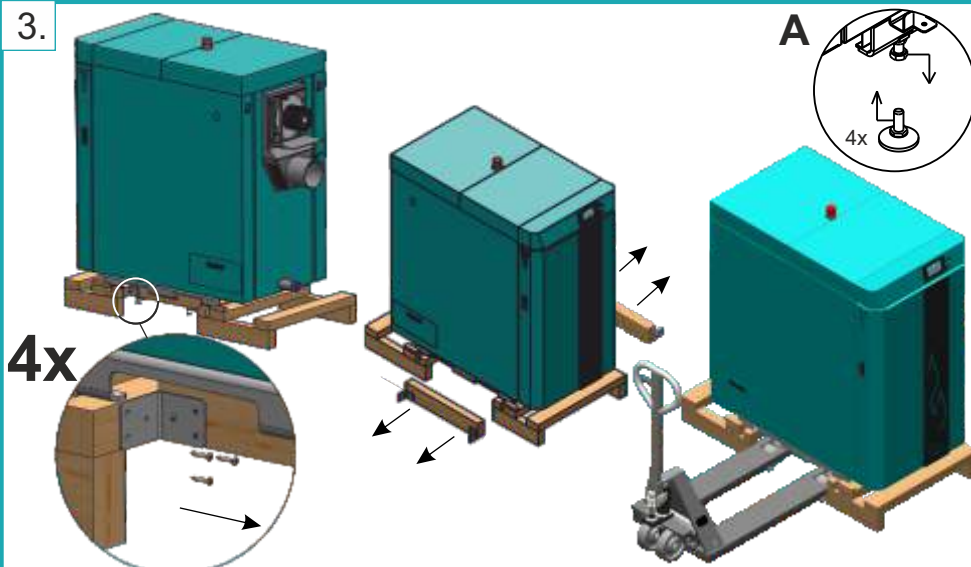
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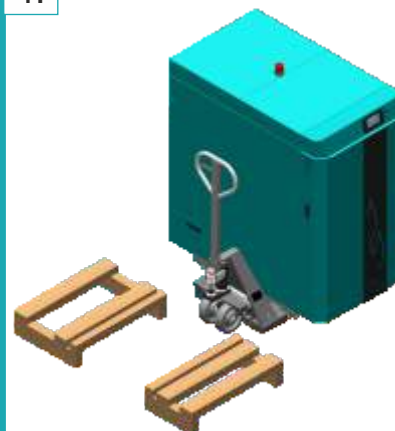
2.



3.



4.



1. The boiler is supplied on a wooden stand (pedestal) protected by a wooden box and PVC foil. The wood box and the PVC foil must be removed before/when placing the boiler to the position of installation.
2. After removing the wooden box and the PVC foil, leave the boiler on a wooden stand (pedestal) (possible manipulation of the boiler to the installation site with a manual forklift from the side or front). (25 kW – 1 fork, 31/35/45 – 2 forks)
3. Unscrew the screws that hold the bracket and the crossbar of the wooden stand (pedestal). Remove the wooden stand (pedestal) to place the hand forklift under the boiler on the side and separate the boiler and the wooden stand (pedestal). Slightly lift the boiler with a hand forklift so that it can be possible to remove the wooden stand (pedestal) (mandatory, the boiler 25 kW has to be supported (take care of the boiler) by the other person all the time from the start to the end of the boiler lifting (including the manipulation and moving wooden parts)). Remove the existing legs (screws) and put the legs (screws) with plastic foot (A) that came with the boiler in the plastic bag.
4. Place the boiler to the position of installation and slightly lower it to the floor. Remove the hand forklift.
5. Level the boiler using the 4 legs (screws) with plastic foot that you have fitted to the boiler stand.

In upper chamber of the boiler are delivered (figure 2.b):

1. Holder for cleaning set, 2 cleaning scrapers and cleaning brush
2. Temperature sensors (2x accumulation tank, 1x DHW, 1x return flow)
3. Ashtray
4. Legs with the plastic slipper (x4)

Holder for cleaning set can be positioned on lateral side of the boiler (A) or to the wall (B), near the boiler and easy accessible. On this holder should be placed cleaning set (2 scrapers and brush). Sensors should be connected according heating installation and connecting scheme.

Figure 2.a Base protection with stone wool

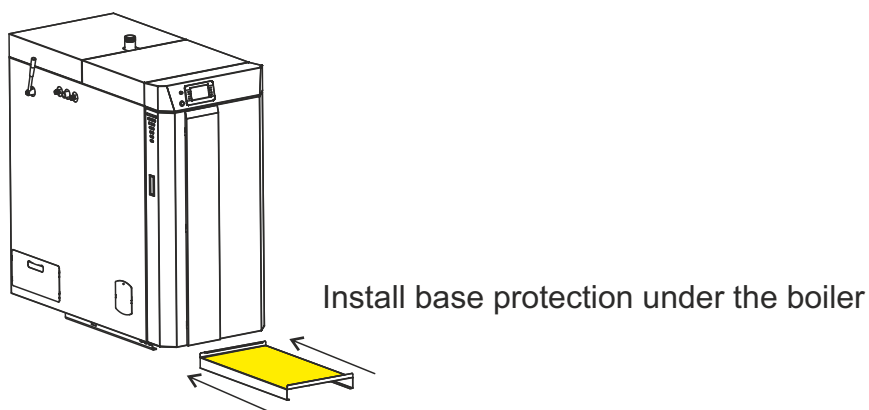
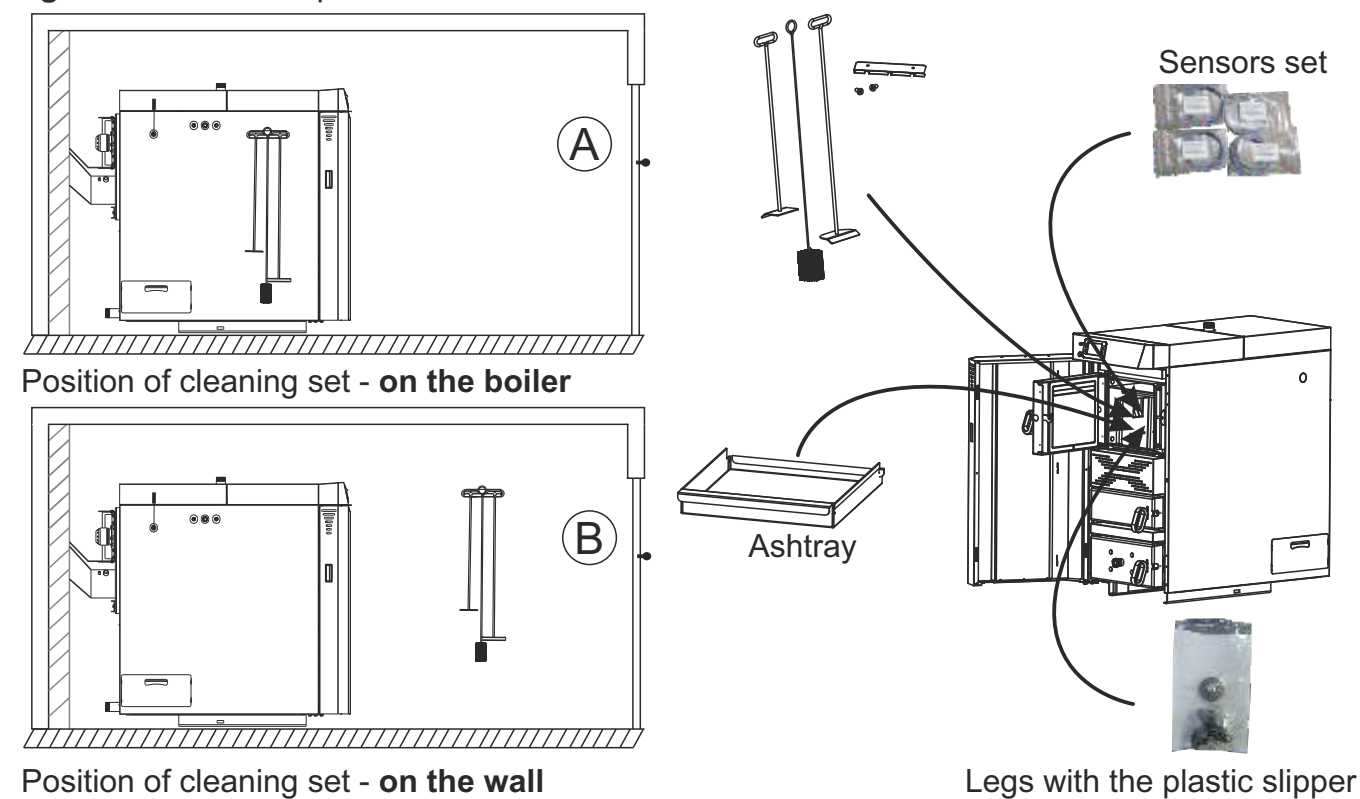


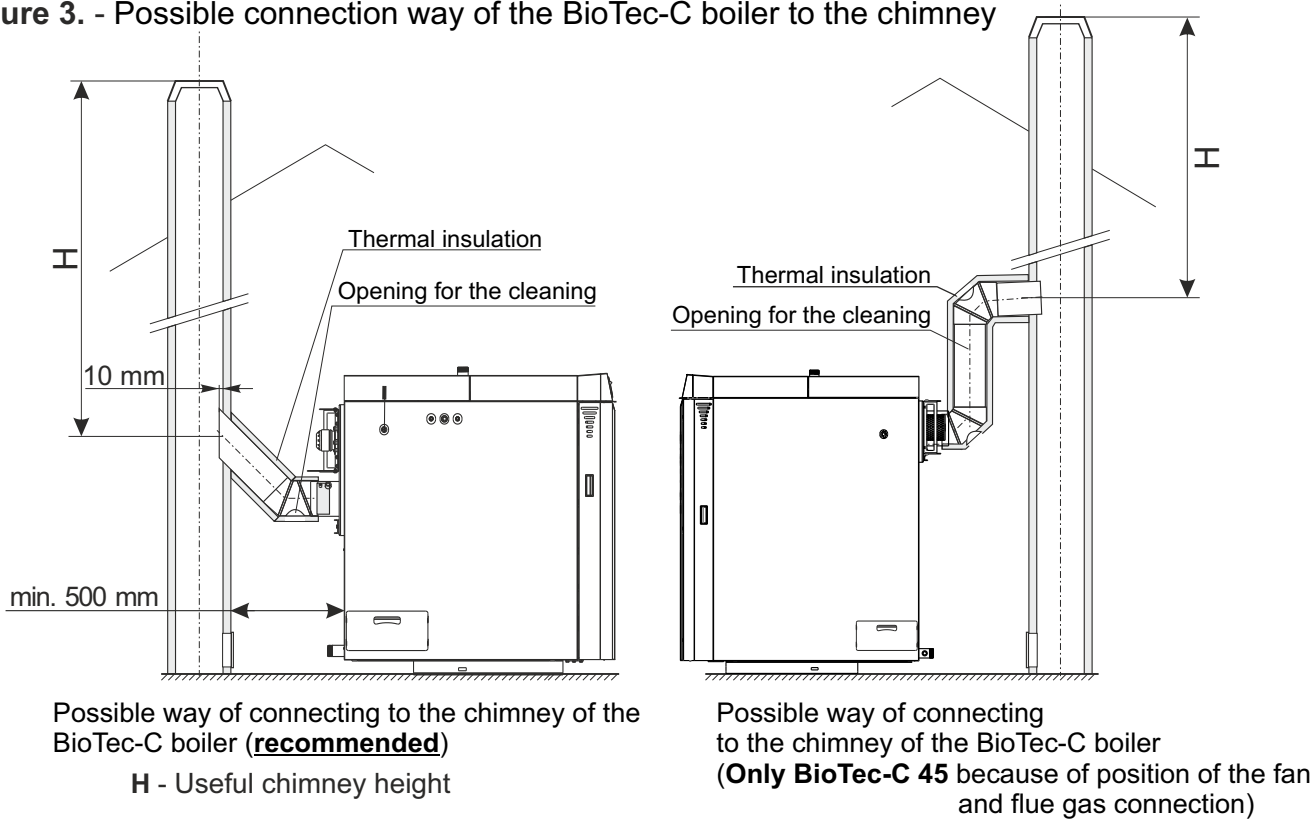
Figure 2.b Delivered parts



3.0. CONNECTION TO THE CHIMNEY

Properly dimensioned and built chimney is the precondition for a safe and reliable operation of the boiler and economic heating. The chimney has to be good insulated, gas-proof and smooth. On the lower part of the chimney, a cleaning door has to be built in. Brick layed chimney has to have 3 layers with an stone wool thermal insulation in the middle. The thickness of the insulation should be 30 mm, if the chimney is situated inside the building, i.e. 50 mm if the chimney is situated outside the building. **Inside chimney diameter dimensions depend on its height and on the boiler thermal output (Figure 5.).** The temperature of the flue gases on chimney exit point should be at least 30°C higher then the temperature of their condensation point. The choice and the construction of the chimney should be performed by an authorized person. Minimal distance between boiler and the chimney is 500 mm. The flue gas tube has to have an inclination of 30-45° to the chimney (Figure 3.). In order to enable entering of the condensate from the chimney into the boiler, 10 mm of the flue gas tube length has to be inserted deeper inside the chimney. **It is OBLIGATORY to insulate the chimney connection tube with a mineral stone wool of 30-50 mm thickness.** All installation works must be done in accordance with valid national and European standards.

Figure 3. - Possible connection way of the BioTec-C boiler to the chimney



When connecting the boiler to the chimney, flue gas tubes and elbows must not pass behind the fan, because in this case the cleaning and maintenance will not be possible. An example of incorrect position of flue gas tubes and elbows in relation to the fan is presented at the Figure 4.

Figure 4. Incorrect connecting the boiler to the chimney - not possible cleaning of the fan

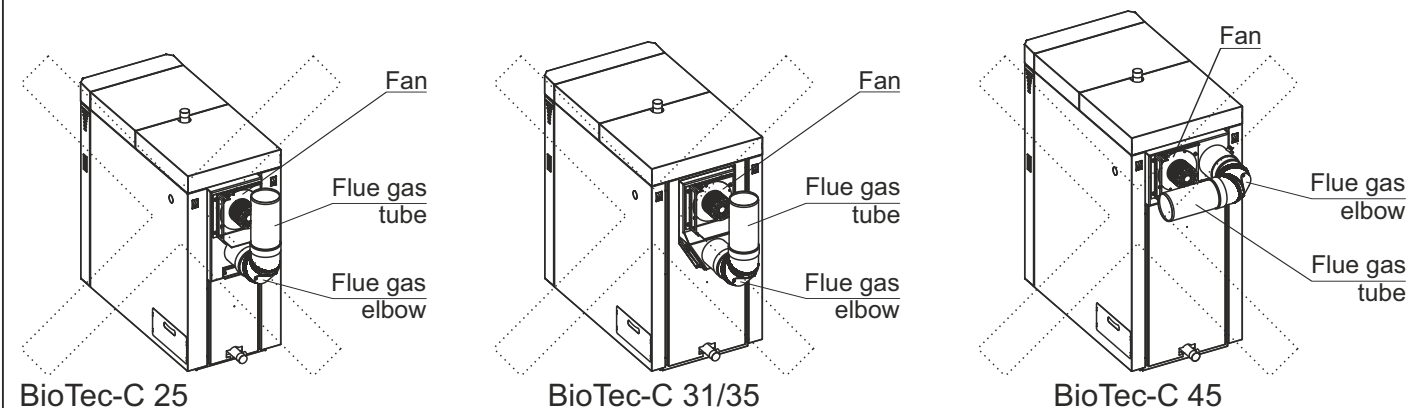
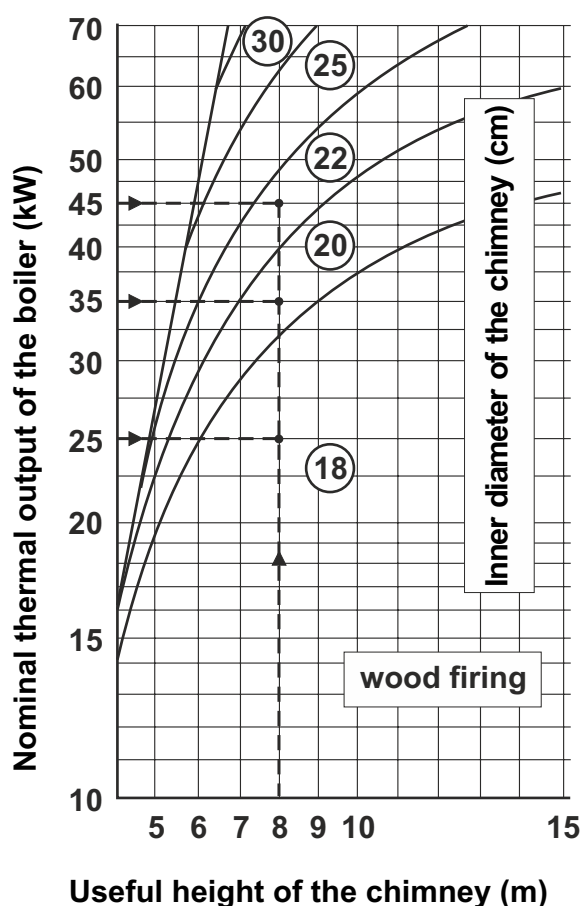


Figure 5. - Dimensioning of the chimney for BioTec-C boilers



An example of the chimney selection:

- **boiler output: 25 kW**
- Fuel: wood logs
- required useful chimney height: $H=8$ m
- required inner chimney diameter: 18 cm

- **boiler output: 31/35 kW**
- Fuel: wood logs
- required useful chimney height: $H=8$ m
- required inner chimney diameter: 20 cm

- **boiler output: 45 kW**
- Fuel: wood logs
- required useful chimney height: $H=8$ m
- required inner chimney diameter: 22 cm

Useful chimney height - from flue gas tube connection to the top of chimney
Inner chimney diameter - interior chimney diameter.

4.0. FRESH AIR OPENING

Boiler room **must be equipped with an opening** for supply of fresh air which is dimensioned in accordance with boiler thermal output (minimum opening area according to below shown equation). Such opening must be protected with a net or grate. All installation works have to be performed in accordance with valid national and European standards. Boiler must not operate in flammable and explosive environment.

$$A = 6,02 \times Q$$

A - opening area in cm²
Q - boiler output in kW

5.0. BOILER THERMAL PROTECTION

According to European EN standards, boiler thermal protection **must be** installed in **closed** heating system. Boiler is factory prepared for installation of thermal protection. Heat exchanger is factory built into boiler, and thermal safety valve ⑦ should be installed according to Scheme 1. In case of any damage of boiler installed in the closed heating system due to its overheating, and boiler or system are not equipped with any thermal protection at all, or do not have properly installed thermal protection, warranty is not valid.

IMPORTANT:

Thermal protection **must be mandatory** connected to the water supply installation of the premises supplied from the public water supply line and not from hydrophor. Namely, in case of failure of power supply, boiler could be overheated, and then hydrophor is not able to ensure required water supply.

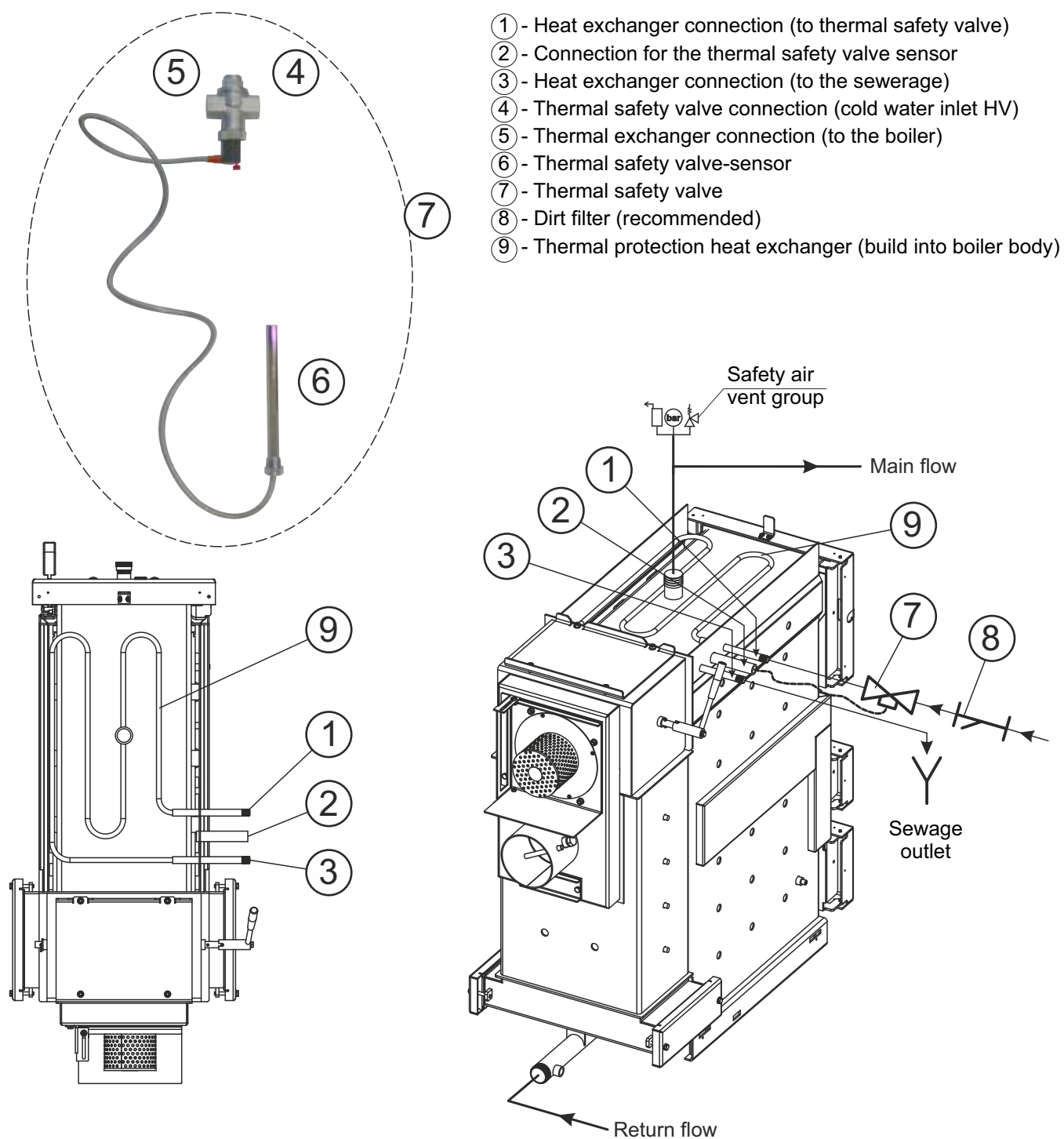
THERMAL PROTECTION:

Thermal protection for boiler BioTec-C consists of a **heat exchanger** which is factory built in boiler, and **thermal safety valve** ⑦ (such as CALEFFI 543 513) (see Scheme 1).

Part ⑦ is installed into prepared connector (male thread 3/4") in the upper part of left lateral side of the boiler casing.

INSTALLATION (see Scheme 1.)

- screw the thermal safety valve sensor ⑥ (outer thread 1/2") into the sleeve joint ② (inner thread 1/2").
- fix the connection ④ (inner thread 3/4") of the thermal safety valve to the sanitary cold water inlet and the connection ⑤ (inner thread 3/4") to the connection point of the heat exchanger ① (outer thread 1/2") - the arrow shows the direction.
- fix the tube connected to the sewage outlet at the connecting point ③ (outer thread 1/2").

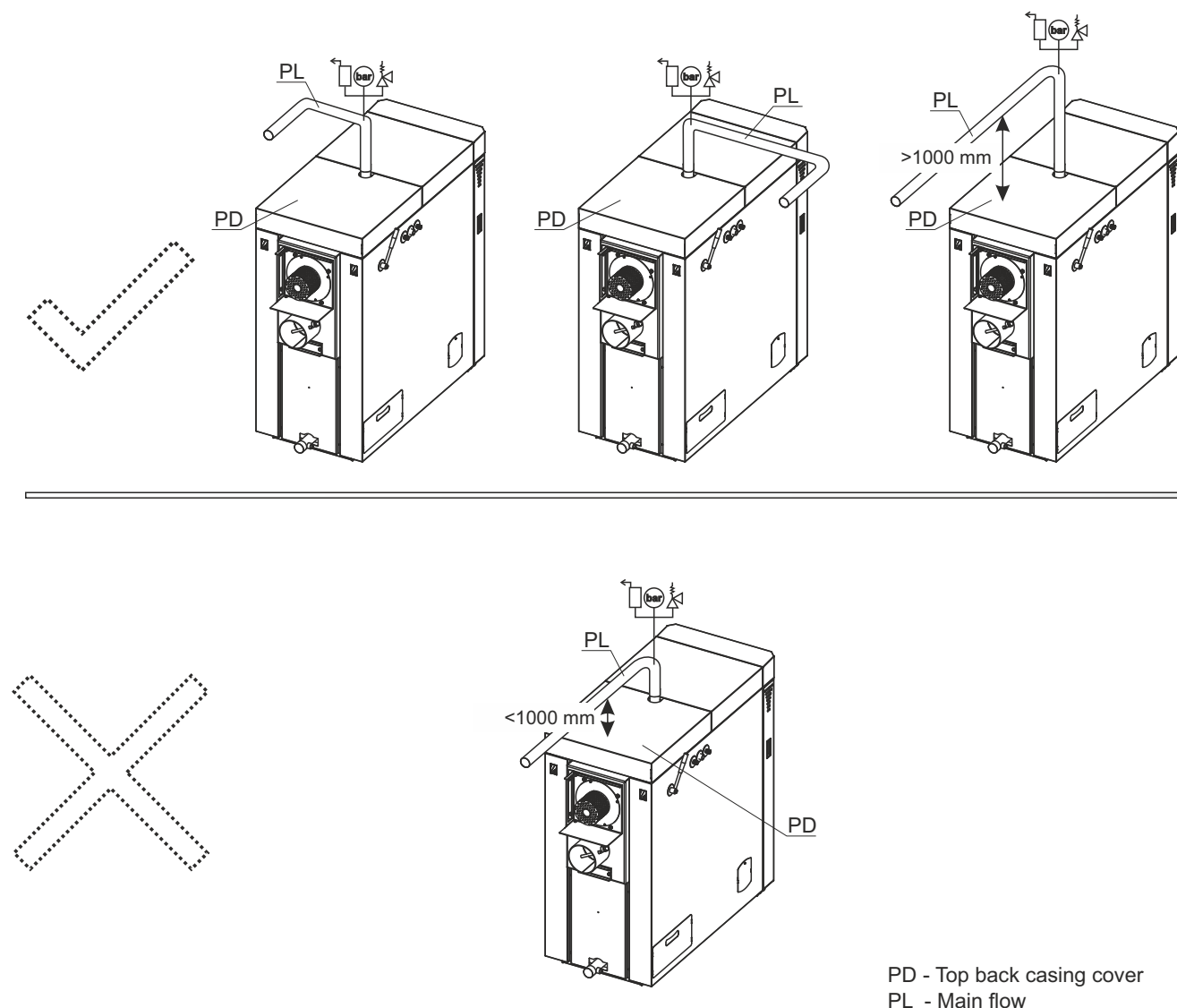
Scheme 1. - Thermal protection in an closed heating system

NOTE: thermal protection heat exchanger is located inside boiler body

6.0. CONNECTION TO THE CENTRAL HEATING SYSTEM

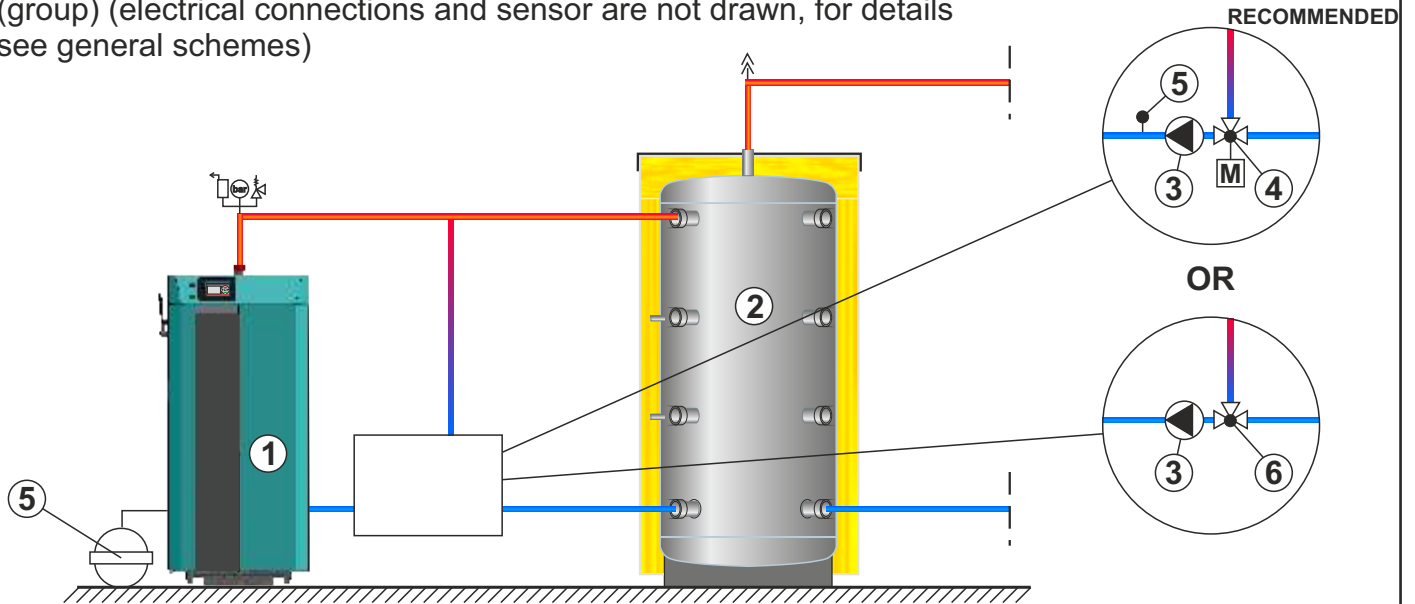
All installation works must be done in accordance with valid national and European standards. Boiler BioTec-C can be built to closed and open central heating system. In both cases boiler must be fired with wood logs. Installation has to be done in accordance with technical standards, by a professional who will be responsible for proper boiler operation. The main flow tube from the boiler to the central heating system must not pass above the top back casing cover (PD), otherwise the removal of the turbulators and cleaning of flue gas tubes is impossible (see Figure 6). Before connecting boiler to central heating system, the system has to be flushed to remove impurities remaining after system installation. It prevents boiler overheating, noise within the system, disturbances at a pump and mixing valve. Boiler should always be connected to central heating system by connectors, never by welding. Figure 1. shows minimum distances required for boiler cleaning and maintenance.

Figure 6. Examples of main flow constructions



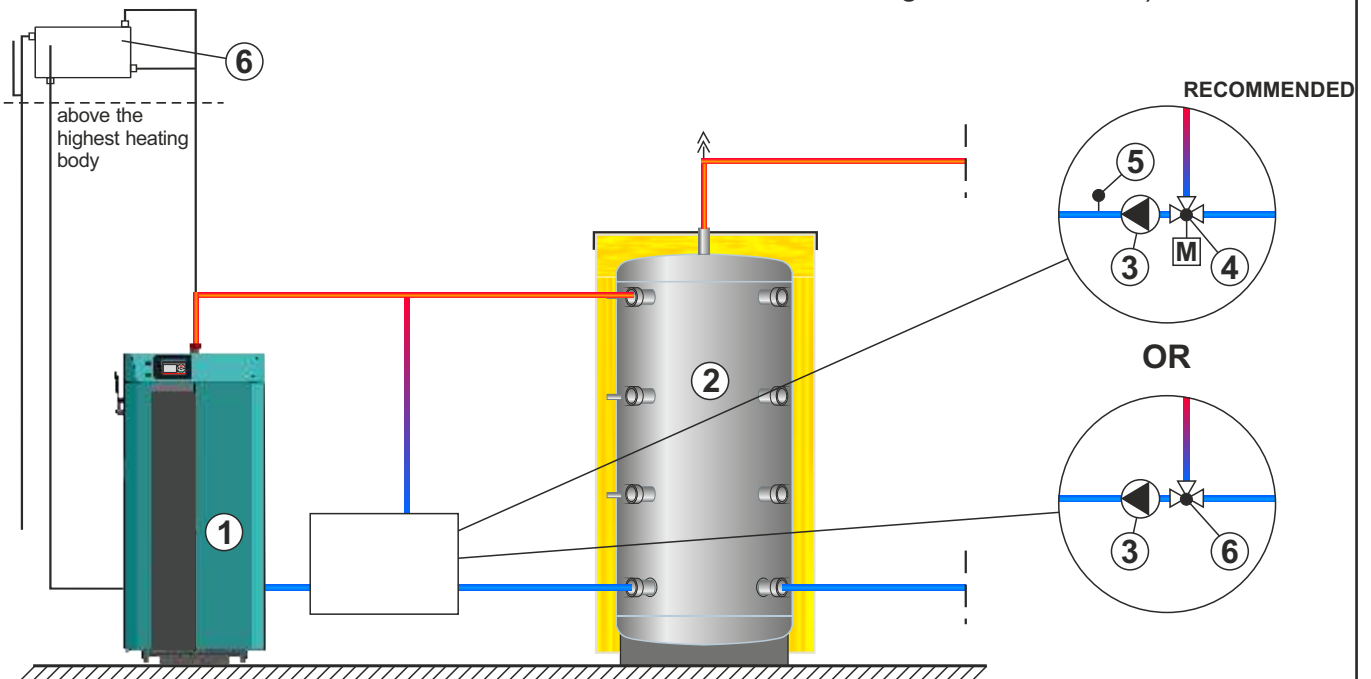
Scheme 2a.

Basic scheme for boiler installation on closed central heating system with return flow protection with 3-way mixing valve with actuator and return flow sensor (recommended) or 3-way thermic valve (group) (electrical connections and sensor are not drawn, for details see general schemes)



Scheme 2b.

Basic scheme for boiler installation on open central heating system with return flow protection with 3-way mixing valve and return flow sensor or 3-way thermic valve (electrical connections and sensors are not drawn, for details see general schemes)



① - Boiler BioTec-C

② - Accumulation tank CAS

③ - Boiler pump

④ - 3-way mixing valve with actuator (60°C)

⑤ - return flow sensor

⑥ - 3-way thermic valve (60°C)

⑤ - Expansion vessel for closed heating systems (min. 10% of the total volume of installation)

⑥ - Open expansion vessel for open heating systems (OPC) (min. 7% of total volume of installation)

6.1. CONNECTION TO THE CLOSED CENTRAL HEATING SYSTEM

In closed heating system (as in example shown in Scheme 2a) it is **obligatory** to build in certified safety valve with opening pressure of 2,5 bar, minimum seat diameter of 15 mm, minimum inlet connection of 1/2", minimum exit connection of 3/4" and a membrane expansion vessel. Safety valve and expansion vessel must be built in accordance with professional rules and any valve must not be located between safety valve and expansion vessel and boiler. The closed heating system must have the installed expansion vessel of larger volume (vessel volume must be min. 10% of the heating installation volume). In all boiler types the heating pump **must be** connected to boiler control unit so that the heating pump switching on and off would depend on water temperature in the boiler. The functioning of boiler regulation is shown in Technical manual "Digital boiler regulation BioTec-C".

The boiler has to be connected with one or more CAS water accumulation tanks, depending of its power. It is recommended to connect 50 liters water accumulation to each 1 kW boiler power (i.e. for the 45 kW boiler minimal water accumulation should be 2250 liters). The functioning of boiler control unit is shown in Technical manual "Digital boiler control unit BioTec-C". The boiler should not be used without being connected to the water accumulation tank. It must be connected to the CAS water accumulator obligatory through an 3-way mixing valve with actuator and return flow sensor or 3-way thermic valve like Esbe VTC 512 (60°C), VTC 531 (60°C), load unit LTC 261/271 (60°C) or load unit Laddomat 21 (63°C).

6.2. CONNECTION TO THE OPEN CENTRAL HEATING SYSTEM

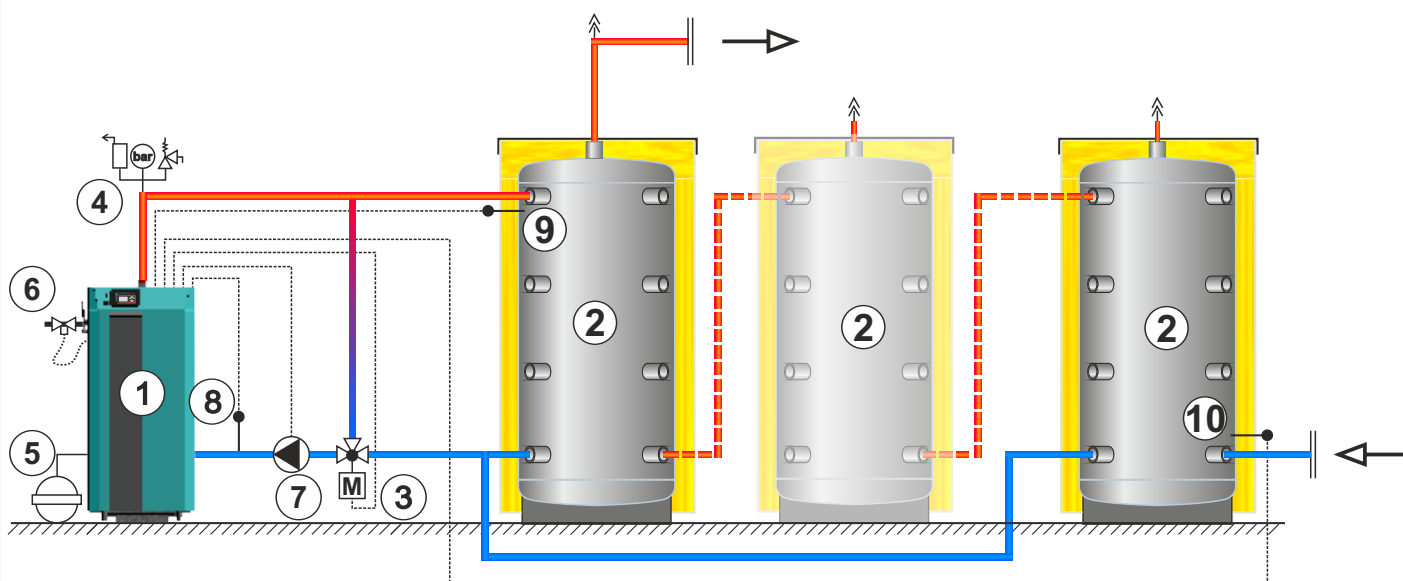
If the boiler is aimed to be integrated into an open central heating system, one of possible connection way to connect the boiler to the system is shown on Scheme 2b. In case of BioTec-C boilers, the boiler pump (P1) **obligatory has to be** connected to the boiler control unit, in order to make turning on and off of the pump depending on the temperature of the water in the boiler, to avoid boiler condensation. The functioning of boiler control unit is shown in Technical manual "Digital boiler control unit BioTec-C".

Connection to an open central heating system requires the implementation of an open expansion vessel (OPC) above the level of the highest heating body (radiator). If the expansion vessel is situated inside the non heated room, it has to be insulated. The volume of the open expansion vessel is min. 7% of the volume of entire heating installation. The boiler **has** to be connected with one or more CAS water accumulation tanks, depending on its nominal power. It is recommended to connect minimum 50 liters water accumulation to each 1 kW boiler nominal power (i.e. for the 45 kW boiler minimal water accumulation should be 2250 liters) and always check the local regulation about the needed minimum volume. The boiler should not be used without being connected to the water accumulation tank with needed min. volume. It must be connected to the CAS water accumulator obligatory through an 3-way mixing valve with actuator and return flow sensor or 3-way thermic valve like Esbe VTC 512 (60°C), VTC 531 (60°C), load unit LTC 261/271 (60°C), load unit Laddomat 21 (63°C).

6.3. GENERAL CONNECTION SCHEMES

Scheme 3. - General scheme of closed central heating system with 2 or more accumulation tanks

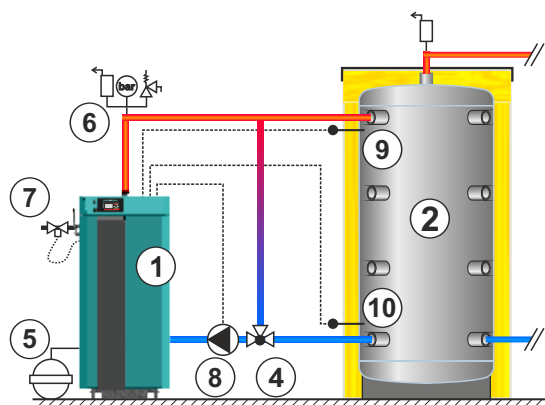
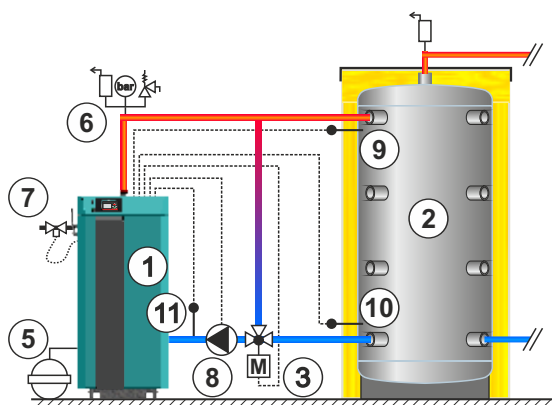
- | | |
|---|---|
| 1 - Boiler BioTec-C | 5 - Expansion vessel for closed systems
(min. 10% of the total volume of installation) |
| 2 - CAS accumulation tank | 6 - Thermal safety valve |
| 3 - Return flow protection:
3-way mixing valve with actuator and return flow sensor or
3-way thermic valve (60°C), VTC 531, LTC 261/271,
Laddomat 21 | 7 - Pump P1 (boiler - accumulation tank) |
| 4 - Safety airvent unit | 8 - Return flow sensor |
| | 9 - Accumulation tank sensor - upper |
| | 10 - Accumulation tank sensor - lower |



**All general schemes hereafter will be shown with one accumulation tank, but they can be performed with two or more accumulation tanks (buffer tanks).
Pay attention to electrical and sensors connections on general schemes!**

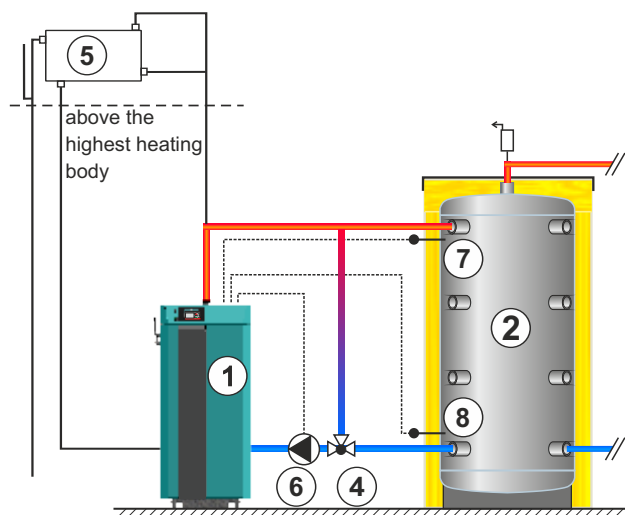
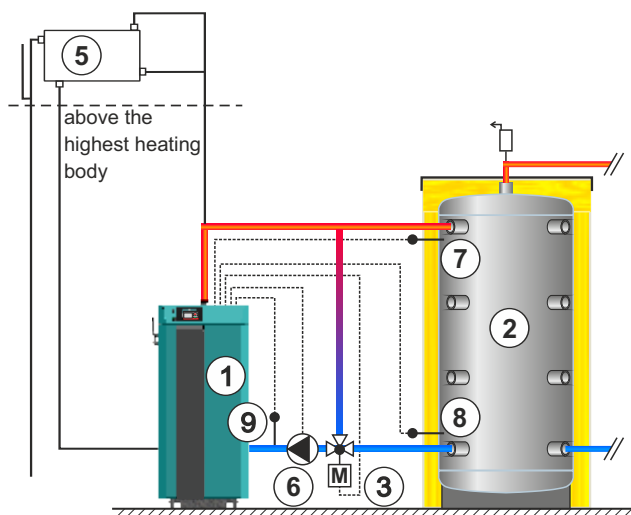
Scheme 4.1. - General scheme of closed central heating system with 1 accumulation tank

- | | |
|--|---------------------------------------|
| 1 - Boiler BioTec-C | 6 - Safety airvent unit |
| 2 - CAS accumulation tank | 7 - Thermal safety valve |
| 3 - Return flow protection 3-way mixing valve with actuator (60°C) | 8 - Pump P1 (boiler pump) |
| 4 - Return flow protection 3-way thermic valve (60°C)
(VTC 531, LTC 261/271, Laddomat 21) | 9 - Accumulation tank sensor (upper) |
| 5 - Expansion vessel for closed systems
(min. 10% of the total volume of installation) | 10 - Accumulation tank sensor (lower) |
| | 11 - Return flow sensor |



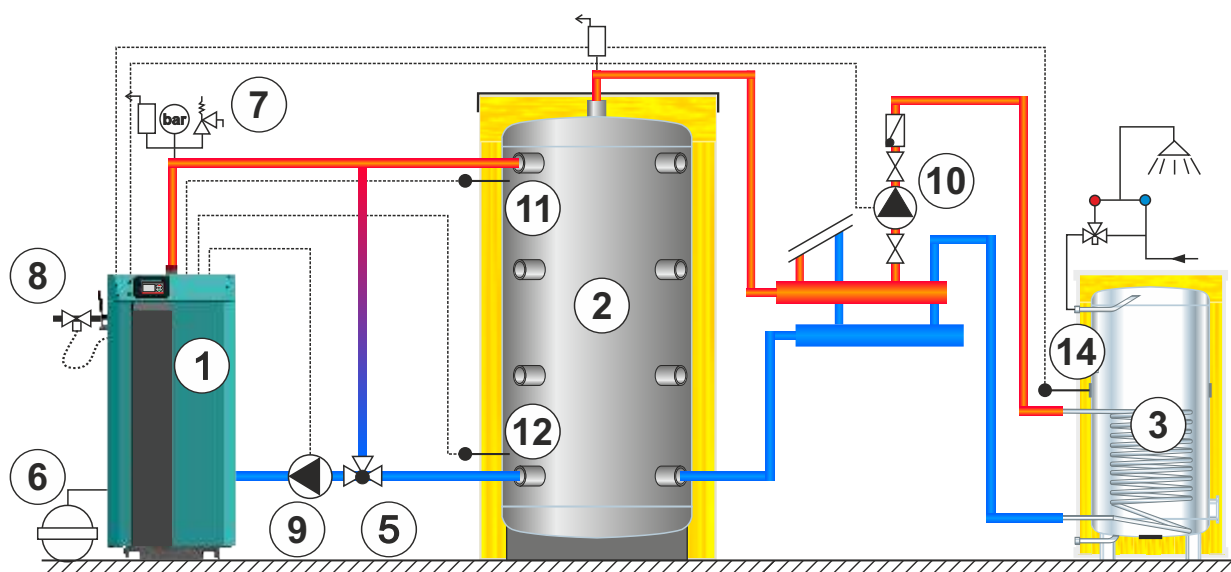
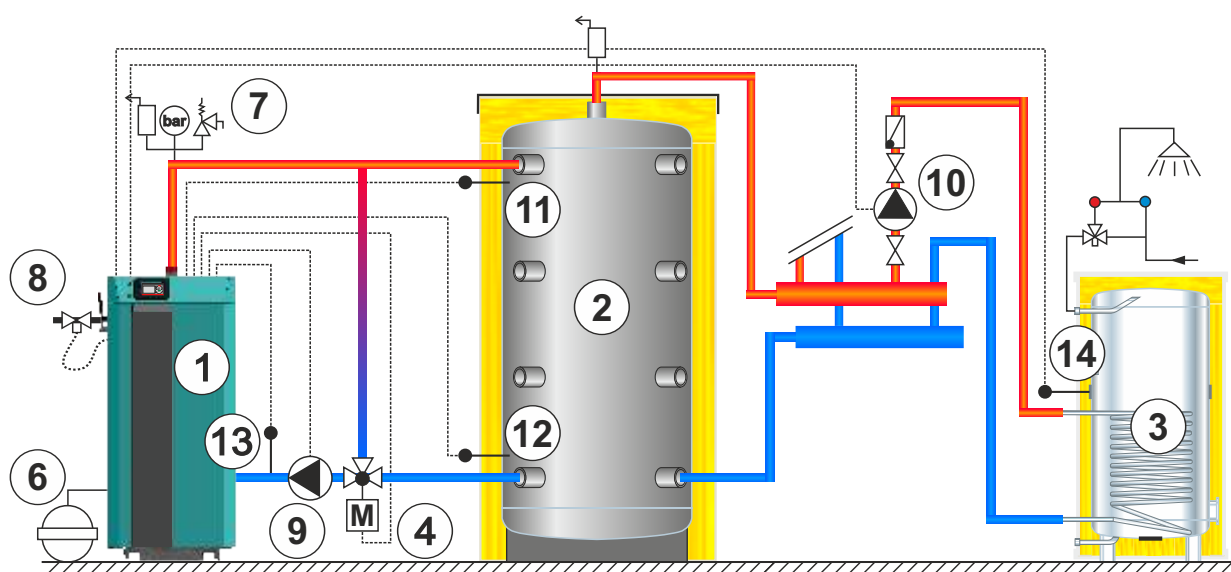
Scheme 4.2. - General scheme of open central heating system with 1 accumulation tank

- | | |
|--|--------------------------------------|
| 1 - Boiler BioTec-C | 6 - Pump P1 (boiler pump) |
| 2 - CAS accumulation tank | 7 - Accumulation tank sensor (upper) |
| 3 - Return flow protection 3-way mixing valve with actuator (60°C) | 8 - Accumulation tank sensor (lower) |
| 4 - Return flow protection 3-way thermic valve (60°C)
(VTC 531, LTC 261/271, Laddomat 21) | 9 - Return flow sensor |
| 5 - Expansion vessel for open systems
(min. 7% of the total volume of installation) | |



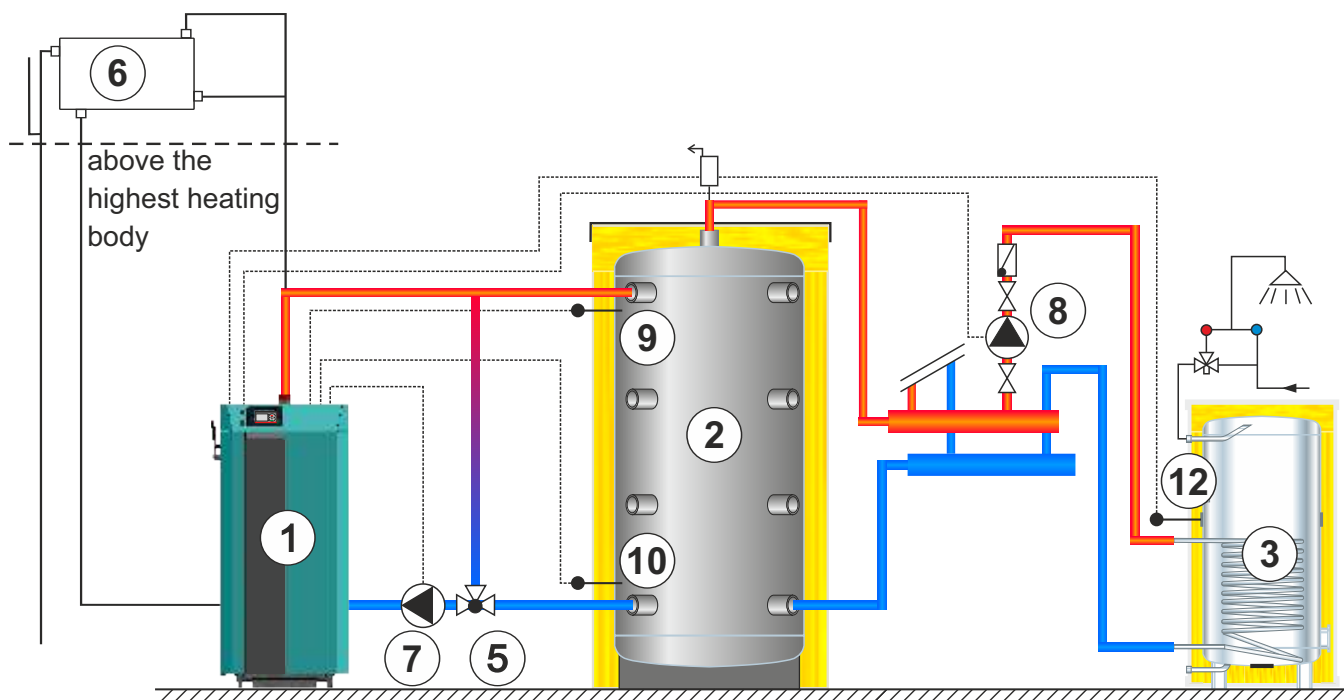
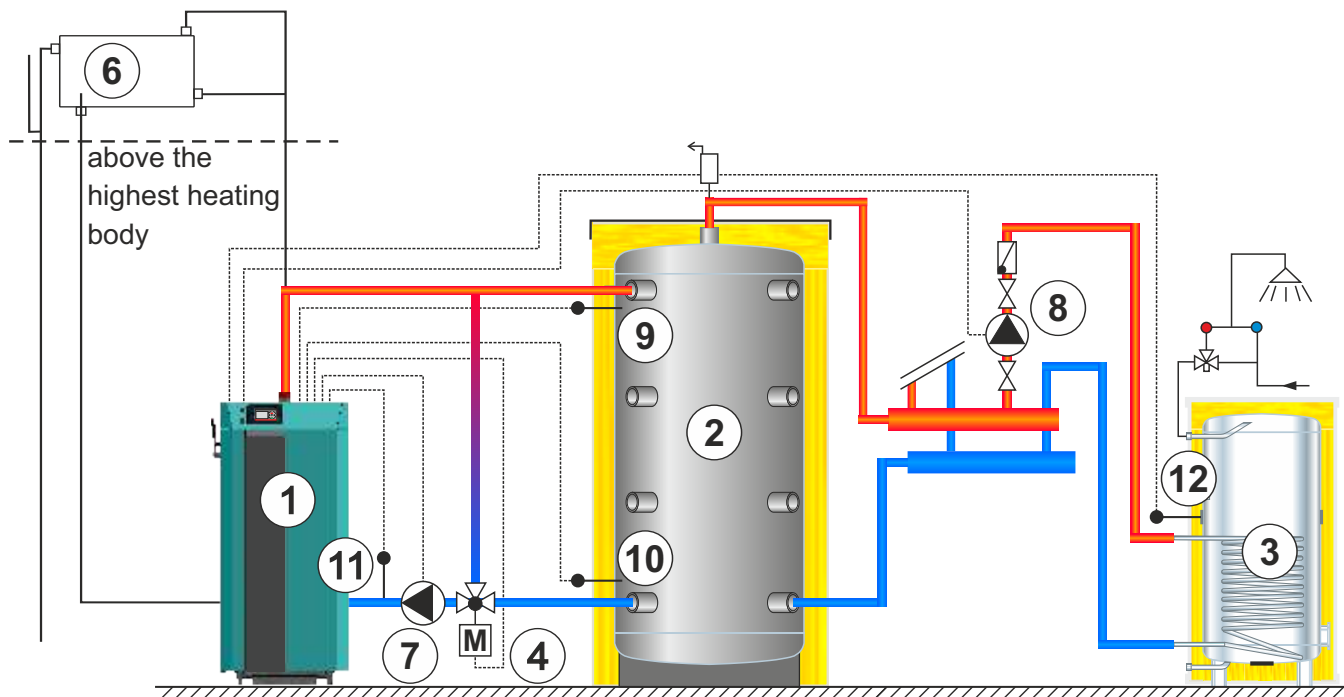
Scheme 4.3. - General scheme of closed central heating system with 1 accumulation tank and DHW tank

- | | |
|--|---------------------------------------|
| 1 - Boiler BioTec-C | 7 - Safety airvent unit |
| 2 - CAS accumulation tank | 8 - Thermal safety valve |
| 3 - DHW tank | 9 - Pump P1 (boiler pump) |
| 4 - Return flow protection 3-way mixing valve with actuator (60°C) | 10 - Pump P2 (DHW pump) |
| 5 - Return flow protection 3-way thermic valve (60°C)
(VTC 531, LTC 261/271, Laddomat 21) | 11 - Accumulation tank sensor (upper) |
| 6 - Expansion vessel for closed systems
(min. 10% of the total volume of installation) | 12 - Accumulation tank sensor (lower) |
| | 13 - Return flow sensor |
| | 14 - DHW tank sensor |



Scheme 4.4. - General scheme of open central heating system with 1 accumulation tank and DHW tank

- | | |
|--|---------------------------------------|
| 1 - Boiler BioTec-C | 7 - Pump P1 (boiler pump) |
| 2 - CAS accumulation tank | 8 - Pump P2 (DHW pump) |
| 3 - DHW tank | 9 - Accumulation tank sensor (upper) |
| 4 - Return flow protection 3-way mixing valve with actuator (60°C) | 10 - Accumulation tank sensor (lower) |
| 5 - Return flow protection 3-way thermic valve (60°C)
(VTC 531, LTC 261/271, Laddomat 21) | 11 - Return flow sensor |
| 6 - Expansion vessel for open systems
(min. 7% of the total volume of installation) | 12 - DHW tank sensor |

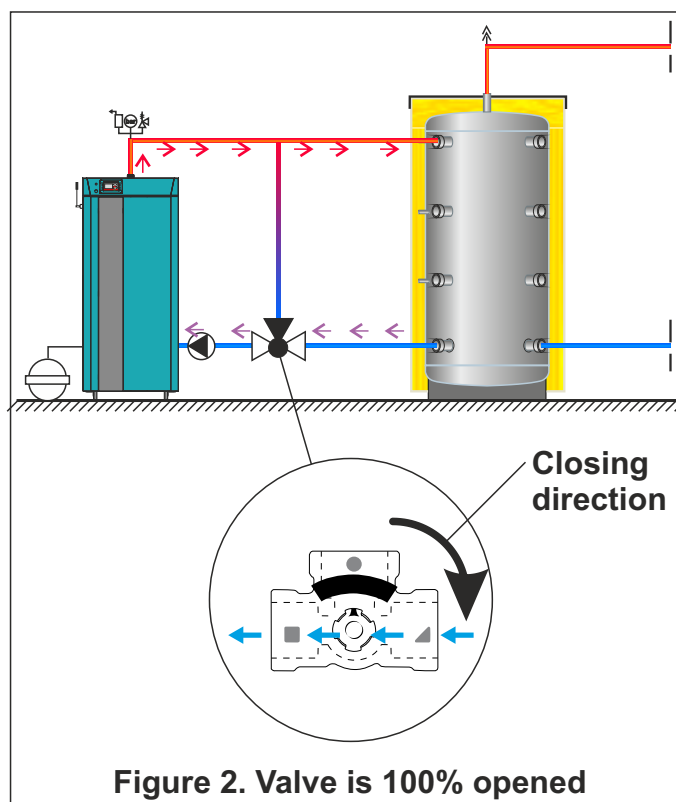
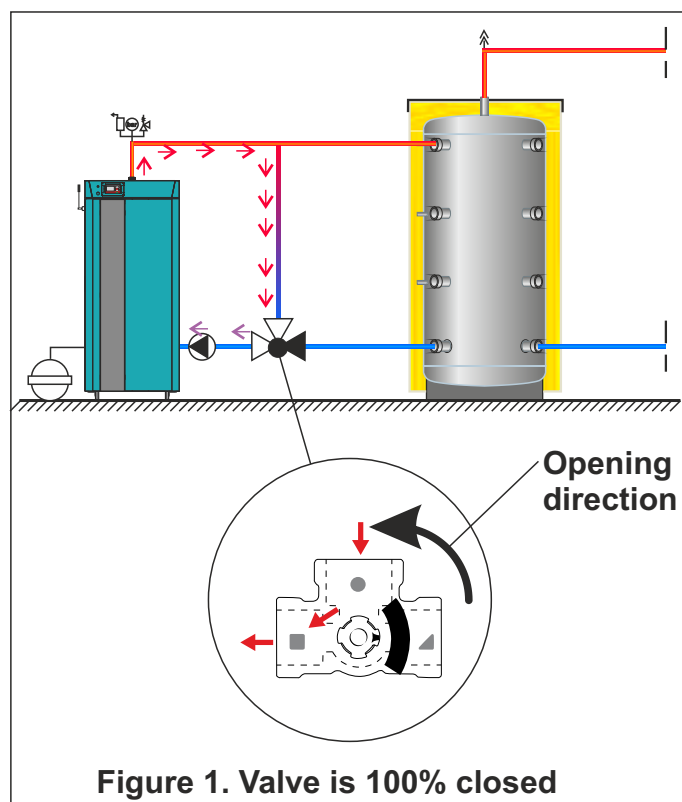


6.4. PROTECTION VALVE (if is selected in configuration menu)

If "PROTECTION VALVE" is selected in the menu "Configuration", with manual test is necessary to check it's correct installation and functionality

Protection valve must be installed according to the next steps:

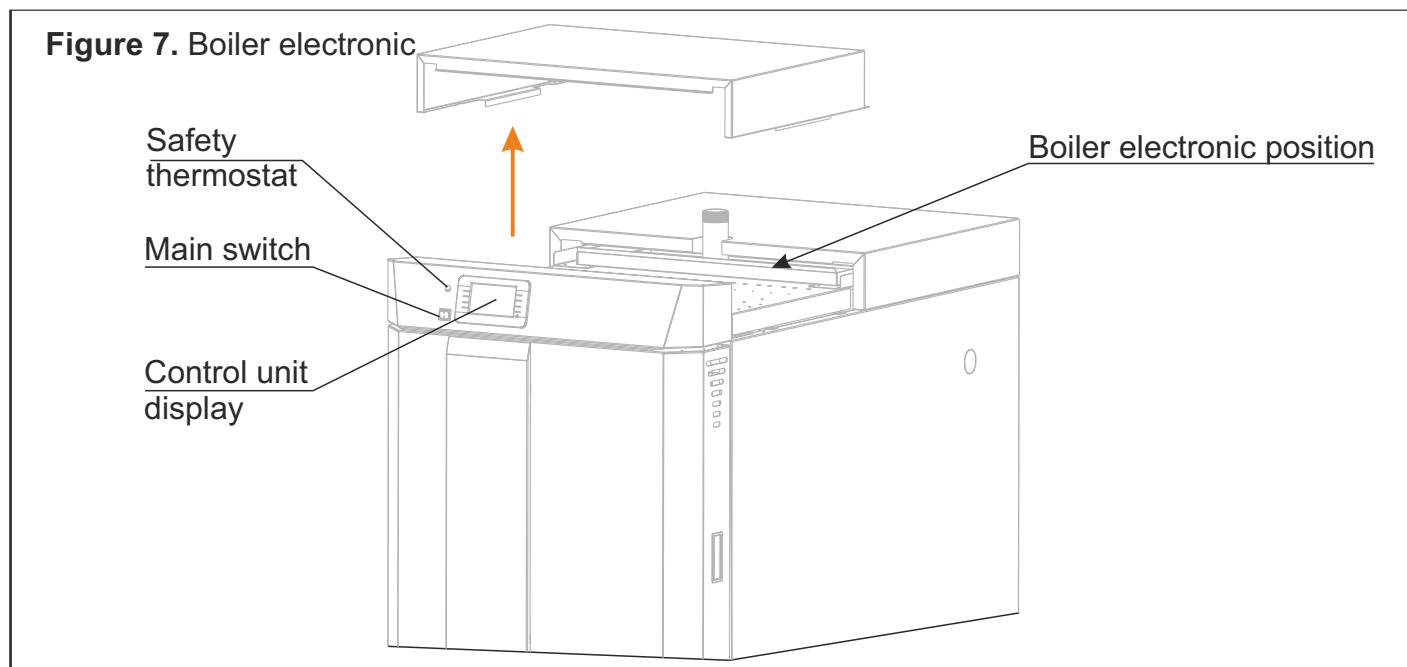
- when "Valve closing" option in manual test menu is started, actuator must close the valve until it stops. When it stops, valve must close entry from accumulation tank (Figure 1.)
- when "Valve open" option in manual test is started, actuator must open the valve unit it stops. When it stops, valve must close entry from bypass (Figure 2.)
- depending on the used valve actuator type is necessary to enter valve actuator opening time in the installation menu.



7.0. BOILER REGULATION

7.1. BOILER CONTROL

The boiler is controlled with electronic control unit, built in the upper part of the boiler, below upper casing. Control unit controls boiler functioning to the accumulation tank and DHW tank. On the front boiler panel are main switch, safety thermostat, control unit and LEDs.



7.2. THERMAL PROTECTION OF THE BOILER (obligatory in closed heating system)

If the boiler is installed in the closed central heating system, a thermal valve must be installed to the prepared connections on the boiler. Thermal valve must be connected to the city water supply and, if this is not possible, the boiler has to be built in the open heating system.

If, even with inbuilt control elements, boiler temperature reaches the temperature of 95°C, the thermal safety valve open and release water from city water supply through the thermal valve into the boiler heat exchanger and to cool the boiler down (see point 5.0.).

7.3. SAFETY PROTECTION IN CASE OF EXCEED TEMPERATURE

The boiler is equipped with safety thermostat that protects the boiler from overheating. For more information about the safety thermostat see Technical manual "Digital boiler control unit BioTec-C".

8.0. ELECTRIC CONNECTION

All electrical works must be performed by a certified professional in accordance with valid national and European standards.

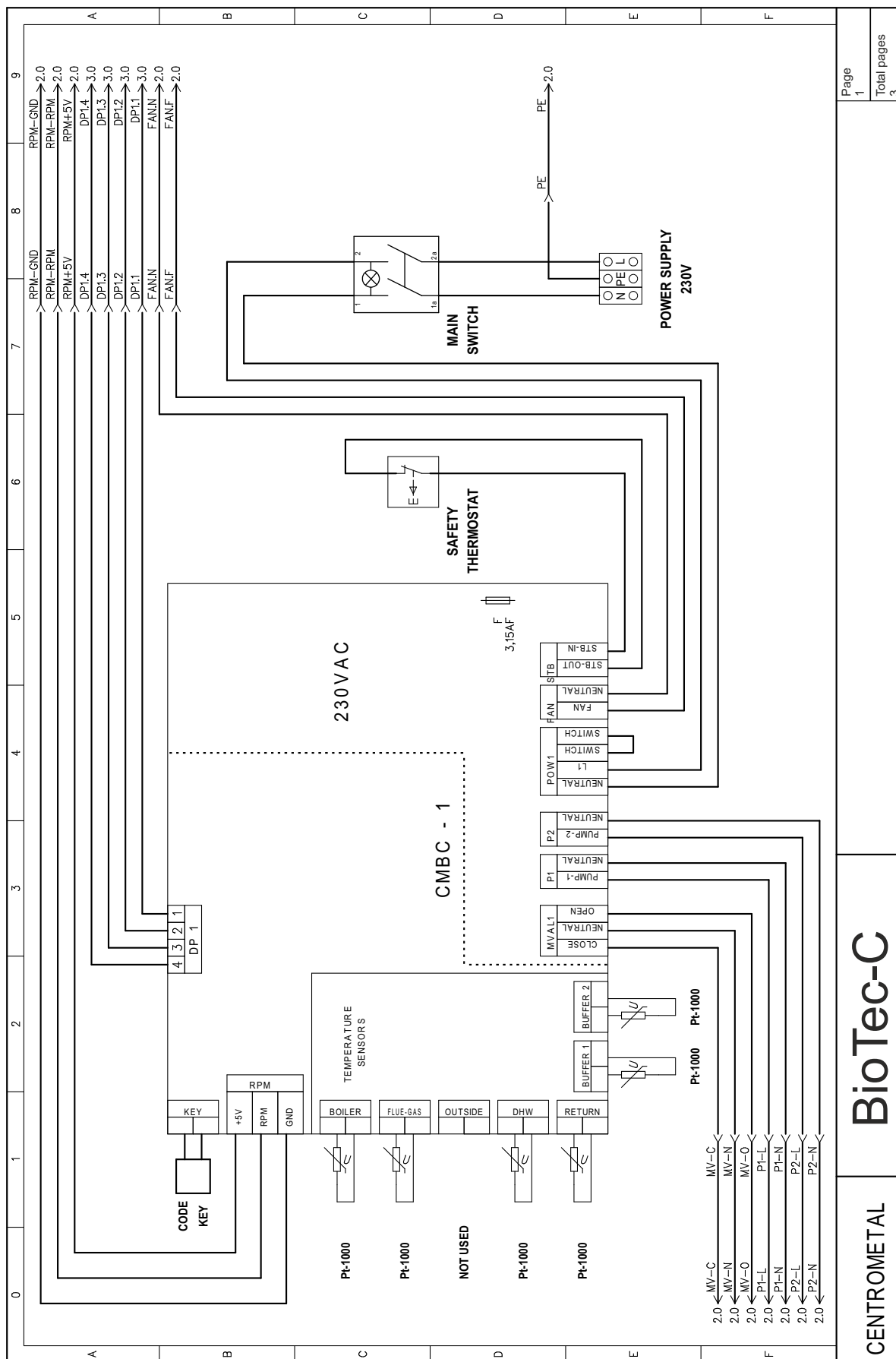
A device for switching of all power supply poles must be installed in electrical installation in accordance with the national regulations on electrical installations.

Detailed description of connecting the sensors and operation of digital regulation is displayed in the Technical manual "Digital boiler control unit BioTec-C".



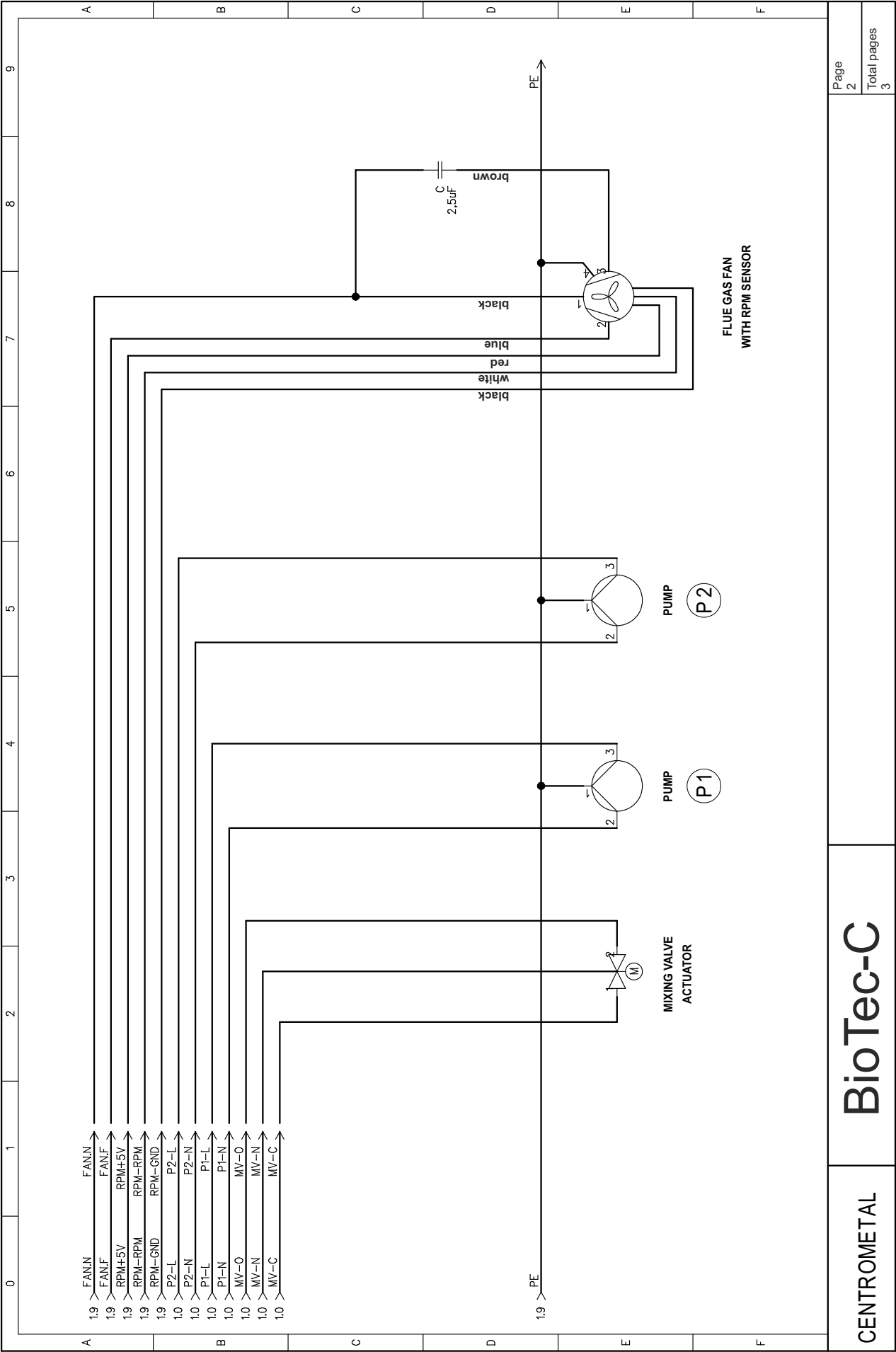
CAUTION:

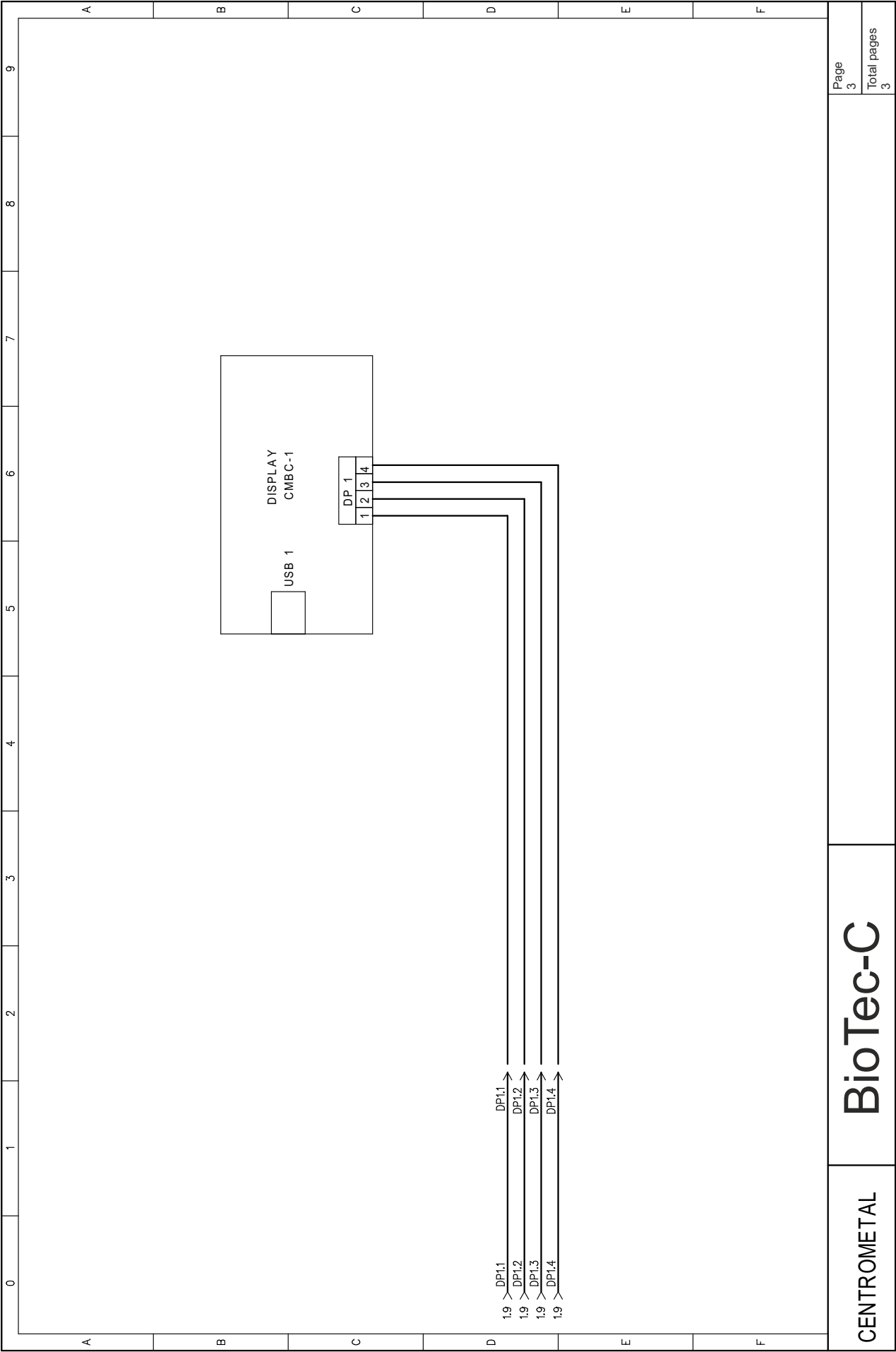
When connecting any electrical part be sure to switch of the boiler on the main switch and disconnect the power supply.



BUFFER 1 - accumulation tank upper temperature sensor
 BUFFER 2 - accumulation tank lower temperature sensor
 MVAL 1 - 3-way mixing valve actuator
 P1 - pump P1 (boiler accumulation tank)
 P2 - pump P2 (DHW tank)
 POW 1 - power supply (factory connected)
 FAN - flue gas fan power supply (factory connected)
 STB - safety thermostat STB (factory connected)

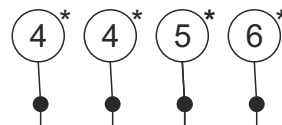
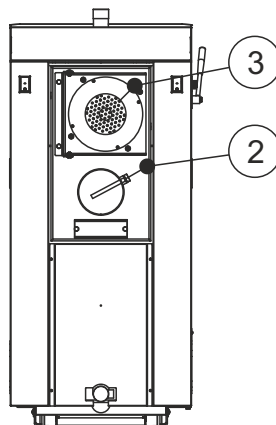
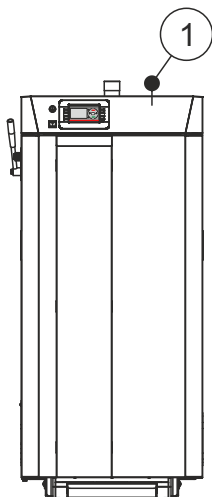
DP-1 - screen (factory connected)
 KEY - CODE KEY (factory connected)
 RPM - flue gas fan rpm sensor (factory connected)
 BOILER - boiler temperature sensor (factory connected)
 FLUE-GAS - flue gas temperature sensor (factory connected)
 OUTSIDE - NOT USED
 DHW - domestic hot water tank temperature sensor
 RETURN - return flow temperature sensor



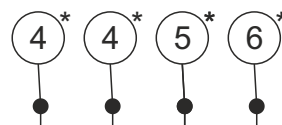
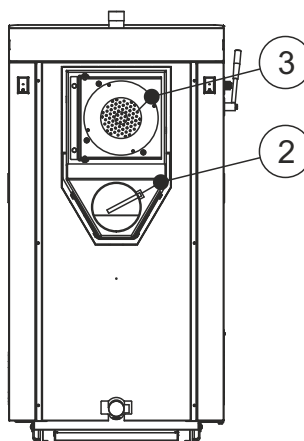
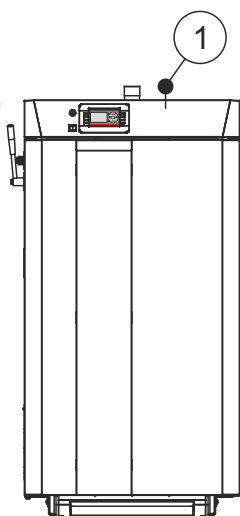


8.1. SENSORS

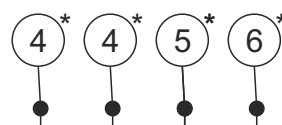
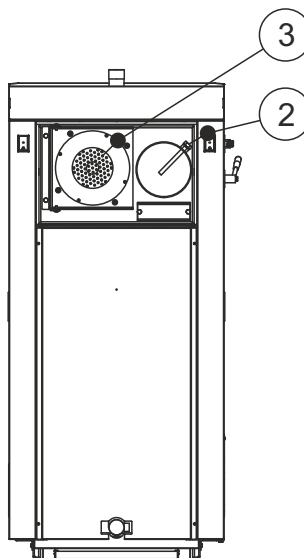
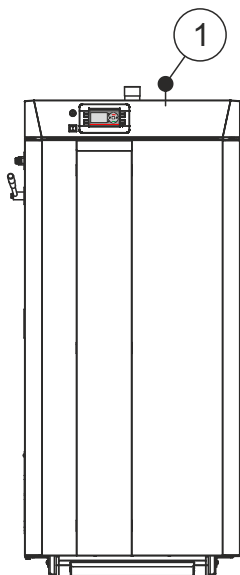
BioTec-C 25



BioTec-C 31 / 35



BioTec-C 45



- ① - Boiler sensor (Pt-1000)
- ② - Flue gas sensor (Pt-1000)
- ③ - Fan speed rpm sensor
- ④ - Accumulation tank sensors 2x (Pt-1000)

- ⑤ - Return flow temperature sensor (Pt-1000)
- ⑥ - Domestic hot water (DHW) sensor (Pt-1000)

* sensors are not factory installed

9.0 CLEANING AND MAINTENANCE OF THE BOILER

Every millimeter of soot and dirt on the surfaces of the boiler surface means approx. 5% higher fuel consumption.

Save fuel – clean the boiler on time!

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Cleaning / maintenance interval	Boiler type	Description
Before each ignition	25, 31, 35, 45 kW	Cleaning top and bottom firebox area (middle and lower doors)

Before every ignition it's necessary to clean area below firebox and lower refractory stone (DS) through middle and lower boiler door (DV).

Before cleaning it is necessary to turn on function "Cleaning" on the regulation (main menu/operation/cleaning/cleaning). This function is used to reduce dust/ash spread in the boiler room.

After entering into this function screen , press "OK" button to start the flue gas fan for set time on set rpm. (fan working time and working rpm can be set in the "Cleaning" menu (main menu/operation/cleaning)).

Fan will work until set time runs out or "ESC" button is pressed. When function is started it can be paused by pressing "OK" button (countdown is shown during this function).

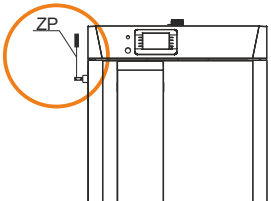
1

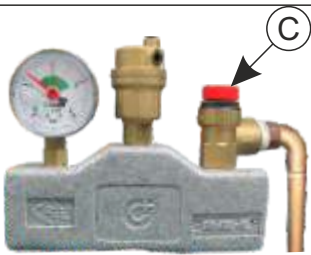
2

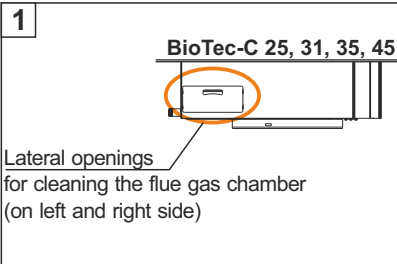
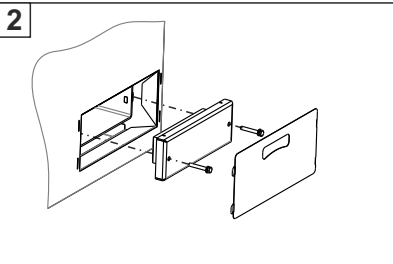
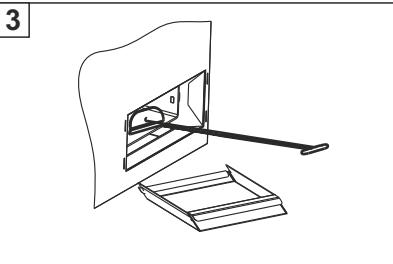

- Enter "Cleaning" function in the boiler regulation (main menu/operation/cleaning/cleaning)
- Press "OK" button to start the function
- Open boiler cover door (VI)
- Open middle boiler door (SV) and grate behind middle door
- Open lower boiler door (DV)
- Insert ashtray under middle boiler door (SV) opening and use scraper to clean the upper side of upper refractory stone (GS) push ash on the astray.
- Place ashtray below lower boiler door (DV) opening and use scraper to clean inside and around the lower refractory stone (DS). Pay attention to properly clean boiler lateral sides (LS) in lower part of combustion chamber (boiler sides (LS) opposite to the lower refractory stones (DS))
- Empty ashtray
- After cleaning, the boiler is ready for ignition.


(a) cleaning menu

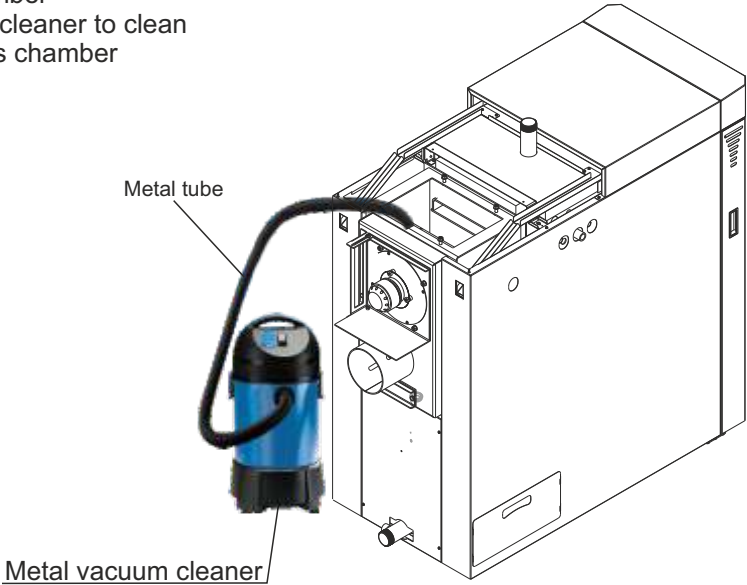

(b) cleaning function screen

Cleaning / maintenance interval	Boiler type	Description
Before refilling of fuel / before ignition	25, 31, 35, 45 kW	Flue gas tubes cleaning
 <p>For flue gas tubes cleaning in necessary to pull lever (ZP) few times.</p>		

Cleaning / maintenance interval	Boiler type	Description
Every 6 months	25, 31, 35, 45 kW	Check the operation of security valve
 <p>Checking the operation of security valve</p> <p>By briefly turning the cap of safety valve (C) check whether water coming out from the safety valve. If no water comes out after several repeated checks, then is necessary to replace the safety valve.</p>		

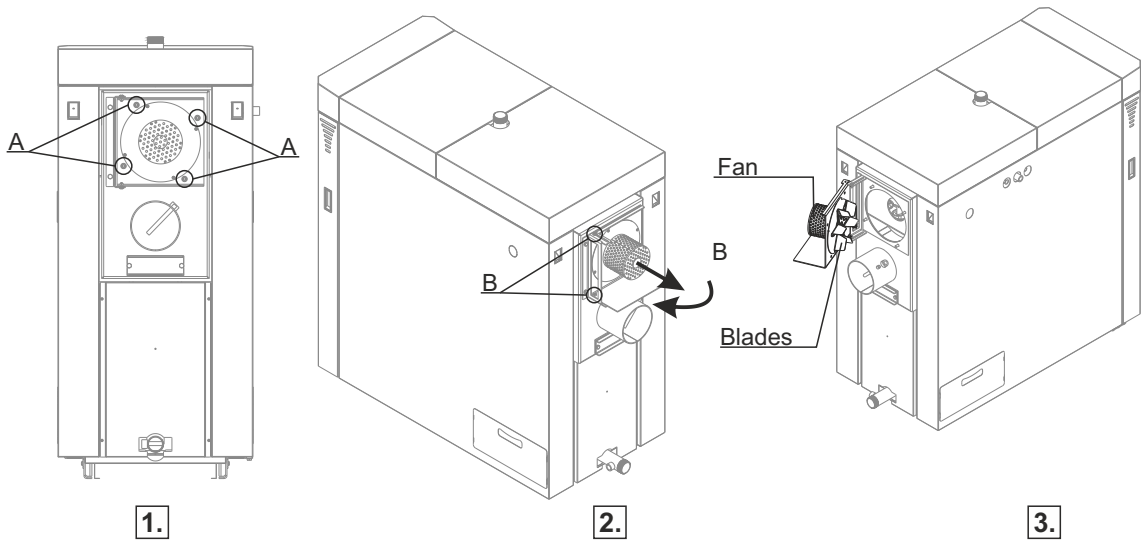
Cleaning / maintenance interval	Boiler type	Description
At least once a year.	25, 31, 35 and 45 kW	Cleaning of flue gas chamber.
<div style="display: flex; justify-content: space-around;"> <div style="width: 30%;"> <p>1</p>  <p>BioTec-C 25, 31, 35, 45</p> <p>Lateral openings for cleaning the flue gas chamber (on left and right side)</p> </div> <div style="width: 30%;"> <p>2</p>  </div> <div style="width: 30%;"> <p>3</p>  </div> </div> <ol style="list-style-type: none"> 1 - Switch off the boiler and disconnect from power supply 2 - Before cleaning flue gas chamber, pull lever (ZP) few times (see "flue gas tubes cleaning") 3 - Take out insulation cover, unscrew two screws which holds door of flue gas chamber. This procedure is the same for the other side of the boiler 4 - Insert ashtray and clean the flue gas chamber with scraper. 5 - Put the doors and insulation cover to original position. <p>Note: For the proper operation of the boiler it is IMPORTANT to hard tight the doors so that it seals perfectly!</p> <div style="display: flex; align-items: center; margin-top: 20px;">  <div style="background-color: yellow; padding: 10px; border: 1px solid black;"> <p>Before this procedure be sure to disconnect boiler from power supply!!!</p> </div> </div>		

Cleaning / maintenance interval	Boiler type	Description
At least once a year	25, 31, 35, 45 kW	Cleaning and checking the flue gas connection sealing
Cleaning and checking the flue gas connection sealing Clean flue gas connection between the boiler and the chimney through the revision openings for cleaning or if there are no openings for cleaning, by removing the flue gas connection. After cleaning, inspect flue gas connection to have good sealing and seal it if the seal is not satisfactory.		
<div style="display: flex; align-items: center;">  <div style="background-color: yellow; padding: 5px; border: 1px solid black;"> Before this procedure be sure to disconnect boiler from power supply!!! </div> </div>		

Cleaning / maintenance interval	Boiler type	Description
At least once a year	25, 31, 35, 45 kW	Cleaning of area over heat exchanger tubes with turbulators
<ol style="list-style-type: none"> 1 - Switch off the boiler and disconnect from power supply 2 - Take out back upper cover side 3 - Open the flue gas chamber 4 - Use the metal vacuum cleaner to clean dust and ash in flue gas chamber 		
<div style="text-align: center;">  <p style="margin-left: 100px;">Metal tube</p> <p style="margin-left: 100px;">Metal vacuum cleaner</p> </div>		
<div style="display: flex; align-items: center;">  <div style="background-color: yellow; padding: 5px; border: 1px solid black;"> Before this procedure be sure to disconnect boiler from power supply!!! </div> </div>		

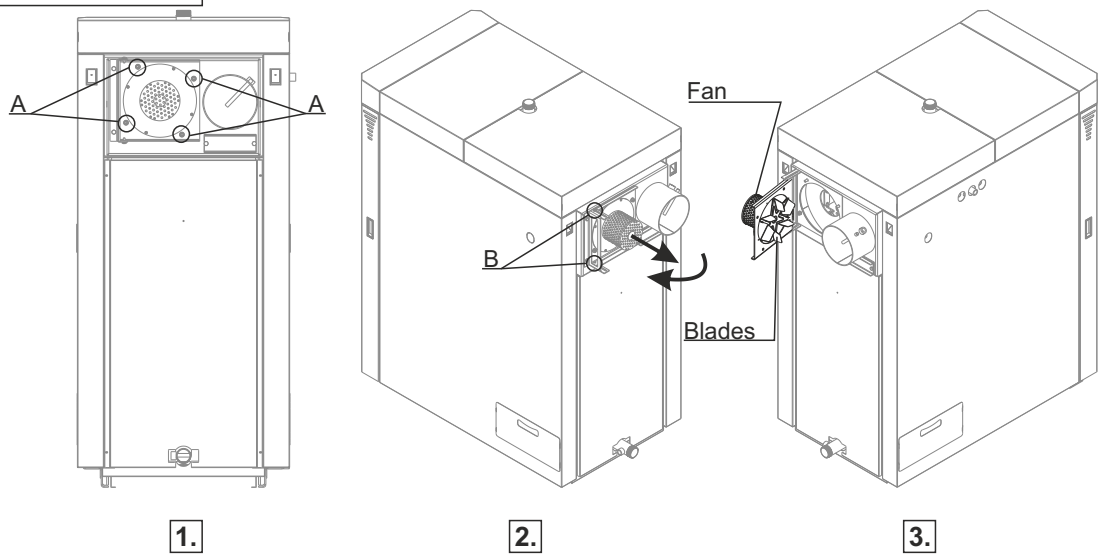
Cleaning / maintenance interval	Boiler type	Description
At least once a year	25, 31, 35, 45 kW	Cleaning the flue gas fan blades and flue gas fan chamber

BioTec-C 25 / 31 / 35



1. Switch off the boiler and disconnect from power supply
2. Remove nuts (A) shown in Figure 1
3. Release screws (B) shown in Figure 2
4. Pull out fan with flange to the end of rail, then open it to left side (see Figure 2. and Figure 3.)

BioTec-C 45



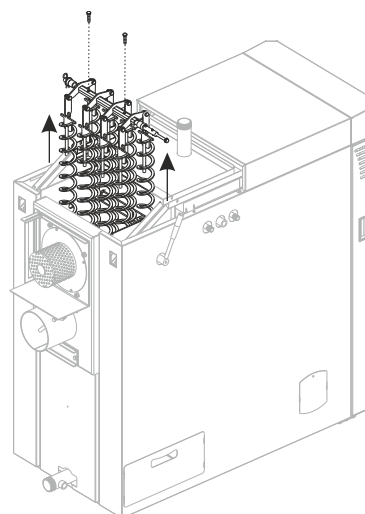
1. Switch off the boiler and disconnect from power supply
2. Remove nuts (A) shown in Figure 1
3. Release screws (B) shown in Figure 2
4. Pull out fan with flange to the end of rail, then open it to left side (see Figure 2. and Figure 3.)



Before this procedure be sure to disconnect boiler from power supply!!!

10. EXTRACTION OF TURBULATORS

- 1 - Switch off the boiler and disconnect from power supply
- 2 - Take out back upper cover side
- 3 - Release 4 nuts and open the flue gas chamber
- 4 - Release 2 screws of turbulator axle and pull out turbulators.



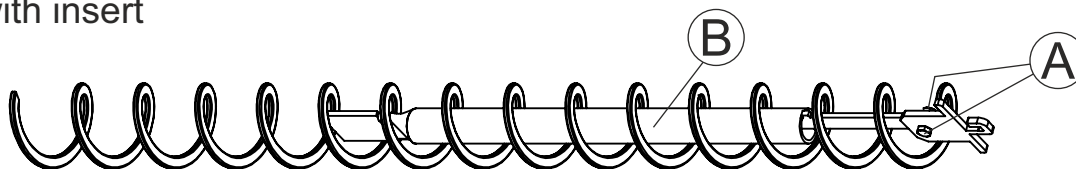
10.1 DESCRIPTION OF EXTRACTION THE INSERT FROM TURBULATORS

Removing the insert from the turbulators is carried out in case of condensation in the chimney to increase flue gas temperature and attempt to prevent condensation. This will increase the flue gas temperature (in boiler operation) and probably prevent further chimney condensation. In order to remove the insert from the turbulators is necessary to unscrew the screw and nut (A) and pull the insert (B) from the bottom.

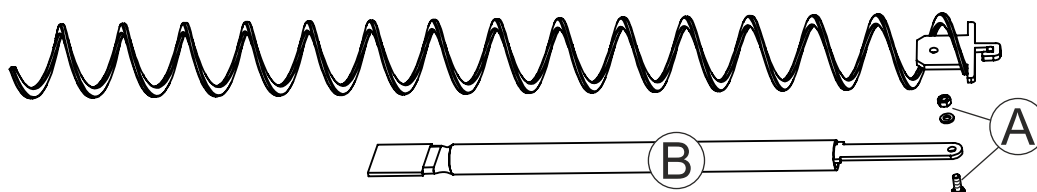
PROTECTIVE GLOVES ARE OBLIGATORY!!!



Turbulator with insert



Extracted insert



We do not recommend this action until you used all other methods for preventing condensation in the chimney because this reduces boiler efficiency. Number of turbulators from which inserts been removed is determined by authorized person on a case-by-case basis.

This procedure must be done only by authorized person!

RESISTANCE TABLE PT1000 SENSOR
(measuring range -30°C - +400°C)

Temperature (°C)	Resis. (Ohm)
-30	885
-25	904
-20	923
-15	942
-10	962
-5	981
0	1.000
5	1.019
10	1.039
15	1.058
20	1.077
25	1.096
30	1.116
35	1.135
40	1.154
45	1.173
50	1.193
55	1.212
60	1.231
65	1.250
70	1.270
75	1.289
80	1.308
85	1.327
90	1.347
95	1.366
100	1.385
105	1.404
110	1.424
115	1.443
120	1.462
125	1.481
130	1.501
135	1.520
140	1.539
145	1.558
150	1.578
155	1.597
160	1.616
165	1.635
170	1.655
175	1.674
180	1.693
185	1.712
190	1.732
195	1.751
200	1.770
205	1.789
210	1.809
215	1.828
220	1.847

Temperature (°C)	Resis. (Ohm)
225	1.866
230	1.886
235	1.905
240	1.924
245	1.943
250	1.963
255	1.982
260	2.001
265	2.020
270	2.040
275	2.059
280	2.078
285	2.097
290	2.117
295	2.136
300	2.155
305	2.174
310	2.194
315	2.213
320	2.232
325	2.251
330	2.271
335	2.290
340	2.309
345	2.328
350	2.348
355	2.367
360	2.386
365	2.405
370	2.425
375	2.444
380	2.463
385	2.482
390	2.502
395	2.521
400	2.540

11. CORRECT DISPOSAL OF THIS PRODUCT

Your boiler is marked in accordance with Directives: 2006/42/EC, 2014/30/EU, 2014/35/EU and contains electrical components. According to EU Regulation 2015/1189 implementing Directive 2009/125/EC with regard to Eco-Design requirements for solid fuel boilers, we draw your attention to the following:



MARK FOR MARKING SEPARATE EE WASTE COLLECTION

This marking on the product indicates that the product contains electrical and electronic parts and must be disposed of separately, it must not be mixed with other waste. Your boiler is labeled in accordance with the Waste Electrical and Electronic Equipment Regulation (WEEE) and can be returned through the return and collection system available to you.

Household users should contact the retailer from whom they purchased this product, their local distributor, or their state agency for details on where and how to dispose of this product. Business users should contact their supplier and review the terms of the sales contract or contact a government agency for details on where and how to dispose of this product.



EC DECLARATION OF CONFORMITY EZ IZJAVA O SUKLADNOSTI

Manufacturer Centrometal d.o.o.
Proizvođač
Adress HR 40306 Macinec, Glavna 12, Croatia/Hrvatska
Adresa

We declare under our sole responsibility that
S punom odgovornošću izjavljuje, da

Product designation Hot-water boiler burning wood (with manual fuel supply)
Proizvod Toplovodni kotao za loženje drvom (za ručno loženje)

Type / model BioTec-C 25, BioTec-C 31, BioTec-C 35, BioTec-C 45

is in conformity with the provisions of the following regulations and also complies with the following standards

odgovara zahtjevima sljedećih propisa i također zadovoljava zahtjeve sljedećih standardi

MD Directive 2006/42/EC MD Direktiva 2006/42/EZ	EN 303-5:2021
PED Directive 2014/68/EU PED Direktiva 2014/68/EU	PED Directive 2014/68/EU, ANNEX I, (2.10, 2.11, 3.4, 5a, 5d). PED Direktiva 2014/68/EU, PRILOG I, (2.10, 2.11, 3.4, 5a, 5d).
LVD Directive 2014/35/EU LVD Direktiva 2014/35/EU	EN 60335-1:2012/AC:2014; EN 60335-2-102:2006/A1:2010; EN 62233:2008
EMC Directive 2014/30/EU EMC Direktiva 2014/30/EU	EN 55014-1 ed.3, EN 61000-3-2 ed.4, EN 61000-3-3 ed.3, EN 61000-6-2 ed.3, EN 61000-6-3 ed.2, EN 60335-1 ed.3, EN 60335-2-102:2016, EN 62233:2008
Directive 2009/125/EC Direktiva 2009/125/EZ	Commission Regulation (EU) No 2015/1189 Uredba Komisije (EU) No 2015/1189
Directive 2011/65/EU Direktiva 2011/65/EU	

Year of affixing of CE marking 2019.
Godina izdavanja CE oznake

Authorized body that has tested the boiler Strojirenský zkušební ústav, s.p. (SZU)
Ovlašteno tijelo koje je obavilo ispitivanje kotla Hudcova 424/56b, CZ-62100 Brno, Czech Republic/Češka
Product certification body 3040 by ČSN EN ISO/IEC 17065:2013
Certifikacijsko tijelo 3040 prema ČSN EN ISO/IEC 17065:2013

Place and date of issue
Mjesto i vrijeme izdavanja

Name, surname, and signature of authorized person
Ime, prezime i potpis ovlaštene osobe

Macinec, 1.6.2022.

Davor Zidarić

Centrometal d.o.o.
40306 MACINEC, Glavna 12
Centrala 040/372-600, Fax 372-601

IMPORTANT !

- The fuel used is only wood logs under 25% humidity content (wood dried min. 1 year).
- The return flow temperature always has to be over 60°C. This can be reached by obligatory connection of the 3-way mixing valve with actuator and return flow sensor (60°C)- **recommended** or 3-way thermic valve ESBE VTC 512 (60°C), VTC 531 (60°C), LTC 141 (60°C), Laddomat 21 (63°C) which keeps return flow temp. to the boiler min. 60°C.
- The connection of CAS water accumulation tanks is obligatory. It is recommended to connect min. 50 liters water accumulation to each 1 kW of boiler power (or see local regulation).
- To the closed central heating system an expanding vessel has to be connected (the volume of the expanding vessel is min. 10% of the installation volume).
- To the open central heating system an open expanding vessel has to be connected (OPC), which volume has to be min. 7% of the installation volume.



Company assumes no responsibility for possible inaccuracies in this book originated typographical errors or rewriting, all figures and diagrams are principal and it is necessary to adjust each actual situation on the field, in any case the company reserves the right to enter their own products such modifications as considered necessary.

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Centrometal
HEATING TECHNIQUE
