Centrometal
HEATING TECHNIQUE

Centrometal d.o.o. - Glavna 12, 40306 Macinec, Croatia, tel: +385 40 372 600, fax: +385 40 372 611

ENG

TECHNICAL INSTRUCTIONS

CE

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

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

EKO-CKS Multi Plus 170-580

TU-CKSMP-1-2025-ENG

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 s 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.

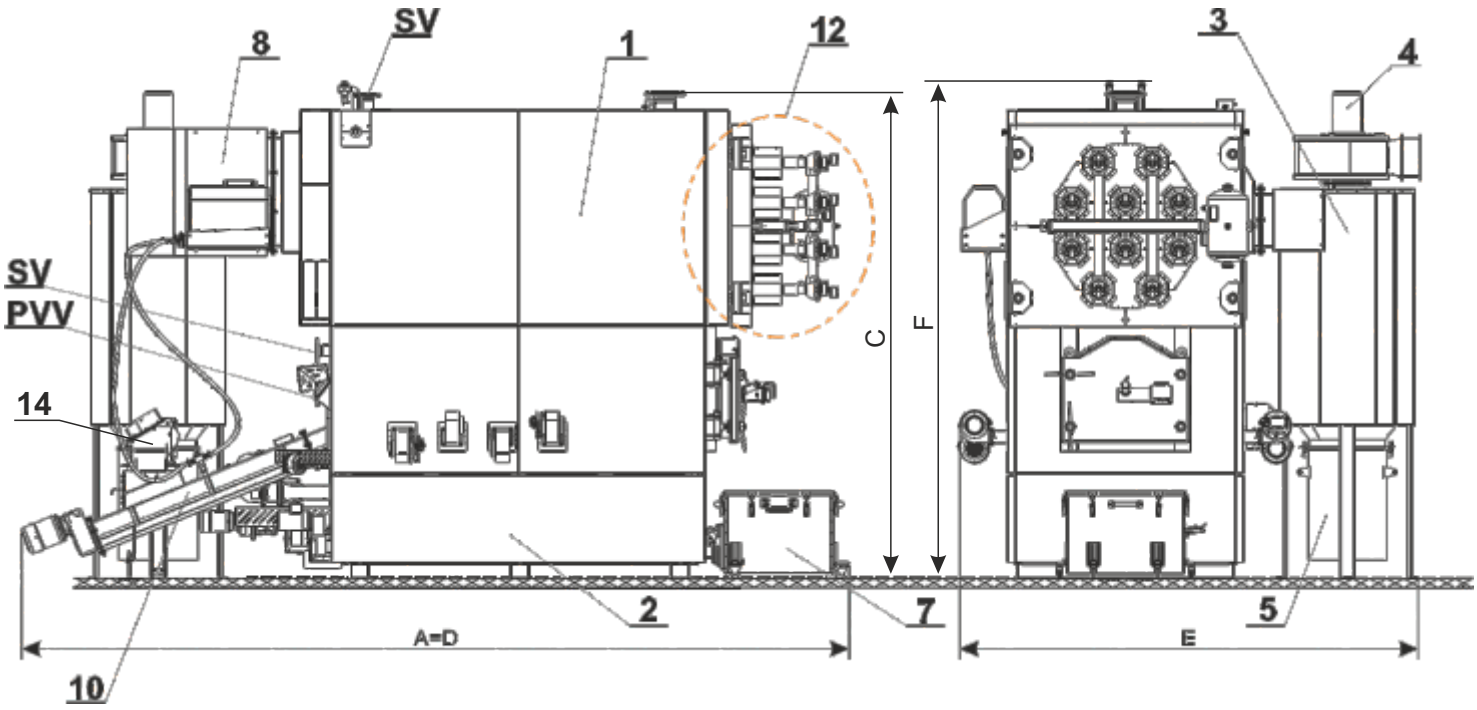
Protect the boiler room and avoid rodents and birds from entering and blocking the air openings.

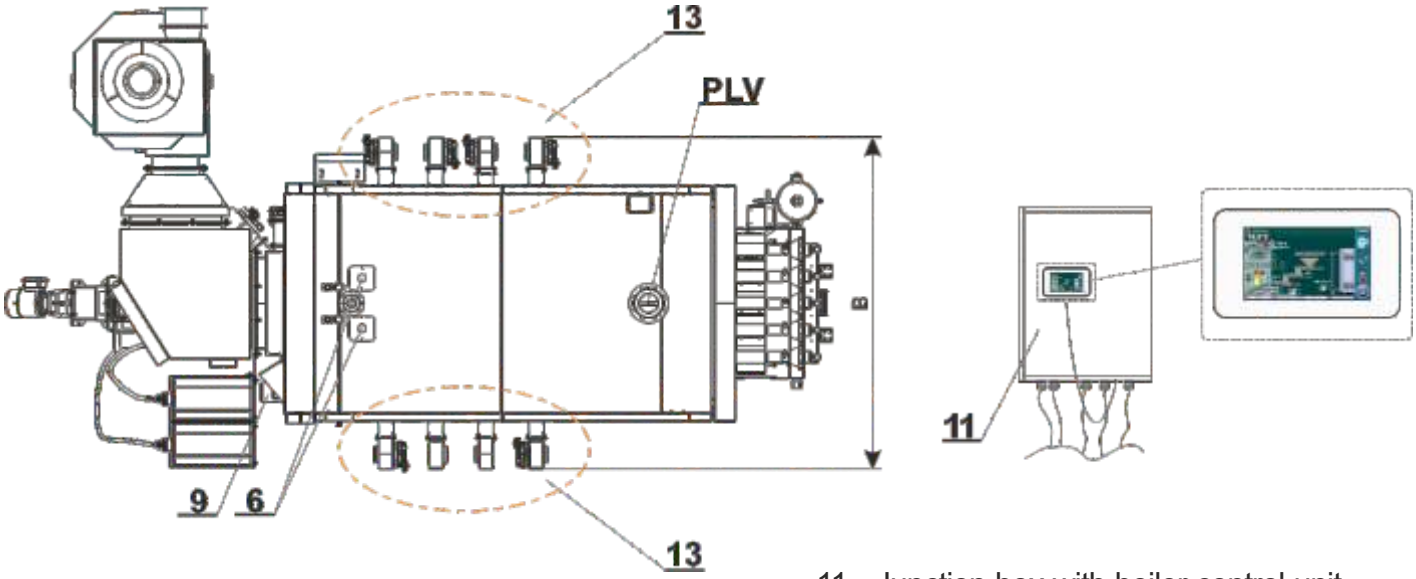
When the above issues have not been resolved, the boiler can not be placed in operation.

TECHNICAL DATA

TYPE			EKO-CKS Multi Plus 170	EKO-CKS Multi Plus 250	EKO-CKS Multi Plus 340	EKO-CKS Multi Plus 450	EKO-CKS Multi Plus 580
Nominal heat output		(kW)	170	250	340	450	580
Heat output range		(kW)	51-170	75-250	102-340	135-450	174-580
Boiler class			5				
Necessary draught		(mbar)	0,05	0,05	0,05	0,05	0,05
Water amount in boiler		(l)	380	520	965	1155	1700
Exhaust gas temperature at nominal heat output		(°C)	150	150	150	150	150
Exhaust gas temperature at minimal heat output		(°C)	100	100	100	100	100
Exhaust mass flow at nominal heat output		(kg/s)	0,131	0,202	0,283	0,358	0,447
Exhaust mass flow at minimal heat output		(kg/s)	0,049	0,077	0,109	0,142	0,18
Setting range for temperature controller		(°C)	75-80; 75-93*				
Minimum operating time at nominal power		(hours)	6,0				
Minimum water temperature on return to the boiler		(°C)	60				
Cold water tem. and pressure for safety heat exchanger		(°C/bar)	10-15°C / 2 bar				
Boiler resistance on water side at nominal output		(mbar)	4	5	12	17	18
Fuel type			Wood chip: (A1-A2) / (P16S-P31S / (G30-G50)) W20-W35 / M20 (EN ISO 177225 - 4); Wood pellets: A1 (EN ISO 177225 - 2)				
Max. heat input (wood chip / wood pellets)		(kW)	186,81 / 186,81	274,15 / 274	372 / 371,58	493,31 / 492,07	637,36 / 634,57
Fuel moisture content		(%)	max. 35 for wood chip, max. 12 for wood pellets				
Fuel size			G30, G50 for wood chip, fi12×50 for wood pellets				
Filling chamber capacity		(l)	125	140	330	395	450
Filling opening dimension (h × w)		(mm)	230×220	230×220	230×220	230×220	230×220
Required minimum accumulation next to boiler			by EN 303-5:2012, point 4.4.6.				
Boiler dimensions	Lenght (A)	(mm)	3995	4350	4345	4620	4620
	Width (B)	(mm)	1470	1650	1600	1880	1970
	Height (C)	(mm)	2220	2470	2485	2555	2735
Total mass - (boiler with casing and accessories)		(kg)	2790	3855	4300	5300	5940
Max. operating overpressure		(bar)	4,0				
Test pressure		(bar)	8,0				
Max. entry overpressure in thermal safety valve for protection against return flame		(bar)	10				
Max. operating temperature		(°C)	93 (Boiler shutdown: 95°C)*				
Boiler connections	Main and return flow	(R)/(DN)	2"	80	80	100	100
	Charge/discharge	(R)	1"	1"	1"	6/4"	6/4"
	Safety line	(R)/(DN)	6/4"	40	40	50	50
Total dimensions of the system	Total lenght (D)	(mm)	3995	4350	4345	4620	4620
	Total width (E)	(mm)	2020	2210	2235	2540	2635
	Total height (F)	(mm)	2290	2540	2540	2635	2810
Number of turbulators (stainless steel / wire)		(pcs.)	18 / 22	26 / 36	32 / 44	32 / 50	44 / 63
Heating appliance working			with fan				
Heating appliance working			under non-condensing conditions				
Heating appliance working at flue gas outlet			overpressure				
Flue pipe diameter		(mm)	Φ182	Φ202	Φ202	Φ202	Φ202
Boiler's emission of airborne noise		(dB(A))	<70				
Method to measure the airborne noise level			according to EN 15036-1				
ELECTRICAL CONNECTIONS							
Supply voltage		(V)	400				
Frequency		(Hz)	50				
Current type			~(AC)				
Electrical input at nominal heat output		(W)	860	1081	1330	1724	2190
Electrical input at minimal heat output		(W)	610	638	670	771	890
Electrical input for stand by mode		(W)	15	19,70	25	29,60	35
Electrical power input		(W)	3499,5	4049,5	3883,5	5388,5	5557,5
Cyclone fan			1 × 0,55[kW], 400[V]	1 × 1,1[kW], 400[V]	1 × 1,1[kW], 400[V]	1 × 2,2[kW], 400[V]	1 × 2,2[kW], 400[V]
Screw feeder-1 motor device			1 × 0,55[kW], 400[V]	1 × 0,55[kW], 400[V]	1 × 0,55[kW], 400[V]	1 × 0,55[kW], 400[V]	1 × 0,55[kW], 400[V]
Ash cleaner motor device			1 × 0,18[kW], 400[V]	1 × 0,18[kW], 400[V]	1 × 0,18[kW], 400[V]	1 × 0,18[kW], 400[V]	1 × 0,18[kW], 400[V]
Primary air fan			1 × 0,18[kW], 400[V]	1 × 0,18[kW], 400[V]	1 × 0,18[kW], 400[V]	1 × 0,25[kW], 400[V]	1 × 0,25[kW], 400[V]
Secondary air lid motor device			2 × 0,0015[kW], 230[V]	2 × 0,0015[kW], 230[V]	2 × 0,0015[kW], 230[V]	4 × 0,0015[kW], 230[V]	6× 0,0015[kW], 230[V]
Primary air lid motor device			2 × 0,0015[kW], 230[V]	2 × 0,0015[kW], 230[V]	2 × 0,0015[kW], 230[V]	2 × 0,0015[kW], 230[V]	2 × 0,0015[kW], 230[V]
Secondary air fan			4 × 0,083[kW], 230[V]	4 × 0,083[kW], 230[V]	2 × 0,083kW, 230[V]	6 × 0,083[kW], 230[V]	8 × 0,083[kW], 230[V]
Movable grate motor device			1 × 0,090[kW], 230[V]	1 × 0,090[kW], 230[V]	1 × 0,090[kW], 230[V]	1 × 0,090[kW], 230[V]	1 × 0,090[kW], 230[V]
Electric heater			1 × 1,6[kW], 400[V]	1 × 1,6[kW], 400[V]	1 × 1,6[kW], 400[V]	1 × 1,6[kW], 400[V]	1 × 1,6[kW], 400[V]
Against flame protection motor device			1 × 0,0065[kW], 230[V]	1 × 0,0065[kW], 230[V]	1 × 0,0065[kW], 230[V]	1 × 0,0065[kW], 230[V]	1 × 0,0065[kW], 230[V]
Motor device of 3-way mixing valve			1 × 0,005[kW], 230[V]	1 × 0,005[kW], 230[V]	1 × 0,005[kW], 230[V]	1 × 0,005[kW], 230[V]	1 × 0,005[kW], 230[V]
ADDITIONAL CONNECTIONS POSSIBILITIES							
Additional electrical power input			6,89 [kW]				
Screw feeder-2 motor device (between boiler and tank)			0,37-1,6 [kW]				
Screw feeder-3 motor device (tank screw feeder (conveyor))			0,37-1,6 [kW]				
Motor device of tank mixer			0,37-1,6 [kW]				
Heating pump			x-2 [kW]				
Motor device of flue gas chamber cleaning screw feeder			0,09 [kW]				
Boiler ash box volume		(l)	120	120	170	170	170
Cyclon ash box volume		(l)	45	90	90	90	90

* Setting range for the temperature controller - depend about system configuration (see point „Boiler installation to central heating system".)





1 - Boiler body
2 - Wood chip / wood pellet burner
3 - Cyclone
4 - Cyclone fan motor
5 - Cyclone ash box
6 - Connection for thermic valve sensors
7 - Ash box
8 - Boiler-cyclone connection
9 - Ash cleaners motor with gearbox
10 - Screw feeder-1
11 - Junction box with boiler control unit
12 - Automatic pneumatic air cleaning of boiler flue passages (additional equipment)
13 - Secondary air fan (number depend about boiler power)
14 - Backfire protection lid (standard delivery) or rotary valve (special order)
PLV - Main flow
PVV - Return flow
SV - Safety line

NOTE:
Cyclone can be mounted on left or right side of the boiler

1.0. BOILER DESCRIPTION

Hot water boiler **EKO-CKS Multi Plus 170 - 580** is automatically controlled system for producing heat by burning wood chips and wood pellets. The boiler body is made of welded steel sheet. The **EKO-CKS Multi Plus 170 - 580** has a modern construction and design and is made out of the controlled materials of high quality, welded with most modern technology and fulfil all special request for the connection on the installation of a central heating system.

1.1. COMPONENTS

OBLIGATORY ADDITIONAL EQUIPMENT:

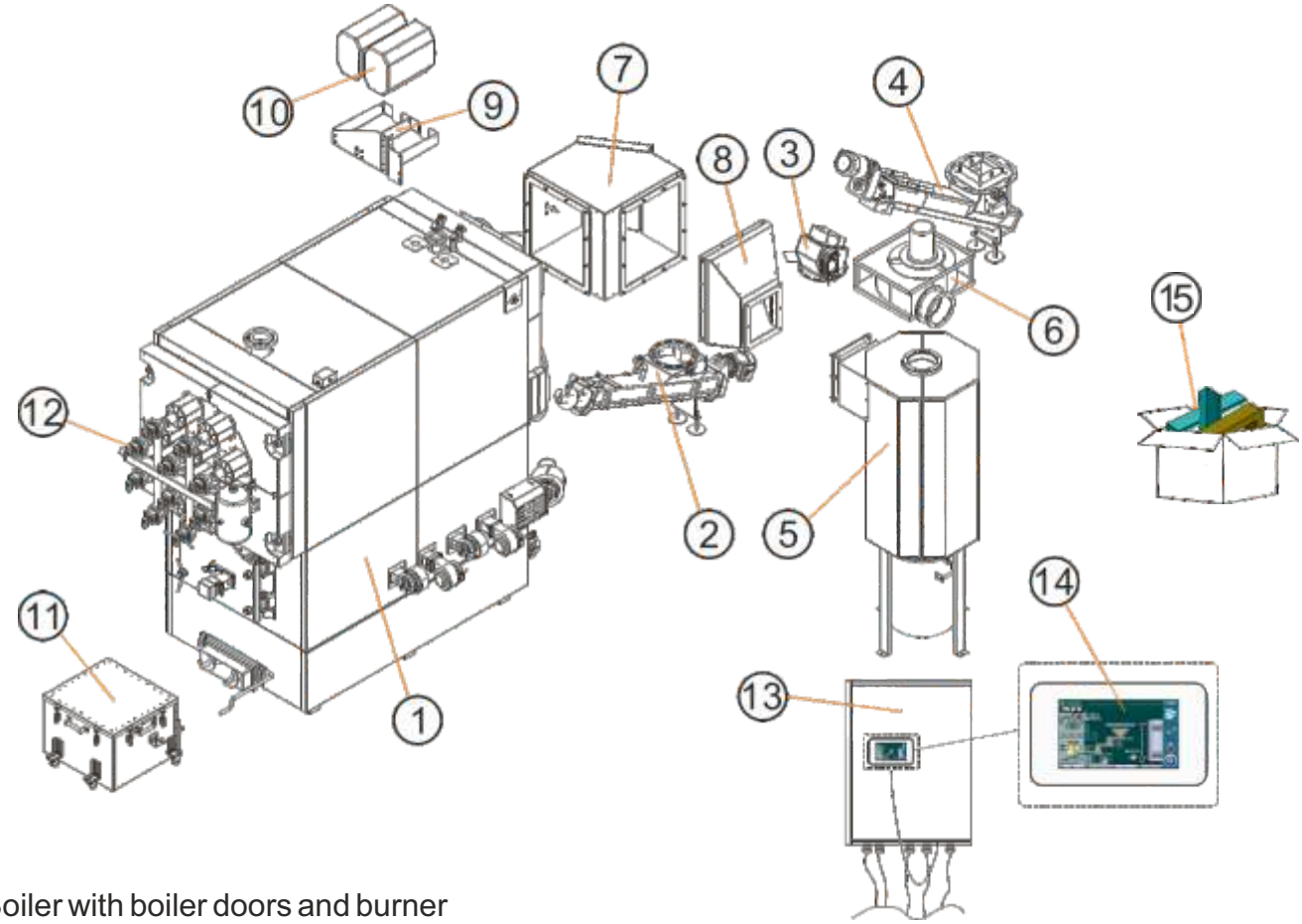
1. Screw feeder-2 for wood chip or wood pellets
2. Boiler return protection

ADDITIONAL EQUIPMENT:

1. Wood chip or wood pellets mixer with screw feeder for a room
2. Wood chip container with mixer and 2m screw feeder and electric actuator
3. Extension for the wood chip or wood pellet mixer screw feeder
4. Automatic pneumatic air cleaning of boiler flue passages (content: air compressor, air pressure regulator (5 bar) with manometer, safety elements of the minimum and maximum pressure)
5. System for automatic extraction of ash from the flue gas chamber (using the screw feeder)
6. Buffer tank
7. Additional connection for buffer tank
8. Module for two heating circuits CM2K (max. 4 pcs.)
9. Room corrector CSK (when using CM2K)
10. Alarm module CAL
11. Communication module CM-GSM
12. Cascade manager CMNET
13. CM WiFi box (Internet supervision) or Profibus modul
14. Ash transport - TP-3M/9M/3000L-Multi Plus 340-580 (only for Multi Plus 340/450/580)

1.2. DELIVERY STATUS

Boiler **EKO-CKS Multi Plus** is delivered in parts for easier transportation and mounting in boiler room. On picture below, item 1 „Boiler with boiler doors and burner" all fans and motor drives with gearbox are shown mounted but they are delivered unmounted and it's necessary to mount them when is boiler placed in boiler room. Mounting procedure of all delivered part is described in „Technical-instructions-ELECTRIC-DEVICES-EKO-CKS Multi Plus_ENG". In picture below is showned delivery condition of boiler EKO-CKS Multi Plus.



1. Boiler with boiler doors and burner
2. Fuel supply box (between Screw feeder-1 and Screw feeder-2) with Backfire protection lid (standard delivery) or Rotary valve (special order)
3. Fuel supply box (between Screw feeder-1 and Screw feeder-2)
4. Screw feeder-2 with motor drive and gearbox
5. Cyclone
6. Cyclone fan
7. Boiler-cyclone connection box 1/2
8. Boiler-cyclone connection box 2/2
9. Water tank holder
10. Water tank (1 or 2 pcs., depend about boiler power)
11. Ash cleaner box
12. Flue gas cleaning system (if is ordered, additional equipment)
13. Junction box
14. Boiler control unit with touch screen
15. Thermal insulation and sheet metal cover for cyclone fan and flue element flanges (in cardboard box)

2.0. BOILER POSITIONING AND ASSEMBLY

Boiler positioning and assembly must be performed by a qualified person. Boiler should be placed on the previously prepared concrete fundament which minimum height is 200-300 mm. Upper fundament surface should be smooth and exactly horizontal. Boiler room must be frost proof and adequately ventilated. Boiler should be placed that it connection to the cimney can be properly performed, cleaning and maintenance must be possible and all parts of the boiler must be accessible. Before connecting to the installation of central heating system boiler must be adjusted exactly in the horizontal position.

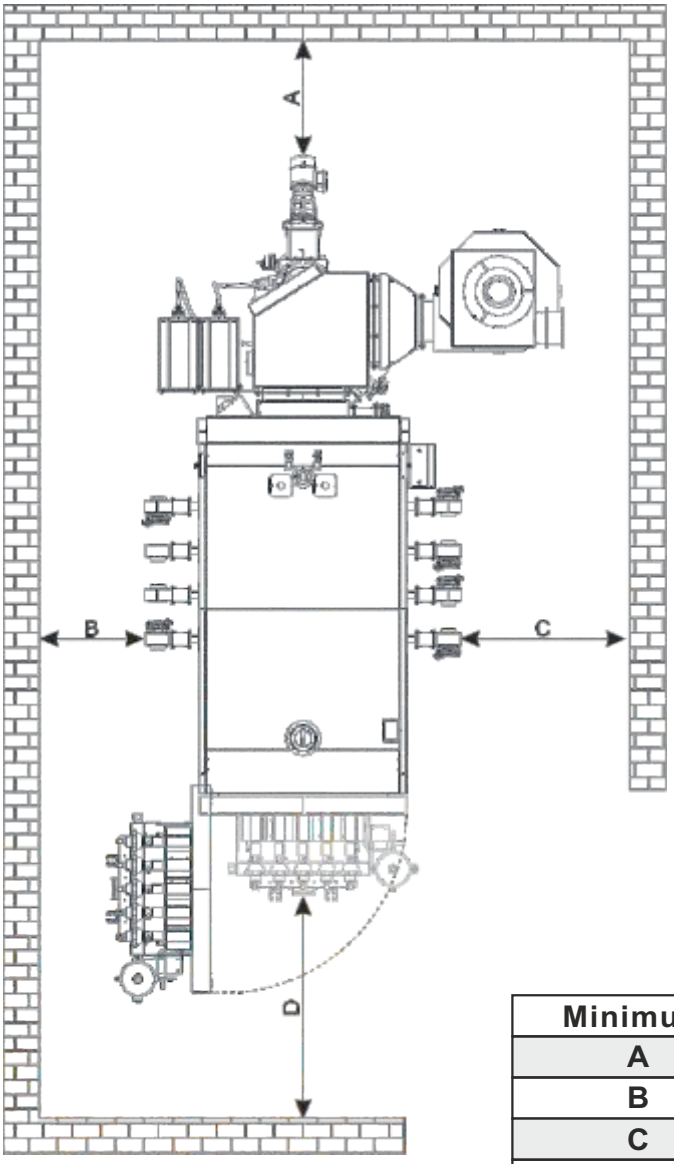
2.1. BOILER ROOM

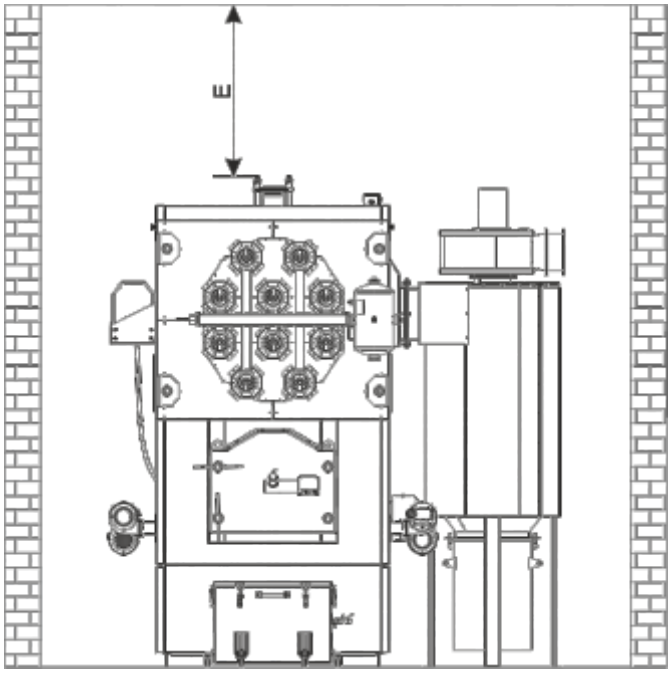
Ensure the boiler room complies with the requirements in these technical instructions. Boiler room must be frost-proof and well ventilated. Boiler has to be positioned so that it can be properly connected to the chimney and simultaneously, enabling tending of boiler and additional equipment, control during operation, and cleaning and maintenance. No combustible materials may be stored in the boiler room. Boiler may only be placed on fire and temperature resistant floor. No temperature-sensitive pipes or lines may be installed in the floor beneath the heating boiler. The minimum distance to the walls required according to point „Minimum distance from the boiler room walls”. The fresh air supply required according to point „Opening for fresh air”. The temperature in the boiler room must not exceed +40°C while system is in operation. The temperature in the boiler room must not fall below +10°C while the system is in operation.

Always follow the most up-to-date local, municipal and building regulations and codes.

Boiler must not operate in flammable and explosive environment.

2.2. MINIMUM DISTANCE FROM THE BOILER ROOM WALLS





Minimum distances from the boiler room walls	
A	500
B	500
C	500
D	1500
E	500

FLAMMABLE ITEMS MUST NOT BE PLACED ON THE BOILER AND WITHIN THE SAFETY DISTANCES.

2.3. OPENING FOR FRESH AIR

Each boiler room **must be equipped with opening** for supply of fresh air which is dimensioned in accordance with boiler output. Such opening must be protected with a net or grate. The boiler location must never be under negative pressure.

Equation for calculate opening area: $A = 6{,}02 \cdot Q$

A - opening area in cm^2
Q - boiler output in kW

Always follow the most up-to-date local, municipal and building regulations and codes.

Boiler must not operate in flammable and explosive environment.

Never cover the boiler or store debris or other materials near the boiler, or in any way block the flow of adequate fresh air to the boiler. Never cover the combustion air opening.

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 and do not block lovers in boiler room door.

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

When the above issues have not been resolved, the boiler can not be placed in operation.

2.4. CONNECTION TO THE CHIMNEY

Properly dimensioned and built chimney is the main condition for safe and economical functioning of the boiler. **The thermal insulation of the chimney has to be done properly**, it has to be absolutely gas-proof and smooth. On its lower part there has to be built in the opening for cleaning with the door. An brick-layed chimney has to have three layers with an insulation of 30 mm in the middle, if the chimney is built inside the house (i.e. inside the heated area), or an insulation of 50 mm if it is built outside the house (i.e. outside the heated area). The flue gas temperature has to be at least 30°C higher then the temprerature of their consdensation point. The choice and the construction of the chimney has to be performed by the authorized person. Inside dimensions of the chimney intersection selected in accordance with diagram for chimney selection, they depend of its height and nominal heat of boiler.

The flue gas tube for connecting the boiler and the chimney **has to have a thermal insulation** made out of 30-50mm thick stone wool.

CHIMNEY SELECTION:

EKO-CKS MULTI PLUS model	**170**	**250**	**340**		**450**	**580**	**kW**
Minimum chimney diameter	300		300	350	350	400	mm
Useful chimney height*	4 - 20						m
Minimum chimney connection tube diameter	250		300		350	350	mm
Maximum chimney connection tube lenght	10		5	10			m
Maximum number of chimney connection tube elbows	5		3	5			pcs

* in accordance with local regulations

For existing chimneys with not offered dimensions or out of standard is necessary to make chimney calculation by real conditions and determine correct dimensions of flue gas connection and chimney.

If for any reason the boiler has to be connected to the chimney dimensioned for higher capacity boilers, the possibility of condensation inside the chimney shall be highly inreased. The boiler's function shall not be affected.

3.0. BOILER INSTALLATION TO CENTRAL HEATING SYSTEM

All installation works must be made in accordance with valid national and European standards. Boiler **EKO-CKS Multi Plus 170-580** can be connected to closed or open central heating systems. Boiler can be fired with wood chip and wood pellets. Installation should be made, in according to technical standards, by a professional who will be responsible for proper boiler operation. 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/flange, never by welding.

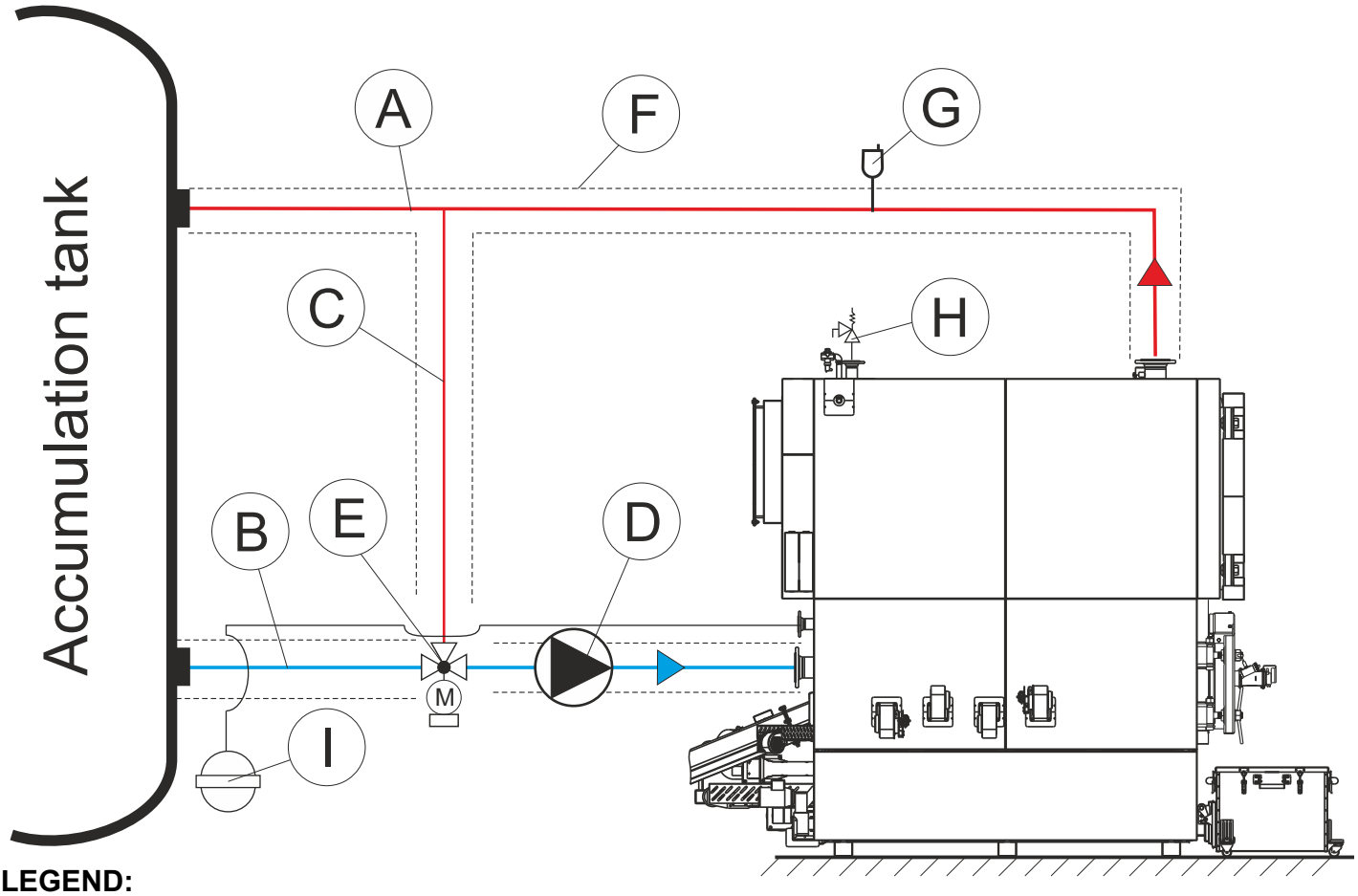
Boiler EKO-CKS Multi Plus can be installed on following ways:

1) through **buffer tank** (CAS) (minimum volume of buffer tank is 12 l/kW)
   - maximal adjusted temperature: **93°C (boiler shutdown: 95°C)**

BOILER SHOULD ALWAYS BE CONNECTED TO CENTRAL HEATING SYSTEM BY CONNECTORS/FLANGE, NEVER BY WELDING!

3.1. BOILER INSTALLATION TO CLOSED HEATING SYSTEM

Figure 2. General connection scheme of the EKO-CKS Multi Plus 170-580 to the closed heating system



LEGEND:

A - Main flow
B - Return flow
C - Connection line inlet-outlet
D - Heating pump
E - 3-way mixing valve with motor drive (not included into delivery)
F - Thermal insulation of the safety boiler circuit
G - Automatic air vent pot
H - Safety valve (obligatory install by EN 12828)
I - Expansion vessel for closed systems (approx. 10% of the total volume of installation)

NOTE: CLOSING VALVES ARE NOT DISPLAYED ON THIS SCHEME

Hydraulic connection scheme must be performed in a manner as shown in this scheme.
Other parts of installation which is not shown in this scheme must be performed according to norme EN 12828:2012+A1:2014.

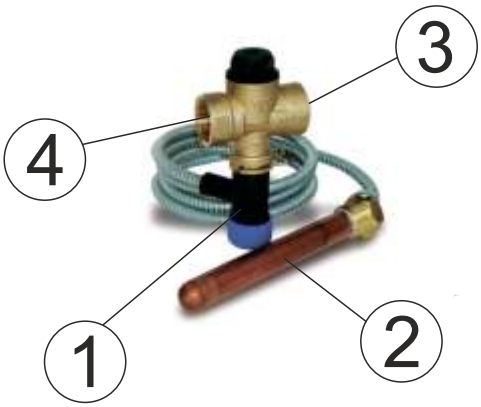
3.1.1. THERMAL PROTECTION

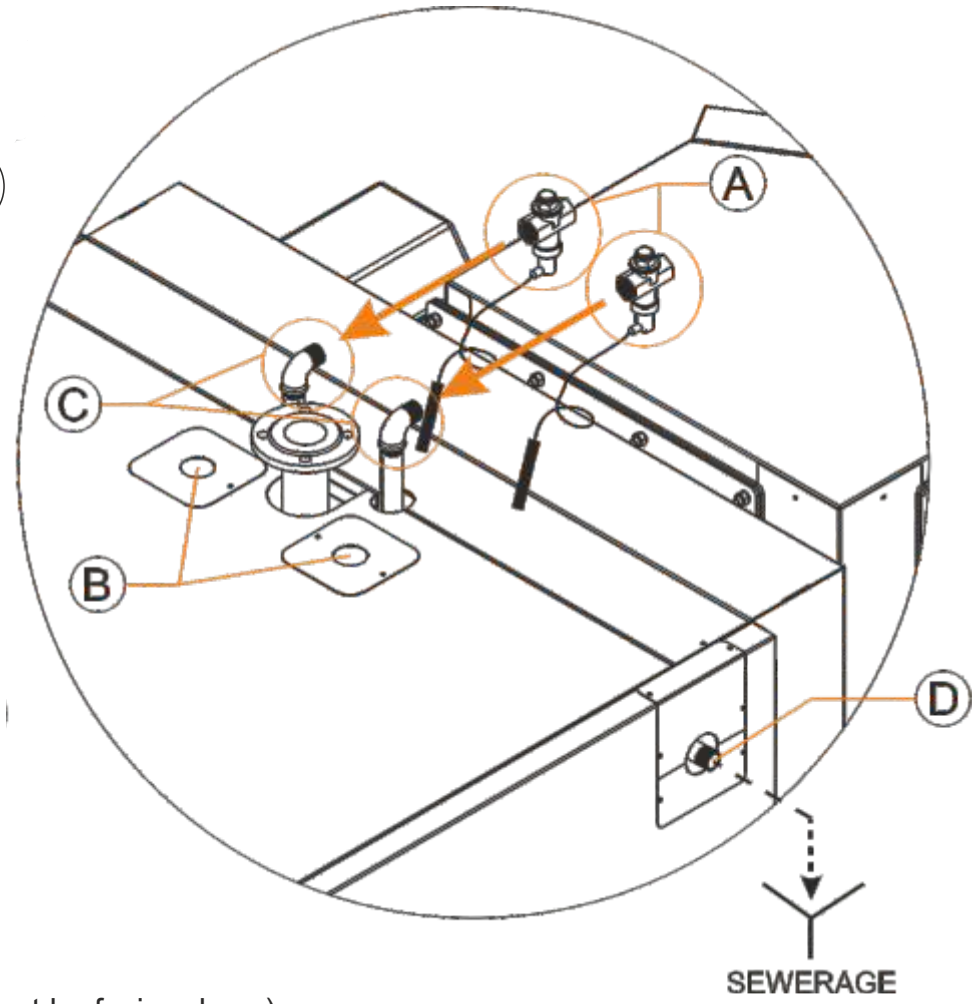
By European EN norms for the closed heating system it's obligatory to install thermal safety protection of the boiler. Boiler is factory prepared for thermal protection installation (heat exchanger and thermal valves). If is boiler mounted to closed heating system and if something happend that has to do with overheating of the boiler, if thermal safety protection is not installed or incorrect installed then warranty is not valid. Thermal protection will be activated if boiler temperature exceed 103°C.

IMPORTANT:
Thermal safety protection must be connected on plumbing installation of the building, charged from plumbing, not from water pressure tank. At power supply failure situation exist possibilty of boiler overheating and then water pressure tank is unable to ensure sufficitent quantity of water.

THERMAL SAFETY PROTECTION MUST BE CONNECTED TO CITY WATER SUPPLY, NOT TO WATER PRESSURE TANK.

A - Thermic safety valve





1 - thermal protecting valve (must be facing down)
2 - thermal protecting valve probe
3 - cold water intlet (connect to city water supply)
4 - connect to prepared connectors on boiler (C)

THERMAL FUSE

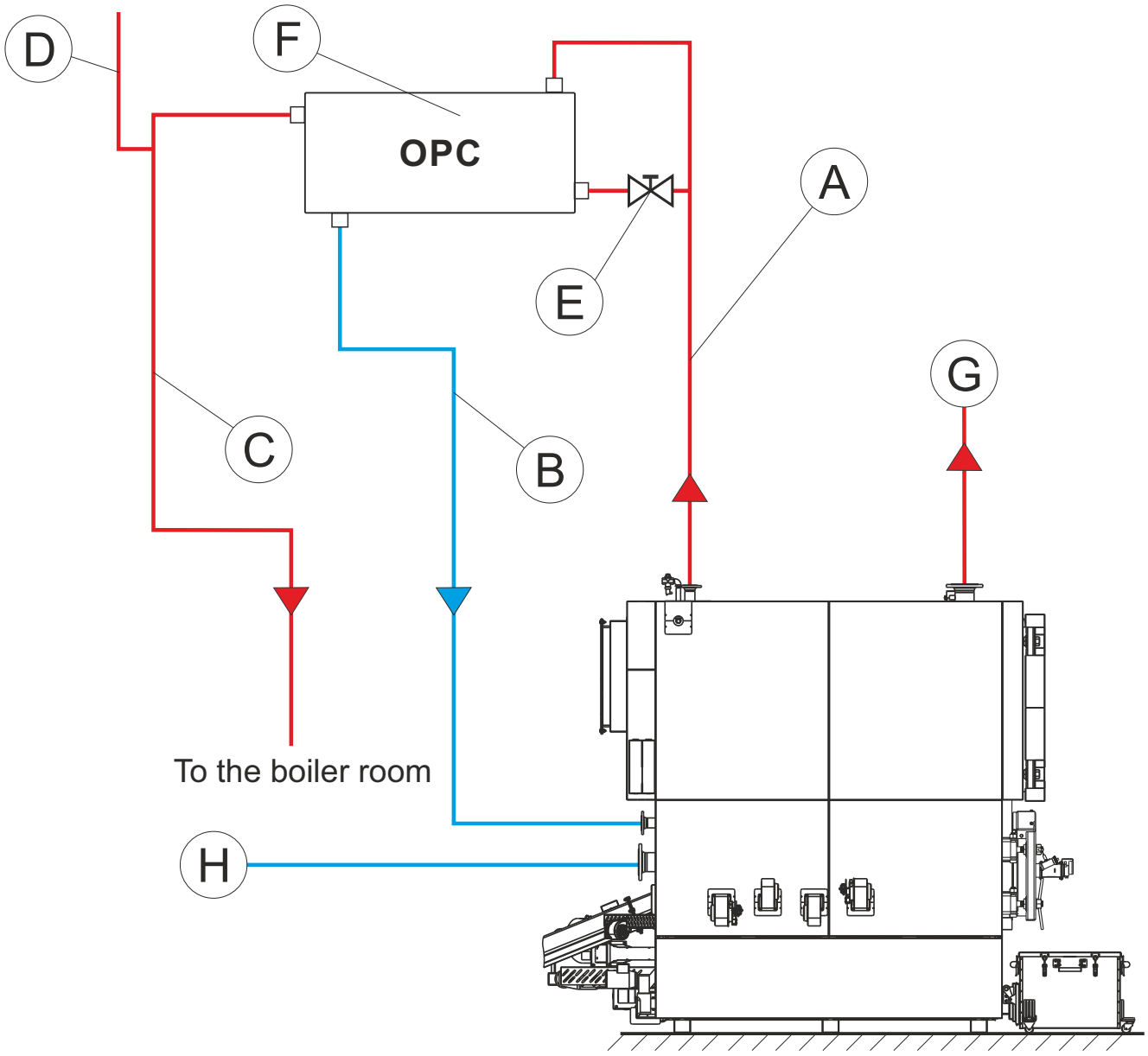
Thermal fuse for the boiler EKO-CKS Multi Plus is composed from factory in-built heat exchanger and two thermic safety valves (A). Boiler have two prepared connectors (C) for connecting thermic safety valves (A) on in-built heat exchangers. Also, boiler have prepared two connectors (D) (on left and right side of the boiler; on picture are showed just one of them) for exit from factory in-built heat exchanger. Connectors (D) is necessary to connect to sewerage. Thermic safety valve probe (2) must be connected to prepared connector (B).

3.2. BOILER INSTALLATION TO OPEN HEATING SYSTEM

3.2.1. INSTALLATION TO OPEN EXPANSION VESSEL

The boiler must be connected to the open central heating system according to the Figure 3 and Figure 4. All lines from boiler to open expansion vessel must be isolated with thermal isolation with a minimum thickness of 40 mm (stone wool or some equivalent thermal isolation). If is expansion vessel is placed outside of heated area it must be thermal isolated. Open expansion vessel must be built enough highly above the highest heating body harness and water heating to allow normal operation of the system, but the water pressure in the boiler in any case shall not exceed the maximum allowed.

Figure 3. General connection scheme of the EKO-CKS Multi Plus 170-580 to the open expansion vessel



LEGEND:

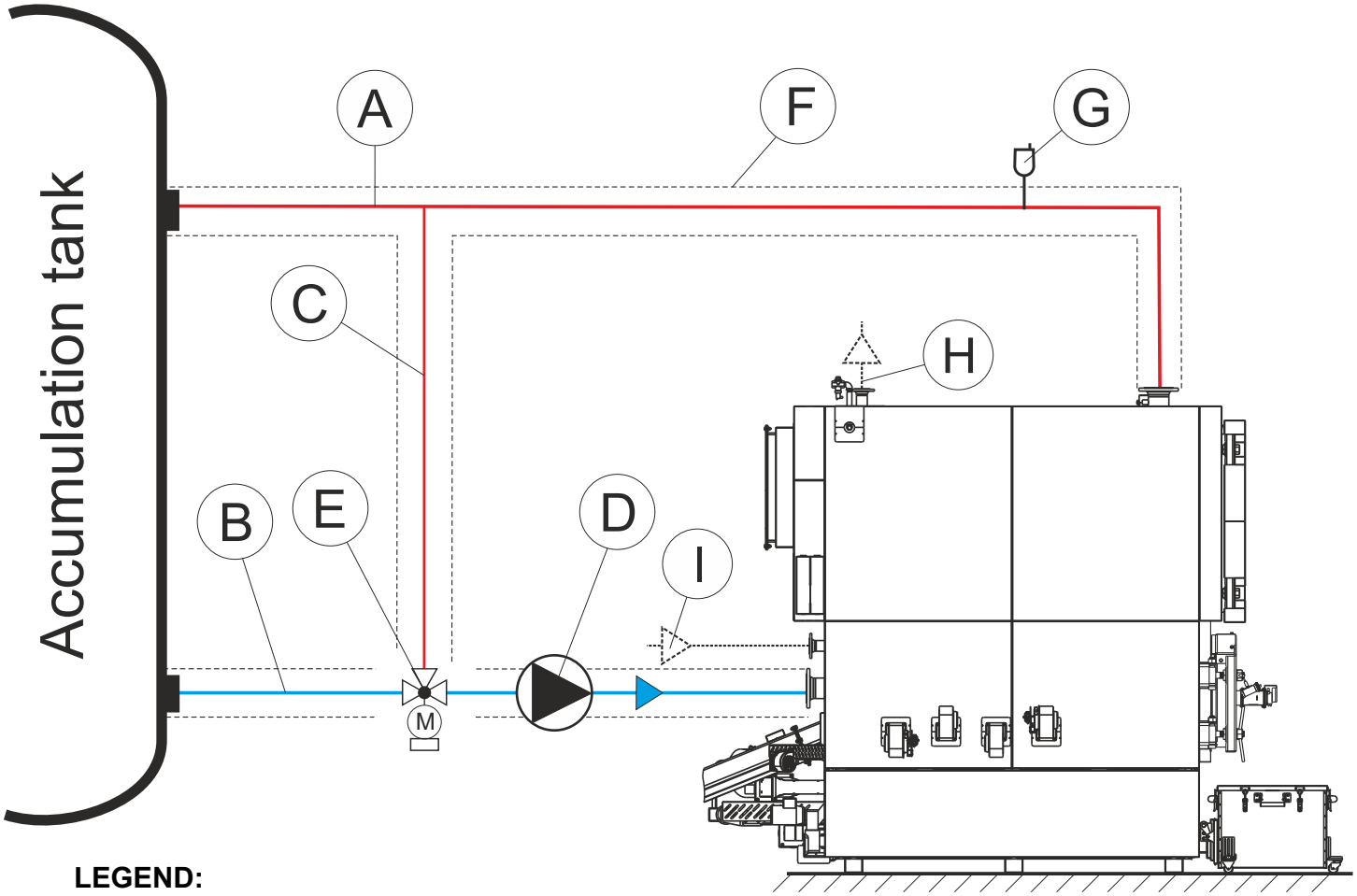
A - Safety main flow
B - Safety return flow
C - Overflow line (has to lead to the boiler room)
D - Air vent
E - Throttle valve
F - Open expansion vessel (Volume = 7% of total system volume)
G - Main flow (heating)
H - Return flow (heating)

NOTE: CLOSING VALVES ARE NOT DISPLAYED ON THIS SCHEME

Hydraulic connection scheme must be performed in a manner as shown in this scheme.
Other parts of installation which is not shown in this scheme must be performed according to norm EN 12828:2012+A1:2014.

3.2.2. INSTALLATION TO OPEN HEATING SYSTEM

Figure 4. General connection scheme of the **EKO-CKS Multi Plus 170-580** to the open heating system



LEGEND:

A - Main flow
B - Return flow
C - Safety line
D - Circulation pump
E - 3-way mixing valve with motor drive (not included into delivery)
F - Thermal insulation of the safety boiler output
G - Automatic air vent pot
H - Safety main flow - accord. to the open expansion vessel
I - Safety return flow

NOTE: CLOSING VALVES ARE NOT DISPLAYED ON THIS SCHEME

Hydraulic connection scheme must be performed in a manner as shown in this scheme.
Other parts of installation which is not shown in this scheme must be performed according to norm EN 12828:2012+A1:2014.

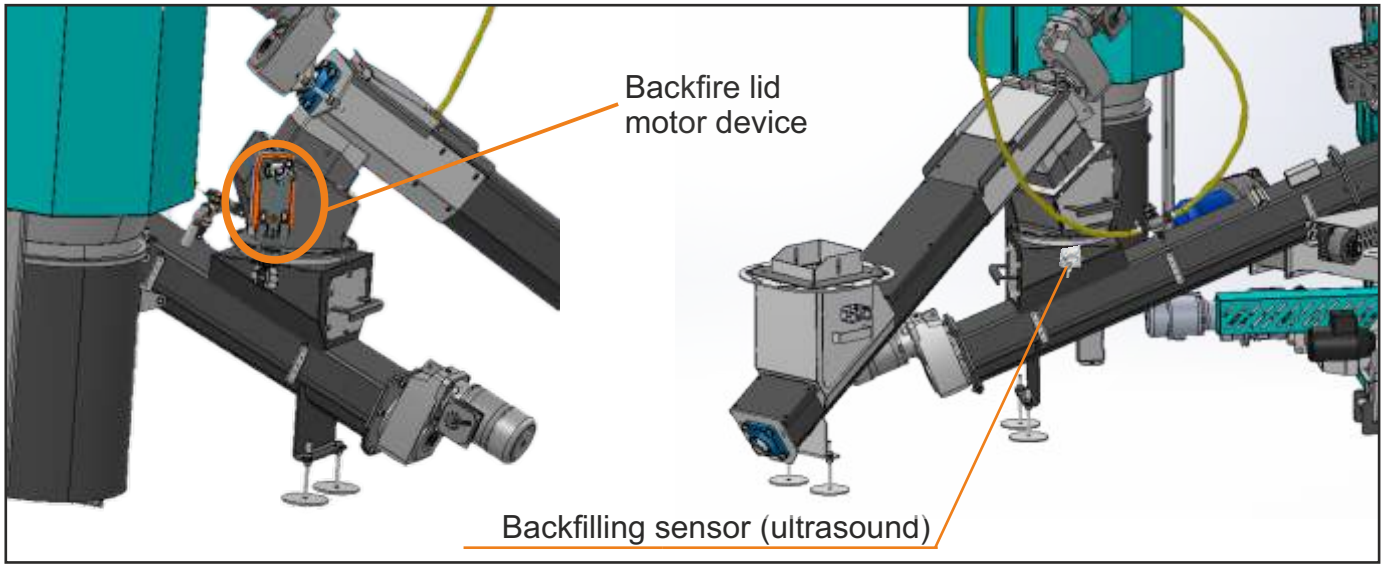
4.0. INSTALLATION / ADJUSTMENT / CHECK PARTS AND EQUIPMENT

4.1. BACKFIRE PROTECTION - LID (if a special order rotary valve is not installed)

Backfire protection in Screw feeder-1 (screw feeder that brings wood chips / wood pellets in the boiler burner) is done by using backfire protection lid located at the fuel supply box (between Screw feeder-1 and Screw feeder-2).

Backfire protection lid opens and closes by an electric motor (backfire lid motor device). Backfire protection lid is managed by ultrasound backfilling sensor on fuel supply box. When ultrasound sensor detect barrier (fuel) then it make power cut of electrical circuit and backfire lid motor device start closing backfire lid. Opening of backfire lid start when is electrical circuit closed again (when ultrasound sensor doesn't see any barrier (fuel) in fuel supply box). At power supply failure (when is boiler works) backfire protection lid will be start with closing immediately.

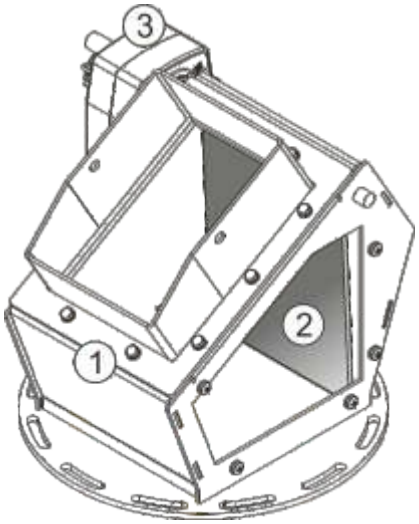
Situations when is backfire lid start to close:
- whenever ultrasound backfilling sensor detect fuel in fuel supply box
- during power failure.
- whenever screw feeders (except Screw feeder-1) not have guarantee for work (operating setting 0%).
- whenever controller report malfunction (displayed on the screen).



4.1.1. ADJUSTMENT OF BACKFIRE PROTECTION LID

MAIN PARTS:

1 - fuel supply box
2 - backfire protection lid
3 - backfire protection lid motor device



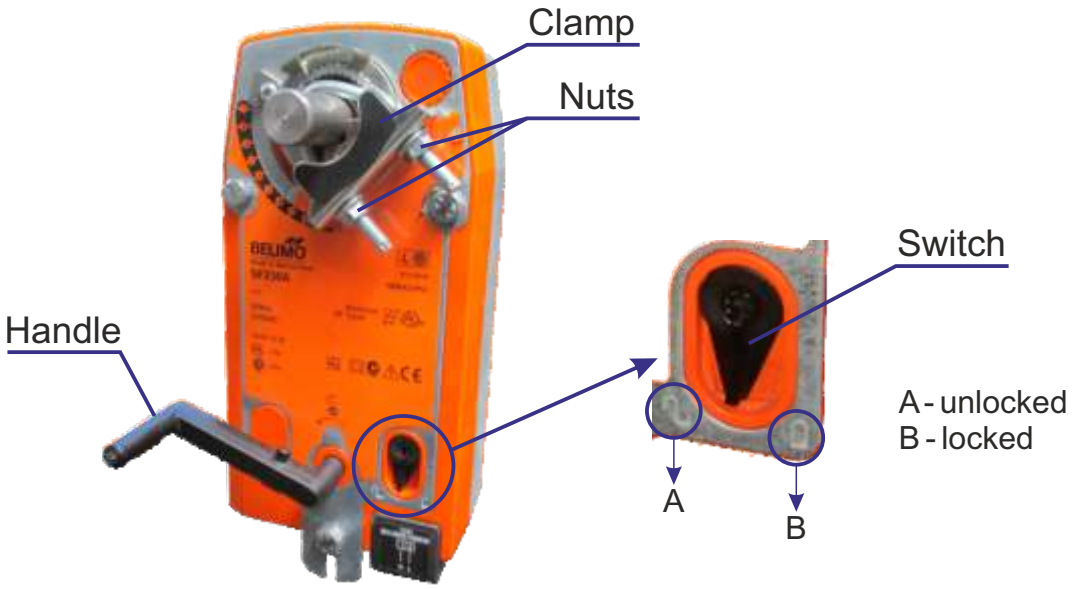
PROCEDURE OF BACKFIRE PROTECTION LID ADJUSTMENT

1. Turn of electrical supply on junction box.

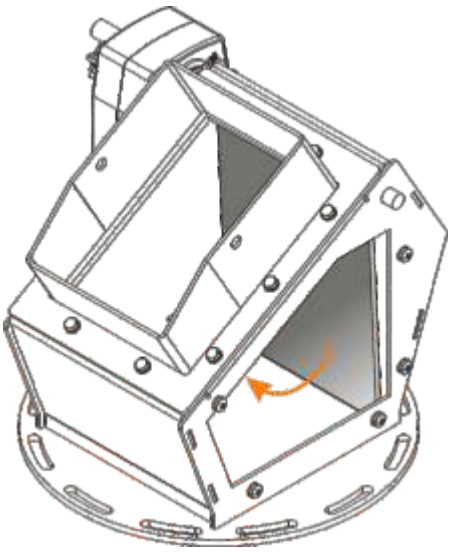
2. Remove cover lid from fuel supply box.

3. Nuts on clam must be relased before the following actions.

4. Wind up return flame protection motor device in a way that rotate motor device handle counterclockwise and make three rounds. Hold the handle and pull the switch in position „LOCKED".



5. Take a lid with hand, lift it up to the top of fuel supply box and hold it. With other hand tight nuts on clamp. During tighting nuts make attention that lid must be on the center of fuel supply box.

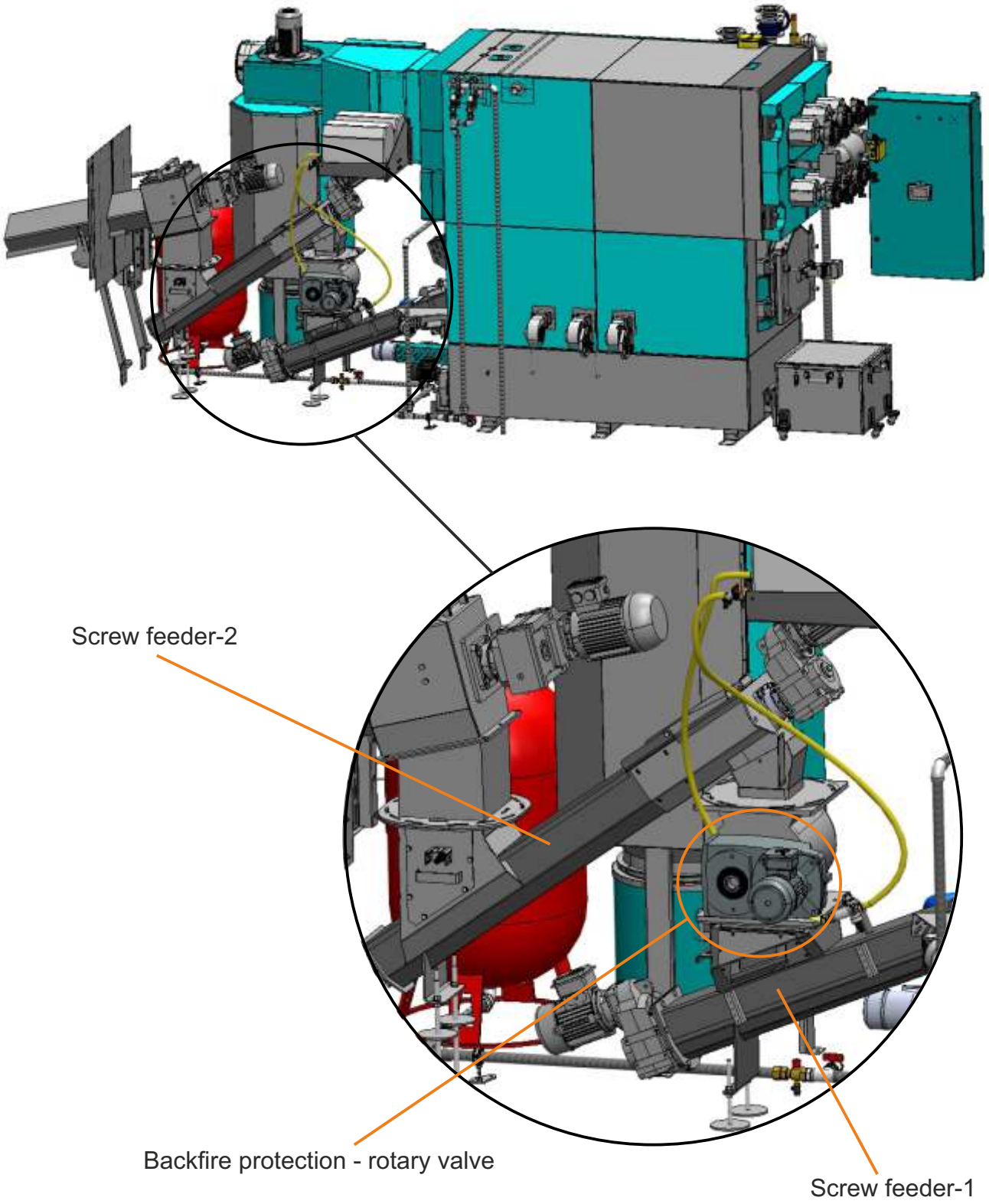


6. When is nuts tighted, lid must stand alone (without holding) on the top of fuel supply box.

7. Pull switch on motor device in position „UNLOCKED”. Motor device will be additionaly press lid on top of the fuel supply box.

4.2. BACKFIRE PROTECTION - ROTARY VALVE (if installed)

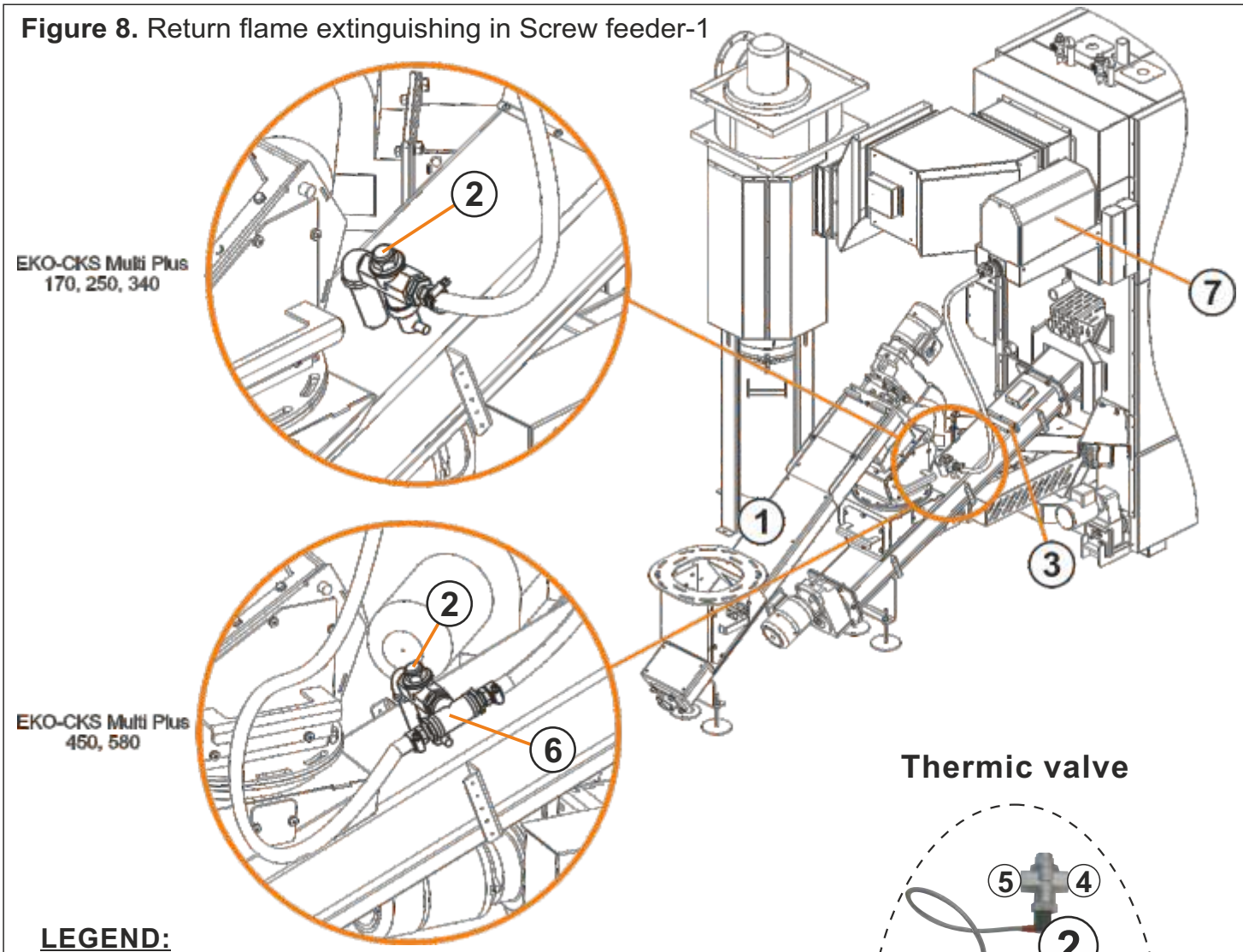
In this variant, backfire protection on Screw feeder-1 (the screw feeder that supplies fuel to the boiler burner) is implemented using a rotary valve located between Screw feeder-1 and Screw feeder-2.

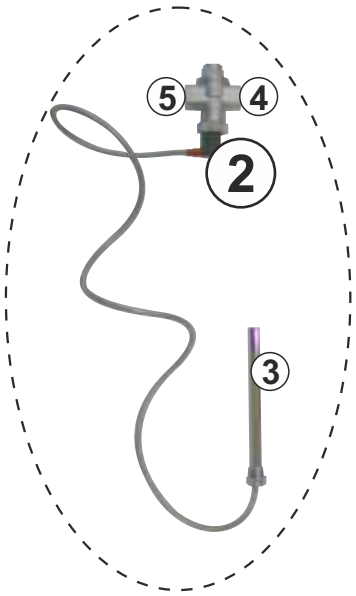


4.3. BACKFIRE EXTINGUISHER ON SCREW FEEDER-1

Backfire extinguisher on Screw feeder-1 (screw feeder which brings wood chips / wood pellets in the boiler burner) is is performed by using a canister located above the Screw feeder-1 (see number 7 on figure 8). The canister is connected to screw feeder through thermic valve which open water when is his sensor (located on Screw feeder-1, see number 3 on figure 8) register temperature of 95°C.
It is necessary to take care of the water level in the canister, and keep it full.

Figure 8. Return flame extinguishing in Screw feeder-1



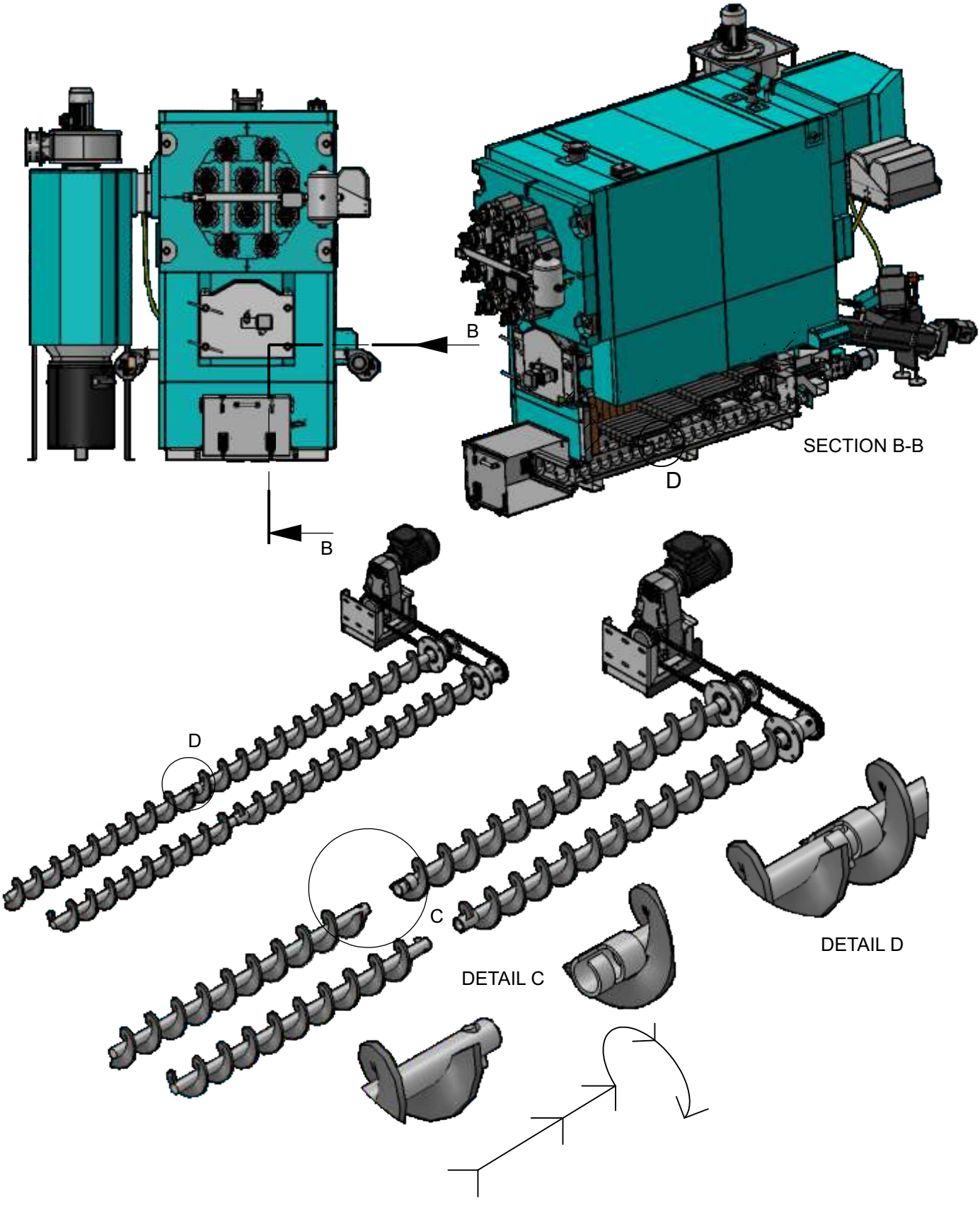


LEGEND:

1 - Wood chip / wood pellet Screw feeder-1
2 - Thermic valve as Caleffi 543 513
3 - Thermic valve sensor
(opening temperature T_{otv}= 95°C)
4 - Connection - thermic valve input
5 - Connection - thermic valve output
6 - T - piece (EKO-CKS Multi Plus 340, 450, 580)
7 - Water tank, **with volumes:**
- *EKO-CKS Multi Plus 170: 1 × 25 liters*
- *EKO-CKS Multi Plus 250: 1 × 25 liters*
- *EKO-CKS Multi Plus 340: 2 × 25 liters*
- *EKO-CKS Multi Plus 450: 2 × 25 liters*
- *EKO-CKS Multi Plus 580: 2 × 30 liters*

4.4. SCREW FEEDER FOR EXTRACTION OF ASH

- View for 250, 340, 450, 580 kW (170 kW there is only one screw feeder)



5.0. STARTUP

Boiler commisioning must be performed by the manufacturer, the company Centrometal d.o.o. or authorized serviceman by company Centrometal d.o.o.

6.0. BOILER OPERATING

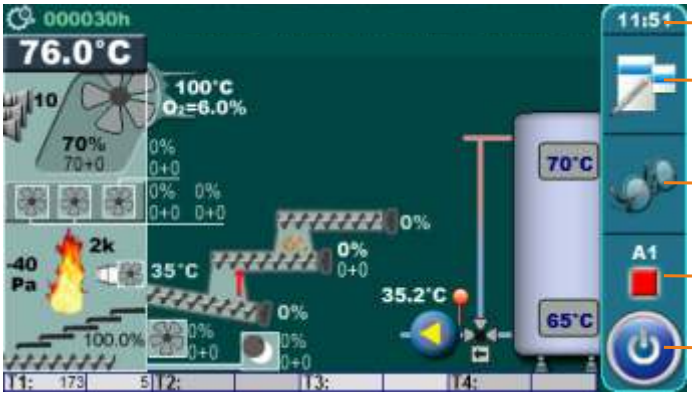
Boiler must not operate in flammable and explosive environment.

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 s person responsible for their safety. Children must be supervised in the vicinity of the product.

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

The boiler may only be used by a person appointed by the owner of the boiler and trained for the safe use, maintenance and cleaning of boiler authorized service technician / fitter of Centrometal d.o.o. for which one should have conviction.

The boiler **EKO-CKS Multi Plus170-580** is equipped with a digital boiler control, which consists of moving and stationary parts. Fixed part is located in the electrical junction box and the mains lead is connected to the movable part - a portable unit that is designed for use in the boiler room. To operate the boiler are necessary both components of regulation. Movable part of boiler control consists touch screen. In figure below is displayed screen of movable boiler control unit in the phase of monitoring the work of the boiler **EKO-CKS Multi 170-580**. Summary of operations contains lots of information about what's happening in real time during the combustion process.



Time

Display selection: Main menu / work

Boiler operation display: graphic / numeric

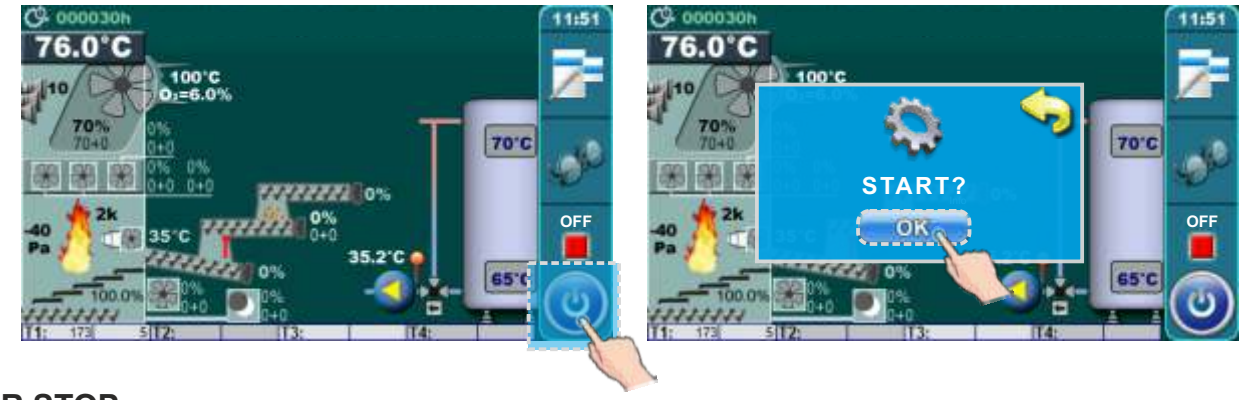
State of current boiler status

Start / stop boiler

Boiler control unit

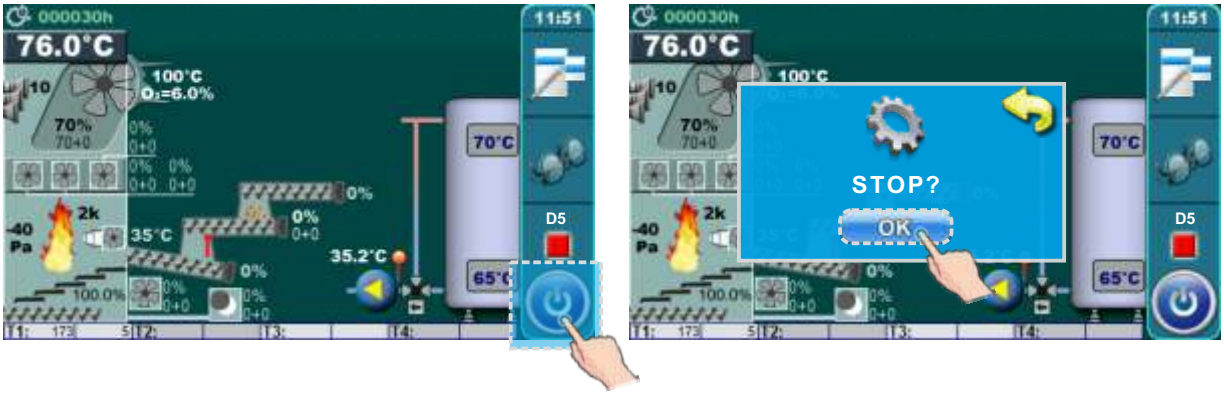
BOILER START:

For boiler start is neccesary 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 neccesary 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.

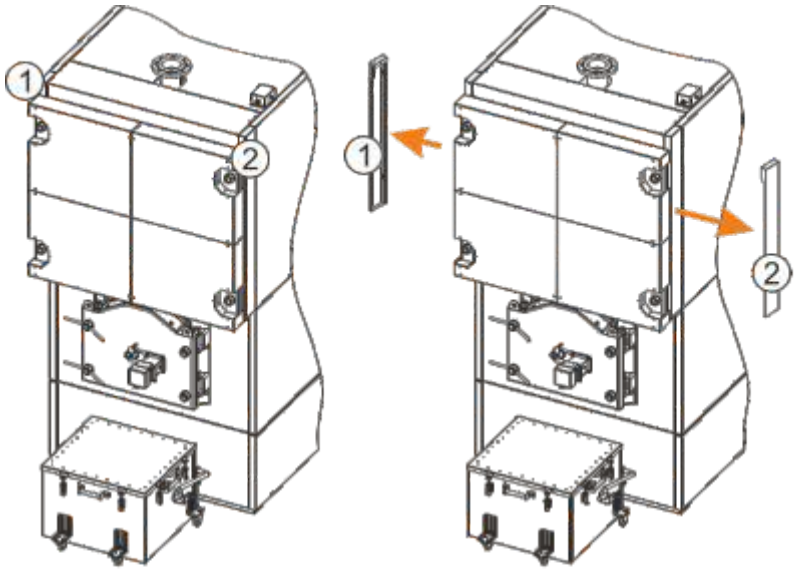


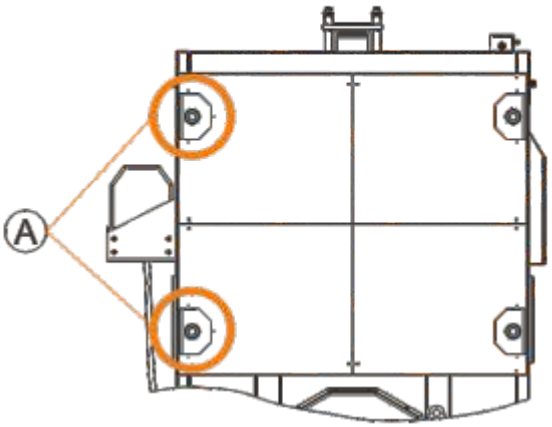
6.1. BOILER DOORS OPENING

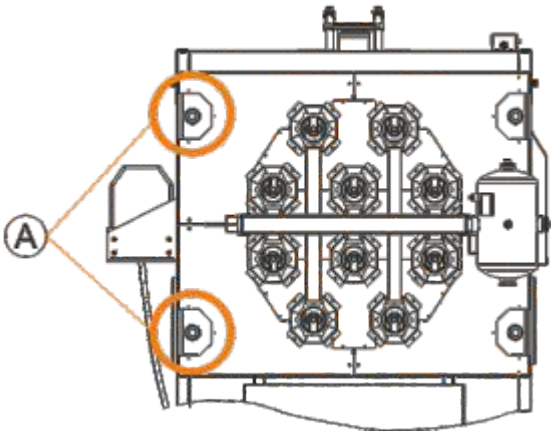
6.1.1. UPPER BOILER DOOR OPENING

Before opening the door boiler must be off from work and cooled.

Before opening the door switch off electrical supply on main switch.







Upper boiler door can be opened on both sides (left or right; at changing door opening direction is necessary to move nuts (B) on opposite side). Here is given example for opening direction from left to right.

Procedure for opening upper boiler door:
- remove casing cover parts (1) and (2)
- unscrew nuts „A”
- open door

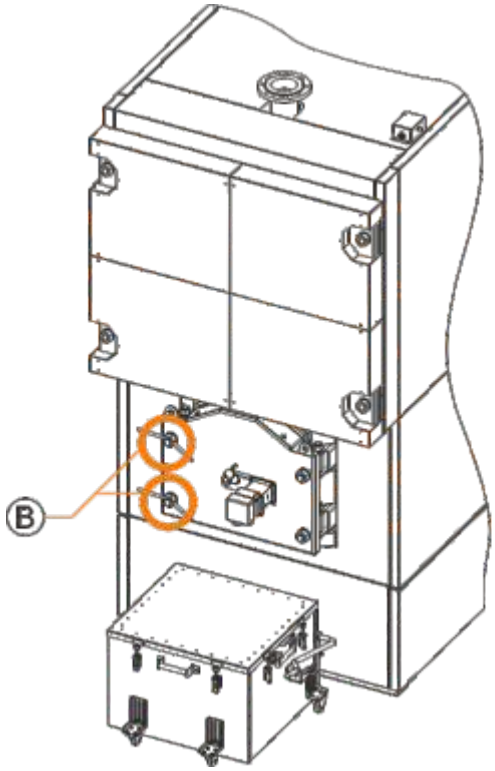
If automatic pneumatic air cleaning of boiler flue passages is installed (addition equipment) pay attention to connection tube for compressed air. If is needed, unplug connection tube.

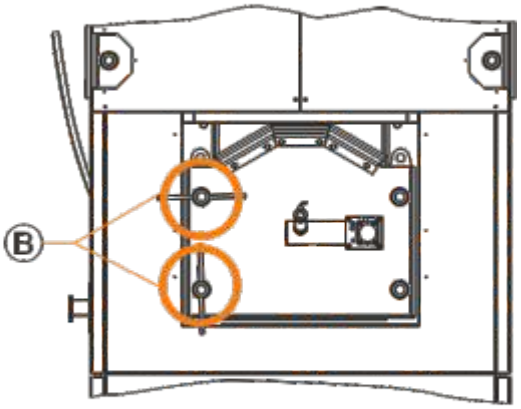
Upper boiler door opening if is installed system for automatic pneumatic air cleaning of flue passages (additional equipment).

6.1.2. LOWER BOILER DOOR OPENING

Before opening the door boiler must be off from work and cooled.

Before opening the door switch off electrical supply on main switch.





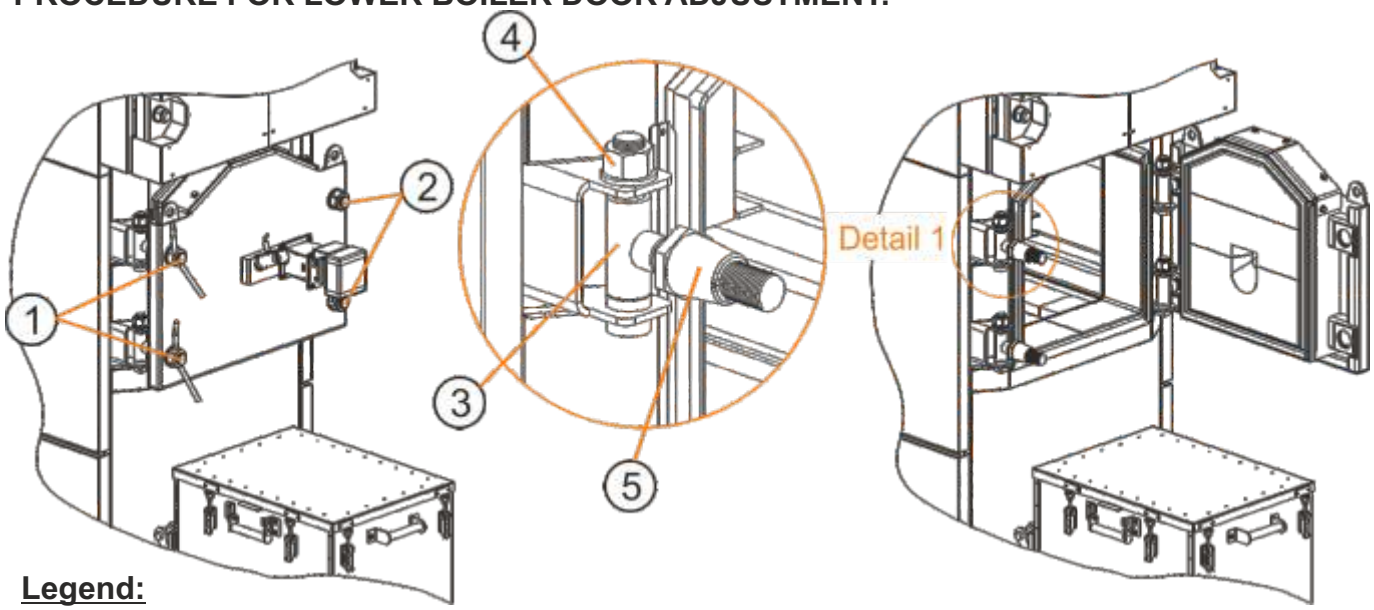
Lower boiler door can be opened on both sides (left or right; at changing door opening direction is necessary to move nuts (B) on opposite side). Here is given example for opening direction from left to right.

Procedure for opening lower boiler door:
- unscrew nuts with handles „B”
- open door

6.1.3. LOWER BOILER DOOR ADJUSTMENT

EKO-CKS Multi Plus boiler lower door can be opened on left and right side, depend how door is adjusted (on which side are placed nuts with handles (1)). Boiler is factory delivered with that nuts mounted on the left side (direction of door opening is from left to right). If user want opposite opening direction than is needed to put nuts with handles (1) on opposite side. Independent on which side will be boiler door open they must be adjusted in a way that good seal and easy open-close.

PROCEDURE FOR LOWER BOILER DOOR ADJUSTMENT:



Legend:

1 - boiler door nuts with handles
2 - boiler door nuts
3 - hinge
4 - hinge nut
5 - coned nut

ADJUSTMENT BOILER DOOR TO FRAME:

It's necessary to adjust boiler door in the way that door braid sits well to door frame on boiler. That is key thing for boiler door proper sealing.

In this step is necessary to boiler door be closed and all four nuts (1 and 2) be tighten. When are all four nuts tighten than is necessary to loose coned nuts (5) in back side of boiler door. When are coned nuts (5) loosed then is necessary to thight all four nuts (1 and 2) for pressing boiler door to door frame ond the boiler. Tight coned nuts (5). Coned nuts (5) must properly fit to holes on the back side of the boiler door. Tight them until boiler door is well thighten.

BOILER DOOR NIVELING:

Boiler door slope is adjusting with nuts (4) on hinges (3). If boiler door hang or don't close properly or stuck then is necessary to adjust slope. For adjustment is necessary to turn the nut (4) on upper and lower hinges (3) which carry boiler door. Turn nuts until boiler door is niveled in the way that boiler door can be easy open-close without stuck.

7.0. CLEANING AND MAINTENANCE

Spare parts must be purchased direct from manufacturer (Centrometal d.o.o.).

Every milimeter of soot and dirt on the exchange surfaces of the boiler means approx. 5% higher fuel consumption. Save fuel - clean the boiler at the time.

Before opening the door boiler must be off from work and cooled.

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

Ash should be disposed in metal container with a lid.

When the boiler is in operation ash box must be connected to boiler and the lid placed on the box.

Protective gloves are obligatory.

CLEANING AND MAINTENANCE SCHEDULE

ITEM	PERIOD	DESCRIPTION
Movable grate and walls around movable grate.	Every 300 working hours or as is needed.	Clean if exist bonded clusters of combustion rest which disturb fuel flow, ash flow through grate frome fuel input to ash output into ash box. Note: See point 6.1. „Boiler doors opening”.
Upper side of refractory stone vault.	Before every heating season or every 1500 working hours	Clean the ash that has accumulated on the upper side of the fireclay stone. Note: See point 6.1. "Boiler doors opening". Visually inspect the condition of the elements of the vault made of fire-resistant concrete, if there is damage that threatens to cause larger parts to fall into the firebox, such parts must be replaced.
Flue gas tubes of 1st and 2nd passage (if automatic pneumatic air cleaning of boiler flue passages is not installed).	Every 80 working hours or as is needed.	Take out turbulators from tubes of 1st and 2nd passage, clean tubes, put back turbulators in tubes. Note: See point 7.1. „Flue gas tubes cleaning; see point 6.1. „Boiler doors opening”.
Flue gas chamber (if system for automatic extraction of ash from the flue gas chamber is not installed).	Every 80 working hours or as is needed.	Remove the flue chamber covers and clean the flue with a scraperchamber.
Connection box „Boiler - cyclone”.	Every 300 working hours or as is needed.	Clean ash through opening on elbow. See point 7.5. „Cleaning of boiler-cyclone connection box”.
Connection tube „Cyclone fan - chimney”.	Once at year or as is needed.	Clean ash from tube.

Ash box	Every 80 working hours or as is needed.	Empty ash box. Note: See point 7.2. „Ash box cleaning”.
Cyclone ash box	Every 300 working hours or as is needed.	Empty the cyclone ash box. Note: See point 7.3. "Cyclone Cleaning and Maintenance".
Photocell protection glass cleaning	Every 100 working hours or as is needed.	Clean photocell protection glass between photocell and firebox. See point 7.8. „Photocell protection glass cleaning”.
Cyclone fan bearing replacement	Every 4000 working hours or more often if is needed.	Bearing replacement on cyclone fan.
Cyclone fan impeller	Before every heating season or every 1000 working hours	Clean cyclone fan impeller blades.
Screws on components exposed to vibration	Before every heating season or every 1000 working hours	Tightening screws on components exposed to vibration (Screw feeders, cyclone fan, ash extraction system and others)
Screws on connectors in the electrical cabinet	Before every heating season or every 1500 working hours	Tighten the screws at the 230/400V circuit wire joints in the electric box.
Glass braid on the boiler doors, ash box lids, cyclone box, ash box	Before every heating season or every 1500 working hours	Change the glass braid in case of bad sealing at some place.
Backfire extinguisher on Screw feeder-1	Before every heating season or every 1500 working hours	If the system leaks somewhere, it must be repaired and made sure it is filled with the required amount of water.
Safety valve	Before every heating season or every 1500 working hours	Check if it opens on the proper boiler overpressure.
The work of all pumps in the system	Before heating season	Make sure that the system pressure is above the minimum value and that every valve in the pump circuit is opened. after that check the pump in manual test.
Chain in automatic ash extraction system from combustion chamber	Before heating season	Tighten the chain up and oil it.
All boiler fans	Before heating season	Check each fan in manual test.
Electric igniter with fan	Before heating season	Disassemble the electric igniter with fan. shake the hot air tube to dust it out. Put the electric igniter back to its place and check if it works in manual test.
Backburn protection flap sealing	Before every heating season or every 1500 working hours	Check if backburn protection flap seals correctly in a closed position
Flue gas tubes of 1st and 2nd passage (if automatic pneumatic air cleaning of boiler flue passages is installed)	Every 1000 working hours	Take out turbulators from tubes of 1st and 2nd passage, clean tubes, put back turbulators in tubes. Note: See point 7.1. „Flue gas tubes cleaning; see point 6.1. „Boiler doors opening”.
Flaps primary, secondary movable with motor	Before every heating season or every 1500 working hours	Checking the operation of each of the flaps in the manual test.

Additional equipment (if is fitted)

Elements for air cleaning of flue pipes using compressed air "Pneumat"	Before every heating season or every 1500 working hours	Checking the operation of each valve, system leakage, compressed air safety valve, checking for condensation in the compressed air tank (s), compressing the compressor according to the compressor maintenance list.

7.1. FLUE GAS TUBES CLEANING

Cleaning period:

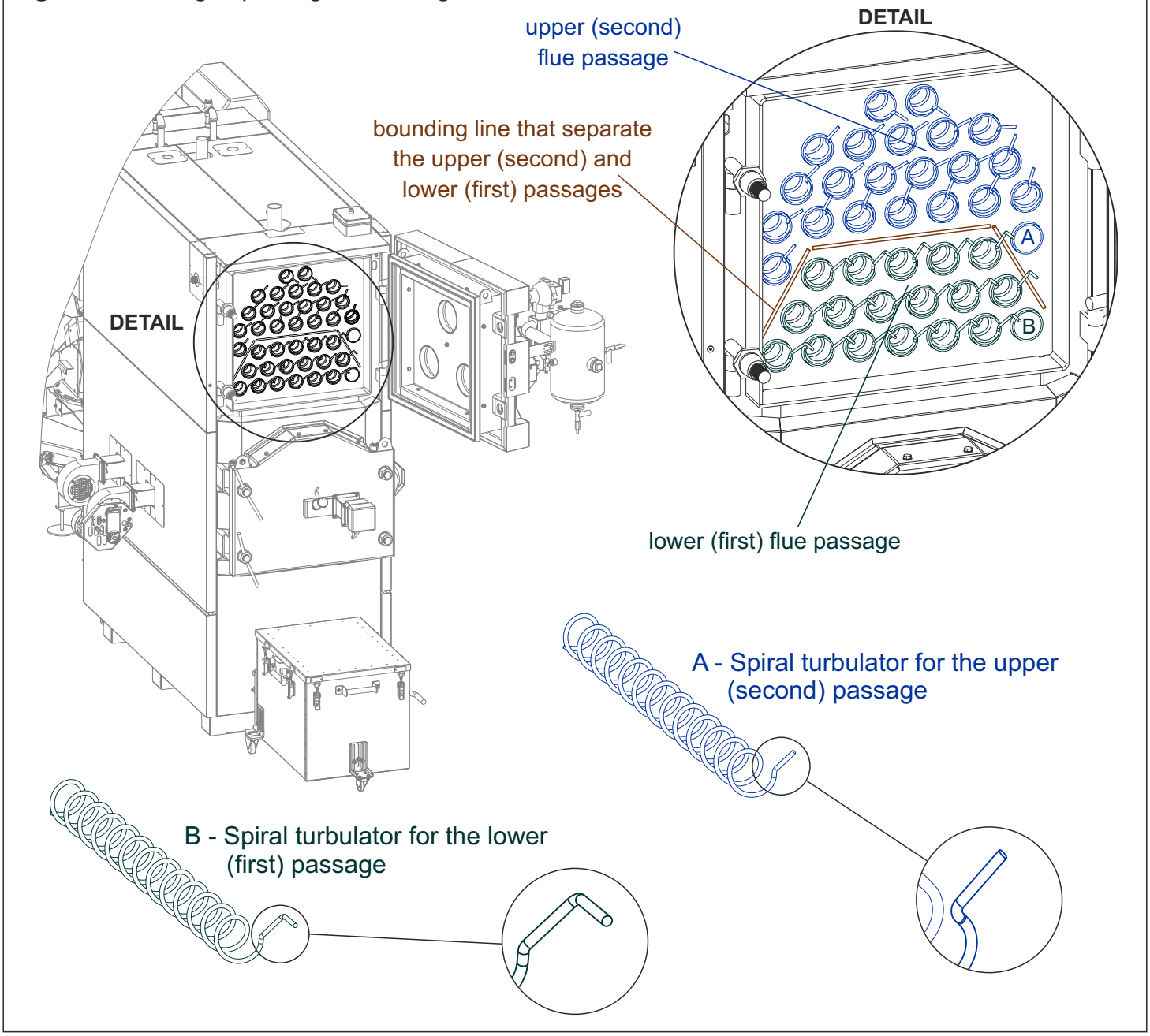
a) if is installed automatic pneumatic air cleaning of boiler flue passages: **every 1000 working hours**

b) if is not installed automatic pneumatic air cleaning of boiler flue passages: **80 working hours or as is needed**

The procedure of flue gas passages cleaning:

1. Open upper boiler door.
2. Take out the upper (second) and lower (first) passage turbulators.
3. Clean all flue gas passages (tube by tube) with cleaning brush (delivered with boiler).
4. Put back the spiral turbulators of the upper (second) and lower (first) passage in the pipes.
5. Close upper boiler door.

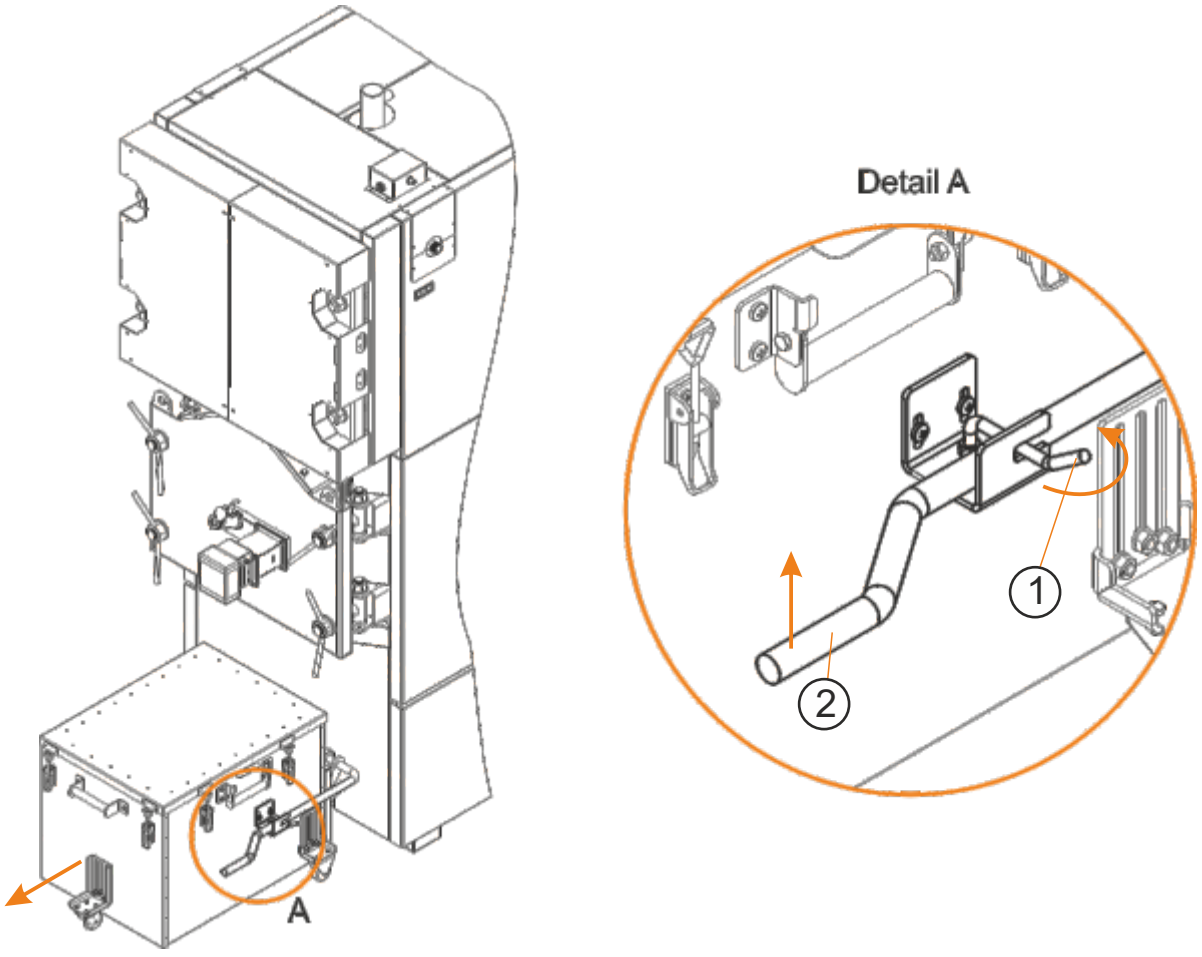
Figure 13. Flue gas passages cleaning



7.2. ASH BOXES CLEANING

Cleaning period: 80 working hours or as is needed.
Cleaning procedure:
First is necessary to relase lever fuse (Figure 14, Detail A, 1). Rotate fuse counterclockwise and relase lever fuse (Figure 14, Detail A, 1). Pull up lever (Fugure 14, Detail A, 2) and detach ash box.
Note: Ash remaining in ash box (3) should be disposed into metal containers with a cover.

Figure 14. Ash box cleaning



Protective gloves are obligatory.

Ash should be disposed in metal container with a lid.

7.3. CYCLONE CLEANING AND MAINTENANCE

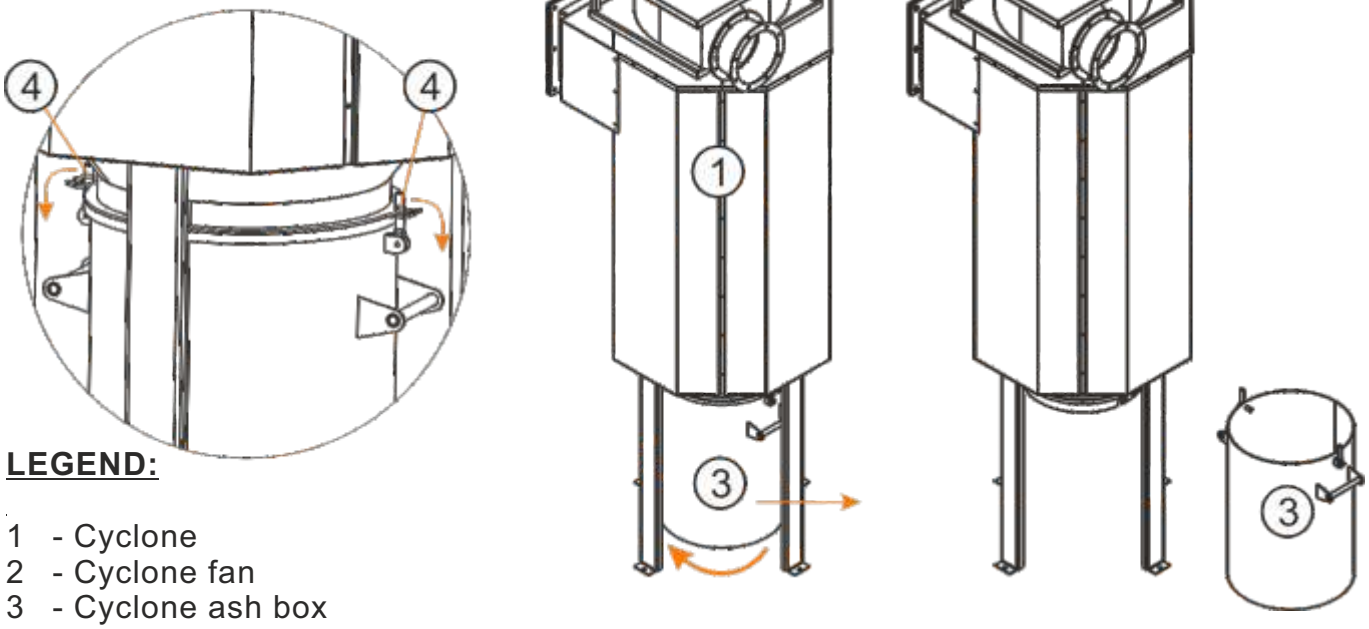
Cyclone ash box must be emptied every 300 working hours or as is needed.

The procedure of emptying the cyclone ash box:

The first of all is necessary to unescrew nuts on holders (4) and relase holder (4) by moving them downward. To relase ash box (3) from cyclone (1) is necessary to make a little counterclokwise rotate with ash box (3). Pull ash box (3) away from cyclone (1) and empty it.

Note: Ash remaining in ash box (3) should be disposed into metal containers with a cover.

Figure 15. Cyclone maintenance



LEGEND:

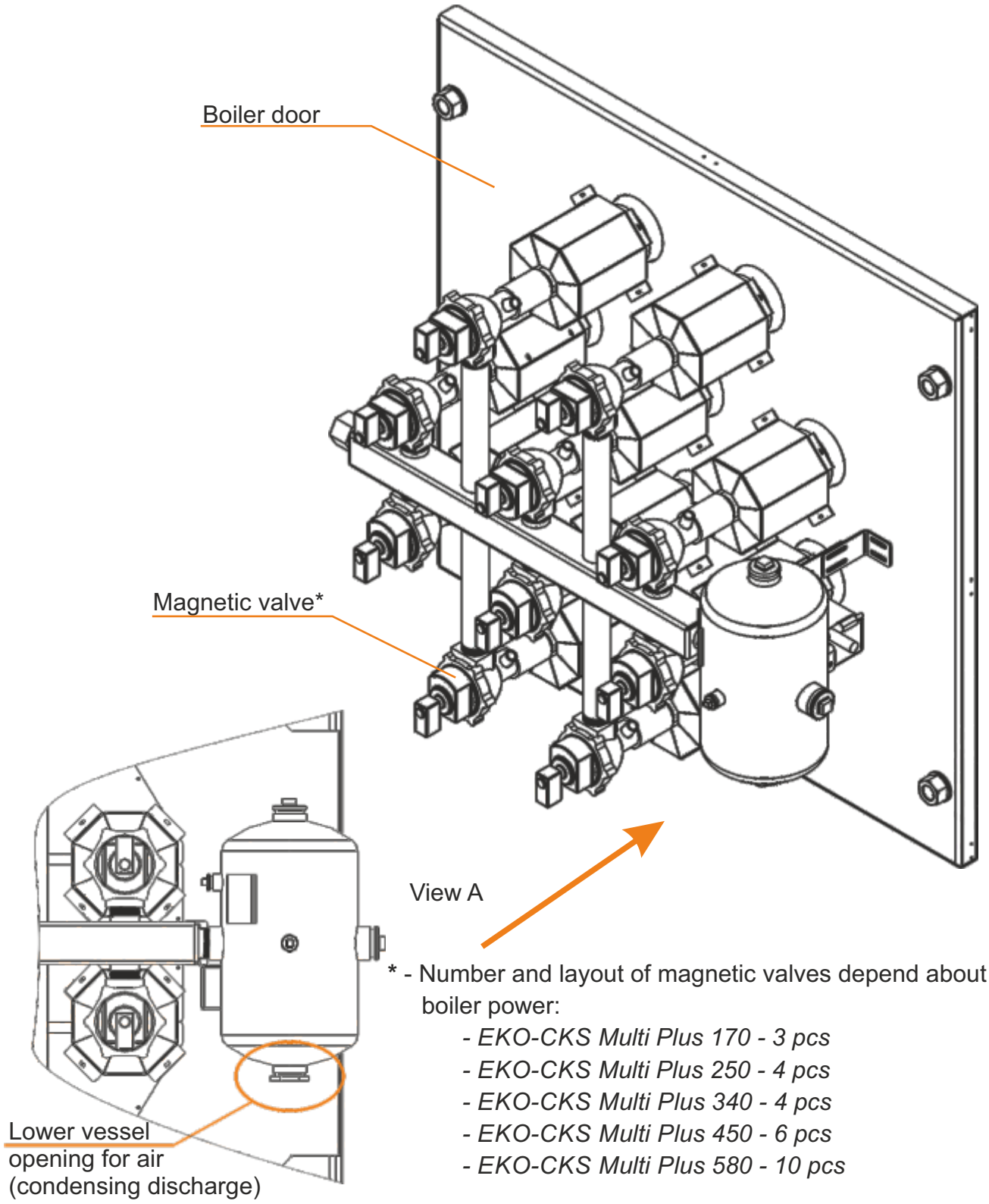
1 - Cyclone
2 - Cyclone fan
3 - Cyclone ash box
4 - Holders with nuts

Protective gloves are obligatory.

Ash should be disposed in metal container with a lid.

7.4. AUTOMATIC PNEUMATIC AIR CLEANING OF BOILER FLUE PASSAGES - PNEUMAT (ADDITIONAL EQUIPMENT)

Figure 16. Automatic pneumatic air cleaning of boiler flue passages



* - Number and layout of magnetic valves depend about boiler power:
- *EKO-CKS Multi Plus 170 - 3 pcs*
- *EKO-CKS Multi Plus 250 - 4 pcs*
- *EKO-CKS Multi Plus 340 - 4 pcs*
- *EKO-CKS Multi Plus 450 - 6 pcs*
- *EKO-CKS Multi Plus 580 - 10 pcs*

7.4.1. PNEUMAT INSTALLING

1. Delivery status

Delivery is consist from:
- compressor with installed additional parts
- PU pipes Ø10mm (5 m)

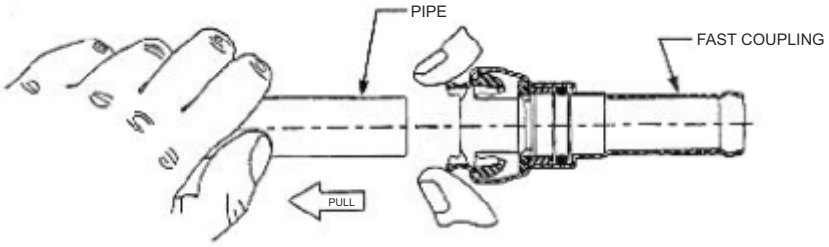
2. Compressor

Compressor is delivered with installed:
- fast coupling
- ball valve 1/4″
- pressure switch
- dirt trap
- electromagnetic valve

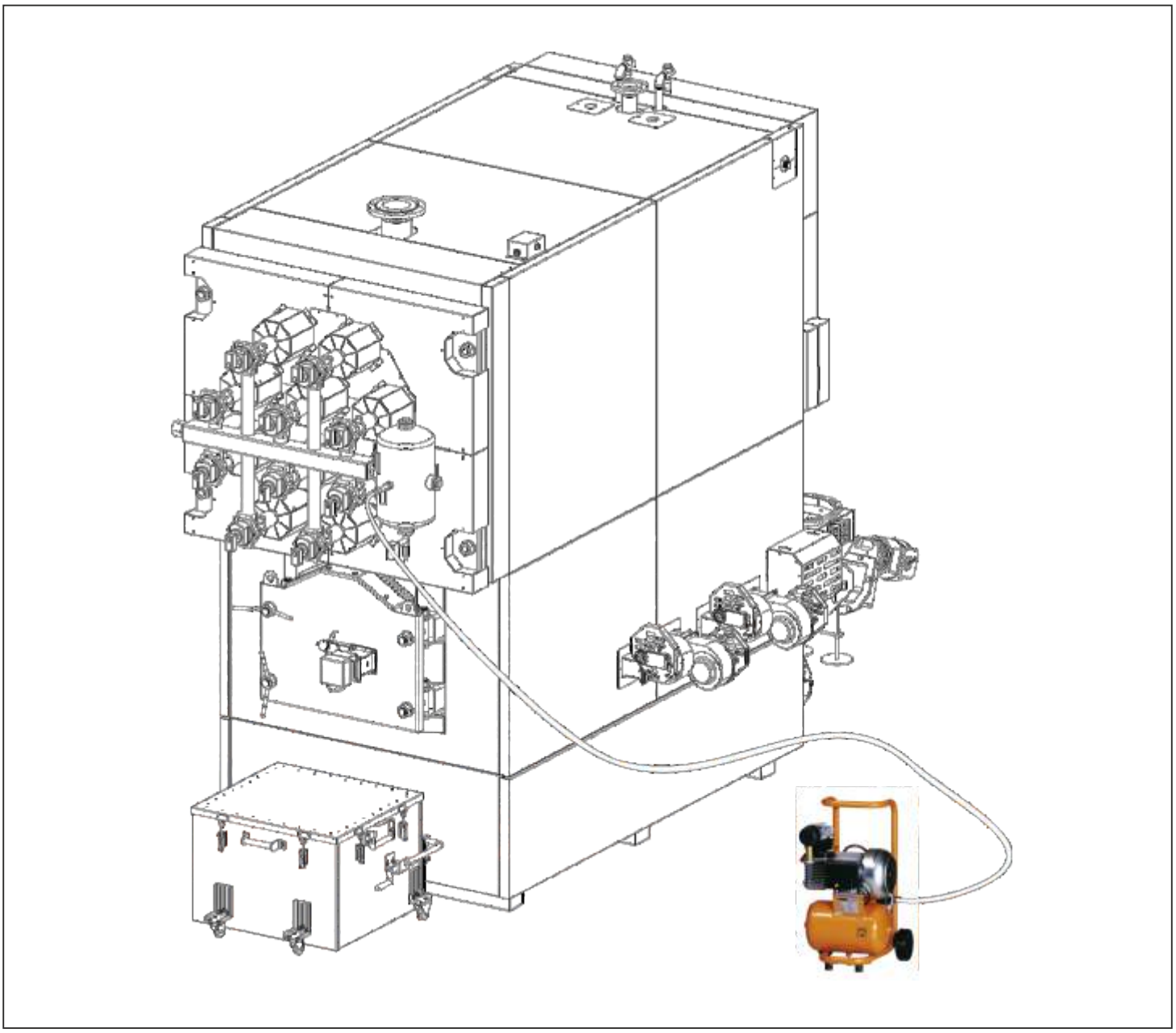
Compressor set connection

It's necessary to connect compressor and pressure vessel which is mounted on boiler door. Connection is performing by using polyurethanium pipe (PU) which is connect on fast couplings installed on vessel and compressor. Fast couplings enable easy and safe connection. At connection just press pipe to fast coupling. For decoupling press plastic ring inward and then pull pipe from coupling (figure 1).
After connecting pressure line compressor must be plug to electrical installation.

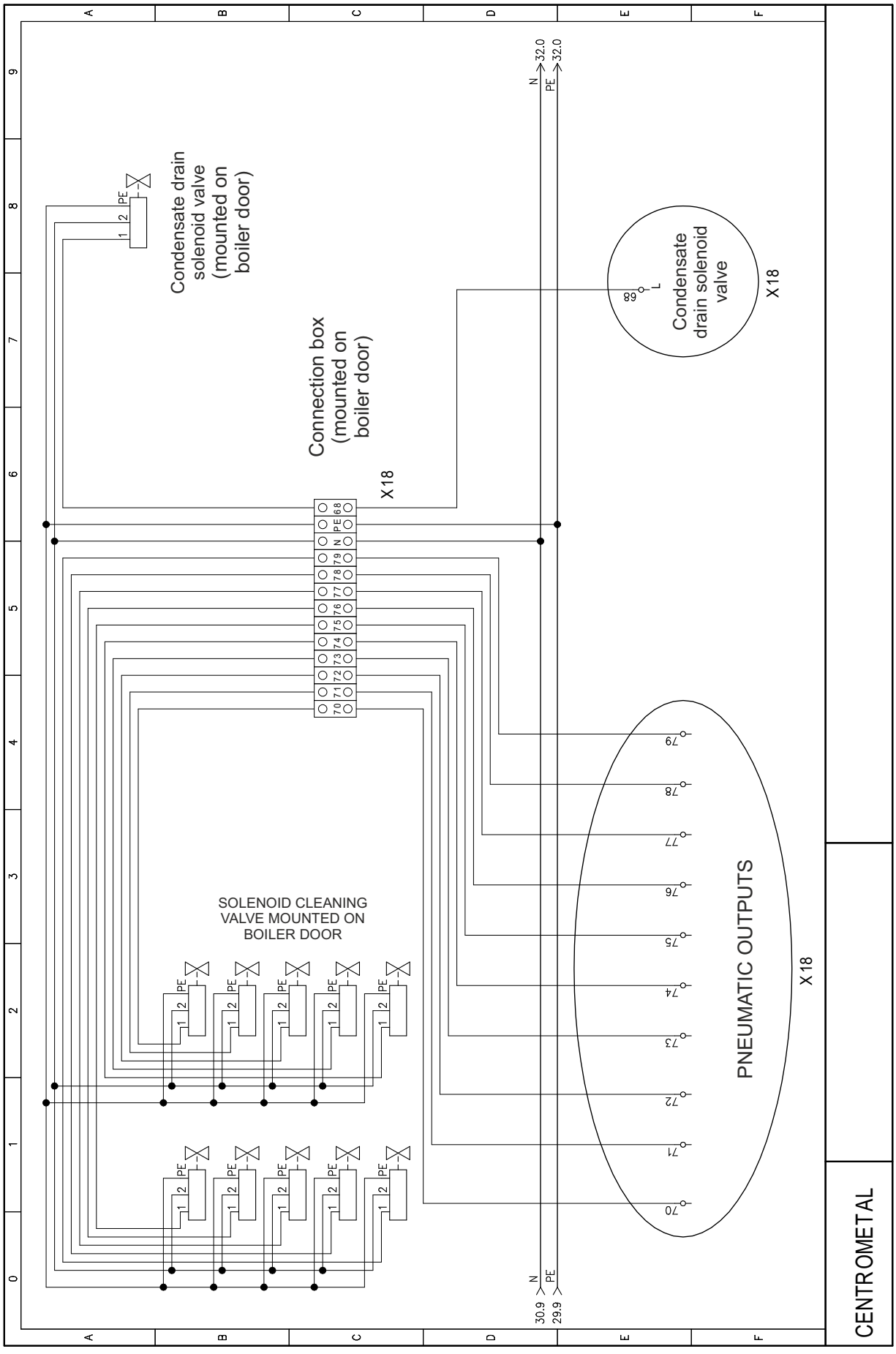
Figure 1.



Air cleaning is intended for flue gas tube cleaning by using compressed air. System for air cleaning must be always connected to air compressor (as shown on figure) or to compressed air installation if is exist. Air pressure from air compressor or compressed air installation **must be** adjusted to **5 bar**. Air cleaning system work is managed by boiler control unit. Working parameters are adjusted with boiler first start-up.



7.4.2. ELECTRICAL SCHEME



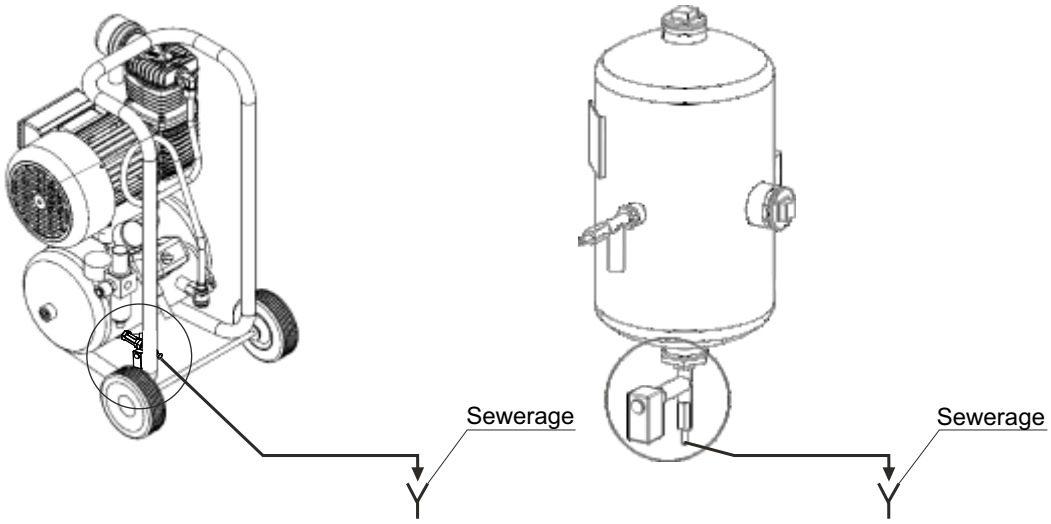
7.4.3. COMPRESSOR MAINTENANCE

It necessary to implement these actions periodically in order to preserve functionallity of compressor and for longer service life.

1. CONDENSATE DRAINAGE

PERIOD: Automatic.
Air compressor produce condensated water which was accumulated in air vessel. Condensated water must be drainaged. Drainage is performed by electromagnetic valve which are placed below air compressor vessel and compressed air vessel on boiler door (see Figure 2). Electromagnetic valves are managed by boiler control unit.

Figure 2.



2. DIRT TRAP CLEANING

PERIOD: ---
It's necessary to check dirt trap and clean it if is needet to prevent clogging.

3. OIL LEVEL CHECKING

PERIOD: Every two days.
Every two day is necessary to check oil level at sight gauge on oil pump. Compressor have enough oil if sight gauge show 2/3 of oil (see Figure 3.). If oil level drop under half on sight gauge than is necessary to refill oil (see Figure 4.).
For refilling is allowed to use only sintetic oil 5W50.

Figure 3.

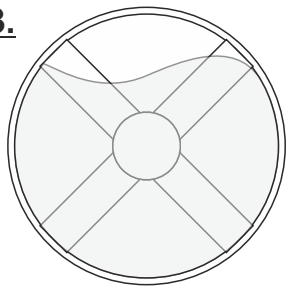
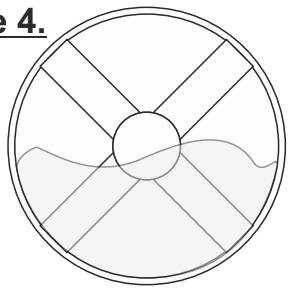


Figure 4.



4. SERVICE INTERVAL

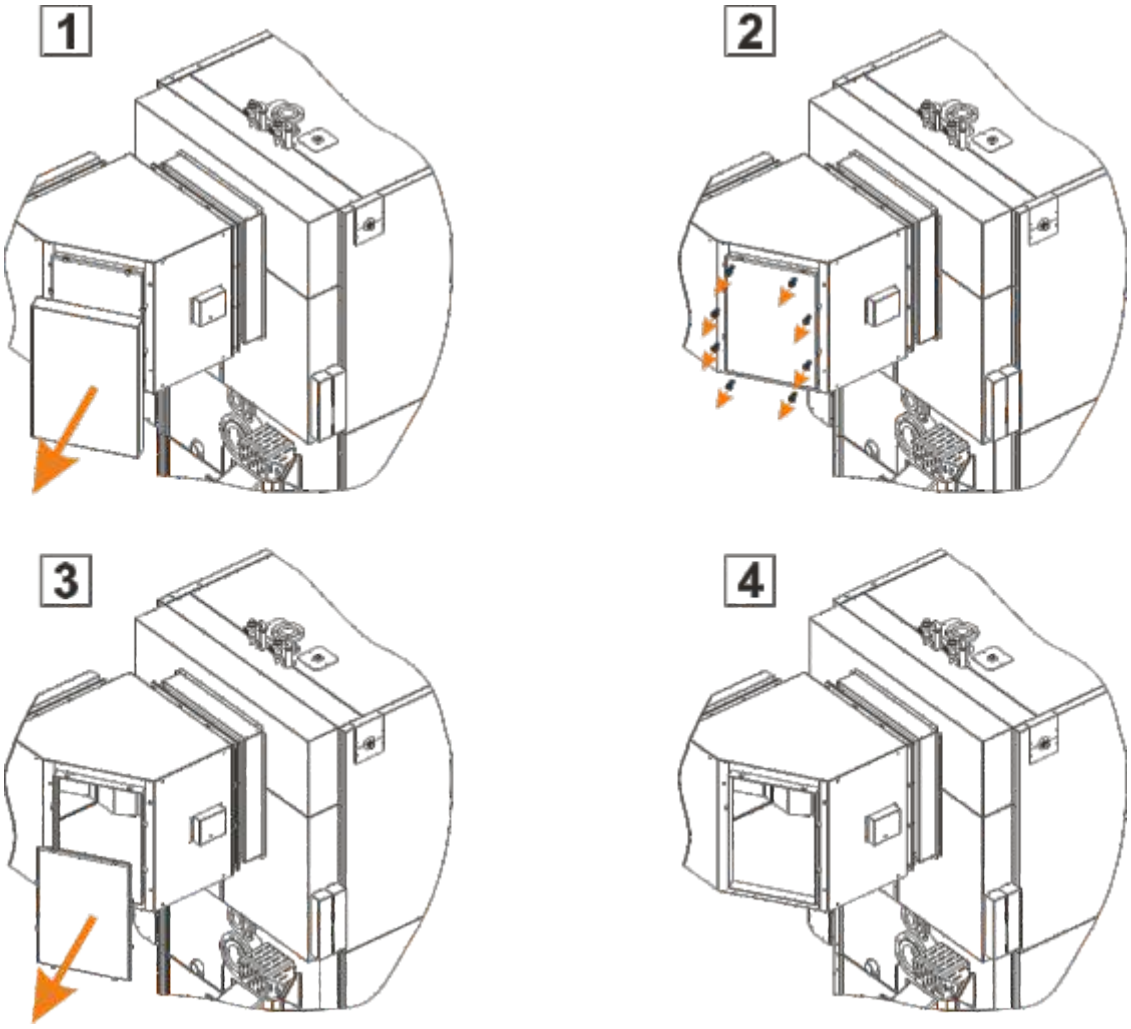
PERIOD: Every six months
It's obligatory to make a compressor service every 6 months.

7.5. CLEANING OF BOILER-CYCLONE CONNECTION BOX

Boiler-cyclone connection box must be cleaned every 300 working hours or as is needed.

The cleaning procedure:

The first of all is necessary to remove casing cover lid from connection box (displayed on figure 1). Unscrew eight screws on connection box lid and remove lid. Clean ash from connection box with scraper. After cleaning put lid back and screw it with eight screws. Place casing cover lid back on connection box lid.

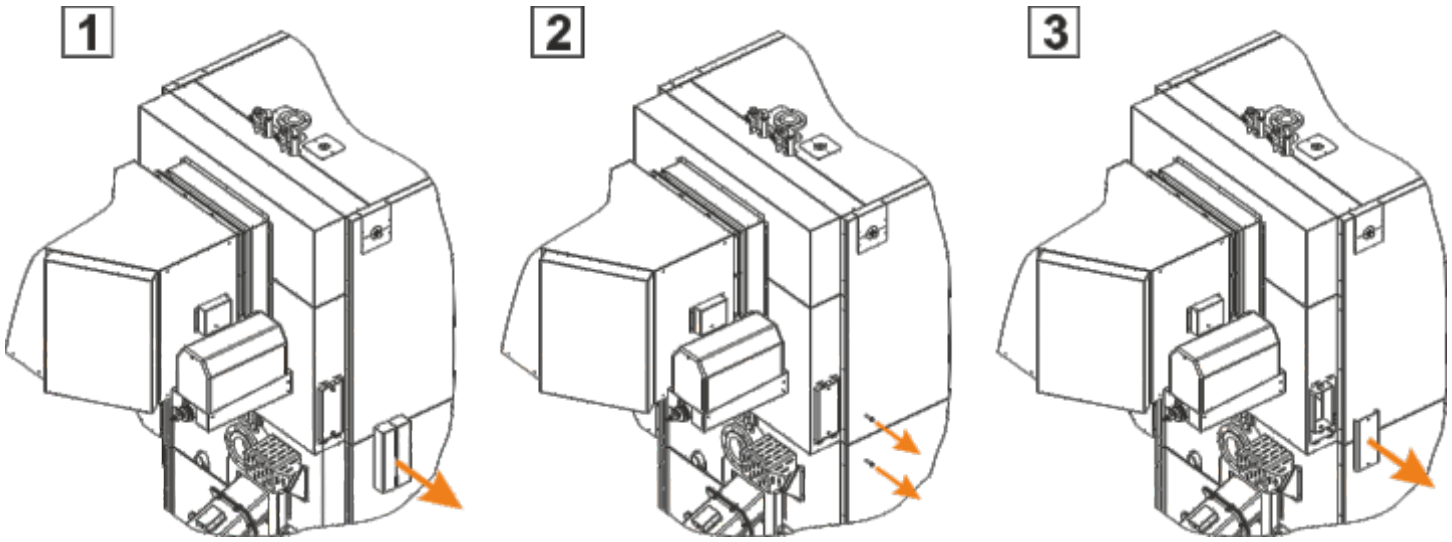


7.6. FLUE GAS CHAMBER CLEANING

Flue gas chamber must be cleaned every 80 working hours or as is needed (if system for automatic extraction of ash from the flue gas chamber is not installed). If is system for automatic extraction of ash from the flue gas chamber installed then is not necessary to clean flue gas chamber.

The cleaning procedure:

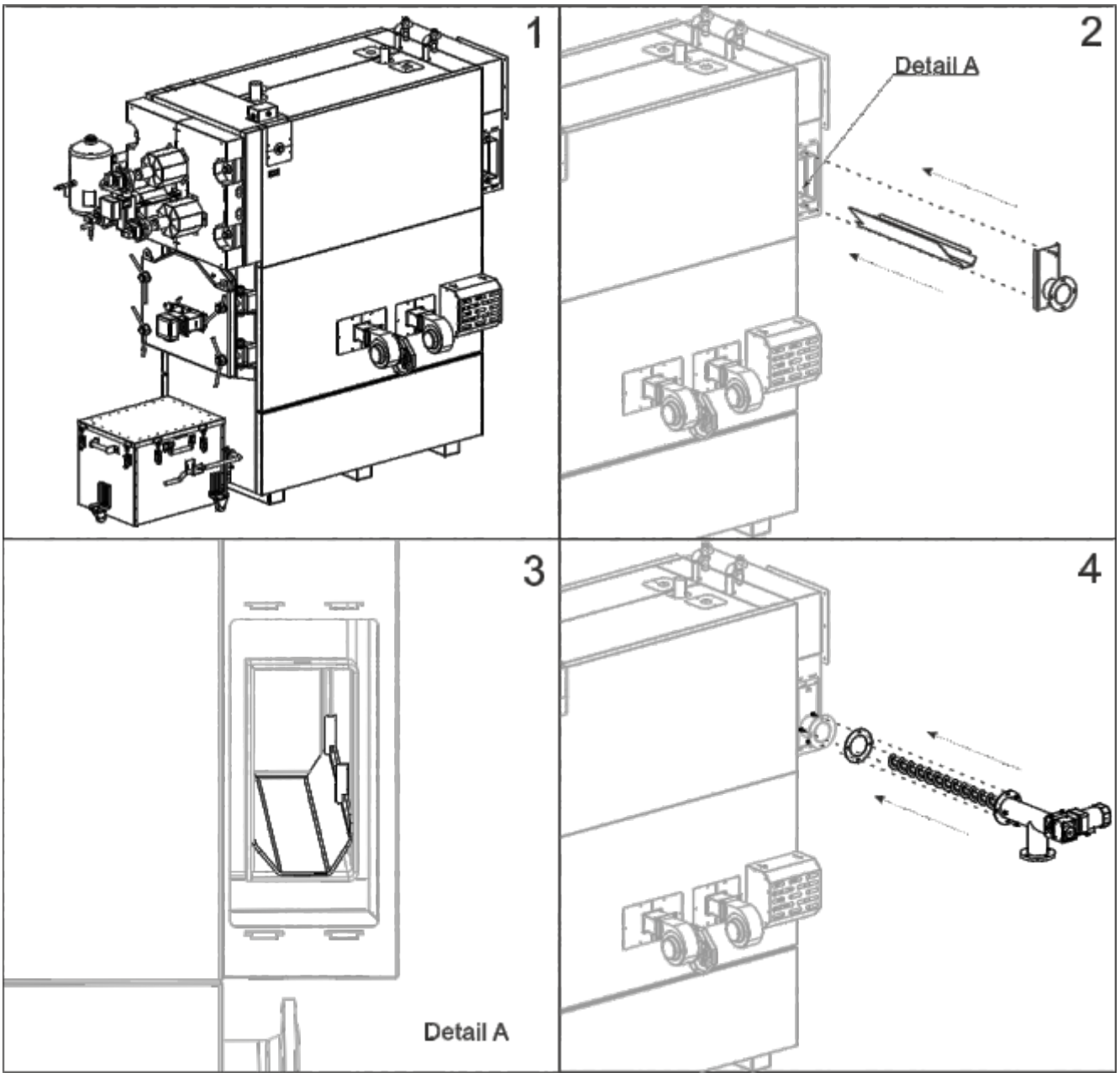
The first of all is necessary to remove casing cover lid from flue gas chamber lid (showned on figure 1). Unscrew two screws on flue gas chamber lid and remove lid (showned on figure 2 and 3). Clean ash from flue gas chamber with scraper. After cleanign put lid back and screw it with two screws. Place casing cover lid back on flue gas chamber lid.



7.7. SYSTEM FOR AUTOMATIC EXTRACTION OF ASH FROM THE FLUE GAS CHAMBER (ADDITIONAL EQUIPMENT)

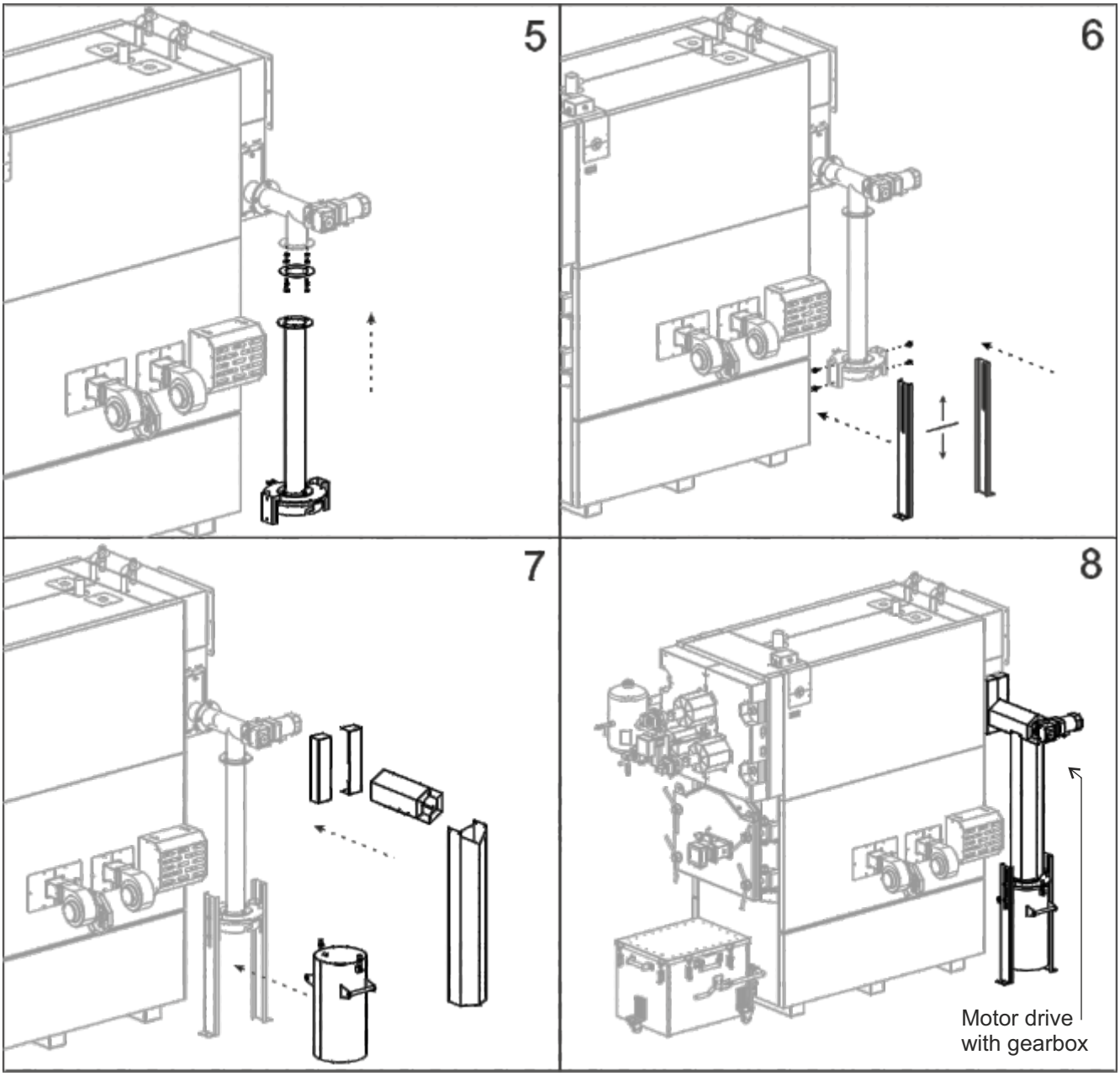
7.7.1. INSTALLATION

1. Boiler without installed system for automatic extraction of ash from the flue gas chamber.
2. Place flue gas chamber router on side opening. Place shortest side on back side of flue gas chamber, below welded anchors (detali A). Close flue gas opening with lid and fix it with two screws M8x40.



3. Detail A - router position is crucial for correct work of ash extraction system.
4. Place screw feeder with T-piece and motor device with gearbox through hole on lid. Place gasget between flanges and fix it with four M8 screws and nuts.

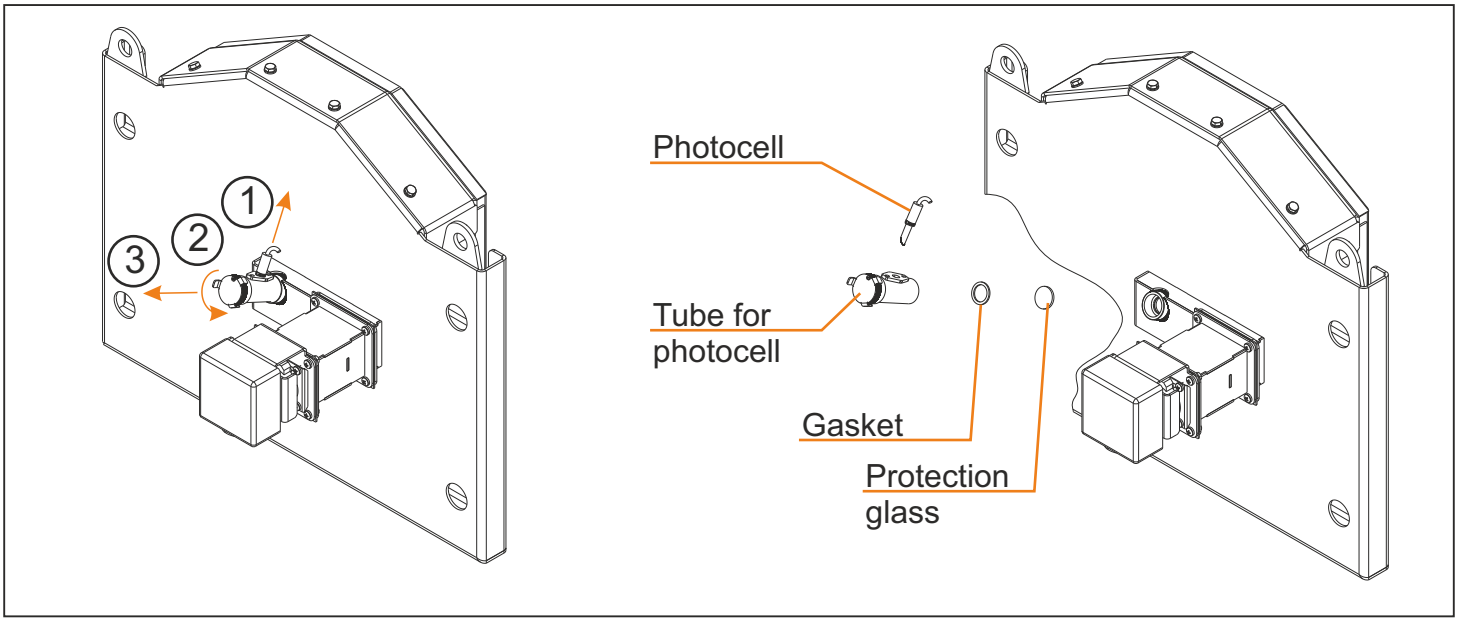
5. Place tube with ash box to T-piece (use gasget) and fix it with M8 screws and nuts.
6. Place ash box porter legs on welded U-profile porters and fix it with M10 screws and nuts. Legs allow height adjustment depend about user needs.



7. Place ash box and attach it with holders. Delivered mineral wool wrap around screw feeder tube. Place casing cover on mineral wool. Casing cover is made that can be bended with hands for shape adjustment. After shape adjustment fix casing cover with screws 3,9x9,5 mm.
8. Assembled system for automatic extraction of ash from the flue gas chamber.
9. System for automatic extraction of ash from the flue gas chamber can be installed in the same way symmetrically on the opposite side of the boiler depending on where it more closely corresponds with the the actual state of the boile room.

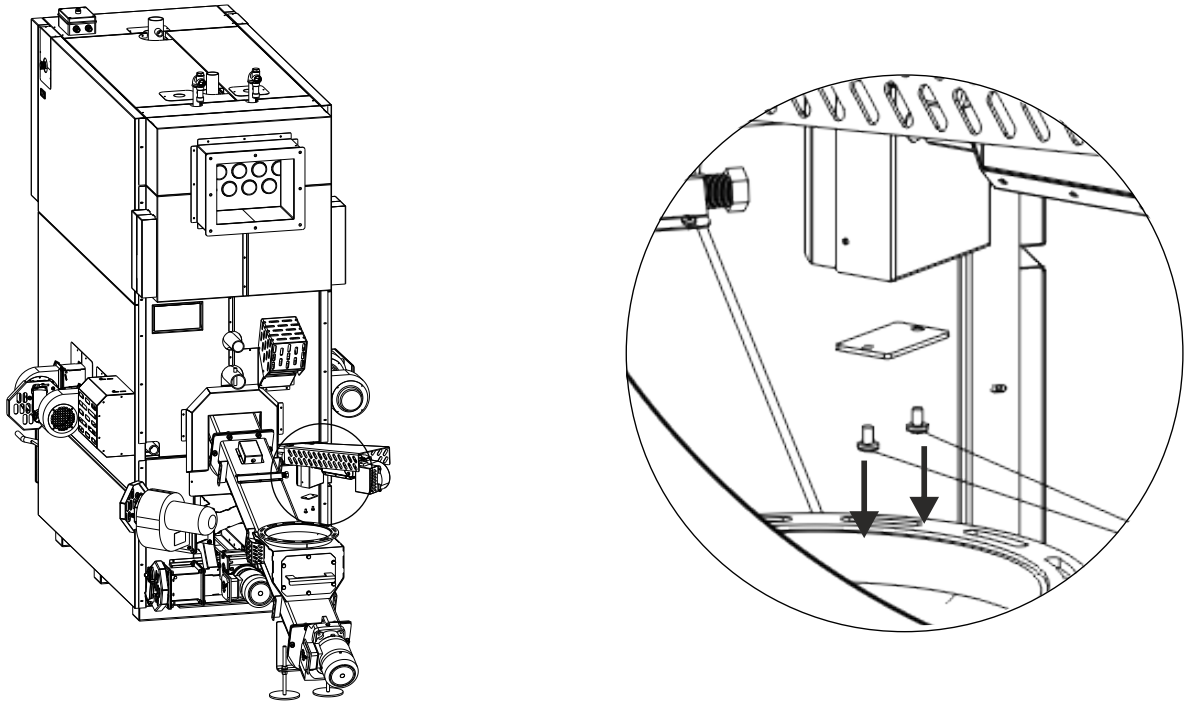
7.8. PHOTOCELL PROTECTION GLASS CLEANING

Photocell protectiong glass must be cleaned every 100 working hours or more often if is needed.
The cleaning procedure:
It's needed to clean photocell protectiong glass. Pull out photocell (1), unscrew photocell tube from boiler door (2) and take it out. Photocell protection glass will be stay in boiler door with gasket. Take it out and clean it. Place all back in original position.
Important: Gaskets must be placed from both sides of photocell protectiong glass.



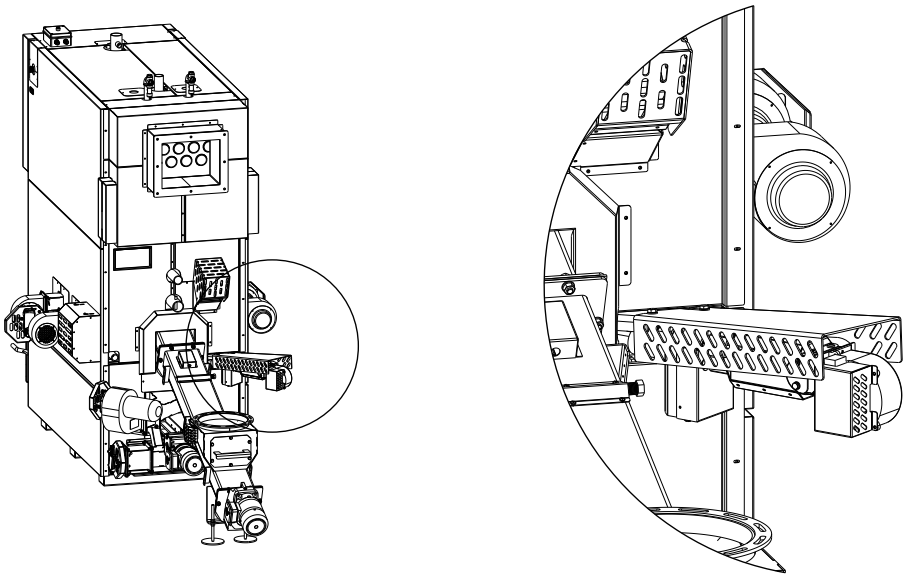
7.9. CLEANING ELECTRICAL IGNITER WITH A FAN

7.9.1. CLEANING THE ELECTRICAL IGNITER SAFETY BOX

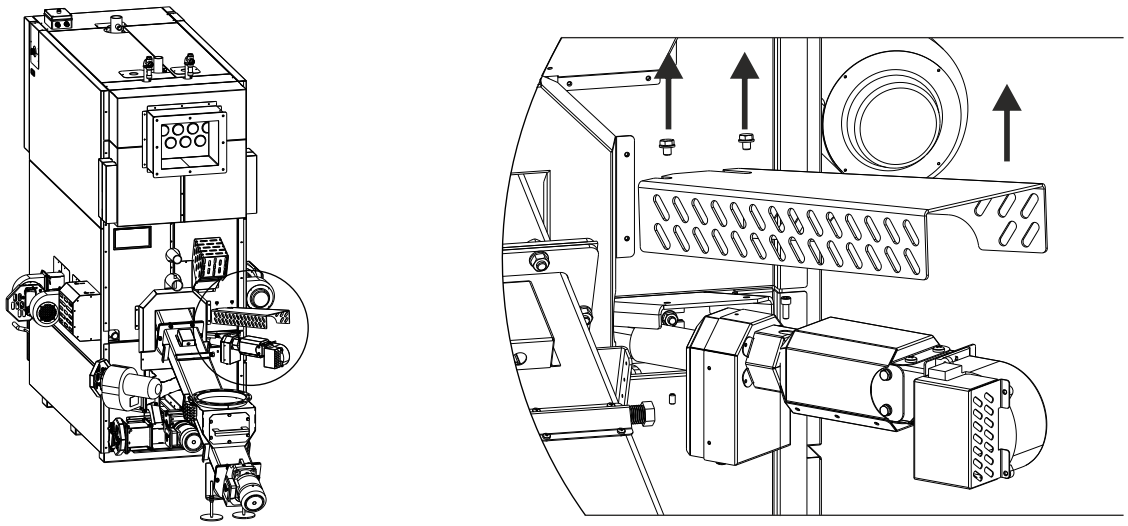


7.9.2. CLEANING THE SAFETY BOX AND EL. IGNITER WITH A FAN

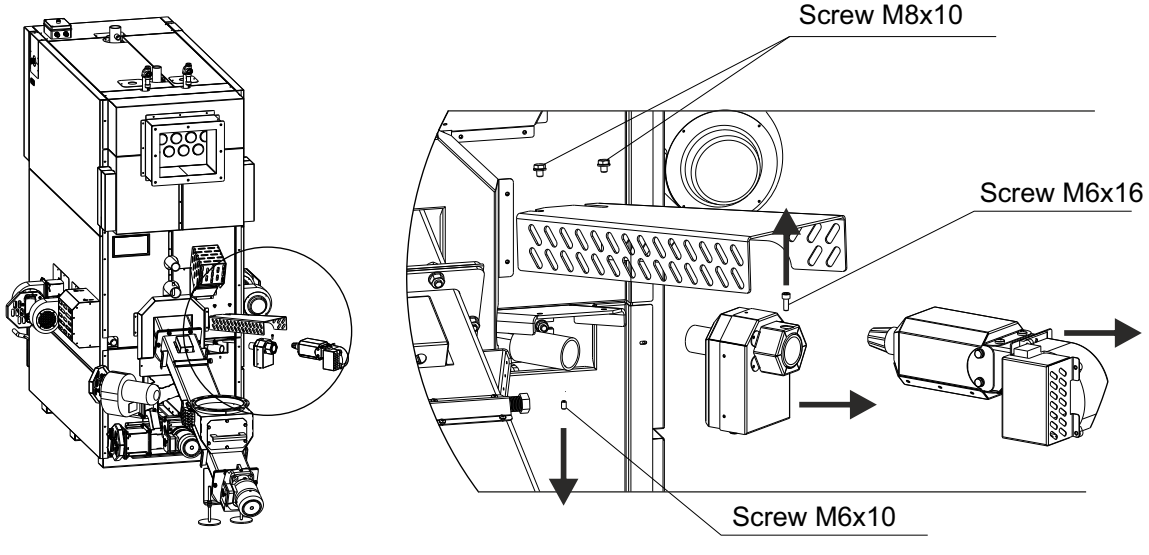
1.



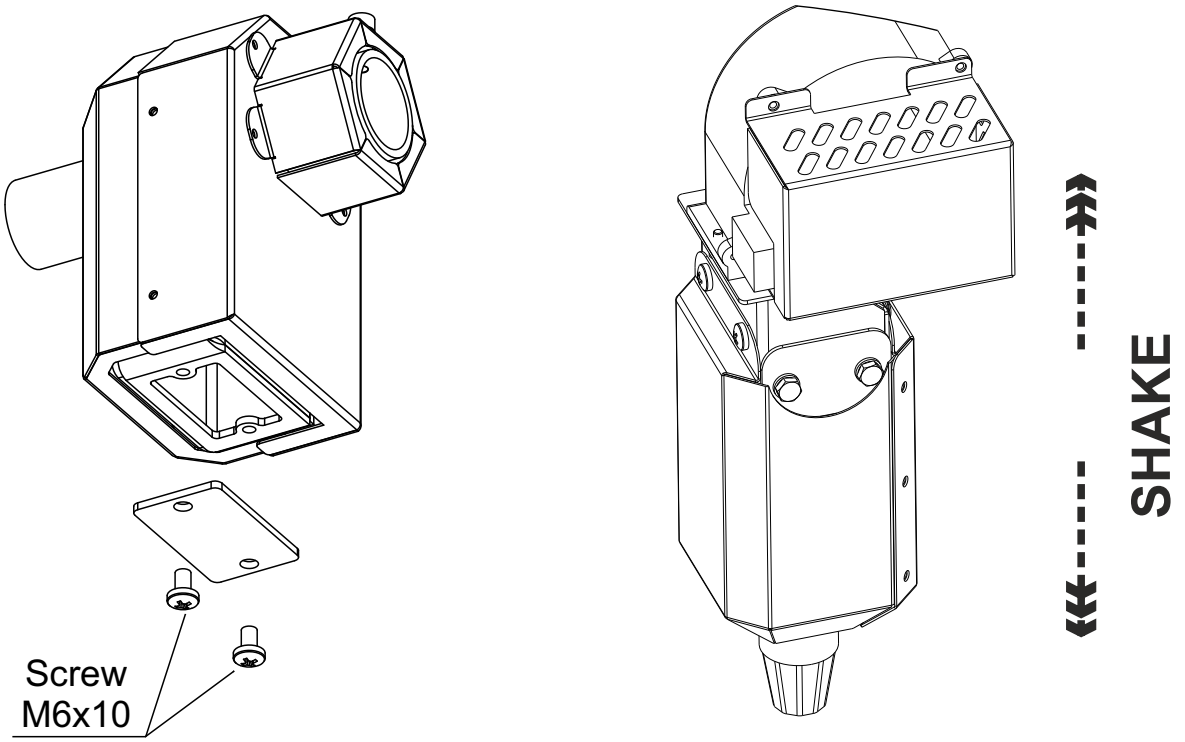
2.



3.



4.



8.0. MALFUNCTIONS

8.1. ERRORS LIST

E1_1 – IGNITION ERROR	Boiler status: boiler go to shut down phase and OFF.
E1_2 – IGNITION ERROR (middle storage)	Boiler status: boiler go to shut down phase and OFF.
E1_3 -	Boiler status:
E2 – FLAME LOSS WHILE WORKING	Boiler status: boiler go to shut down phase and OFF.
E3_1 – FEEDER SCREW 1 CONTROL 1 ERROR	Boiler status: boiler go to shut down phase and OFF.
E3_2 – FEEDER SCREW 1 CONTROL 2 ERROR	Boiler status: boiler go to shut down phase and OFF.
E4_1 – FEEDER SCREW 2 CONTROL 1 ERROR	Boiler status: boiler go to shut down phase and OFF.
E4_2 – FEEDER SCREW 2 CONTROL 2 ERROR	Boiler status: boiler go to shut down phase and OFF.
E5_1 – FEEDER SCREW 3 CONTROL 1 ERROR	Boiler status: boiler go to shut down phase and OFF.
E5_2 – FEEDER SCREW 3 CONTROL 2 ERROR	Boiler status: boiler go to shut down phase and OFF.
E6 – EMPTY MIDDLE STORAGE	Boiler status: boiler go to shut down phase and OFF.
E7 –	Not used.
E8 – FEEDER SCREW TEMPERATURE TOO HIGH	Boiler status: boiler go to shut down phase and OFF.
E9 – FLUE GAS TEMPERATURE TOO HIGH	Boiler status: boiler go to shut down phase and OFF.
E10 – PRESSURE	Boiler status: boiler go to shut down phase and OFF.
E11 – POSITION GRATE ERROR	Boiler status: boiler go to shut down phase and OFF. Possible causes: - the microswitch of the movable grating is not well positioned (the microswitch is not pressed in the end position of the grating), see 8.1.3. the procedure for checking the setting of the grate microswitch. - the electrical conductors between the grate microswitch and the boiler electrical cabinet are broken. - the motor reducer of the movable grating or the lever of the movable grating are not properly installed
E12 – SAFETY THERMOSTAT	Boiler status: instant shut down (OFF) without shut down phase.
E13_1 – WATER PRESSURE LOW	Boiler status: boiler go to shut down phase and OFF.
E13_2 – WATER PRESSURE HIGH	Boiler status: boiler go to shut down phase and OFF.
E14 – TEMPERATURE TOO HIGH CONTROL ENCLOSURE	Boiler status: boiler works normally.
E15 – UNDER-PRESSURE IN FIREBOX dP=0Pa	Boiler status: boiler go to shut down phase and OFF
E16 – WRONG TIME AND DATE	Boiler status: the boiler will not start and shut down according to the schedule, the rest works normally. Possible causes: -new boiler - it is necessary to set the date and time -used boiler - it is necessary to replace the battery in the boiler control unit with a touch screen
E17_1 – ROTARY VALVE CONTROL 1 ERROR	Boiler status: boiler go to shut down phase and OFF.
E17_2 – ROTARY VALVE CONTROL 2 ERROR	Boiler status: boiler go to shut down phase and OFF.

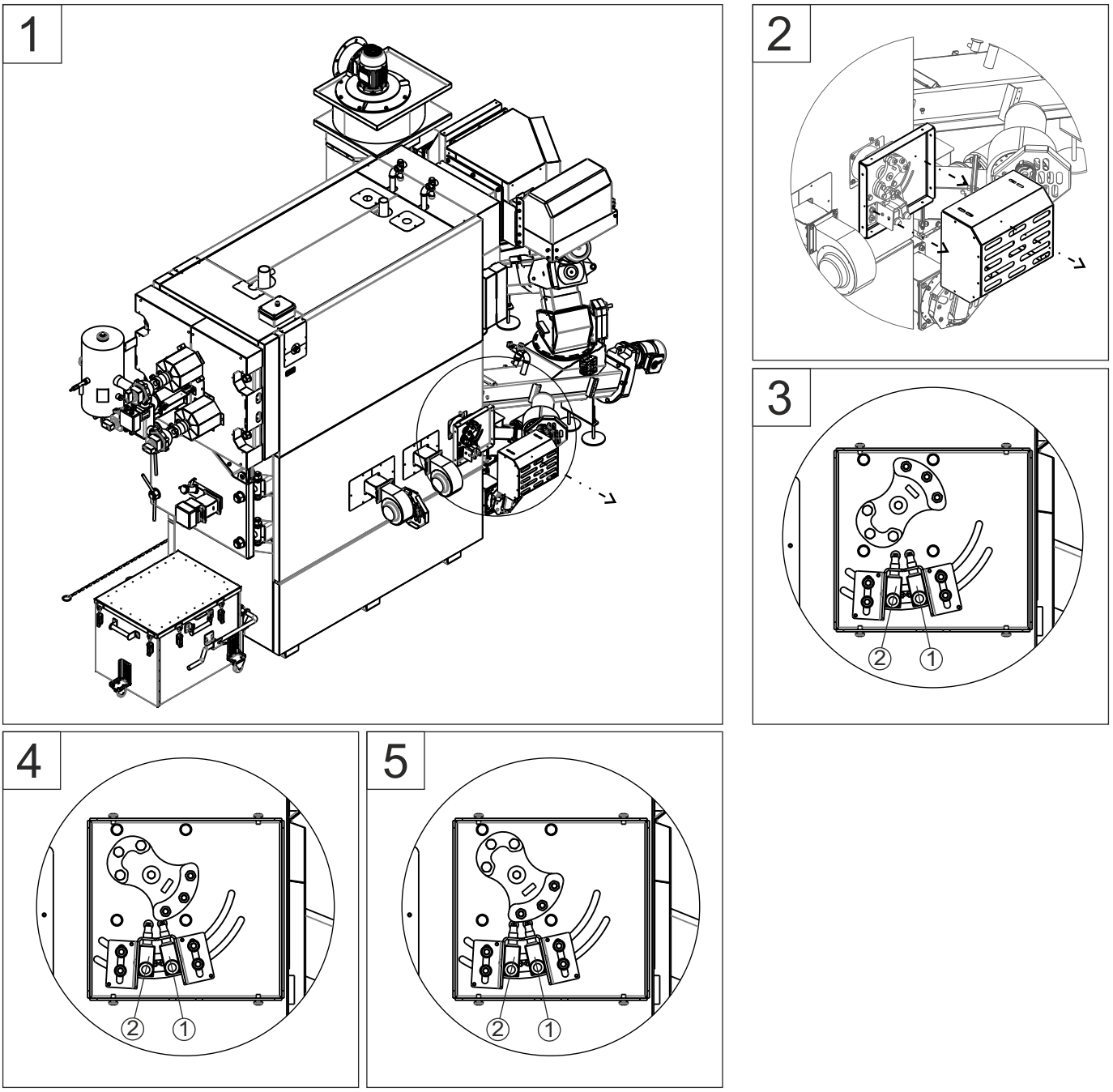
E101 – INCORRECT BOILER SENSOR Tk1	Boiler status: boiler go to shut down phase and OFF.
E102 – INCORRECT FLUE GAS SENSOR	Boiler status: boiler go to shut down phase and OFF.
E103 – INCORRECT RETURN LINE SENSOR	Boiler status: boiler intervention work, W101 "BOILER INTERVENTION WORK" appears
E104 – INCORRECT FEEDER SCREW SENSOR	Boiler status: boiler go to shut down phase and OFF.
E105 – INCORRECT OUTSIDE TEMPERATURE SENSOR	Boiler status: boiler intervention work.
E106 – INCORRECT BUFFER TANK SENSOR UP	Boiler status: boiler go to shut down phase and OFF.
E107 – INCORRECT CROSSOVER TEMPERATURE SENSOR	Boiler status: boiler works normally.
E108 – INCORRECT BUFFER TANK SENSOR DOWN	Boiler status: boiler go to shut down phase and OFF.
E109 – INCORRECT BUFFER TANK DHW	Boiler status: boiler works normally, DHW work on intervention mode.
E110 – INCORRECT TEMP. SENSOR CONTROL ENCLOSURE	Boiler status: boiler works normally.
E111 – INCORRECT PRESSURE SENSOR	Boiler status: boiler go to shut down phase and OFF.
E112 – PHOTO CELL ERROR	Boiler status: boiler go to shut down phase and OFF.
E113 – LAMBDA ERROR	Boiler status: boiler go to shut down phase and OFF.
E114 – CYCLONE INVERTER ERROR	Boiler status: instant shut down (OFF) without shut down phase.
E115 – PRIMARY 1 (CONTACTOR) ERROR	Boiler status: boiler go to shut down phase and OFF. Possible causes: see point 8.1.2.
E116 – PUMP (CONTACTOR) ERROR	Boiler status: boiler go to shut down phase and OFF. Possible causes: see point 8.1.2.
E117 – ASH REMOVING ERROR	It occurs after 24 working hours of active warning W11 or W26. Boiler status: boiler go to shut down phase and OFF.
E118 – GRATE (CONTACTOR) ERROR	Boiler status: boiler go to shut down phase and OFF. Possible causes: see point 8.1.2.
E119 – FUEL TOO HIGH	Boiler status: boiler go to shut down phase and OFF. Possible causes: - see point 8.1.2. - electrical conductors between the microswitch and el. boiler cabinets are on interruption - faulty microswitch
E120 – MIXER (CONTACTOR) ERROR	Boiler status: boiler go to shut down phase and OFF. Possible causes: see point 8.1.2.
E121 – ASH REMOVING 2 (CONTACTOR) ERROR	Boiler status: boiler go to shut down phase and OFF. Possible causes: see point 8.1.2.
E122_1 – CONTROL ERROR MOD 1, FEEDER SCREW 1	Boiler status: boiler go to shut down phase and OFF.
E122_2 – CURRENT RISE ERROR MOD 1, FEEDER SCREW 1	Boiler status: boiler go to shut down phase and OFF.
E122_3 – ERROR CURRENT TOO HIGH MOD 1, FEEDER SCREW 1	Boiler status: boiler go to shut down phase and OFF.
E122_4 – ERROR ASYMMETRY MOD 1, FEEDER SCREW 1	Boiler status: boiler go to shut down phase and OFF.
E122_5 – ERROR CURRENT TOO LOW MOD 1, FEEDER SCREW 1	Boiler status: boiler go to shut down phase and OFF. Possible causes: (The Screw feeder-1 motor gets no el. power.) Interruption of the el. connection to the Screw feeder-1 motor, the Screw feeder-1 contactor and/or fuses in el. cabinet aren't properly switch on (or there are switch off).

E122_6 – ERROR UNWANTED CURRENT MOD 1, FEEDER SCREW 1	Boiler status: boiler go to shut down phase and OFF.
E122_7 – THERMAL OVERLOAD MOD 1, FEEDER SCREW 1	Boiler status: boiler go to shut down phase and OFF.
E122_8 – THERMAL OVERLOAD FEEDER SCREW 1, MOTOR	Boiler status: boiler go to shut down phase and OFF.
E123_1 – CONTROL ERROR MOD 2, FEEDER SCREW 2	Boiler status: boiler go to shut down phase and OFF.
E123_2 – CURRENT RISE ERROR MOD 2, FEEDER SCREW 2	Boiler status: boiler go to shut down phase and OFF.
E123_3 – ERROR CURRENT TOO HIGH MOD 2, FEEDER SCREW 2	Boiler status: boiler go to shut down phase and OFF.
E123_4 – ERROR ASYMMETRY MOD 2, FEEDER SCREW 2	Boiler status: boiler go to shut down phase and OFF.
E123_5 – ERROR CURRENT TOO LOW MOD 2, FEEDER SCREW 2	Boiler status: boiler go to shut down phase and OFF. Possible causes: (The Screw feeder-2 motor gets no current.) Interruption of the el. connection to the Screw feeder-2 motor, the Screw feeder-2 contactor and/or fuses in el. cabinet aren't properly switch on (or there are switch off).
E123_6 – ERROR UNWANTED CURRENT MOD 2, FEEDER SCREW 2	Boiler status: boiler go to shut down phase and OFF.
E123_7 – THERMAL OVERLOAD MOD 2, FEEDER SCREW 2	Boiler status: boiler go to shut down phase and OFF.
E123_8 – THERMAL OVERLOAD FEEDER SCREW 2 MOTOR	Boiler status: boiler go to shut down phase and OFF.
E124_1 – CONTROL ERROR MOD 3, FEEDER SCREW 3	Boiler status: boiler go to shut down phase and OFF.
E124_2 – CURRENT RISE ERROR MOD 3, FEEDER SCREW 3	Boiler status: boiler go to shut down phase and OFF.
E124_3 – ERROR CURRENT TOO HIGH MOD 3, FEEDER SCREW 3	Boiler status: boiler go to shut down phase and OFF.
E124_4 – ERROR ASYMMETRY MOD 3, FEEDER SCREW 3	Boiler status: boiler go to shut down phase and OFF.
E124_5 – ERROR CURRENT TOO LOW MOD 3, FEEDER SCREW 3	Boiler status: boiler go to shut down phase and OFF. Possible causes: (The Screw feeder-3 motor gets no current.) Interruption of the el. connection to the Screw feeder-3 motor, the Screw feeder-3 contactor and/or fuses in el. cabinet aren't properly switch on (or there are switch off).
E124_6 – ERROR UNWANTED CURRENT MOD 3, FEEDER SCREW 3	Boiler status: boiler go to shut down phase and OFF.
E124_7 – THERMAL OVERLOAD MOD 3, FEEDER SCREW 3	Boiler status: boiler go to shut down phase and OFF.
E124_8 – THERMAL OVERLOAD FEEDER SCREW 3 MOTOR	Boiler status: boiler go to shut down phase and OFF.
E125_1 – COMMUNICATION ERROR WITH MOTHERBOARD	Boiler status: boiler go to shut down phase and OFF.
E125_2 – COMMUNICATION ERROR WITH SENSOR BOARD	Boiler status: boiler go to shut down phase and OFF.
E125_3 – COMMUNICATION ERROR WITH LAMBDA BOARD	Boiler status: boiler go to shut down phase and OFF.
E125_4 – COMMUNICATION ERROR WITH EXT BOARD A15	Boiler status: boiler go to shut down phase and OFF.
E125_5 – COMMUNICATION ERROR WITH EXT BOARD A14	Boiler status: boiler go to shut down phase and OFF.

E125_6 - COMMUNICATION ERROR WITH EXT BOARD A13	Boiler status: boiler go to shut down phase and OFF.
E125_7 - COMMUNICATION ERROR WITH EXT BOARD A12	Boiler status: boiler go to shut down phase and OFF.
E125_8 - COMMUNICATION ERROR WITH EXT BOARD A0	Boiler status: boiler go to shut down phase and OFF.
E125_9 - COMMUNICATION ERROR WITH EXT BOARD A1	Boiler status: boiler go to shut down phase and OFF.
E125_10 - COMMUNICATION ERROR WITH EXT BOARD A2	Boiler status: boiler go to shut down phase and OFF.
E125_11 - COMMUNICATION ERROR WITH CMREG (1&2)	Boiler status: boiler works normally, CM2K regulator work on intervention mode.
E125_12 - COMMUNICATION ERROR WITH CMREG (3&4)	Boiler status: boiler works normally, CM2K regulator work on intervention mode.
E125_13 - COMMUNICATION ERROR WITH CMREG (5&6)	Boiler status: boiler works normally, CM2K regulator work on intervention mode.
E125_14 - COMMUNICATION ERROR WITH CMREG (7&8)	Boiler status: boiler works normally, CM2K regulator work on intervention mode.
E125_15 – COMMUNICATION ERROR WITH CMGSM	Boiler status: boiler works normally, CM-GSM work on intervention mode.
E125_16 – COMMUNICATION ERROR WITH CMNET	Boiler status: boiler works normally, CNET work on intervention mode.
E125_17 – COMMUNICATION ERROR WITH WIFI MODULE	Boiler status: boiler work normally. The problem occurs in the work of additional equipment internet supervision (WiFi) if installed. Possible causes: Check the UTP cable and its connections with the electric boards.
E125_18 – COMMUNICATION ERROR WITH EXT BOARD A11	Boiler status: boiler go to shut down phase and OFF.
E126_1 – UNKNOWN BOILER POWER!	Boiler status: boiler go to shut down phase and OFF.
E126_2 – WRONG BOILER POWER!	Boiler status: instant shut down (OFF) without shut down phase.
E126_3 – MOTHERBOARD CHANGED!	Boiler status: instant shut down (OFF) without shut down phase.
E127 – SENSOR CM2K 1.CIRCUIT	Boiler status: boiler works normally,CM2K work on intervention mode.
E128 – CORRECTOR CM2K 1.CIRCUIT	Boiler status: boiler works normally,CM2K work on intervention mode.
E129 – SENSOR CM2K 2.CIRCUIT	Boiler status: boiler works normally,CM2K work on intervention mode.
E130 – CORRECTOR CM2K 2.CIRCUIT	Boiler status: boiler works normally,CM2K work on intervention mode.
E131 – SENSOR CM2K 3. CIRCUIT	Boiler status: boiler works normally,CM2K work on intervention mode.
E132 – CORRECTOR CM2K 3.CIRCUIT	Boiler status: boiler works normally,CM2K work on intervention mode.
E133 – SENSOR CM2K 4.CIRCUIT	Boiler status: boiler works normally,CM2K work on intervention mode.
E134 – CORRECTOR CM2K 4.CIRCUIT	Boiler status: boiler works normally,CM2K work on intervention mode.

E135 - SENSOR CM2K 5.CIRCUIT	Boiler status: boiler works normally,CM2K work on intervention mode.
E136 - CORRECTOR CM2K 5.CIRCUIT	Boiler status: boiler works normally,CM2K work on intervention mode.
E137 - SENSOR CM2K 6.CIRCUIT	Boiler status: boiler works normally, CM2K work on intervention mode.
E138 - CORRECTOR CM2K 6.CIRCUIT	Boiler status: boiler works normally, CM2K work on intervention mode.
E139 - SENSOR CM2K 7.CIRCUIT	Boiler status: boiler works normally, CM2K work on intervention mode.
E140 - CORRECTOR CM2K 7.CIRCUIT	Boiler status: boiler works normally,CM2K work on intervention mode.
E141 - SENSOR CM2K 8.CIRCUIT	Boiler status: boiler works normally,CM2K work on intervention mode.
E142 - CORRECTOR CM2K 8.CIRCUIT	Boiler status: boiler works normally,CM2K work on intervention mode.
E143 – NO COMPRESSED AIR	Boiler status: boiler works normally.
E144 – SERVICE TIME COMPRESSOR	Boiler status: boiler works normally.
E145 – INCORRECT BUFFER TANK RECIRCULATION	Boiler status: boiler works normally.
E146 – STORAGE VENTILATION (CONTACTOR) ERROR	Boiler status: boiler go to shut down phase and OFF.
E147 – FIRE SIGNAL FROM FIRE ALARM STATION	Boiler status: boiler go to shut down phase and OFF
E148 – Communication error with profibus module	Boiler status: boiler works normally.
E149 – No cummunication with profibus master	Boiler status: boiler works normally.
E150_1– CONTROL ERROR MOD 4, ASH REMOVING	Boiler status: boiler works normally.
E150_2– CURRENT RISE ERROR MOD 4, ASH REMOVING	Boiler status: boiler works normally.
E150_3– ERROR CURRENT TOO HIGH MOD 4, ASH REMOVING	Boiler status: boiler works normally.
E150_4– ERROR ASYMMETRY MOD 4, ASH REMOVING	Boiler status: boiler works normally.
E150_5– ERROR CURRENT TOO LOW MOD 4, ASH REMOVING	Boiler status: boiler works normally.
E150_6– ERROR UNWANTED CURRENT MOD 4, ASH REMOVING	Boiler status: boiler works normally.
E150_7– THERMAL OVERLOAD MOD 4, ASH REMOVING	Boiler status: boiler works normally.
E150_8– THERMAL OVERLOAD, MOD 4, ASH REMOVING	Boiler status: boiler works normally.
E151 – ERROR ASH REMOVING SYSTEM	It occurs after 24 working hours of active warning W26. Boiler status: boiler go to shut down phase and OFF.
E152 – Ph Pump	Not used.
E153 – TRANSPORTER 3 INVERTER ERROR	Boiler status: boiler go to shut down phase and OFF.
E154 – ROTARY VALVE INVERTER ERROR	Boiler status: boiler go to shut down phase and OFF.

8.1.1. FLAP FIREBOX MICROSWITCHES, FIRST MICROSWITCH PRESSED, SECOND MICROSWITCH PRESSED - ERROR E119



1. Location of boiler flap microswitches.

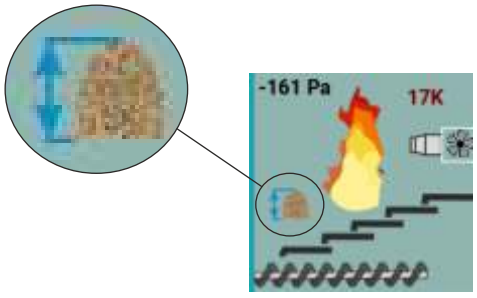
2. Detail of removal cover of the flap microswitches.

3. Status of the flap microswitch when the flap is not raised (no microswitch is pressed).

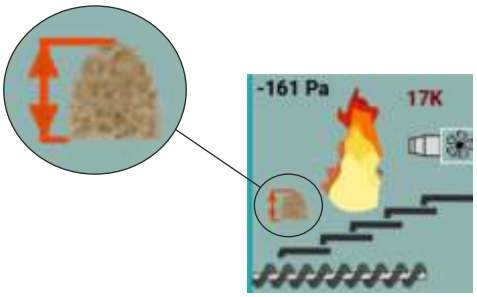
4. Microswitch-1 is pressed. The firebox flap is raised when it presses the first microswitch, a bunch with a blue arrow appears on the control unit screen (pictured in the boiler, see picture a), and information I5 is in HISTORY. The boiler screw feeders stop working while the microswitch-1 is pressed.

5. Microswitch-1 and microswitch-2 are pressed. The firebox flap is raised when it presses the first and second microswitches, a bunch with a red arrow appears on the control unit screen (pictured in the boiler, see picture b) and an error is displayed "E119 – FUEL TOO HIGH" and ejects the "DI" and "F2" automatic electrical fuses (see image c) in the boiler's electrical cabinet. Screw feeders can only be operated if the flap stops pressing at least the micro-switch-2 and if the enabled automatic electrical fuses "DI" and "F2" in the el. boiler cabinet.

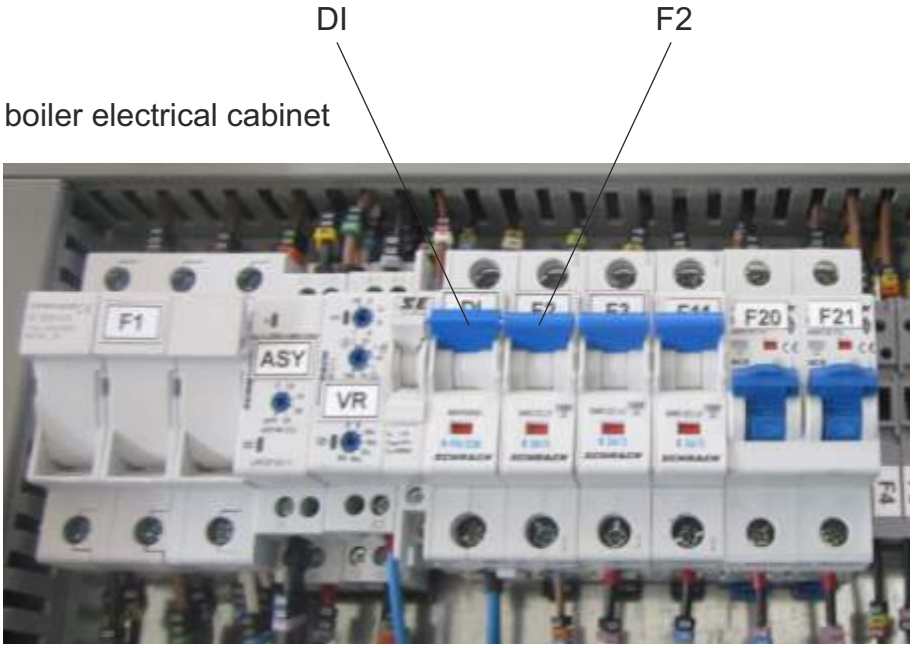
a) Bunch with a blue angular arrow



b) Bunch with a red angular arrow



c) Fuses in the boiler electrical cabinet



8.1.2. POSSIBLE CAUSES OF THE WARNING (W10, W11, W12, W13, W24_1, W24_2, W24_3) AND ERRORS (E115, E116, E118, E120, E121)

1) Ejected by motor protection:

1a) motor protection switch off on the first elbow

- adjusted motor protection to a lower current of 1,1 x rated current of the electric motor
- overheating of the electric motor
- problem with motor protection (3-pole switch)
- problem with MZS auxiliary contact (bad contact)
- input voltage problem (asymmetry of the input voltage of one phase), and the relay does not eject because it is incorrectly set, so one phase overheats (motor module and inverter factory allow a deviation of 20%)

1b) motor protection switch off on the second elbow

- someone manually turned off the motor protection

2) Ejected by switch (not ejected by motor protection):

- problem with the contact on the PCB (loss of contact, interference damages the processor)
- triac problem on the PCB
- PCB fuse problem
- boilers delivered until January 1, 2021. – problem with the grounding of the printed circuit board (PCB) from which the command goes to the switch
- problem with the 220 V switch

3) The motor protection did not ejected, and the switch was turned off by the controller after the error occurred

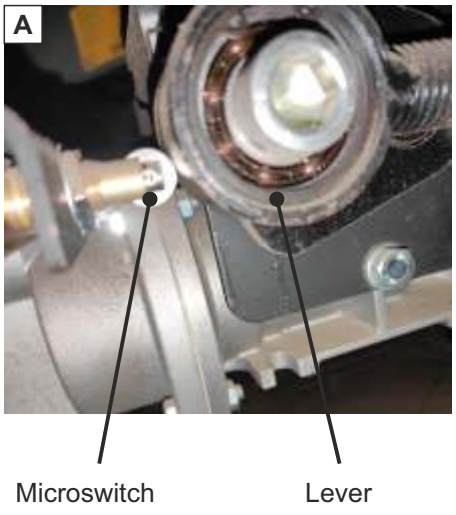
- the related bimetallic fuse has been ejected

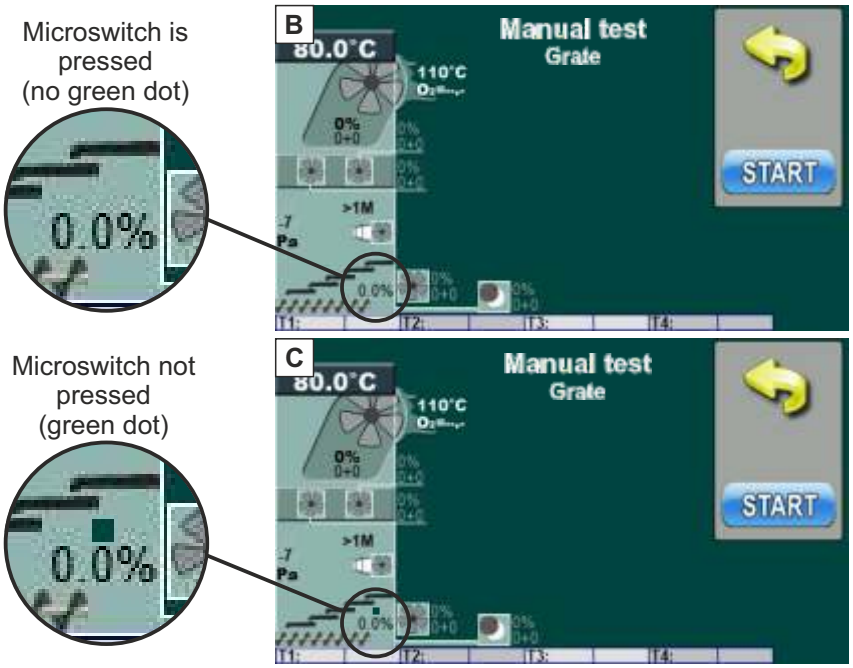
8.1.3. THE PROCEDURE FOR CHECKING THE SETTING OF THE GRATE MICROSWITCH

Operation -> Manual test -> Grate

Correct setting of the grate microswitch:

- the lever pressed the grate microswitch (fig. A)
- display appearance in the manual test when the grate microswitch is pressed (fig. B)
- display appearance in the manual test when the grate microswitch is not pressed (fig. C)





8.2. WARNINGS LIST

W1 - Not used	Boiler status: boiler works normally
W2 - INCORRECT BUFFER TANK SENSOR UP	Boiler status: boiler works normally
W3 - INCORRECT BUFFER TANK SENSOR DOWN	Boiler status: boiler works normally
W4 - INCORRECT HYDRAULIC CROSSOVER SENSOR	Boiler status: boiler works normally
W5 - FEEDER SCREW TEMPERATURE	Boiler status: boiler works normally
W6 - Not used	Not used
W7 - Not used	Not used
W8 - TEMPERATURE TOO HIGH CONTROL ENCLOSURE	Boiler status: boiler works normally
W9 - BACKFILLING SENSOR	Boiler status: boiler works normally
W10 - PRIMARY CONTACTOR	Boiler status: boiler works normally Possible causes: see point 8.1.2.
W11 - ASH REMOVING CONTACTOR	(If installed. After 11/2021 it is not installed.) Boiler status: boiler normally works 24 working hours after the appearance of this warning, after which E117 occurs. Possible causes: see point 8.1.2.
W12 - GRATE CONTACTOR (boiler movable grate)	Boiler status: boiler normally works 24 working hours after the appearance of this warning, after which E118 occurs Possible causes: see point 8.1.2.
W13 - MIXER CONTACTOR	Boiler status: boiler works normally Possible causes: see point 8.1.2.
W14 - FACTORY SETTING LOADED	Boiler status: boiler works normally
W15 - NO COMPRESSED AIR	Boiler status: boiler works normally
W16 - COMPRESSOR RUNNING TOO LONG (Air loss)	Boiler status: boiler works normally Possible causes: - the compressor relief valve does not close (air leakage sound is heard) and the compressor cannot reach the set air pressure. The compressor relief valve needs to be replaced with a new one. - electromagnetic valve for condensate discharge leaks air even when there is no order to discharge condensate. The cause may be dirt in the valve or a faulty valve. It is necessary to remove and blow out the valve, if this does not help, it is necessary to replace it with a new one. - leakage in the connecting pipe for supplying compressed air from the compressor. The pipe needs to be replaced with a new one. - pneumat valve leakage when the valve is not activated. Disassemble the pneumat valve and try to clean the dirt, if that does not help, replace the pneumat valve.
W17 - COMPRESSOR SWITCHED OFF MANUALY	Boiler status: boiler works normally
W18 - SERVICE TIME COMPRESSOR	Boiler status: boiler works normally
W19_1 - THERMAL OVERLOAD MOD 1, FEEDER SCREW 1	Boiler status: boiler works normally
W19_2 - THERMAL OVERLOAD FEEDER SCREW 1 MOTOR	Boiler status: boiler works normally
W20_1 - THERMAL OVERLOAD MOD 2, FEEDER SCREW 2	Boiler status: boiler works normally

W20_2 - THERMAL OVERLOAD FEEDER SCREW 2 MOTOR	Boiler status:
W21_1 - THERMAL OVERLOAD MOD 3, FEEDER SCREW 3	Boiler status: boiler works normally
W21_2 - THERMAL OVERLOAD FEEDER SCREW 3 MOTOR	Boiler status: boiler works normally
W22 - TIME TO EXTINGUISHING PHASE UNDERPRESSURE IN FIREBOX dP=0Pa	Boiler status: boiler normally runs for 60 seconds after which E15 occurs
W23 - WRONG TIME AND DATE	Boiler status: boiler works normally Possible causes: - new boiler - it is necessary to set the date and time - used boiler - it is necessary to replace the battery in the boiler control unit with a touch screen
W101 - BOILER INTERVENTION WORK	Boiler status: boiler works normally, and part of the installation is being adjusted cause of this warning. Pressing this warning are appears error(s) that caused this warning to be appear. If the cause of this warning is error E103 boiler mixing valve works according to a special procedure: - temperature in the boiler <65°C => mixing valve of the boiler goes to closing (openness 0%) - temperature in the boiler <70°C => mixing valve of the boiler goes to 50% (first close and then open to 50%) - temperature in the boiler >=70°C => mixing valve of the boiler goes to 70% (first close and then open to 70%)
W102 - CM2K INTERVENTION WORK	Boiler status: boiler works normally
W103 - DHW INTERVENTION WORK	Boiler status: boiler works normally
W24_1 - ASH TRANSPORT CONTACTOR 1	Boiler status: boiler normally works 24 working hours after the appearance of this warning, after which E151 occurs. Possible causes: see point 8.1.2.
W24_2 - ASH TRANSPORT CONTACTOR 2	Boiler status: boiler normally works 24 working hours after the appearance of this warning, after which E151 occurs. Possible causes: see point 8.1.2.
W24_3 - ASH TRANSPORT CONTACTOR 3	Boiler status: boiler normally works 24 working hours after the appearance of this warning, after which E151 occurs. Possible causes: see point 8.1.2.
W25 - Ash transport flap closed	Boiler status: boiler works normally, ash transport and ash removing don't work
W26 - ASH REMOVING	Boiler status: After the occurrence of this warning, the boiler works normally, with an active warning, for 24 working hours, after which E117 occurs. This warning can also disappear automatically if in a new attempt (standard requirement for the operation of the grate) the grate it somehow works, and 24 working hours have not yet passed since the appearance of the active warning.
W27 - Measurement results will not be valid, fuel moisture >35%!!	Boiler status: boiler works normally. This warning can only appear when the "Chimney Sweeper" is turned on; this warning automatically disappears when you exit the "Chimney Sweeper".

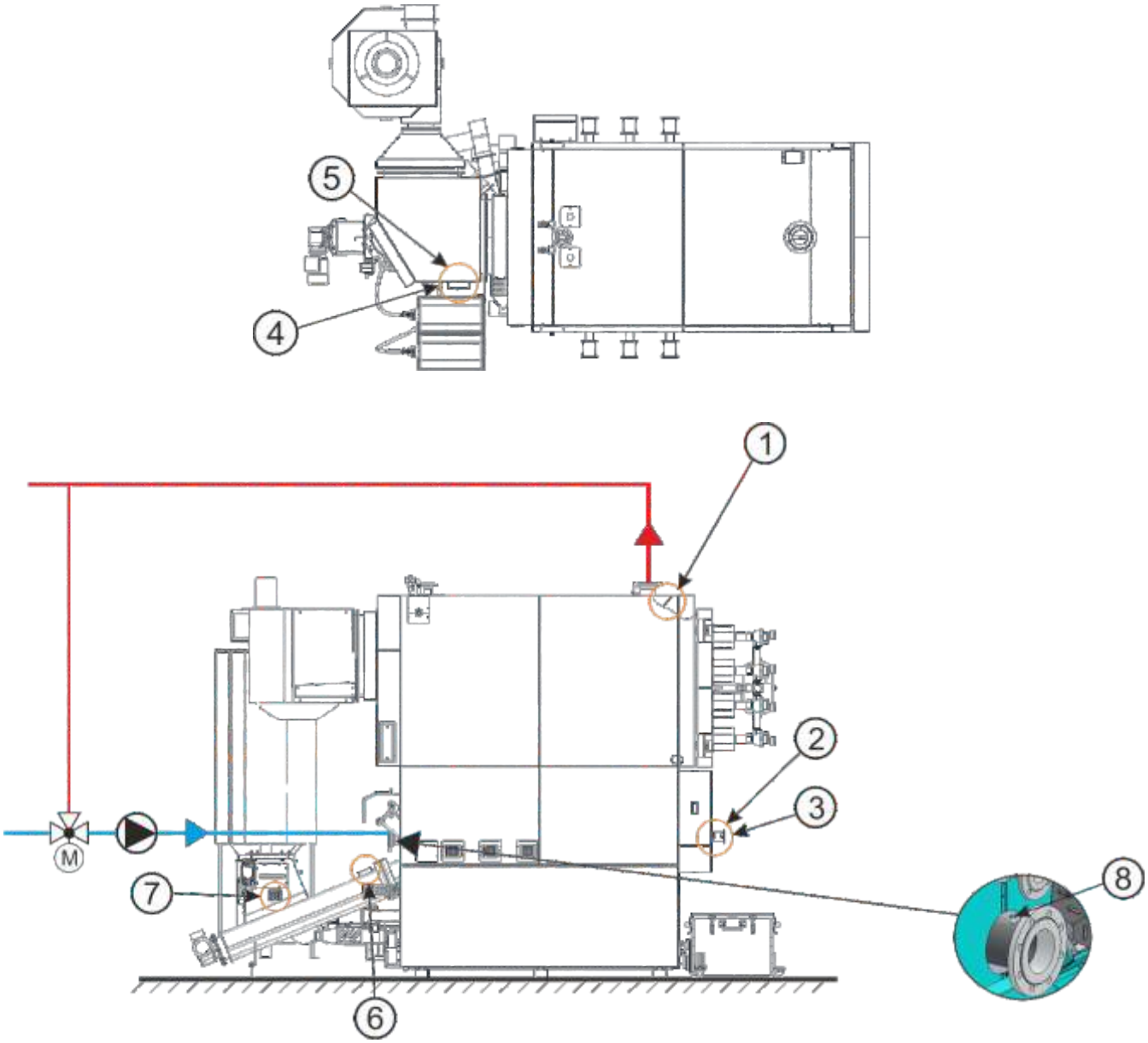
8.3. INFORMATIONS LIST

I1_1 – CONTROL MOD 1, FEEDER SCREW 1	
I1_2 – CURRENT RISE MOD 1, FEEDER SCREW 1	
I1_3 – CURRENT TOO HIGH MOD 1, FEEDER SCREW 1	
I1_4 – ASYMMETRY MOD 1, FEEDER SCREW 1	

I1_5 – CURRENT TOO LOW, MOD 1, FEEDER SCREW 1	
I1_6 – UNWANTED CURRENT MOD 1, FEEDER SCREW 1	
I2_1 – CONTROL MOD 2, FEEDER SCREW 2	
I2_2 – CURRENT RISE MOD 2, FEEDER SCREW 2	
I2_3 – CURRENT TOO HIGH MOD 2, FEEDER SCREW 2	
I2_4 - ASYMMETRY MOD 2, FEEDER SCREW 2	
I2_5 - CURRENT TOO LOW, MOD 2, FEEDER SCREW 2	
I2_6 - UNWANTED CURRENT MOD 2, FEEDER SCREW 2	
I3_1 – CONTROL MOD 1, FEEDER SCREW 3	
I3_2 - CURRENT RISE MOD 3, FEEDER SCREW 3	
I3_3 - CURRENT TOO HIGH MOD 3, FEEDER SCREW 3	
I3_4 - ASYMMETRY MOD 3, FEEDER SCREW 3	
I3_5 - CURRENT TOO LOW, MOD 3, FEEDER SCREW 3	
I3_6 - UNWANTED CURRENT MOD 3, FEEDER SCREW 3	
I4 - UNDER-PRESSURE IN FIREBOX dP=0Pa service	
I5 - FUEL TOO HIGH	Description: microswitch-1 is pressed. The firebox flap is raised when it presses the first microswitch, a bunch with a blue arrow appears on the control unit screen (on the picture in the boiler firebox). The operation of the fuel supply screw feeders to the boiler is interrupted while the microswitch-1 is pressed (see point 8.1.1.).
I6_1 - Ash removing turned off	
I6_2 - Ash removing turned on	
I7 - REFILLING 50%	
I8 - STOP, BOILER TEMP. TOO HIGH	Description: The process of shutting down the boiler was interrupted due to the excessively high temperature of the water in the boiler (>100 °C).
I10_1 – CONTROL MOD 4, ASH REMOVING	
I10_2 - CURRENT RISE MOD 4, ASH REMOVING	
I10_3 - CURRENT TOO HIGH MOD 4, ASH REMOVING	
I10_4 - ASYMMETRY MOD 4, ASH REMOVING	
I10_5 - CURRENT TOO LOW MOD 4, ASH REMOVING	
I10_6 - UNWANTED CURRENT MOD 4, ASH REMOVING	

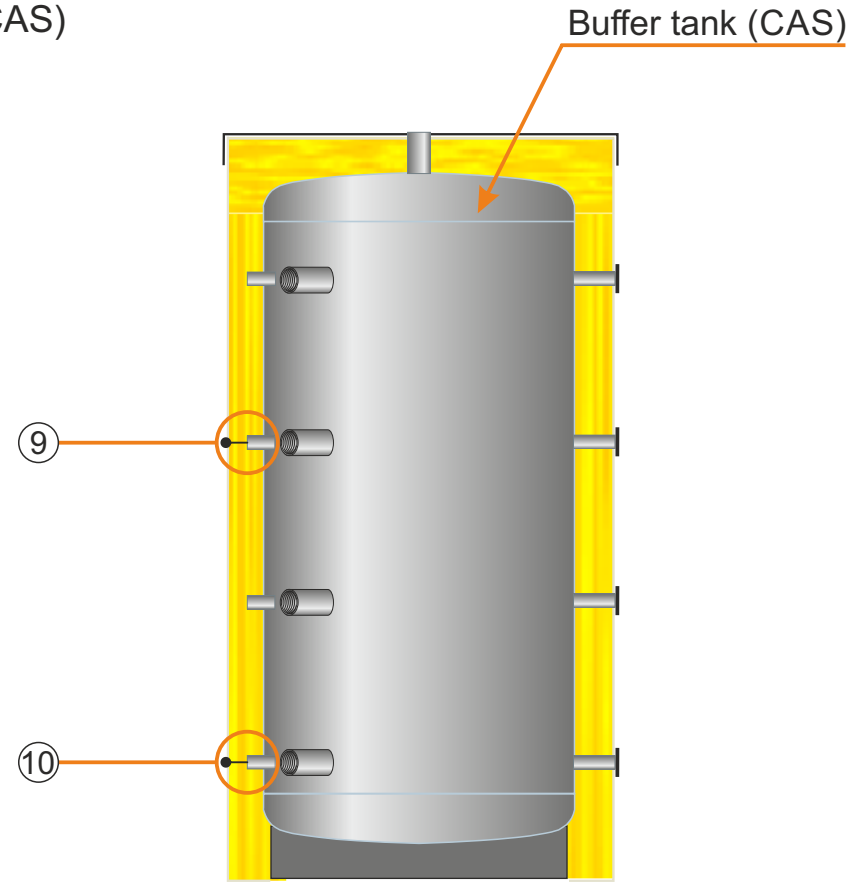
9.0. BOILER SENSORS

Figure 17. Sensors positions



1 - place for boiler temperature sensor (boiler flow) Tk1, type: NTC 5k/25°C
- place for safethy thermostat STB (110-9°C)
2 - photocell
3 - pressure switch
4 - flue gas temperature sensor, type: Pt1000
5 - lambda probe
6 - screw feeder-1 temperature sensor, type: Pt1000
7 - backfire protection valve sensor (thermostatic)
8 - boiler return temperature sensor, type: NTC 5k25°C
9 - buffer sensor (up), type: NTC 5k
10 - buffer sensor (lower), type: NTC 5k
11 - fuel level sensor (luminous sensor - between Screw feeder-2 and Screw feeder-3)

BUFFER TANK (CAS)

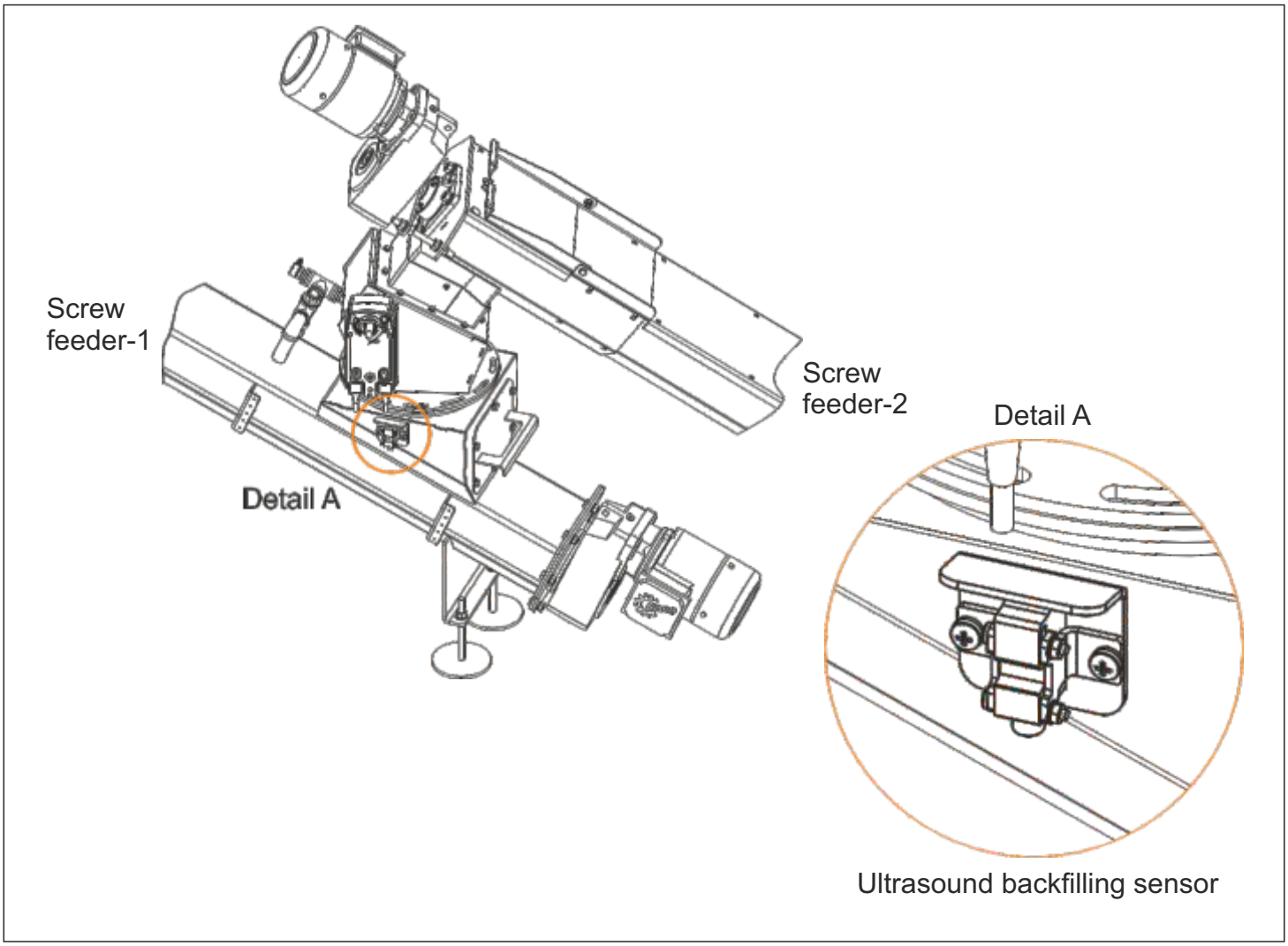


⑨ - Buffer sensor (up)
⑩ - Buffer sensor (lower), type: NTC 5k

9.1. ULTRASOUND BACKFILLING SENSOR (if a special order rotary valve is not installed)

Ultrasound backfilling sensor - between Screw feeder-1 and Screw feeder-2

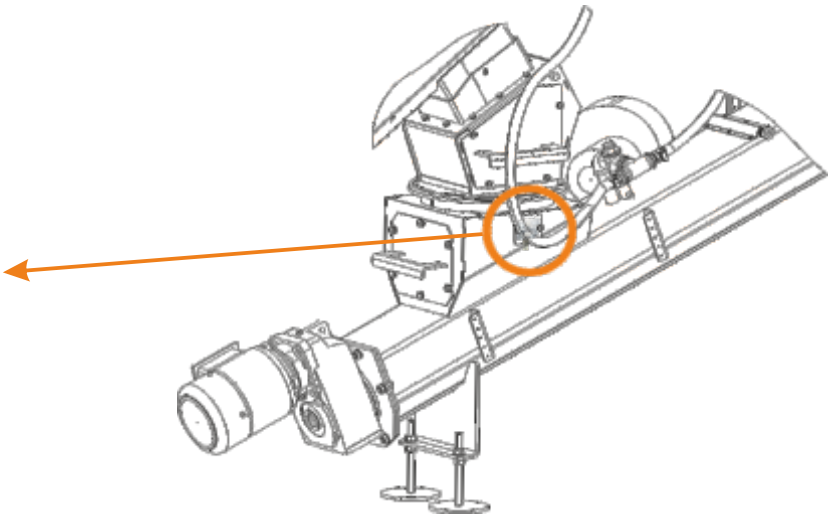
BACKFILLING SENSOR



Ultrasound backfilling sensor

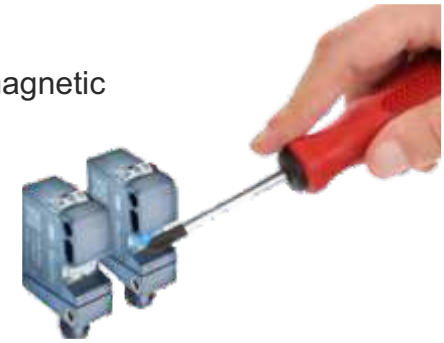
9.1.1. ADJUSTMENT OF ULTRASOUND SENSOR

POSITION OF ULTRASOUND SENSOR:



OPERATING WITH ULTRASOUND SENSOR

Ultrasound sensor can be operated by touch lense with feromagnetic tool (like screwdriver).



PROCEDURE OF ULTRASOUND SENSOR ADJUSTMENT

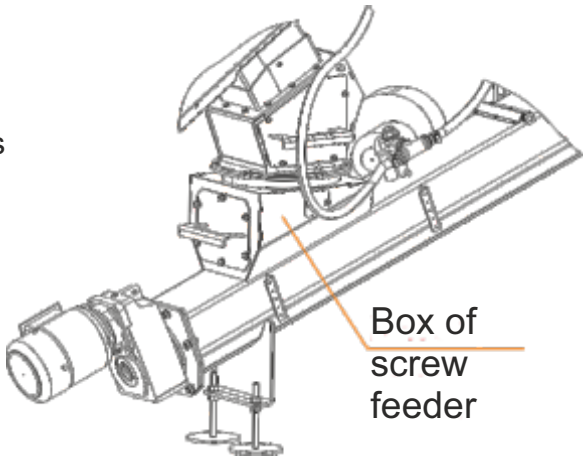
1. Turn off electrical supply on junction box.

2. Remove the sensor from the fuel supply (release the screws on sensor bracket).

3. Measure the inner width of the box through sensor opening (distance from sensor opening to the opposite side of box.

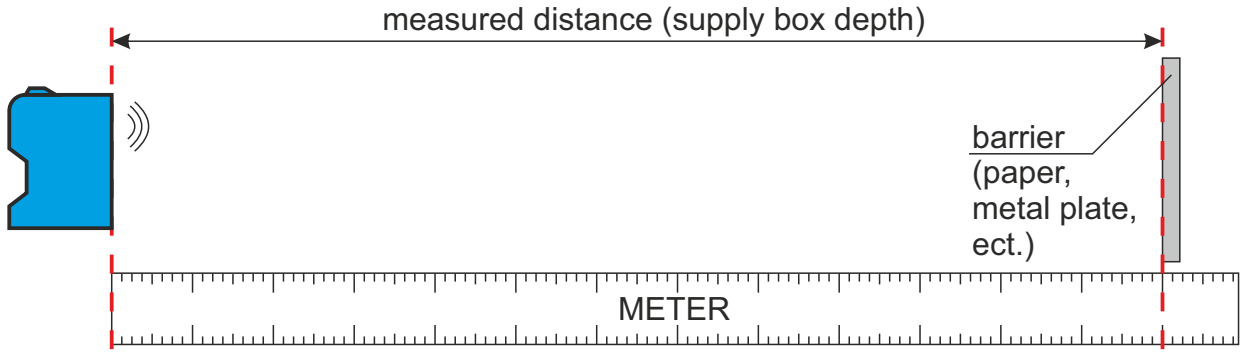
4. Turn on electrical supply on junction box.

5. On ultrasound sensor now light blue light (light will be lights five minutes - in that time sensor must be adjusted - otherwise turn off electrical supply on junction box, wait at least one minute and turn on electrical supply on junction box; ultrasound sensor will be again ready for adjustment).

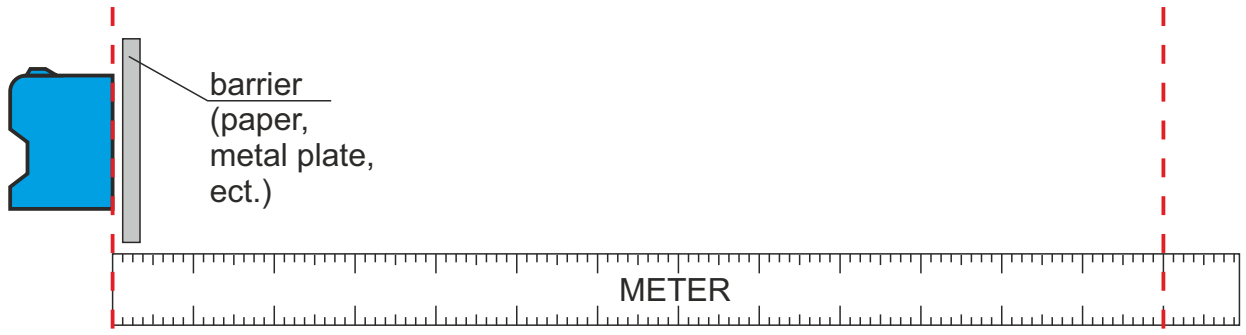


6. On the top of sensor, the green light is on. When you put the screwdriver on the sensor lens (on the blue light), orange light will light up and soon both lights (green and orange) will alternately blink. (If the lights do not start blinking for 2-3 seconds, remove the screwdriver and put it back.). Keep the screwdriver tilted until lights (which accelerate) blinking. The green light will turn on an the sensor is then reset to factory settings.

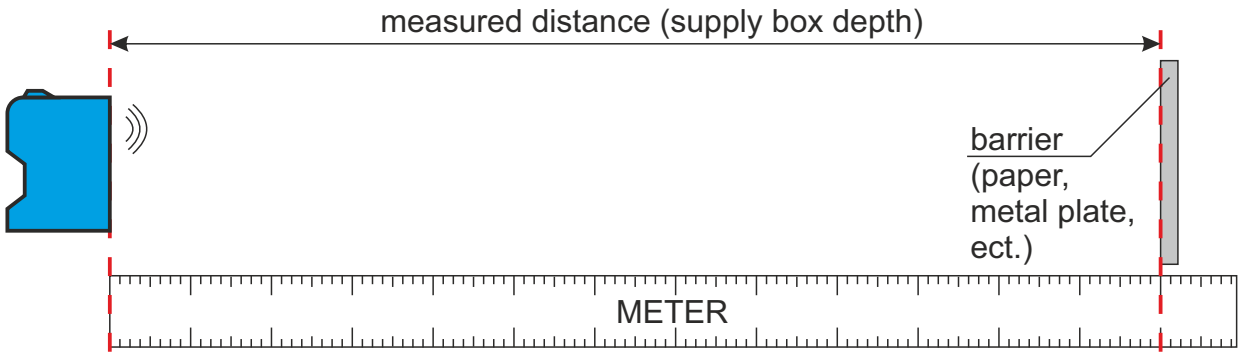
7. For next steps is necessary to have meter and some barrier (peace of paper, metal plate...). Place the meter on a flat surface or take the paper and mark previously measured distance. Set the sensor to the starting lin (start meter or drawn line). Set the barrier to te previously measured distance on the meter or the marked distance on the paper. Barrier must be placed vertically on the sensor. Put the screwdriver on te sensor lens (blue light) and hold it for 2-3 seconds, LED ligts on the sensor top will briefly stop and then start flashing alternately. (If the lights are not blinking, remove the screwdriver ant put it back in). When lights are blinking, remove the screwdriver and put it back on the lens (blue light) and remove it immediately. When te lights stop flashing (after 7-8 seconds), only the green light will light. The sensor programmed the farthest measurement point.



8. Put the barrier to the sensor and place the screwdriver on the lens (blue light). Both lights will blink and for 2-3 seconds LED lights on top of sensor will start blinking. (If the LED lights are not start blinking, remove the screwdriver and put it back in, previous action will not be lose). When the lights blinking, remove the screwdriver and put it back on the lens (blue light) and remove it immediately. The lights will briefly stop and will continue to blink. The sensor programmed the nearest measurement point.



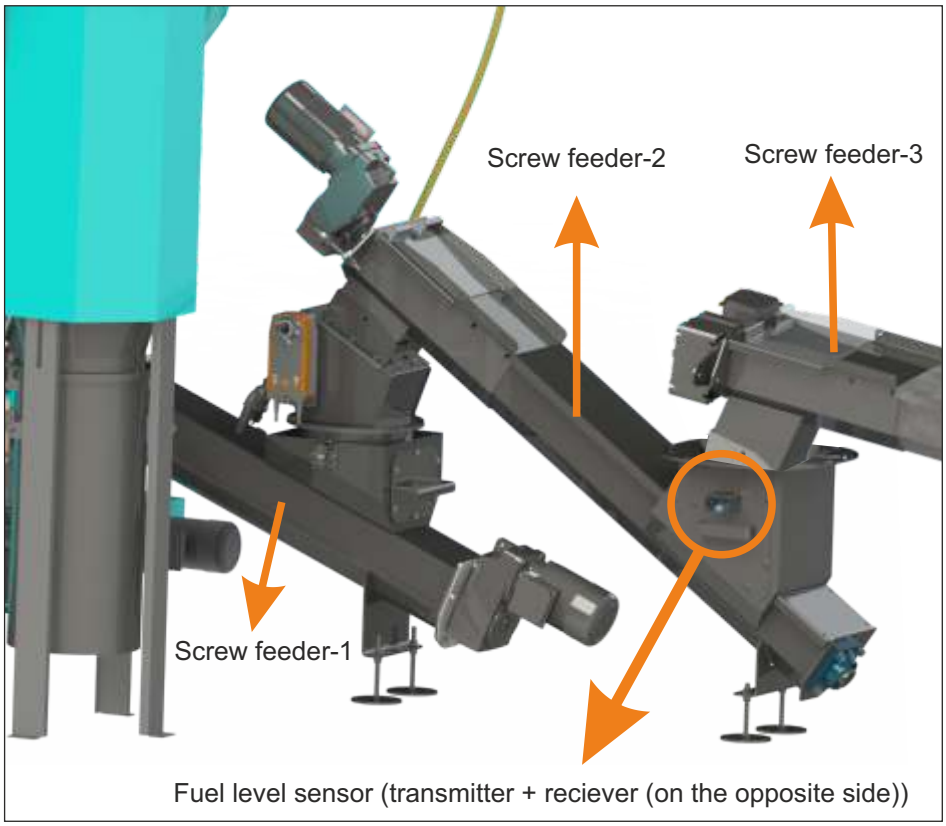
9. The lights continue to blink, put the barrier to the measured distance and confirm the distance by tilting te screwdriver on the lens (blue light) and immediately move it away. The LED ligts will stop momentarily and start blinking quickly. After the blinking stops an the green light is turned on, the sensor is programmed. Place the hand in front of the sensor at a distance smaller than the measured to see if the sensor is working properly. If the sensor registered the hand, the orange light will turn on on top of the sensor. When you remove the hand, the orange light will turn off and only the green light remains. If the sensor doesn't work as described, the sensor must be programmed from again from begining.



10. Turn off the power supply on boiler junction box. Attach the sensor to te screw feeder box. Turn on the power supply on boiler junction box.

9.2. FUEL LEVEL SENSOR (LUMINOUS)

Backfilling sensor (luminous) - between Screw feeder-2 and Screw feeder-3



Fuel level sensor (transmitter + reciever (on the opposite side))

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

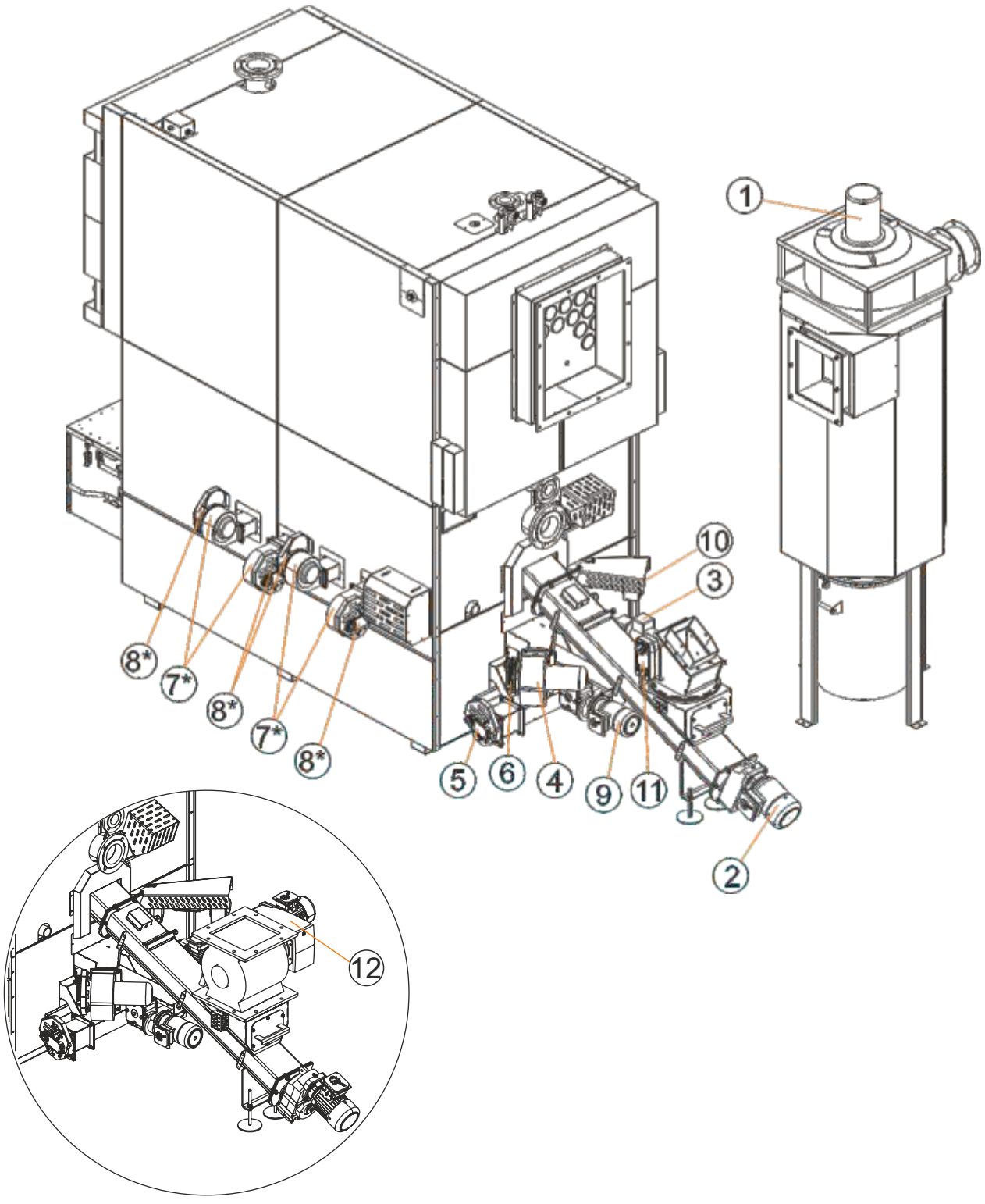
Temperature (°C)	Resis. (W)	Temperature (°C)	Resis. (W)
-30	885	225	1.866
-25	904	230	1.886
-20	923	235	1.905
-15	942	240	1.924
-10	962	245	1.943
-5	981	250	1.963
0	1.000	255	1.982
5	1.019	260	2.001
10	1.039	265	2.020
15	1.058	270	2.040
20	1.077	275	2.059
25	1.096	280	2.078
30	1.116	285	2.097
35	1.135	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	48.535
-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
35	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

10.0. ELECTRICAL COMPONENTS

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.



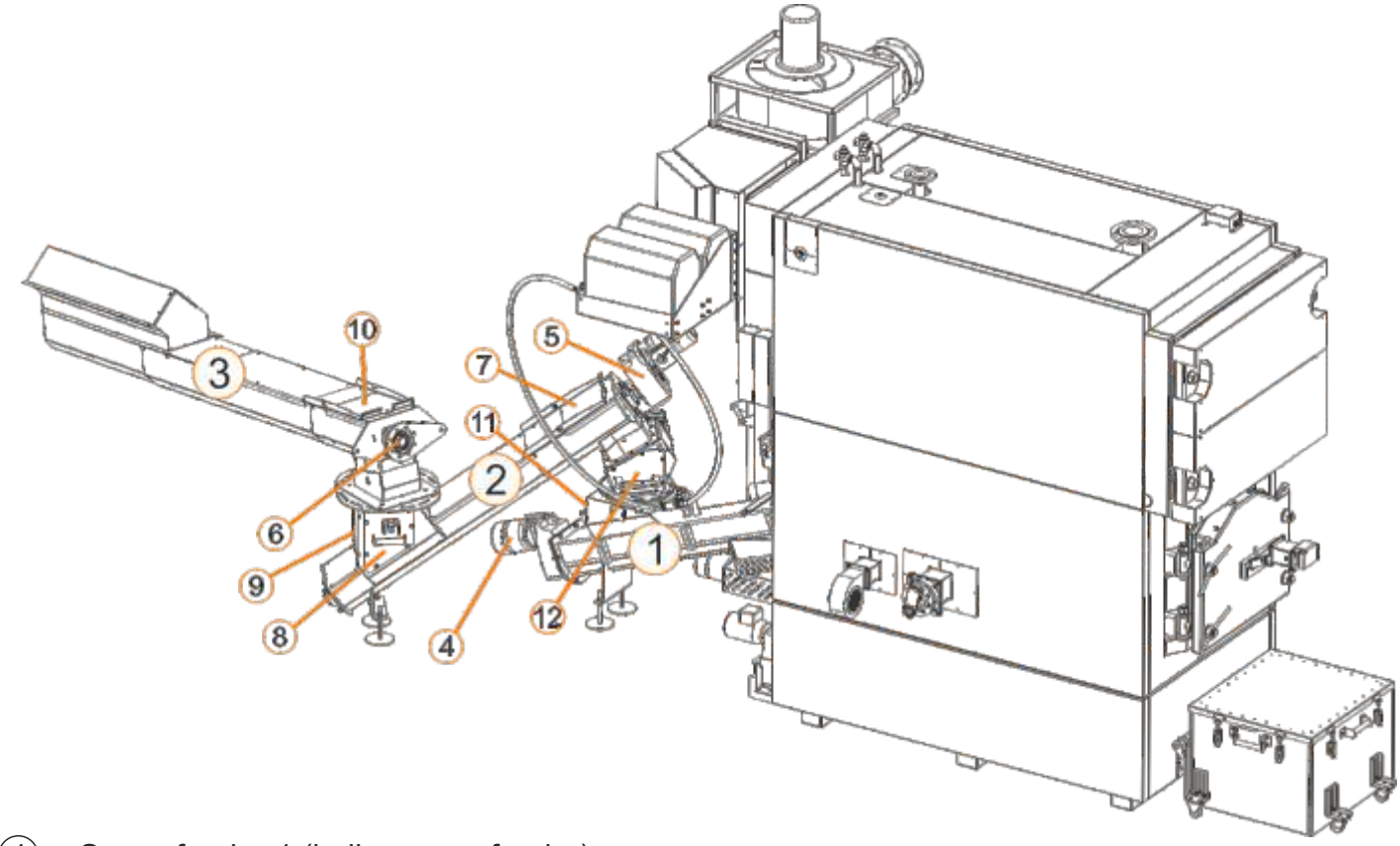
*** - installed on both sides of the boiler (on picture is displayed only one side)**

ELECTRICAL COMPONENTS OVERVIEW

		170	250	340	450	580
1	Cyclone fan	1×0,55 [kW], 400 V	1×1,1 [kW], 400 V	1×1,1 [kW], 400 V	1×2,2 [kW], 400 V	1×2,2 [kW], 400 V
2	Screw feeder-1 motor device	1×0,55 [kW], 400 V	1×0,55 [kW], 400 V	1×0,55 [kW], 400 V	1×0,55 [kW], 400 V	1×0,55 [kW], 400 V
3	Ash cleaner motor device	1×0,18 [kW], 400 V	1×0,18 [kW], 400 V	1×0,18 [kW], 400 V	1×0,18 [kW], 400 V	1×0,18 [kW], 400 V
4	Primary air fan	1×0,18 [kW], 400 V	1×0,18 [kW], 400 V	1×0,18 [kW], 400 V	1×0,25 [kW], 400 V	1×0,25 [kW], 400 V
5	Primary air 2 lid motor device	1×0,0015 [kW], 230 V	1×0,0015 [kW], 230 V	1×0,0015 [kW], 230 V	1×0,0015 [kW], 230 V	1×0,0015 [kW], 230 V
6	Primary air 1 lid motor device	1×0,0015 [kW], 230 V	1×0,0015 [kW], 230 V	1×0,0015 [kW], 230 V	1×0,0015 [kW], 230 V	1×0,0015 [kW], 230 V
7	Secondary air fan	4×0,083 [kW], 230 V	4×0,083 [kW], 230 V	2×0,083 [kW], 230 V	6×0,083 [kW], 230 V	8×0,083 [kW], 230 V
8	Secondary air lid motor device	2×0,0015 [kW], 230 V	2×0,0015 [kW], 230 V	2×0,0015 [kW], 230 V	4×0,0015 [kW], 230 V	6×0,0015 [kW], 230 V
9	Movable grate motor device	1×0,090 [kW], 400 V	1×0,090 [kW], 400 V	1×0,090 [kW], 400 V	1×0,090 [kW], 400 V	1×0,090 [kW], 400 V
10	Electric heater	1×1,6 [kW], 230 V	1×1,6 [kW], 230 V	1×1,6 [kW], 230 V	1×1,6 [kW], 230 V	1×1,6 [kW], 230 V
11	Backfire protection lid motor device (if a special order rotary valve is not installed)	1×0,0065 [kW], 230 V	1×0,0065 [kW], 230 V	1×0,0065 [kW], 230 V	1×0,0065 [kW], 230 V	1×0,0065 [kW], 230 V
12	Rotary valve motor (if installed, then item 11 is not installed)	400 V	400 V	400 V	400 V	400 V
	Motor device of 3-way mixing valve - return flow backfire protection	1×0,005 [kW], 230 V	1×0,005 [kW], 230 V	1×0,005 [kW], 230 V	1×0,005 [kW], 230 V	1×0,005 [kW], 230 V
	Screw feeder-2 motor device	1×0,37 [kW], 400 V	1×0,37 [kW], 400 V	1×0,37 [kW], 400 V	1×0,55 [kW], 400 V	1×0,55 [kW], 400 V

10.1. SCREW FEEDER / REVISION OPENINGS

For use revision opening is necessary switch off electrical supply on main switch.



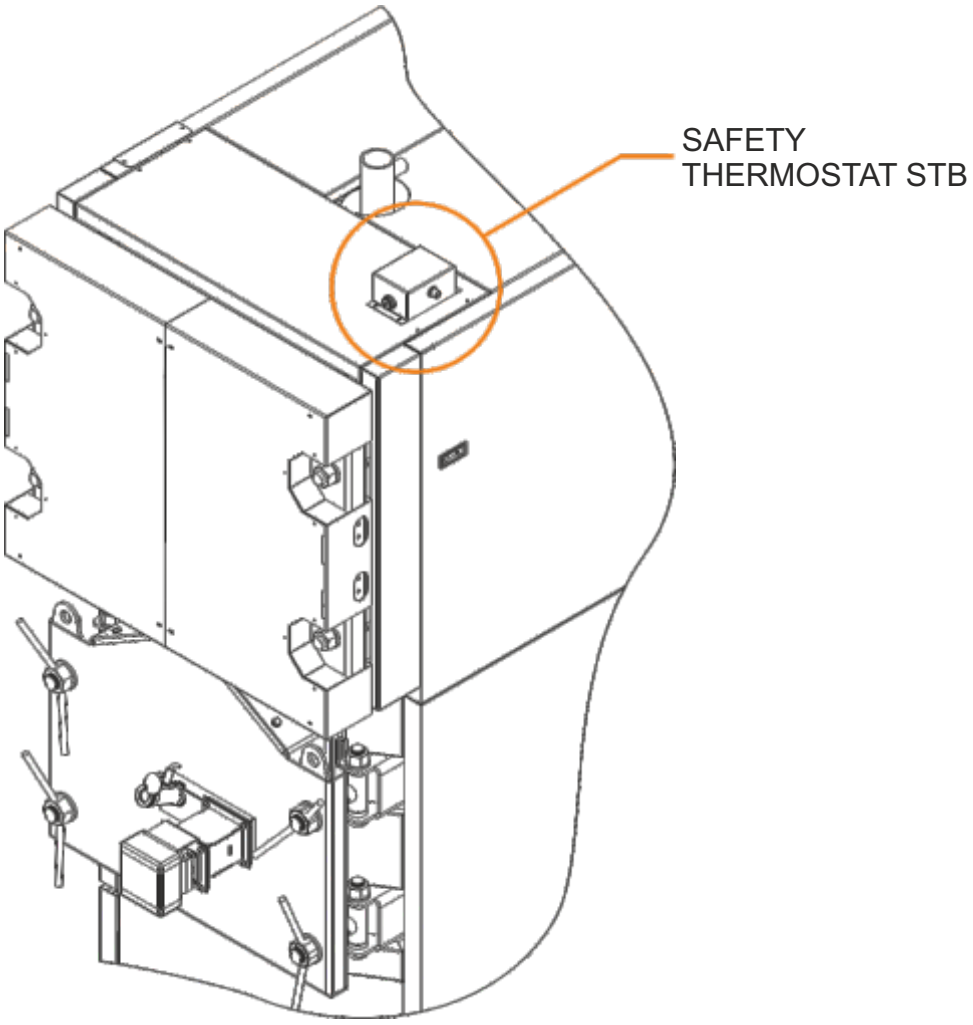
① - Screw feeder-1 (boiler screw feeder)
② - Screw feeder-2 (screw feeder between Screw feeder-1 and Screw feeder-3) - obligatory additional equipment
③ - Screw feeder-3 - obligatory additional equipment

④ - Motor with gearbox of Screw feeder-1
⑤ - Motor with gearbox of Screw feeder-2
⑥ - Motor with gearbox of Screw feeder-3

⑦ - Revision opening of Screw feeder-2
⑧ - Revision opening of Screw feeder-2 (both sided)
⑨ - Revision opening of Screw feeder-2
⑩ - Revision opening of Screw feeder-3
⑪ - Revision opening of Screw feeder-1
⑫ - Revision opening of Screw feeder-1 (both sided)

Maximal nominal el. current of screw feeder motor: 5,5 A per phase.

10.2. SAFETY ELEMENTS



Safety thermostat STB, via boiler control unit, switch off power supply when boiler temperature exceed 110°C (+0°C / -6°C).

When the boiler cools down is necessary to press button on safety thermostat to make boiler ready for work.

11.0. FUEL

Hot water boiler **EKO-CKS Multi Plus 170-580** can be fired with **wood chips** (A1-A2) / (P16S-P31S / (G30-G50)) W20-W35 / M20 (EN ISO 177225 - 4) and **wood pellets** A1 (EN ISO 177225 - 2).

FUEL CHARACTERISTICS

Wood chip; (A1-A2) / (P16S-P31S / (G30-G50)) W20-W35 / M20 (EN ISO 177225 - 4):
- size: G30, G50
- max. moisture content: 35%

Wood pellets; A1 (EN ISO 177225 – 2):
- heating value: >= 5 kWh/kg (18 MJ/kg)
- diameter: <= 6 mm
- max. moisture content: <= 12 %
- max. dust content: <= 1,5 %.

Centrometal d.o.o. Glavna 12, 40306 Macinec, Croatia

central tel: +385 40 372 600, fax: +385 40 372 611
service tel: +385 40 372 622, fax: +385 40 372 621

www.centrometal.hr
e-mail: servis@centrometal.hr

Centrometal
HEATING TECHNIQUE