

Biopel MINI

User Manual

Biopel MINI series pellet boilers are boilers fulfilling stringent requirements for ecological heating with low combustion emissions. Biopel boilers allow for comprehensive control of the heating system and for the connection of a wide range of additional devices. This manual contains a full list of all accessories that can be connected to the control unit. User manual includes all needed information about installation, start-up and maintenance of all types of Biopel boilers, from 11 to 40 kW of power. Information included in this manual is intended to both installers and end customers. The individual chapters are presented chronologically, starting with boiler installation, start-up and proper set-up, to the regular use and maintenance. Read all information included inside this manual carefully.

Each Biopel boiler can be connected to our OPOP online server to use remote control features for both boiler and heating system components. This internet interface is accessible free of charge from the OPOP.cz website.

We believe that you will be satisfied with our product for its long working life. For more information regarding the Biopel boiler, apart from this manual, use the installation and service representatives network listed on our website or contact directly one of the representatives of OPOP spol. s.r.o.

Biopel
MINI

OPOP
partner for your heating

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1. INTRODUCTION

To correctly install, start and operate this boiler from the Biopel series, read this manual step by step, from chapter 1 onwards and proceed chronologically so that none of the steps necessary for the correct boiler operation are omitted during installation and commissioning. Chapters describe first boiler installation, then chronologically accessories connection and activation and boiler maintenance. Chapters describe first boiler installation, then chronologically accessories connection and activation and boiler maintenance.

The latter half of the manual provides examples of heating system wiring and accessories, including a description of the settings in the control unit. If one or more accessories are connected to the boiler, use this information to properly set-up the accessories properly so boiler operation will be in accordance with user manual.

If you require additional information regarding the boiler function or boiler-controlled components, please do not hesitate to contact a certified installer or an OPOP representative directly.

2. BASIC CHARACTERISTICS OF BIOPEL MINI SERIES BOILERS

Biopel MINI boilers are produced in several sizes according to their maximum power, from 11 to 40 kW. The control system of these boilers allows to regulate all control elements of heating systems. The control unit is equipped with many advanced features, ensuring its adaptation to the customer's needs. In addition, it allows the connection of many additional devices that simplify the boiler operation and add additional superior features.

The Biopel MINI boiler control unit enables:

- Control of 2 mixing valves.
- Connection of 2 room thermostats to control 2 separate heating circuits.
- Connection of 5 pumps - central heating pump (CH pump), hot water pump (DHW), valve pump 1, valve pump 2, pump with independently configurable settings.
- Equithermal control based on outdoor temperature.
- Time control of boiler outlet temperature - programmable weekly operation mode.
- Heating of storage tank by 2 temperature sensors.
- Online control of all boiler and heating circuit functions via OPOP web interface.
- Mobile application for iOS and Android phones, allowing remote boiler management and the entire heating system.
- Control unit firmware update via USB interface to get new functions.
- DPCh - operation error detection. The unit displays error and operation messages on the main panel, which are also stored in the Main Settings, Activity History. By clicking on an operating error, you can view a detailed description of the problem and how to solve it.

In addition, the Biopel boiler's v9 MINI control unit allows connection of a wide range of additional devices, which makes boiler maintenance more automatic or add new control options:

- RT10 room thermostat, displaying information of the entire heating system.
- Compressor cleaning of boiler burner and exchanger, extending significantly the need for manual boiler and burner maintenance.
- Automatic ash removal, extracting ash from the boiler into an external container, extending the intervals between boiler ashtray cleaning.
- Lambda sensor, allowing automatic correction of the combustion process by measuring the remaining oxygen inside the boiler.
- GSM module, with which you can receive boiler status reports via SMS. Use in case your boiler cannot be connected to the internet and regulated online.
- S8-Wifi module, allowing control of thermostatic radiator heads. Each room is thus heated as a separate zone with its own room temperature. Therefore, this device ensures optimum heat consumption and keeps heating costs to a minimum.
- Vacuum feeder, transporting pellets from silo to the boiler hopper over long distances.
- Cascade controller, allowing you to operate up to 4 boilers connected together in one boiler room and use their power according to the current requirement of the heating system.

3. MAIN PARAMETERS AND DIMENSIONS

The main components of the basic configuration are the boiler, burner, feeder and pellet hopper. You can find the main parameters and dimensions of each of these components below.

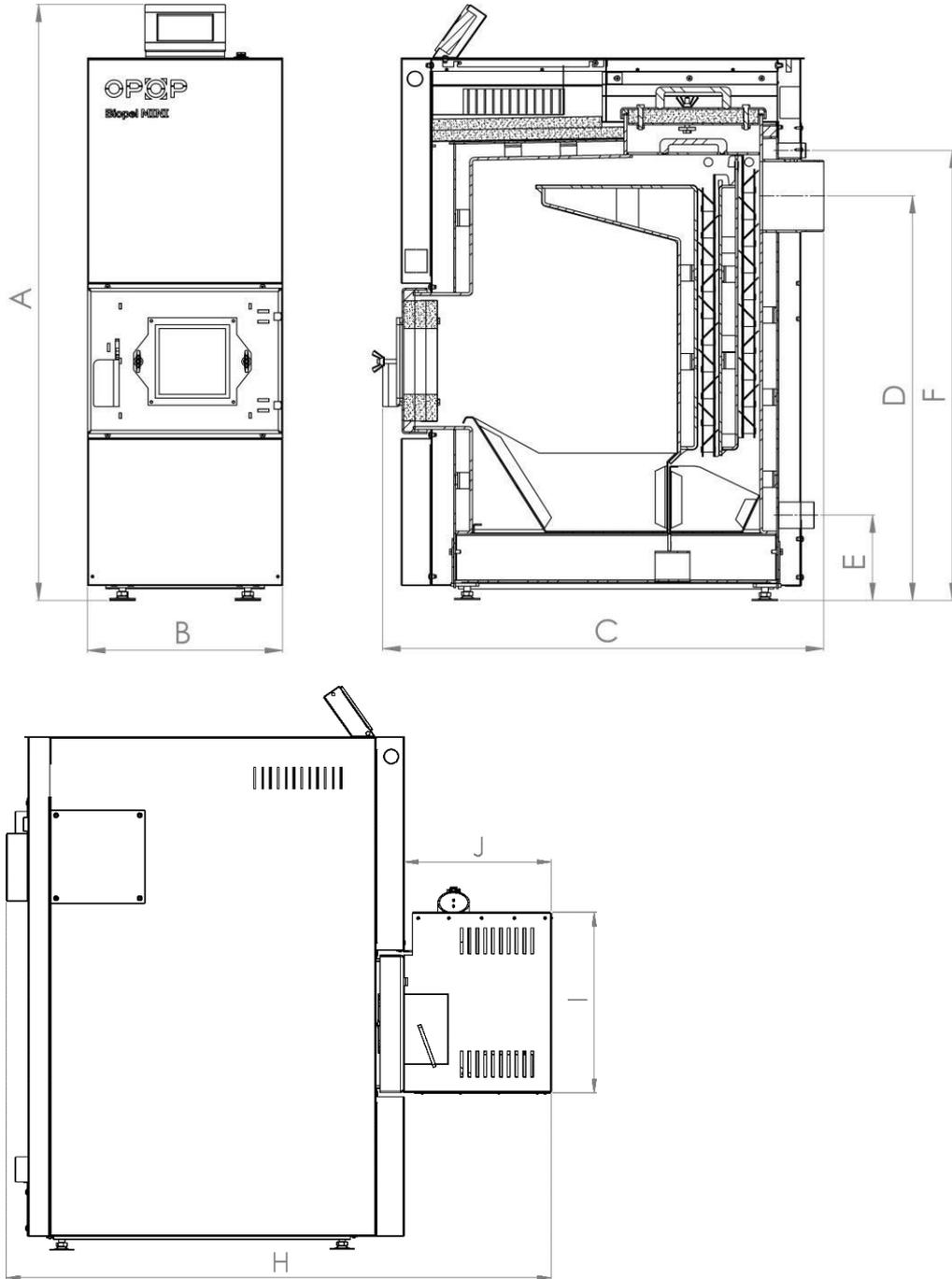
3.1. Biopel MINI 11 / 15kW ; 21 / 30 / 40kW

The boiler body is always different according to its maximum power. Main differences are external dimensions, size of connection outlets and inlets, flue diameter, heat exchanger shape, its type and number of doors.

Technical parameters:		Biopel Mini 11	Biopel Mini 15	Biopel Mini 21	Biopel Mini 30	Biopel Mini 40
Nominal output	kW	11	15	21	30	40
Minimal output	kW	3.3	4.7	6	8.9	11.8
Guaranteed fuel	wood pellets 6-8mm					
Fuel consumption (at boiler nominal output)	kg/h	2.36	3.36	4.68	6.52	8.42
Fuel consumption (at boiler minimal output)	kg/h	0.77	1.01	1.38	1.96	2.64
Emission class *1	5 / Ecodesign					
Efficiency *1	%	93.6	93.7	92.9	93.5	93.6
Water volume	L	32		54		
Operational chimney draught	Pa	5.5	7.5	8	11	11
Maximum operating pressure of water	Bar	2				
Maximum temperature of heating water	°C	80				
Minimum temperature of return water	°C	55				
Flue gas temperature (at boiler nominal output)	°C	85	101	102	107	117
Weight	kg	160		240		
Connecting voltage	V/Hz	230V/50Hz ±10%				
Dimensions:						
Boiler height [A]	mm	1088		1257		
Boiler width [B]	mm	352		482		
Boiler depth [C]	mm	814		914		
Flue diameter	mm	130		150		
Flue centre position from the ground [D]	mm	739		898		
Inlet water funnel position from the ground [E]	mm	156				
Outlet water funnel position from the ground [F]	mm	822		992		
Inlet and outlet water connection [G]	Inches	G 1 ¼ (female thread)				

Technical parameters:		Biopel Mini 11	Biopel Mini 15	Biopel Mini 21	Biopel Mini 30	Biopel Mini 40
Boiler depth including burner cover [H]	mm	1043		1170		
Height of burner cover [I]	mm	349		413		
Burner cover depth [J]	mm	281		308		

*1 Emission values and classes are determined by tests in test institutes, measured according to EN 303-5 Standards.



3.2. Hydraulic losses of boilers

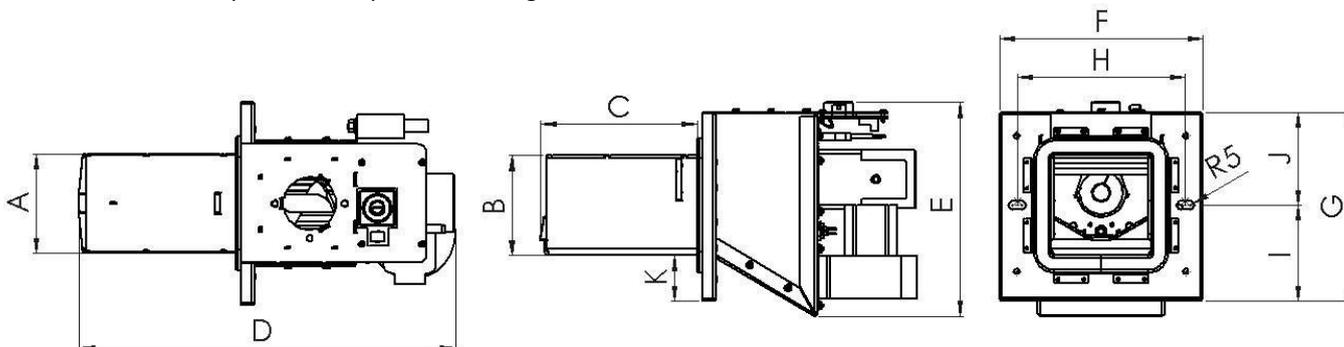
Biopel MINI 11			Value	Uncertainty
$\Delta t - 10\text{ }^{\circ}\text{C}$	Water flow through the boiler	[m ³ /h]	0.950	0.005
	Boiler's hydraulic loss	[Pa]	114	28
	Boiler's hydraulic loss	[mbar]	1.14	0.28
	Flow resistance coefficient	[-]	2.12	0.59
$\Delta t - 20\text{ }^{\circ}\text{C}$	Water flow through the boiler	[m ³ /h]	0.475	0.002
	Boiler's hydraulic loss	[Pa]	< 23	-
	Boiler's hydraulic loss	[mbar]	< 0.23	-
	Flow resistance coefficient	[-]	< 1.75	-

Biopel MINI 21			Value	Uncertainty
$\Delta t = 10\text{ }^{\circ}\text{C}$	Water flow through the boiler	[m ³ /h]	1.806	0.016
	Boiler's hydraulic loss	[Pa]	235	36
	Boiler's hydraulic loss	[mbar]	2.35	0.36
	Flow resistance coefficient	[-]	1.21	0.46
$\Delta t = 20\text{ }^{\circ}\text{C}$	Water flow through the boiler	[m ³ /h]	0.907	0.004
	Boiler's hydraulic loss	[Pa]	62	24
	Boiler's hydraulic loss	[mbar]	0.62	0.24
	Flow resistance coefficient	[-]	1.27	0.58

Biopel MINI 40			Value	Uncertainty
$\Delta t = 10\text{ }^{\circ}\text{C}$	Water flow through the boiler	[m ³ /h]	3.441	0.070
	Boiler's hydraulic loss	[Pa]	775	36
	Boiler's hydraulic loss	[mbar]	7.75	0.36
	Flow resistance coefficient	[-]	1.10	0.23
$\Delta t = 20\text{ }^{\circ}\text{C}$	Water flow through the boiler	[m ³ /h]	1.725	0.003
	Boiler's hydraulic loss	[Pa]	199	24
	Boiler's hydraulic loss	mbar	1.99	0.24
	Flow resistance coefficient	[-]	1.12	0.36

3.3. Burner

The pellet burner, like the boiler, differs according to its maximum power. The differences are in burner dimensions, types of electrical components, shape and size of grates, thickness of the material used.

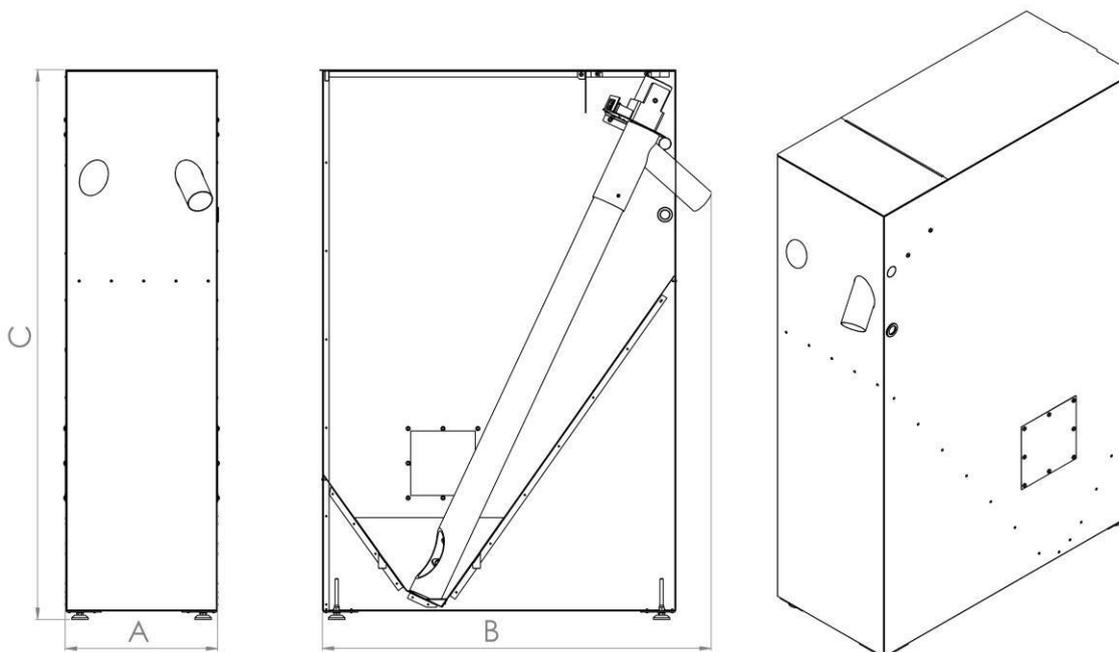


Dimension s mm	Biopel Burner 10	Biopel Burner 15	Biopel Burner 20	Biopel Burner 30	Biopel Burner 40																		
A	116	116	145	177	177																		
B	116.6	116.6	136.6	171	171																		
C	181.1	181.1	199.8	294.9	294.9																		
D	435.6	435.6	458.2	588.2	588.2																		
E	248.7	248.7	254	312.5	312.5																		
F	236	236	240	278	278																		
G	220	220	240	278	278																		
H	195	195	204	248	248 </tr <tr> <td>I</td> <td>111.5</td> <td>111.5</td> <td>120</td> <td>139</td> <td>139</td> </tr> <tr> <td>J</td> <td>108.5</td> <td>108.5</td> <td>120</td> <td>139</td> <td>139</td> </tr> <tr> <td>K</td> <td>53</td> <td>53</td> <td>50.4</td> <td>58.5</td> <td>58.5</td> </tr>	I	111.5	111.5	120	139	139	J	108.5	108.5	120	139	139	K	53	53	50.4	58.5	58.5
I	111.5	111.5	120	139	139																		
J	108.5	108.5	120	139	139																		
K	53	53	50.4	58.5	58.5																		

3.4. Hopper

Hoppers are divided into 2 main types. Compact version and external version applicable for all boiler sizes. In the boiler manual and control unit you may come across two names, namely Hopper or Pellet Tank.

Hopper type	cm	External 60x60	External 80x80	External 100x100	External 1420x80	Compact 150	Compact 225
Pellet volume	kg	110	220	300	350	150	225
Weight	kg	25	29	35	38	39	45
Height [C]	mm	1300	1300	1300	1300	1283	1283
Width [A]	mm	600	815	1000	1420	354	484
Depth [B]	mm	600	815	1000	815	891	891



3.5. External feeder

The external pellet feeder is only used with external hopper version configuration. The compact pellet hopper is already equipped with a feeder from the factory. You can choose between two sizes of the external feeder - 2 or 3m length.

External feeder type	m	2	3
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4. PRESCRIBED FUEL

Fuel	Fuel type	Grain size [mm]	Calorific value [kJ/kg-1]
Wood pellets	ENplus A1	6	16.5-19.5

- Water content in fuel: max. 10 %
- Low caking property
- Low swelling

For heating with the Biopel MINI boiler use only pellets that comply with ENplus1. The pellets must be made from wood only. The lower the bark component in the pellet, the higher you can expect quality combustion with minimal ash.

5. BASIC COMPONENTS OF THE INSTALLATION CONFIGURATION AND PACKAGE CONTENT

Biopel MINI is available in several sizes according to the maximum boiler power, from 11 to 40kW. Each size has its differences, not only in terms of dimensions, but also design of heat exchanger, doors, connection dimensions of inlets, outlets, flue gas outlets. Boiler size is also influenced by pellet hopper, feeder, burner dimensions, etc. You can read the basic parameters of all the complete Biopel MINI elements set below.

5.1. Biopel MINI 11 / 15kW; 21 / 30 / 40kW

The boiler is equipped with two doors, one for cleaning and one for ash. A control unit on the top of the boiler and a cover for the cleaning door. The cleaning door is secured with thumb nuts and is completely removable for better access and boiler exchanger cleaning.

On the front sides, you will find the ash door and the burner hole. In addition, at the top of the side covers, you will find a hole for attaching the automatic exchanger cleaner (an additional device), and ducts leading the wiring from the unit to the rear of the boiler.

There are 2 inlets and outlets in the rear part of the boiler - top for the boiler outlet water, bottom for the boiler inlet water. Next to the water outlet, there are sinks for temperature sensors (CH sensor and Termik sensor). The water inlet is at the bottom of the boiler together with the pipe for the filling valve. There are two covers on the boiler's rear casing. The first is located next to the flue outlet and covers the Lambda Probe and Flue Gas Temperature Sensor connection. The second cover is located at the bottom of the boiler and covers the hole for mounting the automatic ash removal (additional device). The flue outlet connection is located in the rear, central part of the boiler.

i *Temperature sensors (CH, Termic, and flue gas sensor) are led to the rear of the boiler through the side shaft for cabling and connected to the respective pits.*

There are adjustable legs on threads at the bottom of the boiler, which can be used to adjust the boiler height and level the unevenness of the base in the boiler room. The ash door hinges can be mounted on the opposite side of the boiler in the event of installing the so-called compact version of the hopper on the opposite side. Refitting of the ash door hinges is necessary to ensure the ash door's smooth opening.

i *The ash door hinges can be attached to the boiler on the left or right, according to the customer's needs. Therefore, the ash door can be installed from the left or right.*

There are 2 ashtrays inside the boiler and above the ashtray, in the exchanger part of the boiler, you will find the so-called flue turbulators, which reduce the flue gas temperature in the chimney and increase the boiler efficiency.

5.2. Burner

The pellet burner is different according to power, type of grate and type of electrical components used in the burner. The maximum burner power is also indicated by its external dimensions. The burner is equipped with the following components:

- a) internal pellet feeder (motor and worm),
- b) fan,
- c) ignition cartridge,
- d) photosensor,
- e) safety temperature sensor,
- f) burner circuit board,
- g) removable grate,
- h) asbestos sealing cord,
- i) holes for adjusting screws for attachment to the boiler.

At the top, there is a hole for the burner tube connection with three holes for fixing the tube with screws. Next to this hole, you can find 2 connectors for connecting the burner to the control unit. The smaller connector transmits the signal from the photosensor and the safety temperature sensor. The large connector transmits 230V voltage to control the burner's electrical components (fan, internal feeder motor, ignition cartridge). The fan and the internal feeder motor are each connected to a separate start-up capacitor, which are also located on the burner body.

The burner body and grate are made from stainless steel to withstand the high combustion temperatures of up to 1100°C. The burner grate is removable and requires regular cleaning. The holes in the burner must be permeable for maximum combustion efficiency.



The ignition cartridge and the asbestos sealing cord are subject to wear. It is necessary to change them at regular intervals.

The ignition cartridge ensures automatic ignition of pellets, which normally takes 3 to 5 minutes. The resulting flame is detected by a photosensor, which ensures the transition from the automatic ignition phase to normal operation. The photosensor together with the flame safety sensor also serve to ensure the safety of operation and are responsible for shutting down the burner in case of no flame (photosensor) or burner overheating (temperature safety sensor).

The asbestos sealing cord must always lay tight on the boiler or the burner flange on the boiler to prevent smoke and heat escaping from the joint into the room. Otherwise, combustion fumes would escape into the room and there would be a risk of damage to the boiler components and a risk of fire.

The burner is the heart of the boiler and requires regular maintenance of its components, especially the grate. The burner grate is removable for more convenient cleaning. Ensure that the grate is correctly fitted back into the burner, so that it cannot move or fall out. For more information on burner cleaning and handling, see the chapter Regular Maintenance.

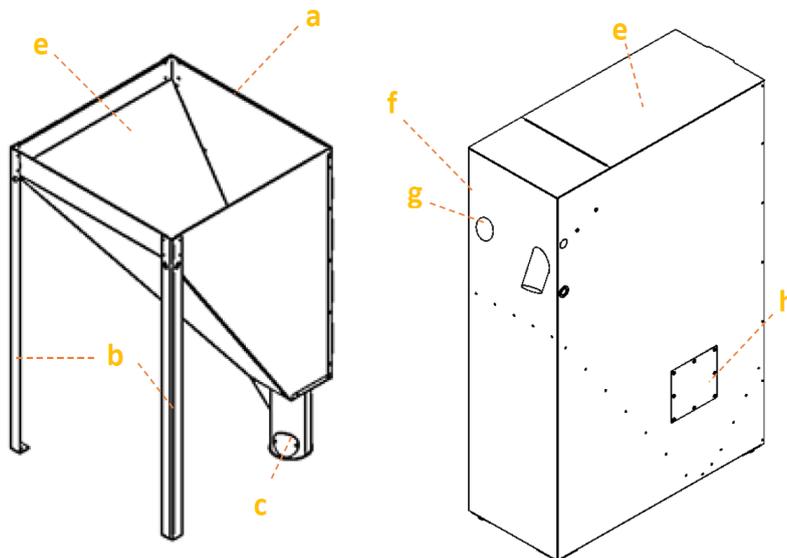
Package content:

- Burner 11 - 40kW
- Control unit v9 display
- Burner cover
- Burner tube - for connection to the burner
- Three 4M bolts for fixing the burner tube to the burner hole
- Sealing ring - for sealing the connection between the burner hole and the burner tube
- PVC hose - to connect the burner to the external feeder
- 2 bolts for fixing the burner to the ash door
- 2 wing nuts - for fixing the burner to the boiler
- 2 washers under the wing nuts
- Burner flange (30 and 40kW)
- Burner gasket cover plate (30 and 40kW)

5.3. Hopper

The basic diagram of both types of hoppers, i.e., Compact and External versions are shown below. The External hopper can be combined with all boiler sizes. This one is assembled on site, it comes from the factory disassembled. For a description and assembly diagram, please refer to the Installation Procedure section of this manual.

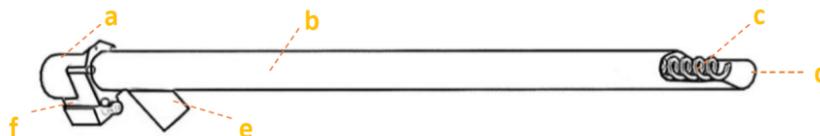
Compact version of the hopper is shown on the right-hand side of the picture. This is already assembled from the factory, and can be easily fixed to the boiler, on both sides according to the position of the pellet burner.



- a) External hopper
- b) 3 main hopper legs - fixed to the top of the hopper
- c) Leg for inserting the External Feeder. There is a hole in the leg into which the feeder is inserted
- d) Cleaning hole for removing dust out of the hopper
- e) Filling opening - can be fitted with a cover
- f) Compact hopper
- g) Hole for changing the feeder to the other side
- h) Cleaning hole for removing dust out of the hopper

5.4. External feeder

The external pellet feeder is used to transport pellets from the external hopper to the burner. It is only installed when installed with the External Hopper, as the Compact hopper version already has this feeder integrated inside. The feeder is equipped with a motor whose speed varies according to the boiler size. Check the label on the External Feeder to see which boiler power this feeder is designed for. Only use the type of External Feeder that is designed for your boiler size.



- a) Feeder motor with capacitor - the bigger the boiler, the faster the motor
- b) PVC feeder pipe
- c) Feeder spiral
- d) Pellet inlet into feeder
- e) Pellet outlet from feeder to burner
- f) 230V socket - for connecting the external feeder to external socket on the boiler

6. INSTALLATION PROCESS

The whole installation process can be divided into the following points:

1. Installation of the boiler, hopper, burner or external feeder
2. Installation of additional devices
3. Boiler's first start-up
4. Calculating the external feeder power in case of non-standard installation
5. Combustion correction
6. Adjustment of other functions and correction of additional device operation

For **Biopel MINI 30 and 40**, the burner flange for the front door including the cover plate must be removed from the burner package and these parts installed on the front door of the boiler. The insulation in the door must be cut out with a sharp knife so that it follows the hole in the burner flange and the burner can be inserted into the hole without any problems.

 *The boiler is fitted with a door with a hole for a 20kW burner. In the case of 30 and 40kW burners, use a sharp knife to enlarge the hole in the door seal so that the seal follows the burner flange and the seal cover found in the burner package.*

The display is located in the boiler ashtray and must be installed on top of the boiler using 2 screws. Then plug the cable into the black connector in the middle of the main control unit PCB.

The **compact hopper** is not rigidly fixed to the boiler. It is only attached to the boiler after it has been installed in its final position. The pellet feeder must be placed in the left or right hole in the front of the hopper by gouge out the oval metal cover and inserting the feeder outlet into it. The feeder outlet should be on the side closer to the boiler. Then be sure to secure the feeder with the two screws on the inside of the hopper. Pull the feeder power cable from the control unit on the boiler into the hopper through the small gouge hole on the top of the hopper.

After placing the hopper, install the pellet burner into the boiler, from the front of the boiler. Before installing the burner, it is necessary to first select the side to open the door. If you want the door to open on the opposite side, then the door must be removed and fitted on the opposite side of the boiler. Depending on the size, the burner is placed in the ash door either with or without the burner flange, which serves as a spacer between the burner and the ash door.

The cable going to and from the external socket is routed through side shaft on the top of the boiler.

External feeder in in the hopper. Its outlet is at the front of the hopper and must be connected to the burner using PVC hose and burner tube (burner accessory). The feeder connector must be connected to the external boiler socket using a 230V cable.

 *Caution: Make sure that the PVC hose is not slack, otherwise pellets falling from the external feeder outlet into the burner can become stuck inside the PVC hose.*

The second version of the pellet hopper is called **External Hopper**. External hopper can be used with all sizes of Biopel MINI boilers. External hopper is assembled during boiler installation and is usually sold in disassembled form. The end of the 2 or 3m external feeder is inserted into the bottom leg of the hopper. The external feeder angle should be 45° from the ground. The feeder is connected to the burner by a PVC hose and burner pipe. The external feeder power supply is led into the external feeder socket using a 230V cable.

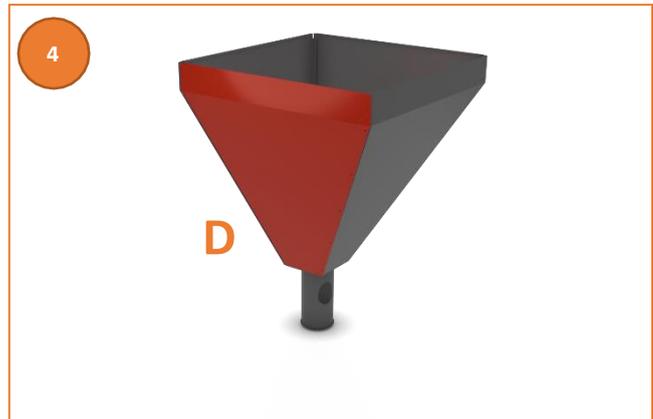
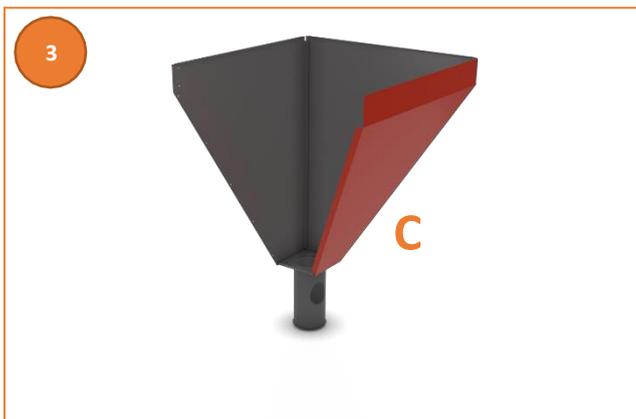
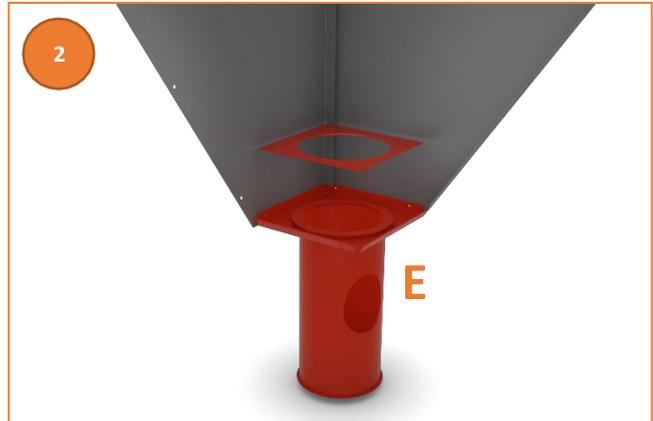
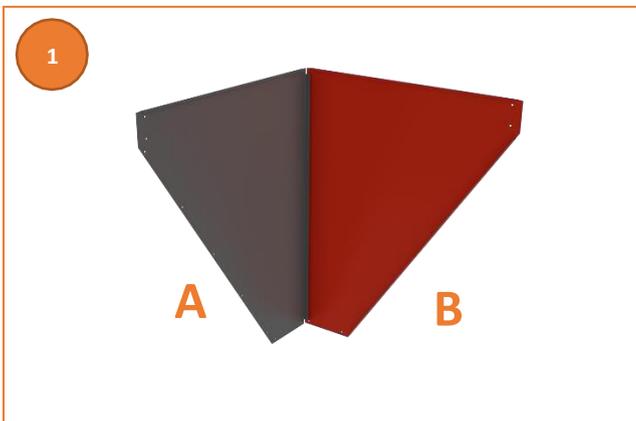
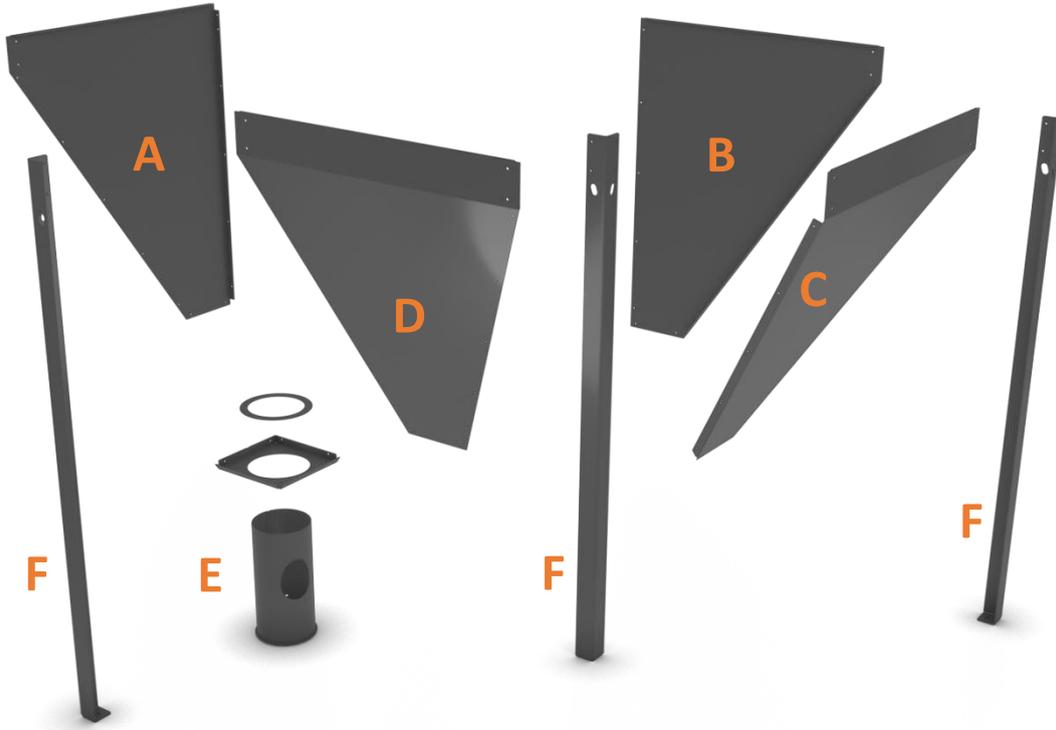
The external hopper can be placed anywhere inside the boiler room, but only in such a way as to ensure that the pellets fall smoothly from the feeder outlet into the burner. Make sure that the PVC hose is not slack, otherwise the pellets falling into the burner may become stuck.

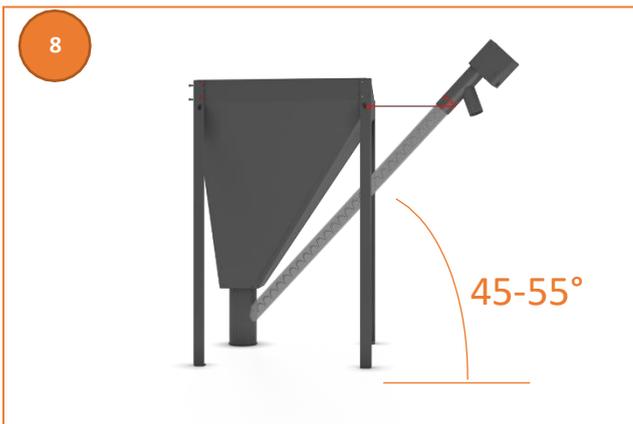
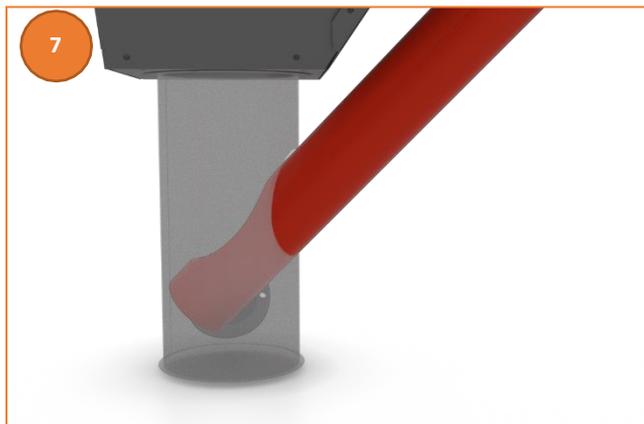
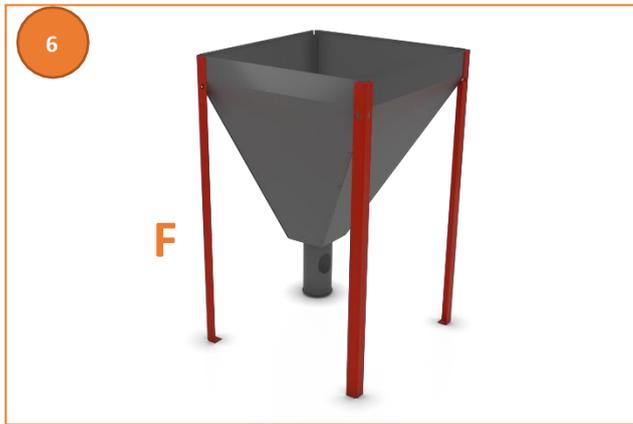
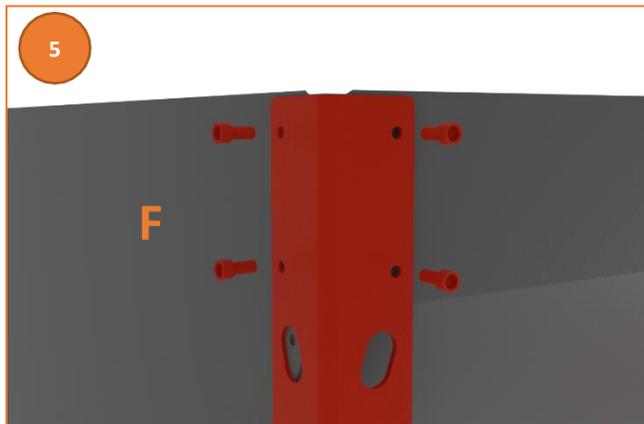
The speed of the motor inside the external feeder varies according to boiler size. The external feeder label always indicates which boiler power range the external feeder is designed. Only use the type of external feeder that is designed for your boiler size. Otherwise, the external feeder will be too fast or slow, which causes poor pellet feeding to the burner.

6.1. Hopper

The compact pellet hopper installation is very simple, as it is already pre-assembled in the factory. Unpack the hopper from the slatting, remove the protective film and place the hopper next to the boiler. Check the ash door opening. If the hopper is on the side of the boiler with the ash door hinges, you must move the hinges to the opposite side of the boiler so that the hinges do not cause the doors to get stuck.

6.1.1. External Hopper





The external hopper consists of 4 main plates A, B, C, D, which you connect together one by one. Start by connecting plates A and B, see figure 1.

Then attach square chimney frame E to plates A, B. Then put chimney frame E through and attach with the four screws and the last square frame with a round hole, see fig. 2.

Continue by connecting side plates C and D. Continuously, or after main plates A, B, C, D have been assembled, attach legs F to the assembly.

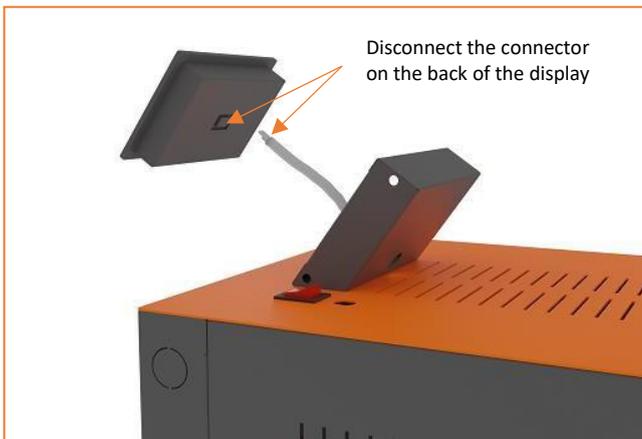
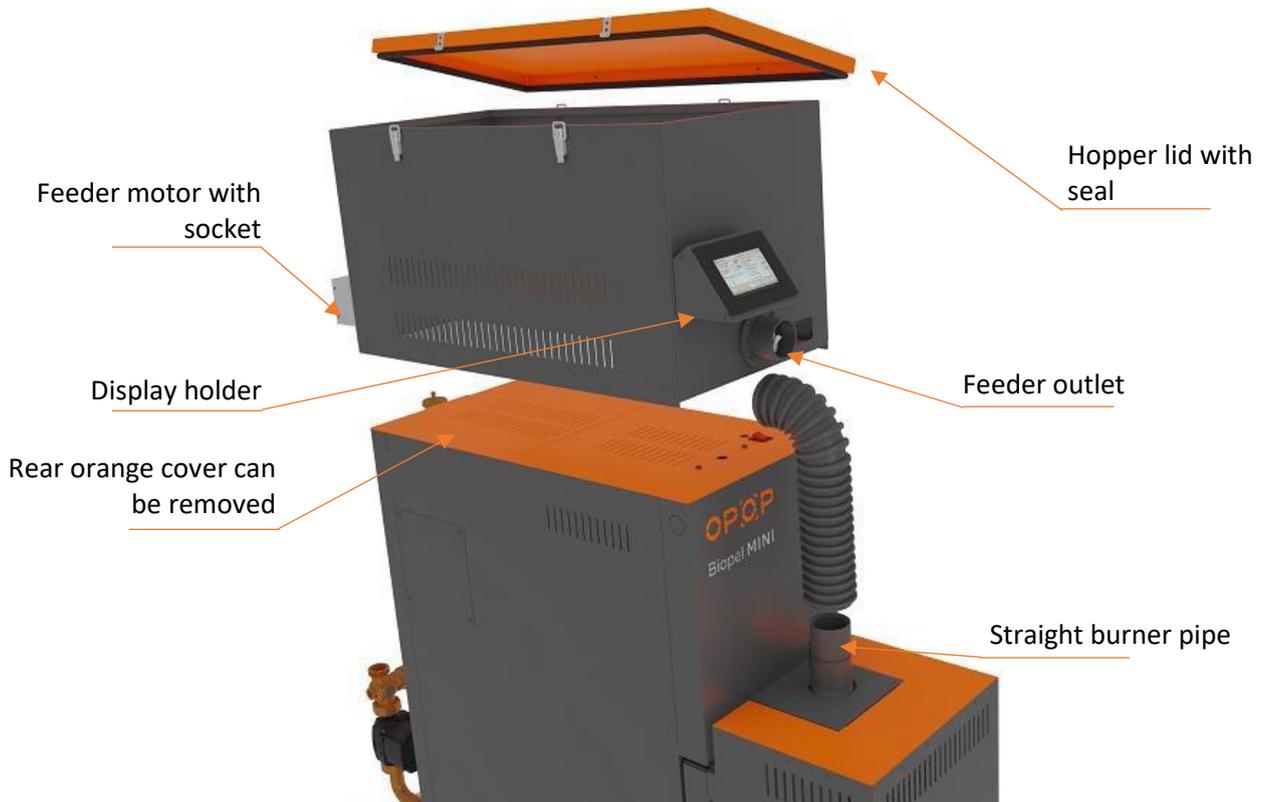
Once the hopper is folded, put it on the legs and slide it to the boiler. Then insert a 2 or 3m long external feeder into the hopper chimney, see figure 7. The external hopper chimney can be rotated. Therefore, turn it so that the feeder opening faces the burner. After inserting the feeder into the chimney, then re-adjust the hopper and feeder position so that the feeder outlet is above the burner.

Attach the feeder to the hopper with the chain and hook so that the angle of the feeder from the ground is between 45-55°. This ensures the expected fuel feeding.

If the boiler room space does not allow the feeder installation at this angle, it is then imperative to calibrate the feeder in the installation set-up. After calibrating the feeder, check the pellet burning and adjust the fan speed in the Coefficients menu in the Installation Set-up so that the flame does not create smoke.

Make sure that the feeder outlet is as far above the burner as possible so that when the burner and feeder are connected with PVC hose, the hose will not become slack so that pellets could become stuck in the hose.

6.1.2. Tower hopper

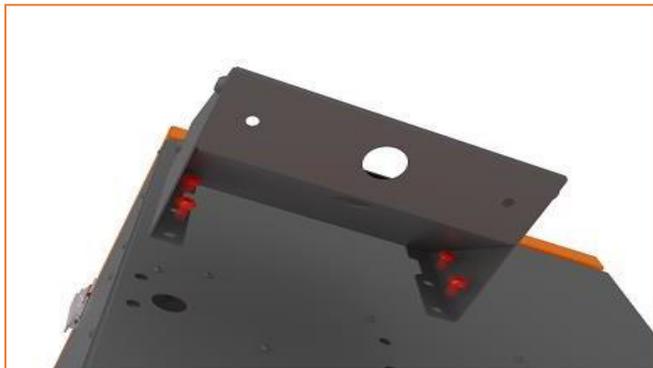


Disconnect the display cable using a small screwdriver.

The feeder cable is factory coiled and laid on the boiler control unit. Access the control unit by removing the top orange cover, which is fixed to the boiler by 2 screws.

After loosening the screws, then pulling backwards and then upwards, carefully remove the orange cover and pull the feeder cable through to the rear of the boiler, as shown in the picture.

Caution! There is a switch and fuse attached to the orange boiler cover. Remove the cover carefully to avoid damaging the cable.



Fix the side walls to the display holder. Then use the 4 screws to fix the display to the Tower hopper as shown in the picture above. Pull the cable through the Tower hopper and display holder to the display itself. Screw the display cable back in using a small screwdriver according to the colours.

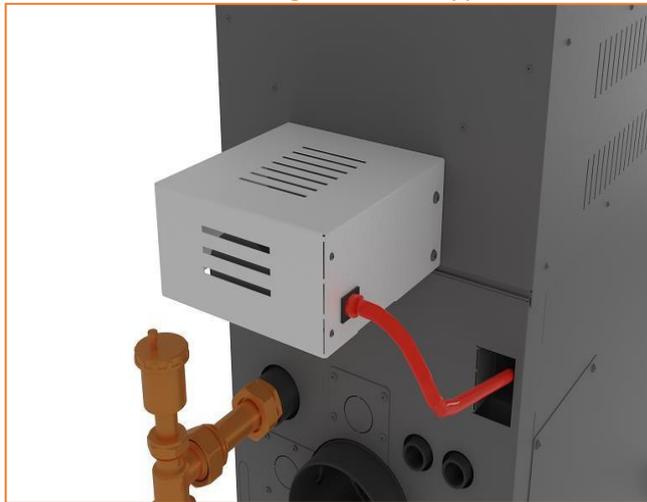
Caution! The orange Tower hopper cover must always be closed and secured with 4 pull-down clips to seal during operation. Otherwise, there is a risk of flame backfiring into the hopper and damaging the PVC burner hose.



The orange lid must always be closed and secured with metal pull-down clips!

Place the display in the display holder according to the pictures above. Adjust the display cable so that the excess length is inserted under the orange boiler cover to prevent it from squeezing when positioning the Tower hopper. Place the tower hopper on the boiler so that it is aligned with the boiler, both at the front and back. Attach the PVC hose to the Tower hopper feeder outlet and secure with a quick coupling. Next, connect the feeder power cable to the back of the boiler as shown in the picture above.

Caution! The rear orange cover on top of the boiler is removed when installing the Tower hopper.

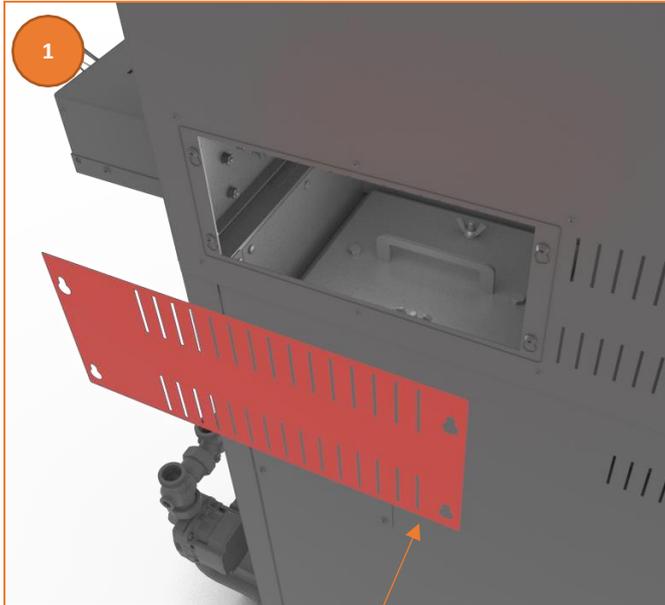


The Tower hopper cleaning hole is located on both the left and right side of the hopper. Loosen the 4 screws to remove the cleaning hole cover. You can reach over the boiler cleaning door through it.

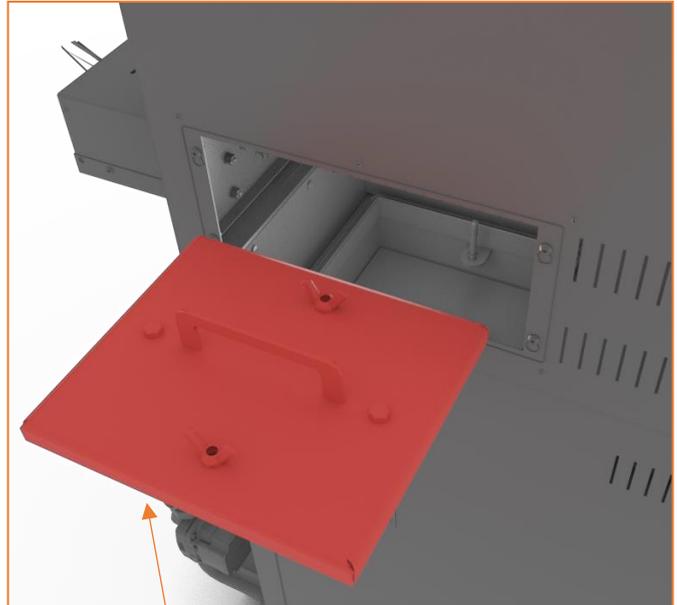
The cleaning door can be removed and the boiler exchanger can then be easily cleaned with either a vacuum cleaner or a cleaning tool. By lifting the flue gas turbulators and shaking them off, you achieve a near-perfect cleaning of all boiler exchanger components.

For complete boiler exchanger cleaning, remove the Tower container, empty pellets, and clean the boiler exchanger properly and completely every now and then.

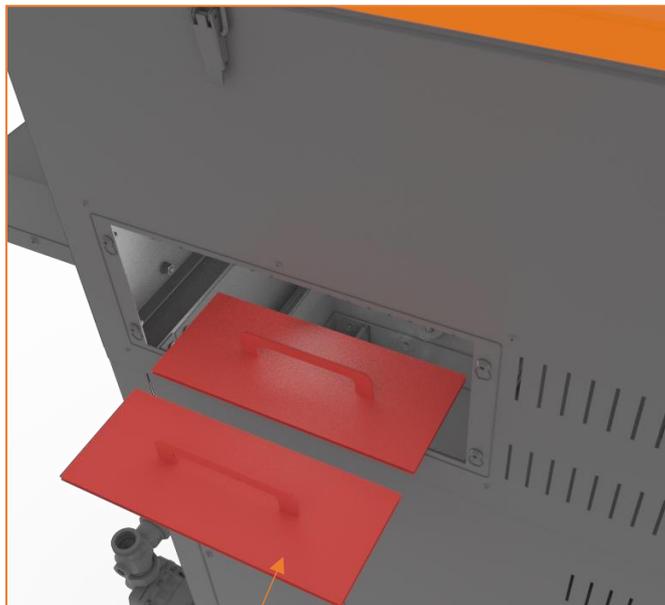
The intervals for cleaning vary and are influenced by many factors. It is recommended to regularly clean and monitor boiler exchanger clogging through the cleaning hole. See Chapter 13, Periodic Maintenance, for more information on recommended cleaning intervals.



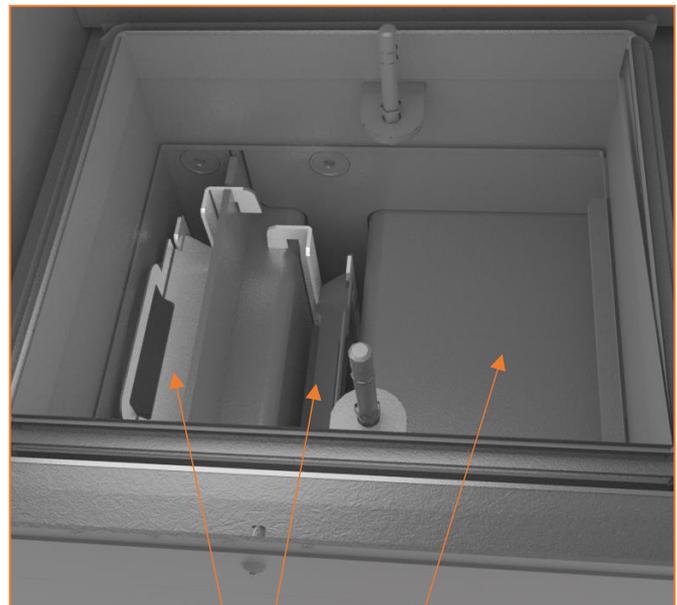
Cleaning hole cover on the sides of the Tower container



The boiler cleaning door can be removed through the cleaning opening of the Tower container



Remove the cover plates and clean the exchanger



Shake off the turbulators and clean the boiler exchanger's horizontal surface

6.2. Burner

The burner type and size always depends on the size of the Biopel MINI boiler. Therefore, installing the burner varies according to burner and boiler size. The entire installation can be summarised in the main points below:

1. Unpack all the burner parts in the box.
2. Install the burner flange on the burner opening on the boiler, if included. Flange type varies according to the burner size, therefore the flange installation method on the boiler varies.
3. Attach the burner on the 2 burner bolts (installed on the flange or on the burner opening on the boiler) and tighten with 2 wing nuts and 2 washers. The joint must be as tight as possible. Push on the burner several times during tightening to ensure that the burner is firmly attached and that it does not move in any direction.
4. Done. The burner is installed in position. If you mover the Compact or External Hopper during burner installation, place it back in its final position.

The next step is to install the External Pellet Feeder, if you used the External Pellet Hopper, then connect the feeder to the burner. Follow the steps below.

6.3. External feeder

The external feeder installation is only done in combination with the external pellet hopper. If this is your case, please follow the points below. If you have used the compact version of the hopper, skip to the next paragraph regarding the connection of the external feeder to the burner.

1. Remove the paper cover from the top of the external feeder.
2. Make sure that no parts of the feeder have been damaged during handling. Check the bottom of the feeder where the worm shaft exits the PVC tube to the outside. The hole at the end of the PVC tube must not be deformed in any way. The edges of the tube opening must be horizontal with the tube body, not curved inwards (towards the worm shaft). If this were the case, there would be a risk of the worm shaft getting stuck on the opening of the PVC tube and possibly jamming the feeder.
3. Rotate the external hopper's bottom leg so that the opening in the hopper faces towards the boiler.
4. Slide the bottom end of the external feeder into the hole in the hopper leg. The hole in the bottom of the external feeder must be entirely inside the bottom leg of the external hopper's bottom leg.
5. Using the chain and hook (included with the external hopper), hang the top of the external hopper by the top edge of the external hopper or by the holes in the top of the external hopper legs.
6. Adjust the chain so that the external feeder is at an angle of approximately 45° from the ground. If the angle is smaller, the feeder gives more pellets than the standard, if the angle is larger, the feeder gives less pellets than the standard. If the angle is different, a combustion correction will be necessary, see chapter Combustion Correction.



The feeder must be at a 45° angle to the ground for proper fuel feeding. If not, make adequate combustion correction, see Combustion Correction chapter.

The external feeder is placed. Connect it to the burner. This connection is made for both the external and compact versions of the hopper. Please follow the steps below:

1. Place the burner pipe inside the hole in the top of the burner. DO not forget to use the sealing ring.
2. Secure the burner pipe with 3 black screws.
3. Connect external feeder outlet and burner pipe with PVC hose. Caution: The PVC hose must not be slack to avoid pellets becoming stuck. The pellets must fall inside the PVC hose without jamming on the way to the burner. Check the correct installation of the PVC hose during boiler operation!

6.4. Control unit

The external feeder is connected to the burner. Now we need to connect all main cables with the v9 MINI control unit. Follow the steps below:

1. Remove the top cover of the boiler. It is secured with 2 screws.
2. Connect 230V power cable to the socket that will supply the boiler electrically.
3. Connect 230V cable from the control unit to the socket at the top of the external feeder.
4. Connect burner cable with the two connectors to the sockets at the top of the burner.

The basic electrical wiring is complete. If you are connecting other devices to the control unit, use the wiring shaft on top of the boiler.

! *The boiler must never be operated with an open or leaking ash door. Otherwise, there is a risk of damage to the boiler's electrical components due to warm air escaping from the ash door.*

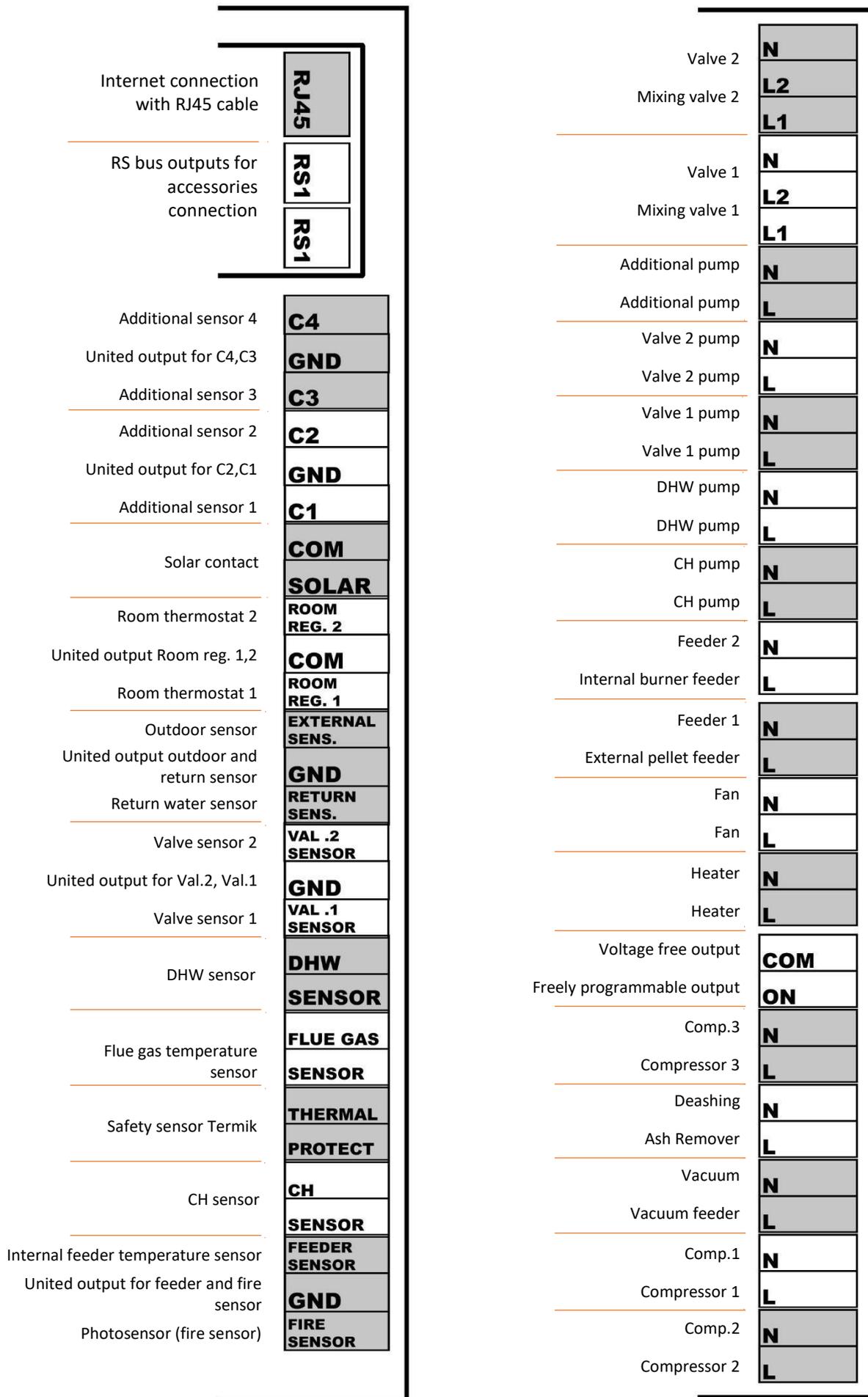
A diagram of the electrical outputs in the control unit is shown on the next page. Use this diagram to connect other additional devices of your choice. Once all electrical components are connected, place the top cover back on the boiler and you start the boiler for the first time using the main switch (red button on top of the boiler).

The installation is practically complete at this point. This is followed by the so-called First Boiler Start-up and Combustion Correction, described in the chapters First Start-up of the Boiler and Combustion Correction. Before proceeding to these steps, we recommend that you study the basic boiler control method and the description of the menu items in the Boiler Control Unit and Description of Control Unit Functions chapters.

i *Before starting the boiler for the first time, read the chapters Electrical Connection of Accessories, Control Unit and Description of Control Unit Functions.*

These chapters will help you to understand how to operate the boiler and the v9 MINI boiler unit. Also use these chapters for the installing accessories, which you will then activate during the boiler's first start-up and, if necessary, set-up in the Installation menu. Bear in mind that the operation of the accessories is pre-set in the Factory Setup, so just activate it and it should operate under standard conditions without problems. Settings the operation of additional devices can be changed at any time in the Installation menu.

6.5. Electrical Connection of Accessories



This is the list of all functions inside the control unit which are connected with each output in the external socket. Use this list for better orientation of accessories setup and activation. Similarly, the source of an alarm message can be easily traced from this list if a function has been activated but the associated sensor is not connected.

- **RJR5** - Installation menu:
 - Ethernet module.
- **RS1 and 2** - Installation menu:
 - Lambda
 - Room thermostat
 - Additional valve 1 and 2
 - GSM module
 - Cascade controller.
- **Additional sensor 4 and 3** - Installation menu:
 - Future use
- **Additional sensor 2 and 1** - Installation menu:
 - Additional pump
 - Buffer tank parameters
 - Built-in valve 1,2 - Selection of CH sensor
- **Solar contact** - Installation menu:
 - Solar control.
- **Room thermostat 1 and 2** - Installation menu:
 - Room thermostat - Standard regulator 1 and 2
 - Built-in valve 1,2 - Room thermostat - Thermostat standard.
- **Outdoor sensor** - Installation menu:
 - Built-in valve 1 and 2 - Equitherm control
 - Outdoor temperature correction
 - Firing up blocked
- **Return water sensor** - Installation menu:
 - Built-in valve 1 and 2 - Return flow protection
- **Valve sensor 2 and 1** - Installation menu:
 - Built-in valve 1 and 2
- **DHW sensor** - Main settings:
 - Operating mode - DHW priority or Parallel pumps or Summer mode
 - Service Menu:
 - Disinfection - Disinfection Temperature
 - Priority Temperature
 - DHW Hysteresis
- **Flue gas temperature sensor** - Service menu:
 - Max. flue gas temperature
- **Safety sensor Termik** - No associated function
- **CH sensor** - Main settings:
 - CH temperature setpoint
 - Boiler weekly programme
 - Operating modes - House heating
 - Installation menu:
 - Built-in valve 1,2 - Boiler protection
 - Service Menu:
 - CH pump emergency activation
 - Boiler alarm temperature
 - Pump switch-on temperature
 - Min. boiler temperature
 - Boiler Hysteresis
- **Internal feeder temperature sensor** - Service menu:
 - Feeder Alarm temperature
- **Photosensor** - Service menu:
 - Pellet settings - Ignition parameters - Firing-up brightness
 - Pellet settings - Operating parameters - Operation control
- **Mixing valve 2 and 1** - Installation menu:
 - Built-in valve 1,2
- **Additional pump** - Installation menu:
 - Additional pump

- Service Menu:
 - Pump switch-on temperature
- **Valve pump 2 and 1** - Installation menu:
 - Built-in valve 1,2 - Valve pump 1,2
- **DHW pump** - Main settings:
 - Operating mode - DHW priority or Parallel pumps or Summer mode
 - Service Menu:
 - Pump switch-on temperature
 - DHW Hysteresis
- **CH Pump** - Main Settings:
 - Operating mode - House heating or DHW priority or Parallel pumps
 - Service Menu:
 - Pump switch-on temperature
- **Internal burner feeder** - Service menu:
 - Internal feeder coefficient
 - Pellet settings - Ignition parameters - Feed time and feed pauses
 - Pellet settings - Damping parameters - Feed time and feed pauses
- **External pellet feeder** - Service menu:
 - Pellet settings - Ignition Parameters - Feed time
 - Pellet Settings - Operating parameters - Minimum power - Maximum feeder pause and Minimum feeder operation
 - Pellet Settings - Operating parameters - Maximum power - Minimum feeder pause and Maximum feeder operation
 - Installation menu:
 - Coefficients - Min feeder coefficient and Max feeder coefficient
- **Fan** - Main settings:
 - Burner cleaning
 - Service Menu:
 - Pellet settings - Ignition parameters - Blow out time, Blow out speed, Fan speed 1,2, Fan delay
 - Pellet settings - Operating parameters - Minimum power - Min. working fan
 - Pellet settings - Operating parameters - Maximum power - Max. working fan
 - Pellet settings - Operating parameters - Cleaning period
 - Pellet settings - Damping parameters - Fan speed
 - Installation menu:
 - Coefficients - Fan lower correction and Fan upper correction
- **Igniter** - Service menu:
 - Pellet settings - Ignition parameters - Heater Protection and Min heater power
- **Freely programmable output** - no associated function
- **Ash Removal** - (Installation menu) - Ash Removal
- **Vacuum feeder** - (Installation menu) - Vacuum feeder
- **Compressor 3 and 2 and 1** – (Installation menu) – Compressor 1 and 2 and 3

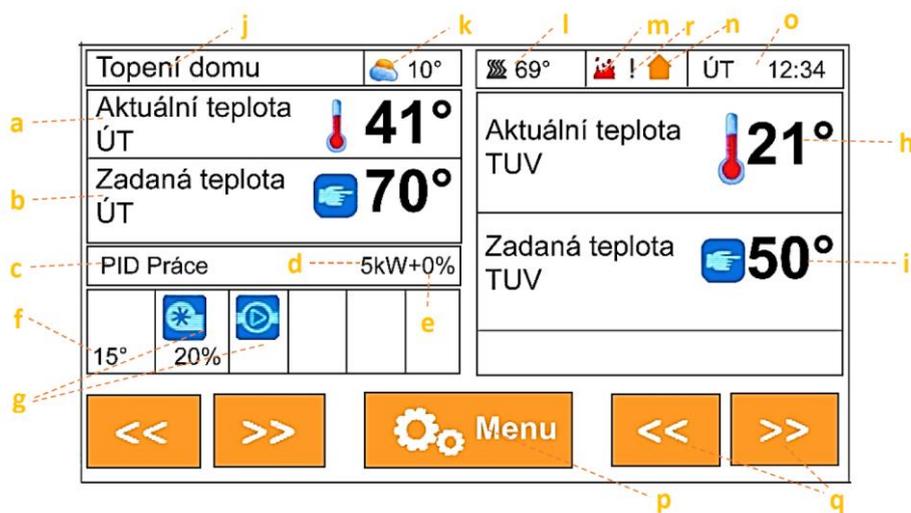
7. BOILER CONTROL UNIT

The v9 MINI control unit is equipped with a high-resolution touch screen device. The display is set to high press sensitivity to ensure easy operation in boiler room environment. It is additionally protected by Plexiglass, which shields the display against damage. The display is connected by a data cable into a connector on the top of the boiler where the control unit is located. After boiler activation, i.e., the boiler is switched on using the main switch on the top of the boiler, the display is activated and the current software version in the display and control unit is checked. The software version numbers are displayed on the unit display together with the OPOP spol. s.r.o. logo when the unit is started. These numbers must be identical for proper boiler operation. If they are not, the unit remains idle in the synchronisation part and it is necessary to update the SW using the USB connector on the display.

The next step is language selection which is displayed after the unit is activated for the first time. You can also change the language at any time in the unit's menu by clicking on the "Language selection" button with a picture of a flag. After selecting the language, we recommend to read the following chapters to familiarise yourself with the v9 MINI control unit functions.

7.1. Basic navigation

The basic navigation is intuitive thanks to the touch screen, which simplifies the whole control. Read the basic description of the boiler control unit main panel below, i.e., what you can read and control from it.



v9 MINI control unit main panel

- CH temperature measured by CH sensor connected to the sink on the outlet at the back of the boiler.
- Selected CH temperature, set in the unit's Main Menu. Standard 65-80°C.
- The boiler's current operating mode - Ignition, PID work or extinction.
- Current power in kW
- Combustion correction made using the functions in Coefficients, in Installation Menu.
- Temperature of the internal feeder in the burner, normally in the range 15-55°C.
- Panel showing the operation of electrical components such as fan, feeders, pumps and additional devices.
- DHW temperature measured by DHW sensor and connected to the "DHW sens." output in the external boiler socket.
- Selected DHW temperature, set in the unit's Main Menu. It works if the DHW pump is activated in the Main Setup.
- Operating modes. Display of pump operating mode, according to the Operating Modes setting in the Main Setup.
- Outdoor temperature, measured by an outdoor sensor connected to the "Weather sens." output in the external boiler socket.
- Flue gas temperature, measured by the flue gas temperature sensor. Standard range 70-110°C, depending on boiler power.
- Flame detection by photosensor. If the icon is displayed, the photosensor detects flame in the boiler.
- Display of the room thermostat operation if it has been activated in the Installation menu, Room thermostat.
- Current date and time entered in the Main settings.
- Menu button, to enter the boiler unit menu.
- Change the display of the main panel to show various information about boiler operation and its accessories.
- Operating error detection - use the right/left arrow keys to navigate the DPCH panel to inform the customer of non-standard boiler operating conditions. After pressing the panel, the activity history will be displayed where you can learn how to solve specific problems.

7.2. Basic operating modes

Biopel goes through several operating modes during its operation, which are displayed on the Main Panel. You can find more information regarding each operation mode down below, included associated messages.

Ignition: automatic ignition of pellets on the grate. Maximum time set at 12min. During this time, the boiler will go through several operating stages:

- Pre-ventilation – grate cleaning by fan, factory setting (FS) = 30s.
- Sub-base time - pellet dosing by feeder, the internal feeder in the burner works twice as long to move all the pellets to the burner grate. FS = 12 - 15s
- Fan delay - preheating igniter before starting the fan. FS = 30s
- Fan speed 1 - fan speed during the first 6 min of ignition. Fan operates at low speed to produce a flame without cooling the ignitor. FS: 3-8%
- Fan speed 2 - fan speed during the second 6 min of ignition. Maximum ignition cycle is 12min. If the pellets do not ignite during the first 6min, the fan will increase its speed to create a flame. The standard ignition time is 3-6min. FS: 5-16%
- Ignition delay - flame has been created, photosensor detects light, followed by flame stabilisation. If the flame detection by the photosensor is stable, the boiler goes into PID work (normal operation). If the flame detection by the photosensor is not stable, the boiler remains in the Ignition phase until the flame is large enough. If the flame is extinguished, a second Ignition follows (maximum for another 12min).
- The output of the Ignition phase can be:
 - Transition to PID work - normal boiler operation, or
 - Alarm message - Ignition error, pellets failed to ignite for some reason. The boiler tries Ignition twice before the announcement of this error condition appears. For more information, see Operating and Error messages chapter.

PID mode: normal boiler operation, indicated by the current boiler power and fan speed in %, which correspond to the percentage of the current power. The following operational states occur in PID mode:

- Min. power – the boiler starts its operation in the lower half of the power spectrum, i.e., 0-50% of the maximum power. The reason for this is to ensure that the small flame is not smothered by a large amount of pellets after ignition. FS = 1-50% of maximum output, depending on boiler type.
- Max. output – the boiler gradually increases its output up to the maximum, i.e., 100%. This can take 5 to 15 minutes, depending on boiler type. The modulation is then influenced by the set and measured CH temperature.
- PID modulation - As the boiler approaches the set CH temperature, it begins to modulate output to keep the set temperature within the limit given by the factory setting in the Service Menu. Boiler set temperature can be exceeded by 5°C. This is also the modulation range within which the boiler attempts to maintain the CH temperature so that it does not have to enter into the Extinguish phase if the set temperature is exceeded by 5°C or more.
- The output of the ignition phase can be:
 - Transition to Extinction - Set temperature exceeded by 5°C.
 - Continuous PID mode - the set CH temperature is not exceeded by 5°C due to downward power modulation. The boiler remains in PID mode and maintains the CH temperature at the set value due to up and down power modulation.
 - Switched off by thermostat - the room thermostat forces the transition from PID mode to Extinction as the room temperature has been reached.

Extinction: phase that the boiler reaches when warmed to the set CH temperature + 5°C, as the room thermostat does not instruct on heating. Boiler goes through the following operating stages in the Extinction phase:

- Cleaning - first phase of extinction. Photosensor still detects flame in the boiler, so the boiler tries to burn it out by deactivating the external feeder and increasing the fan speed to 70%. This continues for a set time or until there is no more flame in the boiler.
- Cooling - After all the remaining pellets on the grate have burned out, the photosensor no longer detects the light, so the boiler goes into the second phase of extinction, which is cooling. Fan speed is 100%. The grate is cooled by the fan to prevent its deformation.

The grate can only deform without fresh air supply, so the fan cools it. FS = 5-15min depending on the boiler type.

 *When the extinction is finished, the unit shows "Stand by" message. This is a standby mode where the boiler waits for conditions to reactivate the Ignition phase. This situation occurs when the measured CH temperature drops by 15°C or when the room thermostat instructs the heating.*

8. CONTROL UNIT FUNCTIONS DESCRIPTION

This chapter presents a complete description of all functions in the v9 MINI control unit menu. This list can be used as a general introduction to the individual functions. In all functions, you will find recommended settings and a description of what each item controls and information on how the functions are interrelated.

8.1. First start

The boiler's first start is used by the installer to easily set the basic operating parameters for proper boiler operation. Therefore, this menu is secured with an access code and only a certified installer has access to this menu. There is an entire chapter in the manual dedicated to this menu.

8.2. Ignition / Extinction

This function is used to activate and deactivate the boiler. If the boiler is deactivated, you will see the Ignition sign. After pressing it and confirming it, the boiler will enter the automatic pellet ignition mode. After about 5 minutes, the boiler will ignite and switch to the so-called PID mode. If the boiler is activated, i.e., in PID mode or Ignition, you will see the Extinction sign. After pressing it and confirming it, the boiler will enter the Extinction mode. The feeders stops feeding fuel and the fan increases fan speed to clean and cool the grate. This takes 5-15min, depending on burner. The boiler will then shutdown and remain deactivated until the Ignition button is pressed.

8.3. Main settings

These settings contain user functions that modify the boiler operation, but do not affect its operation and the operation of accessories important for its proper function.

1. Set CH temperature	Select the central heating temperature (maximum boiler temperature). It is recommended to set it between 60-80°C. higher temperature is better for proper boiler operation and long boiler service life.	60–80°C
2. Set DHW temperature	Select the desired domestic hot water temperature. DHW is only activated if the DHW sensor is connected to the "DHW sensor" output in the external socket and if the operating mode in the Main settings is correctly selected.	45-70°C

3. Burner cleaning	Activating the fan for cleaning the burner grate. The fan regularly increases its speed to clean the burner grate.	
3.1 Cleaning period	Time between cleaning. Bigger burner / more frequent cleaning required.	6-15min
3.2 Fan operation time	Cleaning time. Bigger burner / longer cleaning required.	10-20s
3.3 Blowing intensity	Fan speed during cleaning. Larger burner / faster speed required. Caution for high rotational speed during cleaning. High speed (especially during low boiler output) may cause extinction (no flame after cleaning). High speed may also cause unburned pellets to fall into the ashtray. If any of these situations occur, reduce the fan speed.	50-100%.

4. Operating modes	Operating mode of CH and DHW pumps connected to external socket. Select the time that pumps are to be switched on and off. Caution: CH and DHW pumps only operate in this mode if the current CH temperature is above 40°C. This is set in the Service menu, Pump switch-on temperature. The activated pump is indicated on the Main Panel by an icon 	
4.1 House heating *1	Only the central heating pump is working. The pump switch-on temperature is set to 40°C. The DHW pump is deactivated.	
4.2 DHW priority *2	The DHW pump is overridden by the CH pump. The moment the DHW temperature is reached - the DHW pump is deactivated and the CH pump is switched on for heating the house. The moment the DHW drops below the DHW Hysteresis - the CH pump is deactivated and the DHW pump is re-started until the DHW temperature reaches the desired value.	
4.3 Parallel pumps *2	Both CH and DHW pumps operate simultaneously to heat both the house and the boiler.	
4.4 Summer mode *2	Only the DHW pump is activated to heat the boiler.	

*1 Connect CH pump into the "CH pump" output in the control unit.

*2 Connect DHW pump into the "DHW pump" output in the control unit.

5. Container filled	Enter that the pellet hopper has been filled. If Hopper Calibration has been performed in the Installation Menu, the unit main panel displays 100% pellet level. To display the fuel quantity indicator correctly, you must first calibrate the fuel consumption in the Hopper Calibration function in the Installation Menu.
6. Boiler's weekly programme	Allows weekly adjustment of CH temperature during each hour, every day of the week. BY + - 20°C. If one of the modes is activated, the current temperature lowering is then displayed on the Main Panel under Set CH temperature.
6.1 Mode 1 (Mon-Sun)	Activates Mode 1.
6.2 Mode 2 (Mon-Fri) (Sat-Sun)	Activates Mode 2.
6.3 Mode 1 settings	Select the desired adjustments to CH temperatures for Mode 1.
6.4 Mode 2 settings	Select the desired adjustments to CH temperatures for Mode 2.
7. Alarm History	Displays alarm history and operating messages.
8. Disinfection	Thermal disinfection works in conjunction with DHW heating and can only be activated if the DHW pump is activated in Main Settings, Operating Modes. Thermal disinfection raises the set DHW temperature to the minimum value required for successful disinfection (min. 60°C) throughout the entire DHW circuit.
9.1 Display settings	Change any settings relating to the main display settings of the v9 MINI unit, such as display brightness, display saving, etc.
9.2 Main panels	Display the different types of main panels (main display data).
9.2.1 Panel view	Display for the end user.
9.2.1.1 Manufacturer's screen	Display for the installer.
9.2.1.2 Display brightness	Change display brightness for its better visibility.
9.3 Display saving mode	Select the brightness during the display power saving mode to save power consumption.
9.4 Extinction time	Select how long it takes for the display to go into power saving mode if the user does not use it for that time period.
9.5 Alarm sound	Activates/deactivates the sound during an alarm situation.
9.6 Button sound	Activates/deactivates the sound when the touchscreen is pressed.
9.7 Programme update	Forcibly updates the programme in the v9 MINI control unit. The standard way to update the programme in the control unit and external socket is described in the chapter Firmware update.
10. Factory settings	Reset the user changed Main Settings values to the factory values.
11. Programme Information	Current programme version. Caution: There are two programme types (firmware) - for the v9 MINI display and for the control unit. For more information on uploading a new programme, see the chapter Updating the Firmware.

The items in the Main Menu do not have a significant effect on boiler operation. If you are unsure regarding setting any of the functions, we recommend that you consult a certified installer or a representative of OPOP spol. s.r.o. for the correct setting. We will be happy to assist you in explaining all items not only in the Main Settings but also other control unit settings.

Following is the Installation Menu, which is for the Installer to set-up the combustion process and activate additional devices. This menu is not secured by a code, so it can be modified by the boiler owner, but it is recommended to consult a certified installer or manufacturer's representative for any changes.

8.4. Installation menu

In the installation menu, both the installer and the user can activate and modify the operation of additional devices and also correct the combustion process.

1. Coefficients	Items to correct the flame by the fan and pellet feeder for the boiler's min. and max. output. All corrections are set from the factory to 0. The user can decrease this number (-) ; (lower fan speed or lower pellet feed) or increase this number (+) ; (higher fan speed or higher pellet feed). The adjusted coefficients are displayed on the main panel at the power indicator (feeder coefficient) and at the fan speed indicator (fan coefficient).
1.1 Max. fan coefficient	This function is responsible for changing the fan speed during normal boiler operation. Only the maximum speed value is changed.
1.2 Min. fan coefficient	This function is responsible for changing the fan speed during normal boiler operation. Only the minimum speed value is changed.
1.3 Min. feeder coefficient	This function adjusts pellet feeding or the running time of the feeders, which is saved in the service menu. Change the feeder operating times and feeder breaks for the minimum boiler power.
1.4 Max. feeder coefficient	This function adjusts pellet feeding or the running time of the feeders, which is saved in the service menu. Change the feeder operating times and feeder breaks for maximum boiler power.

2. Feeder calibration*¹	Allows measuring the performance of the external feeder to automatically calculate pellet feeding relative to boiler power. This automatically ensures that the desired amount of pellets is fed into the burner, corresponding to the actual boiler power as displayed on the unit's main panel. This ensures easier boiler set-up. The installer then only adjusts the fan speed for ideal combustion, not the amount of fuel, which is adjusted automatically.
2.1 Fuel calorific value	It is given in MJ/kg of pellets. It has a major influence on the amount of pellets burned. Please refer to the pellet packaging or ask the pellet manufacturer for this information.
2.2 Container content	Enter the size of the pellet container. The main panel then displays how much fuel is left in the container.
2.3 Fuel weight	Enter the amount of pellets in grams, weighed using the "Start weighing" function. From this value, the boiler control unit automatically calculates the pellet dosage. Therefore, the boiler will have adequate output according to the requirement of the heating circuits.
2.4 Start weighing	Activate the external feeder for 5 min. Before activating the function, tie the bag at the external feeder outlet so that the pellets can fall into the bag. Then activate this function. The feeder will deactivate itself after 5min. Then weigh the contents of the bag on a table scale and enter the number in grams into the "Fuel weight" function and you're done.

*¹ If you activate the Feeder Calibration, you can adjust the Max Boiler Power in the Main Menu. Please note that this option is only active when Feeder Calibration is activated and properly set.

3. Manual operation	Here, it is possible to forcibly start all electrical components connected to the boiler, including all additional devices.
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4. Room thermostat	Activate the selected type of room thermostat. Select the Standard Thermostat, which operates on an open/closed circuit basis, or the RT10 OPOP room thermostat. The fact that the room thermostat has been activated is indicated by the icons   An orange icon indicates that the thermostat is instructing the boiler to heat. A red icon indicates that the thermostat is not instructing the boiler to heat.
4.1 Thermostat standard 1*¹	A voltage-free thermostat operating on a closed/open circuit basis. Open circuit instructs the boiler to enter the Extinction phase, i.e., instruct the boiler to stop heating. Closed circuit instructs the boiler to go into the Ignition and PID operation phase, i.e., instructs the boiler to heat. The House icon on the Main Panel flashes if the circuit has been closed and the thermostat therefore instructs the heating.
4.2 Thermostat standard 2*¹	A voltage-free thermostat operating on a closed/open circuit basis. Open circuit instructs the boiler to enter the Extinction phase, i.e., instruct the boiler to stop heating. Closed circuit instructs the boiler to go into the Ignition and PID operation phase, i.e., instructs the boiler to heat. The House

	icon on the Main Panel flashes if the circuit has been closed, so the thermostat instructs the heating.
4.3 OPOP regulator *2	RT10 room thermostat, connected to the RS output inside the external socket in the front of the boiler.
4.4 Ignition function	<p>If this function is activated, the boiler responds to the instruction from the room thermostat by switching off/on immediately.</p> <p>If this function is deactivated, the boiler responds to the no-heat instruction from the room thermostat by lowering the set CH temperature by the value set in the Reduce Temperature by Thermostat function. This solution is advantageous for heating systems with a large volume of water in the system, where complete deactivation of the boiler would mean a large drop in system temperature and a long reheating.</p>
4.5 CH pump - room thermostat	CH pump is started and deactivated together with the boiler on the basis of an instruction from the room thermostat. If the boiler switches off, the CH pump is switched off and vice versa.
4.6 Temperature reduction by thermostat	The boiler responds to a shutdown instruction from the room thermostat by lowering the CH temperature by the set limit. In case the item Ignition function is deactivated, then in this item you set by how many °C the set CH temperature should be decreased so that the boiler operates at a lower temperature and thus saves fuel by automatically modulating the power downwards.

*1 Connect the thermostat standard 1, 2 to the output "Room reg 1,2 and Com" in the control unit.

*2 Connect the OPOP controller (type RT10) to one of the RS data outputs in the control unit.

5. Lambda *	Regulates the residual oxygen in the boiler using a lambda probe.	
5.1 First time for update	Delay of the first regulation intervention. During this time, the lambda sensor is waiting for preheating. After the automatic ignition, it is necessary to wait around 5 minutes for the flame to stabilise, then the lambda probe starts to adjust the combustion process.	5min.
5.2 Update period	Correction period, how often the regulation intervention and O ₂ adjustment occurs in the boiler. The recommended time is 3-5min. The larger the burner, the longer the time must be.	3-5min.
5.3 Oxygen surge	Correction factor for pellet dosing in %. How big is 1 regulation intervention to the pellet feed. The regulation will be according to the set time in the Update Period function.	2%
5.4 Fan surge	Correction factor for fan speed in %. How big is 1 regulation intervention for fan speed. The regulation will be according to the set time in the Update Period function.	2%
5.5 Sum	Should the correction factor (oxygen surge, fan surge) be summed at each Update Period until the specified O ₂ is reached?	Yes
5.6 Min. change	<p>Set the lower level of the correction range. The unit will not go lower than this limit when trying to achieve the desired O₂. If the Sum function is activated. If the Lambda probe interferes with the operation of the external feeder and fan to such an extent that it reduces the boiler maximum power, then the value set in this function is too high. It should be set closer to 0% so that the Lambda probe cannot interfere so much with the boiler power.</p> <p>The Lambda probe is only to correct the flame not to maintain the unburned oxygen set point in the boiler by forcing the boiler power down or up.</p>	-10%
5.7 Max. change	<p>Set the upper level of the correction range. The unit will not go higher than this limit when trying to achieve the desired O₂. If the Sum function is activated.</p> <p>If the Lambda probe interferes with the operation of the external feeder and fan to such an extent that it reduces the boiler maximum power, then the value set in this function is too high. It should be set closer to 0% so that the Lambda probe cannot interfere so much with the boiler power. The Lambda probe is only to correct the flame not to maintain the unburned oxygen set point in the boiler by forcing the boiler power down or up.</p>	+10%
5.8 Lambda 100%	Required O ₂ in % for maximum boiler power. Keep in mind that the lambda probe itself has a certain measurement tolerance which is + - 1%. The boiler control unit is therefore able to maintain the required oxygen in the boiler within 1 - 1% of the set value. We are also talking about the average value of oxygen maintained in the boiler throughout its operation. Short-term deviations of oxygen from the set value are perfectly normal due to external factors such as changes in chimney draft, cleaning the burner by increasing the fan speed (Burner Cleaning function in the Main Settings), etc.	According to the burner size.

5.9 Lambda 1%	<p>Required O₂ in % for minimum boiler power. Therefore, the boiler control unit is able to maintain the required oxygen in the boiler within 1 - 1% of the set value. We are also talking about the average value of oxygen maintained in the boiler throughout its operation.</p> <p>Short-term deviations of oxygen from the set value are perfectly normal due to external factors such as changes in chimney draft, cleaning the burner by increasing the fan speed (Burner Cleaning function in the Main Settings), etc.</p>	According to the burner size.
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* Connecting the Lambda probe to one of the RS data outputs in the control unit.

6. De-ashing *	Activating the motor that drives the worm that empties the ash from the boiler into an external container. Extends the requirement for manual cleaning of the boiler.	
6.1 Operating time	The operating time of the motor that drives the ash removal worm. We recommend to set it between 5-20min, depending on the amount of ash generated. The larger the burner, the longer the cleaning time.	5-20min
6.2 Pause time	For how long the motor is in a stand-by before reactivation occurs. This depends on the pellet quality and burner size. The recommended setting is anything between 2-20 hours.	2-20h

* Connecting the Ash Remover to the "De-ashing" output on the control unit.

7. Compressor cleaning 1, 2, 3 *²	Cleaning the burner and boiler exchanger with the compressor set.	On state	Off state
7.1 ON	In the on state, the compressor always cleans after the extinction phase and also during PID operation according to the time set in the Pause Time function. After cleaning during PID mode, the light is lost (the photosensor does not detect the flame) and the boiler goes into Ignition after the set time. This time is the 20s without flame set in the Service menu, in the Operation Check function.	On	
7.2 OFF	When disabled, the compressor only cleans after extinction and does not clean during PID mode.		Off
7.3 Cleaning time	<p>The compressor's total cleaning time. Recommended between 1-3 min. Bigger burner, longer cleaning time. During this time, the solenoid valve opens and closes periodically according to the values set in the Open Time and Cycle Time functions.</p> <p>When set to On, it is necessary to complete the total Cleaning Time before the automatic ignition occurs so that the compressor does not blow the pellet dose for automatic ignition. Therefore, set the Cleaning Time to a maximum of 1min.</p>	1min	3min
7.4 Opening time	Opening of the solenoid valve. Time of one cleaning period. We recommend between 1-2s.	2s	2s
7.5 Cycle time	The time required to re-pressurise the compressor so that the valve can be reopened and cleaned again. We recommend 20s.	25s	20s
7.6 Pause time	The time of pause between cleaning. Recommended between 10-20 hours. This time is only valid when cleaning during PID operation, i.e., when the compressor is ON.	10-24h	Not taken into account* ¹

* Compressor in the Off setting works only after the Extinction phase (in Off state). Therefore, we do not consider the Pause Time.

* Connecting the compressor solenoid valve to one of the "Compressor 1, 2 or 2" outputs in the control unit.

8. Built-in valve 1, 2 *¹	Controls the mixing valve for one heating circuit.		
8.1 Switch off the valve	Deactivate the mixing valve if you do not want to use it at that moment.		
8.2 Switch on the valve	Activating the mixing valve.		
8.3 Set valve temperature *²	Enter the desired temperature to be maintained by the mixing valve. The maximum adjustable temperature on the mixing valve is determined by the Mixing Valve Type function.		Optional

8.4 Calibration	Calibrate the valve in use to ensure that it opens and closes to the limit positions. This calibration is automatic.	
8.5 Unit jump	The size of one step of each valve position change. This step is performed periodically, according to the time setting in the Measurement Pause function.	1-20%
8.6 Minimum opening	Set the minimum opening to ensure minimum water flow in the heating system even if there is no heating requirement (valve temperature is reached). If you want to prevent water flow into the system if the valve temperature is reached, then set 0%.	0-5%
8.6 Opening time	How long it takes the valve to move from one limit position to another. Close - Open. Also depends on the type of valve.	120s
8.8 Measurement pause	The pause between valve position changes. The unit measures the valve temperature and performs the valve position change at the set interval.	30s
8.9 Mixing valve type	Select the type of valve according to the heating system type. The setting will change the maximum possible temperature of the valve so as not to damage the heating system in use.	
8.9.1 CH valve	Central heating valve. The maximum temperature at the valve should be 85°C.	50-85°C
8.9.2 Underfloor valve	Underfloor valve whose maximum temperature can be 55°C to avoid damage to the underfloor heating system.	10-55°C
8.10 Equithermal regulation *4	Changing the valve temperature according to an outdoor sensor. The temperature at the valve will be automatically adjusted according to the set values in this function. The lower the outdoor temperature, the higher the desired valve temperature should be. Notice: the outdoor sensor must be plugged in, otherwise an error message will occur.	
8.10.1 Heating curve	Set the temperatures on the valve according to the outdoor temperature measured by the outdoor sensor. The temperature at the valve will be automatically adjusted according to the set values.	Optional
8.11 Room thermostat	Activate the control of the mixing valve with the room thermostat. Valve can respond to the instruction from the thermostat by lowering/raising valve set temperature, or closing/opening according to the instruction from the room thermostat.	
8.11.1 Regulation without thermostat	Room thermostat is deactivated. Does not affect the boiler control.	
8.11.2 RS reduction regulator	RT10 room thermostat reduces the temperature at the valve according to the set level in the Temperature Reduction by Thermostat function.	
8.11.3 RS proportional regulator	RT10 regulator closes or opens the valve according to the current heating demand.	
8.11.4 Thermostat standard	Activates the standard thermostat 1 or 2.	
8.11.5 Temperature reduction by thermostat	Enter the temperature by which the set temperature at the valve will be lowered if the RS Reduction Controller function has been activated.	
8.11.6 Room temperature difference	Hysteresis of repeated heating command from room thermostat. By how much the room temperature has to drop to send a command to the room thermostat to start heating.	
8.11.7 Change of the set temperature	If Standard Thermostat 1 or 2 is connected and activated, we can set the temperature at the valve to drop by a given level when there is no heating instruction from the room thermostat.	
8.12 Proportionality coefficient	Coefficient for measuring temperatures and updating the heating status. How often the thermostat checks the temperature and adjusts the valve mode according to the current situation.	
8.13 Opening direction	Change the opening/closing direction of the mixing valve.	
8.13.1 Left	The mixing valve moves from right to left when opening.	
8.13.2 Right	The mixing valve moves from left to right when opening.	
8.14 Selecting CH sensor	Select a sensor that functions as a CH sensor. Linked to the boiler protection function.	

8.14.1 CH sensor	Central heating sensor (boiler temperature). The sensor must be connected, otherwise an alarm message will appear.	
8.14.2 Additional sensor 1 *₆	The sensor must be connected if you activate it. Otherwise, an error message will be displayed.	
8.15 Boiler protection	The mixing valve opens to protect the boiler from overheating if CH temperature exceeds the set limit.	
8.15.1 Max. temperature	Set the maximum permissible boiler temperature. If it is higher, the valve will open to cool the boiler and lower the boiler temperature.	85°C
8.16 Reverse flow protection *₃	Mixing valve primarily maintains the minimum temperature of the return water to the boiler to protect it against isothermal corrosion. Caution: the return water sensor must be connected to the external socket at the front of the boiler, otherwise an error message will occur.	
8.16.1 Off	The return flow protection function is deactivated.	
8.216.2 On	The return flow protection function is activated. The valve will be closed until the valve temperature exceeds the value set in the Min. reverse flow temperature function.	
8.16.3 Min. reverse flow temperature	Set the minimum return water temperature that the mixing valve will primarily maintain. A range of 45 to 65°C is recommended. This is based on the maximum CH temperature. The difference should not exceed 20°C. The minimum return water temperature is 50°C.	55°C
8.17 Valve pump *₅	Activation and setting of Valve pump 1 and 2.	
8.17.1 Always on	The pump is always on, regardless of the valve temperature.	
8.17.2 Always off	The pump is always off, regardless of the valve temperature.	
8.17.3 On above limit	The pump is switched on above the set temperature. Linked to the boiler protection function.	
8.17.4 Temperature On	Set pump switch-on temperature. Linked to the Switched over limit function.	
8.18 Factory settings	Reset to factory settings. All user settings of the valve will be erased.	

- *₁ Connect Mixing Valve 1 or 2 to the "Valve 1" or "Valve 2" outputs on the control unit.
- *₂ Connect Valve Sensor 1 or 2 to the "Val.1 sens." or "Val.2 sens." outputs in the control unit.
- *₃ Connect the Return Water Sensor to the "Return sens." outputs in the control unit
- *₄ Connect the External Sensor to the "External sens." outputs in the control unit.
- *₅ Connect the Valve pump 1 or 2 to the "Valve 1 pump" or "Valve 2 pump" outputs in the control unit.
- *₆ Connect Additional Sensor 1 to the "C1 and Gnd." output in the control unit.

9. Valve 1, 2 (431N) *	You can control another mixing valve using the 431N add-on modules. This can be connected to the boiler control unit via the 431N module. For more information on this additional device, please contact a certified plumbing company or your OPOP spol. s.r.o. representative directly.
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- *₁ Connect Mixing Valve 1 or 2 to the RS data outputs in the control unit, via the 431N add-on modules.

10. Buffer tank parameters*	Set the buffer tank heating method.
10.1 Buffer tank	In this sub-menu, activate or deactivate heating the buffer tank.
10.1.1 Off	Deactivates heating the buffer tank.
10.1.2 On	Activates heating the buffer tank.
10.2 DHW function	Activates DHW heating by means of the buffer tank.
10.2.1 From buffer tank	DHW heating is done through the buffer tank.
10.2.2 From boiler	DHW heating is done through the DHW pump.
10.3 Upper set temperature	Enter the maximum temperature at the top of the buffer tank.
10.4 Lower set temperature	Enter the maximum temperature at the bottom of the buffer tank.

- * Connect the sensors for heating the buffer tank to outputs "C1" and "C2" in the control unit.

11. Additional pump *	Activate and set the additional pump.
11.1 Device type	Select the pump type. For the purpose you will use it.
10.1.1 Pump off	Deactivates the additional pump.
11.1.2 CH pump - room thermostat	CH pump is switched on when the central heating temperature is higher than 40°C. This value can be changed in the Service menu.
11.1.3 DHW pump	DHW pump is switched on according to the set parameters DHW Temperature (Main setting) and DHW Hysteresis (Service menu).
11.1.4 Circulation pump	The circulation pump has a set switching temperature in the Max. Temperature, Min. Temperature, Sensor Selection functions that control the pump.
11.1.5 Floor pump	The floor pump behaves in the same way as the circulator pump, with the difference that its maximum switch-on temperature drops so as not to damage the floor heating. Set the switch-on temperatures in the Max. Temperature, Min. Temperature and Sensor Selection functions that control the pump.
11.2 Max. temperature	Maximum temperature at which the circulation or underfloor pump is switched on.
11.2 Min. temperature	Minimum temperature at which the circulation or underfloor pump is switched on.
11.4 Sensor selection	Select the sensor by which the circulation or underfloor pump is controlled. Caution: if you activate a sensor that is not connected to an external socket at the front of the boiler, an error message will occur.
11.4.1 CH sensor	CH sensor connected to the CH sensor output.
11.4.2 DHW sensor	DHW sensor connected to the DHW sensor output.
11.4.3 Valve 1 sensor	Valve 1 sensor connected to the Valve 1 sensor output.
11.4.5 Valve 2 sensor	Valve 2 sensor connected to the Valve 2 sensor output.
11.4.6 Reverse flow sensor	Reverse water flow sensor connected to the Return sensor output.
11.4 Equithermal sensor	Equithermal sensor connected to the Weather sensor output.
11.4.8 Additional sensor 1	Additional sensor C1 connected to the C1 sensor output.
11.4.9 Additional sensor 2	Additional sensor C2 connected to the C2 sensor output.

* Connect the Additional pump to the "Additional pump" output of the control unit.

12. Ethernet module *	Internet module allowing connection of the boiler to the OPOP online server and providing online remote management of your boiler.
12.1 Switch off the module	Module deactivation.
12.2 Switch on the module	Module activation.
12.3 Registration	Get the registration number to register your boiler on the OPOP online server.
12.4 DHCP	Used for automatic configuration of computers connected to the computer network.
12.5 IP address	Identifies the network interface on the computer network.
12.6 IP mask	Network mask is a number that in computer science describes the division of a computer network into subnets.
12.7 Gateway address	Name of active device (network node) that has the highest status in the computer network. A gateway connects two networks operating with different communication protocols. It also performs the function of a router and is therefore placed above the router in the sequence of network devices.
12.8 DNS address	Hierarchical system of domain names that is implemented by DNS servers and a protocol of the same name that they use to exchange information. Its main purpose and cause of creation is the mutual transfer domain names and IP addresses of network nodes.
12.9 MAC address	Is a unique identifier of a network device that is used by the various second layer (link layer) protocols.
12.10 Module version	SW version of the Internet module that is part of the external boiler socket.

* Connect your modem/router to the external socket on the boiler, using an RJ45 cable.

13. GSM Module *	GSM module allows you to change the basic parameters by SMS messages and receive reports on the boiler operating status.
13.1 Off	GSM module deactivation.
13.2 On	GSM module activation.

* Connecting the GSM module to one of the RS data outputs in the control unit.

14. Cascade *	The cascade controller is an additional module that allows control of up to 4 boilers simultaneously as though it were one. The power of each boiler is then used only when necessary. Boilers are connected to the cascade controller using RS data cable.
14.1 Operating time	Select one of two control modes, using the CH temperature or the outdoor temperature sensor.
14.1.1 Equithermal regulation	Switching on of individual boilers based on the outside temperature. Select on the basis of the outdoor temperature at which the boilers will be switched on. The lower the temperature, the more boilers activated.
14.1.2 Modulation	Switch individual boilers on the basis of the set CH temperature not being reached within a given time. Linked to the Boiler Switch-On Temperature and Waiting Time functions.
14.2 Number of boilers	Select the total number of boilers connected to the cascade controller.
14.3 Hysteresis	Hysteresis ensures that the boiler is restarted when the maximum CH temperature has been reached. When the CH temperature drops by the value set in this function, the boiler is reactivated.
14.4 Low efficiency limit	The lowest temperature level of the boiler. If the temperature does not exceed the set limit in the interval set in the Waiting Time function, the next boiler is switched on.
14.5 3 Boiler 3 switch-on temperature	Temperature at which the boiler is switched on.
14.6 2 Boiler 2 switch-on temperature	Temperature at which the boiler is switched on.
14.7 Boiler 1 switch-on temperature	Temperature at which the boiler is switched on.
14.8 Waiting time	How long it will take for the next boiler to activate if the specified set temperature is not reached within the given time.
14.9 Version	Current version of the Cascade Controller.

* Connecting the Cascade controller to one of the RS data outputs in the control unit.

15. Exhaust fan *	Activates the exhaust fan to increase the chimney draft to the prescribed level to prevent smoke escape. It connects to the external socket using the RS data cable.
15.1 Fan operating minimum	Minimum fan speed.
15.1 Fan operating maximum	Maximum fan speed.
15.3 Version	The current version of the exhaust fan.

* Connecting exhaust fan to one of the RS data outputs in the control unit.

16. Vacuum feeder *	Vacuum feeder transports the pellets over longer distances. From large silos to the boiler hopper.
16.1 Operating time	Set how long the vacuum feeder will be in operation each day. During this time the pellet hopper at the boiler should be filled. 30min to 1hr is usually sufficient time to fill the hopper completely. We recommend to practically verify how long it takes for the hopper to fill using the Vacuum Feeder and set the exact time to this function. The control unit will not try to start the vacuum feeder when the hopper is already filled. This saves the electrical switch on the vacuum container flap.

30min - 1h

16.2 Switch-on hour	Enter the time during the day when the vacuum feeder should start. It will run until the time set in the Operating Time function expires.	Optional
16.3 Switch-on hour 2	If you are using a boiler with higher power, it may be necessary to start the feeder twice a day. Here you can set the time for the second start of the vacuum feeder during the day. It will run until the time set in the Operating Time function expires.	Optional
16.4 Opening time	Operating time of the vacuum feeder. Lasts until the vacuum container is full. Recommended from 80 to 200s depending on the length of the hoses used for feeding. Longer cabling, longer opening time.	80-200s
16.5 Pause time	After the vacuum container is filled by the Opening Time function, the vacuum feeder is temporarily switched off to allow the pellets to fall into the hopper and the entire suction cycle can be repeated. We recommend to set 20s.	20s

* Connecting the Vacuum feeder to the "Vacuum" output of the control unit.

17. Solar control *	Connect an external device controlling the solar collectors to activate/deactivate the boiler in case there is/is no requirement for heating by the boiler but by the solar collectors. The device must have a voltage-free contact, switching off/on the boiler.
17.1 Solar control (NO)	Normally open.
17.1 Solar control (NC)	Normally closed.

* Connect the device controlling the solar heating to the "Solar and Com" output on the control unit.

18.1 Ignition blocking*	Blocks boiler start-up (defrost) if the outdoor temperature measured by the outdoor sensor is higher than the temperature set in the Set Temperature function. Notice: The outdoor sensor must be plugged in, otherwise an error message will occur.
18.2 Set temperature	Higher outdoor temperature than the set temperature will force the boiler to shut down. Caution: Do not forget to calibrate the Outdoor Sensor if it does not measure correctly in the Outdoor Temperature Correction function in the Installation Menu.

* Ignition blocking works in conjunction with the Outdoor Sensor, which you must connect to the "External sens." output in the control unit.

19. Outdoor temperature correction *	Correct the temperature measured by the outdoor sensor. Length of the supply cable affects the measured value. When connecting the Outdoor Sensor, it is recommended to measure the real temperature and then adjust the correction so that the temperature displayed on the Main Panel corresponds to the real value. The temperature measured by the Outdoor Sensor is indicated on the Main Panel by the icon 	
19.1 Correction value	Outdoor temperature correction. Change to match the real temperature.	
19.2 Averaging time	Time how often the measured value is saved in memory and averaged to find the average outdoor temperature over time.	30-100s

* Connect the outdoor sensor to the "External sensor" output of the control unit.

21. Clock setting *	Setting the current time.
22. Date setting *	Setting the current date.

* Important for online functions, Boiler Weekly Programme, and for Alarm History.

23. Factory settings	Do you want to reset all settings made by the user in the installation menu to the factory values?
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8.5. Service Menu

Service menu is used to set the feeder operation and fan speed in all operating states of the boiler. This menu is secured with an access code, as changes to these parameters can have a major impact on the correct boiler operation. Therefore, changes to this menu should only be made by a certified installer with a valid authorisation from OPOP spol. s.r.o.

1. Pellet settings	Change feeder settings and fan speed at max and min boiler output in all 3 phases of boiler operation (ignition, operation, extinction).
1.1 Ignition parameters	Change the parameters for automatic ignition phase.

1.1.1 Blow-out time	Time for cleaning the burner grate before dosing pellets for ignition. Linked to the function Blow out Speed and Ignition Delay.	30s
1.1.2 Blow-out speed	Speed of the fan when cleaning the burner. Linked to the function Blow-out Time.	100%
1.1.3 Hopper time	Amount of pellets for automatic ignition. It is recommended in the range of 12-18s, depending on the burner type. Too few or too many pellets may cause too long or failed ignition.	12-16s
1.1 Ignition delay	During this time, the external feeder will not be in operation to avoid blowing out the pellets supplied for automatic ignition. Linked to the function Blow-out Time.	30s
1.1.5 Feeding time	Internal feeder operation in the burner during ignition. Internal feeder feeds the residual amount of pellets from the back of the burner to the grate at regular intervals. Connected to the Feeding Pause function.	5s
1.1.6 Feeding pause	Pause feeding of the internal burner feeder. How long the internal feeder is number stand-by mode before the next feed. Connected to the Feeding Time function.	100-300s
1.1.7 Fan speed	Fan speed during the first half of the auto-ignition. The fan has a lower speed to create the glow from which the fire is subsequently produced. Connected to the Heater Protection function. The correct fan speed is related to the burner size. For more information, please read the chapter Factory Settings.	1-8%
1.1.8 Fan 2 speed	Fan speed in the second half of the ignition process. If the flame has not been created during the first half of the ignition cycle, the fan will increase its speed to create one. Connected to the Heater Protection function. The correct fan speed is related to the burner size. For more information, please read the chapter Factory Settings.	3-16%
1.1.9 Heater protection	Maximum time of one ignition cycle. During this cycle, the fan speed is graded according to the Fan Speed and Fan Speed 2 settings. If ignition does not occur, the external feeder will feed half the pellet load set in Feeding Time and try two ignitions. If there is no flame during the time set in this function, an error message occurs and the boiler shuts down. In case this time reaches 0 and despite this the pellets fail to ignite, the feeders will feed a second, half dose of fuel (half of the value set in the Feeding Time function). It makes a second attempt to ignite. If the time interval reaches 0 again without ignition (no flame) (the photosensor does not detect light higher than the value set in the function Brightness of ignition), then the alarm message "Failed ignition" is shown.	12min
1.1.10 Ignition brightness	Photosensor sensitivity. You can see the actual detection of the amount of light in the bottom left corner after entering this function. If there is no flame in the boiler, the set number must be higher than the number detected by the photosensor in the bottom left corner. After successful ignition, the photosensor detects a flame and the light level will increase and exceed the set limit. At this point, the ignition phase switches to PID operation.	38
1.1.11 Fan delay	Igniter re-heating. The fan is deactivated for a set period of time after ignition activation to prevent the igniter from cooling down. After the igniter has warmed up, the fan starts. Fan delay after the ignition depends on this function.	30s
1.1.12 Min. power of the heater	Here you can reduce the igniter's supply voltage. With the standard igniter supplied by OPOP, we recommend leaving the original setting.	0
1.2 Operating parameters	Operating parameters for the operation of the external feeder and fan during so-called PID operation.	
1.2.1 Minimum power	Operation setting, pause of the external feeder and fan speed for the minimum boiler power. Ensure that the flame is large enough to avoid poor flame detection or flame extinction.	
1.2.1.1 Maximum feeder pause	Feeder pause at min boiler power. Depends on boiler size.	7-25s
1.2.1.2 Min. feeder operation	Feeder operation during minimum boiler power. Depends on boiler size.	1-3s
1.2.1.3 Min. fan speed Operation	Speed of fan rotation during minimum boiler output. Depends on boiler size.	5-30%

1.2.2 Maximum power	<p>Setting the operation, pause the external feeder and fan speed for minimum boiler power. Ensure that the flame is large enough for efficient combustion with fine ash. At the same time, check the flue gas temperature, which should be within the limits given by the boiler size. Read the manual for the correct flue gas temperature. If it is too high at max. boiler power, perform a combustion correction.</p> <p>The flue gas temperature is displayed on the main panel next to the icon .</p>	
1.2.2.1 Max. feeder operation	Feeder operation during maximum boiler output. Depends on boiler size.	1-8s
1.2.2.2 Min. feeder pause	Feeder operation pause during max. boiler output. Depends on boiler size.	7-25s
1.2.2.3 Max. fan speed Operation	Fan rotation speed during maximum boiler output. Depends on boiler size.	10-70%
1.2.3 Cleaning time	Forced shutdown of the boiler and cleaning by means of the Extinction Phase. The boiler is switched off after a time interval and the Extinction Phase is run to clean the grate. Subsequently, automatic re-ignition occurs. We recommend to use only for high burner powers, 100-200kW. We recommend setting 20h. Factory setting is 0h 0min which means that this function is deactivated.	0-20h
1.2.4 Operation check	How often the photosensor detects light. If the photosensor does not detect a flame for a set time period during PID operation, it will automatically go into the Ignition phase. The recommended setting is from 20-50s. For larger burners this time may be longer.	20-50s
1.3 Extinction parameters	Extinction phase and operation of the feeders and fans in this operating condition. Varies according to burner size.	
1.3.1 Fan speed	Fan speed during the first part of the extinction phase - when the flame is still detected in the boiler by the photosensor. At this point, we want to burn the remaining pellets before the second cleaning phase and cooling occurs. The recommended setting is 50-80%. This is because we want to burn the pellets quickly, but we do not want the fan speed to be too high, which would cause unburned pellets to fall into the ashtray.	50-80%
1.3.2 Feeding time	Operation of the internal feeder in the burner during the extinction phase. The feeder feeds the remaining pellets to the grate. Connected to the Feeding Pause function.	5s
1.3.3 Feeding pause	Pause during the internal burner feeder operation. Connected to the Feeding Time function.	10-100s
1.3.4 Extinction time	Maximum extinction time at the time the photosensor detects the flame. If no extinction occurs and the photosensor still detects flame for the set time, then the boiler goes into the ignition mode and subsequent extinction. This is a safety measure to prevent the boiler from shutting down if there is still a flame in the boiler.	5-10min
1.3.5 Delay time	Second phase of the extinction cycle when the remaining pellets on the grate have burnt out and the photosensor no longer detects light. At this point, the fan speed is increased to 100%. The aim is to clean and cool the grate so that it does not twist. The recommended value is 5- 15min depending on burner size.	5-15min
2. Max. flue gas temperature	<p>If there is an increase in flue gas outlet temperature approaching the set point, the boiler power will be reduced to prevent exceeding the maximum flue gas temperature.</p> <p>The flue gas temperature is displayed on the main panel next to the icon .</p>	220°C
3. Feeder alarm temperature	<p>Maximum temperature of the internal feeder in the burner. If it is too high, an error message will occur. Ensure that the burner/boiler/flue gas outlet and chimney are cleaned properly. Ensure correct grate position and correct combustion settings.</p> <p>Otherwise, it may result in overheating of the burner.</p>	85°C
4. Temperature priorities		62°C
5. CH pump emergency activation	Activation of the CH pump during an alarm message. The pump will circulate the pre-heated water in the boiler until the CH temperature falls below the set limit.	85°C
6. Pump switch-on temperature	The boiler CH temperature at which the pumps will switch on. If the temperature is lower than the set limit, the pumps are inactive. This is to protect the boiler against low temperature corrosion.	40°C

7. Boiler alarm temperature	Maximum CH temperature. If the temperature is higher than the one set, an error message occurs.	93°C
8. Internal feeder coefficient	Extends the internal feeder burner operation. Internal feeder has to run for a longer time compared to the external feeder to deliver all the pellets to the burner grate. The recommended setting is 100-150%.	100-200%
9. Blowing	Fan factory setting. No need to change, setting only for manufacturers.	
10. Min. boiler temperature	Minimum boiler temperature. If the temperature does not exceed this limit for the specified time, an error message will occur. Connected to the Supervision Temperature function.	30-45°C
11. Growth impulses	Change the modulation step during PID operation. The higher the number, the greater the change in power over time. The smaller the number, the smaller the change in power over time. This directly affects how fast the PID modulation responds to temperature change to maintain the set point temperature of the CH.	0-20
12. Supervision temperature	If the temperature does not exceed the value set in the Min. Boiler Temperature function for this set time, an error message will occur.	5°C
13. Boiler Hysteresis	CH temperature minus Boiler Hysteresis means CH temperature level when the boiler is reactivated. CH temperature = 75°C, Boiler Hysteresis = 15°C. The boiler will be switched on automatically when the CH temperature falls below 60°C.	5-15°C
14. DHW Hysteresis	DHW temperature minus DHW Hysteresis means boiler temperature level when the DHW pump/valve is reactivated. DHW Temperature = 60°C, DHW Hysteresis = 10°C. The DHW pump/valve will be reactivated automatically when the DHW temperature drops below 50°C.	5-10°C
15. Disinfection	Forced increase in DHW temperature to destroy bacteria in the hot water boiler.	
15.1 Disinfection temperature	Select the DHW temperature to which the entire DHW system is to be heated.	75°C
15.1 Disinfection time	How long the DHW temperature will remain heated to a higher level.	10min
15.3 Max. time for disinfection to heat up	Maximum time that the Disinfection function can be activated. If the DHW temperature has not been raised to the set value in the Disinfection Temperature function by this time, the control unit deactivates the Disinfection function and resumes normal operation.	20min
16. Min. alarm temperature	Minimum CH temperature (boiler) that must be reached within the time interval (set in the Min. Temperature Time function) to avoid the "Temperature not rising" alarm message.	30°C
17. Min. temperature time	Time for which the CH (boiler) temperature must be higher than the value set in the Min. Temperature Alarm function. If the CH temperature is lower during this time interval after ignition, a "Temperature not rising" alarm will appear.	30min
16. Factory settings	Reset all settings in the Service Menu to their factory values.	

8.6. Language selection

Selecting the language is easy via the custom menu in the main display menu of the v9 MINI. The first time the control unit is switched on, the display asks you to select the language. If you miss this selection (the time interval is 30s), then you can change the language to Czech at any time using this menu. In English, the language selection is called "Language selection". You can recognize it in the menu by the picture with flags. Once the language is selected, it is immediately loaded into the control unit.

9. FIRST BOILER START-UP

After successful installation of all the boiler's components and additional devices, the so-called first start-up follows. A certified installer sets the basic data for the correct combustion process and activates the additional devices connected to the external socket. This menu is secured by an access code.



Caution: when selecting the boiler power during the first start-up, choose one of the powers from 11 to 40kW with the "MINI" attribute. The other powers are for older types of Biopel v9 premium.



Caution: the first start-up is carried out in the boiler's deactivated state (extinct). If you perform the First Start-up during the Ignition or PID operation phase, the data entered would not be saved in the control unit's operating memory and the operation of the feeders and fan may not correspond to the values you have entered.

In the first start-up, the unit will ask you step by step for basic boiler information. After entering each item, move to the next item by pressing the Next button.



Caution: if you do not enter the data for each query within the First Start within a 30s interval, the control unit will move to the next query after 30s.

Therefore, review the First Start diagram on the following pages of this manual before the First Start so that you do not extend the selections inside the First Start beyond 30s. This is to protect against the unit remaining in First Start if the installer stops operating it for a longer time period.



For clarity, during the first start-up the information in the Control Unit Function Description and Accessory Electrical Wiring chapters, as well as the First Start Diagram provided on the following pages of the manual.

- Enter the current time and date - for the boiler's online functions and timed start-up, and for correct alarm history display.
- Burner power - correct burner selection will set the feeder operating times and fan speeds adequately to the size of your boiler and burner. Please note: only enter the burner power as shown on the label on the side of the burner. Entering the wrong power may damage the burner or boiler!
- Filling the external feeder. Start the feeder so that it is filled with pellets. Deactivate the feeder the moment pellets start falling from the feeder into the burner.
- Setting the CH temperature and modulation range - CH temperature, i.e., the boiler power temperature, should be as high as possible, preferably between 65 and 80°C. The following is the activation of pumps if they are connected to the external socket to the outputs "CH pump" or "DHW pump". Caution: for the DHW pump, it is necessary to connect a temperature sensor to the "DHW sensor" output in the external socket of the boiler, otherwise the control unit will announce an alarm when the pump is activated.
- Setting the CH hysteresis - by default 15°C. This is the drop in the boiler's CH temperature at which the boiler is reactivated if the CH temperature was reached in the previous period.
- CH temperature above - by default 5°C. This is the temperature by which the boiler can exceed the set CH temperature before it switches off.
- Connecting the additional devices in the following order:
 - Room thermostat - standard (voltage-free, connected to outputs "Room reg.1" or "Room reg.2") or RT10 (OPOP controller, connected to RS data output in external socket).
 - Lambda probe - connected to the RS data output. The pre-set values can be changed in the Installation menu.
 - Compressor 1,2, 3 - connected to "Komp1" or "Komp2" or "Komp3" output. By default, burner cleaning is connected to "Komp1" output and boiler cleaning to the other 2 outputs. However, these can be changed at any time in the compressor cleaning settings in the Installation Menu.
 - Vacuum feeder, Automatic de-ashing, Exhaust fan - connect these accessories to the "Vacuum", "De-ashing" outputs, RS data output.
- Connecting mixing valves 1,2 - to outputs "Valve1" or "Valve2". Caution: when activating the valves, it is also necessary to connect the valve sensors to the outputs "Valve1 sens." or "Valve2 sens.", otherwise an alarm message will occur. Connect the possible valve pumps to the "Valve1 pump" or "Valve2 pump" outputs and activate them directly in the Built-in Valves 1 or 2 settings in the Installation Menu.
- The following part presents a general introduction to boiler operation and maintenance. Do not forget to familiarise the customer with how to operate and maintain the boiler.
- At the end of the First Start-up, you can activate the boiler and put it into Automatic Ignition, or you can leave the boiler deactivated and carry out further installation work. You can activate the boiler at any time via the Ignition button in the unit menu. Caution: if a room thermostat is connected make sure it is set to heating to instruct the boiler to heat.

Otherwise, the boiler will not be activated when you press Ignition.

The first start-up of the boiler is done. You can change most of the options again at any time after the First Start-up is complete in the Main or Installation menus.



In the case of a non-standard installation with a different external feeder than prescribed, a different chimney draft than prescribed, etc., we recommend that you measure the external feeder power before starting the boiler, see the Combustion Correction, Non-Standard Installations section.

When the boiler is activated by pressing Ignition in the unit menu, the pellets will ignite and the boiler will go into PID operation. This is followed by Combustion Correction if the combustion process is not optimal, see the following chapter.

Therefore, the boiler's first start-up of the boiler is complete. Your selections have been saved in the operating memory of the v9 MINI control unit. If you are unsure about any of the settings, you can perform the First Start-up again at any time in the future. Keep in mind, however, that for proper memory storage, you must always perform the First Start-up in the deactivated (extinction) state of the boiler, not in the Ignition or PID operation mode. After activating the Ignition, wait for the boiler to ignite the pellets and enter into PID operation. The moment its power in PID operation is equal to 100%, you can start the manual Combustion Correction. If you have connected and activated the Lambda probe, the Combustion Correction is automatic. Continue with the combustion setting directly in the Installation menu, Lambda probe, according to the Lambda probe manual. Always visually check the quality of the combustion process when correcting combustion.

10. COMBUSTION CORRECTION

After activating the boiler (Ignition), wait until the igniter ignites the pellets and the boiler goes into PID operation. In PID operation, wait a few minutes until the main panel displays the maximum power in kW (set during First Start-up) and 100% fan speed. At this point, the boiler is operating at full power. Open the ash door carefully and check the combustion quality, flame parameters. In case they are not ideal, perform the correction as described below. We recommend checking the combustion quality continuously, in case of a change in the chimney draft or the pellet type and quality, make the combustion adjustment again. In case of installing Lambda probe, this correction is carried out automatically.



Caution: when the boiler is in operation and the flame is in the boiler, never open the front ash door more than 2-3cm. There is a flame in the boiler and it would flare out of the boiler if opened more. Always close the door after checking the flame so that no flue gas cannot escape into the room.

10.1. Flame quality

By checking the flame coming out of the burner, you can determine quite surely whether the combustion process is optimal or whether a correction is necessary. Examples of good and bad combustion are given below.

Ideal flame at 100% power:

- The maximum length depends on the burner type (may be affected by chimney draft and pellet type).
 - Boiler 10-15kW = approx. 25 - 30cm from the end of the grate
 - Boiler 20-30kW = approx. 35 - 45cm from the end of the grate
- Yellow-orange colour, unburnt pellets do not fall from the grate, only fine ash in the ashtray.

Incorrect flame at 100% power:

- Maximum flame length is less than or greater than the above.
- Light yellow colour (too much combustion air) or dark orange to red (not enough combustion air).
- Unburned pellets falling into the ashtray, dark smoke coming out of the chimney.

10.2. Change fan speed

To change the fan speed at boiler min. and max. power, use the Fan Min. and Max. Coefficient function in the Installation menu, Coefficients. Make the correction if the flame has the following parameters:

Downward correction (minus values):

- Flame is too aggressive and spits.
- Fan is dropping unburned pellets
- Flame is small and aggressive

Upward correction (plus values):

- Flame is slow and dark
- The grate is clogged with black ash

- Flame is too big and smokes black

10.3. Change external feeder operating time

If the correction of the combustion process by means of the fan is not enough, you can proceed to the correction of the operation feeder time, i.e., to the adjust the fuel quantity. Keep in mind that this correction directly affects the maximum and minimum boiler power. The correction can be made using the Max. and Min. Feeder Coefficient in the Installation menu, Coefficients.

Downward correction (minus values):

- The grate is excessively clogged with black ash
- Flame is too big and smokes black
- Flue gas temperature is higher than recommended

Upward correction (plus values):

- Boiler is unable to adequately heat the CH temperature
- Flame is too small and too aggressive
- Flue gas temperature is lower than recommended

After each correction, let the flame settle for a few minutes and check the change in the flame after your correction. If you are not satisfied, perform the correction again. Keep in mind that the boiler power must be stable at the Max or Min value to adequately adjust the Min and Max corrections and see the real result on the flame. Otherwise, the flame will be affected by the PID modulation and will not match the min or max power value.

In the case of a non-standard installation with a different external feeder than prescribed, a different chimney draft than prescribed, etc., we recommend that you measure the external feeder power before starting the boiler, see the Combustion Correction, Non-Standard Installations section.

10.4. Non-standard installations

If the boiler configuration is non-standard, i.e., basic instructions are not followed during installation such as:

- External feeder type (feeder speed) for adequate boiler type. Each boiler has an unmistakable External Feeder type with the correct motor speed.
- 45° angle of the External Feeder from the ground
- Chimney draft 15Pa
- Size and type of pellets

We then recommend that you measure the External Feeder power before starting the boiler. This will determine if your feeder is feeding an adequate amount of pellets for the boiler's maximum power in case of your particular installation configuration. The procedure for determining the External Feeder power is as follows:

1. With the boiler in the deactivated state (Off), disconnect the PVC hose from the Burner Pipe and, on the other top side, from the External Feeder outlet.
2. Attach a plastic bag to the outlet of the External Feeder into which the pellets will fall.
3. Start the External Feeder in the Installation Menu, Manual Operation, Feeder. And leave it running for 5 minutes.
4. After this time, the bag will be filled with pellets that the External Feeder is able to deliver to the burner in 5 minutes.
5. Weigh the bag of pellets on a carry-on scale. The value in grams you get is determined by the speed of the External Feeder, its inclination from the ground (45°C recommended), pellet size (6-8mm), amount of dust in pellets, etc.
6. Enter this weighted number, into the Feeder Calibration - Pellet Quantity function, in the Installation Menu.

Bear in mind that we recommend calculating the External Feeder power only in the case of a non-standard installation.

If using the standard recommendations for feeder installation, pellet type and chimney draft, you can skip this sub-chapter and correct the flame when the boiler is operating using the points explained in the Change Fan Speed and Change External Feeder Operating chapters, found one the page above.

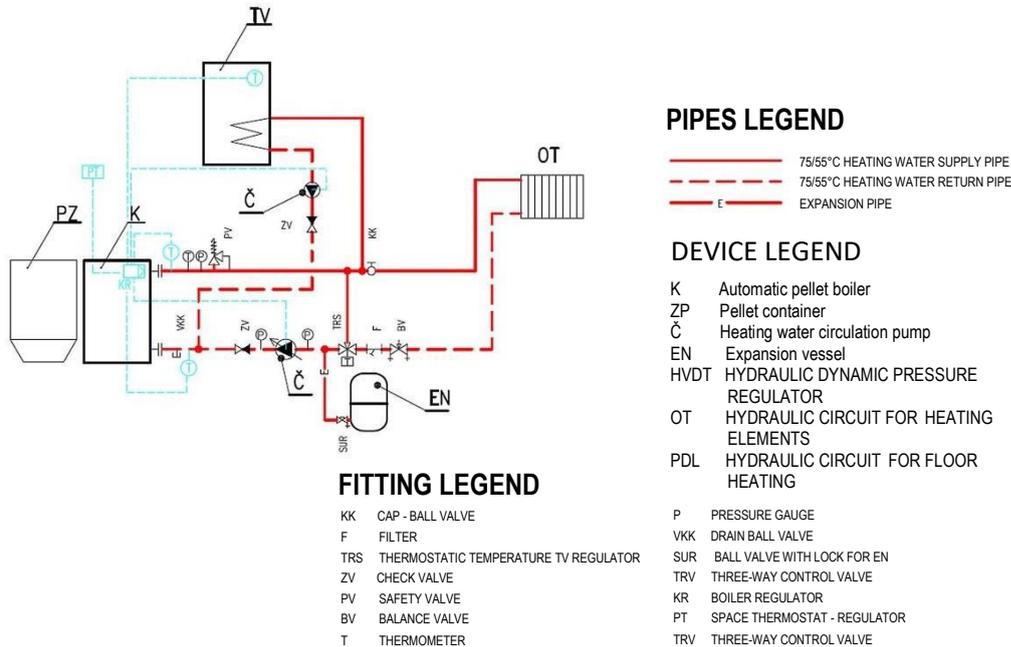


Caution: if you perform a feeder correction, you will change the amount of pellets dosed by the feeder for max. and min. power. Therefore, it is therefore necessary to check the combustion quality and then adjust the fan speed in the Coefficients function so that combustion at the new amount of pellets is ideal, without smoke.

11. HEATING SYSTEM CONTROL

Below you will find the most common examples of heating system connections with the Biopel MINI boiler. In addition, a detailed procedure for the electrical connection and activation of the heating system control elements to the boiler control unit is always given on the following page.

11.1. One CH circuit + DHW

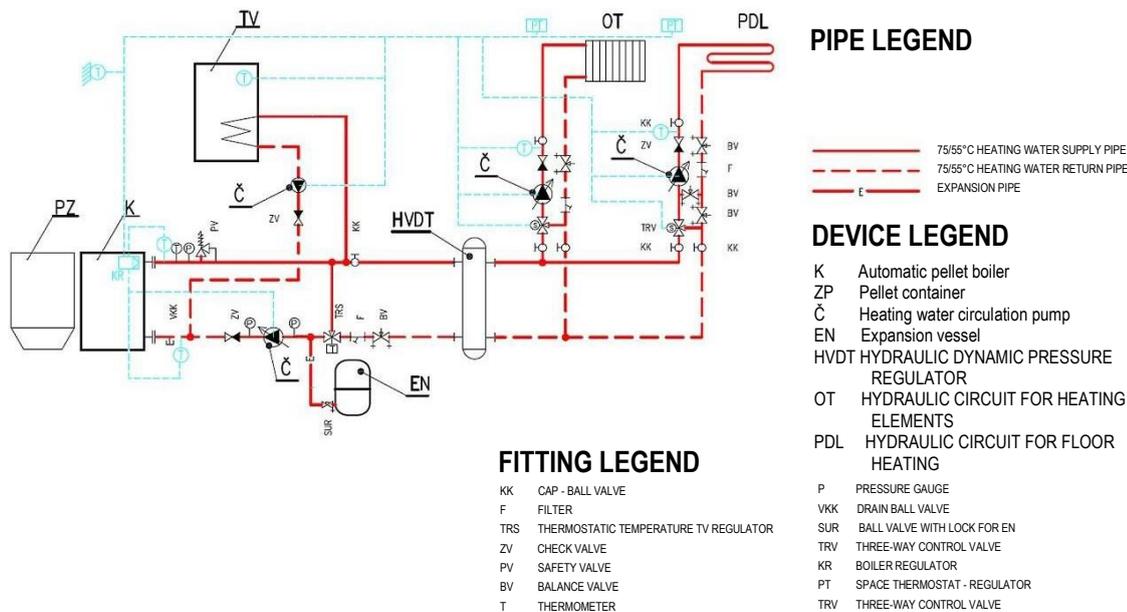


Basic connection with one central heating circuit (controlled by CH pump) and one domestic hot water circuit (controlled by DHW pump):

- Protecting the boiler against low temperature corrosion by a thermostatic valve (50°C and above).
- Boiler regulation according to CH set temperature (60°C and above) and DHW set temperature (according to customer requirement).
- All control elements and accessories are connected to the control unit located at the front of the boiler.
- Connect the CH pump to the control unit at the CH pump output.
- Connect the DHW pump to the control unit at the DHW pump output.
- Connect the DHW sensor to the DHW sensor output of the control unit.
- Set the CH temperature in the Main Setting, CH Set temperature.
- Set the DHW temperature in Main Setting, DHW Set temperature.
- Activate DHW Priority in Basic Settings, Operating mode.
- The boiler will heat the DHW tank as the priority according to the set temperature (the DHW pump will be switched on first until the DHW tank is heated to the set temperature).
- Note that the DHW pump will only be switched on if the current measured CH temperature is higher than the current measured DHW temperature. This is to ensure that no colder water than the actual DHW boiler temperature enters the DHW boiler.
- When the set DHW temperature is reached, the DHW pump is switched off and the CH pump is activated at the same time to ensure water circulation in the heating system.
- The CH and DHW pumps will be switched on if the CH temperature exceeds 40°C. Set in Service menu, Pump switch-on temperature.
- The DHW pump will be switched on again after heating the DHW when the DHW temperature drops by the value set in DHW Hysteresis in the Service Menu. The moment the DHW pump switches on, the CH pump switches off.
- Connect the room thermostat to the control unit, to the outputs of Room controller 1 or 2 (room thermostat), or to the RS output - depending on the type of thermostat selected. RT10 room thermostat is connected to the RS output. Standard thermostat operating on an open/closed circuit basis is connected to one of the Room Controller 1 or 2 outputs.
- Activate the Room Thermostat in the Installation Menu, Room Thermostat - Standard Thermostat 1 or 2, or OPOP Controller (RT10 type) depending on the type of thermostat you are using.

- Set the boiler response type to the instruction from the thermostat. The thermostat can turn the boilers off/on immediately, or it can lower the set CH temperature if the thermostat detects the room temperature has warmed to the set value:
 - Immediate switching off/on of the boiler by the thermostat:
 - Activate the Ignition function in the Installation Menu, Room Thermostat.
 - If you want to switch off the CH pump together with the boiler, activate the CH pump - room thermostat function in the Installation Menu, Room Thermostat. Beware of possible overheating the boiler if the pump is switched off together with the boiler!
 - Lowering the CH set temperature using the thermostat:
 - Deactivate the Ignition function in the Installation Menu, Room Thermostat.
 - Set the lowering level of the CH set temperature in case the thermostat does not give a heating instruction in the Temperature lowering by thermostat function in the Installation Menu, Room Thermostat.
 - The value by which the set CH temperature has just been lowered (in case the room thermostat is not currently giving a heating instruction) will be displayed on the Main Panel, under CH Set Temperature.
 - This regulation method is particularly advantageous for heating systems with large quantities of water, where lowering the CH set temperature will ensure that the system is heated to the required level more quickly without the system cooling down. Otherwise, it would take a long time for the cooled water in the system to heat up again.
- The boiler will heat the DHW even if there is no requirement for central heating from the room thermostat.

11.2. Two CH circuit + DHW



Connection with two central and floor heating circuits (controlled by mixing valve 1, 2 and valve pump 1, 2) and a domestic hot water circuit (controlled by DHW pump):

- Protection of the boiler against low temperature corrosion by a thermostatic valve (50°C and above).
- Boiler regulation according to CH set temperature (60°C and above) and DHW set temperature and floor heating (according to customer requirement).
- All control elements and accessories are connected to the control unit located at the front of the boiler.

Connection of pumps:

- Connect the CH pump to the control unit at the CH pump output.
- Connect the DHW pump to the control unit at the DHW pump output.
- Connect the Valve1 pump (OT) to the control unit at the output of the Valve1 pump (OT pump, radiators).
- Connect the Valve2 pump (PDL) to the control unit at the output of the Valve2 pump (PDL pump, floor heating).

Temperature sensor connections:

- Connect the DHW sensor to the DHW sensor output of the control unit.
- Connect Valve1 sensor (OT) to the control unit at the Valve1 sensor output. (Valve1 sensor).
- Connect Valve2 sensor (PDL) to the control unit at the Valve2 sensor output. (Valve2 sensor).
- Connect the Return Water Sensor to the return (inlet) water pipe to the boiler and control unit at the Return Sensor output. (Return water sensor).
- Connect the Outdoor Temperature sensor to the control unit to the Weather sensor output. (Outdoor sensor).
- Check the CH temperature sensor wiring is correct, which is in the sink on the boiler outlet water funnel.

Connection of mixing valve connections:

- Connect Valve1 (OT) to the control unit at the Valve1 output.
- Connect Valve2 (PDL) to the control unit at the Valve2 output.

Connect room thermostats to OT and PDL circuits:

- It is necessary to connect 2 thermostats to control each circuit. These thermostats will work in conjunction with the mixing valves and will control the temperature at these valves as required by the thermostat.
- Connect the room thermostats to the control unit, to the outputs of Room controller 1 or 2 (room thermostat), or to the RS output - depending on the type of thermostat selected. RT10 room thermostat is connected to the RS output. standard thermostat operating on an open/closed circuit basis is connected to one of the Room regulator 1 or 2 outputs.

Basic parameter settings:

- Set the CH temperature in the Main Settings, Set CH temperature.
- Set the DHW temperature in the Main Settings, Set DHW temperature.

Activation of DHW heating:

- Activate DHW Priority in Basic Settings, Operating Mode. The DHW pump will be activated independently of the heating of the OT and PDL circuits, according to the set DHW temperature. The DHW hysteresis is set in the service menu to 10°C and can be changed at any time.
- On the Main Panel, top left, the DHW priority message is now displayed.
- Note that the DHW pump will only be switched on if the current measured CH temperature is higher than the current measured DHW temperature. This is to ensure that no colder water than the actual DHW boiler temperature enters the DHW boiler.
- When the set DHW temperature is reached, the DHW pump is switched off and the CH pump is activated at the same time to ensure water circulation in the heating system.
- The CH and DHW pumps will be switched on if the CH temperature exceeds 40°C. Set in Service menu, Pump switch-on temperature.
- The DHW pump will be switched on again after heating the DHW when the DHW temperature drops by the value set in DHW Hysteresis in the Service Menu. The moment the DHW pump switches on, the CH pump switches off.

The following is the activation of the mixing valves and room thermostats for each of the heated circuits. Continue as described on the next page.

Activation and setting mixing valve 1 (OT):

- Activate Valve1 (OT) in the Installation Menu, Built-in Valve 1.
- Set the desired temperature on the valve in the Installation Menu, Built-in Valve 1, Valve Temperature.
- The valve will now maintain this temperature. If the temperature is reached, the valve will close. There opening is set from the factory to the minimum of 5%. Therefore, the valve will still be 5% open to ensure water flow in the system. This setting can be changed.

Activation and setting mixing valve 2 (PDL):

- Activate Valve2 (PDL) in the Installation Menu, Built-in Valve 2.
- Set the valve type to floor valve in Installation Menu, Built-in Valve 2, Valve Type, Floor. The maximum adjustable temperature on the valve is now lowered to max. 55°C to avoid destroying the floor heating circuit.
- Set the desired temperature on the valve in the Installation Menu, Built-in Valve 2, Valve Temperature.
- The valve will now maintain this temperature. If the temperature is reached, the valve will close. There opening is set from the factory to the minimum of 5%. Therefore, the valve will still be 5% open to ensure water flow in the system. This setting can be changed.

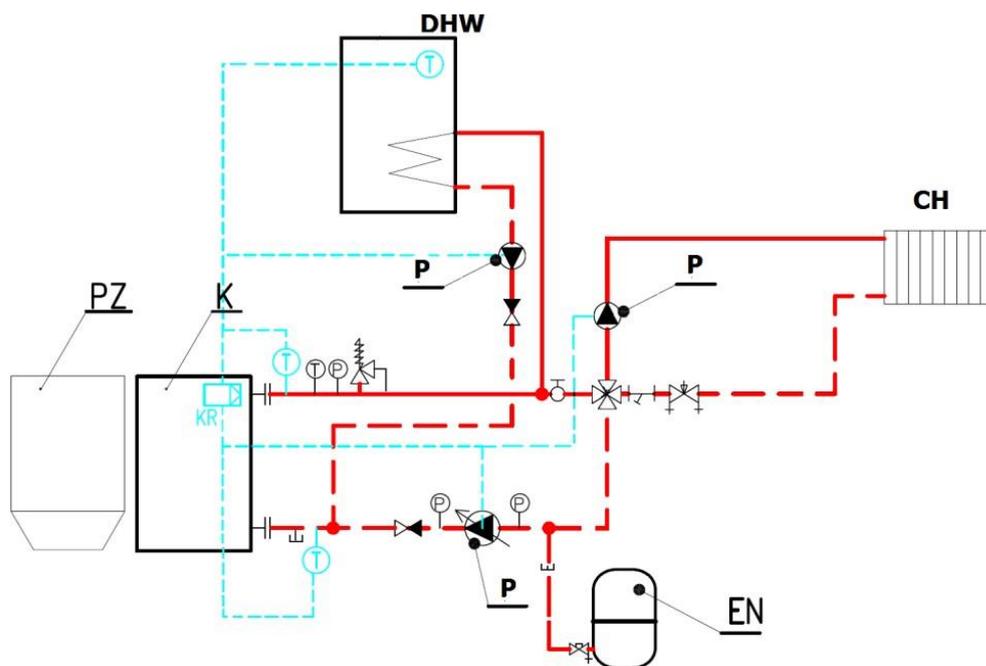
Activation and setting of room thermostats to control mixing valves:

- Connect the room thermostat to the control unit, to the outputs of Room controller 1 or 2 (room thermostat),

or to the RS output - depending on the type of thermostat selected. RT10 room thermostat is connected to the RS output. Standard thermostat operating on an open/closed circuit basis is connected to one of the Room regulator 1 or 2 outputs.

- Activate the Room Thermostat in the Installation Menu, Room Thermostat - Standard Thermostat 1 or 2, or OPOP Controller (RT10 type) depending on the type of thermostat you are using.
- Set the boiler response type to the instruction from the thermostat. The thermostat can turn the boilers off/on immediately, or it can lower the set CH temperature if the thermostat detects the room temperature has warmed to the set value:
 - Immediate switching off/on of the boiler by the thermostat:
 - Activate the Ignition function in the Installation Menu, Room Thermostat.
 - If you want to switch off the CH pump together with the boiler, activate the CH pump - room thermostat function in the Installation Menu, Room Thermostat. Beware of the possibility of overheating the boiler if the pump is switched off together with the boiler!
 - Lowering the CH Set Temperature using the thermostat:
 - Deactivate the Ignition function in the Installation Menu, Room Thermostat.
 - Set the lowering level of the CH set temperature in case the thermostat does not give a heating instruction in the Temperature lowering by thermostat function in the Installation Menu, Room Thermostat.
 - The value by which the set CH temperature has just been lowered (in case the room thermostat is not currently giving a heating instruction) will be displayed on the Main Panel, under CH Set Temperature.
 - This regulation method is particularly advantageous for heating systems with large quantities of water, where lowering the CH set temperature will ensure that the system is heated to the required level more quickly without the system cooling down. Otherwise, it would take a long time for the cooled water in the system to heat up again.
- The boiler will heat the DHW even if there is no requirement for central heating from the room thermostat.

11.3. One CH circuit with 4-way valve + DHW



Wiring with one central heating circuit (controlled by mixing valve 1 and valve 1 pump) and a domestic hot water circuit (controlled by DHW pump):

- Boiler regulation according to CH set temperature (60°C and above) and DHW set temperature and floor heating (according to customer requirement).
- All control elements and accessories are connected to the external socket, located in the front of the boiler.

Connecting pumps:

- Connect the CH pump to the control unit at the CH pump output.
- Connect the DHW pump to the control unit at the DHW pump output.
- Connect the Valve1 pump (OT) to the control unit at the output of the Valve1 pump (OT pump, radiators).

Connecting temperature sensors:

- Connect the DHW sensor to the DHW sensor output of the control unit.
- Connect Valve1 sensor (OT) to the control unit at the Valve1 sensor output. (Valve1 sensor).
- Connect the Return Water Sensor to the return (inlet) water pipe to the boiler and control unit at the Return Sensor output. (Return water sensor).
- Connect the Outdoor Temperature sensor to the control unit to the Weather sensor output. (Outdoor sensor).
- Check the correct wiring of the CH temperature sensor, which is in the sink on the boiler outlet water funnel.

Connecting mixing valves:

- Connect Valve1 (OT) to the control unit at the Valve1 output.

Basic parameter settings:

- Set the CH temperature in the Main Settings, Set CH temperature.
- Set the DHW temperature in the Main Settings, Set DHW temperature.

DHW heating activation:

- Activate DHW Priority in Basic Settings, Operating Mode. The DHW pump will be activated independently of the heating of the OT and PDL circuits, according to the set DHW temperature. The DHW hysteresis is set in the service menu to 10°C and can be changed at any time.
- On the Main Panel, top left, the DHW priority message is now displayed.
- Note that the DHW pump will only be switched on if the current measured CH temperature is higher than the current measured DHW temperature. This is to ensure that no colder water than the actual DHW boiler temperature enters the DHW boiler.
- When the set DHW temperature is reached, the DHW pump is switched off and the CH pump is activated at the same time to ensure water circulation in the heating system.
- The CH and DHW pumps will be switched on if the CH temperature exceeds 40°C. Set in Service menu, Pump switch-on temperature.
- The DHW pump will be switched on again after heating the DHW when the DHW temperature drops by the value set in DHW Hysteresis in the Service Menu. The moment the DHW pump switches on, the CH pump switches off.

Next, the mixing valve is activated. Continue as described below.

Activation and setting mixing valve 1 (OT):

- Activate Valve1 (OT) in the Installation Menu, Built-in Valve 1.
- Set the desired temperature on the valve in the Installation Menu, Built-in Valve 1, Valve Temperature.
- The valve will now maintain this temperature. If the temperature is reached, the valve will close. There opening is set from the factory to the minimum of 5%. Therefore, the valve will still be 5% open to ensure water flow in the system. This setting can be changed.
- Set the minimum return water temperature in the installation menu, built-in valve 1, Return water protection. The minimum return water temperature is recommended by the boiler manufacturer at 55°C.

12. Storage tank size determination

The use of a storage tank is not required for Biopel MINI boilers. If you wish to use one in your heating system, use the formula below to calculate the correct size of storage tank for your boiler size.

Calculation of the smallest storage tank volume:

$$V_{sp} = 15 T_b \times Q_n (1 - 0.3 \times (Q_H / Q_{min}))$$

- Vsp storage tank volume in l
- Tb burning time in h
- Qn nominal thermal power in kW
- QH building thermal load in kW
- Qmin ... minimum thermal power in kW

The storage tank dimensions must be determined according to the boiler power. The pellet boiler does not require a storage tank for its operation. There is no excess heat to be stored in the storage tank. On the contrary, the boiler modulates its power so that it never exceeds the set limit. If the boiler heats the heating system to the desired level, it switches off and on again when the temperature drops.

A storage tank is recommended if the heating system contains more than one heating branch and generally for more complex heating systems with several heating circuits. We recommend that you consult a professional plumbing company or representatives of OPOP spol. s.r.o. before purchasing a storage tank.

13. REGULAR MAINTENANCE

Boiler maintenance is an integral part of solid fuel boiler operation. Recommended intervals for manual cleaning of the boiler, burner and flue. Please note that the intervals given are only basic recommendations and may differ from the actual requirement for regular cleaning. The frequency of regular cleaning is generally determined by the quality of the combustion process, pellet type and quality, dust level and moisture in pellets, chimney draft, etc. Therefore, always check the clogging rate of the boiler at short intervals during the first months of operation so that you can determine how often the boiler, burner and flue gas outlet need to be cleaned according to the actual situation.

	weekly	monthly	quarterly	annually
ashtray cleaning	•			
burner grate cleaning	•			
boiler exchanger cleaning		•		
combustion check		•		
photosensor cleaning		•		
door tightness check			•	
complete burner cleaning			•	
feeder cleaning				•
hopper cleaning				•
Flue gas outlet and chimney				•

- Cleaning the ashtray is an essential step during regular boiler maintenance. Make sure that the ashtray is correctly positioned when placing it back into the boiler. There are two ashtrays in the boiler, so clean both regularly.
- The burner grate is removable and requires regular cleaning. During the first few weeks of operation, observe how often ash builds up on the grate and scrape it off regularly with cleaning tools. Only carry out this operation when the boiler is deactivated (extinct).
- Clean the front of the boiler in the burner area as required at the same time as cleaning the burner grate.
- Cleaning the flue gas turbulators and heat exchanger is an essential task. Ash on the heat exchanger grates reduces efficiency and in turn increases the flue gas temperature, i.e., more heat escapes down the chimney if the heat exchanger is contaminated with ash.
The flue gas turbulators are removable, it is recommended to check the clearance between the turbulator plates regularly and remove and clean them if necessary. The boiler heat exchanger can be accessed by removing the cleaning door at the top of the boiler.
- Once or twice a season, check the flue gas outlet for clearance and clean it using the sweep hole that should be located on the flue.
- Once a season, check the asbestos sealing cords on all doors for tightness. If they are hard and have lost their sealing ability, we recommend replacing them.

Ask your installer to carefully explain how to clean the boiler and burner so that the boiler is operated in accordance with the instructions given. Regular cleaning of the boiler, the burner and flue ensures maximum boiler efficiency and low fuel

consumption during boiler operation.

14. BIOPEL ONLINE

Every Biopel MINI boiler can be connected free of charge to the OPOP online server, which runs an application for remote management of the boiler and heating system via the internet using your web browser. Connecting the boiler to this online system is very simple, see points below.

- Connect the control unit to your internet receiver (modem or router). For the connector in the external socket, see the chapter Electrical Connection of Accessories.
- In the v9 MINI control unit settings, display the Registration Code, in the Registration function in the Installation Menu, Ethernet Module. Write this registration code down, you'll need it later.
- This code has a limited validity, so after displaying the code, we recommend that you proceed immediately to register the boiler, see the next points of the procedure.
- Start the internet browser on your computer and enter the following address: opop.emodul.eu
- Click on New User and register the user to the OPOP online server.
- After successful registration, log in to the system using the username and password you chose earlier during the new user registration.
- Once connected, you must register your boiler by clicking on New Module in the Settings tab (top right).
- During the registration of the new module (boiler), enter all the information requested, including the registration code you wrote down earlier.
- Once the module registration is saved, our online server connects to your boiler and all data from the boiler is uploaded to the server within seconds.

Now your boiler is fully connected to the OPOP online server and you can take full advantage of all the functions that remote boiler management offers via the internet. OPOP spol. s.r.o. technicians are ready to deal with any questions you may have.

15. FIRMWARE UPDATES

Each v9 MINI unit can be updated using a USB key. OPOP spol. s.r.o. regularly releases new versions of the unit software for free download. New versions usually contain new features and options that increase the boiler's automation and provide more control options for the heating system. Consult the possibility of using new software updates with your installer or directly with an OPOP spol. s.r.o. representative. The installation procedure is very simple, see points below.

- Upload a file with the extension ".bin" to the USB key.
- Switch off the boiler using the main switch on the top of the boiler.
- Insert the USB key into the connector on the side of the display.
- Switch on the boiler using the main switch.
- Wait until the installation is complete (the unit displays the standard basic panel) and remove the USB key.
- The v9 MINI control unit and the v9 MINI display are updated.

The USB key in use must be formatted in the FAT32 file system for proper file upload. To check the system file your USB key is formatted in, right-click the USB key icon in your computer's operating system and enter Properties.

Caution: when uploading new software, the control unit settings will be reset to the original, factory default values. Therefore, it is necessary to perform all settings again, including the so-called First Boiler Start-Up.

16. OPERATING AND ALARM MESSAGES

Below is a list of common questions we encounter. These relate to the boiler installation and operation. Read these questions carefully, they may help you in dealing with specific situations you may encounter.

- 1. Alarm: Feeder sensor damaged**
It is safety sensor on the burner. Check the connection of the sensor in the burner circuit board and in the control unit in the "Feeder sens." output.
- 2. Alarm: CH sensor failure**
CH sensor connected in output "CH sens." It is damaged or not connected.
- 3. Alarm: DHW sensor failure**

DHW sensor connected to output "DHW sens." It is damaged or not connected and one of the functions that needs it to work properly is activated.

4. Alarm: CH temperature too high

The CH temperature measured by the CH sensor has exceeded 93°C, i.e., the value set in the Max. Boiler Temperature function in the Service Menu.

5. Alarm: DHW temperature too high

The DHW temperature measured by the DHW sensor has exceeded the maximum value set in the DHW Set Temperature function in the Main Settings.

6. Alarm: Termik sensor opened

Termik sensor is not connected or is defective. Check the contact in the control unit.

7. Alarm: Reverse flow sensor damaged

The return water sensor has been activated in the Built-in Mixing Valve 1 or 2 settings, but is defective or has not been connected to the output in the control unit named "Return sens."

8. Alarm: Temperature sensor C1-C4 damaged

The temperature sensor has been activated but has not been connected to the appropriate output in the unit.

9. Alarm: Mixing valve sensor failure

Built-in mixing valve 1 or 2 has been activated, but the valve 1 or 2 sensor has not been connected to the control unit to the "Valve 1, 2 sensor" output.

10. Alarm: 3 ignitions in 30 min.

Boiler ignites too often. Check correct flame detection by photosensor after Ignition. If the photosensor does not see the light, the boiler goes into normal operation.

11. Message: No communication with room thermostat

The RT10 room thermostat has not been connected but is activated. Check the thermostat settings.

12. Message: No communication with Lambda sensor

Lambda sensor was not connected or connected incorrectly but is activated. Check the Lambda settings in the Installation Menu, Lambda and check the Lambda Sensor wiring.

13. Message: Temperature reached

The boiler has been switched off by reaching the CH temperature.

14. Message: DHW heated

DHW temperature has been reached. The DHW pump has been switched off.

15. Alarm: Outdoor sensor failure

The outdoor temperature sensor has been activated in the settings for built-in mixing valve 1 or 2, but is not connected to the boiler's external socket to the "Weather sens." output.

16. Alarm: Mosfet sensor damaged

The Mosfet component is responsible for fan speed control and has probably overheated. Check the supply voltage, which should not be higher than 240V. If everything is fine, the fan got stuck or is scrapping. Check the fan operation and the functionality of the start-up fan, which is located on the burner.

17. Alarm: Mosfet temperature too high or Incorrect airflow

The temperature at the component measuring the fan speed and current draw is too high. Check the fan operation and the fan start-up capacitor to see if they are OK.

18. Feeder temperature too high

The temperature in the burner has exceeded 80°C. Check correct grate placement, the internal feeder operation using the manual operation in the Installation Menu. Check the flue gas outlet passage.

19. Alarm: Unsuccessful ignition

The igniter is defective or the ignition process is incorrectly set. Make sure that after the flame is formed, it is detected by the photosensor.

20. Alarm: Temperature not rising

If the CH temperature does not exceed 30°C in 30min after the ignition, an alarm message appears. Set in the service menu, in the functions Min. temperature alarm, Min. temperature time.

17. TROUBLESHOOTING OF SPECIFIC SITUATIONS

Below is a list of common questions we encounter. These relate to the boiler's installation and operation. Read these questions carefully, they may help you in dealing with specific situations you may encounter.

1. Incorrect flame at max. power:

- a. Flame extension: Service menu, Feeder settings, Work
 - i. Max feed work - set longer feeder operating time
 - ii. Min feed pause - set a shorter feeding pause time
- b. Flame Shortening: Service menu, Feeder settings, Work

- i. Max feed work - set shorter feeder operating time
- ii. Min feed pause - set a longer feeding pause time
- c. Reduce air quantity: Service menu, Feeder settings, Work
 - i. Max fan power - set a lower number
- d. Increase air quantity: Service menu, Feeder settings, Work
 - i. Max fan power - set a higher number

i *By making these changes you can adjust the flame size and therefore the combustion quality. After the ignition phase, wait 10 minutes for the burner to reach maximum power and then make the changes.*

2. Incorrect flame at min. power:

- a. Reduce the boiler power to the minimum:

i *Wait until the CH temperature is close to the set value, or set the same values in the Service menu, Feeder Settings, Work, for min. and max. power. Example:*

- i. Service Menu: Feeder settings, Work, for min. and max. power:
 - I. Max. feeding work = 2s (value for max. power)
 - II. Min. feeding work = 2s (value for min. power)
 - III. Max. feeding pause = 10s (value for min. power)
 - IV. Min. feeding pause = 10s (value for max. power)

i *Now the same values are set for running the feeder at min. and max. power. Wait 10mins for the flame to stabilise and make any corrections, see below.*

- b. Flame extension: Service menu, Feeder settings, Work
 - i. Min. feed work - set higher feeder operating number
 - ii. Max. feeding pause - set a shorter feeding pause time
- c. Flame Shortening: Service menu, Feeder settings, Work
 - i. Min. feed work - set lower feeder operating number
 - ii. Max. feeding pause - set a longer feeding pause time
- d. Reduce air quantity: Service menu, Feeder settings, Work
 - i. Min. fan speed operation - set a lower number
- e. Increase air quantity: Service menu, Feeder settings, Work
 - i. Min. fan speed operation - set a higher number

i *It is important that the flame is stable during minimum power and there is no risk of extinction during boiler operation.*

3. Unburnt pellets in the ashtray:

- a. Reduce fan speed: Service menu, Feeder settings, Work
 - i. Max. fan power - set a lower number
- b. Reduce feeder operating time: Service menu, Feeder settings, Work
 - i. Max. feeding work - set a lower number
 - ii. Min. feeding pause - set a higher number

4. Long or failed ignition:

- a. High chimney draft - Chimney draft is a major factor that can affect ignition cycle time. This time is normally 4 to 6 minutes. Chimney draft higher than 15Pa negatively affects the resulting ignition time. The solution is to install a draft stabiliser. Also, keep in mind that the higher the boiler power, the more likely it is to affect the ignition time.

i *We recommend installing a draft stabiliser with each boiler. In addition, the draft stabiliser must be set as indicated in the boiler parameter table - chimney draft.*

- b. Quantity of pellets on the grate: Service menu, Feeder settings, Ignition
 - i. Dose time - set a higher or lower number. The pellets should cover the opening of the igniter which is above the grate, but in general, the fewer pellets on the grate during ignition, the faster the ignition cycle.
- c. Poor fan speed: Service menu, Feeder settings, Ignition
 - i. Fan speed 1/2 - set the fan speed lower or higher. A trained installer knows the recommended values.

5. Photosensor does not see flame:

- a. Sensitivity: Service menu, Feeder settings, Ignition
 - i. Brightness - set a lower number for higher sensitivity and vice versa. The minimum number should be around 30. If it is lower you risk that the photosensor sees ambient light without a flame in the boiler.
- b. Bad contact in the burner socket.
 - i. If the display shows the message Feder Sensor Damaged, it means that the socket on the burner is badly connected or damaged. Check the inside of both sockets on the burner.
- c. Cannot see the light during ignition.
 - i. The flame is too small or the pellets are blocking the flame detection in the burner. You need to extend the operating time of the internal feeder so that there are none left in the burner and all are delivered to the burner grate.

6. Failed SW update:

- a. USB must be formatted in FAT32 file system
- b. or the USB file is corrupted.



We recommend to re-format the USB and upload the file for the update. Or replace the USB key with another one.

7. No PID regulation:

- a. The CH sensor or flue gas sensor is not connected.
- b. Flue gas temperature is higher than 170°C.
- c. PID regulation is affected by the rate of temperature change over time, so each system is likely to respond differently.

8. Lambda sensor reduces boiler power:

- a. Change the modulation range in the Installation menu, Lambda. The factory setting is -15 to +15. It is necessary to reduce this range.
- b. Leaks in the flue outlet connections and in the lambda sensor sink. False air is being drawn in, Lambda is trying to regulate it.

9. Lambda sensor degrades combustion quality:

- a. If the flame is consistently large and dark after the Lambda sensor is activated (i.e., not enough combustion air) then it means that the Lambda sensor is measuring a large amount of excess air and trying to reduce it to the set limit by adding fuel or reducing fan speed.
- b. This could be due to a leak in some part of the flue gas outlet, boiler or lambda sensor hole. These leaks allow additional air into the boiler, which the lambda sensor tries to eliminate by the above-mentioned means. The only place that air enters the boiler should be the burner fan.
- c. Also, reduce the modulation range that the Lambda sensor can do, under the Min. Change and Max. Change items in the Installation Menu, Lambda.

10. The data changed on the internet will be uploaded to the boiler after a long time:

- a. Normally, with a good internet connection, it takes 1 minute for internet data to be uploaded to the boiler unit
- b. If the data takes 10 minutes or more to upload, for example, this means that the internet connection is bad or one of the additional devices is activated and not connected to the external socket: RT10 room thermostat, Lambda sensor, 431N module. Connect these additional devices or deactivate them in the settings of the additional device.

11. When the cause of the alarm is removed, it will reappear

- a. The unit has fixed the detection of possible alarms to 15s. If you remove the cause of an alarm after the last detection, the alarm may still reappear after the cause is deactivated. After reconfirmation, the alarm will no longer appear if the cause of the alarm has been removed.

12. Failed synchronisation

- a. The unit synchronises the data with the control unit at start-up.
- b. If the synchronisation fails, the cause is inconsistent SW in the display and the control unit. Upload the latest version of the SW to both devices.

13. Clogged burner grate:

- a. Clogged grate with unburned pellets, too much ash on the grate.
- b. External feeder dosing time too long. Reduce the Max. feeder coefficient in the Coefficients function in the

Installation menu. If necessary, re-adjust the value in the Max feeder coefficient after a while.

- c. Low fan speed. Increase the Max Fan Coefficient in the Coefficients function in the Installation Menu.
- d. Wrong type of pellets that are not 100% wood, the type of wood does not matter.
- e. High humidity in pellets, pellets only burn on the surface and do not burn further.
- f. Wrong grate position in the burner, clogged burner grate holes.
- g. Lower than required chimney draft.
- h. Large amount of dust in the pellets.

14. High temperature of the internal feeder in the burner:

- a. Displayed in the lower left corner of the main panel of the v9 MINI unit.
- b. The standard value is up to 50°C.
- c. Possible causes are:
 - i. Clogged grate due to poor combustion or wrong fuel type.
 - ii. Wrong grate position in the burner, clogged burner grate holes.
 - iii. Lower than required chimney draft.
 - iv. Clogged boiler or flue gas path
- d. There is a risk of backfiring to the rear of the burner, remedial action is required.

18. FACTORY SETTINGS

All factory settings according to boiler size can be found in the table below. These values are saved in the operating memory of the control unit after the boiler power is entered in the First Boiler Start-up.

Ignition parameters	11kW	15kW	21kW	30kW	40kW
Blowing time	30s	30s	30s	30s	30s
Blowing speed	100%	100%	100%	100%	100%
Feed (hopper) time	13s	13s	14s	14s	15s
Ignition delay	20s	20s	20s	20s	20s
Feeding time	3s	3s	3s	3s	3s
Feeding pause	120s	120s	120s	120s	120s
Fan speed	1%	1%	1%	8%	8%
Fan speed 2	3%	3%	3%	13%	13%
Heater protection	12min	12min	12min	12min	12min
Ignition brightness	38	38	38	38	38
Fan delay	30s	30s	30s	30s	30s

Operating parameters:	11kW	15kW	21kW	30kW	40kW
Min. feeder operation	1s	1s	2s	1s	2s
Max. feeder operation	2s	3s	4s	6s	12s
Min. feeder pause	10s	11s	10s	8s	9s
Max. feeder pause	13s	13s	21s	10s	16s
Min. fan speed - operation	16%	17%	12%	35%	38%
Max. fan speed - operation	20%	24%	30%	60%	80%
Cleaning period	0h0min	0h0min	0h0min	0h0min	0h0min
Operation check	30s	30s	30s	30s	30s

Extinction parameters:	11kW	15kW	21kW	30kW	40kW
Fan speed	70%	70%	70%	70%	70%
Feeding time	5s	5s	5s	5s	5s
Feeding pause	20s	20s	20s	20s	20s
Extinction time	10min	10min	10min	10min	10min
Delay time	5min	5min	5min	5min	5min

Service menu:	11kW	15kW	21kW	30kW	40kW
Max. flue gas temperature	220°C	220°C	220°C	220°C	220°C
Feeder alarm temperature	80°C	80°C	80°C	80°C	80°C
Priority Temperature	75°C	75°C	75°C	75°C	75°C
CH pump emergency activation	85°C	85°C	85°C	85°C	85°C
Boiler alarm temperature	93°C	93°C	93°C	93°C	93°C
Internal feeder coefficient	100%	100%	100%	100%	100%
Min. boiler temperature	40°C	40°C	40°C	40°C	40°C
Pump switch-on temperature	40°C	40°C	40°C	40°C	40°C
Growth impulses	0	0	0	0	0
Supervision temperature	5°C	5°C	5°C	5°C	5°C
Boiler Hysteresis	15°C	15°C	15°C	15°C	15°C
DHW Hysteresis	10°C	10°C	10°C	10°C	10°C

Main settings, Burner cleaning:	11kW	15kW	21kW	30kW	40kW
On	Yes	Yes	Yes	Yes	Yes
Cleaning period	15min	15min	15min	10min	10min
Fan operating time	10s	10s	10s	10s	10s
Blowing intensity	60%	60%	60%	80%	100%

Installation menu, Lambda:	11kW	15kW	21kW	30kW	40kW
First time for update	10min	10min	10min	10min	10min
Update period	300s	300s	300s	300s	300s
Oxygen surge	2%	2%	2%	2%	2%
Fan surge	2%	2%	2%	2%	2%
Sum	Yes	Yes	Yes	Yes	Yes
Min. change	15%	15%	15%	10%	10%
Max. change	15%	15%	15%	10%	10%
Lambda 100%	11%	10%	9%	11%	11%
Lambda 1%	12%	12%	13%	14%	15%

Installation menu, Compressor 1: (Burner)	11kW	15kW	21kW	30kW	40kW
Cleaning period	1min	1min	1min	2min	2min
Opening time	2s	2s	2s	2s	2s
Cycle time	17s	17s	17s	25s	25s
Pause time	20h	20h	20h	20h	20h

Installation menu, Vacuum feeder:	11kW	15kW	21kW	30kW	40kW
Operating time	30min	30min	30min	30min	30min
Switch-on hour	9:00	9:00	9:00	9:00	9:00
Switch-on hour 2	15:00	15:00	15:00	15:00	15:00
Opening time	80s	80s	80s	80s	80s
Pause time	20s	20s	20s	20s	20s

Installation menu, Ash Remover:	11kW	15kW	21kW	30kW	40kW
Operating time	5min	5min	5min	10min	10min
Pause time	10h	10h	10h	10h	10h

Installation menu, Compressor 2 and 3: (exchanger)	11kW	15kW	21kW	30kW	40kW
Cleaning period	1min	1min	1min	2min	2min
Opening time	3s	3s	3s	3s	3s
Cycle time	25s	25s	25s	25s	25s
Pause time	8h	8h	8h	6h	5h

These values can only be changed by a certified installer who is authorised to install and start up OPOP spol. s.r.o. boilers.

Information given in the tables serves for better orientation in the Service Menu items and simplifies the clarity of the set values during the power selection in the First Boiler Start-up.

Changing these parameters has a significant effect on the boiler operation. If you need to reset the settings to the default values (see table), you can perform the first boiler start-up again or use the Factory Settings function in the Main, Installation and Service menus to reset to factory settings.

19. ENERGY EFFICIENCY

I.	II.	III.	IV.	V.	VI.
name or trademark of the supplier;	supplier's model identification mark;	energy efficiency class	nominal thermal power in kW	energy efficiency index	seasonal heating energy efficiency in %
OPOP s.r.o.	Biopel 11	A+	11	116	79
OPOP s.r.o.	Biopel 15	A+	15	116	79
OPOP s.r.o.	Biopel 21	A+	21	117	80
OPOP s.r.o.	Biopel 30	A+	30	119	81
OPOP s.r.o.	Biopel 40	A+	40	121	82

20. IDENTIFICATION MARKS

model identification mark: BIOPEL MINI 11								
Condensing boiler:		no	Solid fuel cogeneration boiler:		no	Combined boiler:		no
Feeding mode: automatic		Manual: the boiler should be operated with a hot water tank of at least x(*) litres/ Automatic: we recommend that the boiler be operated with a hot water tank of at least x(**) litres]						
Fuel				Preferred fuel (only one):		Other suitable fuel(s):		
Wood logs, moisture content ≤ 25 %.				no		no		
Wood chips, moisture content 15-35 %				no		no		
Wood chips, moisture content > 35 %				no		no		
Pressed wood in the form of pellets or briquettes				yes		no		
Sawdust, moisture content ≤ 50 %				no		no		
Other woody biomass				no		no		
Non-wood biomass				no		no		
Black coal				no		no		
Brown coal (including briquettes)				no		no		
Coke				no		no		
Anthracite				no		no		
Briquettes from a mixture of fossil fuels				no		no		
Other fossil fuel				no		no		
Briquettes from a mixture of biomass (30-70 %) and fossil fuels				no		no		
Other mixture of biomass and fossil fuels				no		no		
Properties when operating with preferred fuel:								
Seasonal indoor heating energy efficiency η_s [%]:				79				
Energy Efficiency Index EEI:				116				
Energy efficiency class:				A+				
Name	Designation	Value	Unit	Name	Designation	Value	Unit	
Rated thermal output				Rated efficiency				
At nominal thermal power	Pn(***)	10.5	kW	At nominal thermal power	η_n	93.6	%	
At [30 %] of rated thermal power, if applicable	Pp	3.3	kW	At [30 %] of rated thermal power, if applicable	η_p	91.0	%	
Solid fuel cogeneration boilers: Electrical efficiency				Auxiliary electricity consumption				
At nominal thermal power	$\eta_{el,n}$		%	At nominal thermal power	elmax	0.0349	kW	
				At [30 %] of rated thermal power, if applicable	elmin	0.0175	kW	
				Of the built-in secondary emission abatement device, if applicable		not applicable	kW	
				In standby mode	PSB	0.0051	kW	
Contact details				OPOP s.r.o. , Zašovská 750, Valašské Meziříčí, 757 01				
(*) Tank volume = $45 \times Pr \times (1 - 2,7/Pr)$ or 300 litres, whichever is the higher, where Pr is expressed in kW								
(**) Tank volume = $20 \times Pr$, where Pr is expressed in kW								
(***) For the preferred fuel, Pn is equal to Pr								

model identification mark: BIOPEL MINI 15							
Condensing boiler:	no	Solid fuel cogeneration boiler:	no	Combined boiler:	no		
Feeding mode: automatic	Manual: the boiler should be operated with a hot water tank of at least x(*) litres/ Automatic: we recommend that the boiler be operated with a hot water tank of at least x(**) litres]						
Fuel				Preferred fuel (only one):		Other suitable fuel(s):	
Wood logs, moisture content ≤ 25 %.				no		no	
Wood chips, moisture content 15-35 %				no		no	
Wood chips, moisture content > 35 %				no		no	
Pressed wood in the form of pellets or briquettes				yes		no	
Sawdust, moisture content ≤ 50 %				no		no	
Other woody biomass				no		no	
Non-wood biomass				no		no	
Black coal				no		no	
Brown coal (including briquettes)				no		no	
Coke				no		no	
Anthracite				no		no	
Briquettes from a mixture of fossil fuels				no		no	
Other fossil fuel				no		no	
Briquettes from a mixture of biomass (30-70 %) and fossil fuels				no		no	
Other mixture of biomass and fossil fuels				no		no	
Properties when operating with preferred fuel:							
Seasonal indoor heating energy efficiency η_s [%]:				79			
Energy Efficiency Index EEI:				116			
Energy efficiency class:				A+			
Name	Designation	Value	Unit	Name	Designation	Value	Unit
Rated thermal output				Rated efficiency			
At nominal thermal power	P_n (***)	15.0	kW	At nominal thermal power	η_n	93.7	%
At [30 %] of rated thermal power, if applicable	P_p	4.5	kW	At [30 %] of rated thermal power, if applicable	η_p	90.8	%
Solid fuel cogeneration boilers: Electrical efficiency				Auxiliary electricity consumption			
At nominal thermal power	$\eta_{el,n}$		%	At nominal thermal power	e_{lmax}	0.0457	kW
				At [30 %] of rated thermal power, if applicable	e_{lmin}	0.0218	kW
				Of the built-in secondary emission abatement device, if applicable		not applicable	kW
				In standby mode	PSB	0.0051	kW
Contact details		OPOP s.r.o. , Zašovská 750, Valašské Meziříčí, 757 01					
(*) Tank volume = $45 \times Pr \times (1 - 2,7/Pr)$ or 300 litres, whichever is the higher, where Pr is expressed in kW							
(**) Tank volume = $20 \times Pr$, where Pr is expressed in kW							
(***) For the preferred fuel, P_n is equal to Pr							

model identification mark: BIOPEL MINI 21							
Condensing boiler:	no	Solid fuel cogeneration boiler:	no	Combined boiler:	no		
Feeding mode: automatic	Manual: the boiler should be operated with a hot water tank of at least x(*) litres/ Automatic: we recommend that the boiler be operated with a hot water tank of at least x(**) litres]						
Fuel				Preferred fuel (only one):		Other suitable fuel(s):	
Wood logs, moisture content ≤ 25 %.				no		no	
Wood chips, moisture content 15-35 %				no		no	
Wood chips, moisture content > 35 %				no		no	
Pressed wood in the form of pellets or briquettes				yes		no	
Sawdust, moisture content ≤ 50 %				no		no	
Other woody biomass				no		no	
Non-wood biomass				no		no	
Black coal				no		no	
Brown coal (including briquettes)				no		no	
Coke				no		no	
Anthracite				no		no	
Briquettes from a mixture of fossil fuels				no		no	
Other fossil fuel				no		no	
Briquettes from a mixture of biomass (30-70 %) and fossil fuels				no		no	
Other mixture of biomass and fossil fuels				no		no	
Properties when operating with preferred fuel:							
Seasonal indoor heating energy efficiency η_s [%]:				80			
Energy Efficiency Index EEI:				117			
Energy efficiency class:				A+			
Name	Designation	Value	Unit	Name	Designation	Value	Unit
Rated thermal output				Rated efficiency			
At nominal thermal power	P _n (***)	21.0	kW	At nominal thermal power	η_n	92.9	%
At [30 %] of rated thermal power, if applicable	P _p	6.0	kW	At [30 %] of rated thermal power, if applicable	η_p	90.5	%
Solid fuel cogeneration boilers: Electrical efficiency				Auxiliary electricity consumption			
At nominal thermal power	$\eta_{el,n}$		%	At nominal thermal power	el _{max}	0.0479	kW
				At [30 %] of rated thermal power, if applicable	el _{min}	0.0260	kW
				Of the built-in secondary emission abatement device, if applicable		not applicable	kW
				In standby mode	PSB	0.0053	kW
Contact details		OPOP s.r.o. , Zašovská 750, Valašské Meziříčí, 757 01					
(*) Tank volume = 45 × Pr × (1 – 2,7/Pr) or 300 litres, whichever is the higher, where Pr is expressed in kW							
(**) Tank volume = 20 × Pr, where Pr is expressed in kW							
(***) For the preferred fuel, P _n is equal to Pr							

model identification mark: BIOPEL MINI 30							
Condensing boiler:	no	Solid fuel cogeneration boiler:	no	Combined boiler:	no		
Feeding mode: automatic	Manual: the boiler should be operated with a hot water tank of at least x(*) litres/ Automatic: we recommend that the boiler be operated with a hot water tank of at least x(**) litres]						
Fuel				Preferred fuel (only one):		Other suitable fuel(s):	
Wood logs, moisture content ≤ 25 %.				no		no	
Wood chips, moisture content 15-35 %				no		no	
Wood chips, moisture content > 35 %				no		no	
Pressed wood in the form of pellets or briquettes				yes		no	
Sawdust, moisture content ≤ 50 %				no		no	
Other woody biomass				no		no	
Non-wood biomass				no		no	
Black coal				no		no	
Brown coal (including briquettes)				no		no	
Coke				no		no	
Anthracite				no		no	
Briquettes from a mixture of fossil fuels				no		no	
Other fossil fuel				no		no	
Briquettes from a mixture of biomass (30-70 %) and fossil fuels				no		no	
Other mixture of biomass and fossil fuels				no		no	
Properties when operating with preferred fuel:							
Seasonal indoor heating energy efficiency η_s [%]:				81			
Energy Efficiency Index EEI:				119			
Energy efficiency class:				A+			
Name	Designation	Value	Unit	Name	Designation	Value	Unit
Rated thermal output				Rated efficiency			
At nominal thermal power	P_n (***)	29.4	kW	At nominal thermal power	η_n	93.5	%
At [30 %] of rated thermal power, if applicable	P_p	8.9	kW	At [30 %] of rated thermal power, if applicable	η_p	91.6	%
Solid fuel cogeneration boilers: Electrical efficiency				Auxiliary electricity consumption			
At nominal thermal power	$\eta_{el,n}$		%	At nominal thermal power	e_{lmax}	0.0556	kW
				At [30 %] of rated thermal power, if applicable	e_{lmin}	0.0260	kW
				Of the built-in secondary emission abatement device, if applicable		not applicable	kW
				In standby mode	PSB	0.0053	kW
Contact details		OPOP s.r.o. , Zašovská 750, Valašské Meziříčí, 757 01					
(*) Tank volume = $45 \times Pr \times (1 - 2,7/Pr)$ or 300 litres, whichever is the higher, where Pr is expressed in kW							
(**) Tank volume = $20 \times Pr$, where Pr is expressed in kW							
(***) For the preferred fuel, P_n is equal to Pr							

model identification mark: BIOPEL MINI 40							
Condensing boiler:	no	Solid fuel cogeneration boiler:	no	Combined boiler:	no		
Feeding mode: automatic	Manual: the boiler should be operated with a hot water tank of at least x(*) litres/ Automatic: we recommend that the boiler be operated with a hot water tank of at least x(**) litres]						
Fuel		Preferred fuel (only one):		Other suitable fuel(s):			
Wood logs, moisture content ≤ 25 %.		no		no			
Wood chips, moisture content 15-35 %		no		no			
Wood chips, moisture content > 35 %		no		no			
Pressed wood in the form of pellets or briquettes		yes		no			
Sawdust, moisture content ≤ 50 %		no		no			
Other woody biomass		no		no			
Non-wood biomass		no		no			
Black coal		no		no			
Brown coal (including briquettes)		no		no			
Coke		no		no			
Anthracite		no		no			
Briquettes from a mixture of fossil fuels		no		no			
Other fossil fuel		no		no			
Briquettes from a mixture of biomass (30-70 %) and fossil fuels		no		no			
Other mixture of biomass and fossil fuels		no		no			
Properties when operating with preferred fuel:							
Seasonal indoor heating energy efficiency η_s [%]:		82					
Energy Efficiency Index EEL:		121					
Energy efficiency class:		A+					
Name	Designation	Value	Unit	Name	Designation	Value	Unit
Rated thermal output				Rated efficiency			
At nominal thermal power	Pn(***)	38	kW	At nominal thermal power	η_n	93.6	%
At [30 %] of rated thermal power, if applicable	Pp	11.8	kW	At [30 %] of rated thermal power, if applicable	η_p	92.6	%
Solid fuel cogeneration boilers: Electrical efficiency				Auxiliary electricity consumption			
At nominal thermal power	$\eta_{el,n}$		%	At nominal thermal power	elmax	0.0835	kW
				At [30 %] of rated thermal power, if applicable	elmin	0.0260	kW
				Of the built-in secondary emission abatement device, if applicable		not applicable	kW
				In standby mode	PSB	0.0053	kW
Contact details		OPOP s.r.o. , Zašovská 750, Valašské Meziříčí, 757 01					
(*) Tank volume = $45 \times Pr \times (1 - 2,7/Pr)$ or 300 litres, whichever is the higher, where Pr is expressed in kW							
(**) Tank volume = $20 \times Pr$, where Pr is expressed in kW							
(***) For the preferred fuel, Pn is equal to Pr							

21. WARRANTY CONDITIONS, GENERAL INSTRUCTIONS

The following points must be met not only to comply with the warranty conditions, but also to ensure that the installation is correct in terms of the applicable standards, safety and to ensure trouble-free operation of the boiler.

1. Biopel MINI boilers may only be installed by a company with a valid installation and maintenance licence. The installation must be supported by a project in accordance with the applicable regulations.
2. The heating system must be filled with water that meets requirements of ČSN 07 7401 and especially its hardness must not exceed the required parameters: The use of antifreeze is not recommended by the manufacturer.
3. Connection of the boiler to the system must be made in accordance with the applicable regulations and standards.
4. The flue pipe must be inspected by a chimney sweep company before the boiler is installed. An inspection report must be prepared, including the basic parameters of the flue, including the diameter of the chimney, its length and the chimney draft.
5. The flue must be no longer than 1m and fitted with a sweep hole. The flue may only be longer if the chimney draft has been measured and recorded no further than 30cm from the boiler and meets the minimum operating draft requirements, see chapter Main Parameters and Dimensions.
6. The Biopel boiler must be installed in a separate boiler room specially adapted for heating. The boiler room must have sufficient space for boiler installation and maintenance. Sufficient fresh air circulation for combustion must be ensured.
7. The boiler must never be installed in open spaces or balconies, in areas occupied by people such as the kitchen, living room, bathroom, bedroom, in areas where explosive and flammable materials are present.
8. It is recommended to install the boiler on a concrete base made of fire-resistant material.
9. Around the boiler and the pellet hopper must be a minimum handling space, free of obstructions, namely: 60cm from the rear and sides, 100cm from the front of the boiler and hopper.
10. Safe distance of 200 mm from combustible materials must be maintained during installation and operation of the boiler.
11. It is forbidden to store fuel behind the boiler or to stack it next to the boiler at a distance of less than 800 mm.
12. It is forbidden to store fuel between two boilers in the boiler room.
13. Distance between boiler and fuel min. 1000 mm must be observed or place the fuel in a different room than where the boiler is installed.
14. The warranty fuel is considered to be wood pellets only, with a diameter of 6mm or more, with the parameters specified in the instructions for use.
15. The manufacturer is not liable for the quality of the fuel, in terms of combustion quality, ash quantity or frequency of boiler cleaning due to the fact that these are only influenced by external factors such as pellet quality, dust and moisture in pellets, chimney draft or correct combustion settings.
16. It is forbidden to use flammable liquids (petrol, alcohol, etc.) to fire the boiler.
17. It is forbidden to overheat the boiler in any way during operation.
18. If there is a risk of flammable vapours or gases entering the boiler room or during work that creates a temporary risk of fire or explosion (gluing floor coverings, painting with flammable paints, etc.), the boiler must be shut down well in advance of work commencement.
19. The boiler must be thoroughly cleaned after the end of the heating season, including the flue gas outlet. The boiler room must be kept clean and dry.
20. It is forbidden to interfere with the boiler's construction and electrical installation.
21. The manufacturer is not liable for damage caused by improper adjustment or improper operation of the product.
22. Parts subject to wear and tear are not covered by the standard warranty period. These parts are: sealing cord, grenamat board, igniter, burner grate, lambda sensor. However, these parts will function for a long time if the boiler and its components are operated in accordance with the instructions for use. These parts are considered as consumables and are covered by a manufacturer's warranty of 6 months.
23. The manufacturer is not liable for rust on the boiler and its components, as this is always and only due to external influences such as moisture in the room, fuel or due to unprofessional installation without protecting the boiler against low temperature corrosion.
24. The boiler must be protected against low return water temperature by a valve that prevents cold water from entering the boiler. The minimum acceptable return water temperature is set by the manufacturer at 55°C.
25. The manufacturer is not responsible for condensation of cold air in the flue gas passage, as this must be prevented by correct installation of the flue gas passage and correct adjustment of the boiler combustion process.
26. The manufacturer is not liable for smoke leakage from the boiler into the room if this is caused by low chimney draft, incorrect boiler installation or incorrect adjustment of the combustion process.
27. The manufacturer is not liable for damage to parts caused by handling, transport, incorrect adjustment or misuse, or other external causes not directly related to the function of the individual boiler components.
28. The boiler installation, boiler additional devices and correct boiler set-up and start-up are always the responsibility of the installation company who sold the boiler to the end customer.
29. If it has been agreed that a third party (e.g., The so-called commissioning company) will hold the warranty conditions, then this must be stated and agreed by 3 parties, namely the boiler dealer, the boiler commissioning company and the end customer. All of the above-mentioned parties must agree to this and their signatures must be provided in the warranty addendum.
30. The manufacturer is not responsible for the incorrect selection of boiler power to the heating losses of the building (e.g., placing a boiler with too little or too much power in relation to the demand).

22. APPLICABLE STANDARDS AND REGULATIONS

These standards must be met during boiler installation and operation. Information below is designated for installers and plumbing companies carrying out boiler installation and start-up.

Heating system:

The heating system must be filled with water that meets requirements of ČSN 07 7401 and especially its hardness must not exceed the required parameters: Hardness = 1mmol/l, Ca²⁺ = 0.3mmol/l, concentration of total Fe+Mn = 0.3mg/l.

ČSN 06 0310	Heating systems in buildings - Design and installation
ČSN 06 0830	Heating systems in buildings - Safety devices
ČSN 07 7401	Water and steam for thermal energy equipment with working steam pressure up to 8 MPa.
ČSN EN 303-5	Boilers for central heating – Part 5: Heating boilers for solid fuel, with manual or automatic fuel supply, nominal heat output up to 500 kW – Terminology, requirements, testing and marking.

Flue gas system:

ČSN 73 4201	Designing chimneys and flues.
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Fire regulations:

ČSN 06 1008	Fire protection of heating appliances.
ČSN EN 13 501-1+A1	Fire classification of construction products and building elements - Part 1: Classification using test data from reaction to fire.

Electricity network:

ČSN 33 0165	Electrical regulations. Marking the conductors with colours or digits. Implementing regulations.
ČSN 33 1500	Electrical regulations. Revision of electrical devices.
ČSN 33 2000-3	Electrical regulations. Electrical equipment. Part 3: Setting the basic characteristics.
ČSN 33 2000-4-41	Electrical regulations: Part 4: Safety chap. 41: Protection against electric shock.
ČSN 33 2000-5-51	Electrical regulations. Construction of electrical devices.
ČSN 33 2130	Electrical regulations. Internal wiring.
ČSN 33 2180	Electrical regulations. Connection of electrical devices and appliances.
ČSN 34 0350	Electrical regulations. Regulations for mobile connections and wiring management.
ČSN 33 60 079-10	Electrical regulations. Regulations for electrical equipment in areas with potentially explosive flammable gases and vapours.
ČSN EN 60 079-14 ed.2	Electrical apparatus for explosive gas atmospheres - Part 14: Electrical installations in hazardous areas (other than mines).
ČSN EN 60 252-1	Capacitors for AC motors - Part 1: General - Performance, testing and rating - Safety requirements - Guide for installation and operation.
ČSN EN 60 335-1 ed.2	Electric appliances for household and similar purposes - Safety - Part 1: General requirements.
ČSN EN 60 335-2-10	Electric appliances for household and similar purposes Safety - Part 2-102: Particular requirements for appliances burning gas, oil and solid fuel having electrical connections.
ČSN EN 60 445 ed. 3	Basic and safety principles for man-machine interface, marking and identification.
ČSN EN 60 446	Basic and safety principles of machinery operation - Marking the conductors with colours or digits.
ČSN EN 61000 – 6 – 3	EMC – Part 6 – 3: Generic standards – Emissions - residential, commercial and light industry.
ČSN EN 61000 -3 – 2	EMC - Part 3 – 2: Limits – Limits for harmonic current emissions (equipment input current up to 16 A inclusive).
ČSN EN 61000 – 3 – 3	EMC – Part 3 - Limits - section3:Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

System for DHW:

ČSN 06 0320	Heating systems in buildings - Hot water preparation - Designing and planning.
ČSN 06 0830	Heating systems in buildings - Safety devices.
ČSN 73 6660	Water supply systems.

Placement options:

ČSN 06 1008	Combustion grades B, C1, C2 and C3.
ČSN EN 13 501-1	Building materials and products classified in the flammability degree
ČSN 33 2000-3	The basic environment for handling space around the boiler AA5 / AB5.

23. WARRANTY CARD

Biopel v9 MINI

Manufacturer: OPOP spol. s r.o., Valašské Meziříčí, Czech Republic

Tel.: 00420 571 675 589, **fax.:** 00420 571 611 225

Complaint procedure instructions:

The user is obliged to entrust commissioning, regular maintenance and fault rectification only to a professional service. This warranty card contains a quality and completeness certificate. The manufacturer confirms that the product has been inspected and conforms in its design to the technical specifications and EN 303-5. We guarantee the boiler quality, function and performance for a period of 24 months from the date of sale to the relevant consumer, but no longer than 30 months from the date of being dispatched from the factory, in such a way that defects arising from proven faulty materials, faulty construction or faulty workmanship are rectified at our expense as soon as possible, provided that the product:

- is in normal technical condition according to the operating instructions and is operated in accordance with the operating instructions.
- has not been mechanically damaged by force (no unauthorised intervention has been carried out except as permitted in the operating instructions).
- the consumer presents this warranty card, duly completed, when making a claim
- the manufacturer's instructions for the use of the equipment have been followed
- if the purchaser fails to sell the product within the above-mentioned statutory warranty period, all liability for any defect in the product shall be borne by the purchaser
- it is connected to a chimney flue according to EN 73 4201:1989
- the costs associated with the handling of the complaint will be charged to the customer
- when reporting a defect, it is always necessary to present this warranty card, give the exact address and state the circumstances under which the defect occurred. The method and place of repair will be decided by our company.

We guarantee the permanent tightness of the steel weldment for a standard period of two years from the date of being dispatched from the factory. We guarantee a standard 60-month warranty if the required temperature range of the heating water is ensured and the leakage was caused by poor quality material or welding work.

To accept the warranty of a flowing steel weldment, it must be clearly proven that the water in the boiler was not caused by condensation of cooled air, but by a leak in the weldment. The warranty cannot be accepted if the faults were caused by operation or when the boiler is connected to a heating system which does not meet the basic operating conditions of the boiler. If the warranty is accepted during the extended warranty period, we will deliver a replacement weldment by means of individual package transport or by personal pick-up of the user.

If the defective weldment is not returned to the manufacturing company within 30 days from the shipment or delivery date of the replacement weldment, the user will be charged for the full cost of the weldment including the shipping costs for the new weldment.

Weldments replaced within the extended warranty period of 60 months shall have a warranty for 24 months from the removal date. The boiler weldment is sprayed with black, water-diluted paint, which may result in the paint peeling. Peeling paint does not affect the boiler function. This paint will be scorched after the first flooding. The extra warranty is held by OPOP if the plumbing company has regularly completed the Extension Warranty Card through years 3 to 5 as described on the following pages of this manual. In the case of a flowing steel weldment, the customer will be asked to provide a properly completed Warranty Extension Card.

Date and manufacturer's stamp:
(boiler manufacturer)

Date and plumber's stamp:
(plumbing company stamp that sold the boiler)

Warranty period extension for the steel weldment tightness

Customer name: _____ Boiler name: _____
 Address: _____ Serial number: _____
 City: _____ Installation date: _____

Answer Yes or No to all questions or provide a value for each parameter each year. Provide additional information if necessary. Indicate the date of inspection at the end.

■ Text colour indicates visual inspection

■ Text colour indicates flood test inspection

Question:	First start	Year +1	Year +2	Year +3	If NO, then please state the reason
Is the boiler used at a maximum operating pressure of up to 2 bar?					
Is the safety valve used up to a maximum of 2 bar?					
Is the return water temperature during boiler operation 55°C or more?					
Is a 3-way or 4-way valve used as protection against low temperature corrosion?					
Is the boiler installed and started up by a certified company?					Company name:
Is the boiler operated according to the conditions specified in the operating instructions?					
Is the boiler and burner clean?					
Is the boiler dry inside?					
Is regular annual servicing carried out?					
Are the temperature sensors installed in accordance with the installation manual?					
Is only warranty fuel used?					
Is the combustion and flame, correct?					
Is the warranty extended? (yes/no)					
Inspection date					

Service Centre: _____
 Year +1 Year +2 Year +3

Use this form together with the warranty card when making a claim during the extended warranty period.

OPOP, spol. s r. o.

Zašovská 750

757 01 Valašské Meziříčí

Bank account:

Komerční banka a.s., Account number: 1608851/0100

Business ID No: 47674105, Tax ID No: CZ 47674105

Telephone: Sales Department: 571 675 589, secretariat: 571 611 250, Production: 571 675 405

Supply: 571 675 114, Financial Department: 571 675 472