

Centrometal

HEATING TECHNIQUE

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ENG

TECHNICAL INSTRUCTIONS

CE

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



CentroPlus

TECHNICAL DATA

TYPE		CentroPlus 25		
		wood	pellets	oil
Nominal heat output	(kW)	25	25	25
Heat output range	(kW)	15-25	7,5-25	7,4-25
Boiler class		1	3	-
Required chimney underpressure	(Pa)	17		
Water amount in boiler	(l)	155		
Exhaust gas temperature at nominal heat output	(°C)	205	170	115
Exhaust gas temperature at minimum heat output	(°C)	160	95	95
Exhaust mass flow at nominal heat output	(kg/s)	0,029	0,015	0,012
Exhaust mass flow at minimum heat output	(kg/s)	0,030	0,005	0,007
Standby heat losses	(kW)			
Boiler resistance on water side at nominal output	(mbar)	10	10	10
Combustion period at nominal output	(h)	2	34	-
Fuel type		solid fuel	wood pellets	EL oil
Maximum heat input	(kW)			
Fuel moisture content	(%)	12-20	max. 12	-
Fuel size	(mm)	max. 500x150x150	φ 6 x max.50	-
Firebox volume/tank volume	(l)	79	330	-
Wood feeding opening AxB	(mm)	320x220	-	-
Combustion chamber dimensions	(mm)	561x600x420	571x320x378	571x320x378
Combustion chamber volume	(l)	141	69	69
Combustion chamber type		underpressure	overpressure	overpressure
Required minimum accumulation next to boiler	(l/kW)	by EN 303-5 point 4.2.5		
Electrical power input	(W)	250		
Temp. and press. of water from water supply line into heat exchanger	(C°/bar)	10-15 °C, 2 bar		
Supply voltage	(V~)	230		
Frequency	(Hz)	50		
Current type		~		
Boiler dimensions with casing	Lenght (A)	(mm)	1070	
	Width (B)	(mm)	915	
	Height (C)	(mm)	1260	
Boiler body mass	(kg)	419		
Total mass - (boiler with casing and accessories)	(kg)	464		
Max. operating overpressure	(bar)	2,5		
Max. operating temperature	(°C)	90		
Flue gas tube – external diameter	(mm)	150		
Boiler connections	Flow and return line (outer thread)	(R)	5/4"	
	Filling/drainage (internal thread)	(R)	1/2"	
	Heat exchanger connector (outer thread)	(R)	3/4"	
	Connector of exchanger sensor(internal thread)	(R)	1/2"	

Total system dimensions			Solid	Solid / Pellets	Solid / Oil
			25 kW	25 kW	25 kW
Total length	(D)	(mm)	1070	1350	1350
Total width	(E)	(mm)	915	1545	915
Total height	(F)	(mm)	1260	1610	1365

TYPE		CentroPlus 35		
		wood	pellets	oil
Nominal heat output	(kW)	35	35	35
Heat output range	(kW)	25-35	10,5-35	10-35
Boiler class		1	3	-
Required chimney underpressure	(Pa)	19		
Water amount in boiler	(l)	172		
Exhaust gas temperature at nominal heat output	(°C)	240	160	135
Exhaust gas temperature at minimum heat output	(°C)	195	85	105
Exhaust mass flow at nominal heat output	(kg/s)	0,03	0,018	0,017
Exhaust mass flow at minimum heat output	(kg/s)	0,032	0,007	0,01
Standby heat losses				
Boiler resistance on water side at nominal output	(mbar)	15	15	15
Combustion period at nominal output	(h)	2	24	-
Fuel type		solid fuel	wood pellets	EL oil
Maximum heat input				
Fuel moisture content	(%)	12-20	max. 12	-
Fuel size	(mm)	max. 500x150x150	ϕ 6 x max.50	-
Firebox volume/tank volume	(l)	104	330	-
Wood feeding opening AxB	(mm)	420x220	-	-
Combustion chamber dimensions	(mm)	571x600x420	571x320x380	571x320x380
Combustion chamber volume	(l)	143	70	70
Combustion chamber type		underpressure	overpressure	overpressure
Required minimum accumulation next to boiler	(l/kW)	by EN 303-5 point 4.2.5		
Electrical power input	(W)	250		
Temp. and press. of water from water supply line into heat exchanger	(C°/bar)	10-15 °C, 2 bar		
Supply voltage	(V~)	230		
Frequency	(Hz)	50		
Current type		~		
Boiler dimensions with casing	Lenght (A)	(mm)	1070	
	Width (B)	(mm)	1015	
	Height (C)	(mm)	1260	
Boiler body mass	(kg)	476		
Total mass - (boiler with casing and accessories)	(kg)	522		
Max. operating overpressure	(bar)	2,5		
Max. operating temperature	(°C)	90		
Flue gas tube – external diameter	(mm)	160		
Boiler connections	Flow and return line (outer thread)	(R)	5/4"	
	Filling/drainage (internal thread)	(R)	1/2"	
	Heat exchanger connector (outer thread)	(R)	3/4"	
	Connector of exchanger sensor(internal thread)	(R)	1/2"	

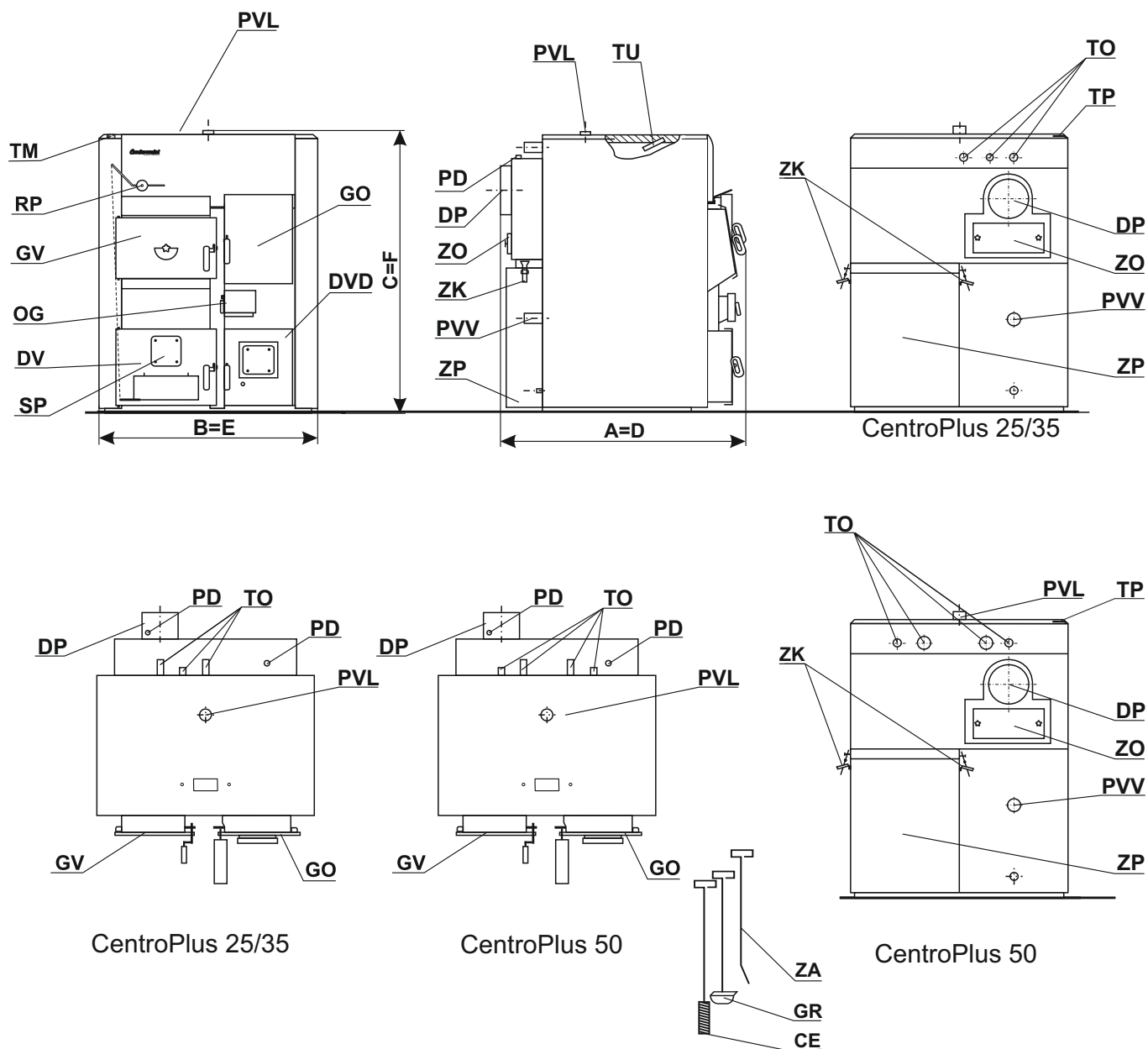
Total system dimensions			Solid	Solid / Pellets	Solid / Oil
			35 kW	35 kW	35 kW
Total length	(D)	(mm)	1070	1350	1350
Total width	(E)	(mm)	1015	1650	1015
Total height	(F)	(mm)	1260	1610	1365

Technical data

TYPE		CentroPlus 50		
		wood	pellets	oil
Nominal heat output	(kW)	49	49	49
Heat output range	(kW)	35-49	14-49	14-49
Boiler class		1	3	-
Required chimney underpressure	(Pa)	22		
Water amount in boiler	(l)	220		
Exhaust gas temperature at nominal heat output	(°C)	225	180	178
Exhaust gas temperature at minimum heat output	(°C)	160	150	113
Exhaust mass flow at nominal heat output	(kg/s)	0,034	0,025	0,024
Exhaust mass flow at minimum heat output	(kg/s)	0,04	0,01	0,014
Standby heat losses				
Boiler resistance on water side at nominal output	(mbar)	25	25	15
Combustion period at nominal output	(h)	2	16	-
Fuel type		solid fuel	wood pellets	EL oil
Maximum heat input				
Fuel moisture content	(%)	12-20	max. 12	-
Fuel size	(mm)	max. 500x150x150	ϕ 6 x max.50	-
Firebox volume /tank volume	(l)	104	330	-
Wood feeding opening AxB	(mm)	470x217	-	-
Combustion chamber dimensions	(mm)	671x620x450	600x340x380	600x340x380
Combustion chamber volume	(l)	187	77	77
Combustion chamber type		underpressure	overpressure	overpressure
Required minimum accumulation next to boiler	(l/kW)	by EN 303-5 point 4.2.5		
Electrical power input	(W)	250		
Temp. and press. of water from water supply line into heat exchanger	(C°/bar)	10-15 °C, 2 bar		
Supply voltage	(V~)	230		
Frequency	(Hz)	50		
Current type		~		
Boiler dimensions with casing	Lenght (A)	(mm)	1140	
	Width (B)	(mm)	1145	
	Height (C)	(mm)	1260	
Boiler body mass	(kg)	580		
Total mass - (boiler with casing and accessories)	(kg)	630		
Max. operating overpressure	(bar)	2,5		
Max. operating temperature	(°C)	90		
Flue gas tube – external diameter	(mm)	180		
Boiler connections	Flow and return line (outer thread)	(R)	5/4"	
	Filling/drainage (internal thread)	(R)	1/2"	
	Heat exchanger connector (outer thread)	(R)	1"	
	Connector of exchanger sensor(internal thread)	(R)	1/2"	

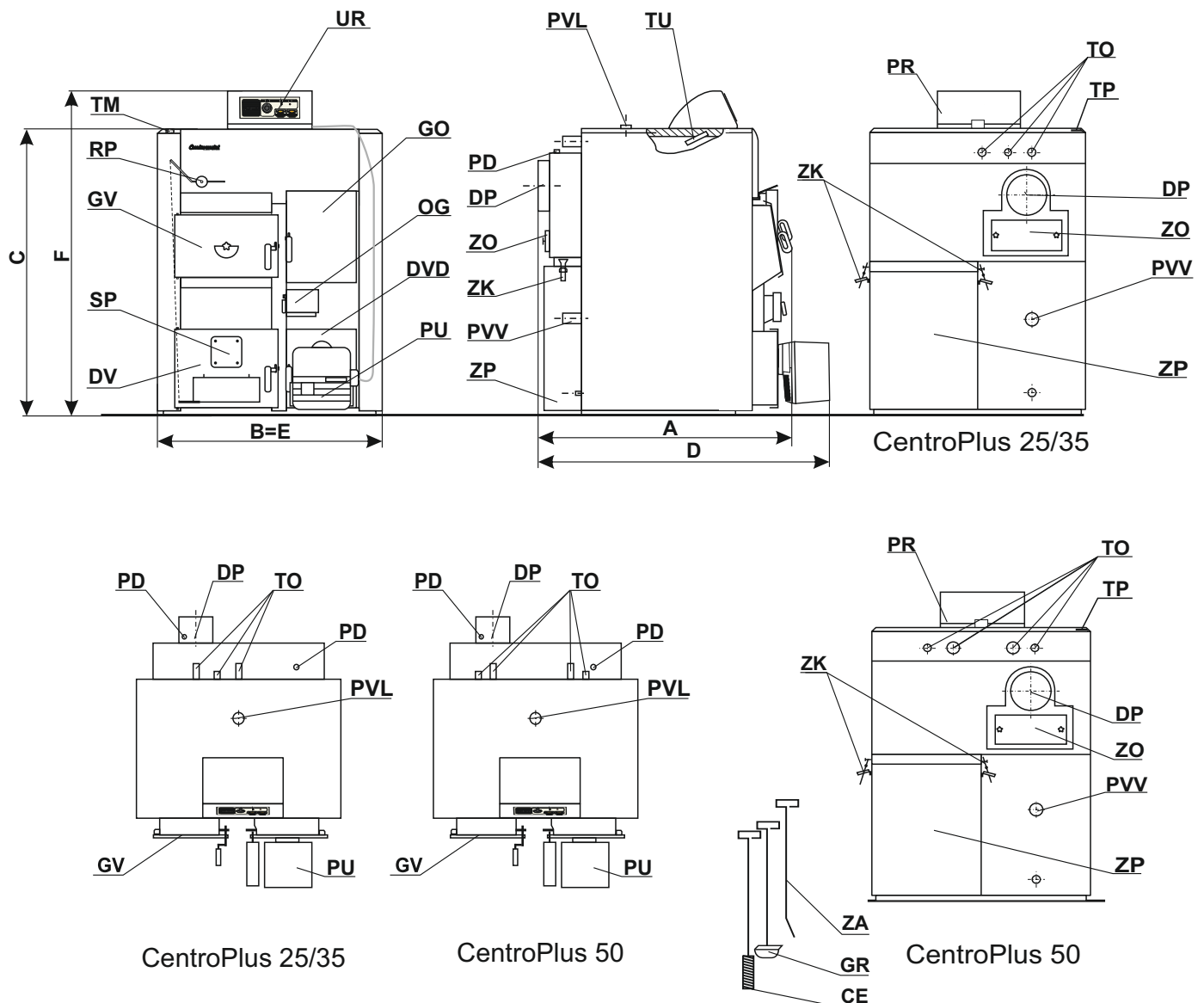
Total system dimensions			Solid	Solid / Pellets	Solid / Oil
			49 kW	49 kW	49 kW
Total length	(D)	(mm)	1140	1420	1420
Total width	(E)	(mm)	1145	1775	1145
Total height	(F)	(mm)	1260	1610	1365

Solid fuel



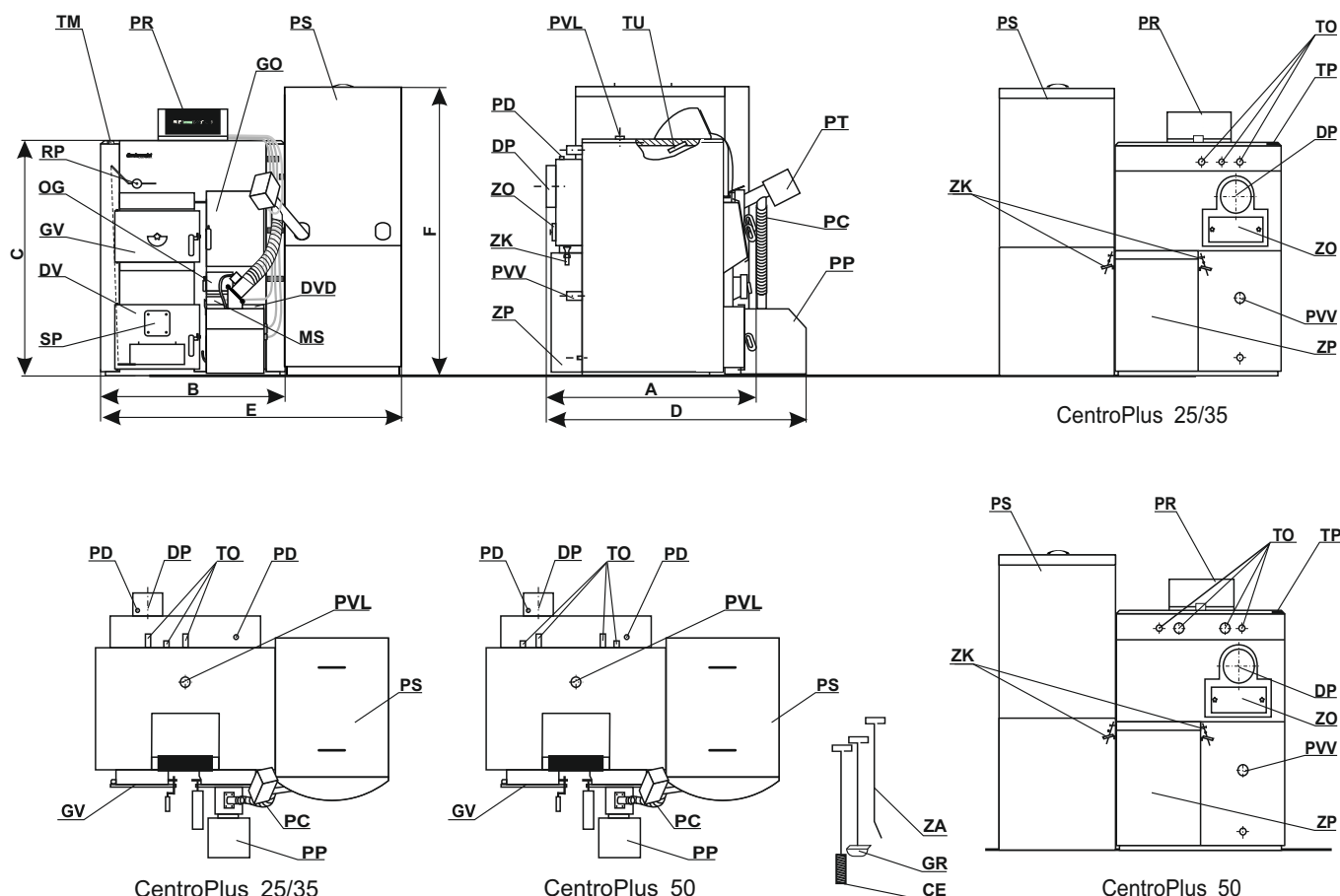
Note: depending on the order, the boiler can be also delivered as left version.

Solid fuel / EL fuel oil



Note: depending on the order, the boiler can be also delivered as left version.

Solid fuel / wooden pellets



Note: depending on the order, the boiler can be also delivered as left version.

DESCRIPTION OF BOILER SYMBOLS FOR SOLID FUEL, SOLID FUEL / EL FUEL OIL, SOLID FUEL / WOODEN PELLETS

LEGEND:

CE - cleaning brush	PU - oil burner
DP - chimney connection	PVL - inlet line
DV - left firebox lower door	PVV - outlet line
DVD - right firebox lower door	RP - draft controller (such as CALEFFI 543 or ESBE ATA200)
GO - right firebox upper door	SP - blind plate
GR - scraper	TM - thermometer
GV - left firebox upper door	TO - thermal protection connectors
MS - micro switch	TP - pump thermostat
OG - opening for monitoring	TU - sensor sleeve
PC - plastic flexible tube	UR - oil-control unit EKO-CK/CKB
PD - connection for flue gas measurement	ZA - poker
PP - pellet burner CPPL	ZK - back ash box holder
PR - pellet control unit CPREG	ZO - cleaning opening
PS - pellet tank CPSP	ZP - back ash box
PT - pellet feeder CPPT	

1.0. GENERAL

The hot water boiler **CentroPlus** has a modern design and construction. It is made out of controlled high-quality materials, welded with the most modern technology and meets all special requirements for connection to the central heating system.

1.1. BOILER DESCRIPTION

Steel hot water boiler **CentroPlus** has two separate combustion chambers inside the common boiler's water chamber. The left combustion chamber is intended for firing with solid or liquid fuel. It has a large heating area and small resistance, and large door which enables simple heating with big-size fuel. The right combustion chamber is intended for firing with wooden pellets or liquid fuel and it is characterised by 3-passes flue gas system with turbolators and large heating area which provides high boiler efficiency. A large amount of water in the boiler enables longer pellet burner work (in that way it is reduced the number of switching on the burner and extends the burner life time). The boiler cleaning is very simply and can be done from the front or back side. Depending on the installed additional equipment, there are three models of boiler use:

- solid fuel firing,
- solid fuel and wooden pellets firing,
- solid fuel and EL fuel oil firing.

The boiler is supplied without above mentioned additional equipment, which can be additionally ordered. The additional equipment is delivered in a separate packing and it is installed onto the boiler after the boiler is installed into the boiler room and connected to the central heating system.

1.2. DELIVERY OF THE BOILER CentroPlus

Due to easier transport and positioning into the boiler room, the boiler CentroPlus is not delivered with built-in thermal insulation and casing (it is delivered separately):

- the boiler body with boiler door is delivered on a wooden pallet (with lid of the left firebox door, lid of the right firebox register, ashtrays, left and right firebox grates and turbolators);
- the cardboard box with boiler casing, thermal insulation, thermometer, draft controller (such as CALEFFI 543 or ESBE ATA200), back ash box, cleaning accessories (accessories holder, brush, scraper and poker), protective box for extension for the pellet burner and set of screws and bolts.

1.3. OBLIGATORY ADDITIONAL EQUIPMENT FOR THE BOILER CentroPlus WHICH IS INSTALLED TO CLOSED CENTRAL HEATING SYSTEM

CentroPlus 25/35:

- thermal valve (such as CALEFFI 543) -1 piece

CentroPlus 50:

- thermal valve (such as CALEFFI 543) -2 pieces
- thermal protection exchanger Centrometal - 2 pieces

1.4. ADDITIONAL EQUIPMENT FOR THE BOILER CentroPlus 25/35

Depending on preferred boiler use it is necessary to install appropriate additional equipment to the boiler:

1) Additional equipment for solid fuel / wooden pellet firing:

- pellet burner CPPL-35, digital boiler control unit CPREG for pellet burner CPPL-35;
- pellet tank CPSP;
- pellet feeder CPPT 14-35.

2) Additional equipment for solid fuel / EL fuel oil firing:

- boiler control unit EKO-CK/CKB for the oil burner;
- oil burner with appertaining equipment.

1.5. ADDITIONAL EQUIPMENT FOR THE BOILER CentroPlus 50

Depending on preferred boiler use it is necessary to install appropriate additional equipment to the boiler:

1) Additional equipment for solid fuel / wooden pellet firing:

- pellet burner CPPL- 50, digital boiler control unit CPREG for pellet burner CPPL-50;
- pellet tank CPSP;
- pellet feeder CPPT 40/50.

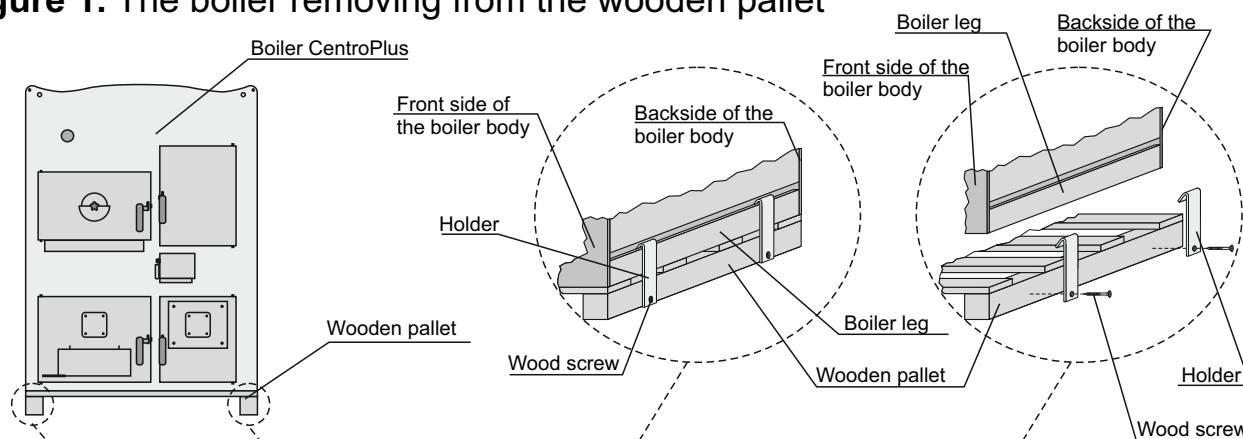
2) Additional equipment for solid fuel / EL fuel oil firing:

- boiler control EKO-CK/CKB for the oil burner;
- oil burner with appertaining equipment.

2.0. POSITIONING AND ASSEMBLY OF THE BOILER/ADDITIONAL EQUIPMENT

The boiler body is delivered on a wooden pallet on which it is fixed with four holders. Before placing the boiler body into the boiler room, it should be removed from pallet (Figure 1.). The boiler positioning, assemble and installation of the additional equipment must be performed by a qualified person. We recommend to place the boiler on a concrete base which is 50 to 100 mm higher than floor. The boiler room has to be frost-resistant and ventilated. The boiler has to be placed in a way which enables connection to the chimney (see point 4.0) and supervising the boiler and additional equipment, cleaning and maintenance (see Figure 4a.). The boiler casing assemble has to be done in accordance with the instructions (Figure 2.).

Figure 1. The boiler removing from the wooden pallet



2.1. SOLID FUEL FIRED BOILER (EQUIPMENT FOR WOODEN PELLETS AND OIL IS NOT BUILT-IN YET)

Draft controller has to be installed to the boiler left side (such as CALEFFI 543, ESBE ATA200) and connect it by a chain to the movable lid on the boiler lower door. The electrical connector and heating pump connect according to the electrical scheme (Scheme 5.).

2.2. SOLID FUEL/WOODEN PELLETS FIRED BOILER

To the left boiler side install draft controller (such as CALEFFI 543, ESBE ATA200) and connect it by a chain to the movable lid on the boiler lower door. The pellet burner CPPL install onto the right lower door. The pellet control unit CPREG install to the casing cover. Above the right lower door (on the casing) install the microswitch. Place the pellet tank CPSP with the pellet feeder CPPT next to the boiler, to its right side. Detailed description of pellet equipment is described in “Technical instructions for startup and setting of the Cm Pellet-set for the CentroPlus and CentroPlus-B boilers (solid fuel and wooden pellets fired)” and in “Technical instructions for pellet tank and screw feeder which are delivered with equipment for wooden pellet firing.”

2.3. SOLID FUEL / EL OIL FUEL FIRED BOILER

To the left boiler side install draft controller (such as CALEFFI 543, ESBE ATA200) and connect it by a chain to the movable lid on the boiler lower door. Remove the blind plate from the lower right door from the ceramic extension for the oil burner. The oil burner has to be installed to the plate opening with ceramic and connected to the fuel supply. Install the boiler control unit EKO-CK/CKB for oil burner to the casing cover and connect it to the burner, electrical connection and heating pump according to the electrical scheme 6.

2.3.1. THE OIL BURNER INSTALLATION TO THE BOILER

Scheme installation of oil burner to the boiler

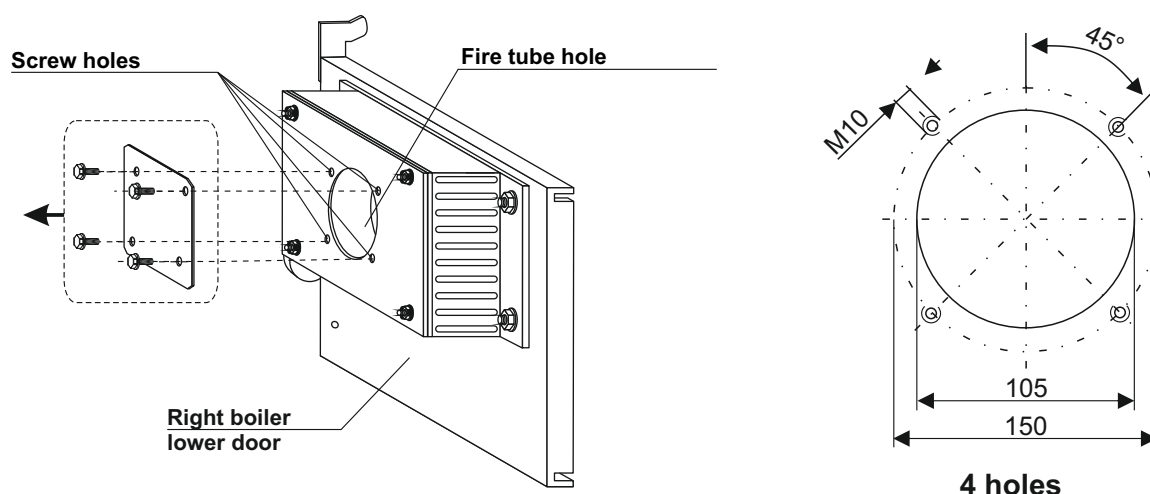
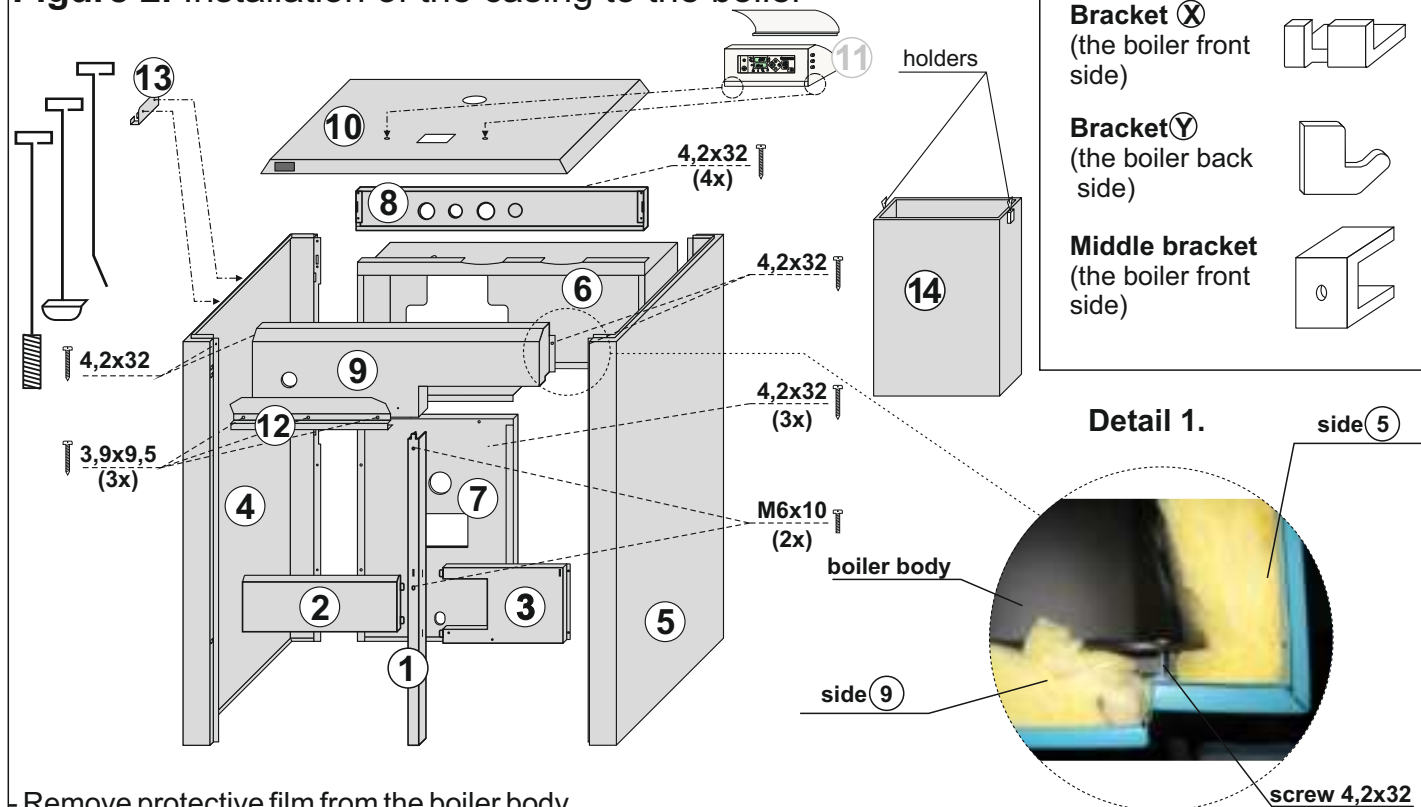


Figure 2. Installation of the casing to the boiler

- Remove protective film from the boiler body.
- Place side ① on two middle brackets and tighten it by two M6 x 10 mm screws.
- Place side ② into grooves on side ① and put it onto left lower bracket X.
- Place side ③ into grooves on side ① and put it onto right lower bracket X.
- Put the side ⑨ on side ① and to left and right upper bracket X.
- Place the lateral left side ④ on two back left brackets Y and then put it on two front left brackets X so that side ② and side ⑨ are linked.
- Tighten the side ⑨ and the side ④ to the boiler body using screw 4,2 x 32 in a way from boiler toward casing (Detail 1).
- Place the lateral right side ⑤ on two back right brackets Y and then put in two front right brackets X so that side ③ and side ⑨ are linked.
- Tighten the side ⑨ and the side ⑤ to the boiler body using screw 4,2 x 32 in a way from boiler toward casing (Detail 1).
- Place the side ⑥ to flue gas chamber and push it and hook into grooves on the lateral sides ④ and ⑤.
- Tighten the side ⑧ to the lateral left side ④ and lateral right side ⑤ using four screws 4,2 x 32mm so that side ⑥ is also tightened.
- Put the side ⑦ on back middle bracket and tighten it onto the lateral left sides ④ and side ⑥ using three screws 4,2 x 32 mm.
- Put the cover ⑩ onto the boiler.
- Pull the control sensors through opening on the cover ⑩ (pellet control unit CPREG or boiler control unit EKO-CK/CKB are parts of the additional equipment if it has been purchased (if it is not, skip this step and next step of the installation) and push it into the sensor sleeve from the the boiler upper side.
- Tighten to half (not completely) sheet metal screws 4,2 x 15 mm in the prepared holes on the casing cover ⑩ and put the boiler control unit ⑪ so that it is attached onto the screws.
- Tighten the protective sheet ⑫ onto the side ⑨ using three screws 3,9 x 9,5 mm.
- Drill two holes on the lateral left side ④ and tighten the bracket for cleaning accessories ⑬ onto the lateral left side ④ using two screws 3,9 x 9,5 mm.
- Place the back ash box ⑭ on the back boiler side below the flue gas chamber onto prepared brackets using two snaps (see page 7, positions ZP and ZK) which have to be adjusted so that box adhere well.

3.0. OPENING FOR FRESH AIR

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

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

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

4.0. CONNECTION TO THE CHIMNEY

Properly dimensioned and built chimney is a precondition for safe boiler operation and heating efficiency. A chimney must be thermally insulated, gas-tight and smooth. Cleaning door must be placed in the lower part of a chimney. Walled chimney must be 3 layered with the middle mineral wool insulation layer. The thickness of the thermal insulation has to be at least 30 mm if the chimney is built against to interior wall and at least 50 mm if it is built on the outer side. **Inner dimensions of the chimney light diameter are dependent on the chimney height and boiler output, so they must be chosen in accordance with diagram shown in Figure 4.** The chimney usable height is the measure from connection spot of smoke tube to the chimney top. As these boilers can be fired also with solid fuel, chimney has to be chosen in accordance with diagram for solid fuel. The flue gas temperature on the chimney exit has to be at least 30°C higher than the condensation temperature of combustion flue gases. Selection and building of a chimney must be done by qualified person. Required maximum distance from the boiler to the chimney has to be 1000 mm (minimum distance has to be 500 mm). A flue gas tube has to be mounted under an inclination (at least 5°) and has to be tilted from the chimney to the boiler (Figure 3.). A flue gas tube has to be mounted 10 mm deeper into the chimney in order to prevent entering condensate into the boiler. The connecting flue gas tube, between the chimney and the boiler, must be thermal insulated with mineral wool insulation which is 30-50 mm thick. All works must be done in accordance with valid national and European standards.

Figure 3. Possible ways of connection boiler CentroPlus to the chimney

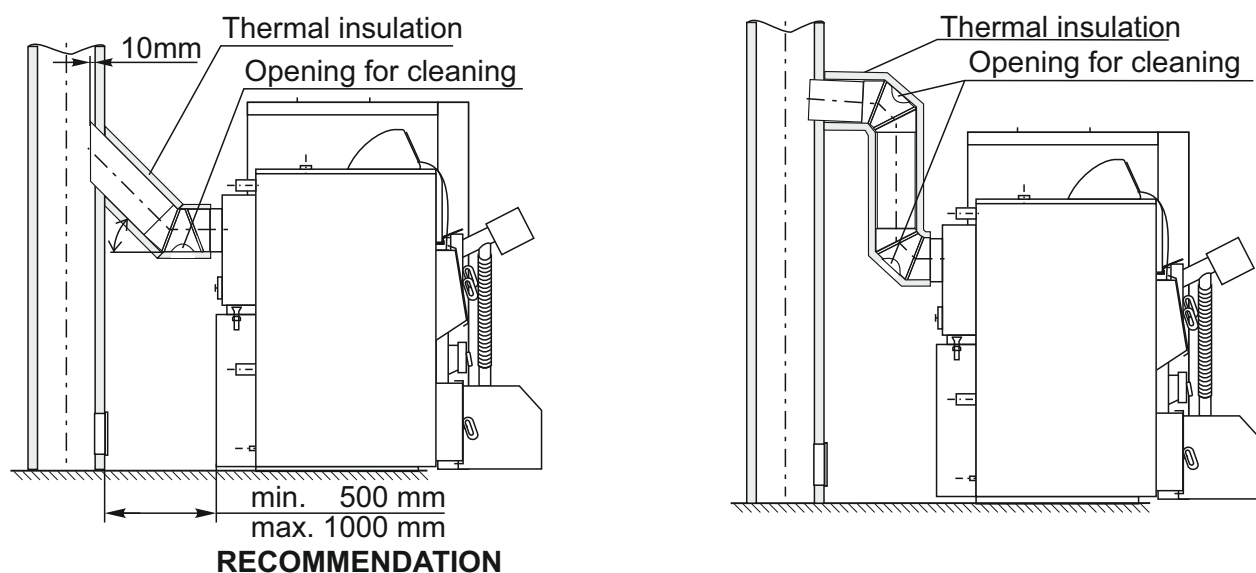
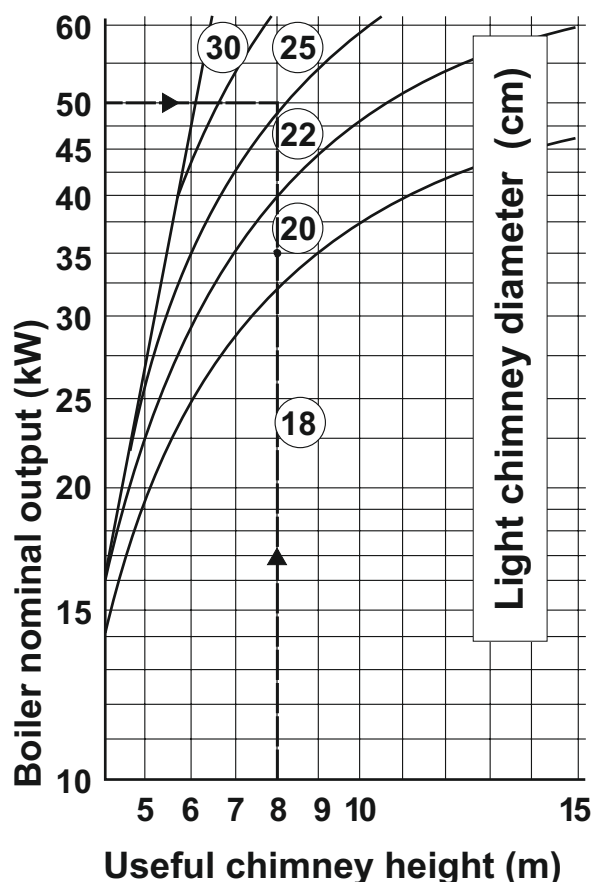


Figure 4. Chimney dimensioning for the boiler CentroPlus



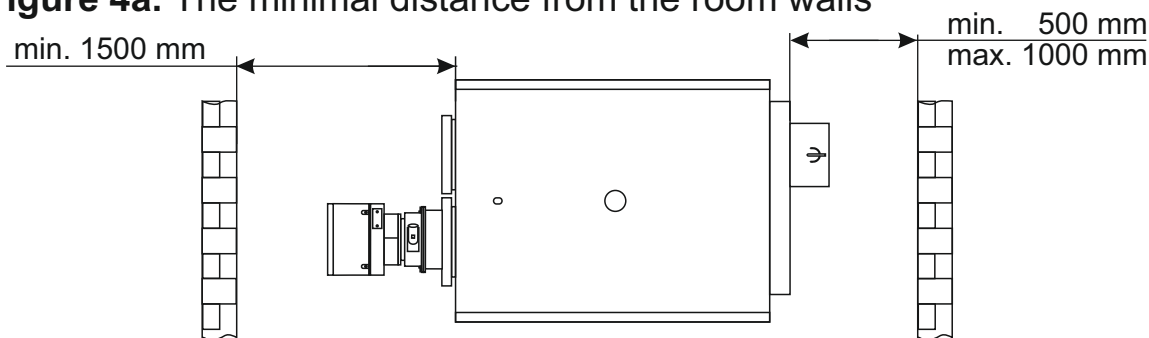
An example of a chimney selection:

- Boiler heat output: **50 kW**
 - Fuel: **Wood, wooden pellets, EL fuel oil**
 - Required usable chimney height: **H = 8 m**
 - Required light chimney diameter: **25 cm**
-
- **Useful chimney height** - chimney height from connection spot of smoke tube to the chimney top.
 - **Light chimney diameter** - inner chimney diameter.

5.0. THE BOILER INSTALLATION TO THE CENTRAL HEATING SYSTEM

All installation works must be done in accordance with valid national and European standards. The boiler CentroPlus can be installed to the closed or open central heating system. In both cases the boiler can be fired with solid fuel, wooden pellets or EL fuel oil. Installation has to be done in accordance with Technical standards and by qualified person who will be responsible for proper boiler operation. Before the boiler is connected to the central heating system it is necessary to flush the system to remove impurities that may remain after system installation. These works prevent boiler overheating, noise in the system, disturbances at pump and mixing valve. The boiler connection to the central heating system must be performed by holenders (never by welding). Safe distances which are required for cleaning and maintenance are shown in Figure 4a.

Figure 4a. The minimal distance from the room walls



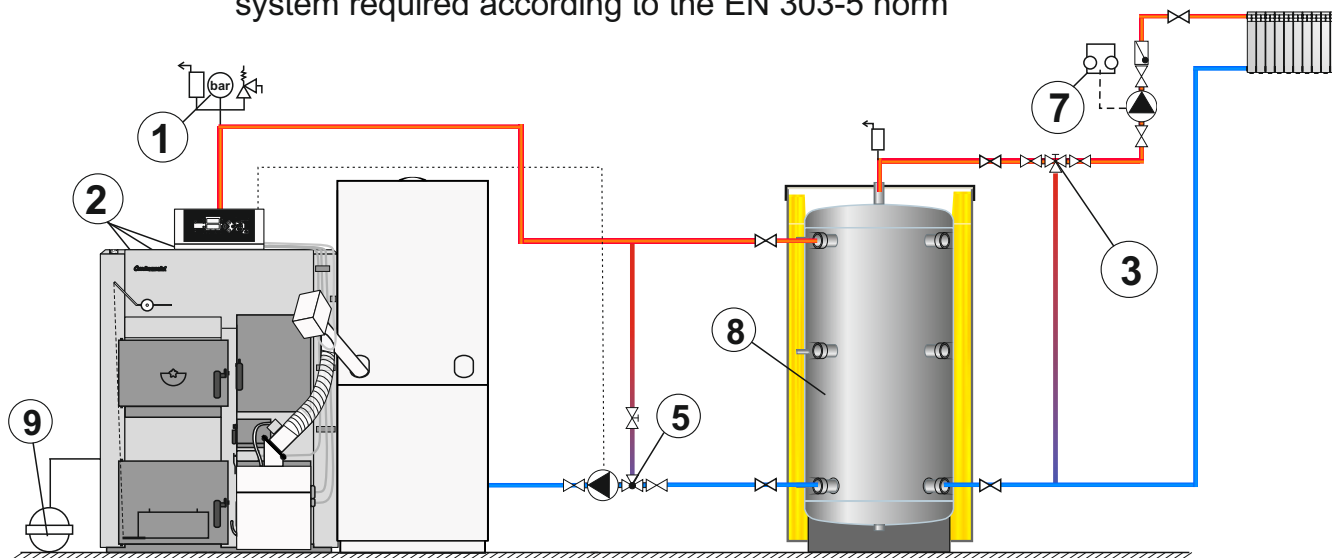
5.1. BOILER INSTALLATION TO THE CLOSED HEATING SYSTEM

In the closed heating system (an example that is shown in Scheme 1a and 1b) it is **obligatory** to install 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 have to be installed in accordance with professional rules and there must not be any stop element between safety valve and the boiler (i.e. between expansion vessel and the boiler). In all boiler types it is **obligatory** to connect the pump in accordance with electric diagram relevant for specific boiler use (see point 7 in these instructions) so the heating pump switching on and off will be dependent on the water temperature in the boiler. If the boiler is connected to the heating system as shown in Scheme 1b., it is recommended to regulate the temperature in room with manual 4-ways mixing valve.

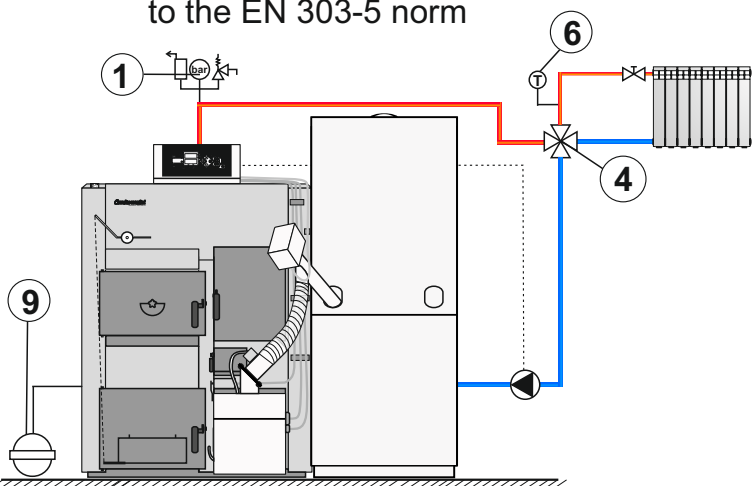
Installation of the boiler CentroPlus to the closed heating system

(solid fuel/wooden pellets firing is presented, installation for the other types is the same)

Scheme 1a. An example of installation of the accumulation tank into the central heating system required according to the EN 303-5 norm



Scheme 1b. An example of installation the accumulation tank into the central heating system when it is not required according to the EN 303-5 norm



- ① - Obligatory installation of air self-venting group (safety valve 2,5 bar)
- ② - Thermal protection of the boiler
- ③ - Manual 3-ways mixing valve
- ④ - Manual 4-ways mixing valve
- ⑤ - Thermostat valve - ensures boiler return temperature at least 60°C
- ⑥ - Thermometer
- ⑦ - Room thermostat
- ⑧ - Accumulation tank (CAS)
- ⑨ - Closed-type expansion vessel

5.1.2. THE BOILER THERMAL PROTECTION - CentroPlus 50

The boiler is factory prepared for installation of thermal protection (two heat exchangers ① and two thermal valves ② (such as CALEFFI 543) (see Scheme 2.1.). In case of any damage of the boiler which is installed to the closed heating system due its overheating, and if boiler and system are not equipped with thermal protection or if it is not properly installed, guarantee will not be applied.

IMPORTANT:

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

THERMAL FUSE

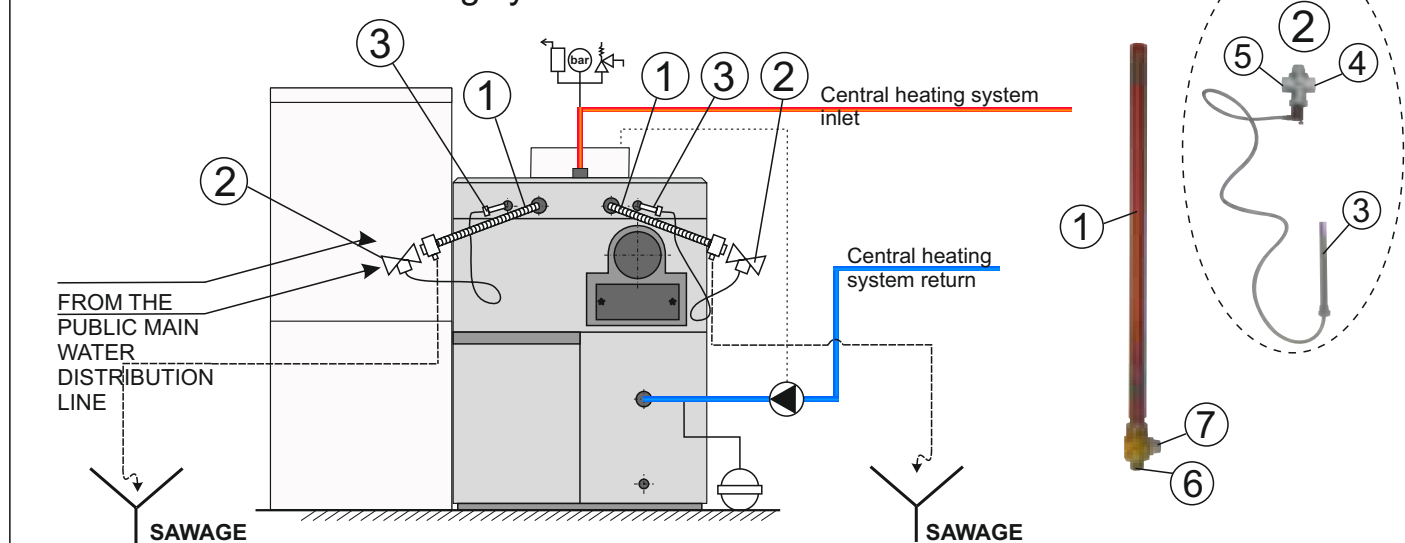
Thermal fuse for the boiler CentroPlus consists of two **heat exchangers** ① and two **thermal valves** ② (such as CALEFFI 543) (see Scheme 2.1.)

Installation of the parts ① and ② has to be performed to the prepared connector (internal thread 1" and 1/2") at the upper part of the back boiler side.

INSTALLATION (according to the Scheme 2.1)

- into the larger coupling (internal thread 1") twist the heat exchanger, so it seal
- into the smaller coupling (internal thread 1/2") twist the thermal valve sensor ③ (outer thread 1/2") (such as CALEFFI 543).
- the thermal valve connector ⑤ (internal thread 3/4") connect to the heat exchanger connector ⑥ (outer thread 1/2") and the thermal valve connector ④ (internal thread 3/4") connect to the supply of the cold domestic water (public main water distribution line).
- the heat exchanger connector ⑦ (outer thread 1/2") connect into the sawage.

Scheme 2.1. The thermal protection installation to the boiler CentroPlus 50 that is installed to the closed heating system



* Position of the thermal valve after installation
(valve head has to be down)

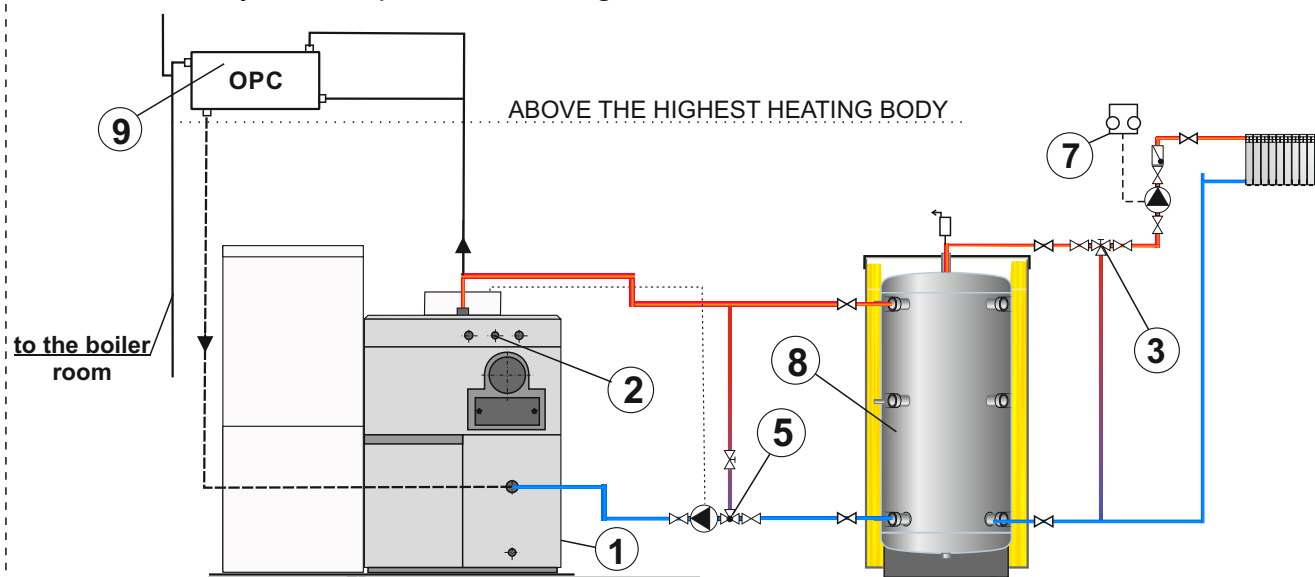


5.2. THE BOILER INSTALLATION TO THE OPEN HEATING SYSTEM

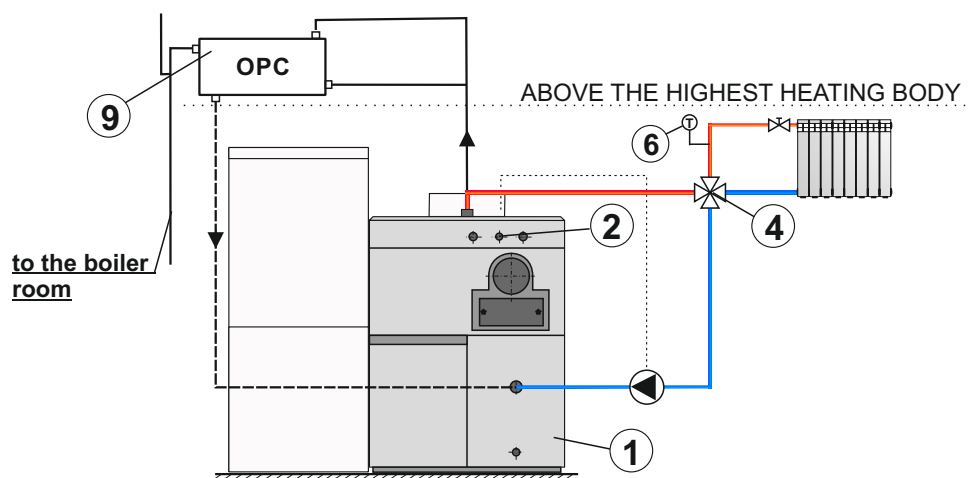
If the boiler is installed to an open heating system, it is recommended to set the system according to the Scheme 3a or 3b. In open heating system it is necessary to place the open expansion vessel to the higher position than the highest heating body is placed. If the open expansion vessel is placed into the unheated room, it is necessary to isolate it.

An example of installation the boiler CentroPlus 25/35 to the open heating system (solid fuel/wooden pellets firing is presented, installation for the other types is the same)

Scheme 3a. An example of installation of the accumulation tank to the central heating system required according to the EN 303-5 norm



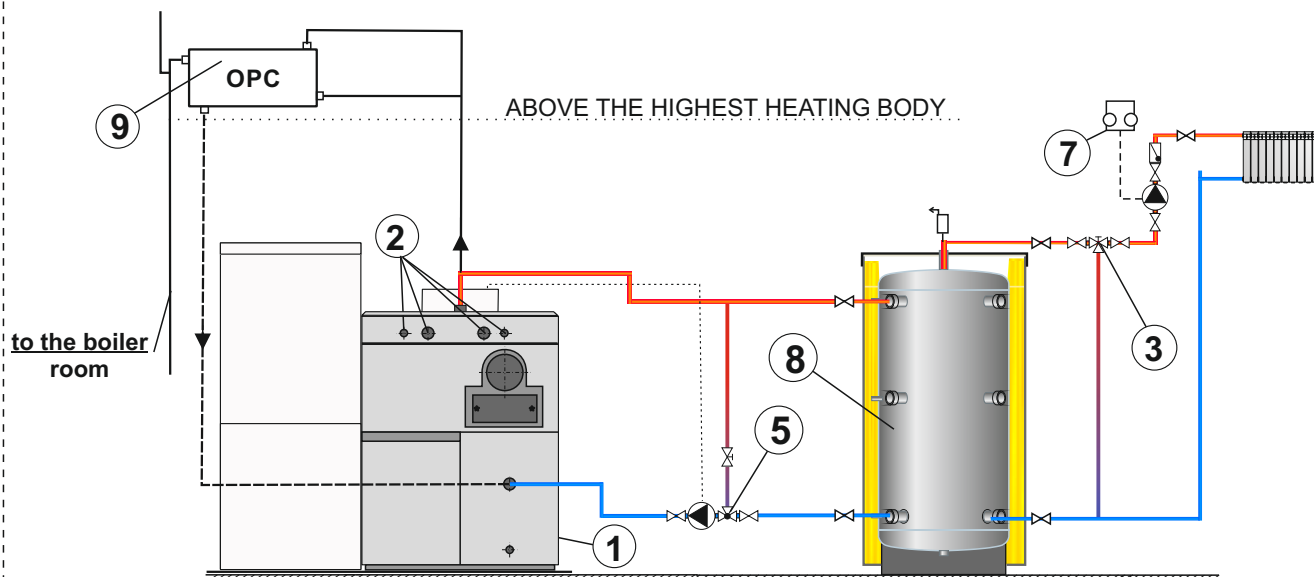
Scheme 3b. An example of installation of the accumulation tank to the central heating system when it is not required according to the EN 303-5 norm



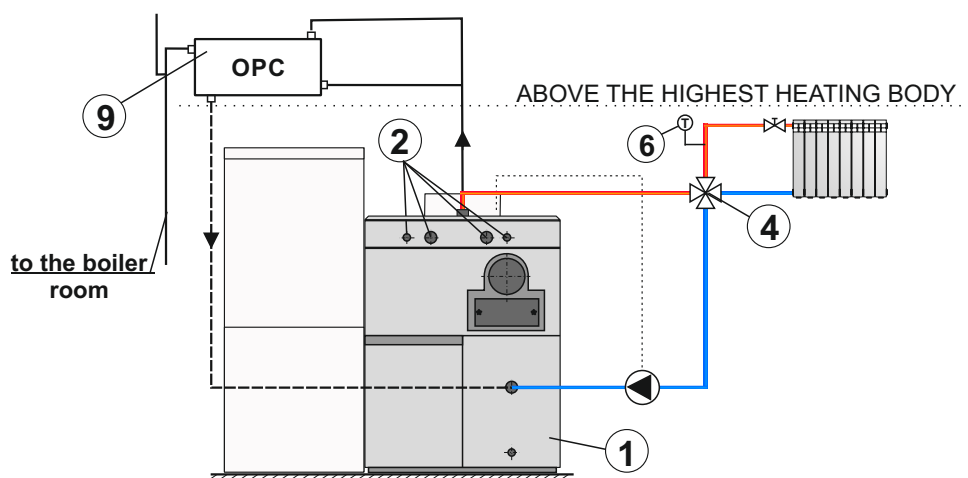
- | | |
|---|-------------------------------|
| ① - CentroPlus 25/35 boiler | ⑥ - thermometer |
| ② - tightly close | ⑦ - room thermostat |
| ③ - manual 3-ways mixing valve | ⑧ - accumulation tank (CAS) |
| ④ - manual 4-ways mixing valve | ⑨ - open expansion vessel OPC |
| ⑤ - thermostat valve- ensures the return line temperature at least 60°C | |

An exaple of installation the boiler CentroPlus 50 to the open heating system
(solid fuel/wooden pellets firing is presented, installation for the other types is the same)

Scheme 4a. An example of installation of the accumulation tank to the central heating system required according to the EN 303-5 norm



Scheme 4b. An example of installation of the accumulation tank to the central heating system when it is not required according to the EN 303-5 norm



- | | |
|---|-------------------------------|
| ① - CentroPlus 50 boiler | ⑥ - thermometer |
| ② - tightly close | ⑦ - room thermostat |
| ③ - manual 3-ways mixing valve | ⑧ - acumulation tank (CAS) |
| ④ - manual 4-ways mixing valve | ⑨ - open expansion vessel OPC |
| ⑤ - thermostat valve- ensures the return line temperature at least 60°C | |

6.0. THE BOILER TEMPERATURE REGULATION

6.1. SOLID FUEL FIRING (EQUIPMENT FOR WOODEN PELLETS OR OIL IS NOT INSTALLED)

The draft controller (such as CALEFFI 543, ESBE ATA200) is needed for the boiler temperature regulation, and it has to be installed on the boiler front left side (see page 5.). The draft controller chain has to be adjusted in a way that boiler temperature do not exceed the temperature from 85 to 90°C by normal firing (opening for air is completely closed), and not drop under 65°C. It is necessary to connect the pump of the heating system and domestic water by the socket placed at the boiler back side (the socket is connected to the pump thermostat).

6.2. THE BOILER FIRED WITH SOLID FUEL AND WOODEN PELLETS

The pump of the heating system and domestic water is necessary to connect to the boiler control unit CPREG which leads the pump operation and prevents the boiler cooling (not cool down to much).

6.2.1. SOLID FUEL FIRING

The draft controller (such as CALEFFI 543, ESBE ATA200) is needed for the boiler temperature regulation, and it has to be installed on the boiler front left side (see page 5.). The draft controller chain has to be adjusted in a way that boiler temperature do not exceed the temperature from 85 to 90°C by normal firing (opening for air is completely closed), and not drop under 65°C. If the boiler is fired with solid fuel, it is necessary to switch on the boiler control unit CPREG on the main switch, so the pump can operate correctly and the boiler and domestic water temperature can be shown. Detailed description of control unit operating is described in the "Technical instructions for use and maintenance of the control unit and the boiler CentroPlus/CentroPlus-B fired with solid fuel and wooden pellets" which are delivered with equipment for wooden pellets firing.

6.2.2. WOODEN PELLETS FIRING

Digital control unit CPREG which is installed to the boiler lid (see page 7) it is needed for the temperature regulation. It is necessary to connect the pump of the heating system and domestic water to the regulation CPREG which leads the pump operation and prevents boiler to not cool down to much. For detailed description of control unit CPREG operating see "Technical instructions for use and maintenance of the Cm Pellet-set for the boilers CentroPlus and CentroPlus-B (fired with solid fuel and wooden pellets)" which are delivered with equipment for wooden pellets firing.

6.3. BOILER FIRED WITH SOLID FUEL AND EL FUEL OIL

It is necessary to connect the pump of the heating system through the pump thermostat to the control unit according to the Scheme 6, which (if the pump switch is set on 1) switch the pump on if boiler temperature exceed 68°C or switch it down if boiler temperature drop under 68°C. In that way the boiler is prevented from excessive cooling.

6.3.1. BOILER FIRED WITH SOLID FUEL

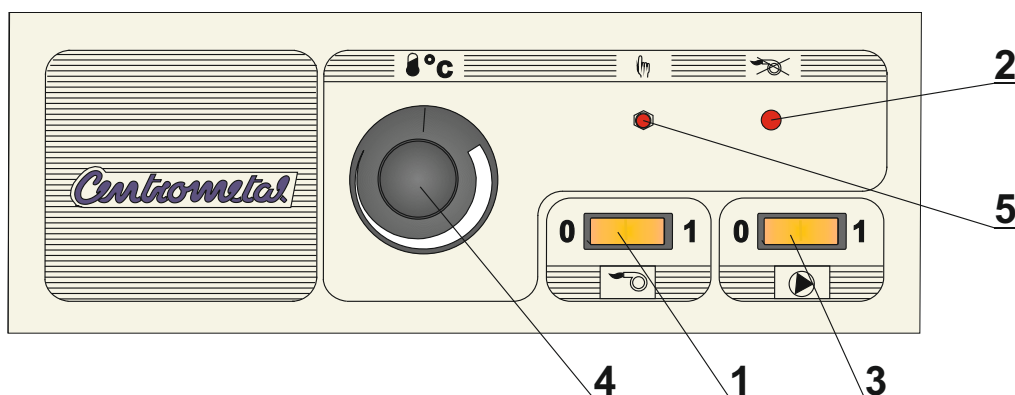
The draft controller (such as CALEFFI 543, ESBE ATA200) is needed for the boiler temperature regulation and it has to be installed on the boiler front left side (see page 5). The draft controller chain has to be adjusted in a way that boiler temperature do not exceed the temperature from 85 to 90°C by normal firing (opening for air is completely closed), and do not drop under 65 °C. The switch for heating pump operation has to be turned on at the boiler control unit EKO-CK/CKB (Figure 5., position 3), if boiler is fired with solid fuel.

6.3.2. EL FUEL OIL FIRING

Temperature in boiler is controlled by boiler control unit EKO-CK/CKB which is installed to the boiler lid (see page 6). On boiler control unit EKO-CK/CKB the burner has to be switched on (Figure 5, position 1) and it is necessary to adjust the regulation thermostat to the preferred boiler temperature (70-90°C).

6.3.3. THE BOILER CONTROL UNIT solid fuel/EL fuel oil

Figure 5.: The basic boiler control unit



1. BOILER SWITCH

The switch with signal lamp for burner switching on and off.

2. BURNER SIGNAL LAMP

If there are some faults in the burner operation, this lamp will appear.

3. THE SWITCH FOR SYSTEM PUMP

The switch with signal lamp for pump switching on and off.

4. THE BOILER CONTROL THERMOSTAT

The control range of boiler operating temperature (35 - 90°C) is controlled by button rotation.

5. SAFETY THERMOSTAT

It stops the burner operation if the boiler temperature exceeds 98°C and in that way prevent system against damage.

To restart the burner, following steps must be taken:

- wait until boiler temperature falls below 70°C
- push the button, position 5, Figure 5.

If there are still frequent interruptions during the boiler operation, call the authorised person to check the boiler.

7.0. BOILER CONNECTION TO THE ELECTRICAL INSTALLATION

All electrical works must be done by qualified person and according to the valid national and European standards. A device for switching off all power supply poles must be installed to the electrical installation in accordance with the national regulations for electrical installations.

7.1. BOILER FIRED WITH SOLID FUEL (EQUIPMENT FOR WOODEN PELLETS OR OIL IS NOT INSTALLED YET)

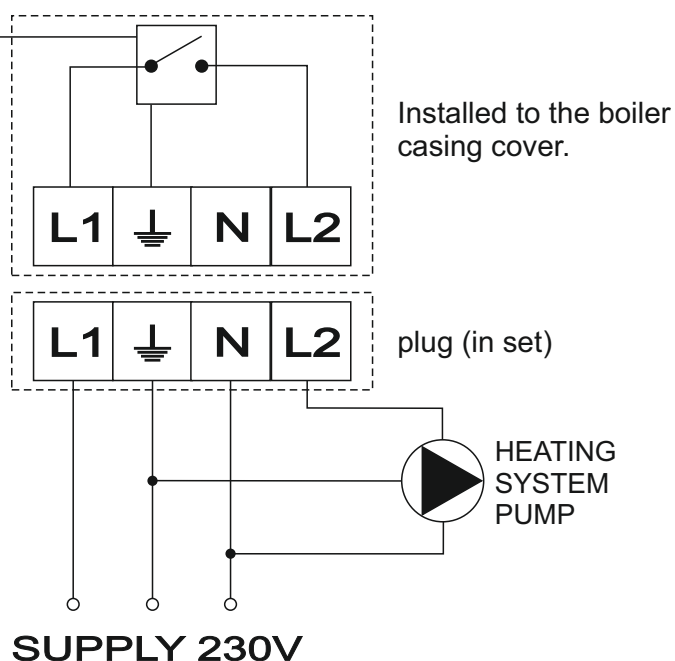
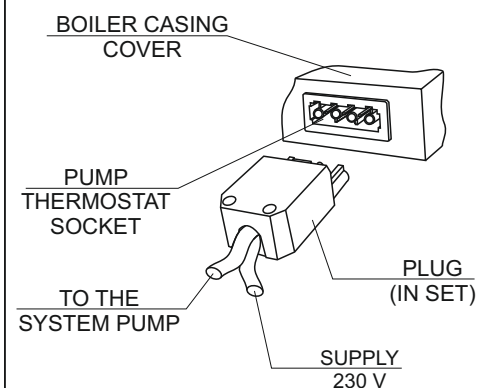
The heating system pump must be connected through a socket which is located on the back of the boiler and connected to the pump thermostat (Scheme 5).

Scheme 5. Electrical connecting scheme for solid fuel firing

THERMOSTAT

(switches the pump on or off, it is installed to the casing cover)

NOTE: socket is placed at the casing cover.



7.2. BOILER FIRED WITH SOLID FUEL / WOODEN PELLETS

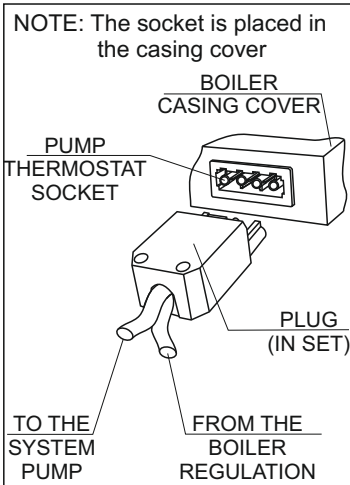
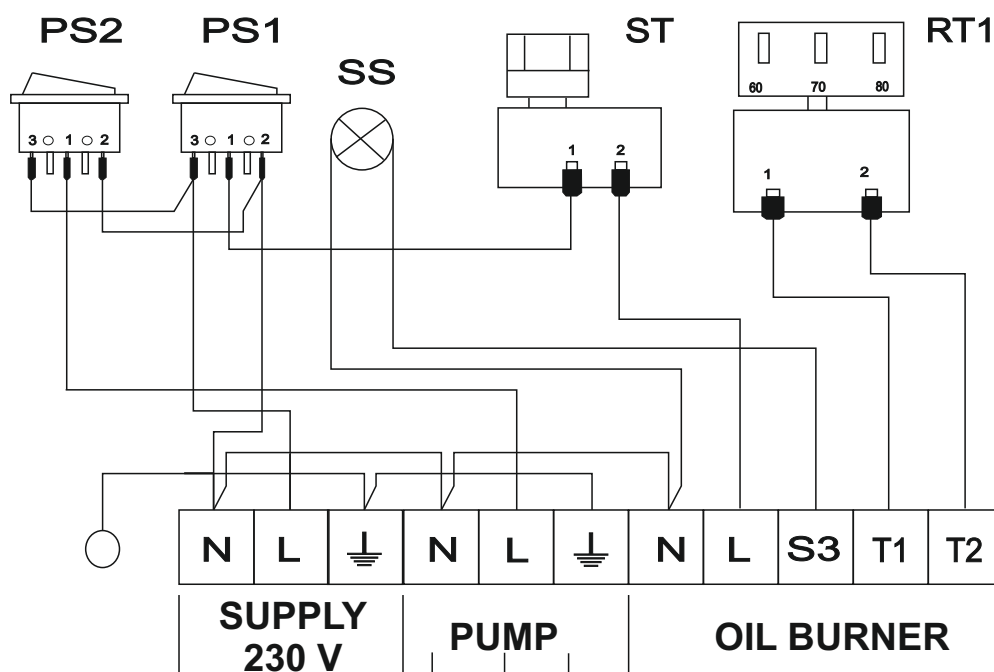
The socket on the back boiler side which is connected to the pump thermostat is not in use in that firing equipment. Instructions for boiler control unit CPREG connection are described in "Technical instructions for installing and adjusting of Cm Pellet-set for the boilers CentroPlus and CentroPlus-B (fired with solid fuel and wooden pellets)" which are delivered with equipment for wooden pellet firing.

7.3. BOILER FIRED WITH SOLID FUEL / EL FUEL OIL

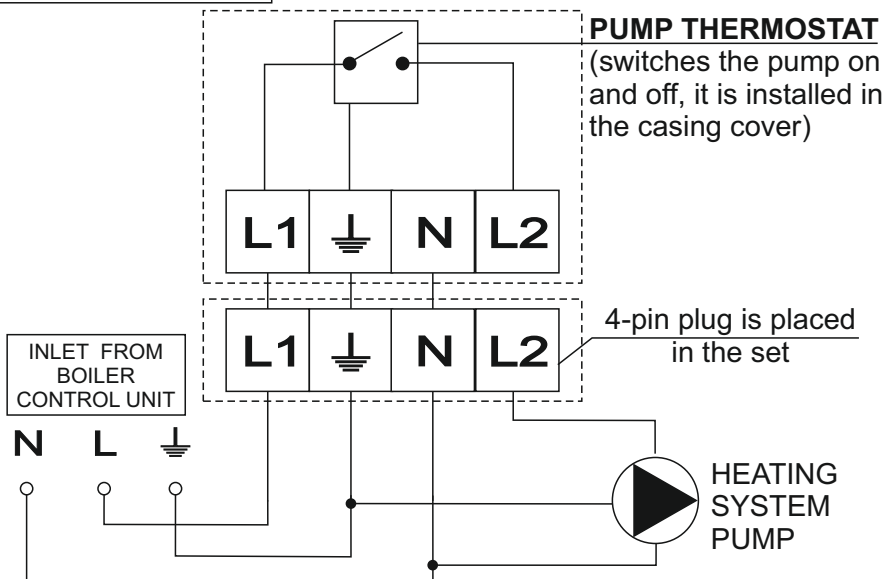
Connection to the power supply it is done through line clamp which is positioned below the panell of EKO-CK/CKB main boiler control unit and plug of the pump thermostat (placed at the back boiler side). Connection is shown in Scheme 5.

Scheme 6. Electrical scheme of the boiler control unit EKO CK/CKB for solid fuel/oil and the pump thermostat

Electrical scheme of the boiler control unit EKO CK/CKB for solid fuel/oil



CONNECT TO THE 4-PIN PLUG OF THE PUMP THERMOSTAT



Ps1 - Switch (burner)
PS2 - Switch (pump)
SS - Signal lamp

ST - Safety thermostat
RT1 - Operating thermostat of the 1st stage
TP - Pump thermostat

8.0. STARTUP

Check if the boiler and equipment are installed and connected in accordance with these Technical instructions (check all points, from the point 1.0. till the point 8.0.). Check also if the chimney and boiler room meet all requests from the point 4 (described in these technical instructions). Check if the fuel meets all requests from these instructions. Check if the boiler and the whole heating system are filled with water and vented. Check whether safety elements are correctly installed and if they work properly (see previous points of these instructions). Check if the flue gas tube is well sealed and thermally insulated.

Boiler must not operate in flammable and explosive environment. Children or disabled person (either physically or mentally), as well as persons without knowledge or experience are not allowed to use the boiler, unless they are under control or trained by a person responsible for their safety.

Figure 6. Movable parts of the left firebox

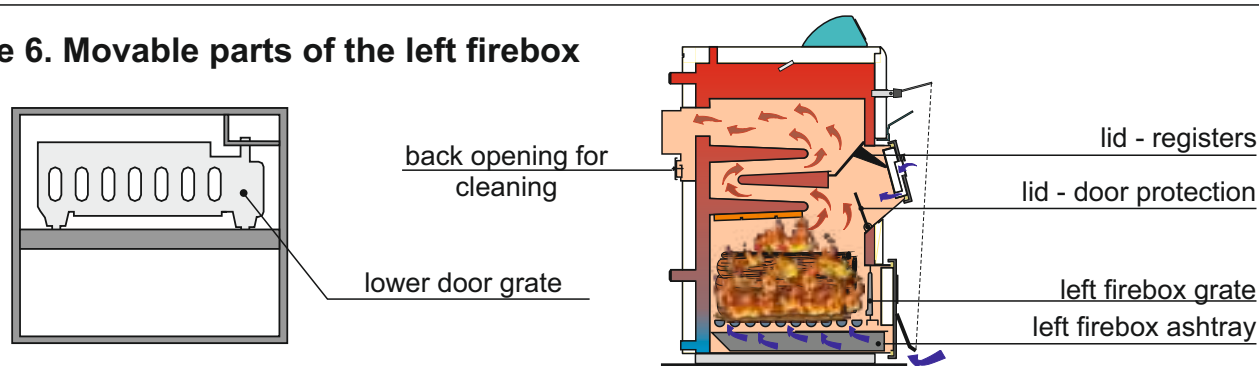


Figure 7. Movable parts of the right firebox

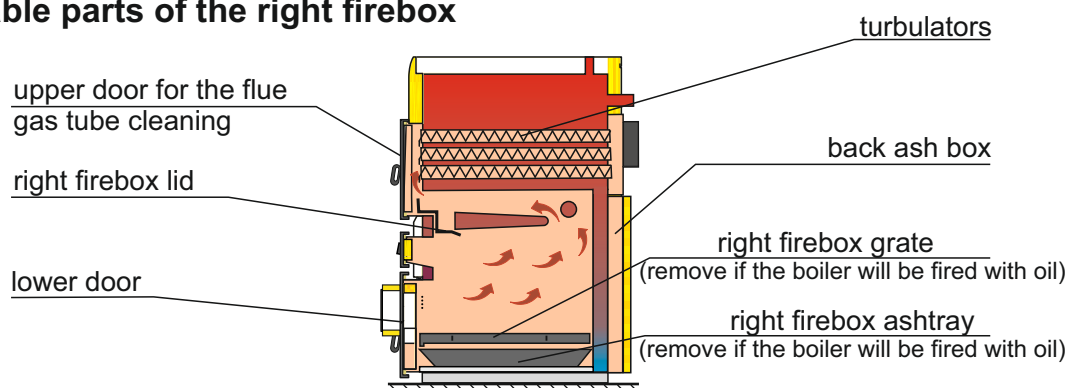


Figure 8. Protective gloves

Protective gloves are obligatory!



8.1. BOILER FIRED WITH SOLID FUEL (EQUIPMENT FOR WOODEN PELLETS AND OIL IS NOT BUILT IN YET)

Solid fuel firing. If the boiler is fired with solid fuel, it is necessary to check if movable parts of the left firebox are placed at the intended place (lid - door protection, lid-registers, the lower door grate and ashtray) - Figure 6. The draft controller (such as CALEFFI 543, ESBE ATA200) has to be adjusted for solid fuel firing in a way that boiler temperature do not exceed the temperature from 85 to 90°C when boiler is normal fired, and do not drop under 65 °C.

Check if the shut-off valves toward the heating bodies are opened. If you are sure that energy from boiler will be consumed, made firing up for one filling of the firebox:

- put tiny wood (moisture content max 25%), crumpled paper and then tiny wood again. Close the upper boiler door and ignite the wood and paper through the lower door
- after tiny wood blaze up, close the lower door and through upper boiler door put some dry smaller logs (moisture content max. 25%) and close the upper boiler door. Wait until logs fully blaze up and fill the firebox with logs and set the draft controller and monitor boiler work during the whole period of combustion of one firebox charge.
- check if the heating system pump is switching on/off when achieve approx. 68 °C
- show to the user how to use the boiler

Before adding fuel into the firebox, the door has to be firstly kept slightly open (about 1 cm) 3 to 5 seconds, and then you can fully open the door.

8.2. BOILER FIRED WITH SOLID FUEL / WOODEN PELLETS

The equipment for wooden pellet firing must be put into the operation by an authorised person. Check if the boiler control unit CPREG is connected to the power supply, if the pumps for heating and domestic water are connected through boiler control unit CPREG. Also, it is necessary to check if the boiler and installed equipment are connected in accordance with these Technical instructions (check all points, from the point 1.0. to the point 8.0.). Check if the chimney and the boiler room meet all requirements from the point 4.

Solid fuel firing. Check if solid fuel meet all requirements from these Technical instructions (moisture content max. 25%). Also, check if all movable parts of the left firebox are set at the intended place (lid-door protection, lid- registers, the lower door grate and ashtray) - Figure 6. The draft controller (such as CALEFFI 543, ESBE ATA200) has to be adjusted in a way that boiler temperature do not exceed the temperature from 85 to 90°C when boiler is normal fired, and do not drop under 65 °C. When the boiler is operating and it is fired with solid fuel, the boiler control unit CPREG has to be turned on (put the main switch on 1). Check if the shut-off valves toward heating bodies are opened. If you are sure that energy from boiler will be consumed, made firing up for one filling of the firebox:

- put tiny wood, crumpled paper and then tiny wood again. Close the upper boiler door and ignite the wood and paper through the lower door
- after tiny wood blaze up, close the lower door and through upper boiler door put some dry smaller logs and close the upper boiler door. Wait until logs fully blaze up and fill the firebox with logs and set the draft controller and monitor boiler work during the whole period of combustion of one firebox charge.
- check if the heating system pump is switching on/off when achieve approx. 68 °C
- show to the user how to use the boiler

Before adding fuel into the firebox, the door has to be firstly kept slightly open (about 1 cm) 3 to 5 seconds, and then you can fully open the door.

Pellet firing. If firing is done with pellets it is necessary to check if all movable parts of the right firebox are set at the intended place (right firebox lid, burner grate, right firebox grate, right firebox ashtray, turbolators placed into the flue gas tubes and back ash box) Figure 7. Check if all parts of equipment for pellet firing are connected and installed properly. Check if the boiler control unit CPREG is connected to the power supply and if all openings on the boiler closed. For proper boiler work it is necessary to set up the control unit CPREG in accordance with boiler size and required boiler power and also it is important to choose pellets which has the same or similar characteristic like those in point 8.2.1. For detailed description of startup of the pellet equipment see "Technical instructions for startup and setting of Cm Pellet-set for the boilers CentroPlus and CentroPlus-B (solid fuel and wooden pellets fired)" and "Technical instructions for pellet tank and screw feeder" which are delivered with equipment for wooden pellet firing.

8.2.1. WOODEN PELLETS CHARACTERISTICS

Wooden pellets are used as a fuel in boilers with built-in pellet burner CPPL. Wooden pellets are biofuel made of wooden residual. Pellets can be packed in different packaging: in bags (15 kg, 1000 kg) or as bulk in a large (underground) tank (4-15 m³) or in basement rooms. Recommended characteristics of pellets for firing in CentroPlus boilers are the following:

- heating value ≥ 5 kWh/kg (18 MJ/kg)
- diameter = 6 mm
- max. moisture percent = 12 %
- max. dust percent = 1,5 %

8.3. BOILER FIRED WITH SOLID FUEL / EL FUEL OIL

Check if the boiler control unit EKO-CK/CKB is connected to power supply and if heating pump is connected through the boiler control unit EKO-CK/CKB and pump thermostat (Scheme 6). Check whether boiler and equipment are installed and connected in accordance with these Technical instructions from point 1.0 to 8.0. Check if the chimney meets requirements set in the point 4 these instructions.

Solid fuel firing. Check if the boiler meets all requirements set in these instructions. Also, check if the fuel meets all requirements set in these instruction (max. 25% moisture content). Check whether all movable parts of the left firebox placed to the intended place (lid- door protection, lid- registers, the lower door grate and ashtray) (Figure 6). The draft controller (such as CALEFFI 543, ESBE ATA200) has to be adjusted for solid fuel firing in a way that boiler temperature do not exceed the temperature from 85 to 90°C when boiler is normal fired, and do not drop under 65°C. When the boiler is operating, the circulation pump switch has to be turned on (Figure 5, position 3). Check if the shut-off valves toward heating bodies are opened.

If you are sure that energy from boiler will be consumed, made firing up for one filling of the firebox:

- put tiny wood, crumpled paper and then tiny wood again. Close the upper boiler door and ignite the wood and paper through the lower door
- after tiny wood blaze up, close the lower door and through upper boiler door put some dry smaller logs and close the upper boiler door. Wait until logs fully blaze up and fill the firebox with logs and set the draft controller and monitor boiler work during the whole period of combustion of one firebox charge.
- check if the heating system pump is switching on/off when achieve approx. 68 °C
- show to the user how to use the boiler

Before adding fuel into the firebox, the door has to be firstly kept slightly open (about 1 cm) 3 to 5 seconds, and then you can fully open the door.

Oil firing. It is necessary to check if movable parts of the right firebox placed to the intended place (right firebox lid and turbolators into the flue gas tubes) Figure 7. Take the grate and ashtray from the right firebox out. Check if all boiler openings are tightly closed. The oil burner startup has to be done by a qualified person.

9.0. BOILER USE

The boiler must not operate in flammable and explosive environment. Children or disabled persons (either physically or mentally), as well as person without knowledge or experience are not allowed to use the boiler, unless they are under control or trained by a person responsible for their safety. Children must be supervised in the vicinity of the boiler. Protective gloves are obligatory (Figure 8).

9.1. SOLID FUEL FIRED BOILER (EQUIPMENT FOR WOODEN PELLETS OR OIL IS NOT INSTALLED YET)

Solid fuel firing. It is necessary to check if the movable parts of the left firebox placed to the intended place (lid - door protection, lid - registers, the lower door grate and ashtray) Figure 6. The draft controller (such as CALEFFI 543, ESBE ATA200) has to be adjusted for solid fuel firing in a way that boiler temperature do not exceed the temperature from 85 to 90°C when boiler is normal fired, and do not drop under 65°C. Only fuel with max. 25% of moisture can be used. Check if the shut-off valves toward the heating bodies are opened.

If you are sure that energy from boiler will be consumed, made firing up for one filling of the firebox:

- put tiny wood, crumpled paper and then tiny wood again. Close the upper boiler door and ignite the wood and paper through the lower door
- after tiny wood blaze up, close the lower door and through upper boiler door put some dry smaller logs and close the upper boiler door. Wait until logs fully blaze up and fill the firebox with logs and set the draft controller and monitore boiler work during the whole period of combustion of one firebox charge.
- check if the heating system pump is switching on/off when achieve approx. 68 °C.

Before adding fuel into the firebox, the door has to be firstly kept slightly open (about 1 cm) 3 to 5 seconds, and then you can fully open the door.

9.2. BOILER FIRED WITH SOLID FUEL / WOODEN PELLETS

Check if the boiler control unit CPREG is connected to the power supply and if the pumps for heating and for domestic water are connected through the boiler control unit CPREG.

It is necessary to check if the boiler and equipment are installed and connected in accordance with these Technical instructions from the point 1.0. to 8.0. Check if the chimney and the boiler room meet requirements set in the point 4 these instructions.

Solid fuel firing. Check if fuel meets all requirements from these techincal instructions (max. 25% moisture content). Check if the movable parts of the left firebox are placed to the intended place (lid - door protection, lid - registers, the lower door grate and ashtray) Figure 6. The draft controller (such as CALEFFI 543, ESBE ATA200) has to be adjusted for solid fuel firing in a way that boiler temperature do not exceed the temperature from 85 to 90°C when boiler is normal fired, and do not drop under 65°C. When the boiler is operating the boiler control unit CPREG has to be turned on (main switch has to be put on 1). Check if the shut-off valves toward the heating bodies are opened.

If you are sure that energy from boiler will be consumed, made firing up:

- put tiny wood, crumpled paper and tiny wood again. Close the upper boiler door and through the lower door and ignite tiny wood and paper through the lower door.
- after tiny wood blazes up, close the lower boiler door and through upper boiler door put some dry smaller logs and close the upper boiler door. When the logs fully blaze up then fill the firebox with logs and set the draft controller and monitore boiler work during the whole period of combustion of one firebox charge.
- check if the heating system pump is switching on/off when achieve approx. 68 °C.
- show to the user how to use the boiler.

Before adding fuel into the firebox, the door has to be firstly kept slightly open (about 1 cm) 3 to 5 seconds, and then you can fully open the door.

Pellet firing. Check if the movable parts of the right firebox are placed to the intended place (right firebox lid, burner grate, right firebox ashtray, turbolators placed into the flue gas tubes and back ashtray box) Figure 7. Check if all equipment parts for pellet firing are installed in a proper way. Check whether the boiler control unit CPREG is connected to the power supply and if all boiler openings are tightly closed. For the proper boiler work it is important to choose pellets which has the same or similar characteristic like those in point 8.2.1. For detailed description of pellet equipment use is shown in "Technical instructions for use and maintenance of Cm Pellet-set for the boilers CentroPlus and CentroPlus-B (fired with solid fuel and wooden pellets).

9.3. BOILER FIRED WITH SOLID FUEL / WOODEN PELLETS

Check if the boiler control unit EKO-CK/CKB is connected to the power supply and if the heating pump is connected through the boiler control unit EKO-CK/CKB and pump thermostat. Also, check if the boiler and equipment is built-in and connected in accordance with these Technical instructions from point 1.0. to 8.0. Check if the chimney and the boiler room meet all requirements from these instructions (point 4).

Solid fuel firing. Check if the fuel meets all requirements set in these instructions. Check if all movable parts of the left firebox are placed to the intended place (lid - door protection, lid - registers, the lower door grate and ashtray) (Figure 6.).

The draft controller (such as CALEFFI 543, ESBE ATA200) has to be adjusted for solid fuel firing in a way that boiler temperature do not exceed the temperature from 85 to 90°C when boiler is normal fired, and do not drop under 65°C. Only fuel with max. 25% of moisture can be used. During the boiler operation the circulation pump switch has to be turned on (Figure 5, position 3). Check if the shut-off valves toward the heating bodies are opened.

If you are sure that energy from boiler will be consumed, made firing up:

- put tiny wood, crumpled paper and tiny wood again. Close the upper boiler door and through the lower door and ignite tiny wood and paper through the lower door.
- after tiny wood blazes up, close the lower boiler door and through upper boiler door put some dry smaller logs and close the upper boiler door. When the logs fully blaze up then fill the firebox with logs and set the draft controller and monitor boiler work during the whole period of combustion of one firebox charge.
- check if the heating system pump is switching on/off when achieve approx. 68 °C.

Before adding fuel into the firebox, the door has to be firstly kept slightly open (about 1 cm) 3 to 5 seconds, and then you can fully open the door.

Oil firing. Check if the movable parts of the right firebox are placed to the intended place (the right firebox lid and turbolators placed into the flue gas tube) Figure 7. Take the grate and the ashtray from the right firebox out. Check if all boiler openings are tightly closed. For proper boiler work it is necessary to adjust the burner and the control unit EKO-CK/CKB in accordance with boiler size, required boiler power and temperature.

10.0. BOILER CLEANING AND MAINTENANCE

Ash remaining in the boiler after solid fuel firing, has to be disposed into the metal containers with a lid. Protective gloves must be used (Figure 8.).

10.1.	SOLID FUEL FIRED BOILER (EQUIPMENT FOR WOODEN PELLETS IS NOT INSTALLED YET)
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It is necessary to clean space below the grate, firebox and flue gas tubes on daily basis. The flue gas tubes are cleaned through the upper door, but firstly remove movable lid placed between the middle and upper register (upper lid). Opening for cleaning flue gas chamber is placed on the back of the boiler (see page 5) through which (after the lid is taken out) the deposits generated during the boiler operation and cleaning can be removed. The ashtray at the lower part of the boiler should be cleaned as required. Before firing, return the movable lid (upper lid), close the grate on the lower door and check the primary air supply opening on the lower door. It is recommended to check all control and safety elements once a year by authorised person.

10.2.	BOILER FIRED WITH SOLID FUEL / WOODEN PELLETS
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It is recommended to check all control and safety elements once a year by authorised person.

Firebox for solid fuel firing:

First, the main switch on the boiler control unit has to be turned off. It is necessary to clean space below the grate, firebox and flue gas tubes on daily basis. The flue gas tubes are cleaned through the upper door, but firstly remove movable lid places between the middle and upper register (upper lid). Opening for cleaning flue gas chamber is placed on the back of the boiler (see page 7) through which (after the lid is taken out) the deposits generated during the boiler operation and cleaning can be removed. The ashtray at the lower part of the boiler should be cleaned as required. Before firing, return the movable lid (upper lid), close the grate on the lower door and check the primary air supply opening on the lower door.

Right firebox and equipment for pellet firing:

It is necessary to take care of:

- Ash amount in the ashtray and empty it as required;
- Deposits in the boiler firebox and to clean it as required;
- Deposits at the burner grate and to clean it as required;
- Ash amount in the ash box on the back of the boiler (empty it if it is required) (page 7, ZP)

Cleaning:

First, the main switch on the boiler control unit has to be turned off.

The right firebox can be cleaned through upper and lower boiler door (page 7.).

The ash box has to be placed below the upper boiler door into the prepared holes (Figure 9.)

Open the upper boiler door, take the turbolators out and clean the flue gas tubes using supplied brush. After that, lift the right firebox lid (Figure 9.). so ash and deposits fall on the right firebox grate. Open the lower door, on which the burner is placed, and clean the right firebox grate, empty the ashtray and clean the burner grate. It is recommended to clean the burner and the boiler firebox after one pellet tank is consumed (aprox. 200 kg).

Intervals between cleaning can be increased or decreased in a relation to the recommended, and it depends upon the quality of used pellets (see point 8.2.1.) and frequency of the burner turning on/off. See instructions for the cleaning and maintenance if the boiler is fired with pellets "Technical instructions for use, maintenance of the Cm Pellet-set for the boilers CentroPlus and CentroPlus-B (fired with solid fuel and wooden pellets" and "Technical instructions for pellet tank and screw feeder".

10.3. BOILER FIRED WITH SOLID FUEL / EL FUEL OIL

It is recommended to check all control and safety elements and also oil burner with additional equipment once a year by a certified serviceman.

Firebox for solid fuel firing:

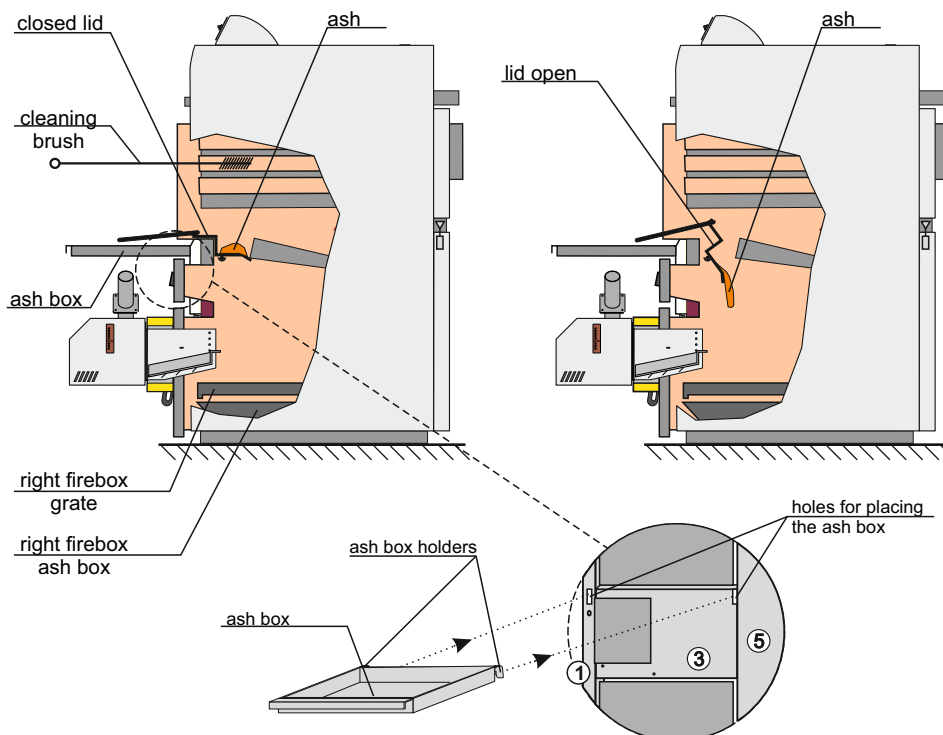
First, the main switch at boiler control unit has to be switched off.

Space below the grate, firebox and flue gas tubes have to be daily cleaned. The flue gas tubes are cleaned through the upper boiler door, but it is necessary first to take the movable lid placed between middle and upper register (upper lid). The cleaning opening for flue gas chamber (see page 6) is placed on the back of the boiler. After the lid is taken off, it is necessary to clean deposits (accumulated during the boiler operation) through the cleaning opening. The ashtray in the lower boiler part has to be cleaned as required. Before firing it is necessary to return the movable lid (upper lid) to its position, close the lower door grate and check supply of primary air on the lower door.

Right firebox and equipment for EL fuel oil firing:

First, the main switch at boiler control unit has to be switched off. Right firebox has to be thoroughly cleaned through the upper and lower door at least once a year. Below the upper boiler door to the prepared holes (Figure 9.) it is necessary to place the ash box. Open the upper boiler door, take the turbolators out and clean the flue gas tubes using supplied brush. Then lift the right firebox lid (Figure 9.) so ash and deposits fall on the bottom of the right firebox. Open the lower boiler door, on which the burner is placed, and clean the bottom of the right firebox. The back ash box placed on the back of the boiler, has to be emptied as well (page 6, ZP).

Figure 9. Right firebox



- when cleaning the flue gas tubes it is necessary to place the ash box below the upper right door.
- ash box holders has to be placed into the holes on the side ① and ③.

[illegible]



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

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