

ASTRA MACHINERY PLANT AB • ANNO 1929

PELLET BOILERS

Astra P-16





Astra P-25

Astra P-35

INSTALLATION AND OPERATION MANUAL

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1. SAFETY REQUIREMENTS

The pellet boiler must be installed and tested by qualified personnel instructed and authorized by Astra. Please carefully read this use and maintenance manual before installing and putting the pellet boiler into operation. For further information, please contact your local Astra dealer.

The use of the pellet boiler must comply with national and European regulations. During the operation of the pellet boiler, strictly observe the following safety requirements:

- The pellet burner is designed to be fuelled exclusively with high-quality wood pellets with a diameter from 6 to 8 mm as described in chapter 4 of this user's guide;
- Do not attempt to operate the burner using traditional wood!
- To avoid potential fire hazards, the burner should not be used for incineration of household garbage under any circumstances!
- Before installation of the pellet burner, check with local building codes to assure that the installation will comply with applicable technical and legal norms;
- Installation of the pellet burner and the electrical connections, initial function checks and adjustments must be performed by qualified and authorized personnel. Correct installation, adjustment and regular servicing will ensure the burner's long term efficiency and lifetime. Optimum adjustment can only be achieved using flue gas analysis instruments – as a minimum, a soot pump and draught meter;
- Improper installation or poor maintenance (not compliant with instructions of this user manual) may endanger surrounding property and/or human health. In the case of the aforementioned product misuse, Astra is exempted of civil and criminal responsibility;
- When linking the burner to a boiler, all boiler ducting works must be completed prior to connecting to the electrical supply;
- To avoid boiling of water in a boiler, the burner must be connected to the electrical supply from the boiler. The latter must have a temperature limiter thermostat which would cut off the electrical supply to the burner if water approaches boiling temperature;
- There must be sufficient air circulation in the room where the burner is installed;
- To avoid a potential fire hazard, never open the boiler door while burning is going on!
- To assure maximum safety while using your burner be sure to follow all use and maintenance operations as described in this manual;
- This pellet burner should not be operated by people with physically or mentally challenging conditions, or who have no experience using such devices, unless they are under the direct guidance of a qualified and responsible person;
- The pellet burner must not be operated or played with by children;
- To avoid a potential fire hazard, never operate the pellet burner with boiler door open, or if the door is not properly sealed;
- While the burner is in operation, its surfaces may become very hot. Use extreme caution and be sure to use heat-resistant personal protective equipment when touching these components;
- Kindle the burner only after the daily inspection described in this manual has been performed;
- To avoid a potential fire hazard, do not dry laundry on or near the burner. Keep clothes and other flammable objects at a sufficient distance from the burner. Keep the burner room free of dust;
- Do not turn off the burner by unplugging it from the electrical supply;
- Do not clean the burner until its body, boiler and ashes have cooled down completely;
- Do not remove and disconnect the thermostat cable from the fuel intake pipe of the burner;
- To avoid the risk of electric shock, do not touch the burner while barefoot or wet;
- The burner must be connected to the electrical supply of the boiler with an easily accessible plug;
- Do not modify the design of the burner;
- To repair the burner, use only original replacement parts supplied by the manufacturer;
- Do not wait for components of the burner to become totally worn before replacing them. Replace a worn component before it is completely disabled to prevent possible accidents caused by the sudden breakdown of the components. Perform periodic maintenance checks as described in chapter 8 of this manual;
- In the case of a chimney fire: 1) call fire department immediately, 2) disconnect the burner from the electrical supply, 3) block an air supply to the burner if possible;
- This pellet burner has been designed to function in all climatic conditions. In the circumstances of particularly adverse weather (high wind,

freezing), safety systems may automatically engage and switch off the burner. If this occurs, please contact technical assistance for directions. In any case, do not disable the safety systems;

- The unauthorized modification or rebuilding of the burner is forbidden.

2. INTENDED USE

Astra P series pellet boilers are steel boilers with an auger conveyor, fired with 6-8 mm wood pellets. They are designed for heating individual houses and small commercial and industrial premises. P series pellet boiler, S series pellet burner and PA series auger pellet conveyor consists of a set controlled by an electronic controller and ensuring the long-term controlled burning of the boiler.

Astra P series boilers meet the European standards EN 303-5, EN 12809, Lithuanian laws and the existing EU directives relating to product safety.

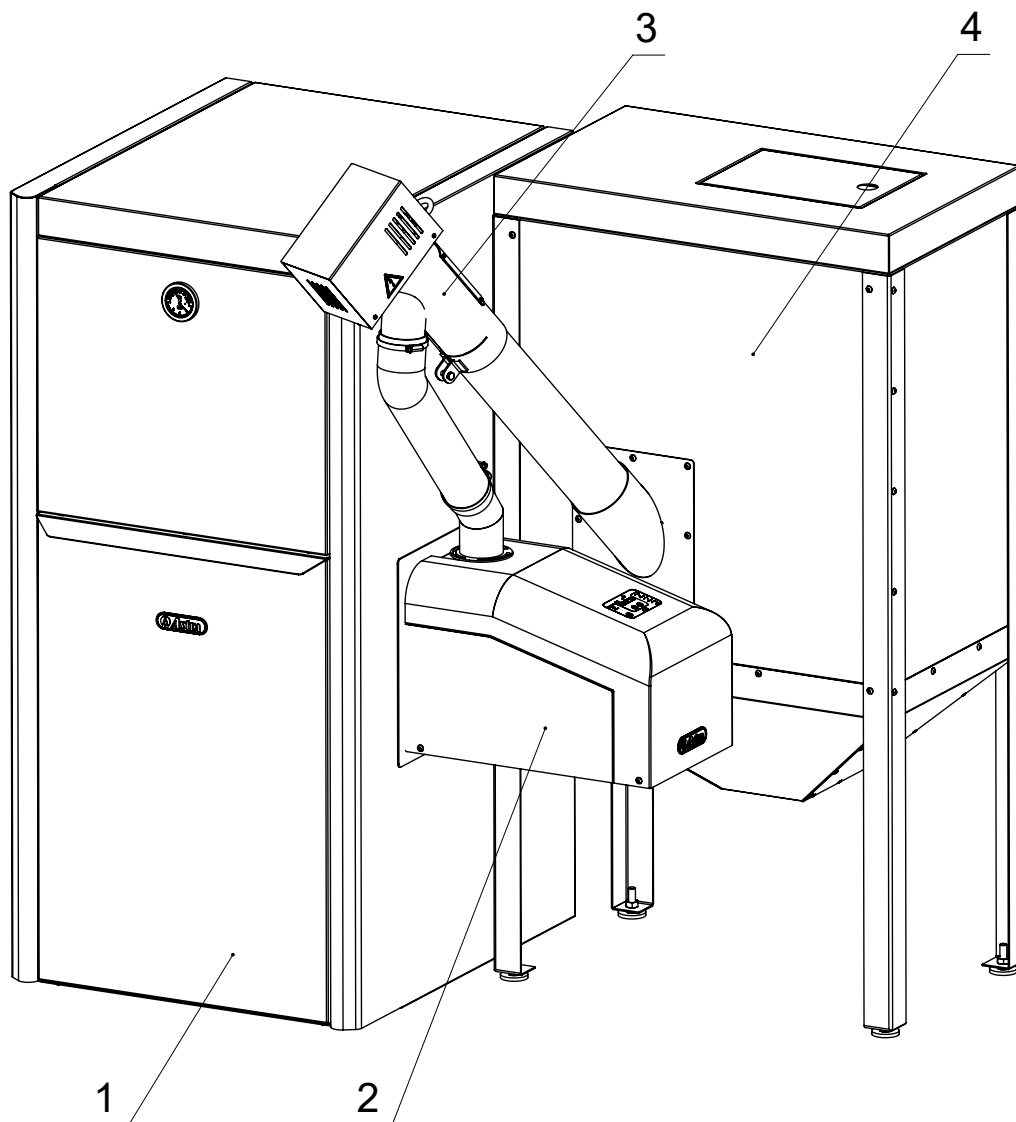


Fig. 1. Boiler components

1 – P series pellet boiler; 2 – S series pellet burner; 3 – PA series auger pellet conveyor; 4 – pellet hopper.

3. TECHNICAL DESCRIPTION

Wood pellets from the bunker (Fig. 1 pos. 4) rise in the auger pellet conveyor (Fig. 1 pos. 3) and in a flexible hose descend to the burner (Fig. 1. pos. 2), where they are burnt.

Granules flow in the fuel loading branch pipe (Fig. 2 pos. 1) directly into the combustion chamber (Fig. 2 pos. 17). During

the ignition phase wood pellets are automatically lit with the heating element (Fig. 2 pos. 16). The air supply fan (Fig. 2 pos. 6) supplies adequate amount of combustion air. The flame shape and direction are formed by the deflector (Fig. 2 pos. 5). The actuator (Fig. 2 pos. 15) is designed for automated mechanical cleaning of the combustion chamber, pushing the chamber drawer forward/backward during each claim extinction. The flame sensor (resistive photo sensor) (Fig. 2 pos. 4) monitors the flame and determines whether the combustion takes place in the combustion chamber. The bimetallic thermostat (Fig. 2 pos. 2), when the fuel supply branch pipe heats to dangerous temperature (95 °C), automatically stops the loading auger. The K-Type thermocouple (Fig. 2 pos. 11) measures the temperature of smoke exiting the boiler (additional option) and the NTC sensor (Fig. 2 pos. 13) measures the boiler outlet water temperature. The controller (Fig. 2 pos. 9) automatically adjusts all processes and phases required for pellet burning. The relay block (Fig. 2 pos. 8) acts as the actuator power source, and has integrated various other relays and fuses for control and operation of other burner elements. All electric elements fitted in the burner are grounded through the grounding block (Fig. 2 pos. 10). The user can track and control the combustion process by using the control panel (Fig. 2 pos. 7). Power cable (Fig. 2 pos. 12) transmits electricity to the burner and must be connected to the boiler outlet (Fig. 3 pos. 1). Interim purpose of the burner (Fig. 2 pos. 3) is to seal the connection between the burner and the boiler.

Astra P boiler model	K	h	B	d	M	N	G
P-16	916	580	150	G1 ½"	76	990	185
P-25	1017	680	150	G1 ½"	76	1092	185
P-35	1131	794	150	G1 ½"	76	1206	185

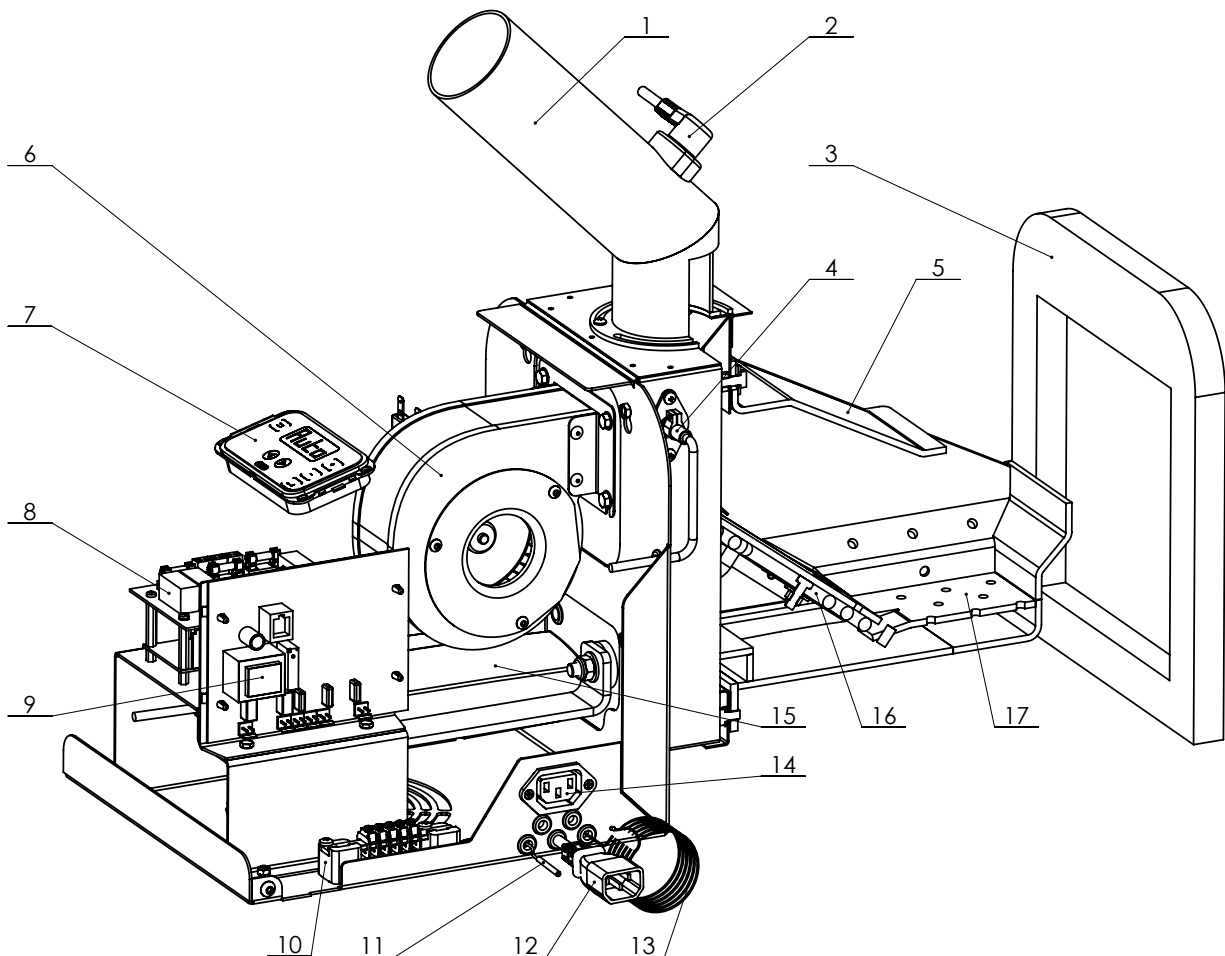


Fig. 2. Burner components

1 – Fuel supply branch pipe; 2 – Overheating thermostat; 3 – Burner gasket; 4 – Flame sensor; 5 – Deflector; 6 – Air supply fan; 7 – Control panel; 8 – Relay block; 9 – Controller; 10 – Grounding block; 11 – Thermocouple; 12 – Power cable; 13 – Water temperature sensor; 14 – Inlet of the auger pellet conveyor; 15 – Actuator; 16 – Heating element; 17 – Combustion chamber.

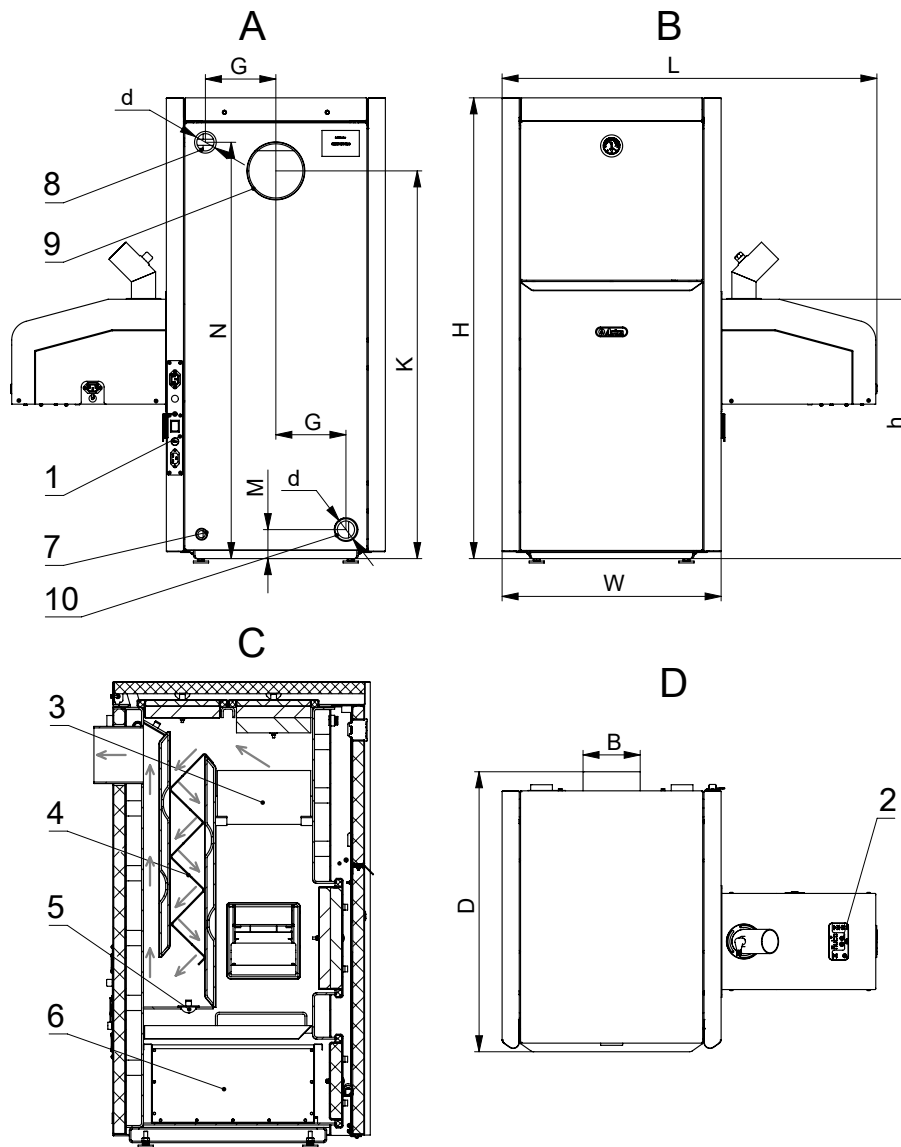


Fig. 3. Overall boiler view

A – rear view; B – front view; C – cross-section; D – top view

1. Rear control panel; 2. Front control panel; 3. Fireclay plate; 4. Turbulence insert; 5. Cap; 6. Ashtray; 7. Water draining branch pipe; 8. Water supply branch pipe; 9. Stack branch pipe; 10. Return water branch pipe

Flame occurring in the burner rises and heats the fireclay panels (Fig. 3 pos. 3). Hot fireclay bricks improve the combustion of flammable products. Next, hot air flow moves along the channel down and is slowed down by a turbulent liner (Fig. 3 pos. 4). There, heat is intensely transferred through the walls to the fluid circulating inside the boiler. In the next channel the cooling air flow rises up the chimney of winning. Ash resulting during combustion and cleaning is delivered to the ashtray (Fig. 3 pos. 6). The ashtrays size determines the autonomous boiler operation time. The bigger the ashtray, the longer are the intervals between its cleaning. Cap (Fig. 3 pos. 5) is used to cover the hole for removal of deposits cleaned from the boiler walls. The supplied “hot” water pipe of the heating system (Fig. 3 pos. 8) is connected to the branch pipe. Return “cold” water pipe of the heating system (Fig. 3 pos. 10) is connected to the branch pipe. Boiler control elements are mounted on the rear control panel (Fig. 3 pos. 1).

3.1 TECHNICAL SPECIFICATIONS

Boiler model		Astra P-16	Astra P-25	Astra P-35
Burner model		Astra S		
Pellet loading conveyor model		Astra PA-12		
Nominal boiler power, kW		16	25	35
Thermal power adjustment range, kW		5-16	5-25	5-35
Boiler class according to EN 303-5		3		
Volume of water in the boiler, l		70	75	82
Boiler weight, kg		265	275	285
Dimensions, mm	Height, H	1108	1206	1323
	Width (with burner) W (L)	575 (984)		
	Depth D	734		
Water pressure in the system, not exceeding, bar		2		
Boiler test pressure, bar		3		
Recommended water temperature in the boiler, °C		70-90		
Minimum return water temperature in the boiler, °C		60		
Recommended chimney draft, Pa	In reduced power	12		
	In nominal power	20		
Connection dimensions	Internal thread of return/supply water branch pipe, G	G1½		
	Filling branch pipe inner thread, G	G1½		
	Boiler flue outlet diameter, mm	150		
Electrical characteristics		L1; N; PE; 50 Hz; 230 V		
System electric power, W		50 (in the initiation stage 1150)		
Boiler electrical safety category		IP30		
Heated area (If a thermal resistance factor of the building is 2.5), m ²		100-180	140-250	240-400
Fuel used		Wood pellets 6-8 mm		
Pellet class according to EN 14961-2: 2010		ENplus-A1, ENplus-A2 ir ENplus-B		
Pellet category according to the manufacturer's classification		A, AB, B, BC, C, CD, E, EF		
Hourly fuel consumption at rated power, kg/h		4	6	8.5
Efficiency at rated power, %		88-92	88-92	88-92
Smoke temperature at rated power, °C		130	160	185

3.2 BOILER SAFETY SYSTEM;

Security system elements include:

1. The boiler has a manually reset thermostat that measures the boiler water temperature and does not allow the water to boil. At dangerous water temperature of 95 °C the thermostat terminates the power supply to the boiler.. The thermostat can be reset to the working position only manually when the water in the boiler has cooled down to a safe temperature.

2. The flame sensor (resistive photo resistor), which enables the burner controller to capture existence of the flame in the combustion chamber.

3. The safety thermostat is mounted on the fuel supply branch pipe of the pellet burner. When the pipe heats up to dangerous 90 ± 3 °C temperature, the thermostat terminates the power supply to the auger pellet conveyor. As the temperature drops to safe level (73 ± 6 °C), the thermostat automatically connects the loading auger power circuit, allowing to continue pellet supply to the burner.

4. Astra PA series granular loading conveyor has a flexible hose and a meltable hose connecting the loading auger and the burner fuel supply pipe to each other. In case of emergency and upon ignition of pellets in the burner fuel supply pipe, the hose would melt from heat of the flame, thus preventing the spread of fire and reaching the fuel stock in the loading auger and the bunker.

Our product is produced in accordance with the following directives:

2006/95/EC – Low voltage directive;

2006/42/EEC – Machinery directive;

2004/108/EEC – Electromagnetic compatibility directive;

89/106/EEC – Construction products directive.

The following standards were applied in the manufacturer of Astra S-series pellet burners and P-series pellet boilers:

EN303-5 – Heating boilers.

EN 15270 – Pellet burners for small heating boilers.

EN 60335-1 – Safety of household and similar electrical appliances;

EN 60335-2-102 – Safety particular requirements for fuel burning appliances having electrical connections;

EN 55014-1; EN 55014-2; EN 61000-3-2; EN 61000-3-3 – Electromagnetic compatibility.

4. TRANSPORTATION, STORAGE, UNPACKING

Assembling elements of Astra pellet boiler may be transported only in the original packaging. Boilers can be transported and stored in vertical position.

Storage should take place in a closed room, which is protected against precipitation at a temperature from -40 °C to + 60 °C. Air humidity in the storage room must not exceed 80%.

If the burner has been transported or stored at freezing temperatures, then, before it is used, it must be kept at room temperature for at least two hours.

After unpacking, check that all the components are in the packages. Standard equipment consists of the following components:

Boiler: boiler – 1 pcs.; fireclay bricks – 2 pcs.; rake – 1 pcs.; hook – 1 pcs.; cast-iron ash grate – 1 pcs.; steel grille adapter – 1 pcs.; adjustable feet – 1 pcs.; IEC 60320 C-13 C-14 connection cable – 1 pcs.; installation user manual 1 pcs.

Burner: burner – 1 pcs.; fuel supply branch pipe – 1 pcs.; burner gasket 1 pcs.

Pellet loading conveyor: auger – 1 pcs.; flexible hose – 1 pcs.; clamp 2 pcs.

Check whether the painted surfaces have not been damaged during transportation, the housing was not deformed, and the control devices are not broken and are in designated locations. If you notice any discrepancies or defects, make claims to the burner reselling company.

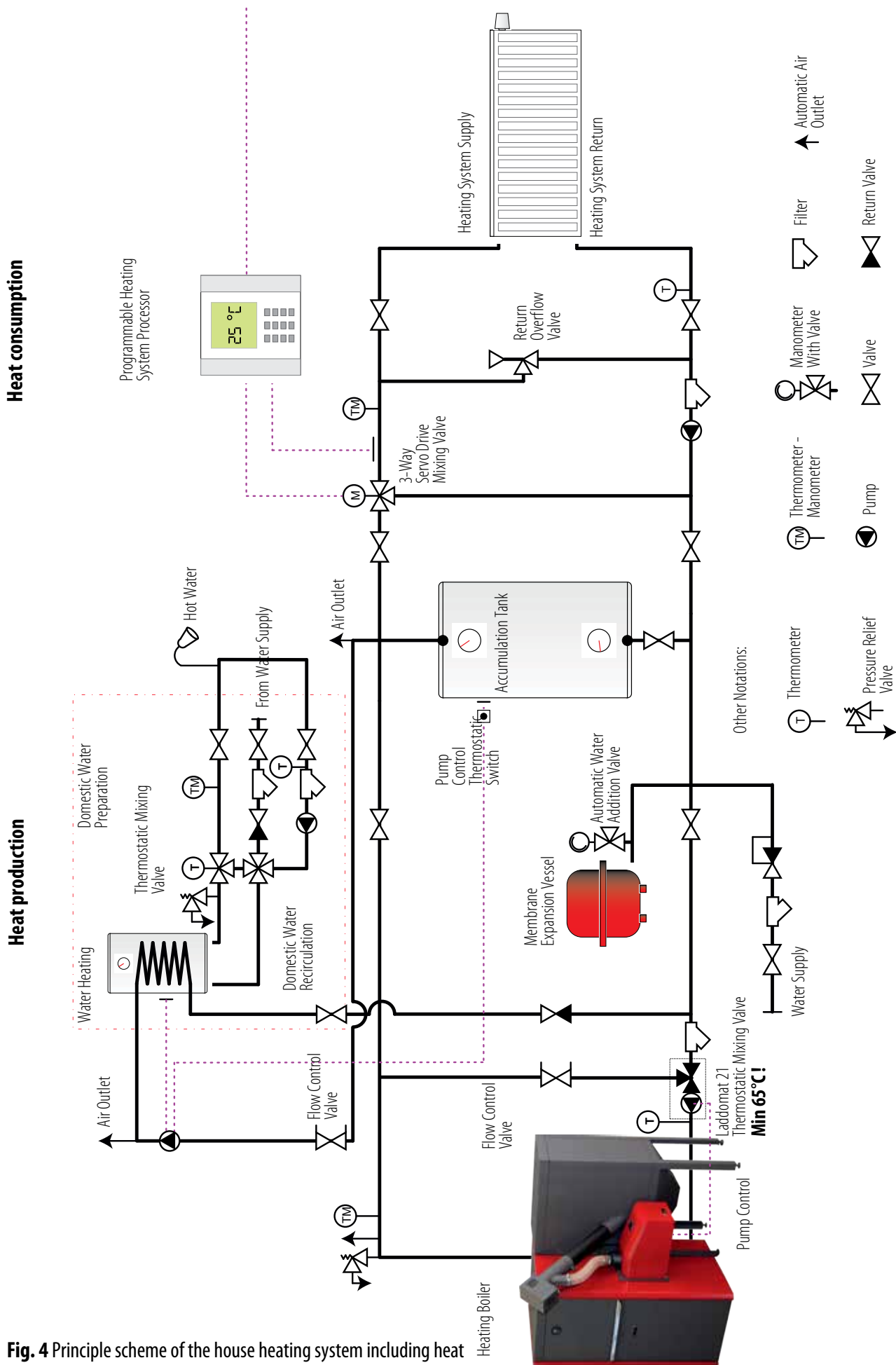


Fig. 4 Principle scheme of the house heating system including heat accumulation.

5. INSTALLATION

5.1 INSTALLATION OF THE BOILER ROOM



The installation must be carried out according to regulations valid at place. It is the responsibility of an installer to be aware of the local applicable laws.

The boiler room should be ventilated. The required air inflow necessary for combustion should be also ensured. For this purpose, boiler room doors should have ventilation grating or there should be a sufficient gap between the doors and the floor. If there is no possibility to supply air in from another rooms or the house is very tight, it will be necessary to install an opening in the exterior wall. The cross-section area of the opening should be at least 0.001 m²/kW.

Place the boiler as close to the flue as possible on a hard concrete levelled basement. Leave at least 600 mm gap between the backside casing of the boiler and the room wall for boiler servicing and cleaning. The smallest distance between a lateral casing of the boiler and a building structure is 200 mm. If the building structure is made of flammable materials, this distance should be doubled. A freely approachable space of at least 800 mm should be then left from the opposite side of the boiler to ensure access to the backside of the boiler, for its servicing and cleaning. The floor under the boiler, within the distance of 50 cm in front of it and within the distance of 30 cm around the boiler should be made of inflammable materials. Screw supporting legs onto the base of the boiler and level the boiler with screw nuts using a level; then connect the heating system circulation pump to the boiler.

The smoke exhaust pipe of the boiler should be connected to the chimney through a metal duct. The internal diameter of the metal connecting duct should be at least the same as the external diameter of the smoke exhaust pipe of the boiler. To improve the draught, the connecting duct between the boiler and the chimney should be installed at an inclination towards the boiler. All junctions should be carefully tightened using a heat-resistant material and insulated using thermal insulation.



If an additional damper is installed between the boiler and the chimney for the draught control purpose, the damper should not close more than 2/3 of the cross-section area of the opening in its fully closed position.

5.2 BOILER PROTECTION AGAINST CORROSION

Fig. 4 shows the principal scheme of the boiler house. In order to protect the boiler from corrosion, it is necessary to use a thermoregulatory valve which helps to make the small and the big heat circles and ensures the return water temperature to the boiler no lower than 65 °C. The higher the return water temperature to the boiler, the lower the possibility of condensation, resins and acids, are harmful to the body of the boiler. Outgoing water temperature should not exceed 90 °C. Smoke temperature must not fall below 110 °C, when the boiler is in working mode. Condensation, resin and acids occur at low gas temperature, even if the boiler operating temperature (not exceeding 90 °C) and the return water temperature (65 °C) are maintained. For example, improperly adjusted pellet burner (operating at reduced capacity).

We recommend using the Laddomat 21 unit. It consists of a cast iron body, thermoregulatory valve, pump, non-return valve, ball valve and thermometer. When the water temperature in the boiler is above the condensation temperature (min. 65 °C), the thermoregulatory valve will open the water supply from the big circle.

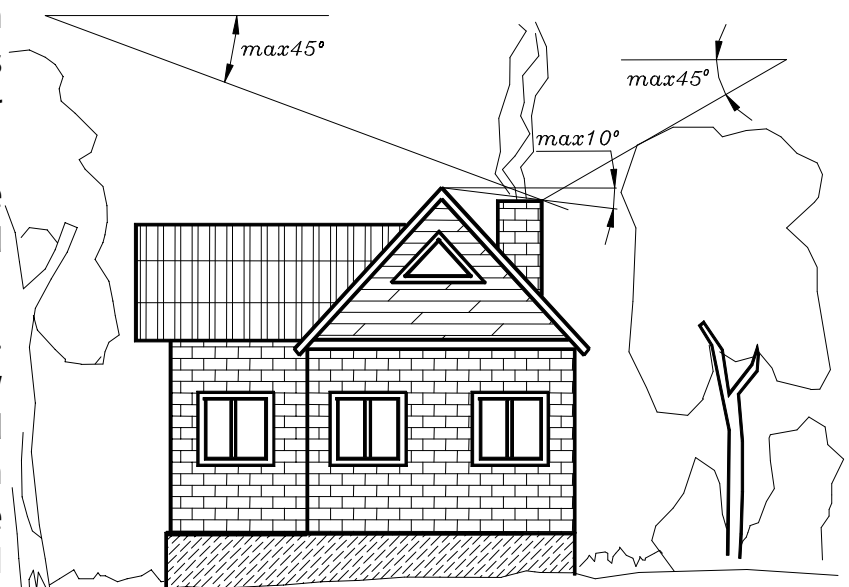


Fig. 5 Positioning of a chimney in respect to vicinity objects

5.3 REQUIREMENTS FOR THE CHIMNEY

It is recommended to insert acid-resistant stainless steel liner, if the chimney is made from masonry. It improves draught of the chimney and protects the masonry from destruction due to the impact of condensate. Internal diameter of the liner should be no less than the external diameter of the smoke exhaust pipe of the boiler. The chimney liner can be round or oval. It is not recommended to use rectangular-shaped liner as, due to the temperature fluctuations, its walls deform, gaps appear at the element junction points, through which the condensate falls on the walls of the bricks chimney. Additional air is sucked in, which reduces draught of the chimney. Draught for each boiler model should correspond to the referred value of draught in the table "Technical data". The liner should be factory made. Minimum permissible height of the chimney should be at least 6 m. The top of the chimney should be above the ridge at least by 0.5 m. If the chimney is further from the ridge than 1m, the angle horizon- the ridge- the cap of the chimney should consist 10° or less degree. Draught of the chimney can also be negatively affected by various obstructions near the building: trees, hills, other buildings. Fig. 5 presents the recommended minimal angles between the chimney, nearby objects and the horizon. Angles larger than those indicated will cause reduction of draught of the chimney.



The connection of other devices to the chimney to which the boiler is connected is prohibited. The chimney should be cleaned at least once a year!

5.4 PELLET BOILER ELEMENTS

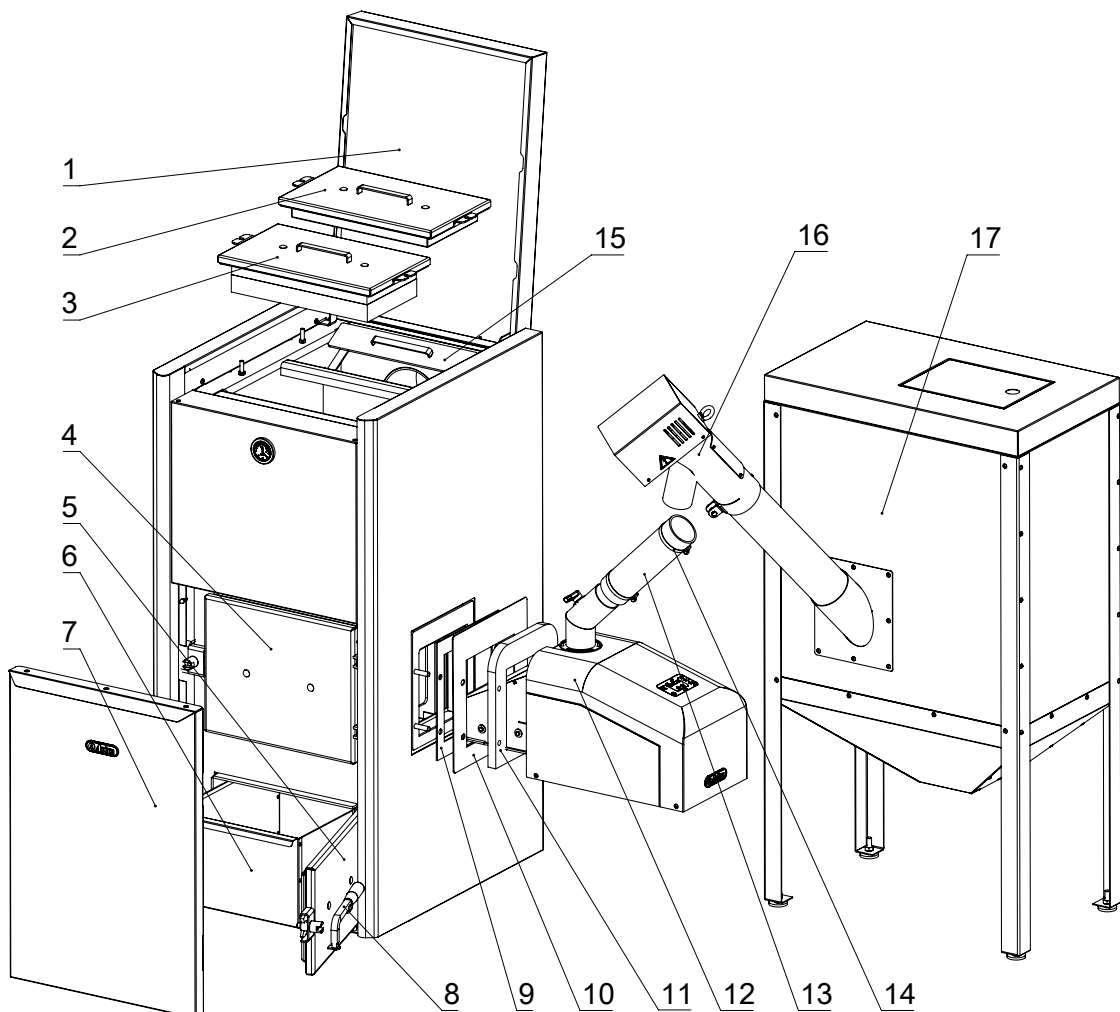


Fig. 6. Pellet boiler elements

1 – Upper casing; 2 – Smoke channel cover; 3 – Hood of combustion chamber; 4 – Combustion chamber door; 5 – Ash chamber door; 6 – Ashtray; 7 – Door casing; 8 – Door handle; 9 – Gasket; 10 – Decorative plate; 11 – Burner gasket; 12 – Burner; 13 – Flexible hose; 14 – Clamp; 15 – Flue hood; 16 – Pellet loading conveyor; 17 – Pellet hopper.

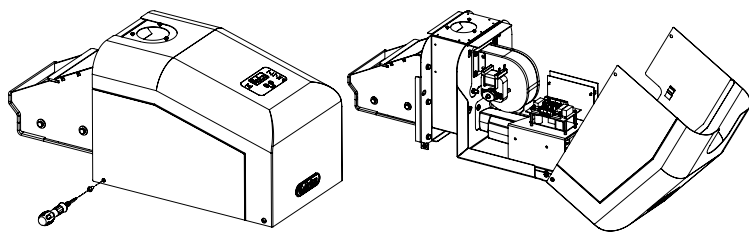


Fig. 7. Preparation of the burner for assembly.

5.5 BURNER INSTALLATION IN THE BOILER

Use the key with hexagon H3 tip to unscrew the two screws (one on the left side of the burner, and the other on the right), which support the burner enclosure (Fig. 7). Open the enclosure by tilting it back – the remaining two screws in front of the burner are used as the pivot axes.

Put the following on the boiler flange in sequence: gasket (Fig. 6 pos. 9), decorative cap (Fig. 6 pos. 10), burner gasket (Fig. 6, pos. 11) and the burner (Fig. 6 pos. 12). Tighten the four M10 nuts on the boiler flange studs (Fig. 8).

Astra P series pellet boilers are equipped with water temperature sensors (NTC). The sensor cable end is routed through the hole in rear control panel and tied with a zip strap (Fig. 12. NTC). Connect the cable ends to the terminals of the burner controller (22 and 23).

Close the burner cover and tighten the two bolts of the cover you have opened earlier.

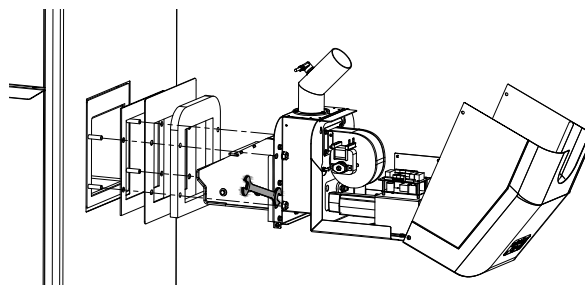


Fig. 8. Burner installation in the boiler.

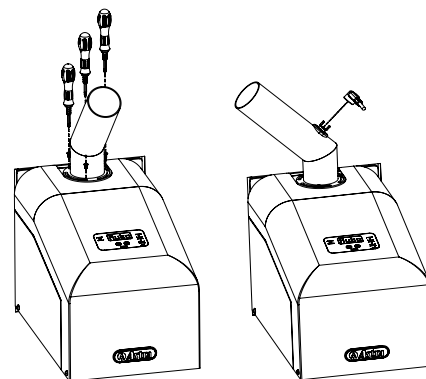


Fig. 9. Pellet supply pipe attachment to the frame and connection of the thermostat cable

5.6 CONNECTION OF THE LORding AUGER AND PELLET SUPPLY PIPE

• INSTALLATION OF FUEL SUPPLY BRANCH PIPE

Place the pellet feed branch pipe on top of the burner frame – the dark green painted surface with one large and three small holes. Based on the selected place for future installation of the pellet hopper, turn the pellet supply pipe in a direction so that the end of the pipe directed upwards is facing directly the pellet hopper. Secure the pellet supply pipe in this position by tightening the three screws through the pipe flange to the burner frame, to the three small holes specially prepared for the screws. Use a screwdriver, with PH2 type dip, for tightening the screws. Connect the cable to the thermostat terminals (Fig. 9).

• CONNECTION OF THE BURNER ELECTRICAL PART WITH THE BOILER

Use the IEC 60320 C-13 and C14 cable in the set to connect the boiler electrical socket S1 (Figure 11). with the burner Power socket (Fig. 10).

• CONNECTION OF THE LOADING AUGER

Insert Astra pellet loading conveyor PA-12 in the pellet hopper (Fig. 6 pos. 17) through the special branch pipe. The lower end of the pipe must lie on the bottom of the pellet hopper. For convenience of installation and maintenance, the pellet loading container can be tied to the boiler room ceiling using the loop on the unit. One end of the flexible hose place onto (Fig. 6 pos. 13) the branch pipe of the pellet loading conveyor, and the other – on the burner fuel supply pipe. Tighten the two clips (Fig. 6 pos. 14). The use of flexible hose use is mandatory – it is a safety element. If the pellets ignite in the pellet supply pipe, the hose will melt and break the connection between the source of fire and the pellet container. The flexible hose must be mounted straight (there must be no visible hose play – dust and fine granular particles can accumulate in the hose grooves because of the play).

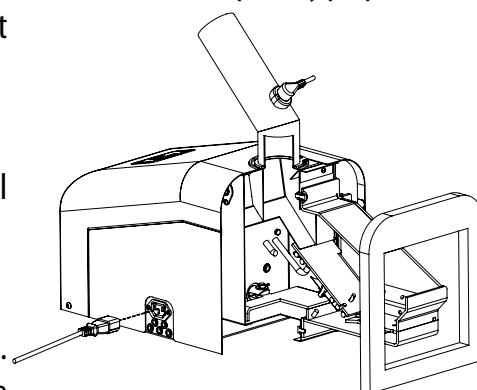


Fig. 10. Boiler power cable connection to the burner Power socket.

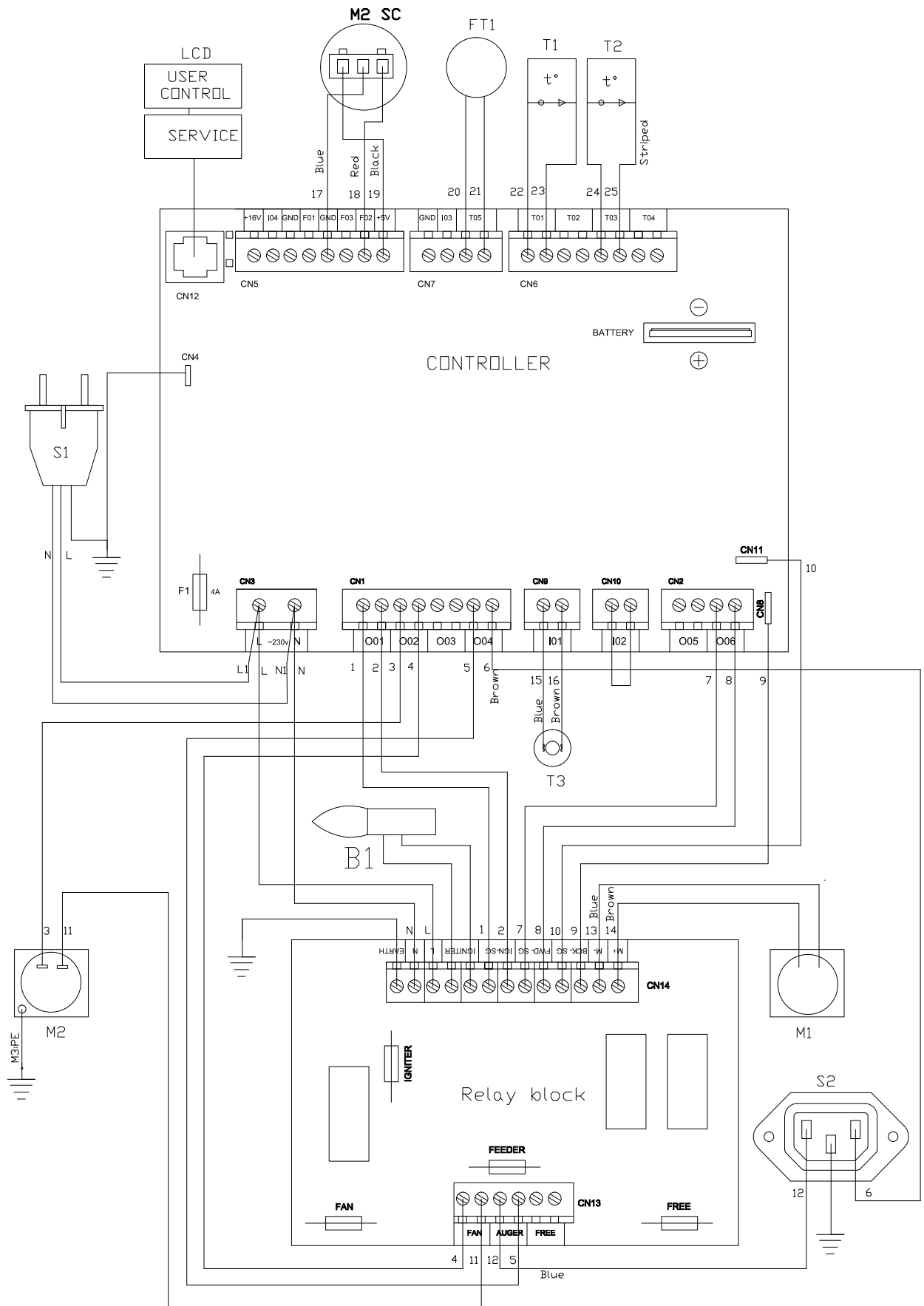


Fig. 11. Electric mounting scheme of the pellet burner

B1 – Heating element; M1 – Actuator; M2 – Air fan; M2 SC – Air fan hall sensor; FT1 – Flame sensor (resistive photosensor); LCD – User interface; S1 – Burner power cable; S2 – Boiler connection jack; T1 – water temperature sensor NTC; T2 – Smoke temperature sensor (thermocouple); T3 – Overheating thermostat of the pellet supply pipe.

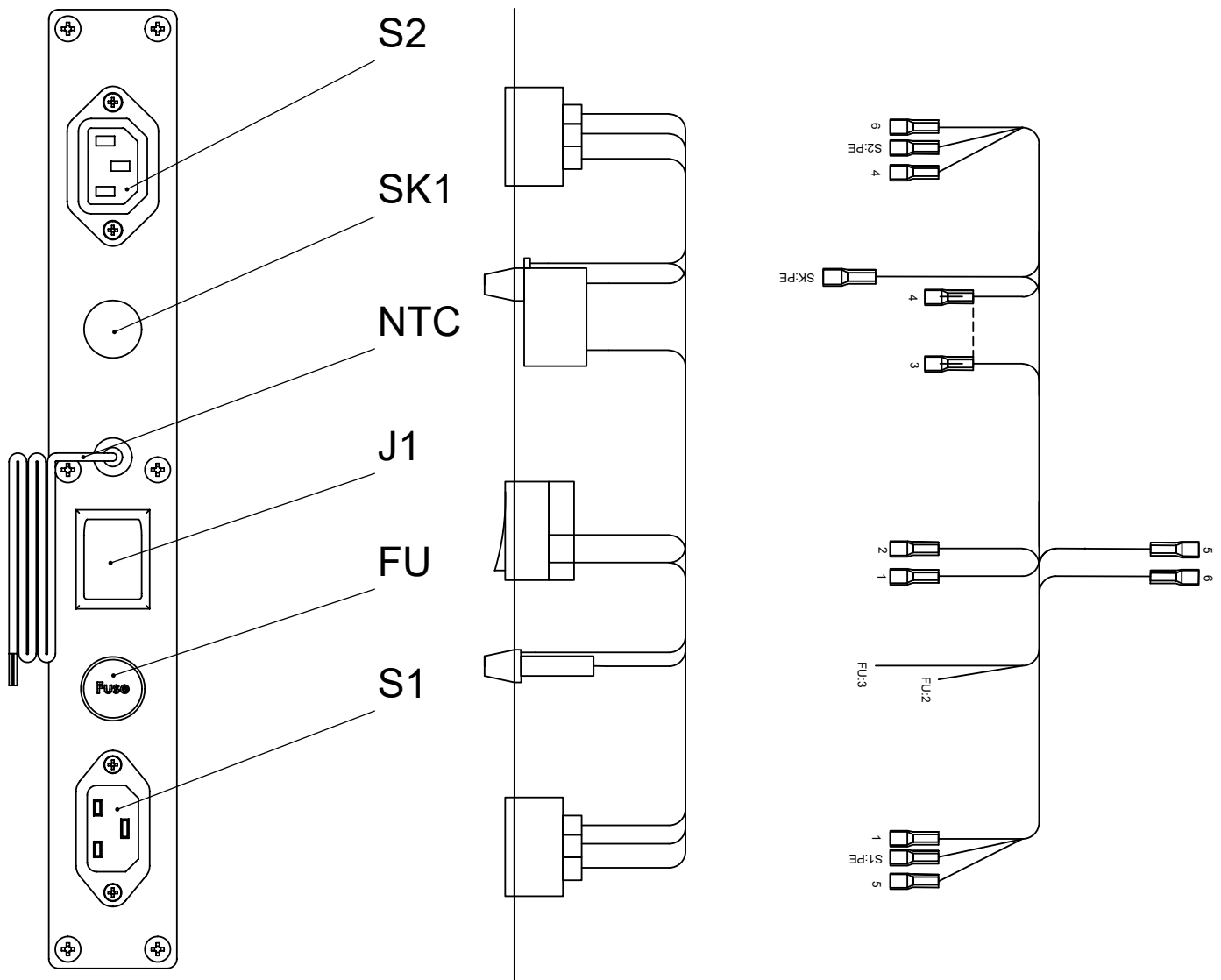


Fig.12. Electrical mounting scheme of Astra P series pellet boiler

S1 – Burner connection jack; S2 – Power socket of the pellet loading auger; SK1 – STB safety thermostat; NTC – water sensor connection cable; J1 – switch; FU – fuse.

• **CONNECTION OF THE ELECTRICAL PART OF THE CHARGING AUGER TO THE BOILER**

The power cable the pellet loading auger is plugged into the power outlet S2 in the boiler (Fig. 12).



The pellet loading auger is operated with the pellet burner controller. It is prohibited to connect he tloading auger directly to the mains.

5.7 ELECTRIC WIRING

The burner may have a lot of additional options such as wireless communication module, fuel level sensor, external room thermostat, additional loading auger, additional fan, smoke temperature sensor. When you install a new component, you may need to change the burner controller settings. The setup-up operations may be carried out only by an authorized technician

• **CONNECTION OF THE CIRCULATION PUMP**

In order to insure a continuous flow of water, a circulation pump is to be installed in the system, on the return water pipe behind the mixing valve. The electronic controller of the boiler controls the pump. The circulation pump is connected to the terminals of the burner controller (005 and GND).

• **ELECTRICAL WIRING DIAGRAM**

Fig. 11 presents the electric mounting scheme of the Astra S series pellet burner. Figure 12. presents the Astra series P pellet boiler rear control unit and the electrical mounting scheme.

5.8 CONNECTION OF THE WIRELESS WI-FI COMMUNICATION MODULE

Wi-Fi module Fumis WiRCu (Fig. 14) – is an additional module extending the burner control functions which is connected to the pellet burner controller that allows users to control the Astra pellet burner remotely from anywhere in the world. This Wi-Fi module, using your home Wi-Fi network, enables to connect to your burner using a smart phone or tablet with Android or iOS operating system.

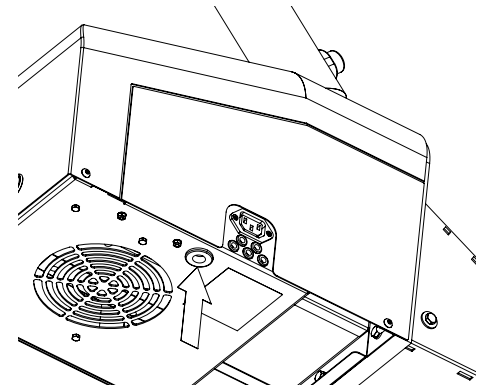


Fig. 13. Rubber gasket at the bottom of the burner for WiRCu signal cable installation to the inside of the burner.

• **WiRCu MODULE MOUNTING**

Attach the WiRCu (Fig. 14) in a convenient location, within the distance of the supplied data cable from the pellet burner. Next to it, install and electric outlet for connection of the WiRCu power block. Connect one end of the cable into the data jack (Fig. 14 pos. 1), and the second – in the socket of the burner controller.

Use the key with hexagon H3 tip to unscrew the two screws (one on the left side of the burner, and the other on the right), which support the burner enclosure (Fig. 7). Open the enclosure by tilting it back – the remaining two screws in front of the burner are used as the pivot axes. If the pellet loading tube prevents the enclosure from opening, release its screws and turn in the right direction.

Lead the DATA cable into the inside of the burner through the rubber seal (Fig. 13). WiRCu module includes the power cord with a USB converter. Connect the USB connector plug into the USB port located on the left side of the WiRCu module.

For further instructions and steps, please carefully read and follow the WiRCu module user's manual, which is available with the WiRCu module

Do not attach and do not connect cables on the actuator – the body may move slightly during operation, and this movement may terminate the cables.

• **CONNECTION OF THE WiRCu MODULE TO THE WI-FI NETWORK**

1. Download Fumis App to your mobile device from Google's app store (Android) or the Mac App Store (iOS) and install it.
2. Connect the power supply for the WiRCu.
3. Start the Fumis application on your mobile device.
4. Confirm the license agreement.
5. After the approval of the program will ask whether your WiRCu device is connected to the Wi-Fi network ("Have you already connected the heating device to your WiFi?").
6. Select "No".
7. The program asks you to enter your Wi-Fi network password ("Enter your wifi password"). Enter the password.
8. In the WiRCu module, press the "SETUP WIFI reset" button. A lamp in the WiFi module (Fig. 14 pos. 3) will start blinking faster.



14 Pav. Fumis WiRCu modulis: 1 – data socket; 2- "Conti" light; 3 - "Status" light; 4 - Wi-Fi indicator; 5 - "Setup WiFi reset" button; 6 - module MAC address; 7 - module PIN code

9. While the WiFi light is flashing, on your mobile device, press the button “Start the WiFi setup”. The WiRCu module will connect to your WiFi network, when the light WiFi is on without flashing (Fig. 14 pos. 3), and the lamp Status (Fig. 14 pos. 2) will start flashing.

10. In the mobile device, press the button “Stop WiFi setup”, press the button “Back”.

11. The program asks you to enter the MAC address of the WiRCu module (Fig. 14 pos. 5) and the PIN code (Fig. 14 pos. 6).

12. Now click the button Connect and the program will connect to WiRCu module.

6. FUEL

Use 6-8 mm diameter high quality pellets to fuel the burner. When purchasing pellets, make sure that they comply with one of standards listed below and that their packing is marked correspondingly:

- EN 14961-2, class A1;
- ENplus-A1;
- DinPlus;

Wood pellets of lower quality could also be used as fuel but the burner’s operation in that case could become unstable because of the fuel quality. Do not use non-wood pellets for fuelling the burner.




The pellets must be transported and stored in a dry place. They swell up after contact with moisture and become unsuitable for firing. The pellets must always be protected against humidity both during transportation and storage.

Parameters of pellets according to the EN14961 standard, class A1		
Length		More than 3, max 15-40 mm
Diameter	D06	6 +/-1 mm
	D08	8 +/-1 mm
Weight	BD600	> 600 kg/m3
Calorific value	Q4.6	> 4.6 kWh/kg
Residual humidity	M10	< 10 %
Ashes content	A0.7	< 0.7 %
Fines content	F1.0	< 1 %

7. CONTROLLER MENU

7.1 DISPLAY

The Astra burner controller consists of two parts: a display and a control board mounted on a frame of the burner. The display operates by principle of capacitive touchscreen. Pushing buttons on it requires good contact with the fingertip rather than force. Therefore, the display will not react if gloves are worn while attempting to use the controller.

Button	Description
	This button is used to start and stop the combustion process in the burner. The process is launched or stopped by pressing the button and holding it for 1 second.
 	Menu buttons are intended to navigate horizontally the controller menu (look at the menu structure tree presented below). The chosen section of the menu is indicated in the upper line of indicators on the display.



Edit buttons are used for two purposes: vertical navigation (look at the menu tree) and increasing/decreasing parameter values in the edit mode, when the selected value blinks.



Enter button is used for entering the edit mode, confirming the set parameter values or entering the lower menu levels.



Cancellation button is used for discarding the made changes and returning up one level in the menu. If you press and hold this button for more than 3 seconds, the last error or alert code will be displayed.

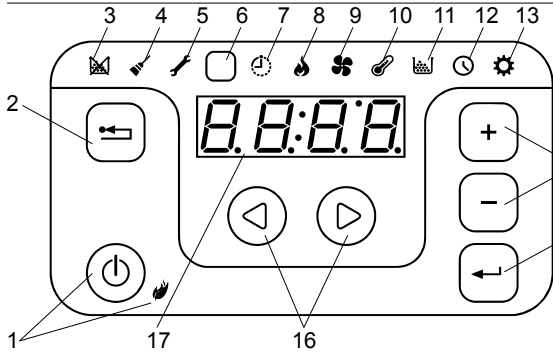


Fig. 15 Display and the remote control unit.

1. Start/stop button and its indicator; 2. Cancel/return button; 3. No fuel indicator; 4. Cleaning required indicator; 5. Servicing required indicator; 6. IR sensor; 7. Weekly timer indicator; 8. Burning power menu indicator; 9. Room ventilator speed menu indicator; 10. Temperature menu indicator; 11. Fuel quality menu indicator; 12. Time menu indicator; 13. Setup menu indicator; 14. Edit buttons; 15. Enter button; 16. Menu buttons; 17. Screen; 18. Burning power +/- buttons; 19. Temperature +/- buttons.

The infrared remote control is intended for day-to-day use when the combustion system is fully configured and operational. It is used for changing the burning power and temperature settings, turning the combustion in the burner on and off.

In the upper part of the display, there is a line of indicators signalling various modes and alerts of the controller. The IR sensor in that line is used for communication with the remote control unit.

The screen displays the set or current values for the currently selected menu option. Buttons help to navigate through the menu and control different functions of the burner controller. The intended use of the buttons is described in the table above.

The display has an integrated beeper. The beeper generates feedback signals, when the display buttons are being pressed. The following sound signals are available:

- Short high tone: sounds when navigating the menu and editing the settings.
- Long low tone: sounds in case of an invalid operation (wrong button pressed).
- Long high tone: in case of an alert, this tone sounds with the user-defined volume; in case of an error, this tone sounds at 100% volume; for description of alerts and errors, refer to the chapter "Troubleshooting".

7.2 NAVIGATING THE MENU

In order to navigate the menu horizontally, in the same level, use the menu buttons . When choosing a menu option, an icon in the indicator line of the display lights up. At the same time, the screen indicates either the value of the chosen menu parameter, or, in the case the chosen menu section has a sublevel (for example, Time menu), the value of the first subsection parameter.

In order to navigate the menu vertically, use the menu buttons . When navigating the lower sublevel of the menu, a number of a particular menu subsection briefly lights up. For example, the Time menu section has a lower level menu consisting of four subsections. Each time you skip to the next subsection the number from 1 to 4 lights in the screen.

To modify a setting in the menu, press button to enter the edit mode for the selected setting. The screen value starts blinking. Use buttons to change the value. To move through the steps in the edit mode, use . buttons. When finished, press button to save the setting and exit the edit mode. The display returns to the menu entry you have just edited.

The screen of the display shows the set value or the actual measured value, depending on the setting. For example, when you edit the temperature, you enter the desired room temperature. After you exit the edit mode, the screen indicates the actual measured temperature which may differ from the set temperature. When you edit, for example, the burning power

setting, the screen indicates the set value.

7.2 NAVIGATING THE MENU

In order to navigate the menu horizontally, in the same level, use the menu buttons \leftarrow \rightarrow . When choosing a menu option, an icon in the indicator line of the display lights up. At the same time, the screen indicates either the value of the chosen menu parameter, or, in the case the chosen menu section has a sublevel (for example, Time menu), the value of the first subsection parameter.

In order to navigate the menu vertically, use the menu buttons $+$ $-$. When navigating the lower sublevel of the menu, a number of a particular menu subsection briefly lights up. For example, the Time menu section has a lower level menu consisting of four subsections. Each time you skip to the next subsection the number from 1 to 4 lights in the screen.

To modify a setting in the menu, press \leftarrow button to enter the edit mode for the selected setting. The screen value starts blinking. Use $+$ $-$ buttons to change the value. To move through the steps in the edit mode, use \leftarrow \rightarrow buttons. When finished, press \leftarrow button to save the setting and exit the edit mode. The display returns to the menu entry you have just edited.

The screen of the display shows the set value or the actual measured value, depending on the setting. For example, when you edit the temperature, you enter the desired room temperature. After you exit the edit mode, the screen indicates the actual measured temperature which may differ from the set temperature. When you edit, for example, the burning power setting, the screen indicates the set value.

To exit the edit mode without saving the changes, press \rightarrow button. This button is also used for returning up one level in the menu. For example, if you are editing the Program 3 in the Weekly Timer Periods menu subsection, press the Cancel button to discard the changes and return to Program 3. Pressing the Cancel button further moves you to Weekly Timer Periods, then - to the Clock menu section.

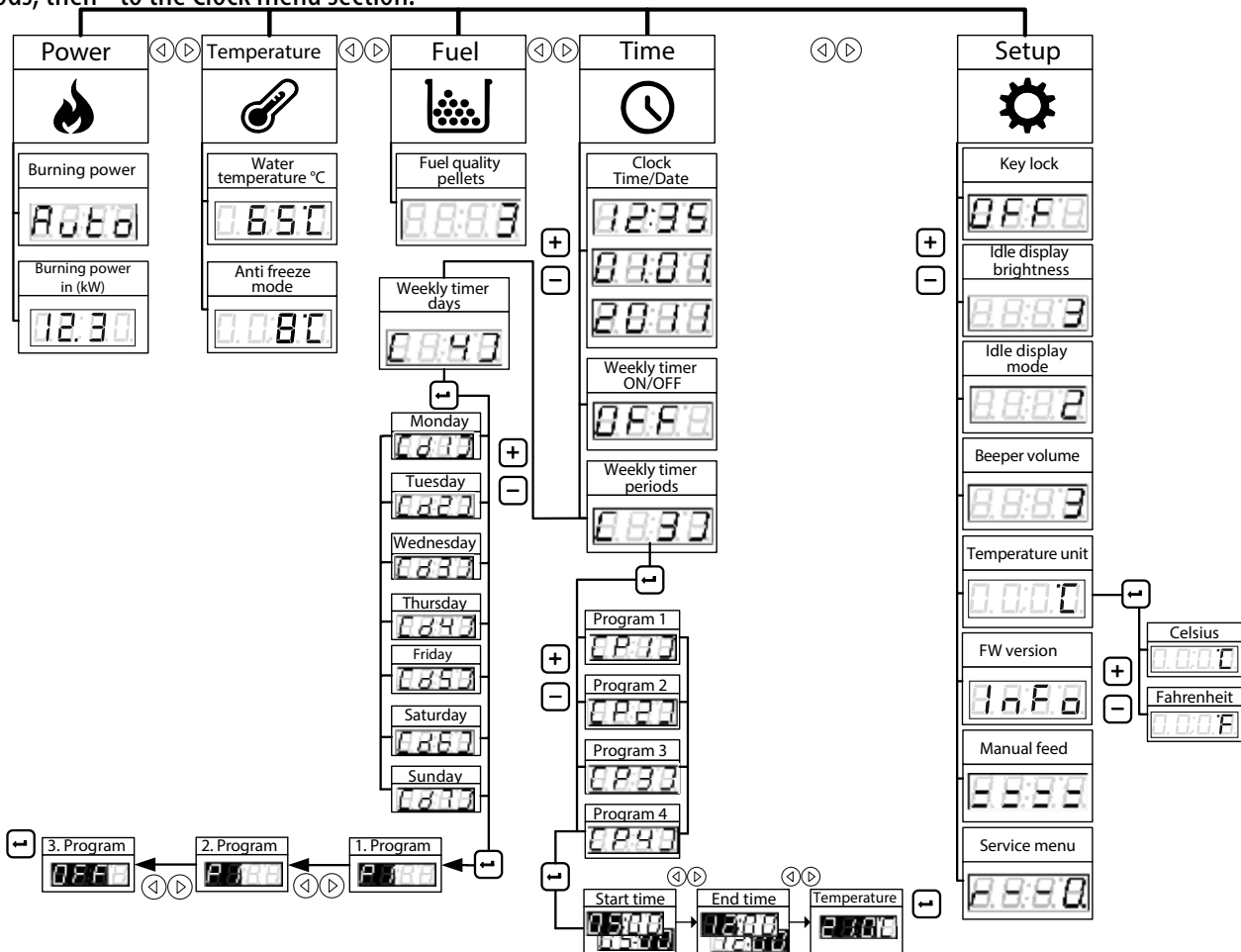





























Fig. 16 Menu structure

7.3 MENU STRUCTURE








The menu structure tree (Fig. 16) exhibits all consisting menu entries. The values of parameters are chosen for purpose of illustration only. The buttons used to reach a particular menu entry are depicted near it.


7.4 SETTING THE CLOCK















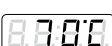













The controller enables you to set the current time, date and weekly timer programs. These settings do not disappear even after power supply failure because the controller has a long-lasting battery. To look up at the current time, press   button to enter the Time menu section. The current time is indicated on the screen . To turn to the other Time menu subsections, use   buttons. The numerical value from 1 to 4 will shortly light up in the screen, when passing each subsection.

	Clock and date setting mode. Press  button and change the desired values.		
	With   buttons set the desired hour. Press  .		With   buttons set the minutes value. Press  .
	With   buttons set the desired day. Press  .		With   buttons set the month value. Press  .
	With   buttons set the year value. Press  .		

7.5 SETTING THE WEEKLY TIMER PROGRAMS

	Weekly timer activation. Press  button and enter the edit mode. With   buttons choose the desired value.
	Weekly timer is switched off.
	Weekly timer is switched on. The icon  in the indicator line lights permanently.

The first step in weekly timer programming is to describe the time intervals- programs. The description consists of specifying the interval start time, the end time and the desired temperature. Then, the desired programs are assigned to each day of a week. The controller permits you to create up to 6 different timer programs and to assign a maximum of 3 of them to each day of the week. The programs with start time in one day and end time in the next day are also allowed. When the weekly timer is active, the icon  in the indicator line lights permanently.

	Creating and editing the weekly timer programs. Press  button and enter the first program edit mode. Use   buttons to skip to another programs for editing.		
	First program. Press  button and enter the desired values.		
	With   buttons set the start time value. Press  .		
	With   buttons set the end time value. Press  .		
	With   buttons set the desired temperature of the program. Press  for confirmation.		
	Second program. Press  button and enter the desired values.		
	With   buttons set the start time value. Press  .		
	With   buttons set the end time value. Press  .		

8850	With + - buttons set the desired temperature of the program. Press ↵ for confirmation.
-------------	---

(the third, fourth, fifth programs are skipped for the purpose of illustration)

0860	Sixth program. Press ↵ button and enter the desired values.
23:00	With + - buttons set the start time value. Press ▶ .
04:30	With + - buttons set the end time value. Press ▶ .
8600	With + - buttons set the desired temperature of the program. Press ↵ for confirmation.

0843	Assigning programs to week days. This is performed after the programs have been created (see above). Press ↵ button and enter the Monday edit mode. With + - buttons skip to another week days for editing.
-------------	--

0810	Monday. 3 different programs can be assigned to each day of a week. Press ↵ button and enter the desired values. If only 2 programs are planned for a particular day, choose option OFF for one of the entries.
88P1	With + - buttons set the desired program number. Press ▶ .
88P2	With + - buttons set the desired program number. Press ▶ .
88P3	With + - buttons set the desired program number. Press ↵ for confirmation.

0820	Tuesday. 3 different programs can be assigned to each day of a week. Press ↵ button and enter the desired values. If only 2 programs are planned for a particular day, choose option OFF for one of the entries.
88P1	With + - buttons set the desired program number. Press ▶ .
88P2	With + - buttons set the desired program number. Press ▶ .
88P3	With + - buttons set the desired program number. Press ↵ for confirmation.

(Wednesday, Thursday, Friday, Saturday are skipped for the purpose of illustration)

0800	Sunday. 3 different programs can be assigned to each day of a week. Press ↵ button and enter the desired values. If only 2 programs are planned for a particular day, choose option OFF for one of the entries.
08P8	With + - buttons set the desired program number. Press ▶ .
88P4	With + - buttons set the desired program number. Press ▶ .
88P6	With + - buttons set the desired program number. Press ↵ for confirmation.



If two programs with overlapping operation time are assigned to the same day of the week, the controller, during the overlap period, performs the program with higher title number. For example, program P6 will have priority against P3.

An example of created programs is presented in the table below:

P1 Program	P2 Program	P3 Program	P4 Program	P5 Program	P6 Program
On Off	On Off	On Off	On Off	On Off	On Off
23:00 4:30	4:30 7:30	17:00 23:00	00:00 7:30	7:30 24:00	7:30 23:00
70°C	65°C	60°C	65°C	70°C	60°C

The above mentioned programs are displayed in the time intervals diagram:

Day/Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
(d1) Monday	[P1] 70°C			[P2] 65°C						[P3] 60°C														
(d2) Tuesday	[P1] 70°C			[P2] 65°C						[P3] 60°C														
(d3) Wednesday	[P1] 70°C			[P2] 65°C						[P3] 60°C														
(d4) Thursday	[P1] 70°C			[P2] 65°C						[P3] 60°C														
(d5) Friday	[P1] 70°C			[P2] 65°C						[P3] 60°C														
(d6) Saturday	[P4] 65°C						[P5] 70°C																	
(d7) Sunday	[P4] 65°C						[P6] 60°C																	

7.6 SETTING THE WATER TEMPERATURE



The burner is capable of sustaining the desired boiler water temperature. It has a NTC temperature sensor for that purpose. The sensor must be placed in a special immersion pocket of your boiler, or fixed on an outside surface of the flow water pipe if the pocket doesn't exist. The burner reacts to indications of the sensor and increases the heating power after the water temperature has decreased below the set temperature level. When the water temperature nears or overshoots the temperature which is set as preferred in the controller, the burner decreases the heating power or even stops.






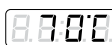
There are two ways to set the desired water temperature:




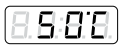
- use weekly timer programs;
- set the water temperature manually.

When using weekly timer, you describe time intervals for each day of a week and assign the desired water temperatures to them. For more information about time programming, see the previous chapter "Setting the Weekly Timer Programs".

It is also possible to set the desired water temperature manually. If a weekly timer program is active at the same time, the manually set water temperature temporary gains priority. This priority disappears when the current weekly timer program ends. When the next time program starts, the water temperature again is controlled by the weekly timer.

To view a current water temperature, press   button to enter the Temperature menu section. The actual measured water temperature value is indicated on the screen.

	To set the desired room temperature, press  button. The screen indicates the target temperature in the blinking mode. Increase or decrease this value with   buttons. When finished, press  button for confirmation. The actual measured room temperature is indicated on the screen again.
	Actual measured water temperature.

	Anti-freeze mode. Lets you to select a minimal necessary water temperature that has to be maintained. Burner will automatically start the burning process to keep the water temperature above the selected necessary temperature. Antifreeze mode is functional only when the weekly timer is set to ON. It is possible to set minimal necessary water temperature in range of 3 – 50 °C
	OFF means that Anti-freeze mode functionality is OFF. Burner will not preserve the water from freezing.
	Minimal necessary water temperature is 3°C
...	...
	Minimal necessary water temperature is 50°C

7.7 THERMAL POWER SETTING



	To view the current heating power, keep pressing the Menu (◀▶) button until you reach the Power section menu. There are six manual power setting levels. When changing the transport auger and the exhauster fan speed, the controller changes the air quantity required for pellets and combustion. If the target room temperature is set, the burner automatically chooses the optimal power level. You can intervene in this process and set, for example, higher power, if you want the room temperature to be reached quicker. To save fuel, you can reduce the power level. In any case, when the room temperature reaches the set temperature, the burner will reduce the thermal power to save fuel. Press the (⏏) button and change the necessary data. Select the desired value using the buttons (+) (-).
	First level.
	Second level.
	Third level.
	Fourth level
	If the target room temperature is set, the burner automatically chooses the optimum power level. The text "auto" is lit on the display.
	If you need to quickly warm the cold room, set the highest power level
	You can see the current status of the burner in the status display window:

	The burner is off
	The burner is in the initiation stage (rising column)
	The burner is in the extinction stage (descending column)
	The burner is in the combustion stage. Shows instantaneous power, kW

7.8 SETTING THE FUEL OPTIONS




The Fuel menu section enables you to select the fuel quality. The quality of pellets are expressed in the following values: . These values stand for the moisture content in pellets. By selecting one of these three fuel options, you can adjust combustion air amount. Fuel option is the default and most strongly recommended to use.

- factory combustion air rate;
- 5% less air for combustion;
- 5% more air for combustion.

7.9 MODIFYING THE SETUP OPTIONS





The Setup menu section enables you to set the options for Key lock, Idle display brightness, Idle display mode, Beeper volume and view service information.






















	The Key lock option enables you to lock the keyboard on the display in order to prevent accidental changes of the settings. With the key lock enabled, you can navigate the menu to display current values, but you cannot edit any of the settings, except the Key lock itself. Note that this option does not disable the remote control. The Key lock setting offers the following options:
--	--





	The Key lock is disabled, all buttons are operational.
	The edit mode is disabled. The Enter button is locked.
	The edit and the power on/off modes are disabled. The Enter button and the Power button are locked.











We recommend using the Key lock option, when cleaning the display.

	The display brightness in the idle mode can be set from 1 to 5 or set to turn off after 30 seconds.
	The display switches off after 30 seconds. The lighting is restored after pressing any button.
	Brightness of the display is 1.
...	...
	Brightness of the display is 5.

	The Idle display mode has the following options:
	The display stays in the last selected menu section. In case the menu has been in the edit mode, the changes are discarded and the edit mode is exited.
	The display exits the last selected menu section and cycles between a current water temperature and a clock.  <-> 
	The display exits the last selected menu section and moves to the Temperature menu. The actual measured room temperature is displayed on the screen. 
	The display exits the last selected menu section and moves to the Time menu. The current time is indicated on the screen. 
	Beeper volume setting enables the user to change the volume of the display signals from 1 to 5 or switch the beeper off.
	The beeper is off.
	The sound level is 1.
	The sound level is 2.
...	...
	The sound level is 5.
	Temperature measurement units.
	Celsius.
	Fahrenheit.
	The controller information menu subsection. Used for service purposes.
	After pressing the  button you can see firmware version of the display or the controller main board.
	Screw feeder control menu. The screw feeder ON/OFF function is used to fill the feeder with pellets when the pellet hopper becomes empty after some time of the burner operation. It is also used during the first run or after maintenance if the feeder is completely empty. When the screw feeder is turned ON, the empty tube of the feeder gets stuffed with pellets.

	<p>Press the  button and hold it while the screw feeder motor operates and fills the feeder tube with pellets. Release the button to stop the feeder's gear motor. When the gear motor is turned ON, running lines are indicated on the screen.</p>
	<p>The service menu subsection. Access for the authorized service personnel only.</p>
	<p>The key symbol is indicated on the screen.</p>

To modify the setup options, press   button to enter the Setup menu section. The set idle display brightness value is displayed. To move between the setup options, press   buttons to display the settings. To change a setting, press  button and use   buttons to increase/decrease the selected values. When finished, press  button to confirm the set value.

8. OPERATION

The Astra pellet burner uses the Fumis ALPHA controller which takes care of all the burning control processes. The ALPHA controller features a battery powered internal clock, serial communication with PC and Fumis ALPHA keyboard and 16-bit microcontroller. All sensors and other accessible connectors are doubly insulated. The Fumis ALPHA controller complies with high safety standards.

• SCREW FEEDER OPERATION

The Astra burner controller can support up to two feeders. The primary screw feeder is used for loading the wood pellet type fuel into the burning chamber of the burner. The screw feeder operates in an ON/OFF mode. The ratio between the ON and the OFF times defines the amount of pellets supplied to the burning chamber. The operation of the feeder is defined with the pertaining parameters and is configured specifically for each burning phase or sequence.

In addition to the primary screw feeder, the second screw feeder unit can be connected. When the pellet level sensor is used, the second feeder serves as a supplement fuel feeder for filling up an operation pellet hopper from the main pellet storage.

• COMBUSTION FAN OPERATION

The Astra burner combustion system regulates the combustion fan speed based on the motor's Hall sensor feedback. The burner controller compensates for all variations in voltage and tolerances of the motor but cannot compensate for the chimney quality and air pressure. Speed of the motor can vary in a range of 0-2900 rpm.

• PHASES OF OPERATION

The Astra burner controller defines the following main operation phases of the combustion system:

- Fire Up phase
- Burning phase
- Cleaning phase
- Fire Down phase
- OFF

Each phase is divided further into sequences which can vary depending on configuration.


8.1 FIRE UP PHASE

In this phase, the burner combustion system is turned on. It starts operating and ignites the fuel in the burning chamber. To start the burner, press and hold the power button for 3 seconds – the green LED indicator near the power button will start blinking, meaning that the burner is turned on and starting.

FIRE UP phase is divided into the following sequences:

TEST FIRE. In this sequence, the controller performs a test using a flame sensor to determine if a flame is present in the burning chamber of the burner. If the flame is detected, the controller goes straight to the next BURNING phase. If there is no flame in the burning chamber, the controller goes on to the next part of the queue - the HEAT UP sequence.

HEAT UP. In this sequence, a heating element (igniter) warms up and fuel is intensively loaded into the burning chamber. A fan works at low speed. Duration of the sequence is 120 seconds.

FUEL IGNITION. In this sequence, the heating element heats the fuel which starts glowing and emitting gases; the flame develops after a while. The sequence is not defined by a specific period - it will continue until the flame sensor reports that the flame has appeared. Then, the IGNITION TEST sequence starts. However, there is a maximum time limit of 20 minutes set to pass the sequence. If the designated time has elapsed and the flame has not appeared, the burner stops and the alarm "Burning chamber or chimney dirty" is shown – the LED indicator with the broom symbol  starts blinking.

IGNITION TEST. This sequence is executed when the flame sensor reports the presence of the flame. In this sequence, the controller starts the combustion fan with a set speed. At the end of the phase, it checks if the flue gases temperature has risen by more than 3°C per minute or if the flame sensor still reports the flame signal. If so, the BURNING phase starts, if not, the ignition test is repeated until time-out. The set time-out limit for this phase is 5 minutes. If the limit is reached, the controller reports the ALARM FIRE error.

8.2 BURNING PHASE

After successful FIRE UP, the BURNING phase starts. Burning power level can be set manually by choosing between levels from 1 to 5 (setting 5 is AUTO) and Hi. When the AUTO mode is chosen, the burner operates at maximum power till it reaches the set desired water temperature. Then, power of burning is further regulated automatically and modulates to maintain the selected water temperature. Modulation of the burner is very smooth – there are 1024 steps between the 1 and the Hi power levels.


8.3 CLEANING PHASE

During the BURNING phase, the controller interferes into it to make a planned cleaning. Cleaning is done after every 25 minutes of screw feeder total OFF time (the controller calculates the durations of screw feeder pauses and sums them up, until the sum is equal to 25 minutes).

The first five cleanings are blow-type. The screw feeder stops feeding pellets and the combustion fan starts working at a high speed for 30 seconds. A strong stream of air blows away the ashes incremented in the combustion chamber of the burner. Having performed the cleaning stage, the burner returns to a usual burning operation.

After succession of five blow-type cleanings, the sixth cleaning done is a mechanical one. The screw feeder stops feeding pellets and the combustion fan blows air at a high speed. When the flame sensor reports that the fire is gone, the controller turns on an actuator. A shaft of the actuator moves the drawer of the burning chamber forwards, and then backwards, thus dumping all the burned content from the chamber. After the mechanical cleaning phase, the burner restarts, ignites pellets and continues burning process as it has been before. Calculation of the cleaning cycles also restarts from 0.

8.4 FIRE DOWN PHASE

In this phase, the burner combustion system is turned off and the burning chamber starts cooling down. The burner can be turned off manually (at the control panel by pressing the power button  for 3 seconds) or by an external power signal: by a weekly timer, by a thermostat or by an Android gadget using the WiRCu unit. The feeder stops loading the fuel into the burning chamber and the combustion fan cools down the burning chamber. There are two sequences in the FIRE DOWN phase:

Stop Fire. Active until the flame sensor gives the No Flame signal. After the Stop Fire has been executed, the combustion fan accelerates to full speed for a set period of time in order to clean the burning chamber.

Cool Fluid. When the temperature of water at the minimum burning power rises above the set upper threshold (factory set default value = set water temperature + 5°C), the combustion system turns off. It restarts automatically when the air/water temperature falls below the set threshold.

8.5 OFF PHASE

The burner combustion system has cooled down and the fan is turned off. The combustion system is in the standby mode and can be turned on manually, by a weekly timer, by a thermostat, or by an Android device using the WiRCu unit.

9. ADJUSTMENT

Before the first start of the burner, please make sure that:

- installation has been carried out properly;
- the angle of the screw feeder is 45° from the horizontal plane;
- all control units have been properly adjusted;
- the boiler is in proper functioning order;
- there exists a sufficient air supply for combustion in a boiler room;
- the screw feeder is not empty and wood pellets are being fed to the burner properly;
- the flue has a draught limiter, is fully intact and of right dimensions.

• VALUES OF THE COMBUSTION PARAMETERS

Factory settings of the burner are not instant operational settings. They should be adjusted by using a flue gas analysis instrument in every single instance. Correct adjustments are important in order to ensure fuel burning efficiency, a high level of energy efficiency, low emission of substances that may harm an environment, and also for the longevity of the burner parts which come into direct contact with the flame. Optimal adjustments can only be achieved by using flue gas analysis instruments.

The values presented below are recommended for optimal combustion of the burner. Note that these values vary during the combustion stages:

- Flue gas temperature: 130–160 °C
- Efficiency level: >80 %
- CO content: <300 ppm
- Set boiler water temperature: 75–80 °C
- CO₂ content, substance: 12.5 % (depending on the type of flue, it can vary by ±2.5%)

9.1 FILLING THE SCREW FEEDER WITH PELLETS

For successful start-up, the screw feeder must be filled with pellets. There are two possible ways to do it:

a. Use the special controller option called “Screw feeder control menu”. The instructions on how to use this option can be found in this user manual’s section 7.9 “Modifying the setup options”.

b. Connect the screw feeder directly to the power supply. Just connect the screw feeder power supply cable to the same socket that is used for the Astra pellet burner power supply and is located on your boiler. Keep in mind that the boiler power supply must be turned ON.

Using any of these two options, fill the screw feeder until the first pellets begin to drop into the burning chamber of the burner.



Do not place your hands or objects inside the screw feeder because of risk of injury!

9.2 INDICATORS OF CORRECT COMBUSTION

• FLUE GAS TEMPERATURE

While operating at rated output, the temperature in the flue gas pipe of the boiler should be 160-200 °C. Higher temperatures can be resulted by soot blockage in the boiler, or by excessive combustion air supply. Too high flue gas temperatures cause poor efficiency levels and unnecessary high pellet consumption.

An older boiler often has higher flue gas temperatures than a modern type boiler in the same conditions.

A low flue gas temperature may be due to poor combustion because of a lack of combustion air, or that the burner is used in over-sized boiler, especially when running at low power output settings. In this case there is a risk of condensation in the flue with frost damage as a result.

• THE FLUE

In order to avoid damage to the flue, flue gas temperatures must be checked on every occasion. During combustion process, water builds up in the form of water droplets. These droplets follow the flue-gases out of the flue, and depending on the drop in temperature, the droplets can condense into water, which can then cause damage to the flue.

Condensation damage can be avoided if flue gas temperatures are no lower than 70 °C at one metre from the top of the flue. Even though low flue gas temperatures give a higher efficiency level, this merit has to be weighed against the high risk of condensation.

The measures to take for raising the flue gas temperatures are these:

- remove any agitators or baffle plates in the boiler;
- mount a contraflow hatch;
- isolate the flue in a cold environment;
- increase the burner's power output level;
- mount an insert pipe.

• CONTRAFLOW HATCH

All pellet burning equipment should have a contraflow hatch. For flues higher than 5 meters, or with a very high and/or variable draught, this hatch is a statutory requirement. Draught is affected by temperature, weather and wind. Given the fact that combustion results are affected by draught, stable draught conditions are very much preferred.

The simplest way to stabilise draught conditions is to mount a contraflow hatch on the waste gas flue. In this case, the air from the burner combustion chamber slips into the waste gas flue via the hatch. The advantages of having the contraflow hatch are:

- more stable draught and flue gas temperature;
- reduced losses when in the OFF mode;
- ventilation of the waste gas flue;
- drier flue-gases, which reduces the risk of condensation.

• AGITATORS

Certain boiler types have, or can be equipped with, flue gas agitators. Their job is to agitate the flue-gases in order to obtain more heat and thereby raise efficiency levels. With a low burner heating output, the flue gas temperature is low and there is a risk of condensation build up in the flue. Try to shorten the agitations somewhat until a suitable flue gas temperature is obtained.

• SMOKE FROM THE FLUE

The colour of the smoke reveals how well combustion is proceeding:

- Grey brown: there is a lack of air.
- Invisible: heat shimmer, in temperatures above freezing, or just below, the smoke should be invisible.
- White: with lower outside temperatures, only a weak white trail of steam should be seen.

Where a boiler has previously burned timber, the smoke can be dark and have a strong smell because the tar in the boiler and flue walls is being burned off. This can last for up to a week.

• SMOKE EMISSION

If the unit's hatches and damper are not sealed correctly, there is a risk of smoke emission, particularly if overpressure builds up in the boiler. A smoke alarm can be a great help in showing that flue-gases are leaking from the burner room. Boiler hatches must always be closed when the burner is in operation.

• THE FLAME

The amount of air must be adjusted so that the flame is light yellow. A few minutes after start-up, the flame should have a yellow-white appearance. It is perfectly normal for the colour to vary between yellow and white.

The colour of the flame is an indicator of how well the combustion process is going:

- Light yellow: good combustion, invisible smoke at normal temperatures;
- Reddish: not enough air or too much fuel, low efficiency level, the boiler heat absorbing surfaces are blocked by soot.



A short flame is due to surplus of air or a lack of fuel. This leads to a low efficiency level and a high flue gas temperature.

9.3 POWER ADJUSTMENT OF THE BURNER



Due to the screw feeder's uneven feed ratio during the first day of use, the adjustments should be checked after approximately one week's cycle. Adjustments must be carried out using a flue gas analysis instrument.



Adjustments are made by changing the values of the factory parameters through the secured service menu of the controller. It is strictly forbidden to change any other parameter value than those mentioned in this section. Changing other parameters may lead to serious failures in the burner's operation processes.

• HIGH POWER OUTPUT ADJUSTMENT

Perform the next steps:





1. Start the burner and allow it to run at highest power output for approximately 10 minutes.
2. Carry out a CO₂ measurement. If the CO₂ value (see section 9.Adjustment) is too low, you will need to increase the Parameter No 18 (P018) value. If the CO₂ value (see section 9.Adjustment) is too high, you will need to reduce the Parameter 18 (P018) value.






Parameter 18 defines duration of the fuel dosing interval for the highest power. Increase of its value raises the fuel dosing rate. The screw feeder delivers doses of pellets in ON/OFF intervals. One ON interval + one OFF interval = 1 period. The period duration is 10 seconds. By changing the parameter 18 value, you are changing the ON interval duration. For example, if the Parameter 18 value is 62, this means that the ON interval duration is 6.2 seconds (10 units are equal to 1 second). Accordingly, the OFF interval duration will be $10 - 6.2 = 3.8$ seconds. So, at the high power output, the feeder will be repeatedly working in 10 second periods, when pellets are dosed for 6.2 seconds, and for 3.8 seconds, pellets are not dosed.

3. Use the secured service menu to change Parameter 18 (Power 5 feeder 1 ON time) regarding the measured CO₂ value:










3.1. Press the buttons   until the Setup menu  is accessed.

3.2. When the Setup menu icon  lights, use the Edit buttons   and choose the Setup menu level  (Service menu).

3.3. Press the Enter button . The Key sign  appears on the display. This means that the Service menu is locked. Press the enter button  again. A random number from 0000 to 9999 will appear on the display. Sum up each digit of this number shown on the display, and add 1 to the sum. The number you calculated will be your unlock code (For example, if the random number shown on the screen is , sum up each digit: $9 + 1 + 6 + 3 = 19$. Now add 1 to the sum you got: $19 + 1 = 20$. So, your unlock code is 20).

3.4. Press the Enter button . The display shows . Use the Edit buttons  , and change the number 0 to the number you have calculated as your unlock code (in the example above, it was 20) and then press the Enter button .

3.5. You have successfully unlocked the service menu. Again go to the Setup menu . When the Setup menu icon  is lit, use the Edit buttons   and choose the Setup menu level  =  (Parameters). Press Enter button .

3.6.  appears on the screen. Use the Edit buttons  , and select the parameter No 18  which you need to change. Press the Enter button . The current parameter value appears on the screen. Use the Edit buttons   and adjust this value with respect to the measured CO₂ value. Press the Enter button  and overwrite the default value with the one you entered (with the Cancel button  you can go back by one menu level by every press).

• **LOW POWER OUTPUT ADJUSTMENT**

Perform the next steps:

1. Start the burner and allow it to run at its lowest power output for approximately 10 minutes.
2. Carry out a CO₂ measurement. If the CO₂ value (see section 9.Adjustment) is too low, you will need to reduce the Parameter No 24 (P024) value. If the CO₂ value (see section 9.Adjustment) is too high, you will need to increase the Parameter No. 24 (P024) value.

Parameter 24 is the combustion fan speed at the lowest power level. The higher the value, the higher the fan speed, and accordingly, more air is provided for combustion. To calculate the exact fan speed in rpm, you need to multiply the parameter 24 value by the multiplier *11.4. This means that when the Parameter 24 value is, for example, 100, the fan speed then is $100 * 11.4 = 1140$ rpm.

3. Use the secured service menu to change Parameter 24 (Power 1, Fan 1 speed) regarding the measured CO₂ value. Perform steps from 3.1 to 3.6 described above in “High power output adjustment”. The procedure is analogical.

9.4 CLEANING OPERATION ADJUSTMENT

The Astra pellet burner has some automatic cleaning operations which are done during combustion process. These cleaning operations are:

- **Blow-cleaning.** Pellets stop being dosed temporarily, and the combustion fan starts blowing at a higher speed to clean the combustion area with a stream of air. Possible adjustments of this operation are: the blow-cleaning duration, the fan speed during the cleaning, and the frequency of cleaning.
- **Mechanical cleaning.** It is done after a set amount of blow-cleanings. During mechanical cleaning, pellets stop being dosed, and as soon as the fire is gone in the burning chamber, the actuator extends and then retracts back the burning chamber drawer, removing all the burned contents: ashes, soot, slag. After the mechanical cleaning, the burner restarts and burning process continues further. Possible adjustment of this operation is changing frequency of the mechanical cleaning.

The factory settings for the cleaning operation are pretty much optimal for using high quality A1 class wood pellets. However, using other types of pellets (worse quality), may lead to a different pollution level in the burning chamber. If slag builds up intensively in the burning chamber, and the blow-cleaning is not able to reduce it effectively, or if after mechanical

cleaning, big pieces of slag are still left in the burning chamber, intensification of the cleaning operations may be a solution. However, if the burning is going perfectly, and there are no signs of excess slag building up, consider reducing the cleaning intensity and mechanical cleaning frequency. This will lead to longer burning periods with less restarts.

- **BLOW-CLEANING PERIOD**

The blow-cleaning period describes the time lapse between two blow-cleanings.

To adjust the blow-cleaning period, change the Parameter No 60 value (P060; Fan 1 blow-cleaning period). Parameter No 60 units are minutes. Keep in mind that the blow-cleaning period is not related to the screw feeder ON time, but instead, in regards to OFF time (the amount of time for pauses when dosing pellets). The Parameter 60 factory value is 25. This means, that by default, each blow-cleaning will be done after 25 minutes of the screw feeder OFF time. One example is when the burner is working at such a power output, that the pellets are dosed for 6 seconds, and the pause duration (OFF time) is 4 seconds. The burner controller calculates these OFF times, and when the sum reaches 25 minutes, blow-cleaning will be done. The higher the power output is, the shorter the OFF time durations happen. This means, that the cleaning is done less frequently when the burner runs at high power output, and more frequently when it operates at low power output.

- **BLOW-CLEANING DURATION**

The blow-cleaning duration is the time amount in seconds, which describes the time lapse when blow-cleaning is happening. During it, pellets are stopped feeding. To adjust the blow-cleaning duration, change the Parameter No 61 (P061; Fan 1 blow-cleaning duration) value. Parameter 61 value units are seconds. This parameter's factory value is 30, which means that by default, the blow-cleaning duration is 30 seconds.

- **COMBUSTION FAN SPEED DURING THE BLOW-CLEANING**

During each blow-cleaning, the combustion fan starts blowing at a higher speed in order to puff out as much as possible ashes and soot from the burning chamber. To adjust the combustion fan speed during blow-cleaning, change the Parameter No 62 (P062; Fan 1 blow-cleaning speed) value. Parameter 62 defines the fan speed using the multiplier *11.4. The factory value for parameter No 62 is 230. This means that by default, the combustion fan speed during blow-cleaning will be $230 * 11.4 = 2622$ rpm. The maximum allowed fan speed is 2900 rpm (parameter value 255).

- **MECHANICAL CLEANING FREQUENCY**

The mechanical cleaning is performed after a certain number of blow-cleanings done in a row. To adjust the mechanical cleaning frequency, change the Parameter No. 64 (P064; Chamber cleaning duration/rot.) value. Parameter No. 64 units are the number of times that the blow-cleaning is done in a row, less 1 blow-cleaning. The factory value of parameter No. 64 is 6. This means that by default, mechanical cleaning will be done instead of the 6th blow-cleaning – there will be five blow-cleanings in a row, and then, at the 6th time, a mechanical cleaning will be started, instead of a blow-cleaning. After the mechanical cleaning, the burner restarts, and the blow-cleaning counter also resets.

10. CLEANING

The Astra S-series burner is equipped with an actuator. The actuator enables the burner to work for much longer periods without any cleaning efforts required by a user. On the opposite, conventional burners which are not equipped with an actuator require daily care and a burning chamber cleaning. However, after some time, cleaning operations should periodically be done in the Astra S-series burners as well.

- **BURNING CHAMBER CLEANING**


The actuator extends and retracts the drawer of the burning chamber, thus removing ashes, soot and slag from inside. This mechanical dumping does not completely prevent the chamber from getting dirty. Combustion residues start to increment

the walls of the burning chamber; as a result, the combustion air supply holes get clogged. To remove these unwanted increments, the burning chamber should be cleaned.

Before cleaning the chamber, make sure that the burner is switched off, there must be no fire inside the boiler, the boiler and the burner have totally cooled down. Open the upper door of the boiler. Using a brush or any small scraper, scrape off the inner walls of the burning chamber. Remove the waste with an ash vacuum cleaner.

• **FLAME SENSOR CLEANING**

After longer periods of the burner operation, the flame sensor's sensing part may cover up with a layer of soot. The layer hampers the sensor's ability to effectively detect the flame. This may lead up to problems during the ignition process: the ignition may take longer because the sensor will detect the flame appearance harder and later. The dirty flame sensor may lead to fake alarms which may stop the burner as well.

 **Disconnect the burner from the power supply before cleaning. If the burner is already mounted in the boiler, be sure that the burner is switched off, that there is no fire burning in the fire chamber, and that the boiler and burner have fully cooled down.**

Unscrew two bolts which fasten the casing of the burner (Fig. 7). To open the casing, you may need to straighten the fuel downpipe (its end should be directed towards the Astra logo on the front of the burner). In some cases, you may also need to loosen the adjustable brace of the screw feeder flexible hose and disengage the screw feeder from the fuel downpipe. Open the casing by raising the unscrewed side of it.

The flame sensor is located at the right side of the box which holds the fuel downpipe. Take a wire and pull the sensor out of its plastic insert (Fig. 17). The tip of the flame sensor has a sensing part with a little peephole. Take a slightly wet fabric patch and wipe out all dust from the flame sensor, especially from the transparent area. Insert the cleaned flame sensor back into its place. Reassemble the burner casing.

• **BOILER CLEANING**

The ash is removed from the boiler every 3-7 days. Before carrying out the boiler cleaning operations, take care of personal protective equipment: appropriate clothing, gloves.

 **Make sure the burner is switched off from the mains there is no flame in the combustion chamber and the burner is completely cold.**

One or two times a month clean the boiler cavities of soot and resin deposits. For this purpose, lift the top cover (Fig. 6 pos. 1), remove the covers of the combustion chamber and the smoke channel (Fig. 6 pos. 2 and 3). Remove the turbulent insert (Fig. 3 pos. 4), fireclay plates (Fig. 3 pos. 3), flue top (Fig. 18 pos. 1) and lower caps (Fig. 3 pos. 5)).

Clean soot and deposits from the combustion chamber and the flue walls with a rake or a wire brush. Deposits dropped from the combustion chamber wall fall directly into the ashtray. There is an opening to clean the deposits dropping on the bottom of the flue channel to which the soot and deposits fall into the ashtray. Pull out the ashtray and remove the ash. Collect fallen deposits and ash with a vacuum cleaner.

After cleaning, MOUNT the boiler components in reverse order.

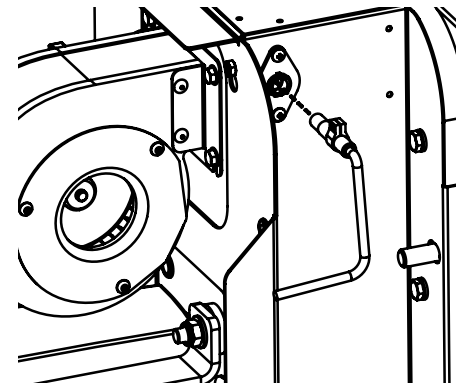


Fig 17. Taking out the flame sensor.

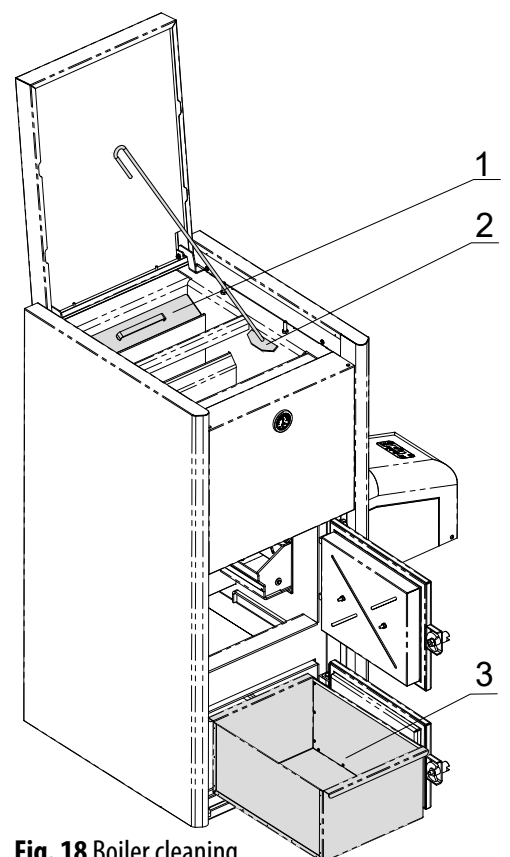


Fig. 18 Boiler cleaning. 1 – Upper chimney cover; 2 – Poker; 3 – Ashes drawer.

11. MAINTENANCE

11.1 CHANGING THE HEATING ELEMENT

⚠ Disconnect the burner from the power supply. The burner is powered by the ~230V, AC electrical current, and any direct user contact with it may be life threatening. If the burner is already mounted in the boiler, make sure that the burner is not working, that there is no fire burning in the fire chamber, and that the boiler and the burner have cooled down completely.

Disconnect the flexible hose of the screw feeder from the fuel downpipe. Then, using the same instructions as in section 5.3, part “Mounting the burner onto the boiler”, only in reverse order, open the lid of the burner, and unmount the burner from the boiler by unscrewing the two nuts, which hold the burner to the boiler.

To reach a heating element and change it, the next steps should be performed:

1. Unscrew the bolt on the top of the burning chamber. Dismount the deflector plate (Fig. 19);

2. Unscrew two bolts on the burning chamber lateral walls. Then, remove the guiding plates from inside the burning chamber (Fig. 20);

3. When the guiding plates have been removed, you can disconnect the heating element wires – the two wires are connected to the relay board contacts designated “IGNITER”, the third, grounding wire is connected to the grounding terminal (Fig. 1, position 10);

4. Now you can take out the heating element plate: unscrew further four bolts on the burning chamber lateral walls. Take out the heating element unit together with a plate (Fig. 21);

5. Unscrew the nut which holds together the heating element and the thermal screen plate. Remove the thermal screen, dismount the heating element (Fig. 22).

6. Change the heating element and assemble the chamber in the reverse order. To route the wires of heating element, pull them through the rubber bushing on the rear wall of the chamber (Fig. 23).

⚠ When positioning the new heating element onto the heating element plate, make sure that the heating element touches the two metal fingers of the plate (Fig. 22). Then slots of the plate find themselves in between winding of the heating element and air can move through unobstructed.

11.2 CHANGING THE ACTUATOR

⚠ Disconnect the burner from the power supply. The burner is powered by the ~230V, AC electrical current, and any direct user contact with it may be life threatening. If the burner is already mounted in the boiler, make sure that the burner is not working, that there is no fire burning in the fire chamber, and that the boiler and the burner have cooled down completely.

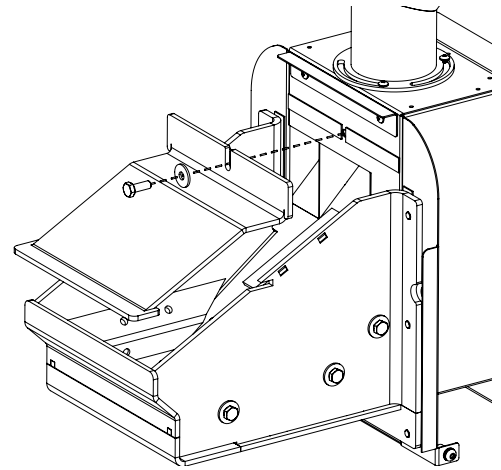


Fig. 19 Dismounting the deflector from the burning chamber.

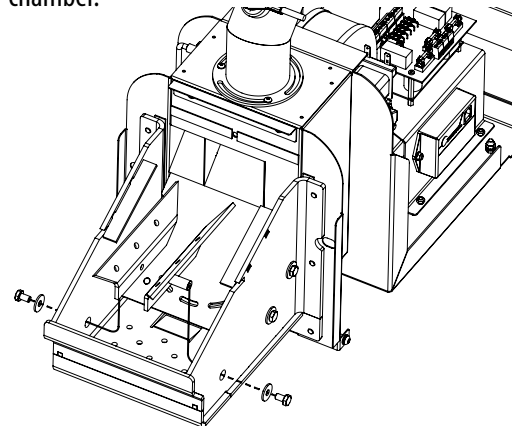


Fig. 20 Removing the guiding plates from the chamber.

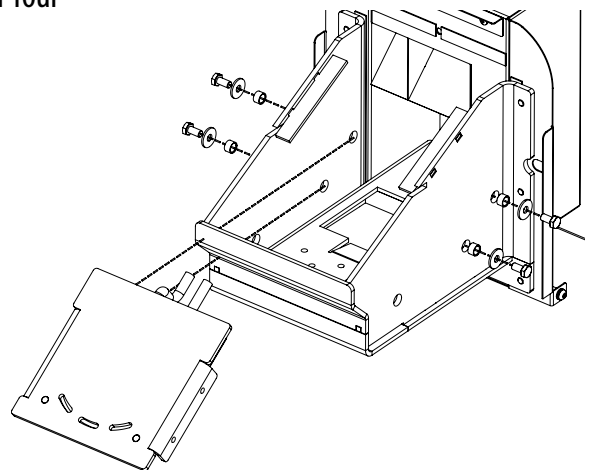


Fig. 21 Taking out the heating element unit together with a plate.

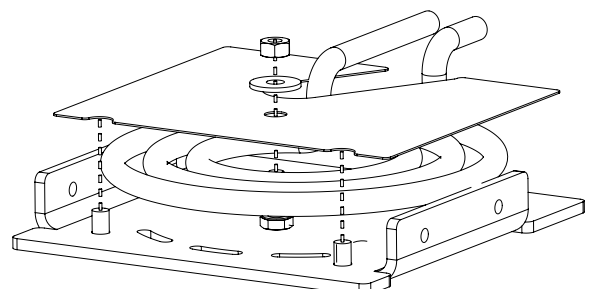



Fig. 22 Disassembling the heating element unit.

There exists a low probability that the actuator may malfunction, and will need to be replaced by another one in the distant future. For the actuator replacement, first, disconnect the flexible hose of the screw feeder from the fuel downpipe. Then, using the same instructions as in section 5.3, part “Connection to a Boiler”, only in a reverse order, disconnect the burner from the boiler.

To exchange the actuator, perform the next actions:

1. Make the same steps No. 1 – 4 described in section “11.1 Changing the heating element”;

2. Return the burner power supply cable back to the boiler or connect it directly to the electrical network. Press and hold the ON key  on the controller panel of the burner for three seconds, then release it, and after a while, press it again for three seconds. Thus, you imitate a start of the burner, and then instantly- a turn off. The actuator will start to extend. Wait until it fully extends and stops (Fig. 24). Be prepared for this moment, and when the actuator has stopped in the extended position, disconnect the burner power supply cable from the boiler or electrical network.

3. Inside the casing of the burner: unscrew the nut which holds the supporting leg of the actuator to a frame of the burner (Fig. 25);

4. Back in the burning chamber: unbend the thin split pin and pull it out from the thick pin. The latter serves as a coupling connecting the drawer and the actuator. Remove the thick pin and pull the drawer out (Fig. 26);

5. In the front of the burner, unscrew the two bolts that are holding the lid of the casing – one on left side, another one on the right. Disconnect the controller data cable from the control panel in the lid, and remove the lid off the burner (Fig. 27);

6. Now, because the lid of the burner does not obstruct the actuator anymore, you can take the actuator out through the existing opening in the electrical components bracket (Fig. 28). Before pulling it out, do not forget to disconnect its wires from the relay unit;

7. Disconnect the support leg from the actuator – unbend the split pin, and pull it off from the thick pin which serves as a

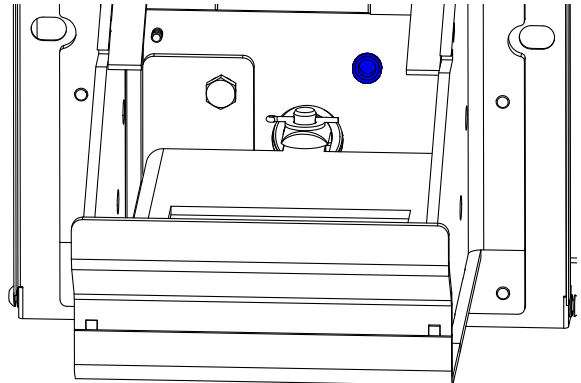


Fig. 23 The rubber bushing used to route the wires of the heating element.

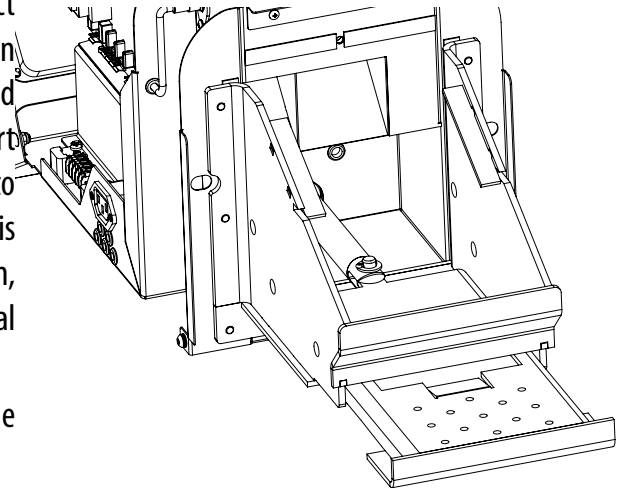


Fig. 24 Actuator and a drawer extended, exposing a joint of the drawer and the actuator.

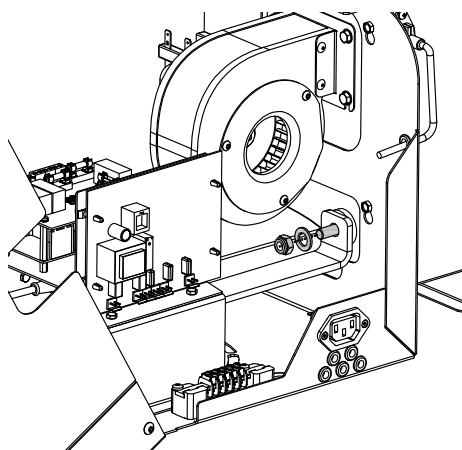


Fig. 25 Unscrewing the nut fastening the actuator to the frame of the burner.

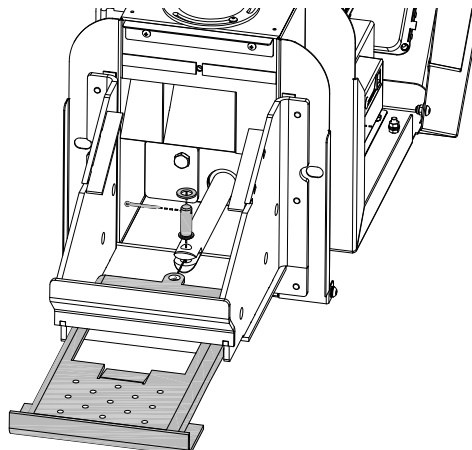


Fig. 26 Disconnecting the actuator from the drawer.

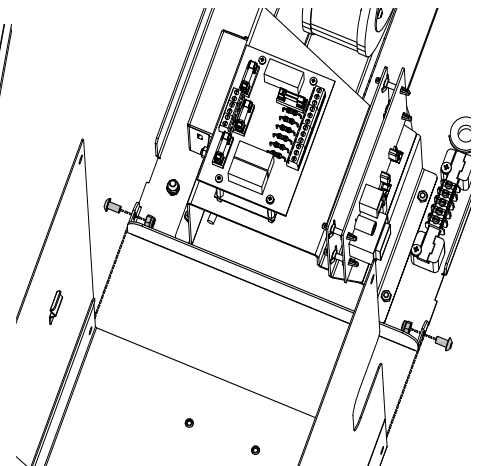


Fig. 27 Taking out the lid of the burner casing.

coupling connecting the support leg and the actuator (Fig. 29).

8. Now, take the new replacement actuator, and in reverse order, assemble everything back. Check the electrical circuit diagram (Fig. 12) for correct wire connection.



After the reassembly and replacement, the controller will remember that it have extracted the actuator earlier, and in a few seconds it will start retracting it. The replaced actuator and the drawer are already retracted, so this discrepancy may trigger an alarm appearing on the control panel (the orange coloured LED indicator with a broom symbol lighting up). Clear this alarm by pressing the power button (⏻) on the panel for three seconds. After you release the button, the alarm indicator should disappear.

11.3 REPLACING THE CONTROLLER BATTERY

The controller of the burner switches to its on-board battery during power failure, or when it is disconnected from the electrical power supply. The battery powers the internal clock and maintains the internal microprocessor memory. When the battery is empty, the controller operates normally while connected to the electrical power supply. During a power supply failure, the internal clock stops and the operational phase is not stored in its memory. After the power supply returns, the clock is reset, and the controller stays in the OFF phase.

To replace the battery:

1. Disconnect the electrical power supply;
2. Locate the battery on the controller board;
3. Remove the old battery from the holder with INSULATED tweezers or a similar tool. Take care not to bend the battery holder contacts;
4. Check the polarity orientation and insert the new battery;
5. Reconnect the electrical power supply.

12. TROUBLESHOOTING

The display of the burner provides warnings for alerts and errors which can occur during the operation of the controller. The alarm icons in the indicator line of the display signal a problem. An alert notification is indicated by blinking icons, and errors are indicated with continuously lit icons. In case of an alert, the combustion system remains operational. In case of an error, the combustion system has malfunctioned seriously and becomes disabled. To solve the problem, a service technician should be contacted. Each alert and error has a code which can be used to identify the problem. To display the code, press and hold the Cancel button (⏻) for 3 seconds. If there is no information on the alert/error code, the screen shows

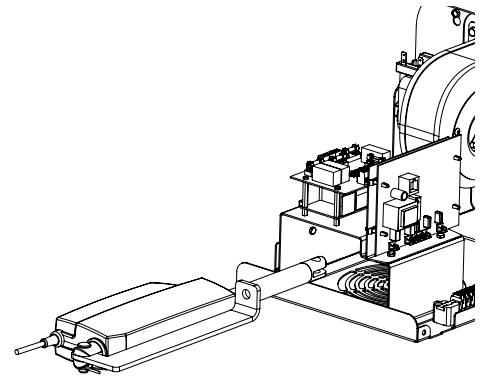


Fig. 28 Removing the actuator with its supporting leg from the burner.

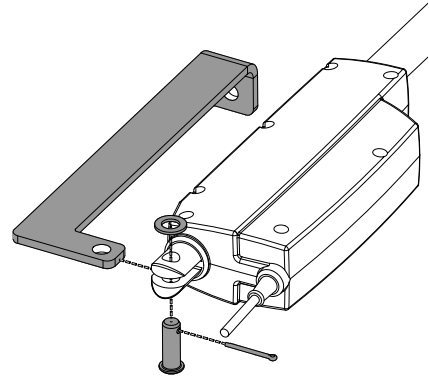




Fig. 29 Disconnecting the actuator from its support leg.


• **ALERTS**

No fuel


Indication: Icon <i>No fuel</i> is blinking	Code: ---- 	Cause: When the fuel in the hopper runs out, the notification is triggered. The combustion system turns off and cannot be restarted.	Solution: Refill the pellets hopper. Delete the alert by pressing and holding the Start/stop button on the display.
---	--	---	--

Combustion chamber or chimney is dirty


Indication: Icon <i>Cleaning</i> is blinking	Code: A003 	Cause: The combustion chamber or the chimney are dirty and require cleaning. There is too much ash or unburned pellets in the combustion chamber; and/or the chimney is congested with soot.	Solution: Inspect and empty the combustion chamber or contact service personnel to sweep the chimney.
--	--	---	--

Indication: Icon <i>Cleaning</i> is blinking	Code: ---- 
--	--



Low battery

Indication: Icon <i>Service</i> is blinking	Code: A004 	Cause: The controller battery gets discharged. The combustion system is still operational.	Solution: Contact service personnel to change the controller battery. Do not attempt to change the battery on your own.
---	--	---	--

Fan 1 – the exhaust fan- speed sensor failure

Indication: Icon <i>Service</i> is blinking	Code: A005 	Cause: The speed sensor of the exhaust fan is malfunctioning. The combustion system is still operational.	Solution: Contact service personnel.
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Regular maintenance required


Indication: Icons <i>Service</i> and <i>Cleaning</i> is blinking	Code: A002  	Cause: The time to the next service has run out. If set up by service personnel, the Time to service counter counts time in hours in the reverse direction. When this counter reaches zero, the Service icon starts blinking. This value is read-only and can be modified by authorized personnel only.	Solution: Contact service personnel.
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Remote control battery empty


Indication: Remote control is not responsive	Cause: The battery of the remote control is empty. The remote control uses the CR2025 or CR2032 battery.	Solution: Replace the battery. Refer for the instructions to the back side of the remote control unit.
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• ERRORS

Service required

Indication: Icon Service lights constantly 	Code E001: Keyboard error E002: IR communication error E003: RF communication error E004: MB communication error E101: Fire error E105: NTC2 error E106: NTC3 error E107: TC2 error E108/109: Security switch or Pressure switch error E110: NTC1 error E111: TC1 error E112: Pellets hopper overheating error E115: General error	Cause: The combustion system has malfunctioned and not operational.	Solution: note the error code and contact service personnel.
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Unspecific errors on the display

Indication: Icon Service lights constantly 	Unknown error is displayed on the screen	Cause: Certain information stored in the controller is updated to the display at startup moment, for example, configuration data. An unexpected error appears on the screen when making changes to the controller settings.	Solution: disconnect and then reconnect the display to reset it. If the problem persists, contact service personnel for support.
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• POWER SUPPLY FAILURE

During power supply failure, the controller remains active due to internal battery. Its internal status remains as it was before the power failure. Internal electronics runs in power saving mode consuming very little amount of energy. In case of the power supply failure, the controller operates as follows:

Duration of power supply failure	Operation before the power supply failure	Operation after the power supply failure
Less than 1 minute	Fire up phase	The controller continues normally.
	Burning phase	The controller checks the flue gases temperature and continues in the Burning phase or restarts in the Fire Up phase.
	OFF phase	Remains OFF.
More than 1 minute	Fire Up phase	The controller continues normally.
	Burning phase	The controller checks the flue gases temperature. If the flue gases temperature dropped below some setting (PAR56), the combustion system restarts in the Fire Up phase, otherwise it continues in the Burning phase.
	OFF phase	Remains OFF.

13. WARRANTY TERMS AND CONDITIONS

The manufacturer provides a warranty for the burners, the main conditions of which are the following:

- the installation of the burner as well as the initial kindling, adjustment and repairs are carried out by an authorised company;
- the burner is installed and operated following the requirements of this operation manual;
- the client presents this operation manual with the validated selling card form in it;
- the duration of the warranty period for the burner is 24 months with the exceptions of the below presented components;
- the warranty does not apply for the following components of the burner:
 - gaskets;
 - an ignition element;
- the warranty repairs are performed when the fault has occurred due to the manufacturer's fault;
- damages originated from transportation, careless storage and handling will not be covered by the warranty. The claims for such kind of damages should be presented to the vendor company;
- the warranty term is not extended after removing the faults which have occurred during the warranty period;
- cleaning of the burner and installation works are not covered by the warranty;
- the damage caused to the premises and the property in the premises, human health due to the burner fault will not be compensated;
- the warranty repair works and replacement of parts during the warranty period are free;
- the warranty period starts from the burner purchase date;
- all the warranty obligations of the manufacturer are listed in this chapter; the manufacturer cannot be held responsible for additional obligations undertaken by third parties.

14. ACCEPTANCE CERTIFICATE

The pellet boiler Astra P-....., serial No., the pellet burner Astra S-....., serial No., the auger pellet conveyor Astra PA, serial No., the pellet hopper Astra PK-....., serial No., conforms to the technical documentation, requirements of the standard EN 14785 and is approved as fit for operation.

Manufacturing date 201

L. S.

Head of Quality Service

SELLING CARD

Pellet burner sold by:

Company:
 Address:
 Telephone:
 Date of sale:
 Signature:

BURNER INSTALLATION PROTOCOL

Pellet burner installed by:

Company (Technician):
 Address:
 Telephone:
 Installation date:

Installation data:

Boiler model, type, thermal capacity:
 Screw feeder model, type:

Height of the chimney:
Diameter of the flue:
Draught of the chimney:
Other information concerning installation:
.....
.....

The pellet burner was tested on site, adjusted, the control and safety elements were checked and found to be operating properly

Person responsible for installation and testing:
(Name, surname, signature of the employee)

I accept the installation works:
(Name, surname, signature of the employee)

WARRANTY AND POST-WARRANTY REPAIR CARD

Pellet burner repaired by:

Company (technician):
Address:
Telephone:
Repair date:
Information on fault, works performed:
.....
.....
Signature of the technician:

Pellet burner repaired by:

Company (technician):
Address:
Telephone:
Repair date:
Information on fault, works performed:
.....
.....
Signature of the technician:

Pellet burner repaired by:

Company (technician):
Address:
Telephone:
Repair date:
Information on fault, works performed:
.....
.....
Signature of the technician:

DECLARATION OF CONFORMITY



Manufacturer: Machinery plant "Astra" AB.



Address: Ulonu g. 33, 62161 Alytus, Lithuania.

Product designation: pellet burner Astra S-25

Our product is manufactured in accordance with the following directives:

Our product is manufactured in accordance with the following directives:

2006/95/EC – Low voltage directive;

2006/42/EEC – Machinery directive;

2004/108/EEC – Electromagnetic compatibility directive;

89/106/EEC – Construction products directive.

The following standards were applied for the Astra S-25 pellet burner:

EN 15270 – Pellet burners for small heating boilers;

EN 60335-1 – Safety of household and similar electrical appliances;

EN 60335-2-102 – Safety particular requirements for fuel burning appliances having electrical connections;

EN 55014-1; EN 55014-2; EN 61000-3-2; EN 61000-3-3 – Electromagnetic compatibility.

Viktoras Bondarevas

Head of Heating Products Division

AB machinery plant Astra