

Centrometal

HEATING TECHNIQUE

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TECHNICAL INSTRUCTIONS

for installation, use and maintenance
of hot water boiler
and installation additional equipment



BioTec Plus



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



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.



Boiler must not operate in flammable and explosive environment.



Before any work on the boiler, electric energy must be switched off.



Insufficient combustion air for chimney vent boilers with room air for combustion can lead to dangerous conditions.

Make sure that the combustion air supply and discharge openings are not reduced or closed off.

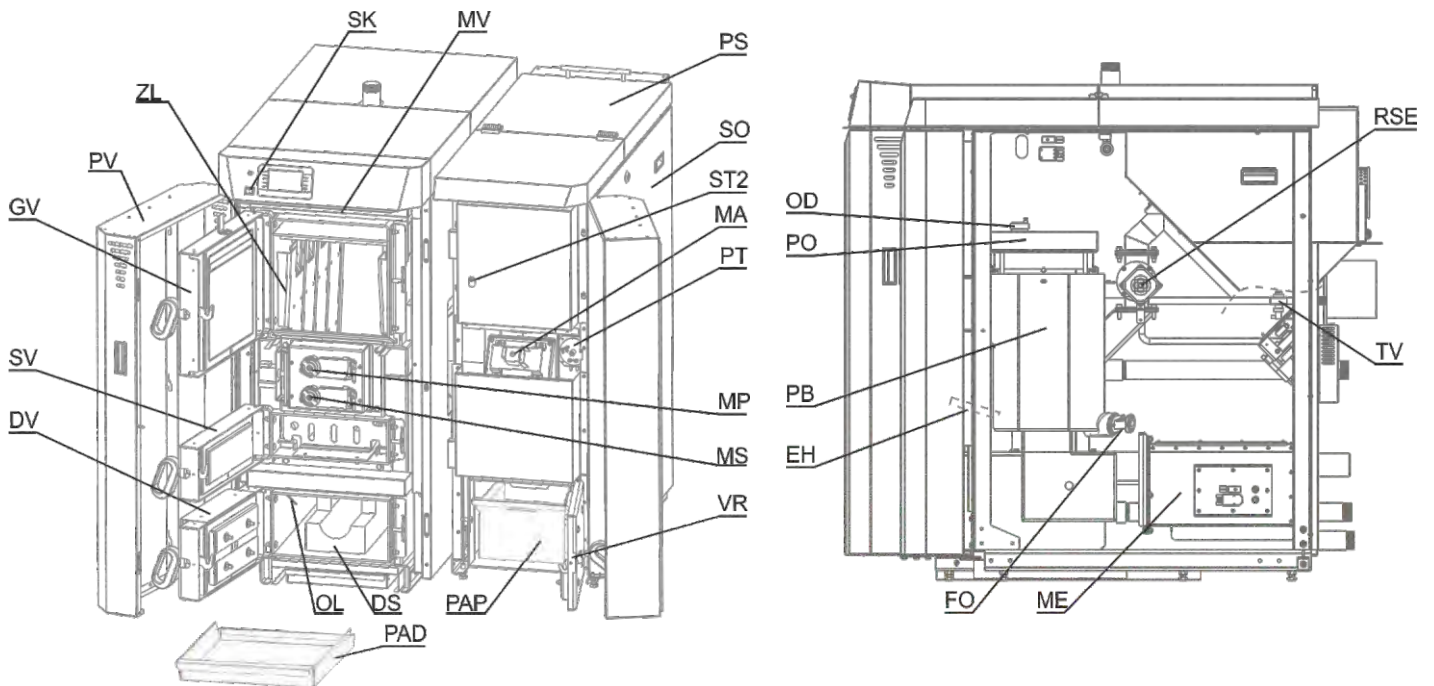
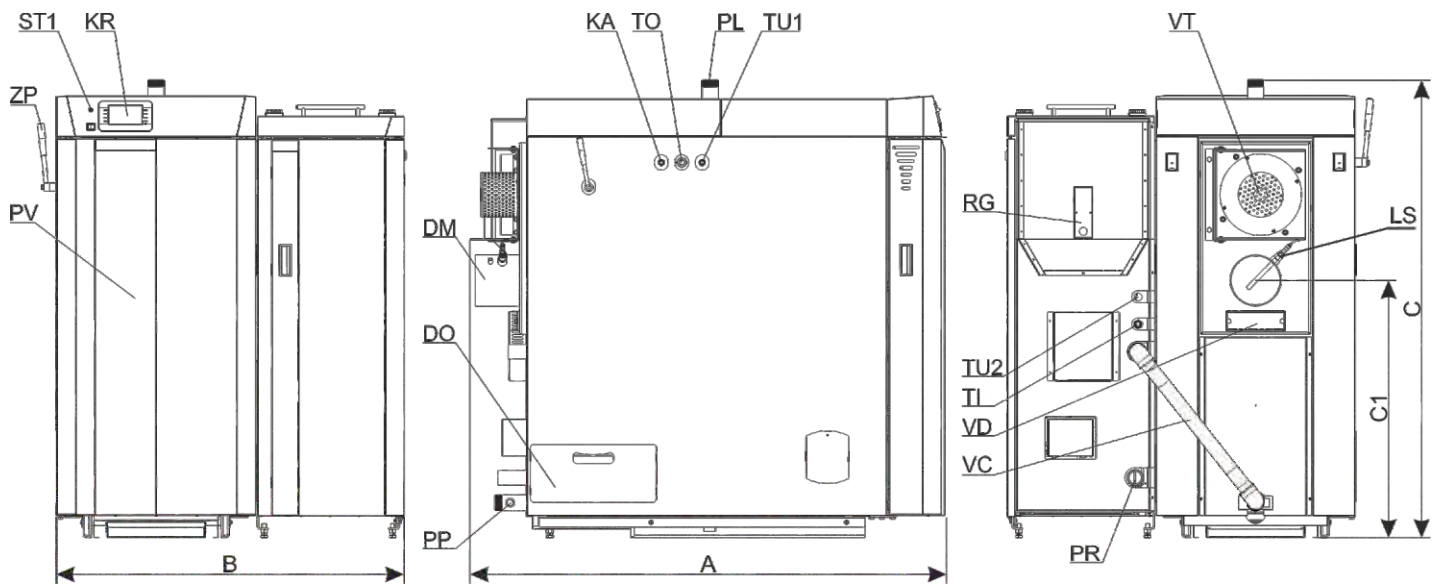
Keep doors to the boiler room closed.

Protect the boiler room and avoid rodents and birds from entering and blocking the air openings.

Boiler cannot be placed in operation until above points are not met.

TIP		BioTec Plus	25	29	31	35	45
Nominal heat output		(kW)	25	29	31	35	45
Heat output range (wood)		(kW)	12,5-25	14,5-29	15,5-31	17,5-35	22,5-45
Heat output range (wood pellets)		(kW)	7,5-25	8,7-29	9,3-31	10,2-35	13,5-45
Boiler class (wood / wood pellets)			5				
Required chimney underpressure		(mbar)	10				
Water amount in boiler		(lit.)	138	167	167	167	187
Exhaust gas temperature at nominal heat output (wood)		(°C)	90-170	90-170	90-170	90-170	90-170
Exhaust gas temperature at nominal heat output (wood pellets)		(°C)	90-130	90-130	90-130	90-130	90-130
Exhaust gas temperature at minimal heat output (wood)		(°C)	70-110	70-110	70-110	70-110	70-110
Exhaust gas temperature at minimal heat output (wood pellets)		(°C)	60-110	60-110	60-110	60-110	60-110
Exhaust mass flow at nominal heat output (wood)		(kg/s)	0,019	0,0209	0,022	0,022	0,027
Exhaust mass flow at nominal heat output (wood pellets)		(kg/s)	0,0206	0,0243	0,0262	0,030	0,0385
Exhaust mass flow at minimal heat output (wood)		(kg/s)	0,010	0,011	0,012	0,012	0,014
Exhaust mass flow at minimal heat output (wood pellets)		(kg/s)	0,0553	0,00234	0,0075	0,0080	0,0121
Minimum operating time at rated power (nominal Q _n) (wood)		(h)	3,5	4	4	4	4
Minimum operating time at rated power (nominal Q _n) (wood pellets)		(h)	-	-	-	-	-
Min. inlet water tem. at the boiler supply water connection		(°C)	60				
Cold water tem. and pressure for safety heat exchanger		(°C/bar)	10-15°C / 2 bar				
Setting range for temperature controller (wood / wood pellets)		(°C)	max. 90 / 65 - 90				
Boiler resistance on water side at nominal output (dT=10°C)		(mbar)	12,8	17,3	19,7	25,1	41,6
Fuel type			WOOD: A by 303-5:2012; B by EN ISO 17225-5:2014-09 WOOD PELLETS: C1 by EN 303-5:2012; A1 by EN ISO 17225-2				
Fuel moisture content		(%)	max 25 % for wood, max. 12% for wood pellet				
Fuel size			(450-550) x 70 x 50 for wood, fi6				
Fuel loading chamber capacity (wood)		(lit.)	90	144	144	144	176
Fuel loading chamber dimensions (D×W×H) (wood)		(mm)	600×250×600	600×400×600	600×400×600	600×400×600	600×400×735
Firebox volume (wood pellets)		(lit.)	1,6	1,6	1,6	1,6	2,5
Combustion chamber volume (wood pellets)		(lit.)	10,4	10,4	10,4	10,4	20,2
Pellet tank volume		(lit.)	80	148	148	148	148
Combustion chamber type			underpressure				
Required minimum accumulation volume (tank) next to boiler			by EN 303:2012-point 4.4.6				
Maximal electrical power input (wood)		(W)	1100	1100	1100	1100	1100
Auxiliary power requirements at Q _n (wood)		(W)	110	112	114	116	122
Auxiliary power requirements at Q _{min} (wood)		(W)	60	63	65	68	75
Standby power (wood)		(W)	5	5	5	5	5
Maximal electrical power input (wood pellets)		(W)	1100	1100	1100	1100	1100
Auxiliary power requirements at Q _n (wood pellets)		(W)	45	46	47	48	50
Auxiliary power requirements at Q _{min} (wood pellets)		(W)	30	31	32	33	35
Standby power (wood pellets)		(W)	5	5	5	5	5
Supply voltage		(V~)	230				
Frequency		(Hz)	50				
Max. electrical current		(A)	5,1	5,1	5,1	5,1	5,1
Current type			~				
Total mass - (boiler with casing and accessories)		(kg)	750	875	875	875	930
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	160	180
Number of turbulators		(pcs.)	8	10	10	10	10
Boiler connections	Flow and return pipe (male thread)	(R)	6/4"				
	Charge/discharge (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				

BioTec Plus 25 / 29 / 31 / 35



INNER PARTS VIEW FOR BOILERS BioTec Plus 25-45

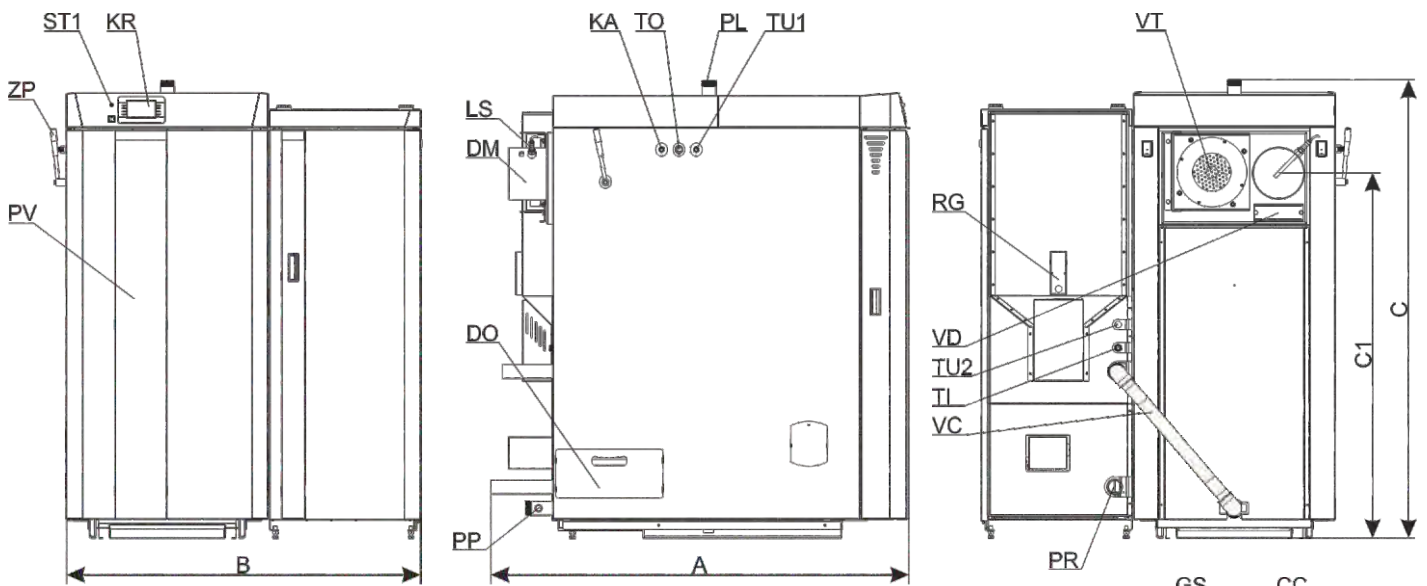
Boiler

dimensions	BioTec Plus 25	BioTec Plus 29	BioTec Plus 31	BioTec Plus 35	BioTec Plus 45
Depth (A)	1605	1450	1450	1450	1450
Width (B)	1055	1255	1255	1255	1260
Height (C)	1350	1450	1450	1450	1585

Other dimensions

Height (C1)	760	760	760	760	1260
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BioTec Plus 45



DM - Flue gas tube connection
 DO - Cover of lower openings of the flue gas chamber
 DS - Lower refractory stone (chamotte) (2 parts)
 DV - Lower boiler door (wood)
 EH - Electric heater (pellets)
 FO - Photocell
 GV - Upper boiler door (wood)
 KA - Heat exchanger connection (safety cooling system) (wood)
 KR - Digital boiler controller
 LS - Lambda probe
 MA - Magnetic valve
 ME - Cleaning mechanism assembly (pellets)
 MP - Primary air actuator
 MS - Secondary air actuator
 MV - Upper door microswitch
 OD - Air-vent
 OL - Combustion chamber temperature sensor
 PAD - Ash tray (wood)
 PAP - Ash tray (wood pellets)
 PB - Pellet burner
 PL - Main flow
 PO - Door for cleaning of pellet burner
 PP - Filling / drainage
 PR - Return flow
 PS - Pellet tank cover
 PT - Pressure switch
 RG - Fuel level sensor (pellet)
 RSE - Backfire protection valve (RSE)
 SK - Main switch
 SO - Casing cover (removable) for acces to electric parts (pellets)
 ST1 - Safety thermostat (wood)
 ST2 - Safety thermostat (wood pellets)

SV - Middle boiler door (wood)
 TI - Heat exchanger output (safety cooling system) (pellet)
 TO - Thermal safety valve sensor connection (safety cooling system) (wood)
 TU1 - Heat exchanger connection - thermal safety valve connection point (safety cooling system) (wood)
 TU2 - Heat exchanger input (safety cooling system) (pellet)
 TV - Built-in thermal safety valve (safety cooling system)
 VC - Connection tube
 VD - Opening for cleaning of the flue gas chamber
 VR - Lower boiler door (pellet)
 VT - Fan
 ZL - Sheet metal protection cover (wood)
 ZP - Flue gas tube cleaning lever

CLEANING SET:

CC - Flue gas tubes cleaning brush
 GG - Scraper for upper refractory stone (chamotte), flue gas chamber and place around lower chamotte cleaning
 GS - Scraper for cleaning of the lower refractory stone (chamotte)
 ZN - Holder for cleaning set

1.0. GENERAL

Steel hot water boiler BioTec Plus has two separate combustion chambers inside the common boiler water chamber. Boilers BioTec Plus, nominal heat output 25, 29, 31, 35 and 45 kW, are designed for wood log firing in left part and wood pellet firing in right part of the boiler. The wood gasification principle enables a complete fuel burning in left part of the boiler. 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 12 hours, which means that in this period it is not necessary to fire up the boiler in order to keep the heating process. In the right side of the boiler is installed the burner for wood pellet firing with the automatic firing and automatic self-cleaning function which enables the reliable operation also with the low quality wood pellets. Boiler operation is controlled with inbuilt boiler control unit using two boiler sensors, sensor in combustion chamber, flue gas sensor and lambda probe, motors for primary and secondary air for combustion and modulating underpressure fan on flue gases outlet from boiler. Boiler must be connected to one adequately designed chimney and to the central heating system with return flow protection and adequately designed water accumulation tank (CAS).

1.1. CHARACTERISTICS OF THE BioTec Plus BOILER

The BioTec Plus 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 and wood pellets. The system of flue gases conduction and their additional burning out, enables its high efficiency, which makes this product extremely economical.

Widely sized left side fuel loading door enables firing with large pieces of wood logs and very simple and easy cleaning and maintenance. The wood gasification principle enables a complete fuel burning so maintenance of left part of the boiler is set to minimum. 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 12 hours (depends on the quality of the wood), during which period it is not necessary to repeat the start firing process.

In the right side of the boiler is installed the burner for wood pellet firing with the automatic firing and automatic self-cleaning function which enables the reliable operation also with the low quality wood pellets.

The boiler must be connected to the central heating system with return flow protection and with properly sized water accumulation tank(s).

Boiler operation is managed with inbuilt boiler control unit using two boiler sensors, sensor in combustion chamber, flue gas sensor and lambda probe, motors for primary and secondary air intake for combustion and modulating underpressure fan on flue gases outlet from boiler. Boiler control unit can run return flow protection, buffer tank management, one heating circuit with circulation pump and 3-way mixing valve with actuator steered by outer temperature sensor and room corrector and DHW water heater tank pump.

With boiler BioTec Plus it is easy to handle, integrated control unit with color touch screen 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 of the wood 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, or just start pellet side of the boiler.

The boiler is delivered together with thermal insulation, covered by a metal casing on two wood pallets.

Concerning the specific need of sanitary hot water, the BioTec Plus 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 accumulation tanks CAS-B. If the future connection to the solar system has been planned, boiler can be connected to combined accumulation tank CAS-BS or STEB solar water heater. 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 and ISO 14001 standards.

Although the boiler has two separate furnaces, boiler connects to one properly selected chimney.

1.2. SAFETY PRECAUTIONS

The boiler and related accessories are state of the art and meet all applicable safety regulations. The control unit, wiring chamber, el. heater, safety cut-out STB thermostat, fan, grid cleaning mechanism, flue gas tubes cleaning mechanism and pellet supply mechanism are integrated into the BioTec Plus. They are operate at a voltage of 230V AC. Improper installation or repair can pose the danger of life-threatening electric shock. Installation may be performed only by appropriately qualified technicians.

Caution symbols:

Please take careful note of the following symbols in this Operating Manual.



This symbol indicates measures for protection against accidents and warning for the user and / or exposed persons.

1.3. IMPORTANT INFORMATIONS

All local regulations, including those referring to national and European standards need to be complied with when installing the appliance. The boiler must not be modified unless using the tested original accessories we provide or if the work is undertaken by our Customer Service. Only fit original spare parts. These can be obtained from your customer service partner or directly from ourselves. European standards need to be complied with when installing the appliance.

Regular care and cleaning of the appliance, flue gas outlets, connecting piece and flue.



CAUTION:

The flue may block if the boiler is heated again after a long period of it not being used. Before starting the boiler, have the flue checked by a specialist (chimney sweep). Ensure sufficient supply of fresh air in the installation room when heating. The air must be replaced at least 0.8 times an hour through constant and reliable room venting. Fresh air may have to be provided from outside if the windows and doors in the room where the boiler is installed are well sealed or if this room contains other equipment, such as extractor hoods, clothes dryer, fan etc.

1.4. WOOD GASIFICATION COMBUSTION PROCESS (wood side)

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 $100\div 300^{\circ}\text{C}$ 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 (chamotte) of the upper chamber. This demand for moisture content is fulfilled with wood dried on air at least 12 months.

1.5. FIRING PROCESS IN WOOD PELLET SIDE

Wood pellets are used as fuel in right side of BioTec Plus boiler. Wooden pellets are bio-fuel made of wooden wastes. Pellets can be packed in different packaging: in bags (15 kg or 1000 kg), or as bulk in large (underground) tanks ($4 - 15 \text{ m}^3$) or in basement spaces. Recommended properties of pellets for firing in BioTec Plus boilers are the following:

- heating value $\geq 5 \text{ kWh/kg}$ (18 MJ/kg)
- diameter $\leq 6 \text{ mm}$
- max. moisture content $\leq 12 \%$
- max. dust content $\leq 1,5 \%$.

2.0. DELIVERY PACKAGE

Boiler **BioTec Plus** is delivered in parts for easier transportation and mounting to boiler room.

Basic equipment is delivered seperately:

- left part of the boiler for wood firing with mounted thermal insulation (on wood pallet) with inbuilt:

- color touch screen display control unit
- sensor in combustion chamber
- flue gas sensor
- boiler sensor
- lambda probe
- 2 actuators for primary and secondary air
- flue gas modulating fan
- microswitch for upper boiler door
- STB safety thermostat

- right part of the boiler for wood pellet firing with mounted thermal insulation (on wood pallet) with inbuilt:

- photocell
- cleaning mechanism with movable grate
- pellet tank
- feeder screw
- backfire protection by rotation valve (RSE)
- pellet level sensor
- magnetic valve for air
- thermal safety valve
- electric heater
- pressure switch
- STB safety thermostat
- boiler sensor
- ash tray

- Additional sensors in basic delivery:

- 2 × Buffer tank sensors
- 1 × Outer temperature sensor
- 1 × Return flow sensor
- 1 × DHW sensor
- 1 × Room corrector (CSK)

- cleaning brush, two scrapers and holder for cleaning set and portable ash tray (for left part of the boiler (wood))

- set for connecting left and right side of the boiler: gasgets, screws, nuts.

- connection tube for connecting left and right side of the boiler

2.1. ADDITIONAL EQUIPMENT



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

1) OBLIGATORY ADDITIONAL EQUIPMENT:

- accumulation (buffer) tank for heating system (CAS (min. liter according to local regulation), minimum 50 litres / kW of boiler).
- return flow protection - 3-way mixing valve with actuator (protection valve) or 3-way thermostat 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 (like Grundfos)	Volume of CAS accumulation tank for BioTec Plus wood gasification boilers
25	5/4"	6/4"	Magna3 32-60	Minimum 50 litres / kW of boiler
29	5/4"	6/4"	Magna3 32-60	
31	5/4"	6/4"	Magna3 32-60	
35	5/4"	6/4"	Magna3 32-60	
45	5/4"	6/4"	Magna3 32-60	

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 Plus wood gasification boilers
25, 29, 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)

2) OTHER ADDITIONAL EQUIPMENT:

- CAL alarm box (light/speaker)
- CM2K-B module for regulation 2+ heating circuits (max. 4 units.)
- GSM alarm module for mobile network
- Room thermostat
- Automatic flue gas tubes cleaning
- Pellet suction system CVT + CentroPelet box (pellet feeding box)
- Pellet suction system CVT + Feeder screw
- Pellet tank on wheels with volume of 780 l with feeder screw for filling standard installed pellet tank



Room corrector (CSK)
(basic equipment)



CAL alarm box
(light/speaker)



GSM alarm module
for mobile network



CM2K-B module
for regulation
2+ heating circuits

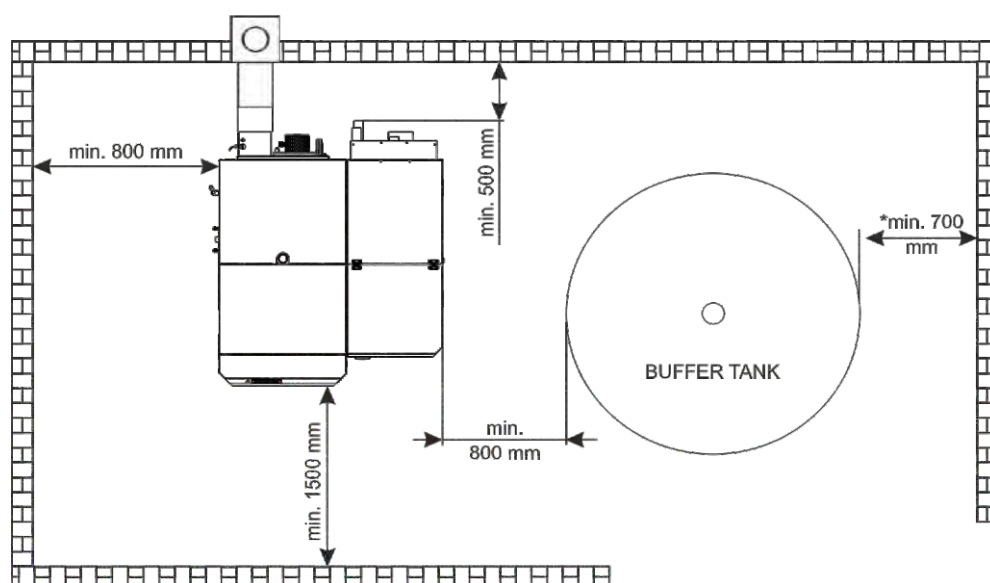
3.0. BOILER / ADDITIONAL EQUIPMENT POSITIONING AND ASSEMBLY

The positioning of the boiler has to be carried out by 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 servicing 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 accumulator 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 2.250 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 (protection valve) or 3-way thermic valve (like ESBE VTC 512, VTC 531 (60°C), LTC 261, LTC 271 (60°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

3.1. INSTALLATION OF DELIVERED PARTS

BioTec Plus is delivered on two wooden pallets. It must be mounted like is described on next pages of these technical instructions. After the boiler is mounted, should be positioned in the boiler room (see point 2.0.). Base protection with stone wool push under the boiler as shown in figure 2.a.

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

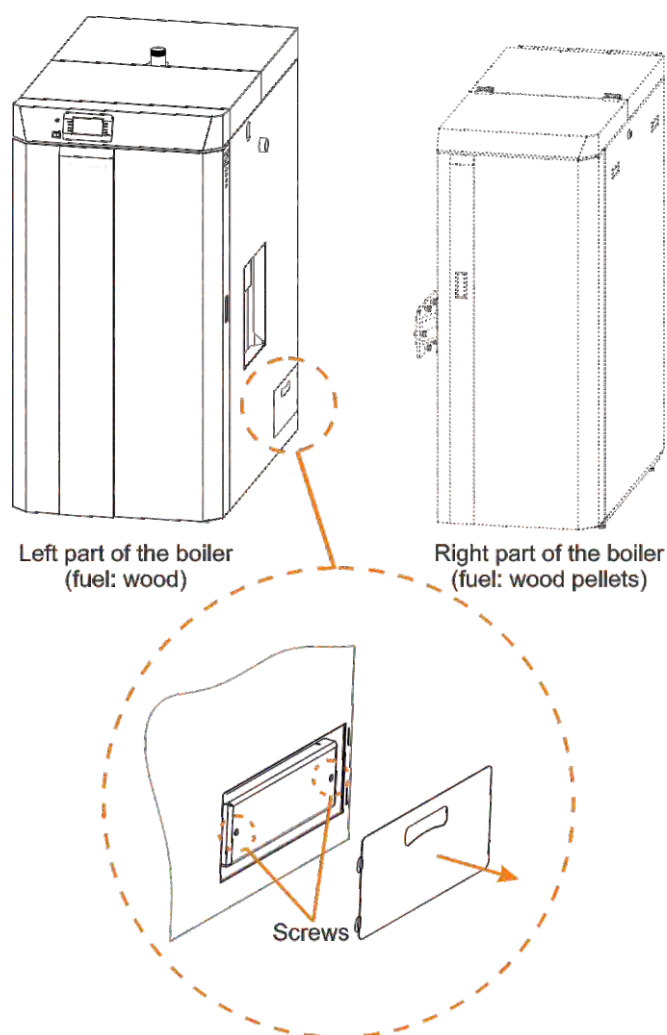
1. holder for cleaning set and 2 cleaning scrapers and cleaning brush
2. room corrector and sensors (2 buffer tanks sensors, 1 return flow sensor, 1 DHW sensor, 1 outer sensor)

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).

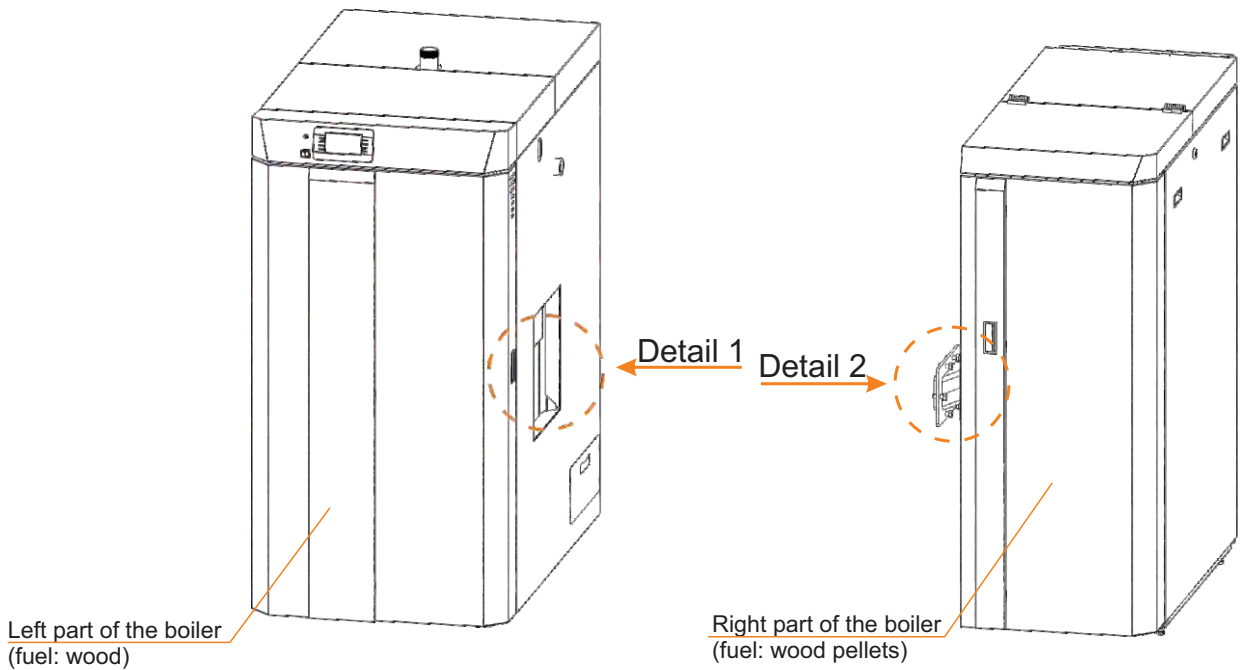
Sensors and room corrector should be connected according heating installation and connecting scheme.

CHECKING FLUE GAS CHAMBER LID

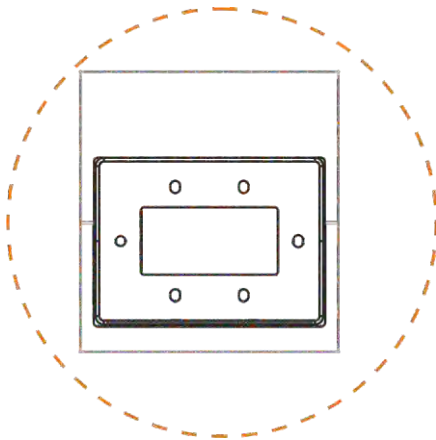
Before connecting of left (fuel: wood) and right (fuel: wood pellets) sides of boiler is necessary to check if is right flue gas chamber lid it properly tight. Remove casing cover lid and additionally tight screws on flue gas chamber lid (like is shown on figure below). Acces to right flue gas chamber will be disabled after connection left and right side of the boiler.



CONNECTING LEFT AND RIGHT SIDE OF THE BOILER

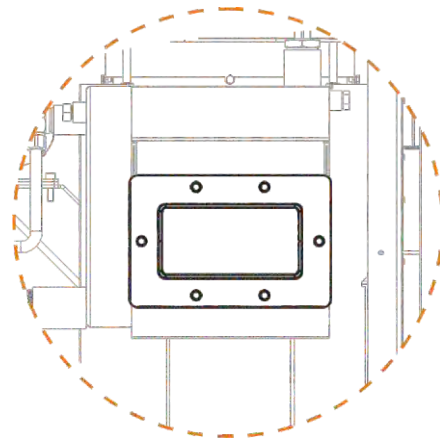


Detail 1



Prepared flange with holes on left part of the boiler. First hole (left) have circle shape, other five holes are slitted (have possibility for height niveling).

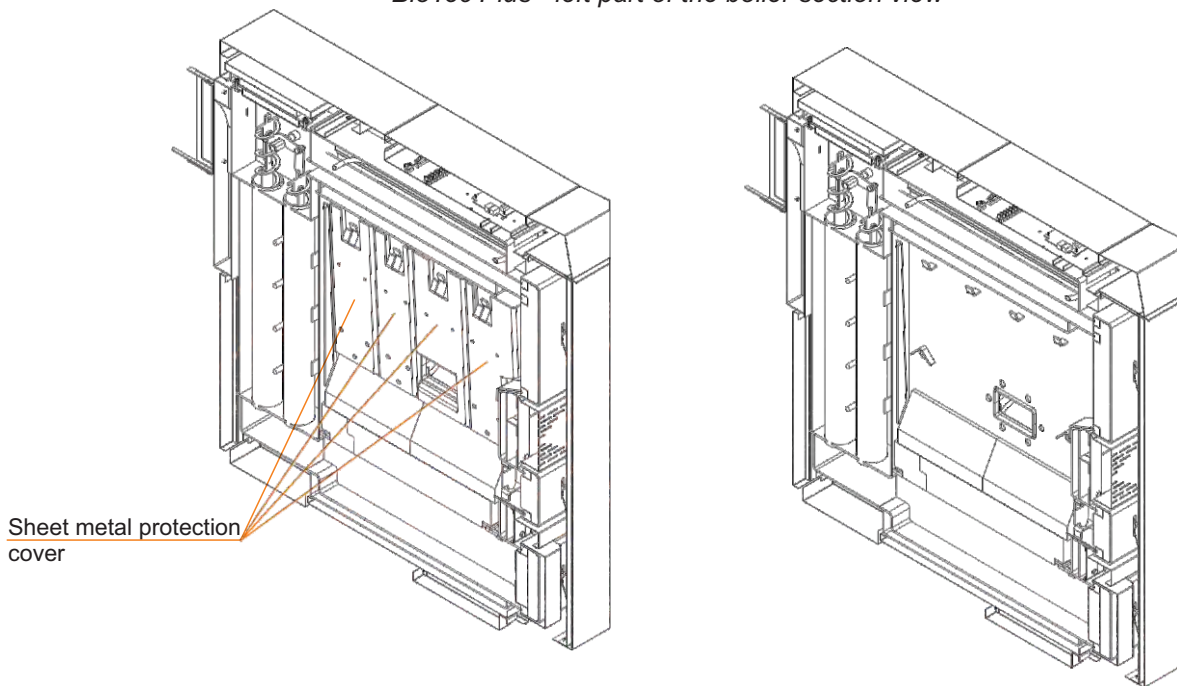
Detail 2



Prepared flange on right side of the boiler. Flange have factory glued gasket and factory mounted six screws M12.

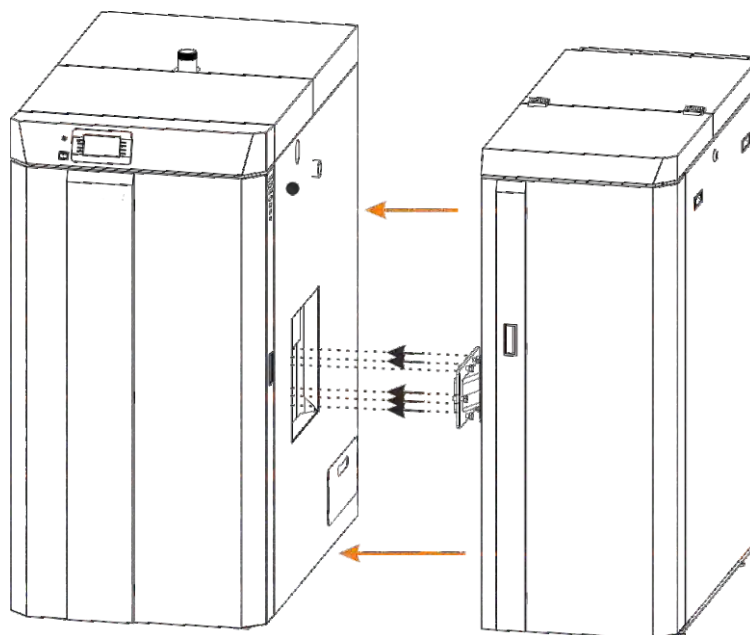
STEP 1:

BioTec Plus - left part of the boiler section view



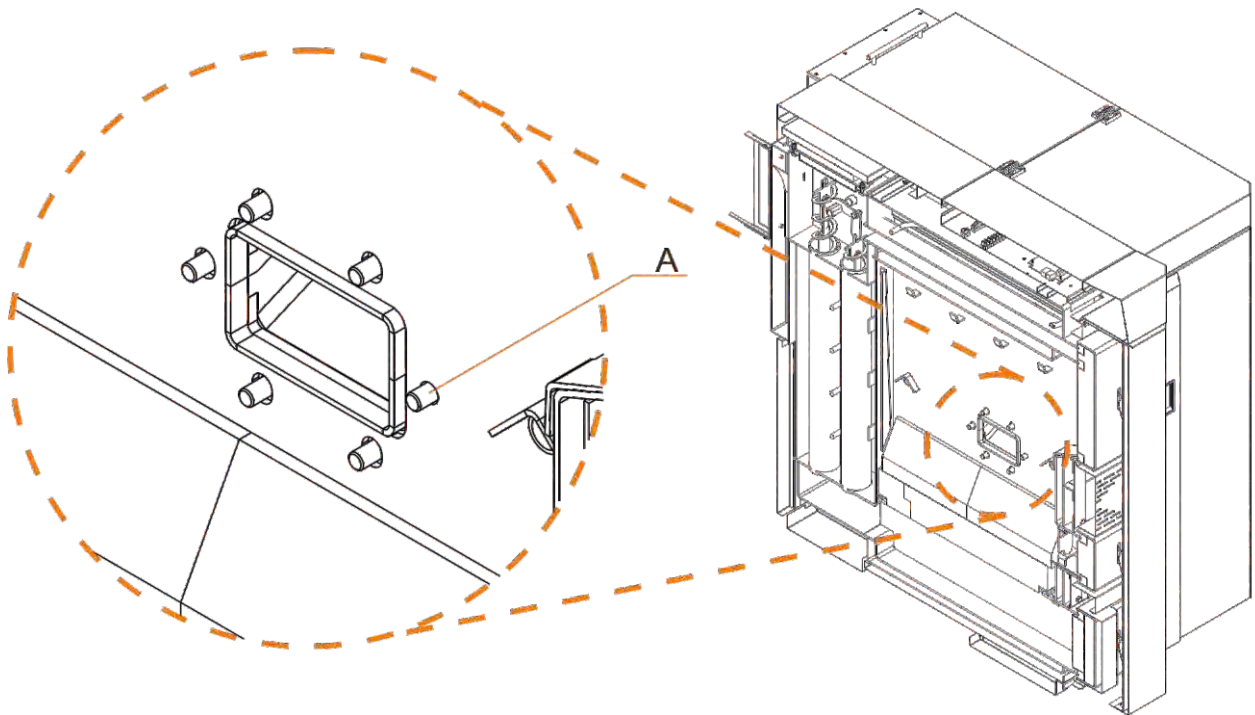
Remove sheet metal protection cover through the upper boiler door.

STEP 2:



It's necessary draw closer left side of the boiler to right side of the boiler. Screws from flange on right side of the boiler must get into flange holes on left side of the boiler. See figure on the next page.

BioTec Plus - left part of the boiler section view

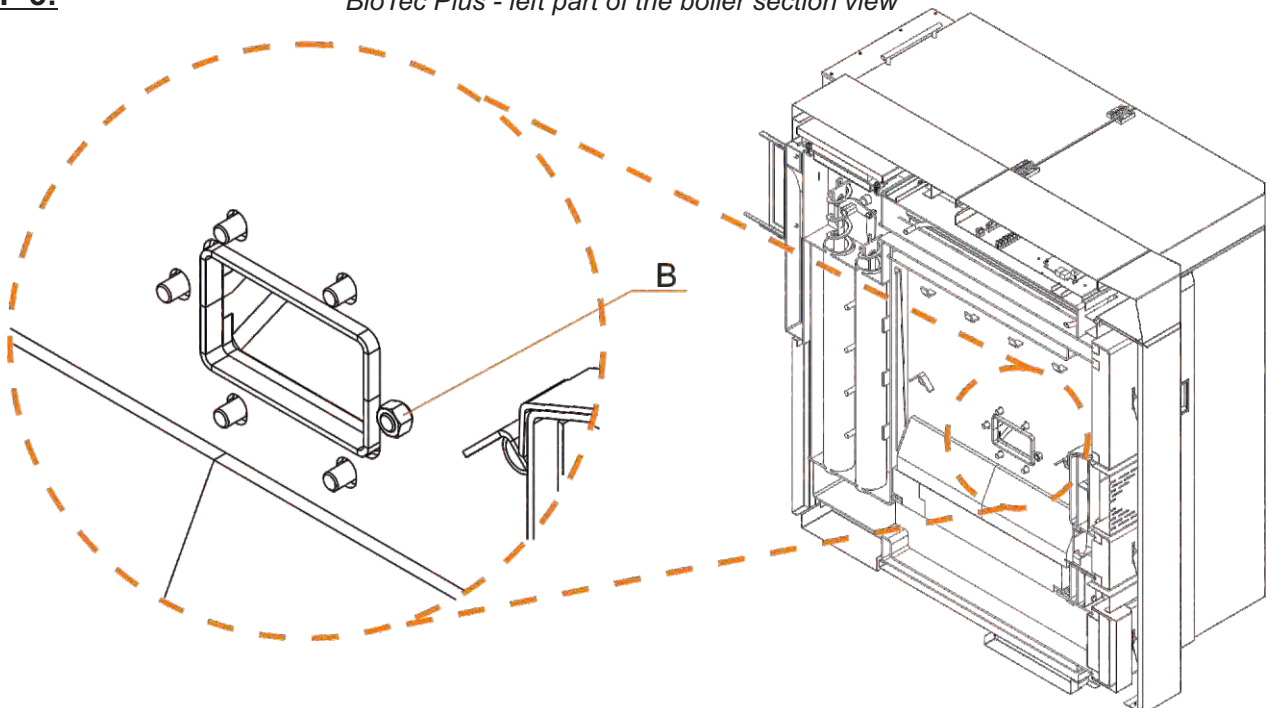


A - hole with circle shape; other holes are slitted for height leveling possibility.

Screws from flange on right side of the boiler must get into flange holes on left side of the boiler like is shown on figure above.

STEP 3:

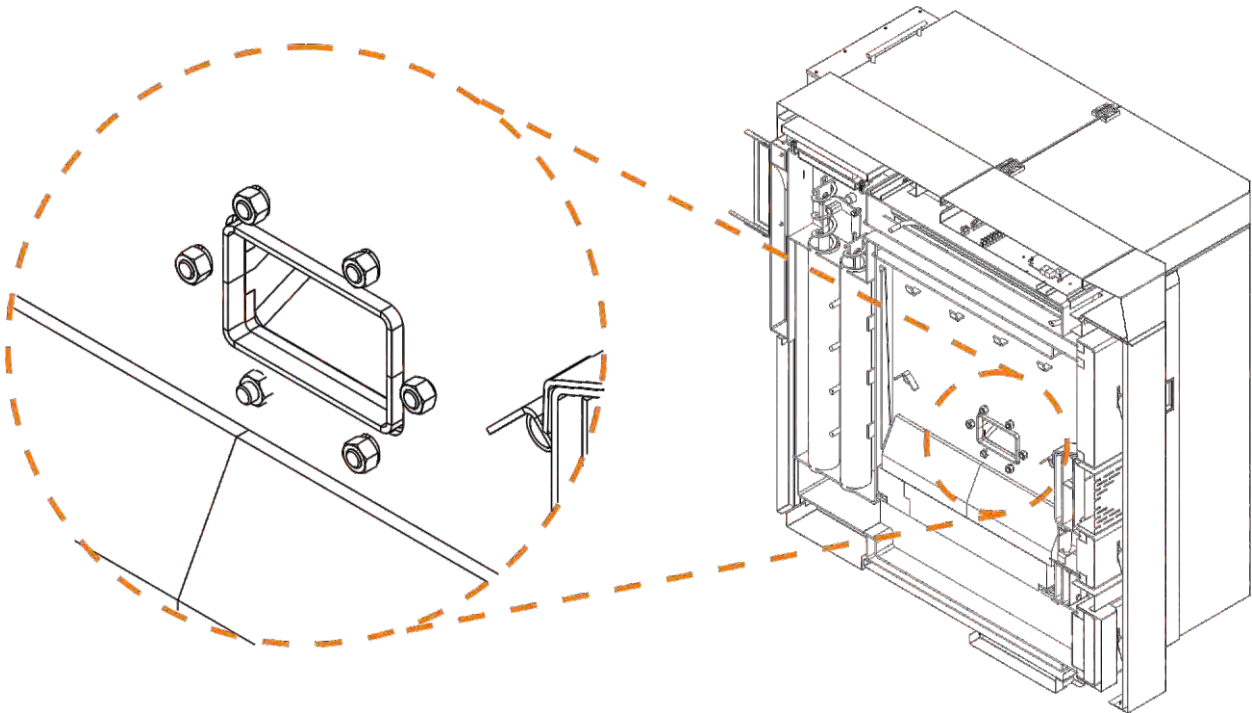
BioTec Plus - left part of the boiler section view



Put washer, toothed washer and nut on screw like is shown on figure above (B). Tight nut but not completely tight.

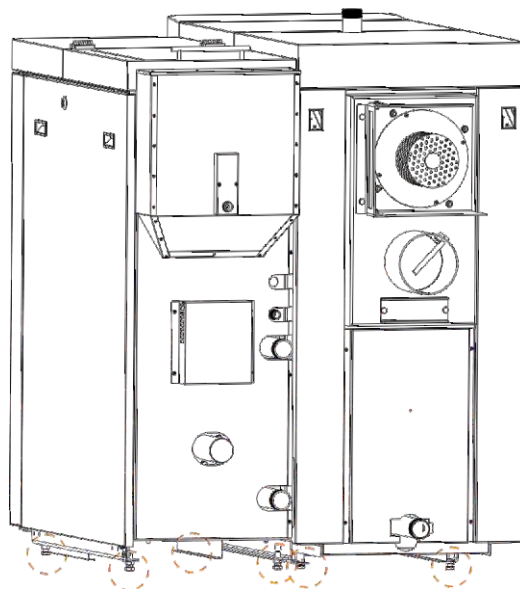
STEP 4:

BioTec Plus - left part of the boiler section view



Put washers, toothed washers and nuts on all other screws and start tight them. If is needed, nivel boiler (holes are slitted for nivelng). Tight hard all six nuts.

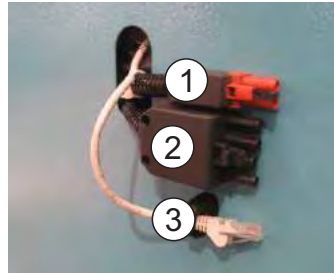
STEP 5:



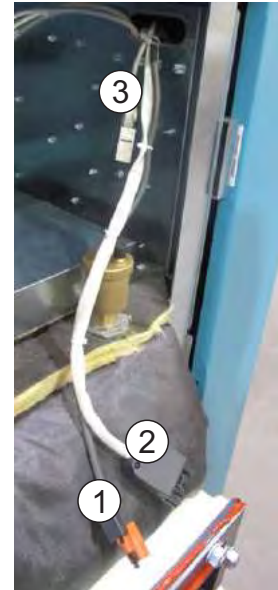
Left and right side of the boiler have adjustable foots. Adjust it if is necessary. Boiler foots must touching boilerroom floor.

STEP 6:

prepared sockets on left side
of the boiler (wood)



prepared plugs on right side
of the boiler (wood pellets)



On left side of the boiler (wood) are prepared sockets, on right side of the boiler (wood pellets) are prepared plugs. Cabels must be connected in right order: 1-1; 2-2; 3-3;

Figure 2.a Base protection with mineral wool

Push base protection under the boiler

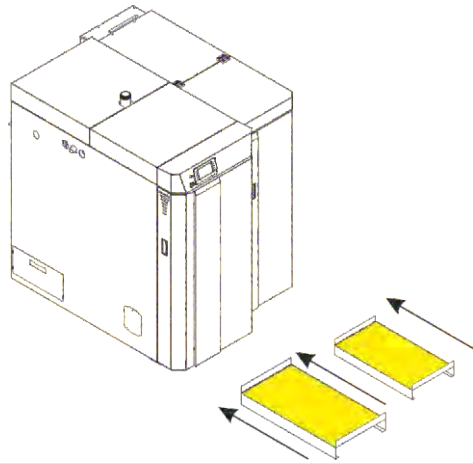
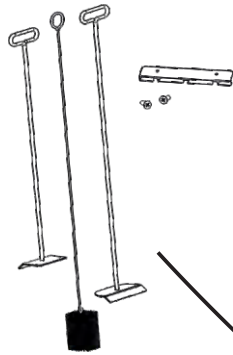
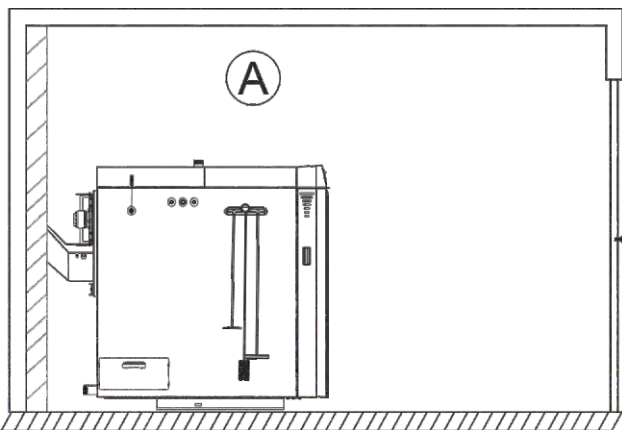
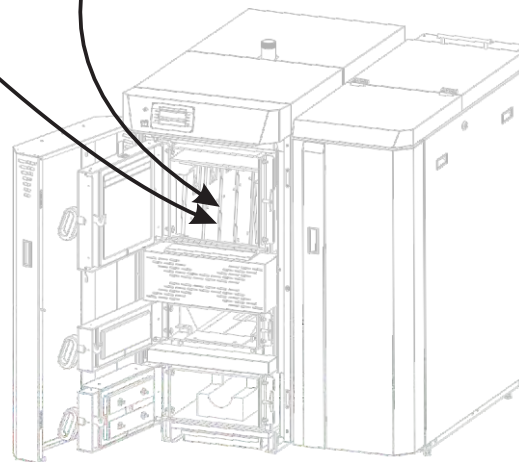


Figure 2.b Delivered parts

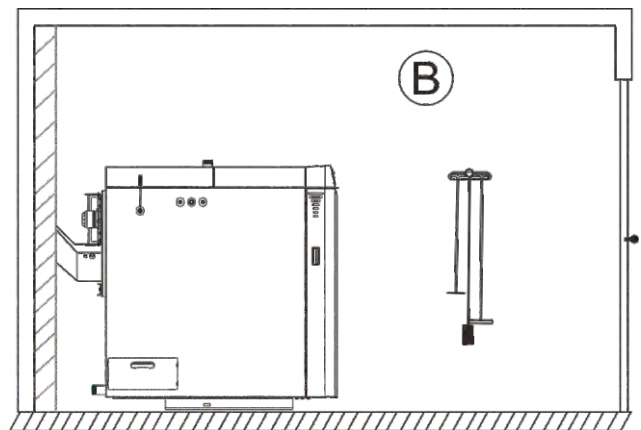
Cleaning set



Sensor set



Position od cleaning set - **on the boiler.**

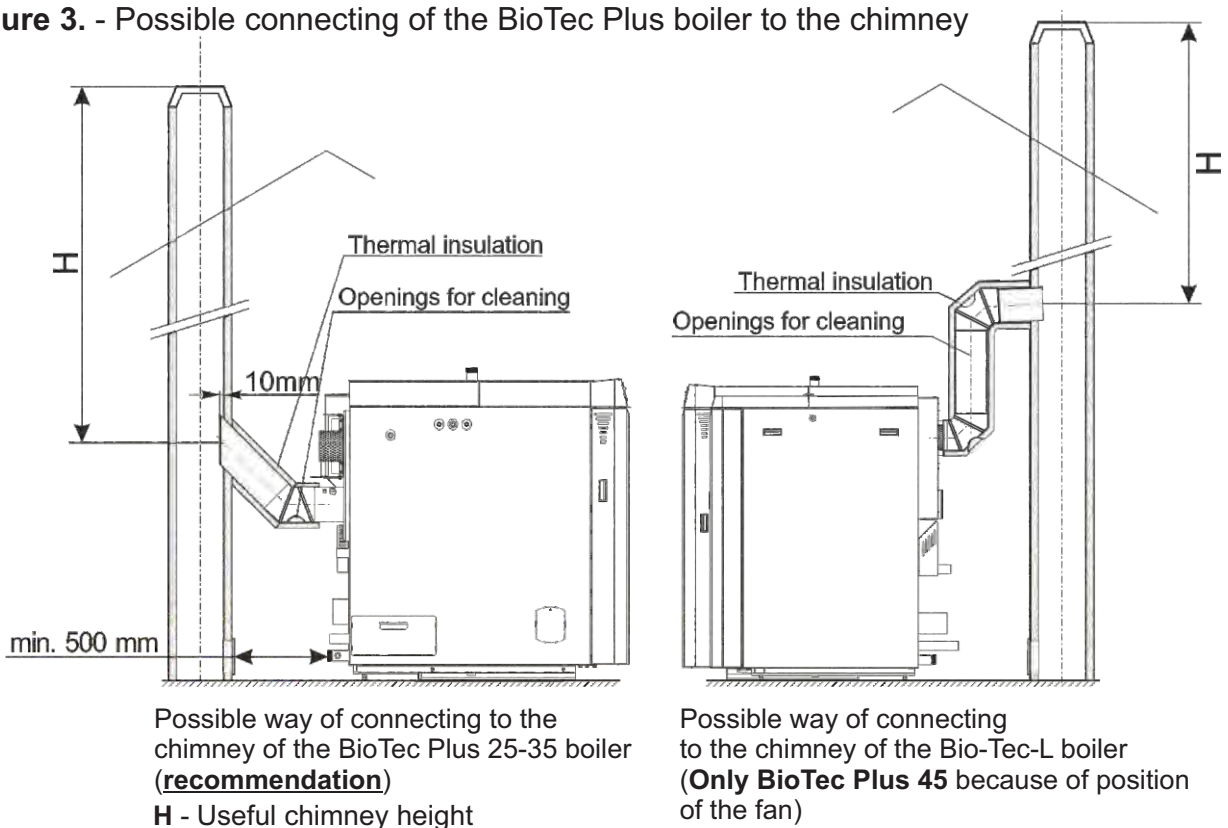


Position od cleaning set - **on the wall.**

4.0. 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 layered 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 minimum 30°C higher than the temperature of their condensating 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 made in accordance with valid national and European standards.

Figure 3. - Possible connecting of the BioTec Plus boiler to the chimney



At connecting a boiler to the chimney, flue gas tubes and elbows must not pass behind the fan since in that 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

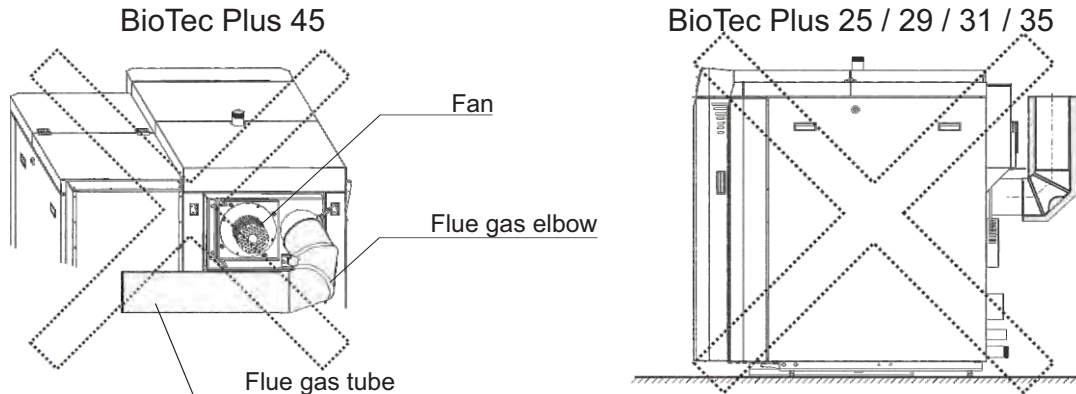
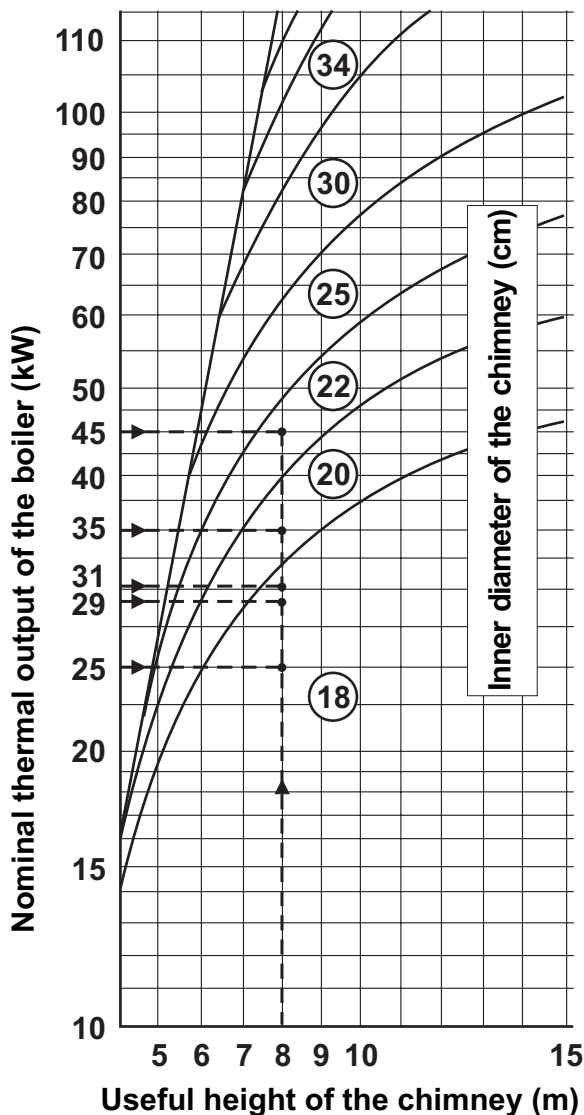


Figure 5. - Dimensioning of the chimney for BioTec Plus boilers



An example of the chimney selection:

- **boiler output: 25 kW**
- Fuel: wood logs, wood pellets
- required useful chimney height: H=8 m
- required inner chimney diameter: 18 cm
- **boiler output: 29 kW**
- Fuel: wood logs, wood pellets
- required useful chimney height: H=8 m
- required inner chimney diameter: 18 cm
- **boiler output: 31 kW**
- Fuel: wood logs, wood pellets
- required useful chimney height: H=8 m
- required inner chimney diameter: 18 cm
- **boiler output: 35 kW**
- Fuel: wood logs, wood pellets
- required useful chimney height: H=8 m
- required inner chimney diameter: 20 cm
- **boiler output: 45 kW**
- Fuel: wood logs, wood pellets
- 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.

4.1. 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.

Equation for calculate opening area:

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

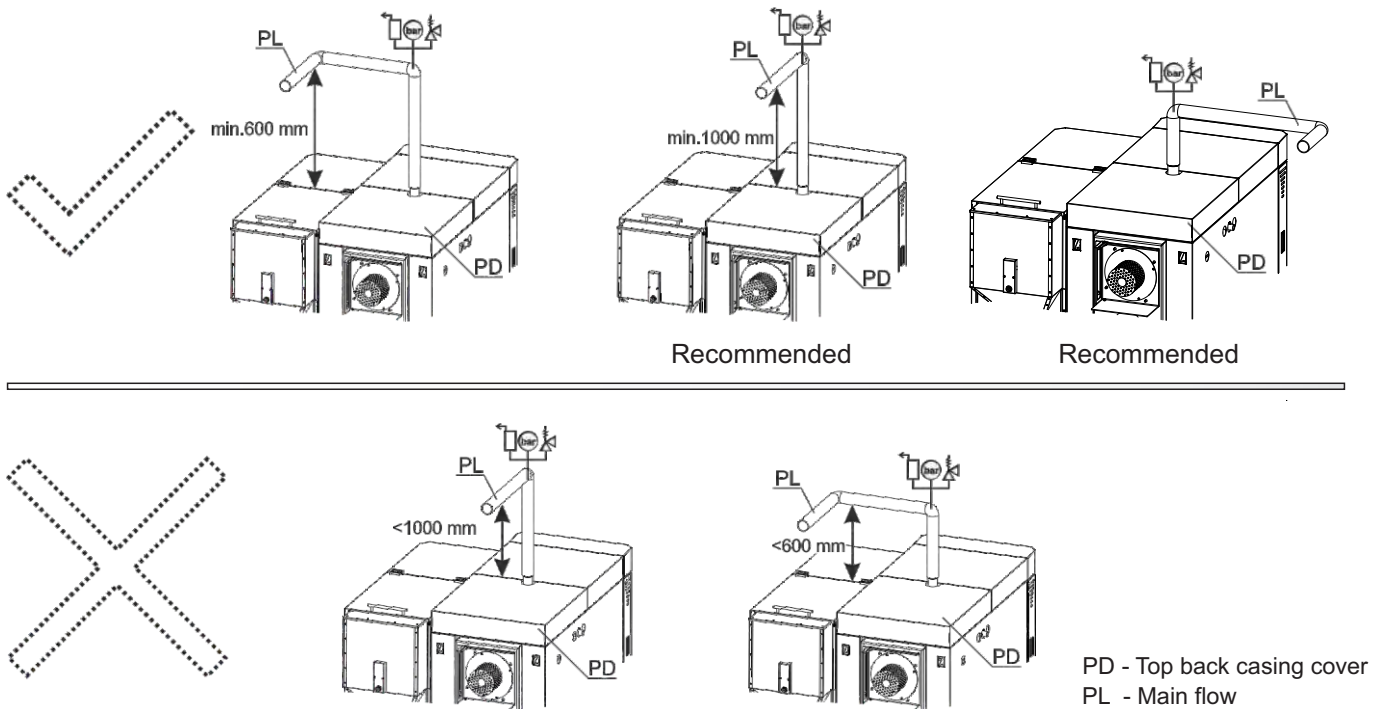
A - opening area in cm²

Q - boiler output in kW

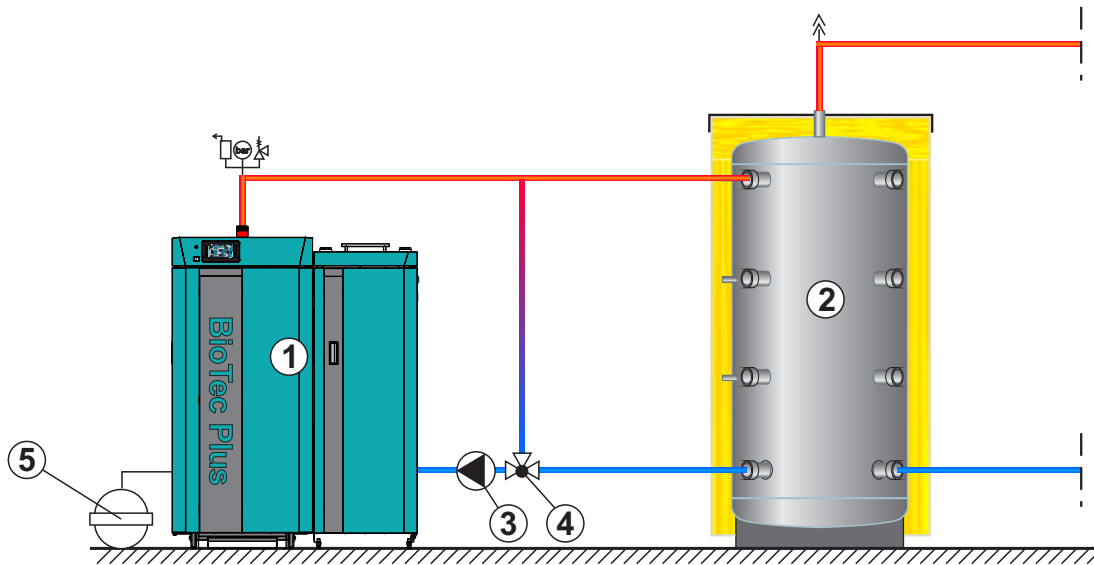
5.0. CONNECTION TO THE CENTRAL HEATING SYSTEM

All installation works must be made in accordance with valid national and European standards. Boiler BioTec Plus can be built to closed and open central heating system. In both cases boiler must be fired with wood logs or wood pellets. Installation has to be made in according to technical standards, by a professional who will be responsible for proper boiler operation. The main flow pipe 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.

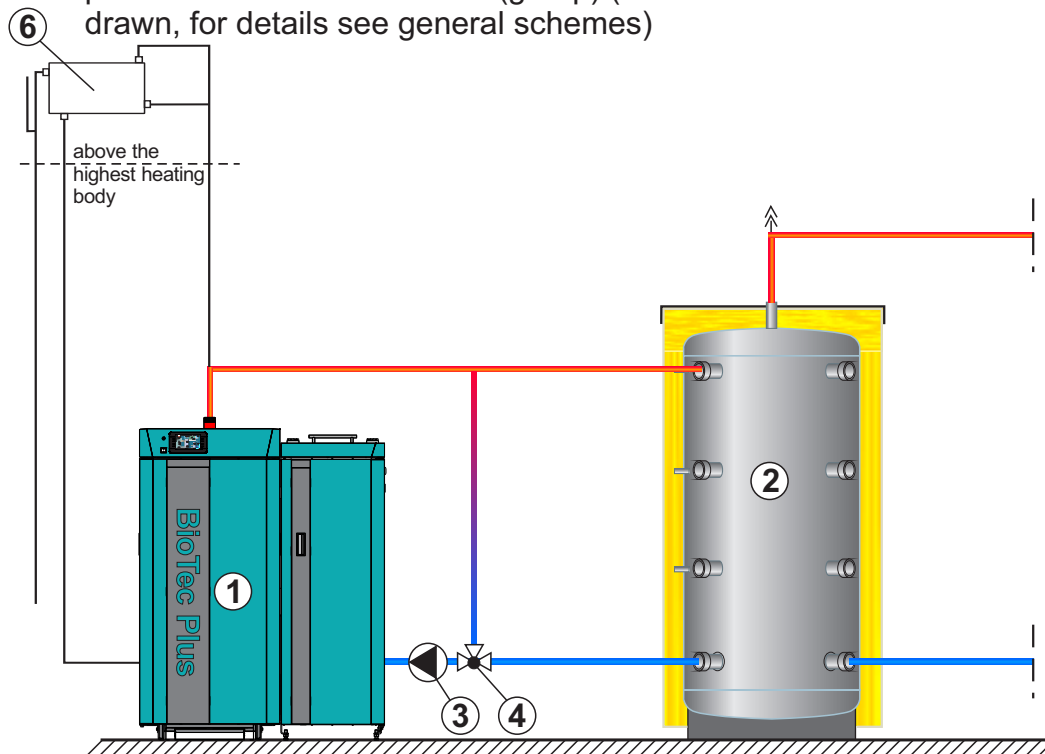
Figure 6. Examples of main flow constructions



Scheme 1a. - Basic scheme for boiler installation on closed central heating system with return flow protection with thermic valve (group) (electrical connections and sensor are not drawn, for details see general schemes)



Scheme 1b. - Basic scheme for boiler installation on open central heating system with return flow protection with thermic valve (group) (electrical connections and sensors are not drawn, for details see general schemes)



- | | |
|-----------------------------|---|
| ① - Boiler BioTec Plus | ④ - Return flow protection by 3-way mixing valve with actuator (protection valve) or by 3-way thermic valve (like Esbe LTC, VTC..., 60°C) |
| ② - Accumulation tank «CAS» | ⑤ - Expansion vessel for closed heating systems (approx. 10% of the total volume of installation) |
| ③ - Boiler pump | ⑥ - Open expansion vessel for open heating systems (OPC) (approx. 7% of total volume of installation) |

5.1. CONNECTION TO THE OPEN CENTRAL HEATING SYSTEM

If the boiler is aimed to be integrated into an open central heating system, one of possible way how to connect the boiler to the system is shown on Scheme 1b. In case of BioTec Plus boilers, the boiler pump 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.

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 about 7% of the volume of entire heating installation. The boiler **has** to be connected with one or more CAS water accumulators, 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 (protection valve) or 3-way thermic valve (like ESBE VTC 512, VTC 531 (60°C), LTC 261, LTC 271 (60°C)).

5.2. CONNECTION TO THE CLOSED CENTRAL HEATING SYSTEM

In closed heating system (as in example shown in Scheme 1a) 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 approx. 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 boiler has to be connected with one or more CAS water accumulators, 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 Plus". The boiler should not be used without being connected to the water accumulator. It must be connected to the CAS water accumulator obligatory through an 3-way mixing valve with actuator (protection valve) or 3-way thermic valve (like ESBE VTC 512, VTC 531 (60°C), LTC 261, LTC 271 (60°C)).

5.2.1. 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 installed on left side of the boiler (wood), and thermal safety valve (7) should be installed according to Scheme 2. On right side of the boiler (wood pellet) is also factory installed heat exchanger with factory installed thermal safety valve. 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, guarantee will not be applied.

IMPORTANT:

Thermal protection must be 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:

Left side of the boiler (wood):

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

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

Right side of the boiler (wood pellets):

Thermal protection for right side of the boiler BioTec Plus consists of a **heat exchanger** which is factory built in boiler, and **thermal safety valve (11)** which is also factory built in boiler.

INSTALLATION (according to Scheme 2.):

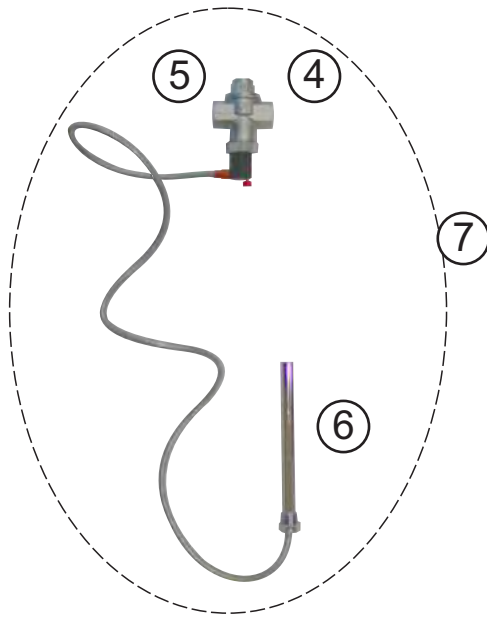
Left side of the boiler (wood):

- 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 city plumbing 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").

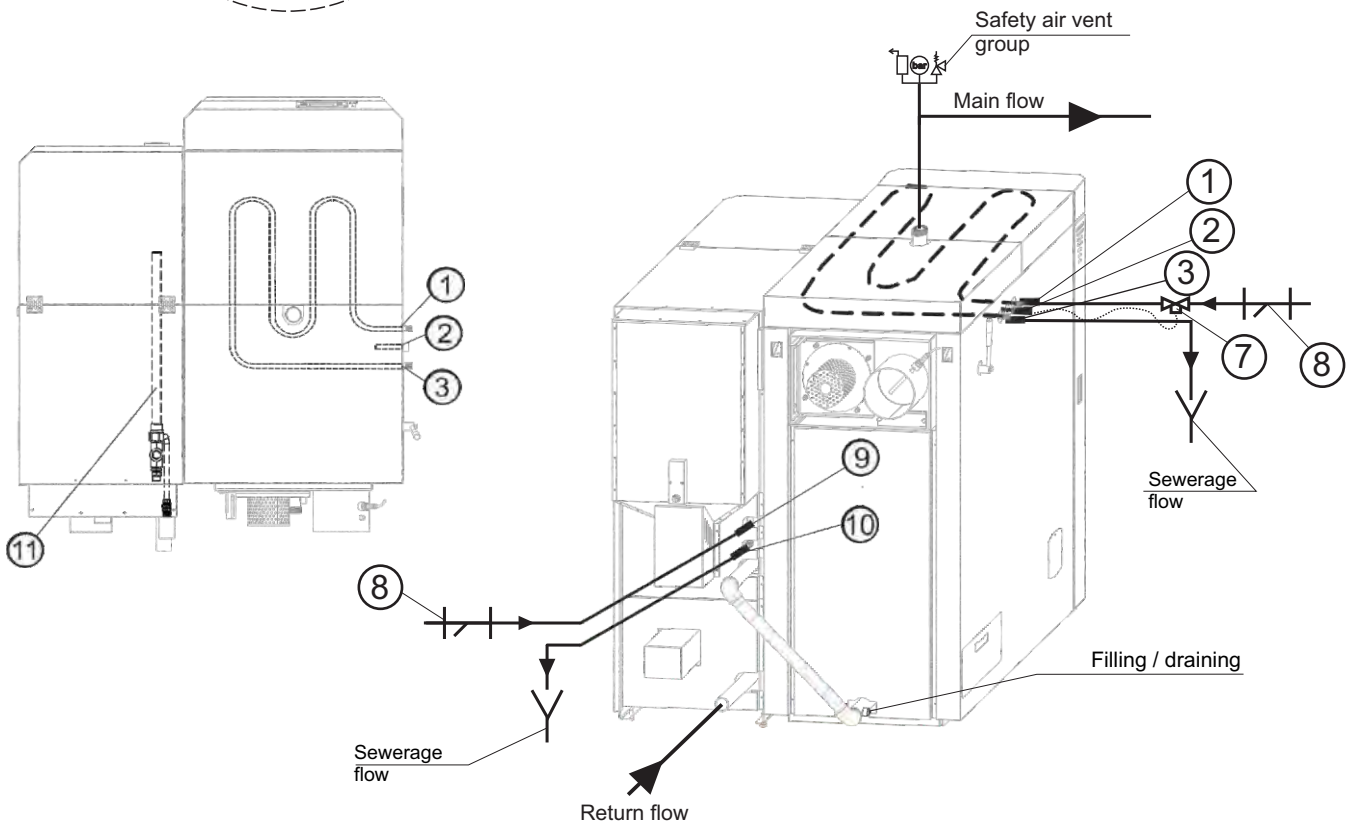
Right side of the boiler (wood pellets):

- fix the connection (9) (inner thread 3/4") to the city plumbing cold water inlet.
- fix the tube connected to the sewage outlet at the connecting point (10) (outer thread 1/2").

Scheme 2. - Thermal protection in an closed heating system



- ① - Heat exchanger connection (to thermal safety valve)
(left side of the boiler - wood)
- ② - Connection for the thermal safety valve sensor
(left side of the boiler - wood)
- ③ - Heat exchanger connection (to the sewerage)
(left side of the boiler - wood)
- ④ - Thermal safety valve connection
(cold water inlet HV)
- ⑤ - Thermal exchanger connection (to the boiler)
(to the boiler)
- ⑥ - Thermal safety valve-sensor
- ⑦ - Thermal safety valve
- ⑧ - Dirt filter (recommended)
- ⑨ - Heat exchanger connection
(right side of the boiler - wood pellet)
- ⑩ - Heat exchanger connection (to the sewerage)
(right side of the boiler - wood pellets)
- ⑪ - Factory inbuilt thermal safety valve
(right side of the boiler - wood pellets)



5.3. GENERAL CONNECTION SCHEMES

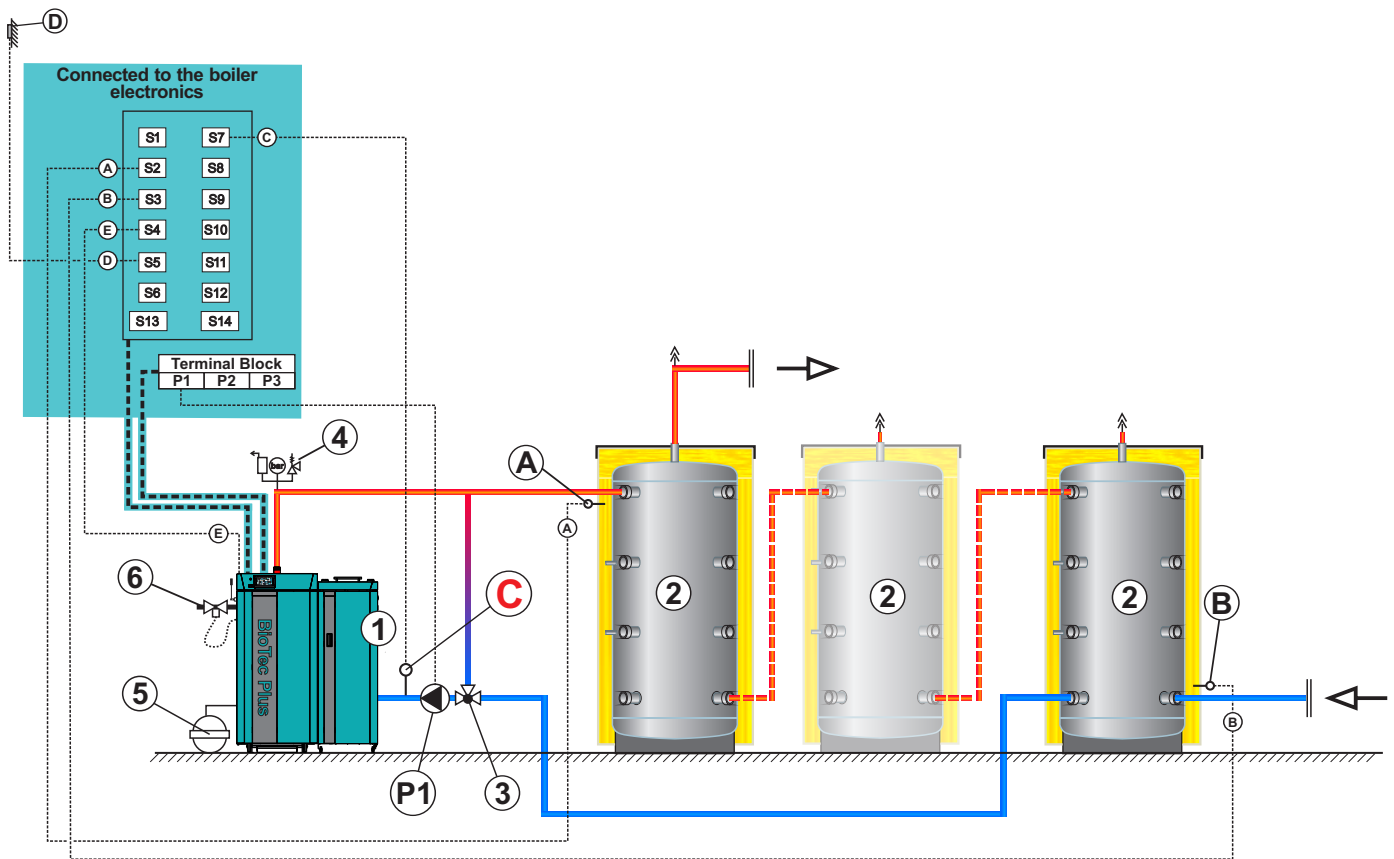


Each heating scheme with BioTec Plus has option of installing up to 4 pcs CM2K-B modules (additional heating circuits management, DHW preparation and recirculation).

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

- *1 - Boiler "BioTec Plus"
- *2 - "CAS" accumulation tank (buffer tank)
- *3 - Return flow protection (3-way mixing valve with actuator (protection valve) or 3-way thermic valve (60°C), VTC 512, VTC 531, LTC 261, LTC 271)
- *4 - Safety airvent unit
- *5 - Expansion vessel for closed systems (min. 10% of the total volume of installation)
- *6 - Thermal safety valve

- *P1 - PumpP1 (boiler pump)
- A - Accumulation tank sensor (upper)
- B - Accumulation tank sensor (lower)
- **C - Return flow temperature sensor
- D - Outer temperature sensor
- E - Flue gas sensor



* Not included in delivery of boiler BioTec Plus (need additional order)

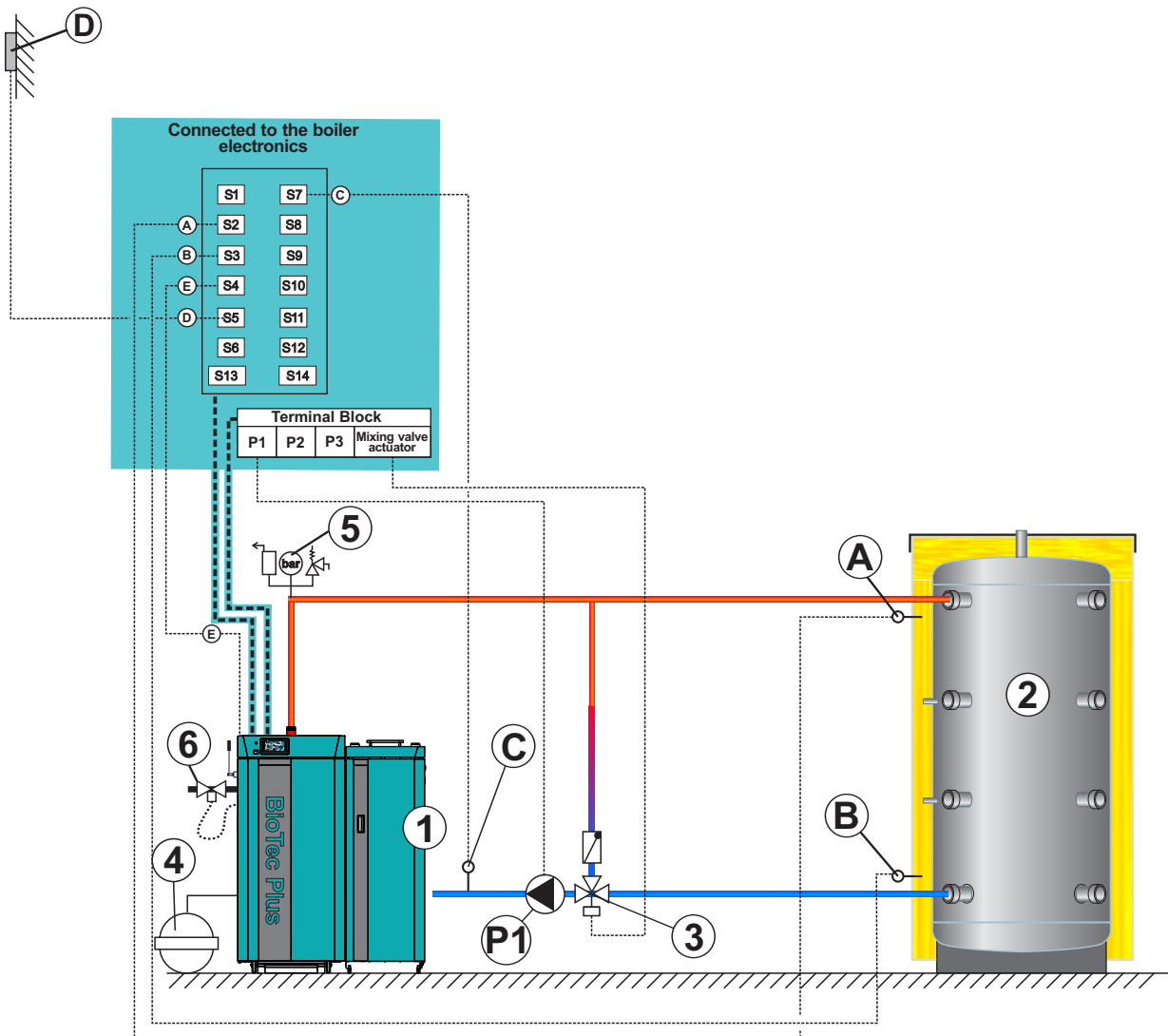
** Can be used only if it's on position „3“ installed actuator

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. - General scheme of closed central heating system with 1 accumulation tank, boiler return flow protection with 3 - way mixing valve with electric actuator.

- 1 - Boiler "BioTec Plus".
- *2 - "CAS" accumulation tank (buffer tank).
- 3 - Return flow protection (3-way mixing valve with actuator (protection valve))
- *4 - Expansion vessel for closed systems (min. 10% of the total volume of installation)
- *5 - Safety airvent unit
- *6 - Thermal safety valve

- *P1 - Pump P1 (boiler pump)
- A - Accumulation tank sensor (upper)
- B - Accumulation tank sensor (lower)
- C - Return flow temperature sensor
- D - Outer temperature sensor
- E - Flue gas sensor



* Not included in delivery of boiler BioTec Plus (need additional order)

NOTE:

- According to this scheme is possible to preform version for open central heating system (see point 6.0, Connection to the central heating system).
- Return flow protection (3) can be also performed by 3-way thermic valve ((60°C), VTC 512, VTC 531, LTC 261, LTC 271).

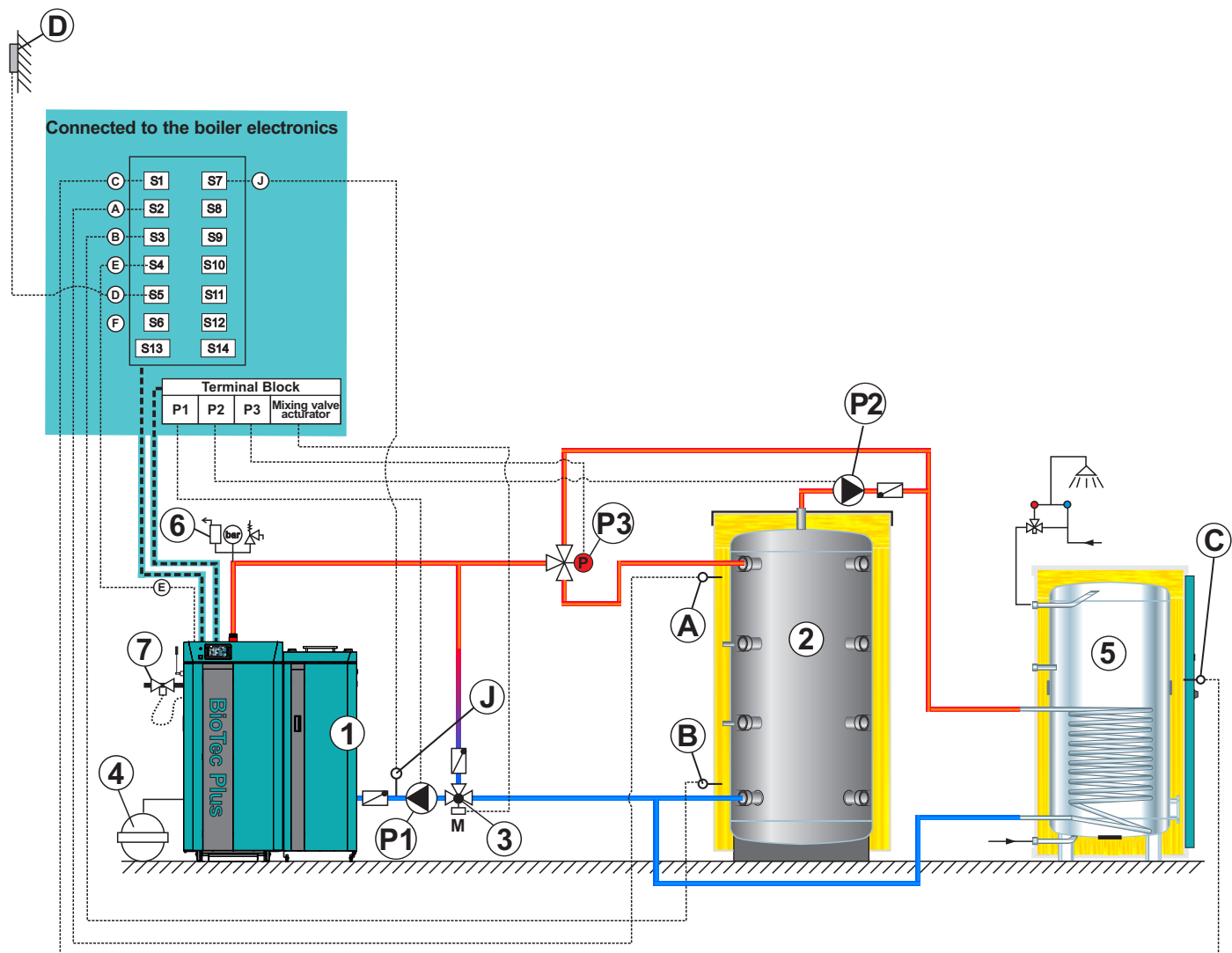
Scheme 5.- General scheme of closed central heating system with 1 accumulation tank and DHW preparation in front/behind accumulation tank.



IMPORTANT! This way of connecting DHW tank is necessary if in some part of the year we only want to use pellets for heat DHW tank.

- 1 - Boiler "BioTec Plus".
- *2 - "CAS" accumulation tank (buffer tank).
- *3 - Return flow protection (3-way mixing valve with actuator
- *4 - Expansion vessel for closed systems (min. 10% of the total volume of installation)
- *5 - Sanitary water tank (SKB-Digi/LKB-Digi/TB/STEB)
- *6 - Safety airvent unit
- *7 - Thermal safety valve

- *P1 - Pump P1 (boiler pump)
- *P2 - Pump P2 (DHW pump)
- *P3 - 3-way diverter valve P3
- A - Accumulation tank sensor (upper)
- B - Accumulation tank sensor (lower)
- C - DHW sensor (domestic hot water)
- D - Outer temperature sensor
- E - Flue gas sensor
- F - Main flow sensor
- J - Return flow temperature sensor



* Not included in delivery of boiler BioTec Plus (need additional order)

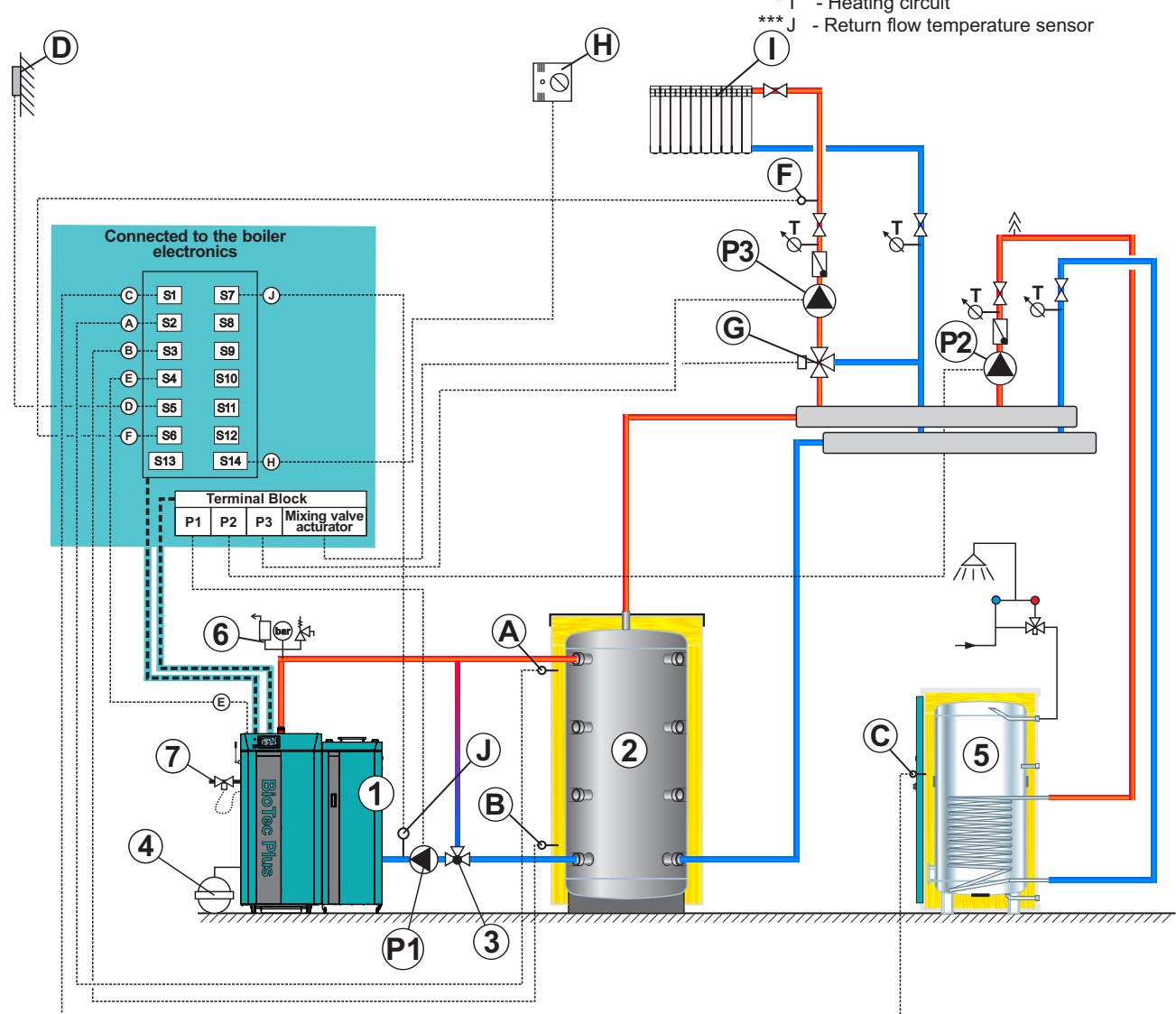
NAPOMENA:

- According to this scheme is possible to perform version for open central heating system (see point 6.0, Connection to the central heating system).

Scheme 6. - General scheme of closed central heating system with 1 accumulation tank, heating system behind accumulation tank, 1 heating circuit with 3-way mixing valve with actuator (or without actuator), and DHW preparation.

- 1 - Boiler "BioTec Plus".
- *2 - "CAS" accumulation tank (buffer tank).
- *3 - Return flow protection (3-way mixing valve with actuator (protection valve) or 3-way thermic valve (60°C), VTC 512, VTC 531, LTC 261, LTC 271)
- *4 - Expansion vessel for closed systems (min. 10% of the total volume of installation)
- *5 - Sanitary water tank (SKB-Digi/LKB-Digi/TB/STEB)
- *6 - Safety airvent unit
- *7 - Thermal safety valve

- *P1 - Pump P1 (boiler pump)
- *P2 - Pump P2 (DHW pump)
- *P3 - Pump P3 (heating pump)
- A - Accumulation tank sensor (upper)
- B - Accumulation tank sensor (lower)
- C - DHW sensor (domestic hot water)
- D - Outer temperature sensor
- E - Flue gas sensor
- F - Main flow sensor
- *G - 3-way mixing valve with actuator or manual 3-way mixing valve
- **H - Room corrector (CSK)
- *I - Heating circuit
- ***J - Return flow temperature sensor



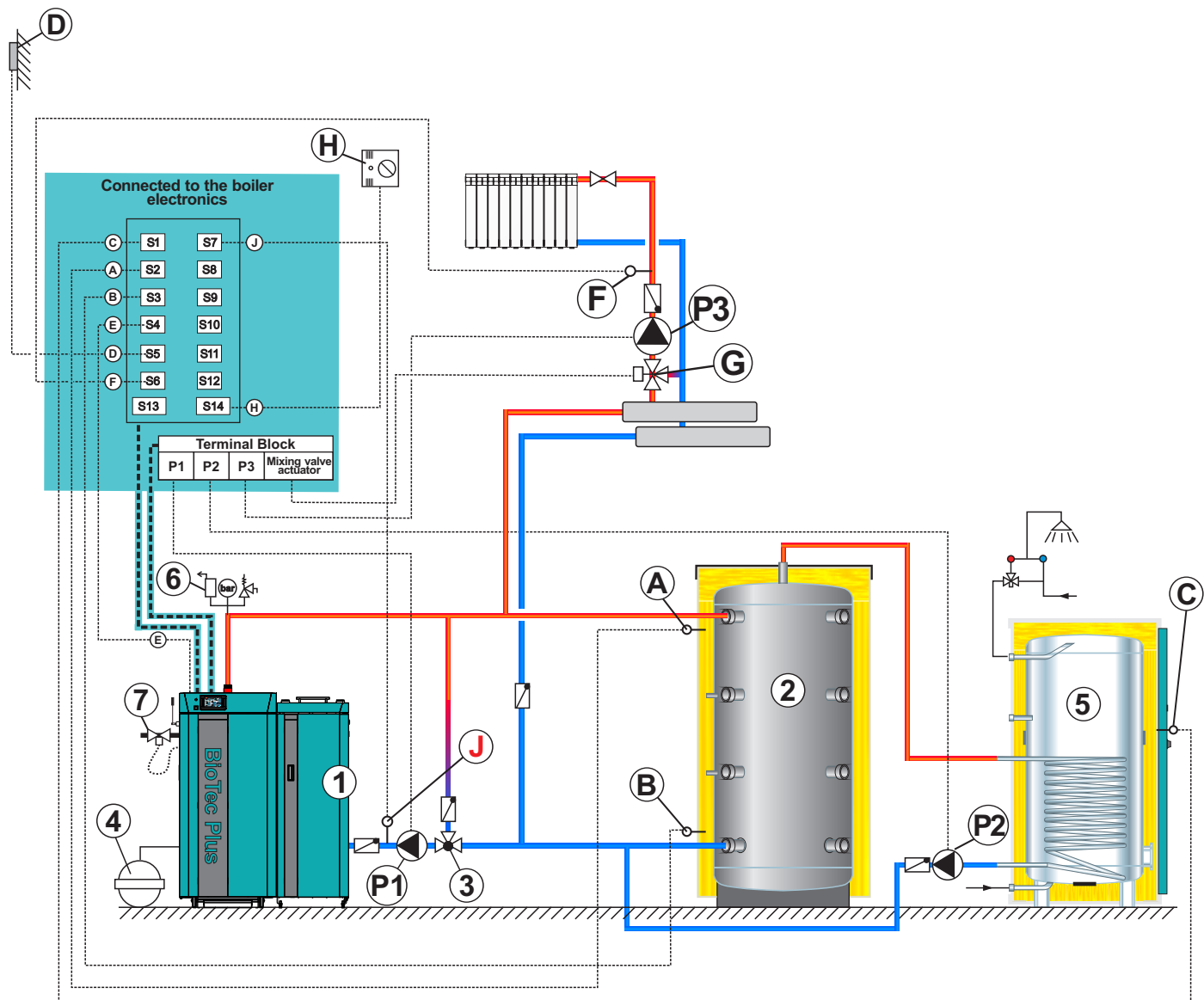
* Not included in delivery of boiler BioTec Plus (need additional order)
 ** Can be used only if it's on position „G” installed actuator
 *** Can be used only if it's on position „3” installed actuator

NOTE:
 - According to this scheme is possible to preform version for open central heating system (see point 6.0, Connection to the central heating system).
 - Actuator can be installed only on position „G” or position „3” and noway on any other positions.

Scheme 7. - General scheme of closed central heating system with 1 accumulation tank, heating system in front of accumulation tank, 1 heating circuit with 3-way mixing valve with actuator, room corrector, and DHW preparing.

- 1 - Boiler "BioTec Plus".
- *2 - "CAS" accumulation tank (buffer tank).
- *3 - Return flow protection
- *4 - Expansion vessel for closed systems (min. 10% of the total volume of installation)
- *5 - Sanitary water tank (SKB-Digi/LKB-Digi/TB/STEB)
- *6 - Safety airvent unit
- *7 - Thermal safety valve

- *P1 - Pump P1 (boiler pump)
- *P2 - Pump P2 (DHW pump)
- *P3 - Pump P3 (heating pump)
- A - Accumulation tank sensor (upper)
- B - Accumulation tank sensor (lower)
- C - DHW sensor (domestic hot water)
- D - Outer temperature sensor
- E - Flue gas sensor
- F - Main flow sensor
- *G - 3-way mixing valve with actuator
- *H - Room corrector (CSK)
- I - Heating circuit
- **J - Return flow temperature sensor



* Not included in delivery of boiler BioTec Plus (need additional order)

** Can be used only if it's on position „3“ installed actuator

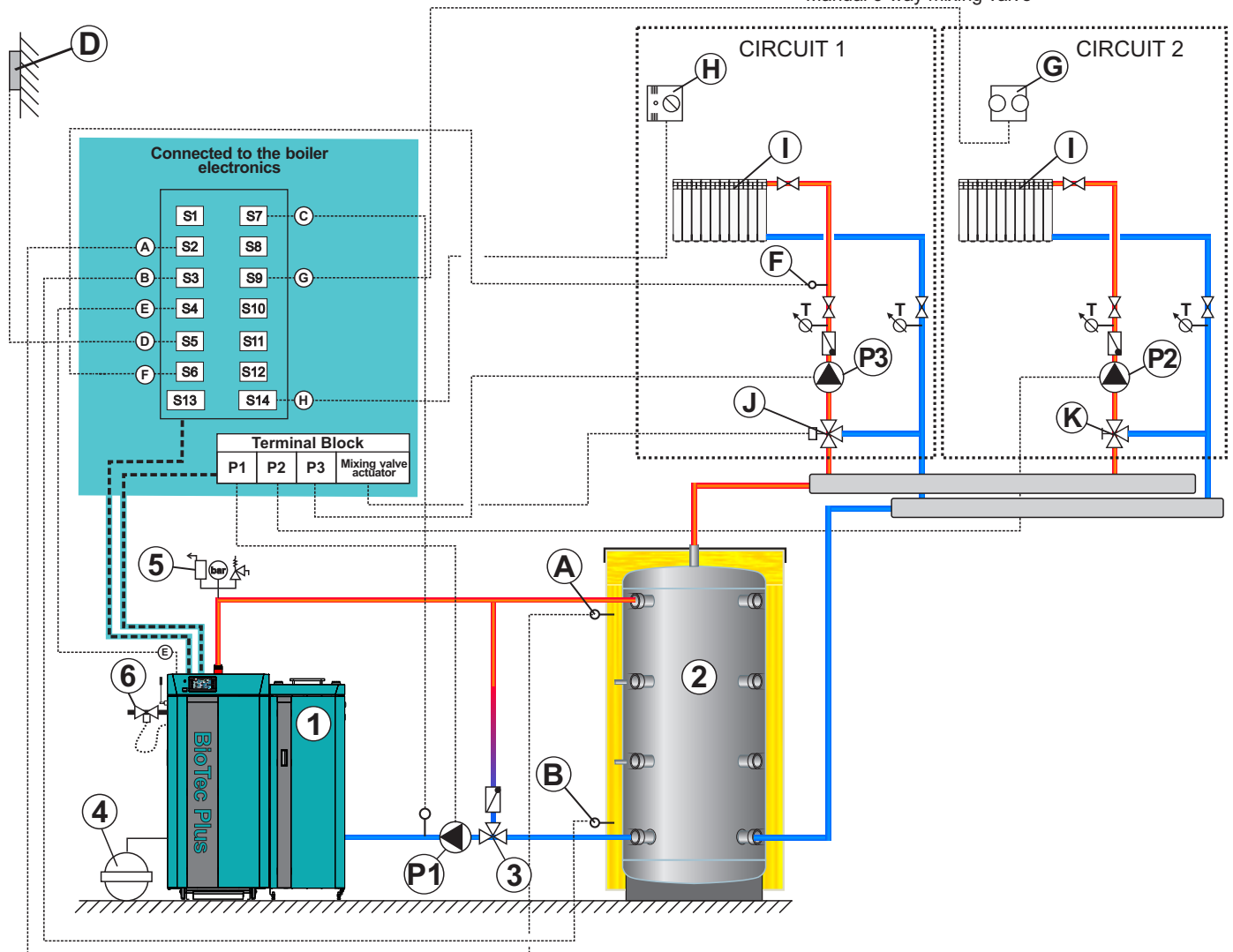
NOTE:

According to this scheme is possible to preform version for open central heating system (see point 6.0, Connection to the central heating system).

Scheme 8. - General scheme of closed central heating system with 1 accumulation tank, heating system behind accumulation tank, 2 heating circuit with 3-way mixing valve (one with actuator, other manually operated).

- 1 - Boiler "BioTec Plus".
- *2 - "CAS" accumulation tank (buffer tank).
- *3 - Return flow protection (3-way mixing valve with actuator (protection valve) or 3-way thermic valve (60°C), VTC 512, VTC 531, LTC 261, LTC 271)
- *4 - Expansion vessel for closed systems (min. 10% of the total volume of installation)
- *5 - Safety airvent unit
- *6 - Thermal safety valve

- *P1 - Pump P1 (boiler pump)
- *P2 - Pump P2 (heating pump circuit 2)
- *P3 - Pump P3 (heating pump circuit 1)
- A - Accumulation tank sensor (upper)
- B - Accumulation tank sensor (lower)
- ***C - Return flow temperature sensor
- D - Outer temperature sensor
- E - Flue gas sensor
- *F - Main flow temperature sensor
- **G - Room thermostat
- *H - Room corrector (CSK)
- *I - Heating circuit
- J - 3-way mixing valve with actuator or manual 3-way mixing valve
- K - Manual 3-way mixing valve



* Not included in delivery of boiler BioTec Plus (need additional order)

** Can be used only if it's on position „J” installed actuator

*** Can be used only if it's on position „3” installed actuator

NOTE:

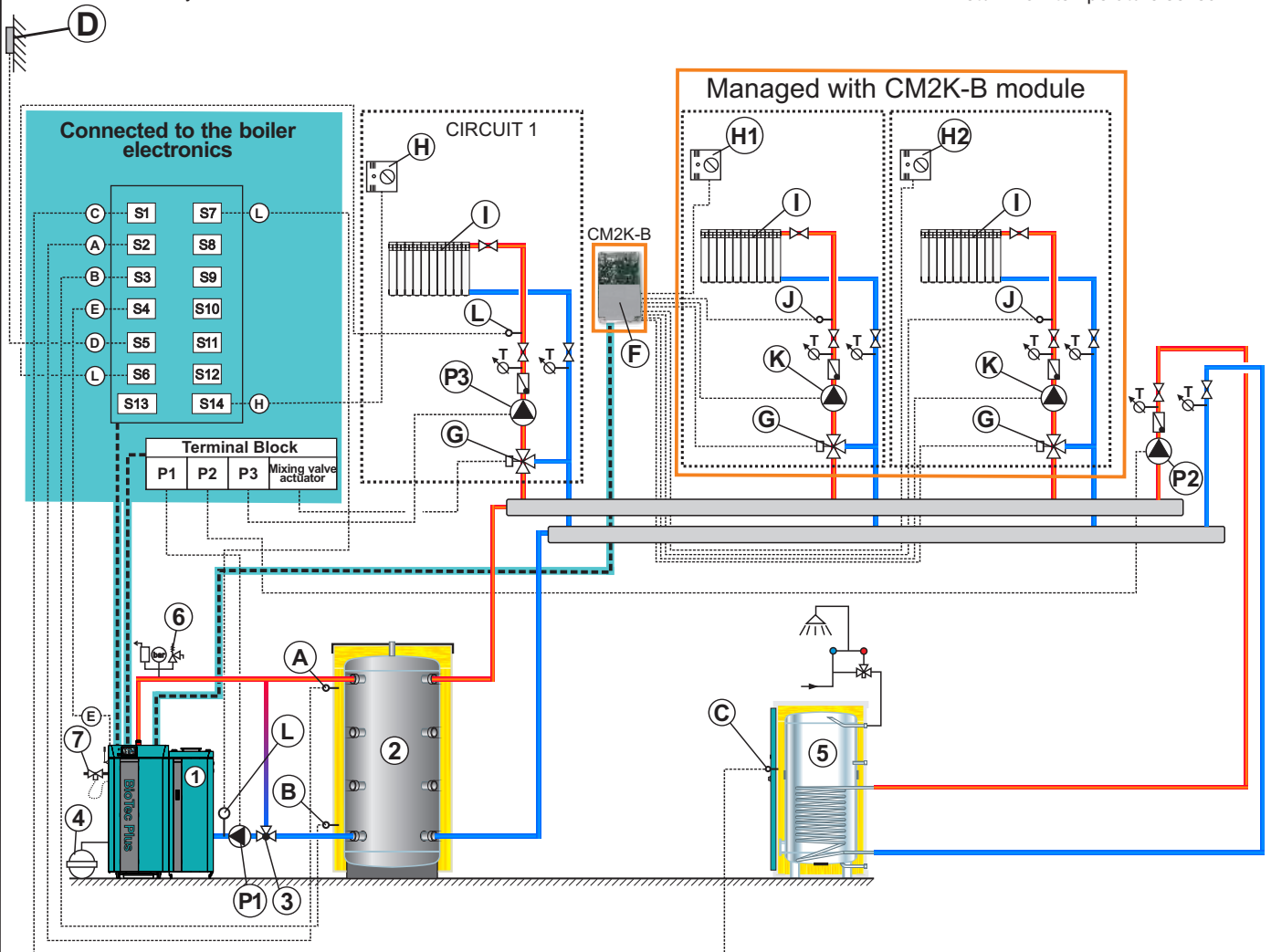
- According to this scheme is possible to preform version with heating system in front accumulation tank.
- According to this scheme is possible to preform version for open central heating system (see point 6.0, Connection to the central heating system).
- Actuator can be installed only on position „J” or position „3” and noway on any other positions.

Scheme 9. - General scheme of closed central heating system with 1 accumulation tank, heating system behind accumulation tank, 3 heating circuit with 3-way mixing valve and DHW preparing.

- 1 - Boiler "BioTec Plus".
- *2 - "CAS" accumulation tank (buffer tank).
- *3 - Return flow protection (3-way mixing valve with actuator (protection valve) or 3-way thermic valve (60°C), VTC 512, VTC 531, LTC 261, LTC 271)
- *4 - Expansion vessel for closed systems (min. 10% of the total volume of installation)
- *5 - Sanitary water tank (SKB-Digi/LKB-Digi/TB/STEB)
- *6 - Safety airvent unit
- *7 - Thermal safety valve

- *P1 - Pump P1 (boiler pump)
- *P2 - Pump P2 (DHW pump)
- *P3 - Pump P3 (heating pump circuit 1)
- A - Accumulation tank sensor (upper)
- B - Accumulation tank sensor (lower)
- C - DHW sensor (domestic hot water)
- D - Outer temperature sensor
- E - Flue gas sensor
- L - Main flow temperature sensor
- ***H - Room corrector 1 (CSK)

- **F - CM2K-B module (can be expanded to max. 4 units connected in series)
- *G - 3-way mixing valve with actuator or manual 3-way mixing valve
- *H1 - Room corrector 2 (CSK)
- *H2 - Room corrector 3 (CSK)
- *I - Heating circuit
- **J - Main flow temperature sensor in circuit CM2K.
(must be installed with 3-way mixing valve with actuator)
- *K - Heating pump (managed by CM2K-B)
- ****L - Return flow temperature sensor



* Not included in delivery of boiler BioTec Plus or CM2K-B module (need additional order)

** Included in basic delivery of CM2K-B module

*** Can be used only if it's on position „G” installed actuator

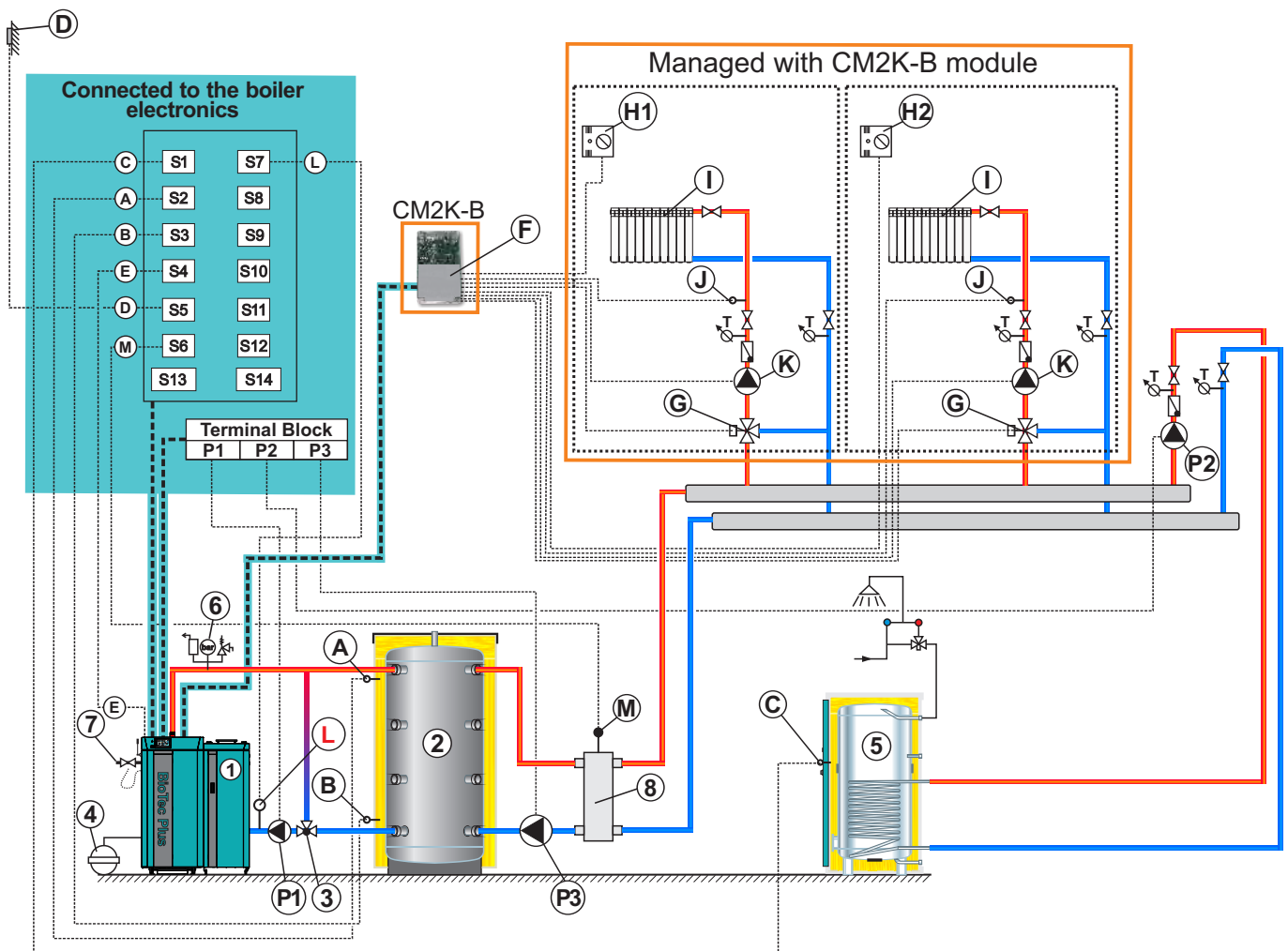
**** Can be used only if it's on position „3” installed actuator

NOTE:

- According to this scheme is possible to preform version for open central heating system (see point 6.0, Connection to the central heating system). It's possible to expand system of heating circuit lead by CM2K-B module with installing additional CM2K-B modules (max. 3 pcs) in serial connection.
- Actuator can be installed only on position „G” or position „3” and noway on any other positions.

Scheme 10. - General scheme of closed central heating system with 1 accumulation tank, hydraulic crossover behind accumulation tank, 2 heating circuits with 3-way mixing valve with actuator managed by CM2K-B module, DHW preparing.

- | | | |
|---|---|--|
| 1 - Boiler "BioTec Plus". | *P1 - Pump P1 (boiler pump) | **F - CM2K-B module (can be expanded to max. 4 units connected in series) |
| *2 - "CAS" accumulation tank (buffer tank). | *P2 - Pump P2 (DHW pump) | *G - 3-way mixing valve with actuator or manual 3-way mixing valve |
| *3 - Return flow protection (3-way mixing valve with actuator (protection valve) or 3-way thermic valve (60°C), VTC 512, VTC 531, LTC 261, LTC 271) | *P3 - Pump P3 (hydraulic crossover pump) | H1 - Room corrector 1 (CSK) (1x room corrector CSK included in basic boiler delivery) |
| *4 - Expansion vessel for closed systems (min. 10% of the total volume of installation) | A - Accumulation tank sensor (upper) | *H2 - Room corrector 2 (CSK) |
| *5 - Sanitary water tank (SKB-Digi/LKB-Digi/TB/STEB) | B - Accumulation tank sensor (lower) | *I - Heating circuit |
| *6 - Safety airvent unit | C - DHW sensor (domestic hot water) | **J - Main flow temperature sensor in circuit CM2K (must be installed with 3-way mixing valve with actuator) |
| *7 - Thermal safety valve | D - Outer temperature sensor | *K - Heating pump (managed by CM2K-B) |
| *8 - Hydraulic crossover | E - Flue gas sensor | ***L - Return flow temperature sensor |
| | M - Hydraulic crossover sensor (delivered as flow temperature sensor) | |



* Not included in delivery of boiler BioTec Plus or CM2K-B module (need additional order)

** Included in basic delivery of CM2K-B module

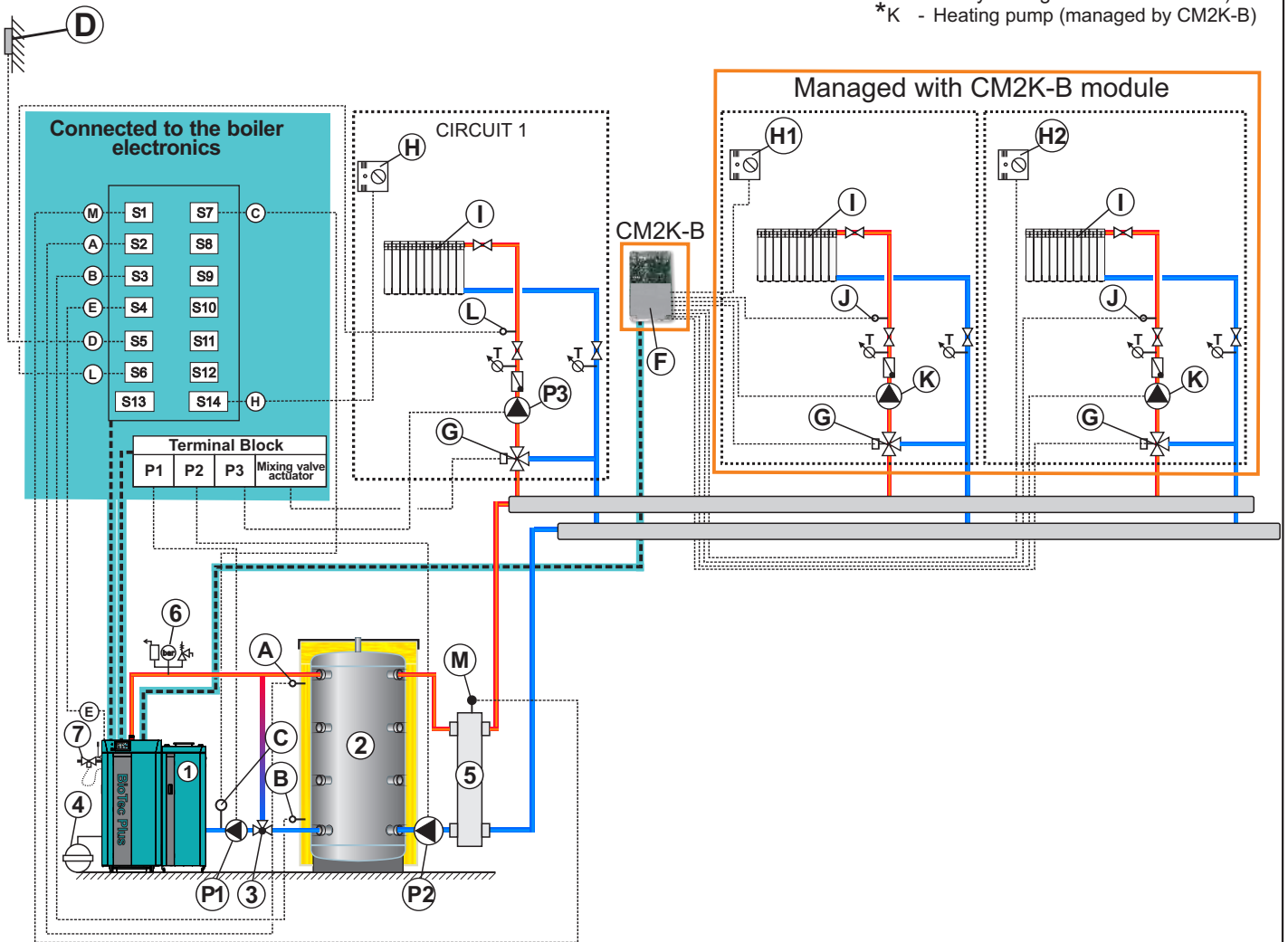
*** Can be used only if it's on position „3” installed actuator

NOTE:

- According to this scheme is possible to preform version for open central heating system (see point 6.0, Connection to the central heating system).
- It's possible to expand system of heating circuit lead by CM2K-B module with installing additional CM2K-B modules (max. 3 pcs) in serial connection.

Scheme 11. - General scheme of closed central heating system with 1 accumulation tank, hydraulic crossover behind accumulation tank, 3 heating circuits with 3-way mixing valve with actuator (1 direct heating circuit and 2 circuits managed by CM2K-B module).

- 1 - Boiler "BioTec Plus".
- *2 - "CAS" accumulation tank (buffer tank).
- *3 - Return flow protection (3-way mixing valve with actuator (protection valve) or 3-way thermic valve (60°C), VTC 512, VTC 531, LTC 261, LTC 271)
- *4 - Expansion vessel for closed systems (min. 10% of the total volume of installation)
- *5 - Hydraulic crossover
- *6 - Safety airvent unit
- *7 - Thermal safety valve
- *P1 - Pump P1 (boiler pump)
- *P2 - Pump P2 (hydraulic crossover pump)
- *P3 - Pump P3 (heating circuit 1 pump)
- A - Accumulation tank sensor (upper)
- B - Accumulation tank sensor (lower)
- ***C - Return flow temperature sensor
- D - Outer temperature sensor
- E - Flue gas sensor
- **H - Room corrector 1 (CSK)
- L - Main flow temperature sensor (circuit 1)
- M - Hydraulic crossover sensor (delivered as flow temperature sensor)
- **F - CM2K-B module (can be expanded to max. 4 units connected in series)
- *G - 3-way mixing valve with actuator or manual 3-way mixing valve
- H1 - Room corrector 2 (CSK) (1x room corrector CSK included in basic boiler delivery)
- *H2 - Room corrector 3 (CSK)
- *I - Heating circuit
- **J - Main flow temperature sensor in circuit CM2K (**must be** installed with 3-way mixing valve with actuator)
- *K - Heating pump (managed by CM2K-B)



- * Not included in delivery of boiler BioTec Plus or CM2K-B module (need additional order)
- ** Included in basic delivery of CM2K-B module
- *** Can be used only if it's on position „G” installed actuator
- **** Can be used only if it's on position „3” installed actuator

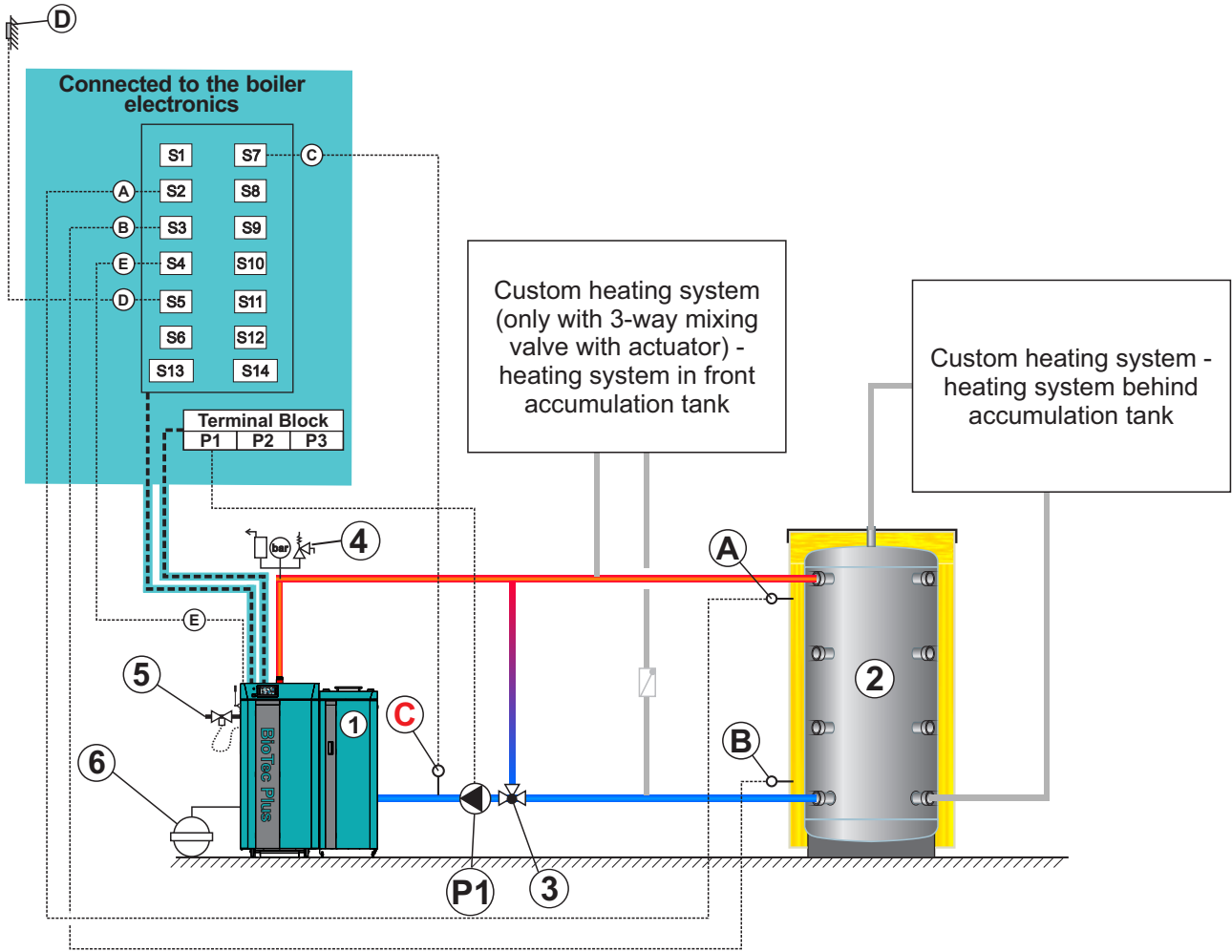
NOTE:

- According to this scheme is possible to preform version for open central heating system (see point 6.0, Connection to the central heating system).
- It's possible to expand system of heating circuit lead by CM2K-B module with installing additional CM2K-B modules (max. 3 pcs) in serial connection.
- Actuator can be installed only on position „G” or position „3” and noway on any other positions.

Scheme 12. - General scheme of closed central heating system with 1 accumulation tank, custom heating system

- 1 - Boiler "BioTec Plus".
- *2 - "CAS" accumulation tank (buffer tank).
- *3 - Return flow protection (3-way mixing valve with actuator (protection valve) or 3-way thermic valve (60°C), VTC 512, VTC 531, LTC 261, LTC 271)
- *4 - Expansion vessel for closed systems (min. 10% of the total volume of installation)
- *5 - Safety airvent unit
- *6 - Thermal safety valve

- *P1 - Pump P1 (boiler pump)
- A - Accumulation tank sensor (upper)
- B - Accumulation tank sensor (lower)
- **C - Return flow temperature sensor
- D - Outer temperature sensor
- E - Flue gas sensor



* Not included in delivery of boiler BioTec Plus (need additional order)

** Can be used only if it's on position „3“ installed actuator

NOTE:

- According to this scheme is possible to preform version for open central heating system (see point 6.0, Connection to the central heating system).

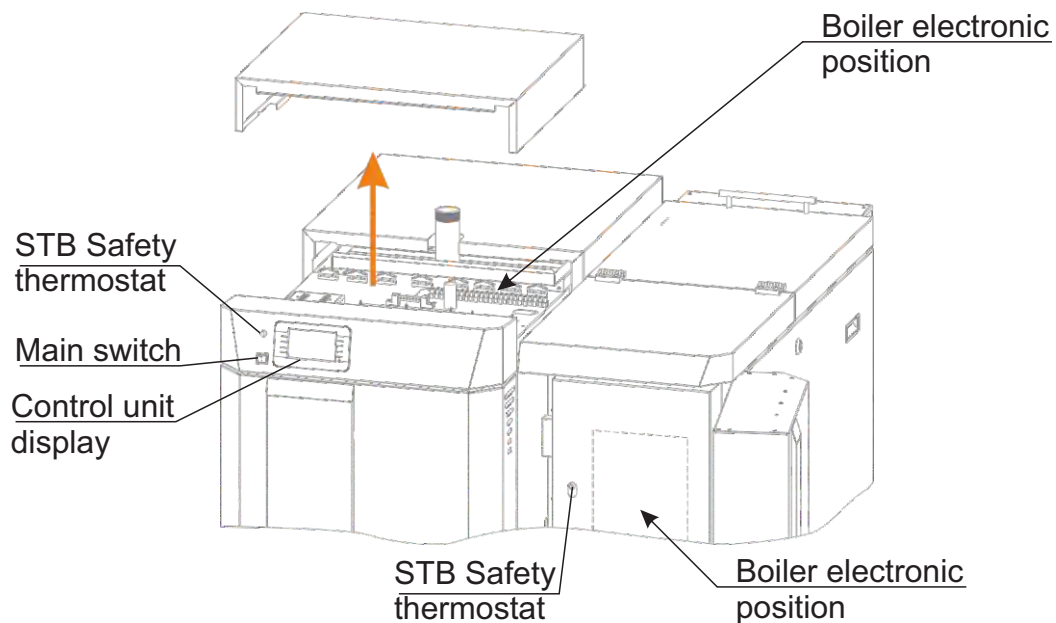
6.0. BOILER REGULATION

6.1. 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, one heat circuit through 3 way mixing valve with actuator and outer temp. sensor and DHW tank. On the front boiler panel are main switch, for switching on/off the boiler control unit, safety thermostat and touch screen of control unit.

Figure 7. Boiler electronic



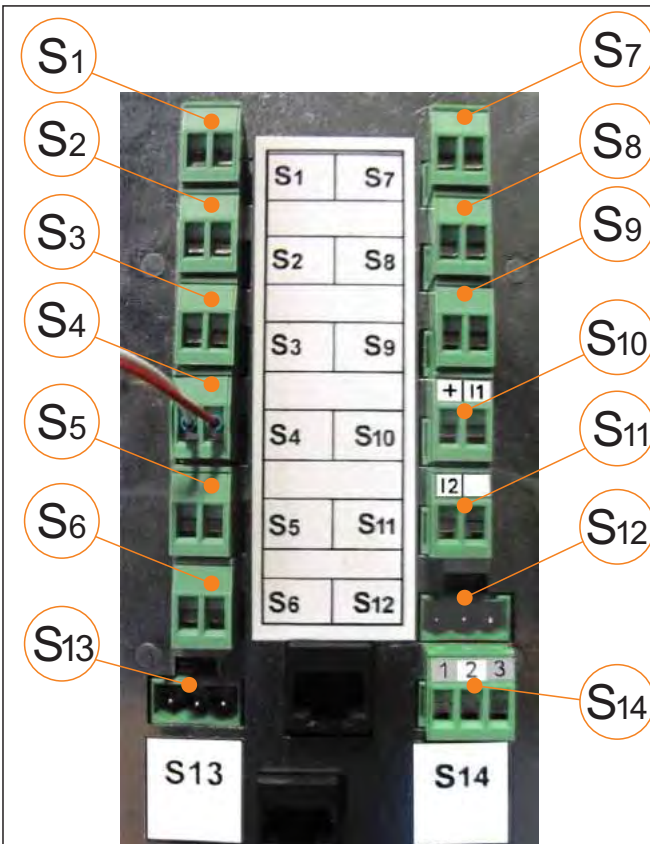
7.0. ELECTRIC CONNECTION

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.

CAUTION:










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

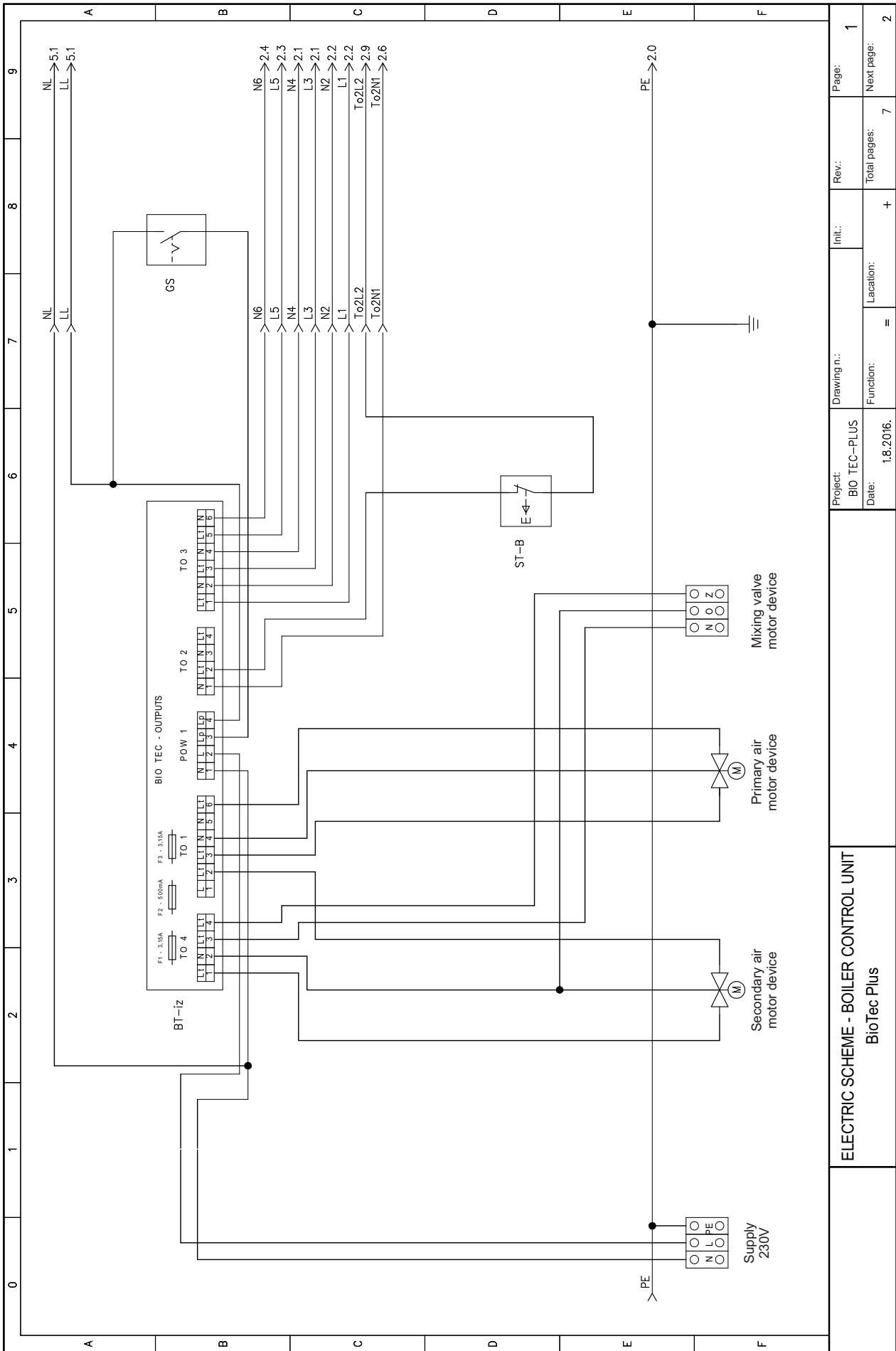


S1	S7	S1 - Sanitary water / hydraulic crossover sensor*
S2	S8	S2 - Accumulation tank 1 sensor (up)
S3	S9	S3 - Accumulation tank 2 sensor (down)
S4	S10	S4 - Flue gas sensor
S5	S11	S5 - Outer sensor
S6	S12	S6 - Main flow sensor / hydraulic crossover sensor*
S13	S14	S7 - Return flow sensor
		S8 - Not used
		S9 - Room thermostat
		S10 - Alarm output 1 (Additional equipment)
		S11 - Alarm output 2 (Additional equipment)
		S12 - Not used
		S13 - Not used
		S14 - Room corrector

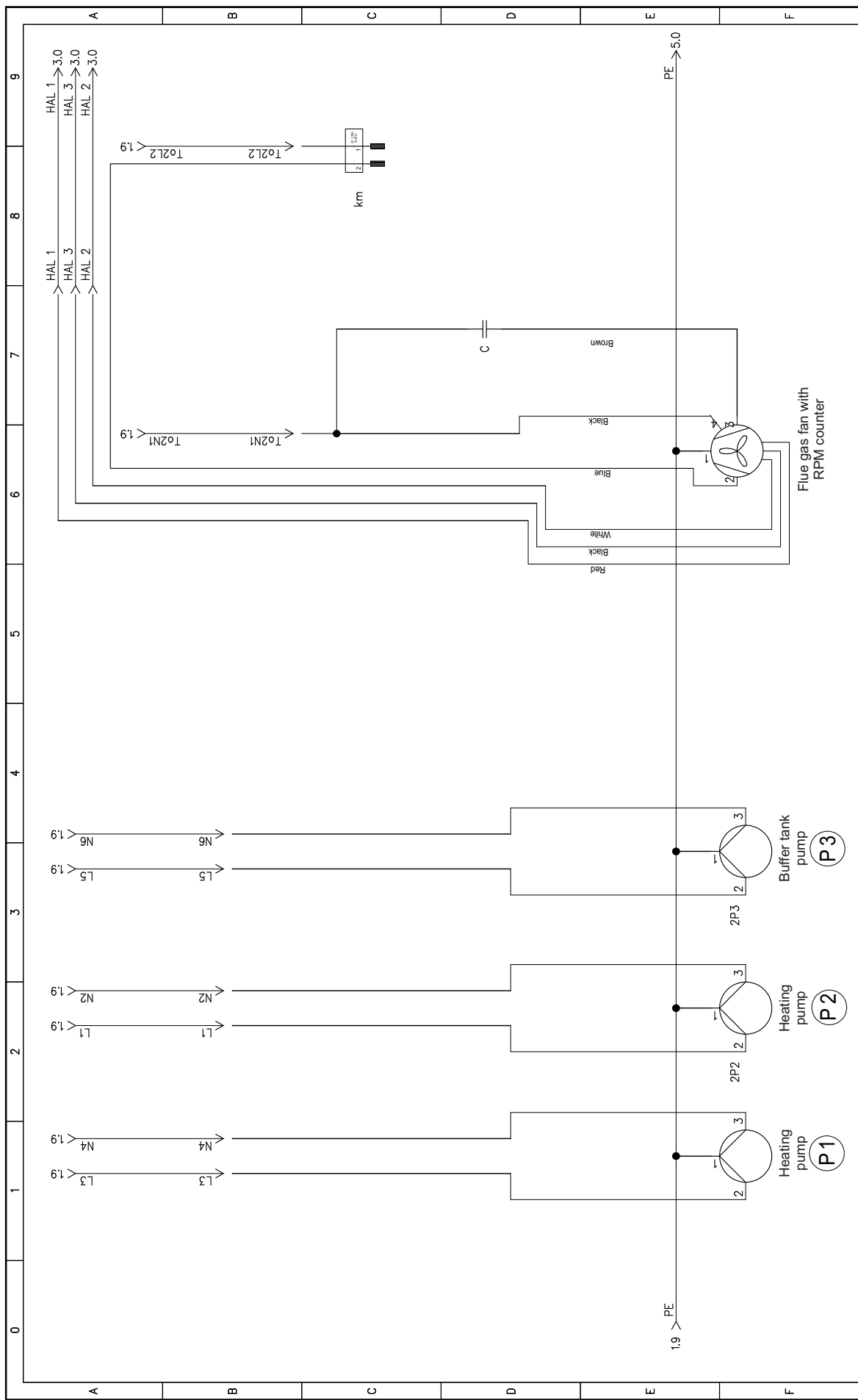
*If the configuration contains hydraulic crossover, delivered main flow temperature sensor or sanitary water sensor becomes hydraulic crossover sensor, depending on other elements of the configuration. When configuration contains hydraulic crossover along DHW tank or heating circuit, then hydraulic crossover temp. sensor must be connected to connector S6, in other cases hydraulic crossover temp. sensor must be connected to the connector S1.

Terminal Block & Strip Connector

N L 	N L 	N L 	N L 	N L 	N L 	N  	N L  L1	Red	Black	White
Power supply 230 V	Pump P1	Pump P2	Pump P3	MD	Mixing valve actuator	Fan	RPM Counter			

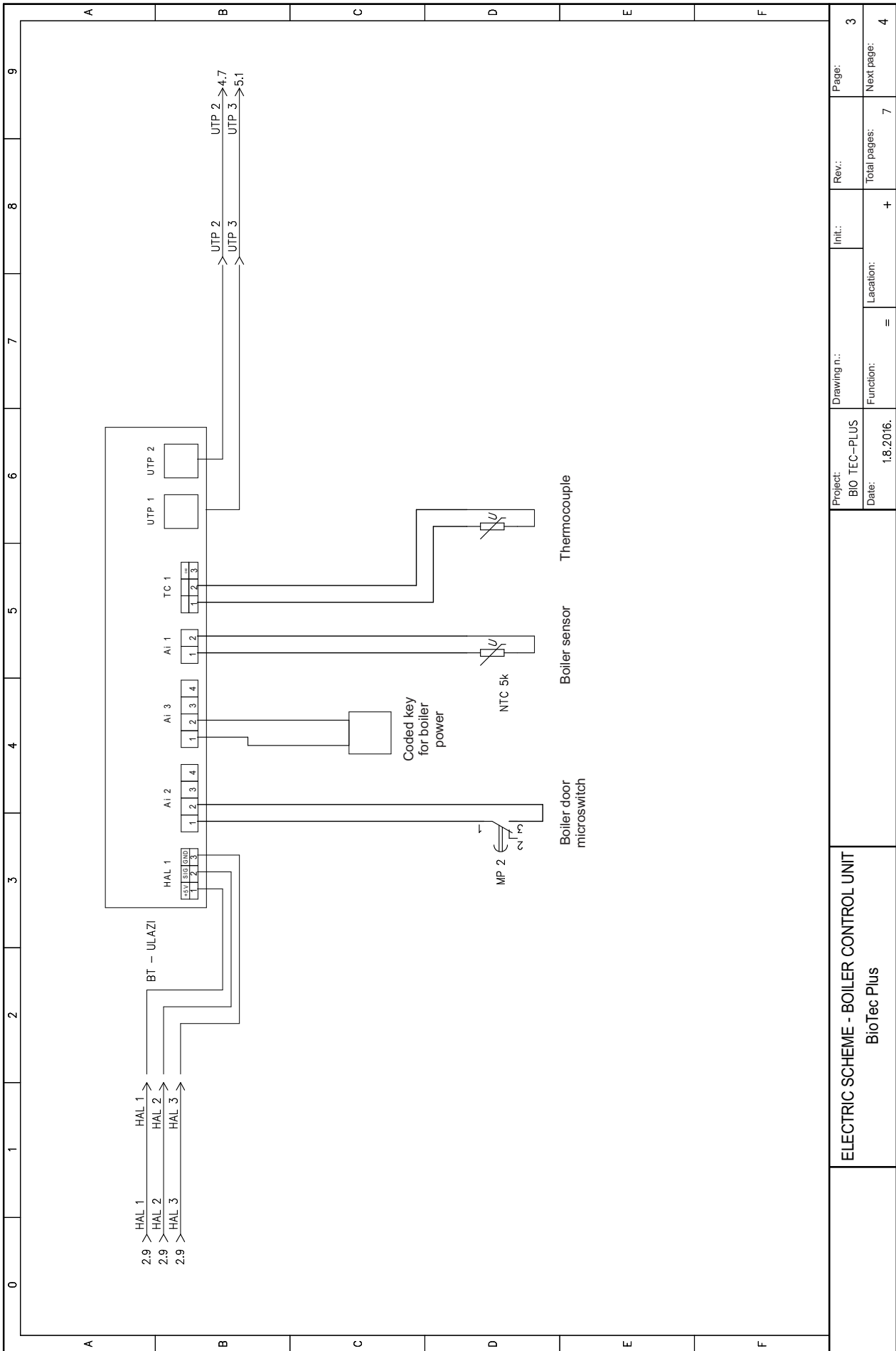


Project: BIO TEC-PLUS		Drawing n.:		Rev.:		Page: 1	
Date: 1.8.2016.		Function: =		Location: +		Total pages: 7	
ELECTRIC SCHEME - BOILER CONTROL UNIT		BioTec Plus				Next page: 2	

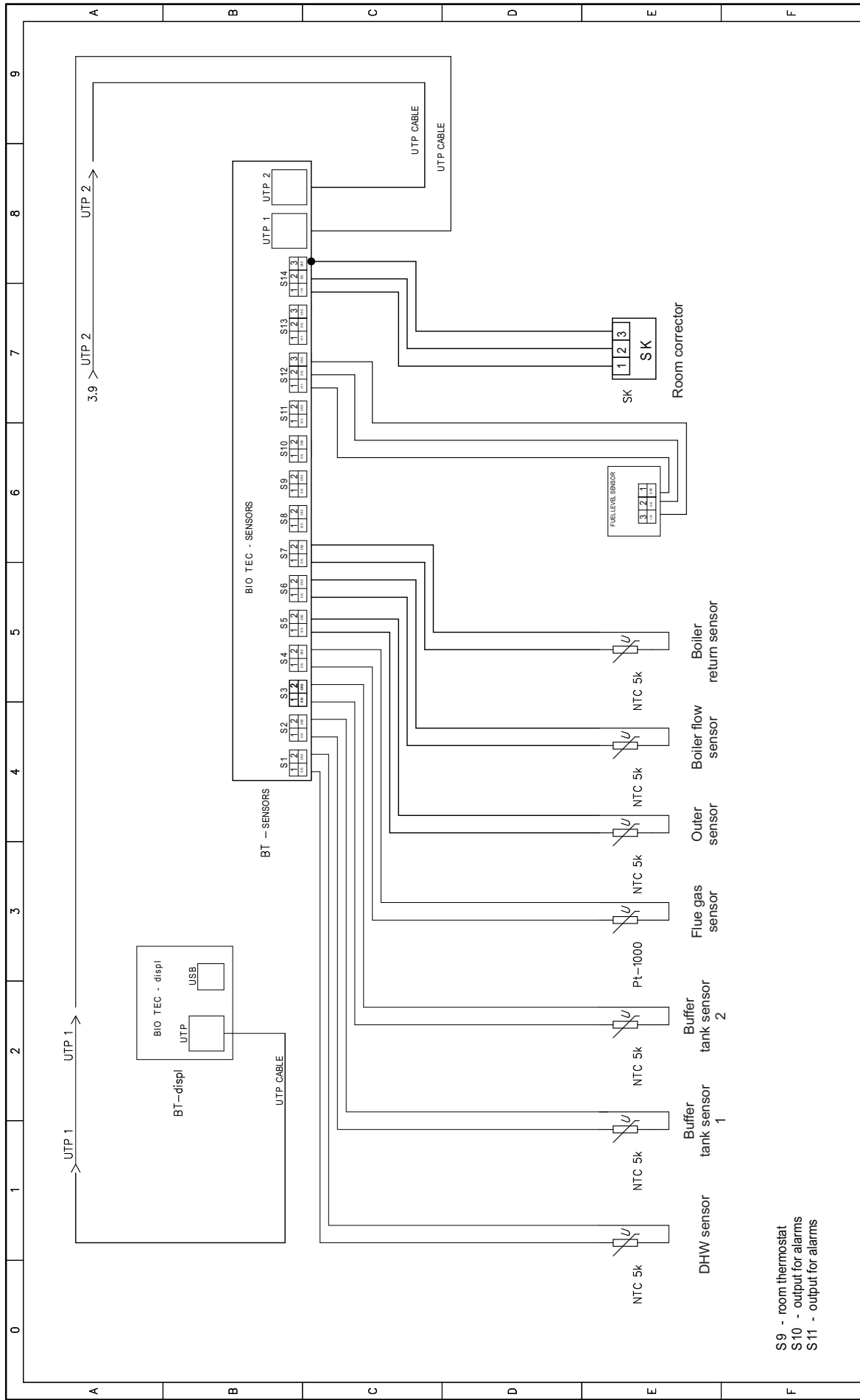


Project: BIO TEC-PLUS Date: 1.8.2016.		Drawing n.:		Rev.:	Page: 2
		Function: =	Location: +	Total pages: 7	Next page: 3

ELECTRIC SCHEME - BOILER CONTROL UNIT
BioTec Plus

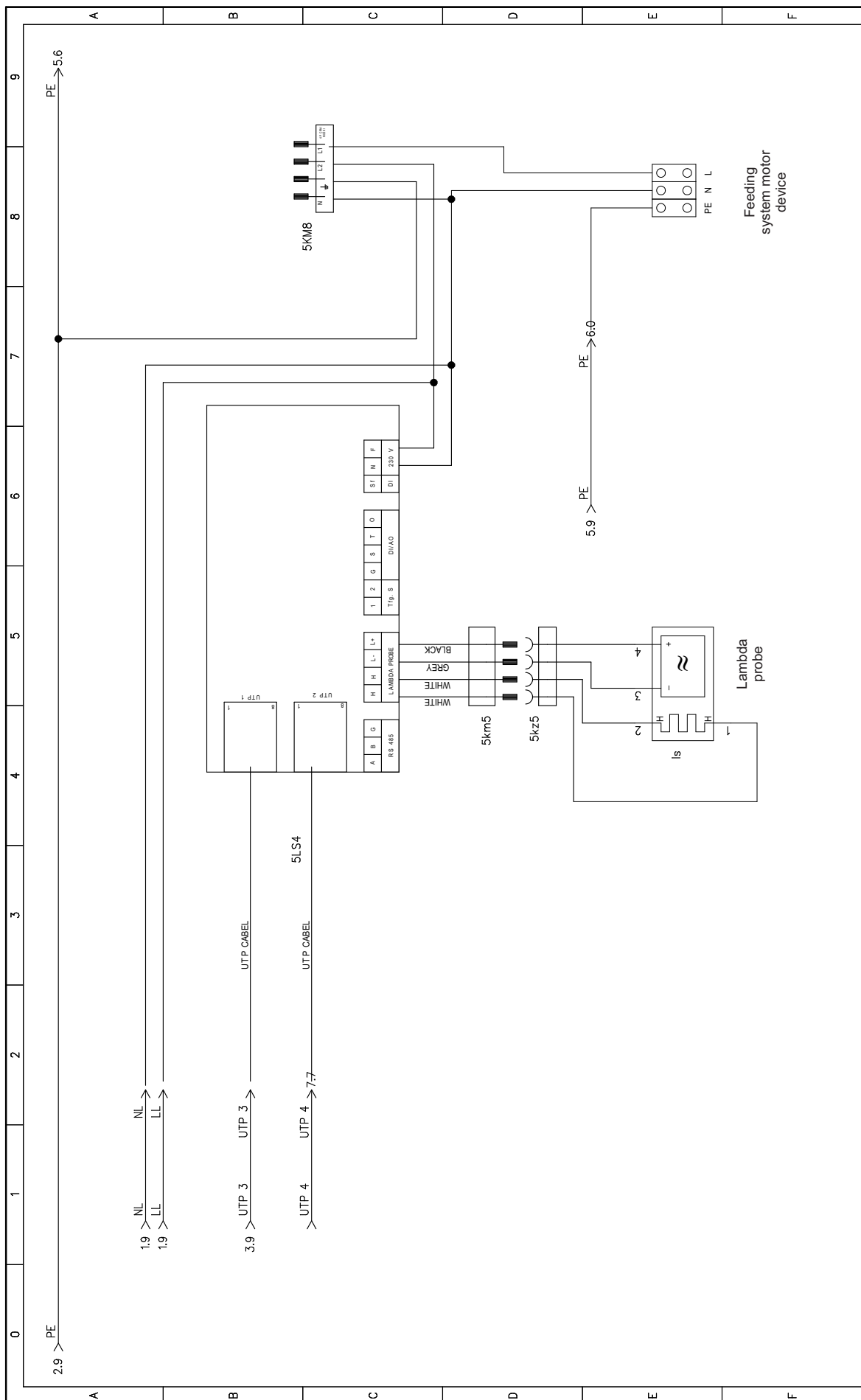


Project: BIO TEC-PLUS		Drawing n.:		Rev.:		Page: 3	
Date: 1.8.2016.		Function: =		Location: +		Total pages: 7	
ELECTRIC SCHEME - BOILER CONTROL UNIT		BioTec Plus				Next page: 4	

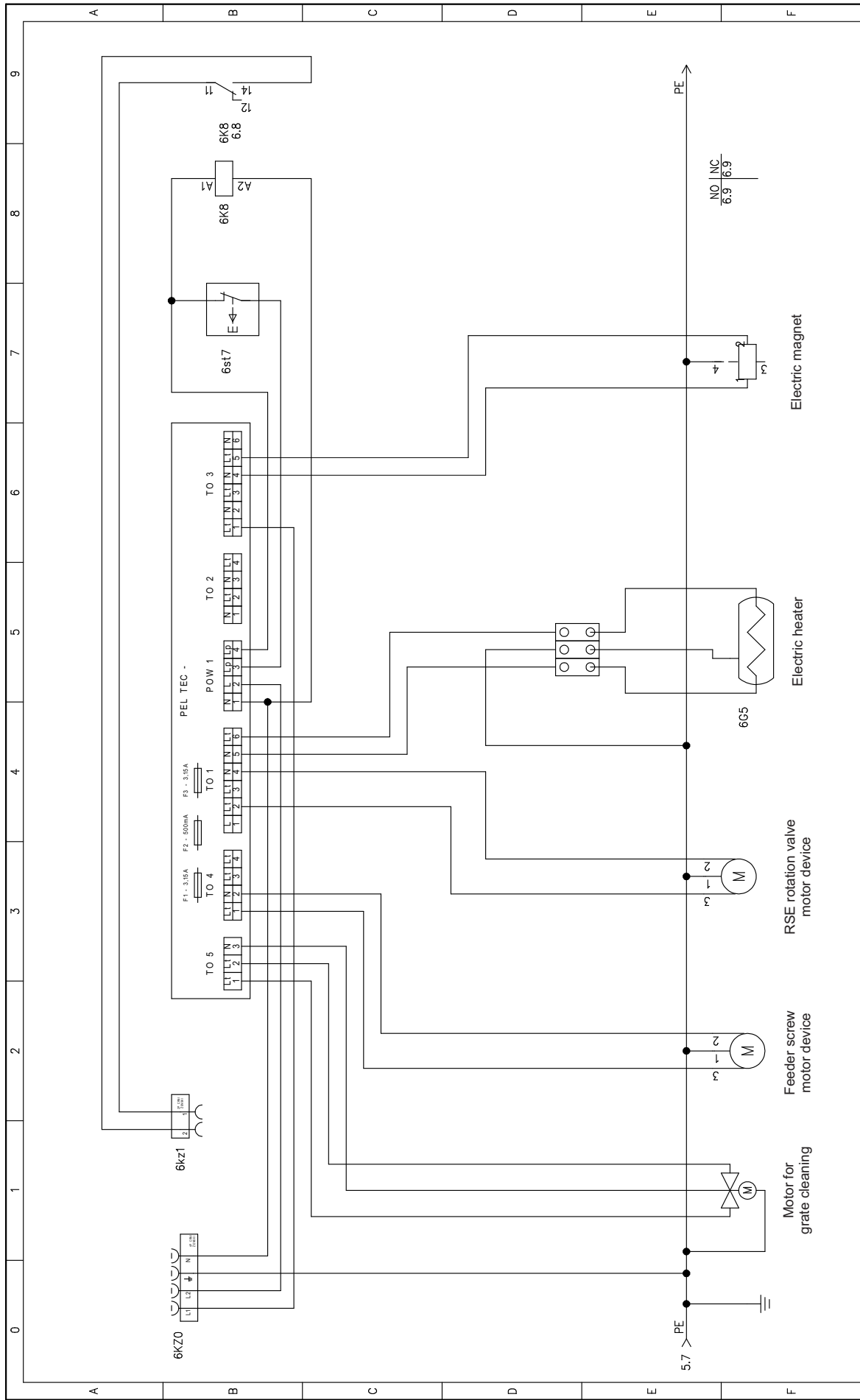


S9 - room thermostat
 S10 - output for alarms
 S11 - output for alarms

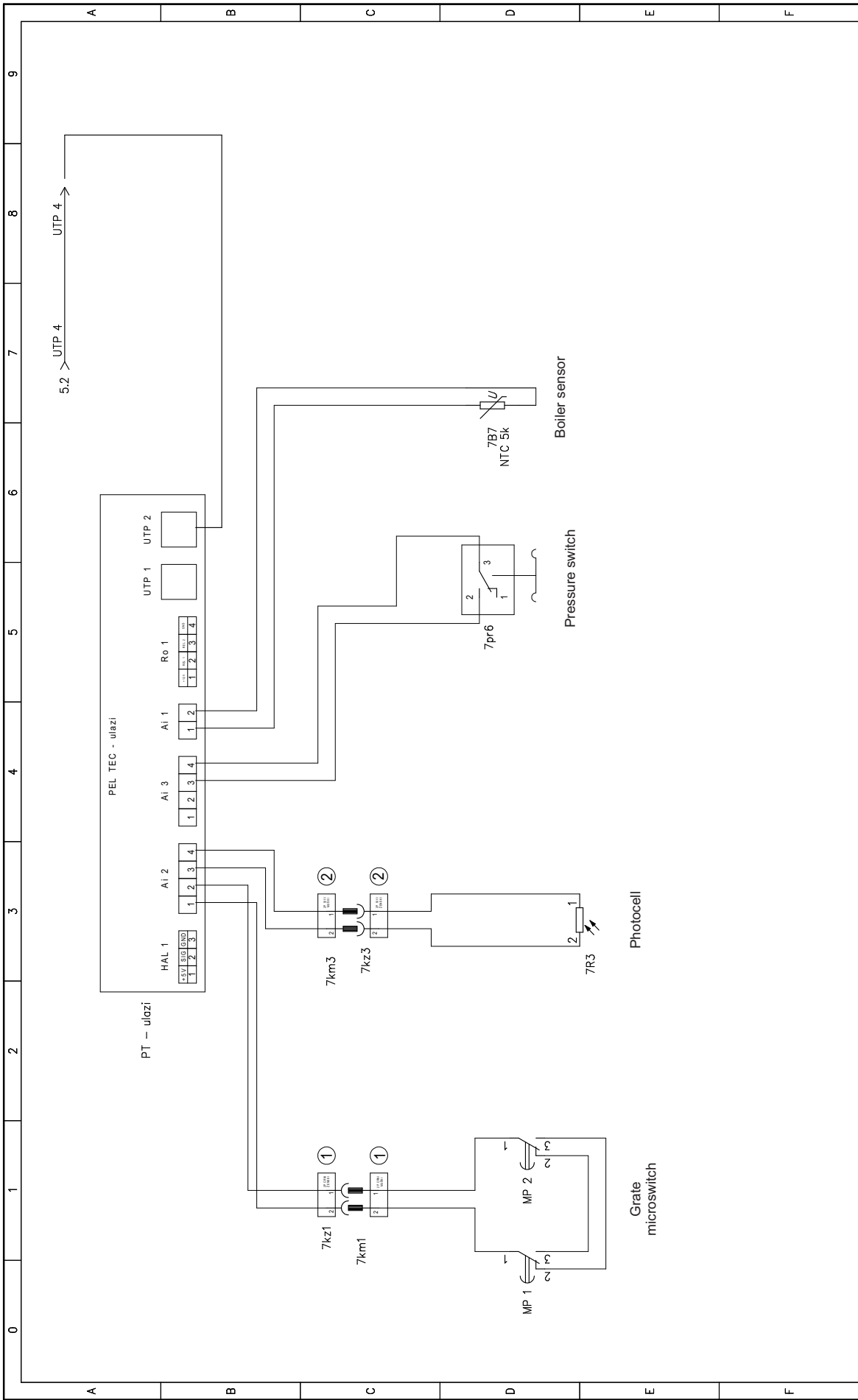
ELECTRIC SCHEME - BOILER CONTROL UNIT		Project: BIO TEC-PLUS	Drawing n.:	Init.:	Rev.:	Page: 4
BioTec Plus		Date: 1.8.2016.	Function: =	Location: +	Total pages: 7	Next page: 5



ELECTRIC SCHEME - BOILER CONTROL UNIT BioTec Plus		Project: BIO TEC-PLUS		Drawing n.:		Rev.:		Page: 5	
		Date: 1.8.2016.		Function: =		Location: +		Total pages: 7	
								Next page: 6	

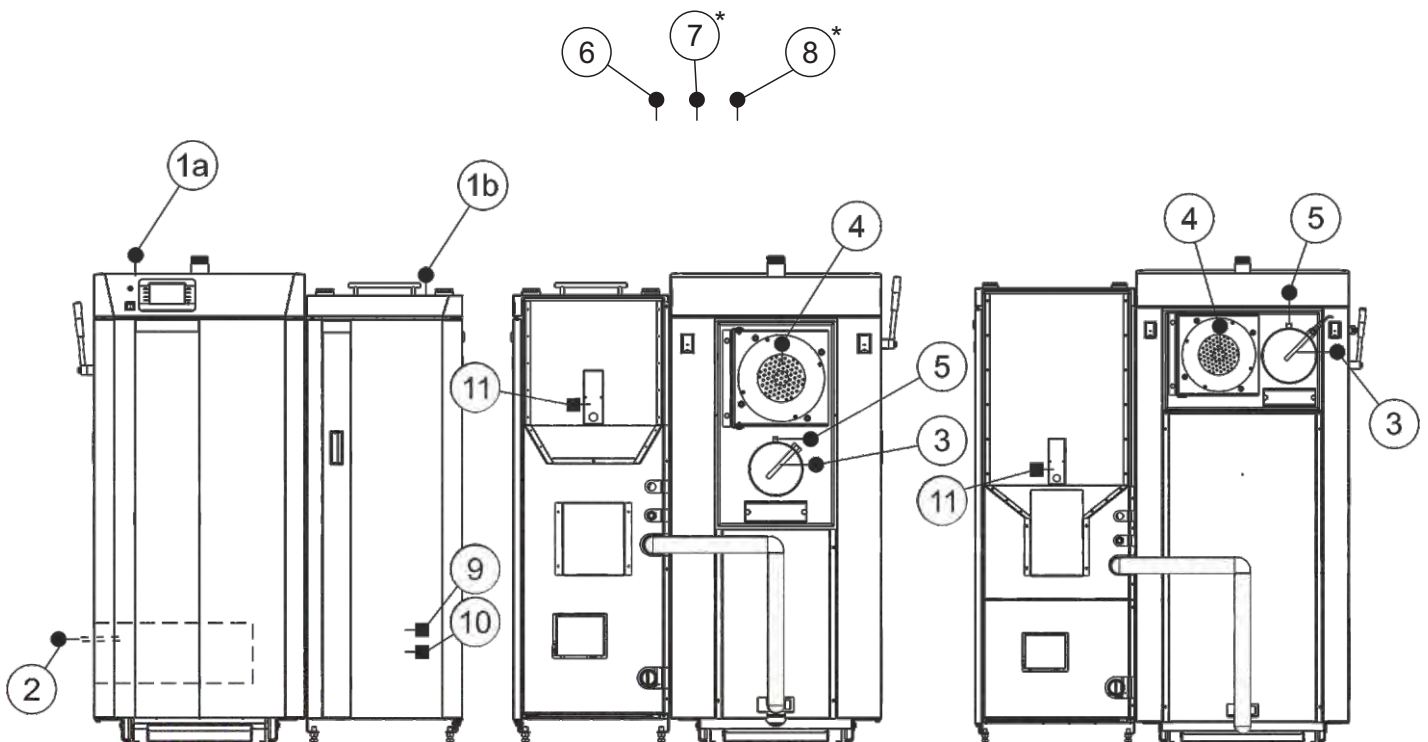


ELECTRIC SCHEME - BOILER CONTROL UNIT		BioTec Plus	
Project:	BIO TEC-PLUS	Drawing n.:	
Date:	1.8.2016.	Function:	=
Rev.:		Location:	+
Page:	6	Total pages:	7
Next page:	7		



Project: BIO TEC-PLUS		Drawing n.:		Init.:	Rev.:	Page:
		Date: 1.8.2016.		Function: =	Location: +	Total pages: 7
ELECTRIC SCHEME - BOILER CONTROL UNIT BioTec Plus						Next page: 7

7.1. BOILER SENSORS AND PROBES



- ①a - Boiler temperature sensor (NTC 5K) (left side of the boiler; fuel: wood)
- ①b - Boiler temperature sensor (NTC 5K) (right side of the boiler; fuel: wood pellets)
- ② - Combustion chamber temperature sensor (thermo couple)
- ③ - Flue gas sensor (PT1000)
- ④ - Fan RPM sensor
- ⑤ - Lambda probe
- ⑥ - Outer temperature sensor (NTC 5K)
- ⑦ - Main / return flow temperature sensor (NTC 5K)
- ⑧ - Domestic hot water (DHW) temperature sensor (NTC 5K)
- ⑨ - Pressure switch
- ⑩ - Photocell
- ⑪ - Fuel level sensor (wood pellets)

* - Installed on heating installation

RESISTANCE LIST NTC Pt1000 SENSOR
(measuring field -30 - +400 °C)

Temperature (°C)	Resis. (Ω)	Temperature (°C)	Resis. (Ω)
-30	885	225	1.866
-25	904	230	1.886
-20	923	235	1.905
-15	942	240	1.924
-10	962	245	1.943
-5	981	250	1.963
0	1.000	255	1.982
5	1.019	260	2.001
10	1.039	265	2.020
15	1.058	270	2.040
20	1.077	275	2.059
25	1.096	280	2.078
30	1.116	285	2.097
35	1.135	290	2.117
40	1.154	295	2.136
45	1.173	300	2.155
50	1.193	305	2.174
55	1.212	310	2.194
60	1.231	315	2.213
65	1.250	320	2.232
70	1.270	325	2.251
75	1.289	330	2.271
80	1.308	335	2.290
85	1.327	340	2.309
90	1.347	345	2.328
95	1.366	350	2.348
100	1.385	355	2.367
105	1.404	360	2.386
110	1.424	365	2.405
115	1.443	370	2.425
120	1.462	375	2.444
125	1.481	380	2.463
130	1.501	385	2.482
135	1.520	390	2.502
140	1.539	395	2.521
145	1.558	400	2.540
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		

RESISTANCE LIST NTC 5k/25°C SENSOR
(measuring field from -20 - +130 °C)

Temperature (°C)	Resistance (Ω)
-20	48.534
-15	36.465
-10	27.665
-5	21.158
0	16.325
5	12.694
10	9.950
15	7.854
20	6.245
25	5.000
30	4.028
34	3.266
40	2.663
45	2.184
50	1.801
55	1.493
60	1,244
65	1.041
70	876
75	740,7
80	629,0
85	536,2
90	458,8
95	394,3
100	340,0
105	294,3
110	255,6
115	222,7
120	190,7
125	170,8
130	150,5

8.0. BOILER USE

Boiler must not be used in flammable and explosive environment.

It 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. If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard. Protective gloves are obligatory.

Check whether boiler and equipment are installed and connected in accordance with these Technical instructions. Check whether chimney meets requirements of point 4.0 therein. Check whether boiler room meets all requirements therein. Check if fuel fulfils all requirements therein. Check whether the boiler and the entire heating system are filled with water and vented.

Note:

Before every use check if the boiler doors and cover door are closed.

If you smell flue gas:

- shut down the heating system
- Ventilate the boiler room
- Close all doors leading to the living space



Flue gas can lead to life-threatening poisoning!

8.1. BOILER CONTROL UNIT USE

8.1.1. BUTTONS



Button **"ON / OFF"**
options: on / off boiler operation"



Button **"OK"**



Button **"DISPLAY SELECTION"**
options: main menu / work



Button **"START"/"STOP"**



Button **"BOILER OPERATION DISPLAY"**
options: graphic / numeric



Navigation buttons:
"LEFT", "RIGHT", "UP", "DOWN"



Button **"ENTER"**



Button **"DELETE"**



Button **"BACK"**



Button **"FACTORY SETTINGS"**



Button **"PREVIOUS SCREEN"**



Button **"INFORMATION"**



Button **"NEXT SCREEN"**

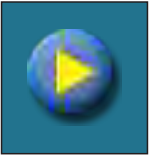


Button **"COPY"**

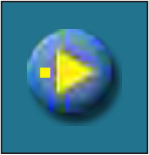


Button **"PASTE"**

8.1.2. SYMBOLS



Pump (when pump is working symbol is rotating, otherwise idle)



The pump has a request for work (next to the pump symbol bright yellow square when the consumer given the demand for work the pump, the pump does not work if you have not met all the conditions for work, for example. low temp. in the boiler, otherwise the pump normally works)



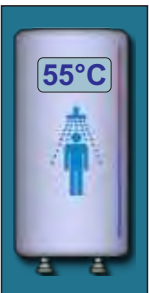
Room thermostat



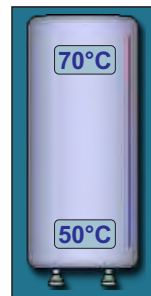
Next to the room thermostat symbol bright blue circle (the room thermostat has requested for operating the pump, the pump does not work if you have not met all the conditions for its operation, for example. low temp. in the boiler, otherwise normally works)



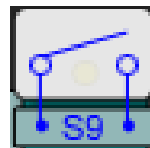
Heating circuit



Domestic hot water tank with current temperature



Accumulation tank with current temperature at top of the tank and at the bottom of the tank.



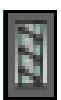
Burner operation is not required by external control (this symbol is visible only if external control is installed and configured)



External control require burner operation (this symbol is visible only if external control is installed and configured)

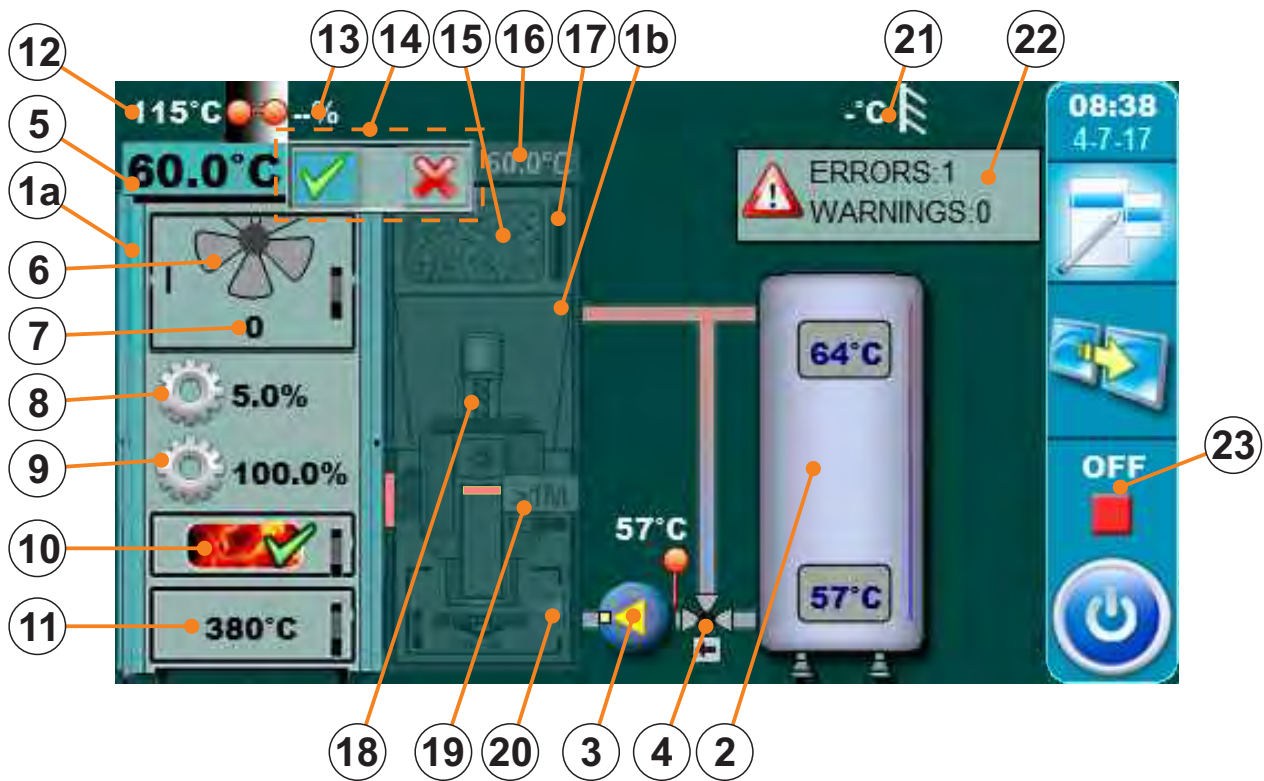


Cleaning of flue pass.
(this symbol is located in left side-wood)



Pellets refill
(this symbol is located in left side-wood)

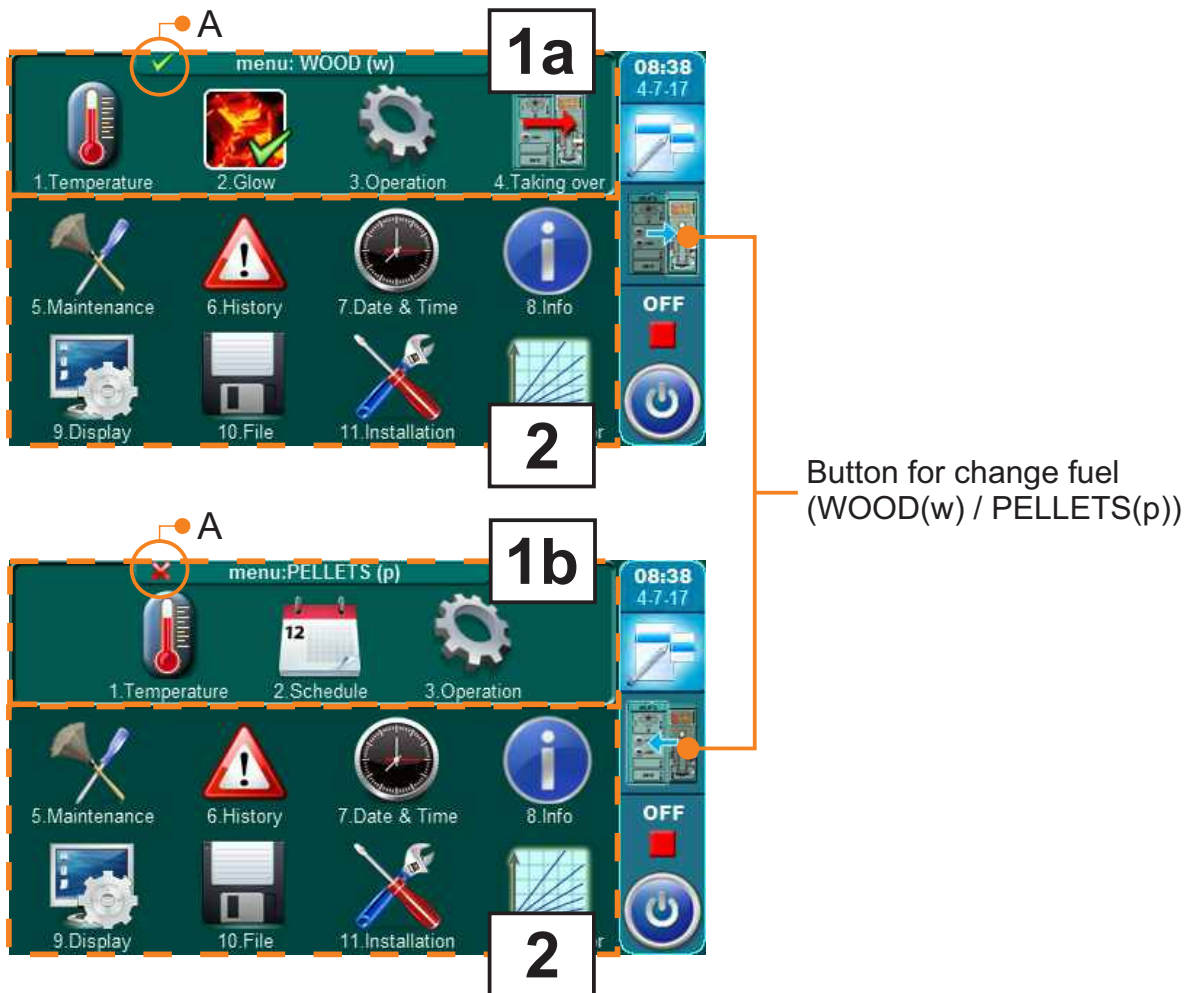
8.1.3. MAIN SCREEN



- | | |
|---|--|
| 1a - Boiler (Wood firing side) | 11 - Combustion chamber temperature |
| 1b - Boiler (Pellet firing side) | 12 - Flue gas temperature |
| 2 - Buffer tank | 13 - The percentage of oxygen in the flue gases (lambda probe) |
| 3 - Boiler pump P1 | 14 - Boiler side activity indicator |
| 4 - 3 - way protection valve (thermic or with actuator) | 15 - Wood pellet tank |
| 5 - Boiler temperature (Wood firing side) | 16 - Boiler temperature (Wood pellet firing side) |
| 6 - Symbol of fan operation (symbol is rotate when fan working) | 17 - Fuel level sensor (Wood pellets) |
| 7 - Fan speed (rpm) | 18 - Feeder screw |
| 8 - Simbol and opening percentage of primary air actuator | 19 - Photocell |
| 9 - Simbol and opening percentage of secondary air actuator | 20 - Electric heater |
| 10 - Glow option (if is enabled) | 21 - Outer temperature |
| | 22 - Errors and warnings |
| | 23 - Boiler working phase |

8.1.4. MAIN MENU

Main menu on BioTec Plus boiler control unit is composed of two parts - changeable part (1a and 1b) and static part (2). By pressing button for change fuel (see image below) displayed parameter will be changed. Displaying parameters can be changed regardless of boiler working phase and which fuel are chosen as active for work.



1a - WOOD(w) menu (changeable menu) - menu for using parameters at wood firing (left side of the boiler)

1b - PELLETS(p) menu (changeable menu) - menu for using parameters at wood pellet firing (right side of the boiler)

2 - static part of main menu - this part of main menu is always same

8.1.5. CHOOSING BOILER SIDE (choosing fuel)

Using of BioTec Plus boiler are consist of using of left part of the boiler (fuel: wood) and using of right part of the boiler (fuel: wood pellets). On boiler control unit is necessary to choose which side of the boiler will be used (which fuel will be used). Below is shown procedure for choosing boiler side for work when is boiler turned off (working phase „OFF”).

PROCEDURE FOR CHOOSING BOILER SIDE FOR WORK (USED FUEL):

Example: Selecting wood pellets for active fuel (right side of the boiler).



Left and right side of the boiler have indicators (A and B) which shows which of these two side are active (which fuel are choosen). Active side have green indicator, inactive side have red indicator (red „x”). On figure above is example for switching from left side of the boiler to the right side of the boiler (from wood to wood pellets). It's necessary to press and hold for 3 seconds indicator on inactive boiler side (figure 1, indicator B). On display will be displayed message „Do you want choose wood pellets for active fuel?” (figure 2). Press „OK” button (figure 2). Now left side of the boiler have red inactive indicator, right side of the boiler have green indicator of activity (figure 3.).

8.1.6. TAKING OVER

Note: Option „Taking over” is possible only from left side of the boiler (fuel: wood) to right side of the boiler (fuel: wood pellets) (wood pellets taking over wood).

„Taking over” option is used for automatic switching operation from one fuel to another fuel. Automatic switch is possible only from wood to wood pellets.

For use of „Taking over” option is necessary to activate it (see „Activating „Taking over” option”).

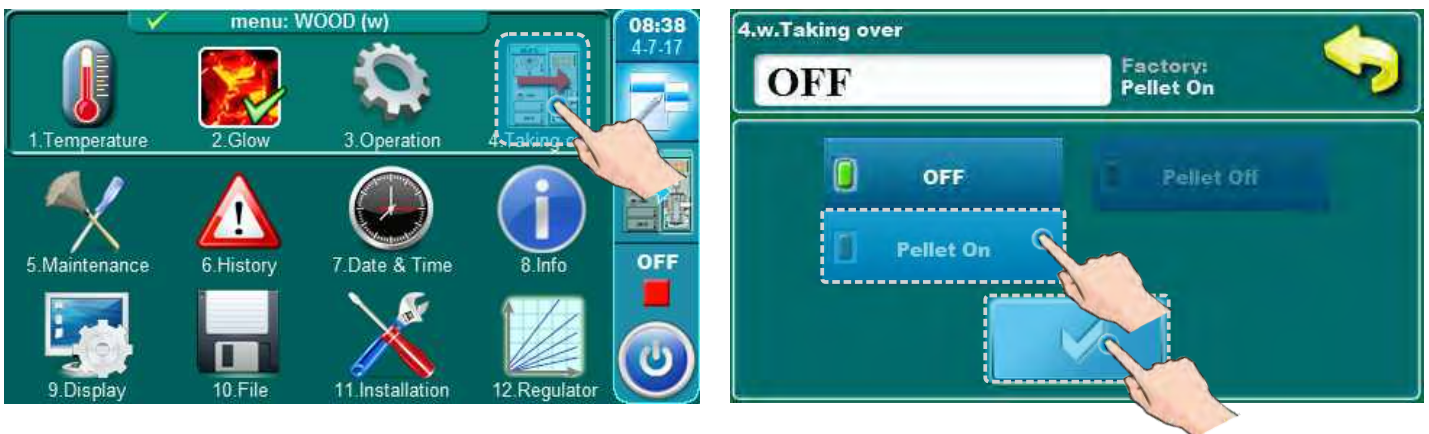
„Taking over” option works on the way that when left part of the boiler (fuel: wood) runs out of the fuel, right side of the boiler (fuel: wood pellets) automatic take over work activity and right side of the boiler (fuel: wood pellets) continues with work.

ACTIVATING „TAKING OVER” OPTION

Activating „Taking over” option can be done on two ways:

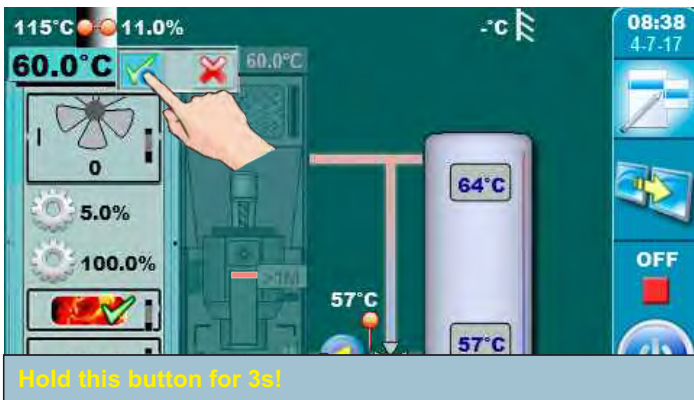
- a) through main menu (menu: WOOD(w), „Taking over” submenu)
- b) through main screen by pressing boiler side status indicator

a) activating „Taking over” option through main menu



On main menu (menu: WOOD(w)) (see Point „8.1.4. Main menu”) choose submenu „4. Taking over”, select „Pellet On” and confirm it by pressing „Confirm” button.

a) activating „Taking over” option through main screen (boiler side activity indicator)



Press green activity indicator on right boiler side (fuel: wood) and hold it for 3 seconds. On display will be displayed „Do you want to ENABLE „pellets take over?”. Confirm it by pressing „Confirm” button.

8.2. USE THE LEFT SIDE OF THE BOILER - FUEL: WOOD

8.2.1. IGNITION

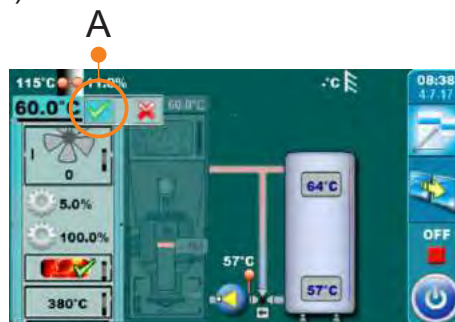
Boiler must not be used in flammable and explosive environment. It must not be used by children or disabled persons (either physically or mentally), as well as by person without knowledge or experience, unless they are under control or trained by a person responsible for their safety. Children must be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



Protective gloves must be used!

NOTE:

Before ignition make sure that is left side of the boiler selected like active (see indicator „A” on figure below) (for procedure for choosing boiler side for work (used fuel) view point 8.0. „Boiler use” in this technical instructions).



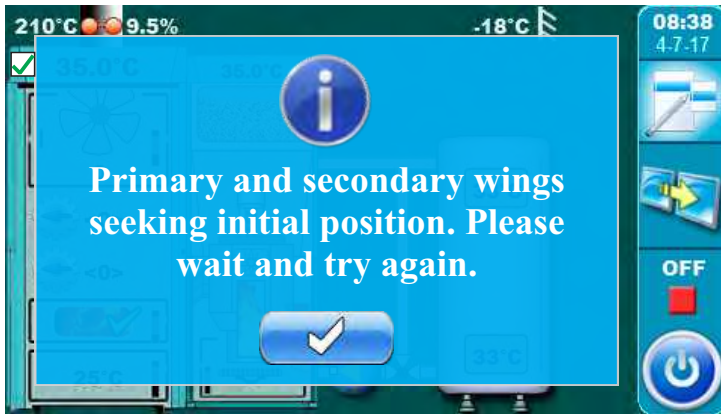
IGNITION PHASE:

- Open upper and middle boiler doors (see pages 4 i 5 in this technical instructions”)

Follow these steps for succesfull igniton phase:

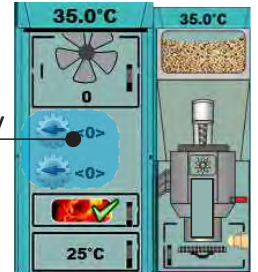


- press button for boiler start
- on display will be displayed window for boiler start
- press "OK" button

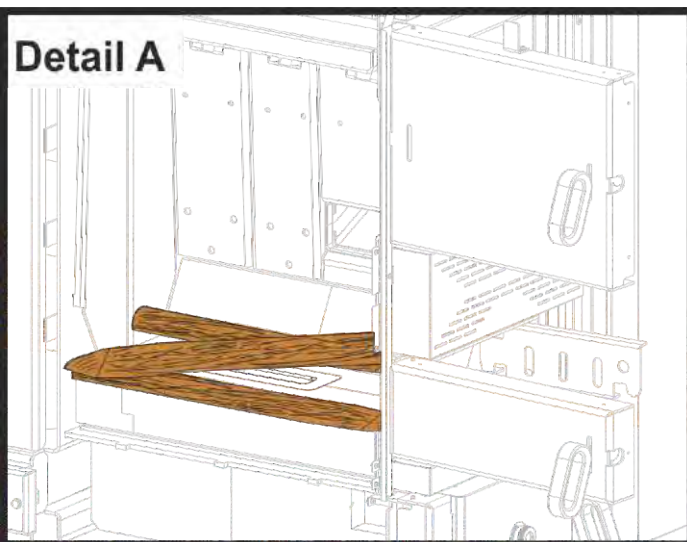


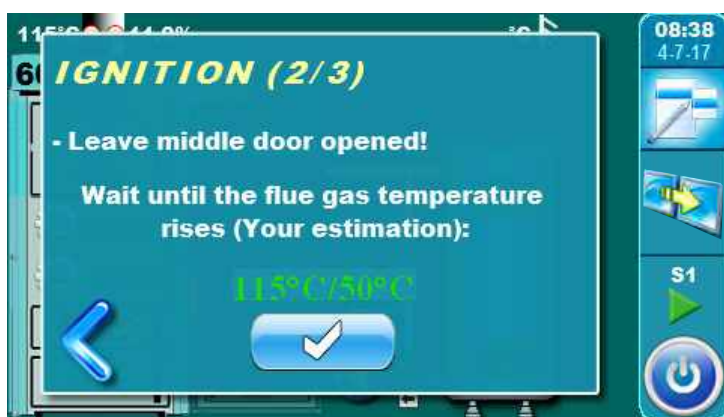
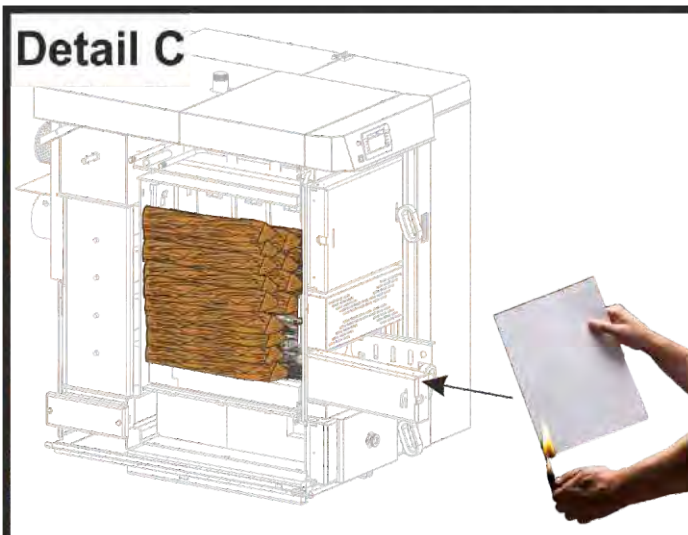
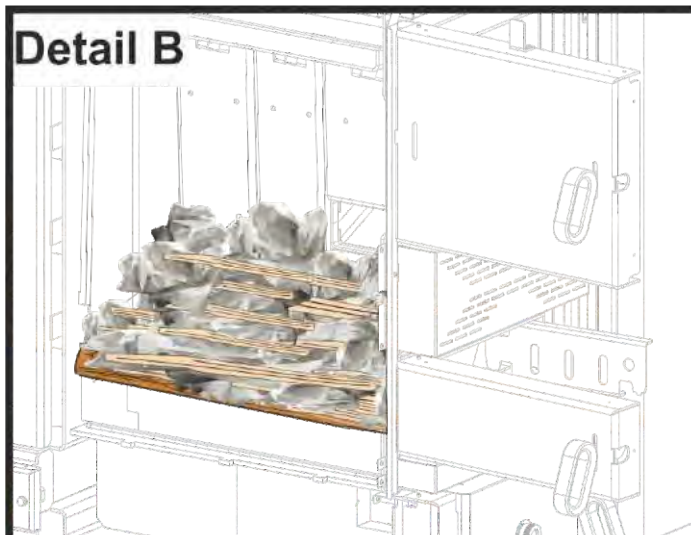
- if this message is shown on display than wait for primary and secondary air actuators
- primary and secondary air is ready for work when indicator stop blinking

Primary and secondary air indicators.

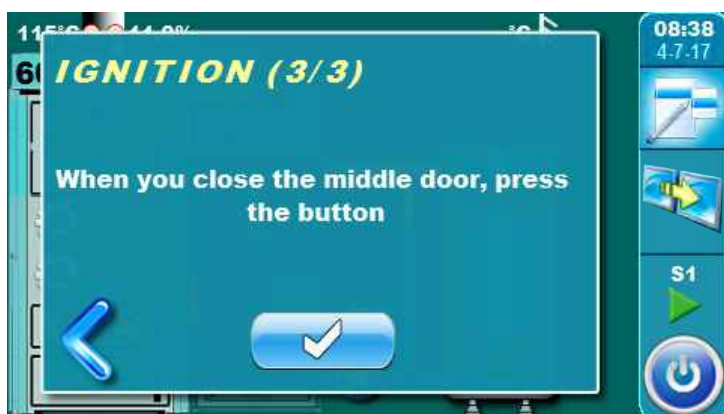


- on display is displayed message "IGNITION 1/3"
- cover the refractory stone with one row of wood logs (be careful to not plug hole on refractory stone (detail A))
- cover the wood logs with fine chopped wood (use enough fine chopped wood to cover wood logs below)
- height of fine chopped wood layer must conform a approx. height of first row of wood logs
- cover the fine chopped wood with crumpled paper (use enough crumpled paper to cover fine chopped wood) (detail B)
- place the wood logs on crumpled paper
- fill the fuel loading chamber with wood logs (detail C)
- close upper and lower doors
- leave middle door opened
- ignite the fire throuh middle boiler door (detail C)
- press "enter" button







- on display is displayed message "IGNITION 2/3"
- on this step is necessary to wait until flue gas temperature raise 50°C
- middle boiler door must be opened all time
- when is flue gas temperature higher than 50°C press "enter" button



- on display is displayed message "IGNITION 3/3"
- close middle boiler door
- press "enter" button

Additional:

During ignition phase is possible to see main display. It is necessary to press  button. Because ignition phase is on proces, display will be displayed current ignition step to (1). By pressing  button we return to full preview of ignition phase.



8.2.2. REFILLING

Boiler must not be used in flammable and explosive environment. It 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. Protective gloves must be used!

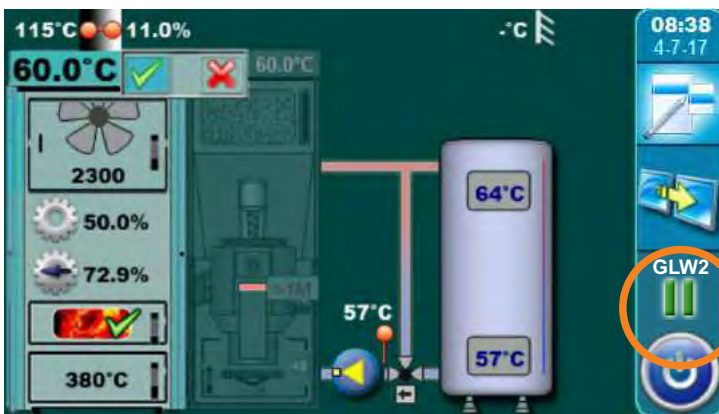


Protective gloves must be used!

PHASE OF REFILLING FUEL LOADING CHAMBER:

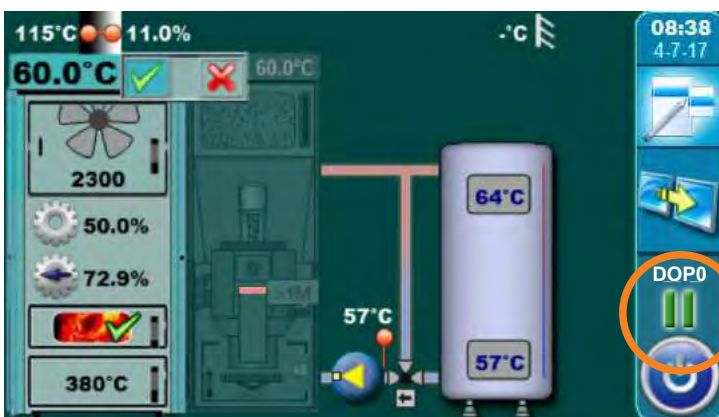
For successful refilling of the fuel loading chamber follow the next steps:

1.



When on display is displaying boiler operating phase „GLW2” that is mean the boiler have spent all the fuel and it’s remaining only glow in the fuel loading chamber.

In this step is necessary to open upper boiler door and check if it glow quality good enough for firing continue and refilling wood loading chamber or it is necessary to go on ignition phase again.



When you open upper boiler door (see pages 4 i 5 in this technical instructions) than is displayed boiler operation phase „DOP0”.

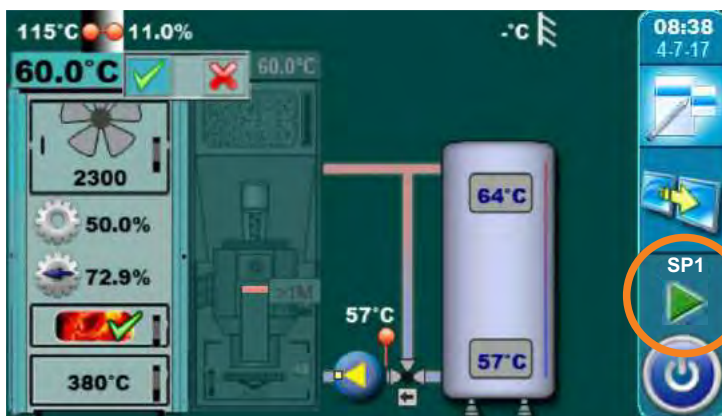
If you estimate that the glow is good enough for refilling wood load chamber with fuel it’s necessary to folow next steps. If you estimate that the glow is not good enough for refilling wood load chamber follow steps in point „Procedure if glow is not enough good”. After glow checking is necessary to close upper boiler door.

2.



Press button „START / STOP“, on display will be displayed window with offered options „NEW LOADING“ and „OFF“. Press button „NEW LOADING“.

3.



On display is displaying boiler operating phase „SP1“.

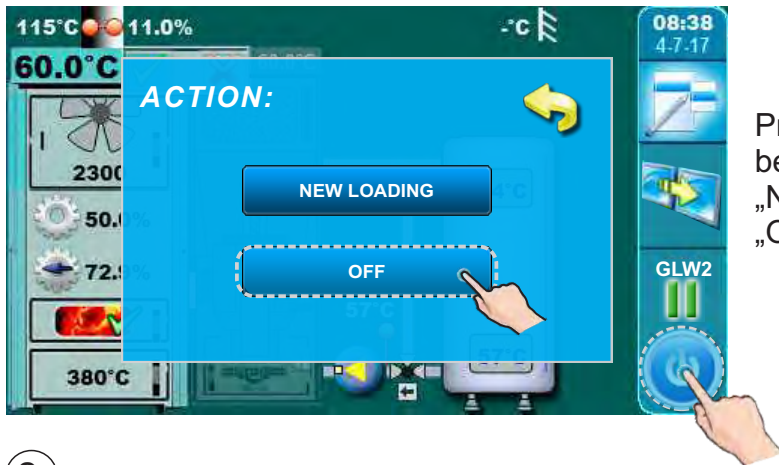
Description of the refilling wood loading chamber:

- open upper boiler door (see pages 4 i 5 in this technical instructions).
- align the glow with scraper
- based on estimates of glow quality and amount of glow put more or less dry thin wood (depend about estimate) and after that fill the wood loading chamber with wood
- close upper boiler door (see pages 4 i 5 in this technical instructions)

PROCEDURE IF GLOW IS NOT ENOUGH GOOD

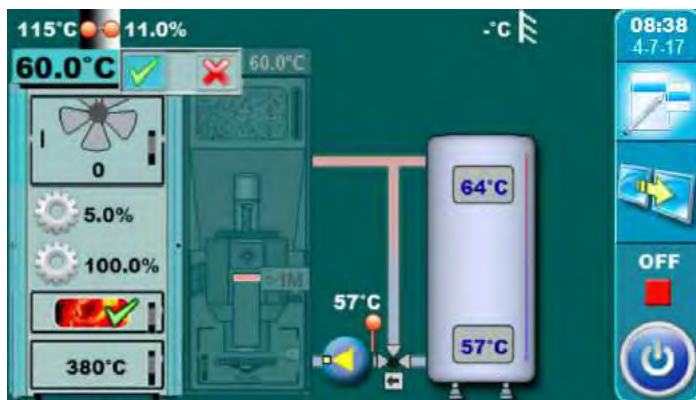
If glow is not enough good for fuel refilling folow the next steps:

1.



Press button „START / STOP“, on display will be displayed window with offered options „NEW LOADING“ and „OFF“. Press button „OFF“.

2.



Wait until on display is displayed boiler operating phase „OFF“.

3.

Go to the ignition phase like is described in point „IGNITION“ in this technical instructions.

8.3. USE THE RIGHT SIDE OF THE BOILER - FUEL: WOOD PELLETS

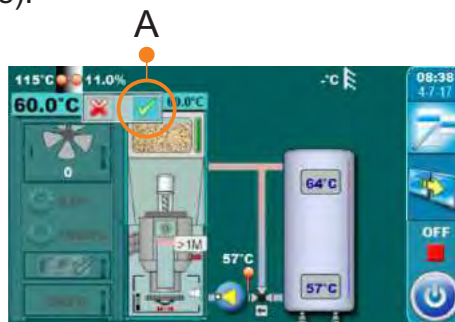
Boiler must not be used in flammable and explosive environment. It must not be used by children or disabled persons (either physically or mentally), as well as by person without knowledge or experience, unless they are under control or trained by a person responsible for their safety. Children must be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



Protective gloves must be used!

NOTE:

Before ignition make sure that is right side of the boiler selected like active (see indicator „A” on figure below) (for procedure for choosing boiler side for work (used fuel) view point 8.0. „Boiler use” in this technical instructions).



BOILER START:

For boiler start is necessary to press ON / OFF button. After pressing ON / OFF button on display will be displayed window for boiler start confirmation. Press „OK” to confirm boiler start.



BOILER STOP:

For boiler stop is necessary to press ON / OFF button. After pressing ON / OFF button on display will be displayed window for boiler stop confirmation. Press „OK” to confirm boiler stop.

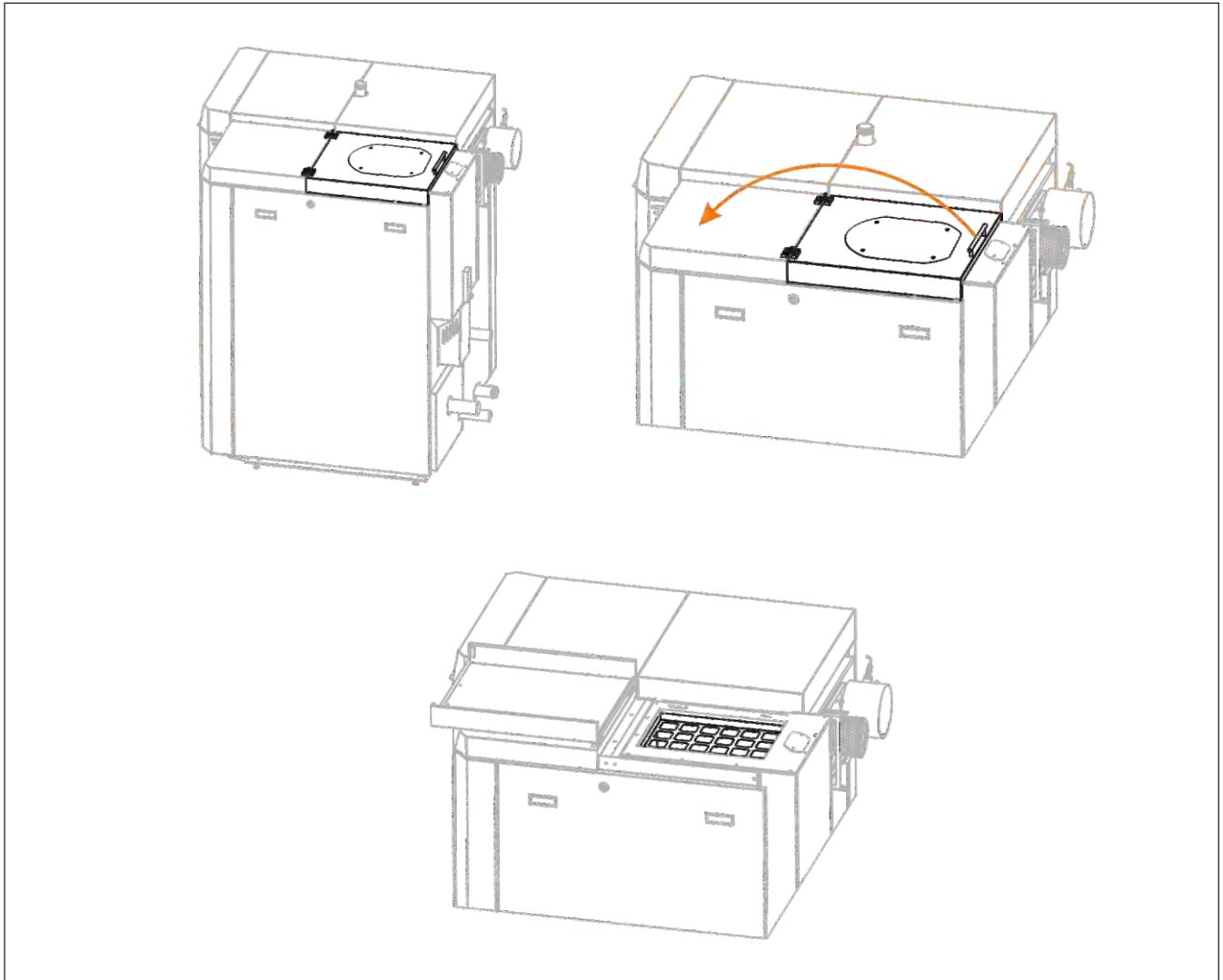


8.3.1. REFFILING OF WOOD PELLETS

Wood pellet is manual filling on right upper side of the boiler (pellet part) (see figure below). It's necessary to open casing cover using the handle.

IMPORTANT:

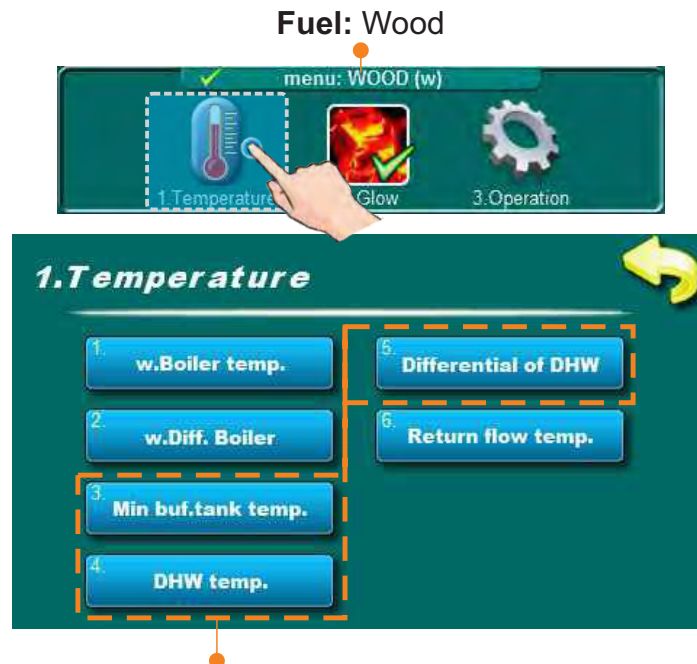
At filling wood pellet tank it must be filled at least 2/3 of capacity for correct work of wood pellet level sensor!



8.4. TEMPERATURE ADJUSTMENT

Temperature adjustment are performed separately for left (fuel: wood) and right (fuel: wood pellets) side of the boiler. For adjustment left side of the boiler (fuel: wood) temperature it's necessary to choose menu for wood firing (WOOD(w)). For adjustment right side of the boiler (fuel: wood pellets) temperature it's necessary to choose menu for wood pellet firing (PELLETS(p)).

TEMPERATURE ADJUSTMENT FOR WOOD FIRING



SUBMENUS:

This submenus depend about DHW configuration

1. w.Boiler temperature

In this submenu is possible to adjust boiler working temperature.

- Factory adjusted: 85°C
- Adjustment range: 75°C - 90°C

2. w.Differential Boiler

In this submenu is possible to adjust differential for boiler working temperature.

- Factory adjusted: 5°C
- Adjustment range: 5°C - 7°C

3. Minimal buffer tank temperature

In this submenu is possible to adjust minimal buffer tank temperature.

- Factory adjusted: 20°C
- Adjustment range: 5°C - 85°C

4. DHW temperature (depend about DHW configuration)

In this submenu is possible to adjust domestic hot water temperature.

- Factory adjusted: 50°C
- Adjustment range: 40°C - 80°C

5. Differential of DHW (depend about DHW configuration)

In this submenu is possible to adjust differential of domestic hot water temperature.

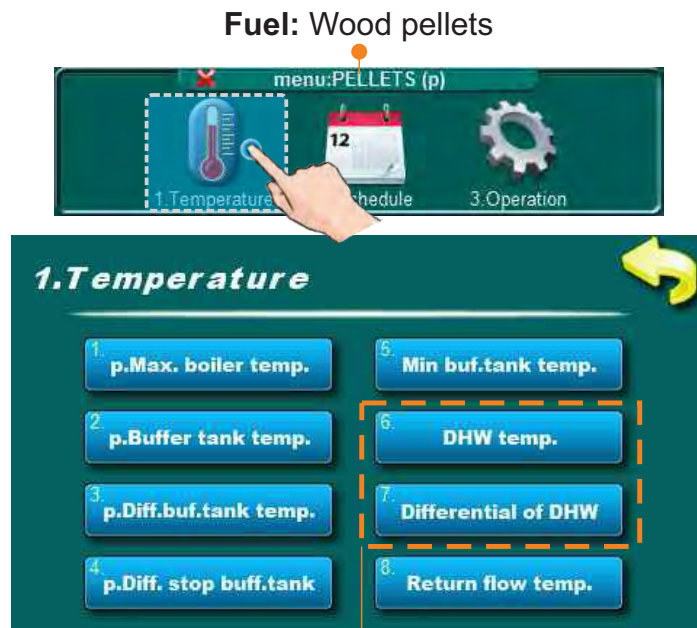
- Factory adjusted: 5°C
- Adjustment range: 4°C - 40°C

6. Return flow temperature

In this submenu is possible to adjust return flow temperature.

- Factory adjusted: 60°C
- Adjustment range: 60°C - 70°C

TEMPERATURE ADJUSTMENT FOR WOOD PELLET FIRING



This submenus depend about DHW configuration

Submenus:

1. p.Maximal boiler temperature

In this submenu is possible to adjust maximal boiler working temperature.

- Factory adjusted: 80°C
- Adjustment range: 70°C - 90°C

2. p.Buffer tank temperature

In this submenu is possible to adjust buffer tank temperature.

- Factory adjusted: 80°C
- Adjustment range: 40°C - 85°C

3. p.Differential buffer tank temperature

In this submenu is possible to adjust differential for buffer tank temperature.

- Factory adjusted: 10°C
- Adjustment range: 5°C - 30°C

4. p.Differential stop buffer tank temperature

In this submenu is possible to adjust differential stop for buffer tank temperature.

- Factory adjusted: 5°C
- Adjustment range: 3°C - 30°C

5. Minimal buffer tank temperature

In this submenu is possible to adjust buffer tank temperature.

- Factory adjusted: 20°C
- Adjustment range: 5°C - 85°C

6. DHW temperature (depend about DHW configuration)

In this submenu is possible to adjust domestic hot water temperature.

- Factory adjusted: 50°C
- Adjustment range: 40°C - 80°C

7. Differential of DHW (depend about DHW configuration)

In this submenu is possible to adjust differential for domestic hot water temperature.

- Factory adjusted: 5°C
- Adjustment range: 4°C - 40°C

8. Return flow temperature

In this submenu is possible to adjust return flow temperature.

- Factory adjusted: 60°C
- Adjustment range: 60°C - 70°C

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!

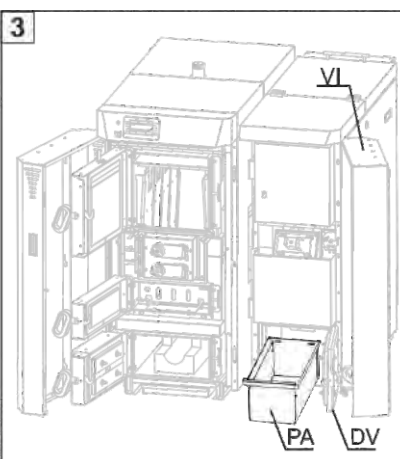
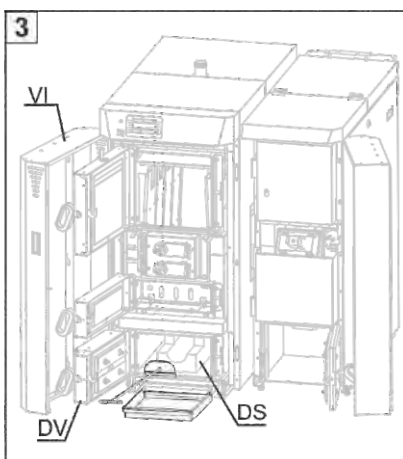
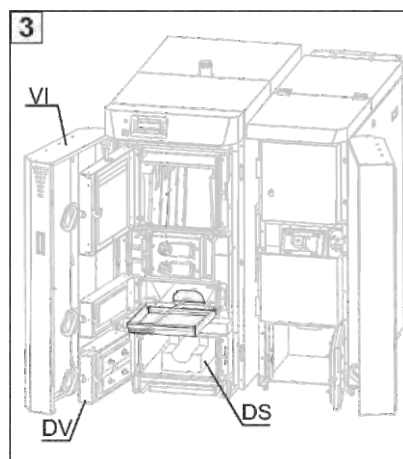
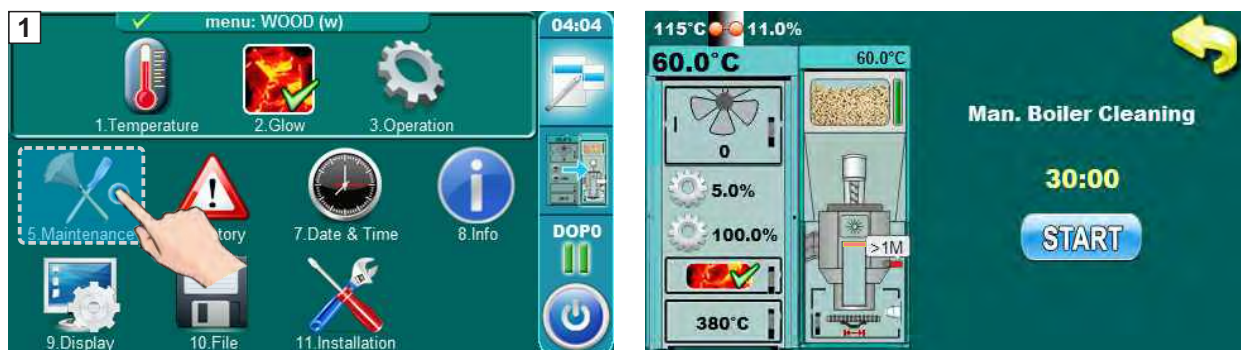
PROTECTIVE GLOVES ARE OBLIGATORY!!!



DESCRIPTION OF MAINTENANCE	INTERVAL
Cleaning ash in firebox and under firebox (through middle and lower door - left part of the boiler) and ash tray emptying from right part of the boiler.	Before each ignition.
Flue gas tube cleaning.	Before refilling of fuel / before ignition.
Checking correctness of security valve.	Every 6 months.
Cleaning of flue gas chamber.	At least once per year.
Cleaning and checking the flue installation sealing.	At least once per year.
Cleaning of area over heat exchanger pipes with turbulators.	At least once per year.
Cleaning the blades and box of the fan.	At least once per year.
Photocell cleaning.	At least once per year.

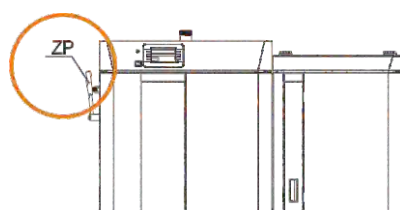
Cleaning / maintenance interval	Boiler type	Description
Before each ignition	25, 29, 31, 35 and 45 kW	Cleaning ash in firebox and under firebox (through middle and lower door - left part of the boiler) and ash tray emptying from right part of the boiler.

Before every ignition is necessary to clean area below firebox and lower refractory stone (DS) (through middle and lower boiler door (DV)) and empty ashtray (PA) from the **right** side of the boiler. Before cleaning is necessary to turn on option "cleaning". Fan will work at maximum speed to reduce the spread of dust to the room. When you finish cleaning, press the "STOP" button. If time of 30:00 minutes has expired cleaning option (fan) will automatically turn off.



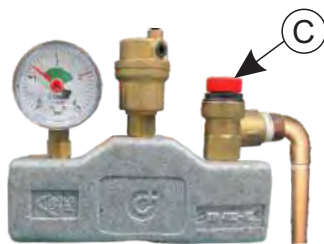
- Press button "Cleaning" on main screen
- Press button "OK"
- Open front boiler door (VI).
- Open middle boiler door
- Open lower boiler door (DV).
- Insert the ashtray to the middle gate (1) and clean up firebox with scraper and push the ash on the ashtray.
- Insert the ashtray under lower door and use scraper to clean refractory stone(DS) and push ash on the astray.
- Empty ashtray
- Take out ash tray (PA) from right side of the boiler.
- Empty ashtray (PA) and place it back.
- After cleaning, the boiler is ready for ignition.

Cleaning / maintenance interval	Boiler power	Description
Before refilling of fuel / before ignition	25, 29, 31, 35 and 45 kW	Flue gas tubes cleaning



For flue gas tubes cleaning in necessary to pull lever (ZP) few times.

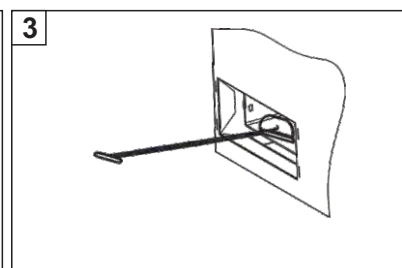
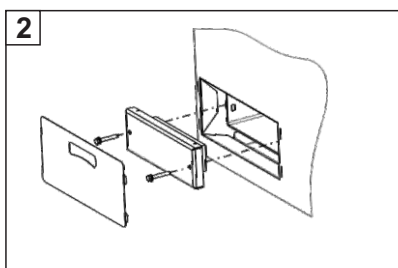
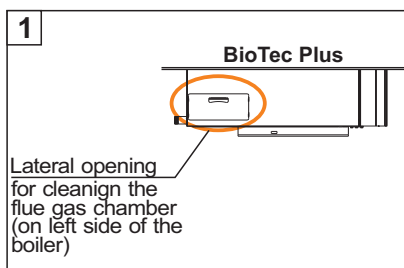
Cleaning / maintenance interval	Boiler power	Description
Every 6 months	25, 29, 31, 35 and 45 kW	Check the correctness of security valve



Checking the correctness of security valve

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.

Cleaning / maintenance interval	Boiler power	Description
At least once per year.	25, 29, 31, 35 and 45 kW	Cleaning of flue gas chamber.



- 1 - Switch off the boiler and disconnect from electric. power.
- 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 hold door of flue gas chamber.
- 4 - Insert ashtray and clean the flue gas chamber with scraper.
- 5 - Put the doors and insulation cover to original position.

Note: For the proper operation of the boiler it is IMPORTANT to hard tight the doors how it to seal perfectly!



Before this procedure be sure to disconnect boiler from electric. power!!!

Cleaning / maintenance interval	Boiler power	Description
At least once per year	25, 29, 31, 35 and 45 kW	Cleaning and checking the flue installation sealing

Cleaning and checking the flue installation sealing

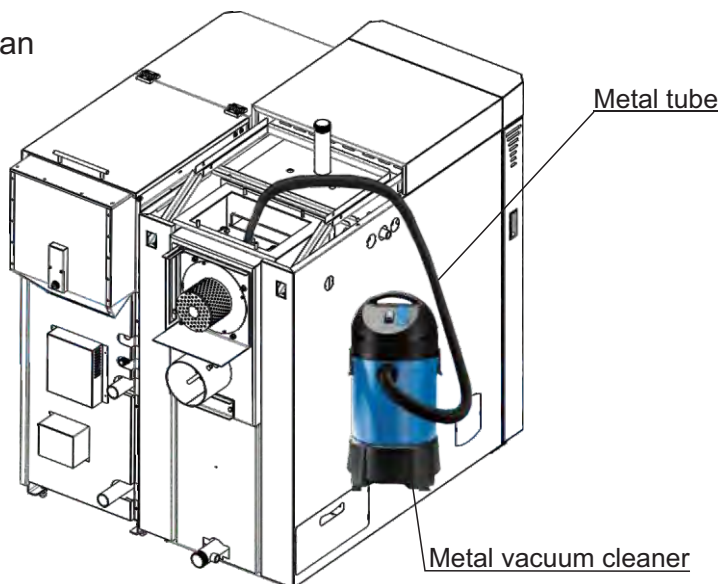
Clean flue installation between the boiler and the chimney through the revision openings for cleaning or if not incorporated revision opened by removing the flue installation. After cleaning, inspect flue installation good sealing and seal it if the seal is not satisfactory.



Before this procedure be sure to disconnect boiler from electric. power!!!

Cleaning / maintenance interval	Boiler power	Description
At least once per year	25, 29, 31, 35 and 45 kW	Cleaning of area over heat exchanger pipes with turbulators

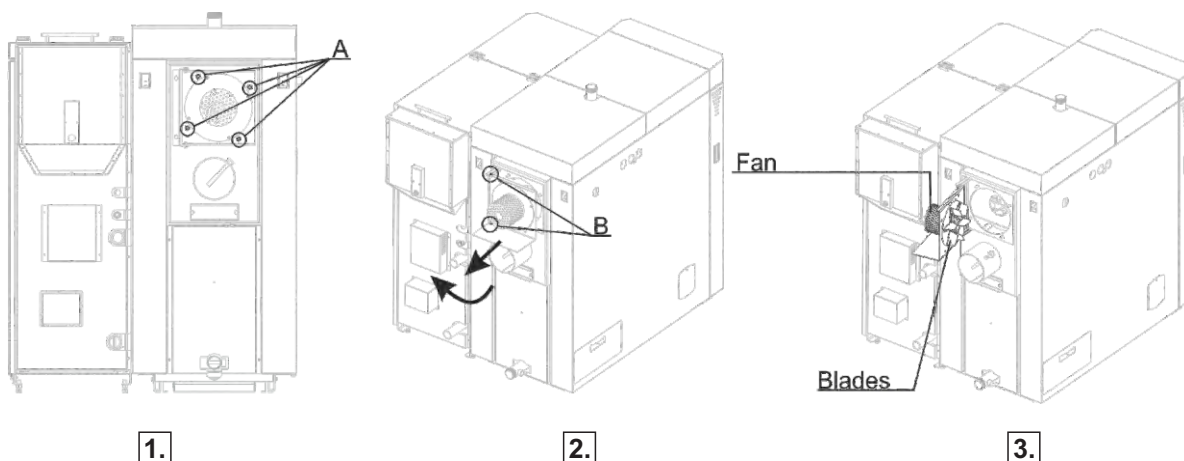
- 1 - Switch off the boiler and disconnect from electric. power.
- 2 - Take out last upper cover side.
- 3 - Open the flue gas chamber.
- 4 - Use the metal vacuum cleaner to clean dust and ash in flue gas chamber.



Before this procedure be sure to disconnect boiler from electric. power!!!

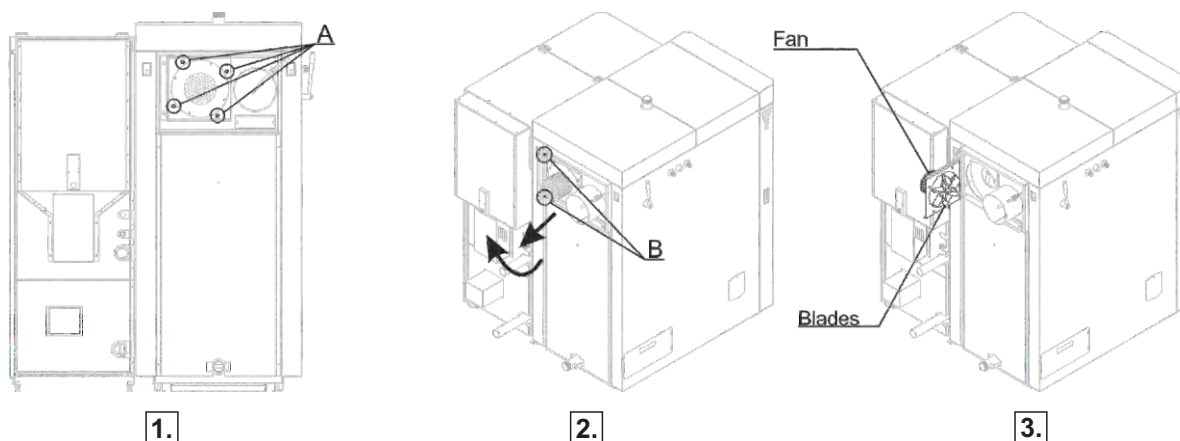
Cleaning / maintenance interval	Boiler power	Description
At least once per year	25, 29, 31, 35 and 45 kW	Cleaning the blades and box of the fan

BioTec Plus 25, 29, 31, 35



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

BioTec Plus 45



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



Before this procedure be sure to disconnect boiler from electric. power!!!

Cleaning / maintenance interval	Boiler type	Description
At least once a year (or if you have problems with the ignition)	25, 29, 31, 35 and 45 kW	Photocell cleaning

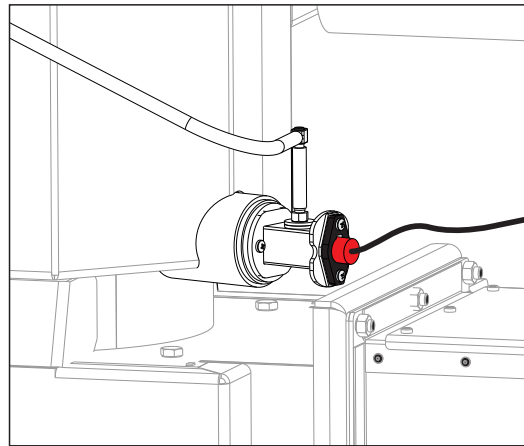


Dirty photocell which can result error in ignition or flame dissapear error

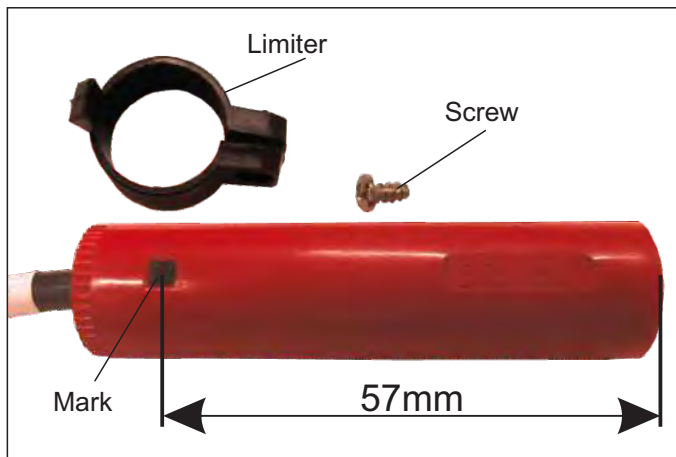


Valid photocell

Carefully remove the photocell from the box and then gently with a cotton swab clean the body and lens of photocell. After cleaning, carefully return photocell to work position.

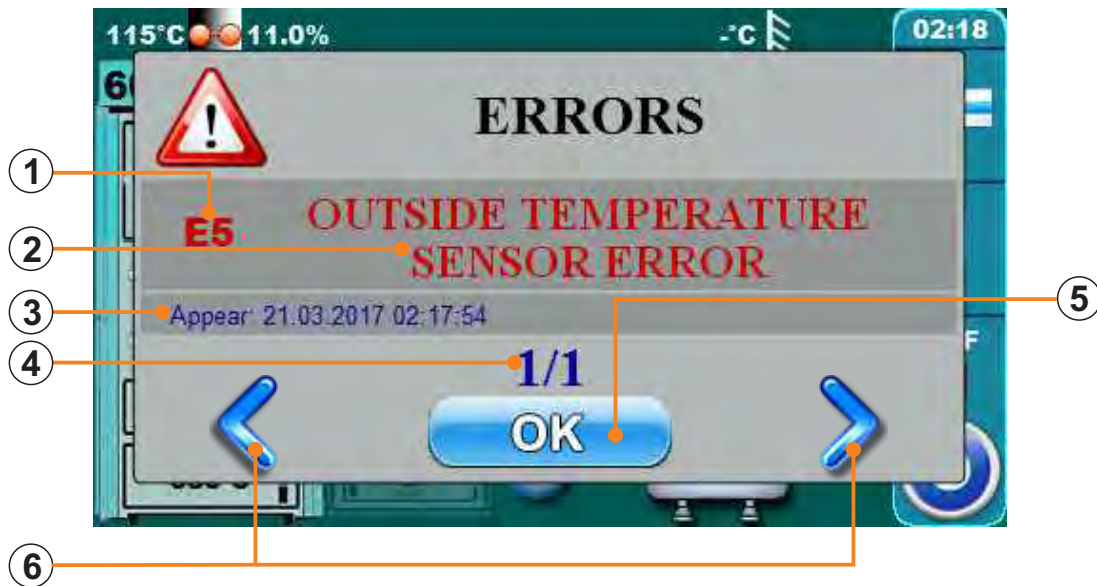


The photocell should not be set too deep or too shallow in the box. So, limiter determines the proper depth of photocell position. Make sure the limiter is set to black mark. Black mark should be barely visible (see image below).



10.0. MALFUNCTIONS

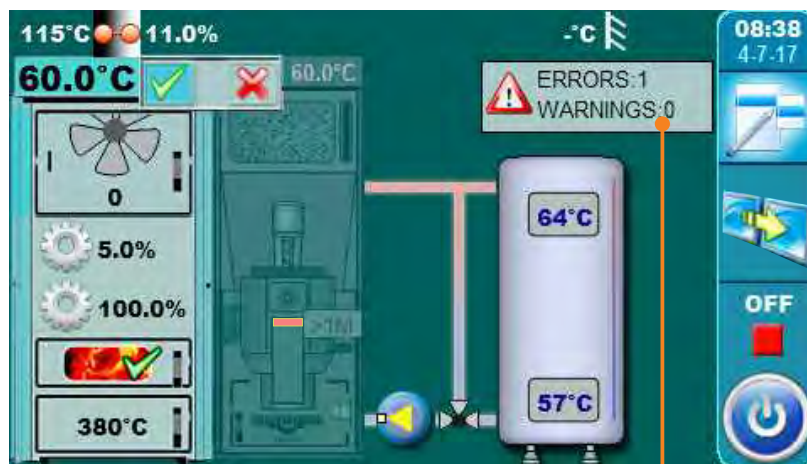
10.1 ERRORS/WARNINGS/INFORMATIONS ON THE MAIN SCREEN



When the error/warning still present, error/warning name and code is painted red, and when error/warning is resolved, text turns green

- ① Error / Warning / Information code
- ② Error / Warning / Information name
- ③ Date and time of error / warning / information occurrence
- ④ Number of errors / warnings / informations
- ⑤ „OK” button
- ⑥ Buttons for scrolling through errors / warning / informations

By pressing „OK” button error window will be minimized and showed on main display.



Minimized window on main display



All errors/warnings are recorded in history (see point 10.2.History)

10.2. HISTORY



By pressing on „History” button will be opened menu for choosing history list. It can be chosen between error list and warning list. Informations history are placed with error list.

- Written is:**
- time of occurrence errors / warnings / informations
 - error / warning / information code
 - description of the error / warning / information.

The first press on the field error/warning/information field is indicated, in addition to see and date generated errors/warnings/information. The second press on the selected error/warning/information, prints a detailed description of the error/warnings/information and corrective action errors/warnings/information. If for some error/warning/information there is no description on current software version, on the screen will be displayed "empty".

Errors list

History		
02:52 OFF	E8	BOILER SENSOR ERROR (WOOD)
02:52 DOP0	E12	COMMUNICATION ERROR WITH MOTHERBOARD
02:52 DOP0	Ew21	FIREBOX SENSOR
02:53 DOP0	E13	COMMUNICATION ERROR WITH SENSOR BOARD
02:53 DOP0	E29	COMMUNICATION ERROR WITH MOTHERBOARD 2
E14	LAMBDA PROBE ERROR	14-Dec-2016 02:53:00 DOP0

History	
E14	LAMBDA PROBE ERROR 14-Dec-2016 02:53:00
Empty	

Warnings list

History		
23:50 OFF	W6	INTERVENTION WORK (Fluegas sensor)
23:50 DOP0	Ww4	INTERVENTION WORK (Firebox sensor)
23:50 DOP0	W5	INTERVENTION WORK (Lambda sensor)
02:52 OFF	W6	INTERVENTION WORK (Fluegas sensor)
02:52 DOP0	Ww4	INTERVENTION WORK (Firebox sensor)
W5	INTERVENTION WORK (Lambda sensor)	14-Dec-2016 02:53:00 DOP0

History	
W5	INTERVENTION WORK (Lambda sensor) 14-Dec-2016 02:53:00
Empty	

10.3. ERROR LIST

MUTUAL ERRORS (WOOD / WOOD PELLETS):

ERROR	NAME	DESCRIPTION
E1	DHW sensor error	Boiler status: Boiler go to phases S7, C0 and OFF. Possible causes: Interruption on el. connections between sensor and boiler, connection to the boiler, cold connection or DHW sensor is invalid.
E2	Buffer tank sensor error (Up)	Boiler status: Boiler go to phases S7, C0 and OFF. Possible causes: Interruption on el. connections between sensor and boiler, cold connection or buffer tank sensor (up) is invalid.
E3	Buffer tank sensor error (Down)	Boiler status: Boiler go to phases S7, C0 and OFF. Possible causes: Interruption on el. connections between sensor and boiler, cold connection or buffer tank sensor (down) is invalid.
E4	Flue gas sensor error	Boiler status: Boiler go to phases S7, C0 and OFF. Possible causes: Interruption on el. connections between sensor and boiler, cold connection or invalid flue gas sensor.
E5	Outside temperature sensor error	Boiler status: Boiler work normally, problem appears on work of CM2K regulator if is installed. Possible causes: Interruption on el. connections between sensor and boiler (CM2K), cold connection or invalid outside temperature sensor.
E6	Main flow sensor error	Possible causes: Interruption on el. connections between sensor and boiler, cold connection or invalid main flow sensor.
E7	Return flow sensor error	Boiler status: Boiler go to phases S7, C0 and OFF. Possible causes: Interruption on el. connections between sensor and boiler, connection to the boiler, cold connection or invalid return flow sensor.
E8	Boiler sensor error (Wood)	Boiler status: Boiler go to phases S7, C0 and OFF. Possible causes: Interruption on el. connections between sensor and boiler, connection to the boiler, cold connection or invalid sensor.
E9	Unknown boiler power	Boiler status: Boiler immediate go to phase OFF. Possible causes: Key for power loading is not installed or recognized, cold connection or invalid key.
E10	Fan error	Boiler status: Boiler immediate go to phase OFF. Possible causes: Invalid fan or rpm counter (integrated in fan housing) or safety thermostat is interrupt el. supply to fan because of too high temperature in the boiler.
E11	Memory error	Possible causes: Call service man!

E12	Communication error with motherboard	Boiler status: Boiler immediate go to phase OFF. Possible causes: Call service man!
E13	Communication error with sensor board	Boiler status: Boiler go to phases S7, C0 and OFF. Possible causes: Call service man!
E14	Lambda probe error	a) Error occurs in the phase of "OFF" The problem is with el. heater which is integrated into the lambda probe b) Error occurs in all phases except "OFF" The problem is with the communication system within the lambda(Cables, connectors, el. boards, software)
E16	Communication error with CM2K module (1st and 2nd circuit)	Boiler status: Boiler work normally. Possible causes: Interruption in el. connections between boiler and CM2K (between two CM2K's), connection on boiler and CM2K (or two adjacent CM2K's) or CM2K module is invalid.
E17	Sensor reg. 1. circuit	Boiler status: Pump of 1+ heating circuit doesn't work. Boiler work normally. Possible causes: Error on flow temperature sensor of 1+ heating circuit (on regulator CM2K).
E18	Corrector reg. 1. circuit	Boiler status: Pump of 1+ heating circuit work in intervention mode by heating curve. Boiler work normally. Possible causes: Error on room corrector of 1+ heating circuit (CM2K regulator), bad corrector connection to the CM2K or room corrector failure.
E19	Sensor reg. 2. circuit	Boiler status: Pump of 2+ heating circuit doesn't work. Boiler work normally. Possible causes: Error on flow temperature sensor of 2+ heating circuit (on regulator CM2K).
E20	Corrector reg. 2. circuit	Boiler status: Pump of 2+ heating circuit work in intervention mode by heating curve. Boiler work normally. Possible causes: Error on room corrector of 2+ heating circuit (CM2K regulator), bad corrector connection to the CM2K or room corrector failure.
E22	Flue gas temperature too high	Boiler status: Boiler goes to phase „OFF”. Possible causes: Flue gas tubes are dirty (wood side), invalid flue gas sensor, bad sealing, open middle boiler door (wood side).
E24	Room corrector	Boiler status: Boiler work normally. Possible causes: Interruption on el. connections between room corrector and boiler, connection to the boiler or room corrector is invalid.
E26	Firebox sensor disconnected	Boiler status: Boiler work normally. Intervention mode: Boiler work to content heating demand but boiler has reduced possibilities. Possible causes: Interruption on el. connections between firebox sensor and boiler or bad connection to the boiler.

E27	Hydraulic crossover sensor error	Boiler status: Boiler work normally. Possible causes: Interruption on el. connections between room corrector and boiler, connection to the boiler or hydraulic crossover sensor is invalid.
E16_1	Communication error with CM2K module (3rd and 4th circuit)	Boiler status: Boiler work normally. Possible causes: Interruption in el. connections between boiler and CM2K (between two CM2K's), connection on boiler and CM2K (or two adjacent CM2K's) or CM2K module is invalid.
E17_1	Sensor reg. 3. circuit	Boiler status: Pump of 3+ heating circuit doesn't work. Boiler work normally. Possible causes: Error on flow temperature sensor of 3+ heating circuit (on regulator CM2K).
E18_1	Corrector reg. 3. circuit	Boiler status: Pump of 3+ heating circuit work in intervention mode by heating curve. Boiler work normally. Possible causes: Error on room corrector of 3+ heating circuit (CM2K regulator), bad corrector connection to the CM2K or room corrector failure.
E19_1	Sensor reg. 4. circuit	Boiler status: Pump of 4+ heating circuit doesn't work. Boiler work normally. Possible causes: Error on flow temperature sensor of 4+ heating circuit (on regulator CM2K).
E20_1	Corrector reg. 4. circuit	Boiler status: Pump of 4+ heating circuit work in intervention mode by heating curve. Boiler work normally. Possible causes: Error on room corrector of 4+ heating circuit (CM2K regulator), bad corrector connection to the CM2K or room corrector failure.
E16_2	Communication error with CM2K module (5rd and 6th circuit)	Boiler status: Boiler work normally. Possible causes: Interruption in el. connections between boiler and CM2K (between two CM2K's), connection on boiler and CM2K (or two adjacent CM2K's) or CM2K module is invalid.
E17_2	Sensor reg. 5. circuit	Boiler status: Pump of 5+ heating circuit doesn't work. Boiler work normally. Possible causes: Error on flow temperature sensor of 5+ heating circuit (on regulator CM2K).
E18_2	Corrector reg. 5. circuit	Boiler status: Pump of 5+ heating circuit work in intervention mode by heating curve. Boiler work normally. Possible causes: Error on room corrector of 5+ heating circuit (CM2K regulator), bad corrector connection to the CM2K or room corrector failure.
E19_2	Sensor reg. 6. circuit	Boiler status: Pump of 6+ heating circuit doesn't work. Boiler work normally. Possible causes: Error on flow temperature sensor of 6+ heating circuit (on regulator CM2K).

E20_2	Corrector reg. 6. circuit	Boiler status: Pump of 6+ heating circuit work in intervention mode by heating curve. Boiler work normally. Possible causes: Error on room corrector of 6+ heating circuit (CM2K regulator), bad corrector connection to the CM2K or room corrector failure.
E16_3	Communication error with CM2K module (7rd and 8th circuit)	Boiler status: Boiler work normally. Possible causes: Interruption in el. connections between boiler and CM2K (between two CM2K's), connection on boiler and CM2K (or two adjacent CM2K's) or CM2K module is invalid.
E17_3	Sensor reg. 7. circuit	Boiler status: Pump of 7+ heating circuit doesn't work. Boiler work normally. Possible causes: Error on flow temperature sensor of 7+ heating circuit (on regulator CM2K).
E18_3	Corrector reg. 7. circuit	Boiler status: Pump of 7+ heating circuit work in intervention mode by heating curve. Boiler work normally. Possible causes: Error on room corrector of 7+ heating circuit (CM2K regulator), bad corrector connection to the CM2K or room corrector failure.
E19_3	Sensor reg. 8. circuit	Boiler status: Pump of 8+ heating circuit doesn't work. Boiler work normally. Possible causes: Error on flow temperature sensor of 8+ heating circuit (on regulator CM2K).
E20_3	Corrector reg. 8. circuit	Boiler status: Pump of 8+ heating circuit work in intervention mode by heating curve. Boiler work normally. Possible causes: Error on room corrector of 8+ heating circuit (CM2K regulator), bad corrector connection to the CM2K or room corrector failure.
E28	Communication error with CMGSM	Boiler status: Boiler work normally. Possible causes: Interruption in el. connections between boiler and CMGSM or invalid CMGSM module.
E29	Communication error with motherboard 2	Boiler status: Boiler goes to phase „OFF”. Possible causes: Call service man!

WOOD FIRING ERRORS:

ERROR	NAME	DESCRIPTION
Ew21	Firebox sensor	Boiler status: Boiler work normally. Intervention mode: Boiler work to content heating demand but boiler has reduced possibilities. Possible causes: Invalid firebox sensor.

WOOD PELLETS FIRING ERRORS:

ERROR	NAME	DESCRIPTION
Ep31	Photocell error	Boiler status: Boiler go to phase OFF after ending phase S0 (retry start is allowed). Possible cause: Invalid photocell (sending information that flame exist in phase S0).
Ep32	Safety pressure switch	Boiler status: Boiler immediate go to phase OFF. Possible causes: Firebox resistance is too high in phases S2, S3, S4, (S5). It's open any door or opening on boiler. Interruption in el. connection between safety pressure switch and boiler, connection to the boiler, cold connection or invalid safety pressure switch. Interruption or bad sealing of safety pressure switch pipe.
Ep33	No flame in ignition phase	Boiler status: Boiler immediate go to phase OFF.
Ep34	Flame disappeared working phase	Boiler status: Boiler immediate go to phase OFF.
Ep35	Error grate cleaner	Boiler status: Boiler immediate go to phase OFF.
Ep36	Fuel level	Boiler status: Boiler go to phases S7, C0 and OFF.
Ep37	Flame disappeared at ignition stage	Boiler status: Boiler immediate go to phase OFF.
Ep38	Flame disappeared stabilization stage	Boiler status: Boiler immediate go to phase OFF.
Ep39	Fuel sensor	Boiler status: Boiler immediate go to phase OFF.
Ep40	Error flap not closed	Boiler status: Boiler work normally. Possible causes: Check if the flap is blocked with pellets , if the sensor is soiled with dust , if the sensor is about 1 mm distant from the flap , if the sensor reacts on the flap (the LED lamp is switching on the sensor).

Ep41	No pellets	Boiler status: Boiler work normally. Possible causes: Check the pellet level in the big tank/room , check if the flexible tubes are blocked, check if the turbine net is full with dust.
Ep42	Mole or screw not working	Boiler status: Boiler work normally. Possible causes: Check the electric connections on the mole/feeder screw, check the filthiness of the mole/feeder screw.
Ep43	Communication error with CMVAC	Boiler status: Boiler work normally. Possible causes: Check the UTP cable and its connections with the electric boards.
Ep44	Boiler sensor error (pellet)	Boiler status: Boiler go to phases S7, C0 and OFF. Possible causes: Interruption on el. connections between sensor and boiler, connection to the boiler, cold connection or invalid sensor.
Ep45	Wood in firebox or incorrect adjustment of pellet side.	Boiler status: Boiler go to phases S7, C0 and OFF. Possible causes: Existing of larger quantity of wood in firebox (wood side) during burner work (wood pellet side) or incorrect adjustment of pellet side.
Ep46	Upper door opened - wood side	Boiler status: Boiler go to phases S7, C0 and OFF. Possible causes: Upper boiler door are opened (wood side) during burner work (wood pellet side) after warning time Wp15 expire, invalid microswitch - upper boiler door (wood side).
Ep47	Screw refill	Boiler status: Boiler work normally. Possible causes: No pellets in CPSP-BP tank for refilling, problem with feeder screw in CPSP-BP, interruption on el. connection between boiler and feeder screw, connection to the boiler.

10.4. WARNING LIST

MUTUAL WARNINGS (WOOD / WOOD PELLETS):

WARNING	NAME	DESCRIPTION
W1	Factory setting loaded	Factory settings loaded.
W3	Fan protection	Appear always when fan decrease rotating speed or if turning "OFF" itself because of high flue gas temperature.
W4	Intervention work (Firebox sensor)	The boiler operates without using the firebox sensor.
W5	Intervention work (Lambda sensor)	The boiler operates without using the lambda probe.
W6	Intervention work (Flue gas sensor)	The boiler operates without using the flue gas sensor.
W10	Low return temperature	It can occur only if the configuration contain "Protection valve". The boiler will resume normal work (the cause should be removed because boiler condensation will occur and flue passes will clog up). The problem may be with 3-way mixing valve (protection valve) / motor drive / sensor of return flow temperature.
W12	Low buffer temperature	The temperature accumulation tank is lower than the desired which allow pump work.

WOOD FIRING WARNINGS:

WARNING	NAME	DESCRIPTION
Ww2	Flue gas temperature high. Close the upper door!	Boiler working (wood side), upper boiler door is opened and flue gas temperature is too high. It's necessary to close upper boiler door.
Ww7	Intervention work (RPM sensor)	The boiler operates without using the RPM (rotates per minute) sensor.
Ww8	Ignition error	Bad ignition, too damp wood, non-closed middle or lower door, non-closed side covers for cleaning or rear top cover for cleaning), impassable flue pipe from the fan to the chimney, blocked passes for the primary or secondary air between the upper and middle boiler door. Check and close the insufficiently sealed openings and if necessary fill and start the boiler again, if you don't help these actions, call an authorized service to check primary / secondary openings.

Ww9	Fan is OFF, flue gas temperature is to high. Close the upper door!	Too high flue gas temperature with the open upper boiler door. Close the uper door and restart the boiler (load fuel if is necessary).
Ww11	Out of fuel	No fuel.

WOOD PELLETS FIRING WARNINGS:

WARNING	NAME	DESCRIPTION
Wp13	Fuel level	Boiler status: Boiler will be work for a while, if pellet tank don't be refilled with pellets will be shown „E22 Fuel level” what's mean that is no enough fuel for continue of boiler work. Possible causes: Low fuel level in pellet tank, enough for short time.
Wp15	Upper door opened - wood side	Upper boiler door are opened (wood side) during burner work (wood pellet side), if time counter expire then will be shown error Ep46.

10.5. INFORMATION LIST

MUTUAL INFORMATIONS (WOOD / WOOD PELLETS):

INFO.	NAME
I5	Power up (Power down)

WOOD FIRING INFORMATIONS:

INFO.	NAME
Iw1	Off during ignition
Iw2	Ignition automaticly proceeded
Iw3	Bad ignition
Iw4	Off during stabilization
Iw6	Glow after power up
Iw7	Off after power up

WOOD PELLETS FIRING INFORMATIONS:

INFO.	NAME
Ip8	Refill
Ip9	Flame disappeared in ignition phase
Ip9_1	Retry ignition
Ip10	No flame in stabilization stage
Ip10_1	Retry ignition
Ip11	Pellet supply tube temperature too high
Ip12	Flame disappeared working phase
Ip12_1	Retry ignition



Company assumes no responsibility for possible inaccuracies in this book originated typographical errors or rewriting, all the pictures 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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