ENG

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TECHNICAL INSTRUCTIONS FOR ASSEMBLY, OPERATION AND MAINTANCE OF ELECTRIC BOILER

EK SMART EU

Table of content

1. Explanation of the symbols and safe work instructions

1.1. Introduction

These technical instructions contain important information about adequate assembly, commissioning, handling and maintains of the device.

It is intended for authorized installers, authorized service technician's and end – users of the electro-boiler.

Please read and retain the instructions for future reference in case of need.

1.2. List of symbols with explanations

Warning symbols

	**RISK OF ELECTRIC SHOCK** Risk of electric shock symbol is presented by a lightning bolt arrow in a triangle warning symbol
	**WARNING** Warning symbol in the text is presented by the warning sign in a triangle
	**IMPORTANT INFORMATION** Important information for which there is no risk of injury or material damage
	**SETTINGS** Settings intended for service technicians or experts and end user should not perform them by themselves.

Key words at the beginning of the safety notice denote the type of hazard and potential consequences if one does not comply with the measures for preventing hazard.

- **NOTE** indicates that there might be some material damage.
- **CAUTION** indicates that there might be minor or moderate bodily injuries.
- **WARNING** indicates that there might be severe or life-threatening bodily injures.
- **DANGER** indicates that might be life – threating bodily injuries.

1.3. General boiler safe work instructions

General safety instructions

⚠ This device is not intended for use by persons with limited mental or psychophysical capabilities, as well as by inexperienced persons including children. Children above 8 may handle this device only if an adult is present or if they are instructed for date handling and are aware of all hazards.

- ⚠ Non-compliance with the safe work instructions may result in severe injuries, death, material damage, and may jeopardize environment.
- ⚠ Before assembling the boiler professional inspection and control testing of the electrical installation is required.
- ⚠ All works on the electrical installation should be performed by a competent and authorized person in accordance with relevant regulations.
- ⚠ Commissioning, maintenance and repair may only be performed by an authorized service technician.
- ⚠ Ensure technical approval of the installation in accordance with the relevant regulations.

Danger due to compromising one's own safety in case of need, e.g. in case of fire

- ⚠ Never put yourself in a life-threatening situation. Your safety should always come first.

Damage due to errors in operating the boiler

- ⚠ Error in operating the device may cause bodily injuries or material damage.
- ⚠ Ensure that only persons who are able to use this boiler adequately have access to it.
- ⚠ Errors in operating the boiler may cause injuries and/or damage to the installations.

Assembly and commissioning of the boiler

- ⚠ Assembly of the boiler should be carried out only by authorized service technician.
- ⚠ The commissioning of the boiler should always be performed only if there is appropriate pressure in the installation, while the working pressure must be in accordance with the data of manufacturer. Do not close safety valves in any case, as the material damage that may be caused by high pressure will thus be avoided.
- ⚠ The boiler should be installed only in a room in which water cannot freeze.
- ⚠ Do not use or store flammable materials (paper, thinner, paint, etc.) near the boiler.
- ⚠ Maintain safe separation distance from the boiler, in accordance with the regulations in effect.

Life-threatening risk of electric shock

- ⚠ Electrical connection works should be done by authorized service technicians. Please comply with the connection scheme.
- ⚠ Prior to works on electrical installations disconnect the power supply and ensure that it may not be accidentally connected again.
- ⚠ The device must not be assembled in damp premises.

Maintained/check-up

- ⚠ We recommend that you sign a contract on inspection/maintenance with an expert company, so that the inspection and necessary maintenance of the device may be carried out once a year.
- ⚠ End-user of the boiler is responsible for ensuring that the hearing installation is safe and environmentally friendly.
- ⚠ Adhere to the safe work instructions in the section

Spree parts

⚠ No liability shall be accepted for damage caused by use of spare parts which have not been delivered by the manufacturer.
⚠ Use only original spare parts.

Damage to the system as a result of freezing temperatures

⚠ In case of freezing temperatures, protect the heating system from freezing. Heating water should be drained at the lowest point of the heating system.

Instructions for service technicians

⚠ Inform the end-users about the manner of work and the maintenance of the boiler.
⚠ Warn the end-users that they must not make any change or repairs on their own.
⚠ Ensure that the children do not use this boiler without supervision and not play with it.
⚠ Hand over boiler technical documentation to the end-user.

Environmental protection/Disposal of waste

⚠ Dispose of packaging in an environmentally friendly manner.
⚠ Dispose of the boiler in an environmentally friendly manner at the recycling spot.

Cleaning of the boiler

⚠ Clean the boiler on the outside with a damp cloth.

2. Information about the boiler

2.1. Description of the product

EK-SMART EU is produced with the following powers:
6kW, 9kW, 12kW, 16kW, 18kW, 21kW, 24kW, 27kW.

Advantages of electric boilers: reliable heating, quiet work, not requiring a separate room for installation, small dimensions, low price, high level of operational safety, absence of chimney, no harmful emissions during operation (environmental protection). Smaller power boilers of up to 9kW may require Single Phase or Three Phase power supply, while boilers of greater power exclusively require Three Phase power supply.

In addition to standard elements of an electric boiler, the EK Smart EU electric boiler contains: expansion vessel, circulation pump, safety valve, filling and drainage tap, automatic air vent, etc.

The device is equipped with a protective assembly unit which guarantees complete safety.

Heating elements and pump are turned on through controller in charge of maximum work optimisation.

Specially designed logarithm measures the time of work of each heating element and periodically turns off the heating elements which worked the most and turns on those that worked the least. In this way, equal exploitation of the heating elements is ensured, which significantly extends the working life of the product.

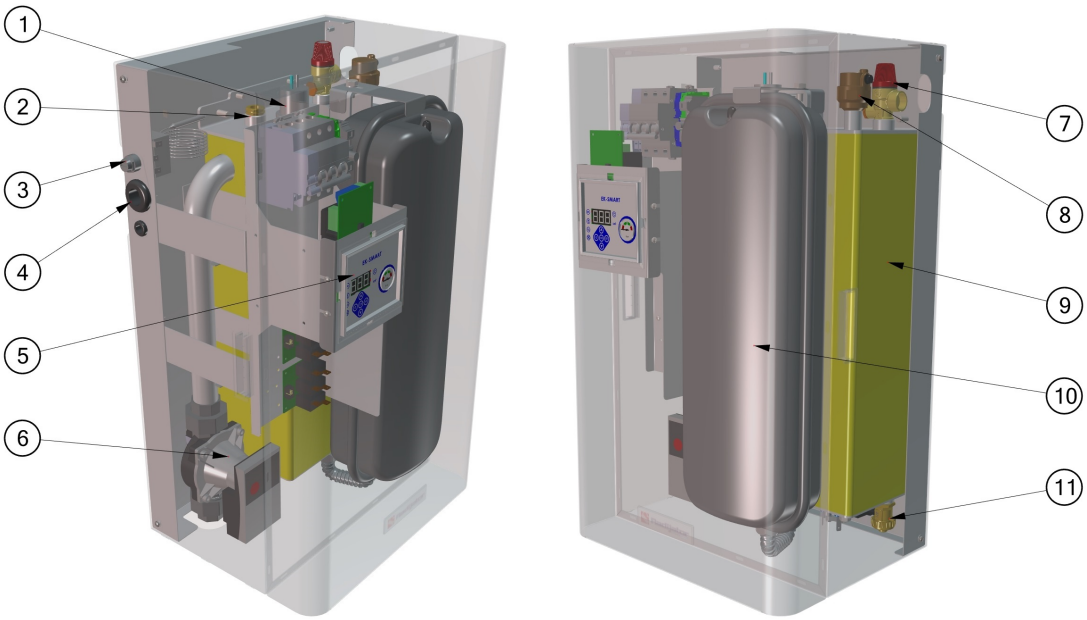
Algorithm is designed upon the principle of modulation, so, as the boiler approaches the set temperature, it reduces its power output and thus achieves maximum comfort with minimum consumption.

Additional equipment: **room thermostat** is recommended since they significantly increase the efficient energy use of the product and retain the same comfort with reduced consumption.

Electric boiler may be used:

1. As a principal source of heating (through radiators: in houses, holiday cottages, apartments...)
2. As an auxiliary/additional source of heating (systems with a heat pump, solar systems, pyrolytic boiler...)
3. For heating through heat accumulator (accumulation), In addition to already mentioned inputs and outputs, EK-Smart EU boiler controller also contains additional equipment and functions which provide maximum comfort and safety to the end-user with minimum consumption.

Picture 1. *Boiler overview: isometric view, front side, left and right side, top side, bottom side*



Picture 2. *Boiler components*

1. Pressure switch
2. Copper immersion for probes
3. STB - Safety thermostat
4. Set of grommets
5. Control table with the LED display
6. Pump
7. Pressure safety valve
8. Automatic air vent
9. Exchanger-boiler body
10. Expansion vessel
11. Drain and filling tap

2.2. Electro-boiler models

It is important to emphasise that the boilers of 6kW and 9kW are produced in two versions, with Single Phase and Three Phase connector. The boilers with Single Phase connectors are EK 06 Smart MONO EU and EK 09 Smart MONO EU, boilers with Three Phase connectors are EK 06 Smart EU and EK 09 Smart EU. When purchasing the product, you should emphasise which connector you want. Subsequent "reconnections" are not approved by the manufacturer.

Electro-boiler models	Power
EK 06 Smart EU	**6 kW**
EK 06 Smart MONO EU	**6 kW**
EK 09 Smart EU	**9 kW**
EK 09 Smart MONO EU	**9 kW**
EK 12 Smart EU	**12 kW**
EK 16 Smart EU	**16 kW**
EK 18 Smart EU	**18 kW**
EK 21 Smart EU	**21 kW**
EK 24 Smart EU	**24 kW**
EK 27 Smart EU	**27 kW**

Tabela 1. *Electro-boiler models*

2.3. Declaration of conformity

We declare that these boilers have been examined in accordance with the Directives 2006/95/EC (Low Voltage Directive-LVD) and 2014/30/EU (Electromagnetic Compatibility Directive - EMC).

2.4. Minimum separation distance and flammability of building materials

Minimum separation distance from inflammable materials may differ from country to country. Please adhere to the regulations on electrical installations and prescribed minimum distances in your country. The following table shows the classification of flammability of building materials as per DIN 4102.

Flammability of building materials		
A	Non-combustible	
A1	Non-combustible	Asbestos, stone, ceramic wall tiles, terracotta, plaster (without organic additives)
A2	Containing minor quantities of flammable additives (organic ingredients)	Gypsum-cardboard plates, base felt plates, glass fibres, plates of AKUMINE, ISOMINE RAYOLITE, LIGNOS, VELOX and HERACLITE
B - Flammable		
B1	Not easily flammable	Beech and oak wood, composite wood, felt, plates of HOBREX, VERSALITE and UMAKART
B2	Flammable	Pine wood, larch and spruce wood, veneered wood
B3	Easily flammable	asphalt, cardboard, cellulosic material, tar paper, particle board, cork, polyurethane, polystyrene, polyethylene, floor fibres

Table 2. *Flammability of building materials per DIN 4102*

2.5. Tools, materials and auxiliary aids

For assembly and maintenance of the boiler, standard tools for doing thermo-technical, plumbing and electrical installations are required.

2.6. Antifreeze protection

If the use of antifreeze additives cannot be avoided, use those additives which are permitted for heating installations.

2.7. Waste disposal

- Dispose of the packaging in an environmentally friendly manner.
- Dispose of the components which should be replaced in an environmentally friendly manner.

2.8. Scope of delivery

During delivery of the boiler, adhere to the following:

- Check whether the packaging is undamaged
- Check whether the delivery is complete.

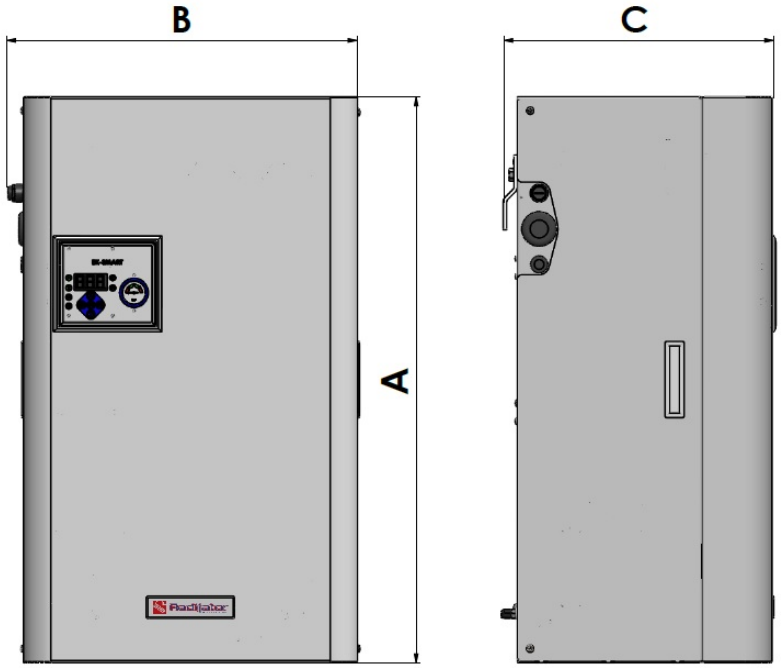
Delivery Item	No of units
Boiler	1
Assembly set	1
Instruction for use	1

2.9. Name plate

Standard plate of the boiler is located on the outside of the boiler and contains the following technical data:

- model,
- voltage,
- power,
- serial number,
- year of production.

2.10. Dimensions and technical data



Slika 3. *Dimenzije kotla*

A=640mm;
B=400mm
C=300mm

		Models									
		EK 06 Smart MONO EU	EK 06 Smart EU	EK 09 Smart MONO EU	EK 09 Smart EU	EK 12 Smart EU	EK 16 Smart EU	EK 18 Smart EU	EK 21 Smart EU	EK 24 Smart EU	EK 27 Smart EU
Power	kW	6	6	9	9	12	16	18	21	24	27
Number of levels of power		3	3	6	6	6	6	9	9	9	9
Division of levels of power		3x2	3x2	6x1.5	6x1.5	6x2	6x2.67	9x2	9x2,33	9x2.67	9x3
Mains voltage	Vac	230	400	230	400	400	400	400	400	400	400
Built-in fuse	A	1x32	3x10	1x50	3x16	3x20	3x25	3x32	3x32	3x40	3x50
Min. cross-section of connection cable	mm2	3x6	5x2.5	3x10	5x2.5	5x4	5x4	5x6	5x6	5x10	5x10
Safety valve	bar	3									
Max. allowable working pressure	bar	3									
Min. allowable working pressure	bar	0.8									
Max. temperature of the water boiler	°C	80									
Water volume in the boiler	lit	11									
Volume of the expansion vessel	lit	10									
Hot water connection	cola	1									
Cold water connection	cola	1									
Boiler dimensions	mm	650x400x290									
Handling		PCB board									

Table 3. *Technical data*

NOTE : When purchasing the boiler of 6kW or 9kW, emphasise whether you want a model with Single Phase or Three Phase connection.

3. Transport of the boiler

	**NOTE:** Transport damages
	⚠ Pay attention to transport instructions found on the packaging
	⚠ Use a suitable transport vehicle, e.g. a trolley with a tightening strap.
	⚠ During the transport, the boiler must be in a lying position.
	⚠ Avoid blows or collision with various objects.

- Put the packed boiler onto a trolley, if needed tie it with a tightening strap and transport it to the place where it will be installed.
- Take off the packaging additions.
- Remove the packaging and dispose of it in an environmentally friendly way.

4. Installation of the boiler

	**CAUNT:** Incorrect installation of the boiler may cause injuries or material damage!
	⚠ Never install the boiler without the expansion vessel (AG) and safety valve.
	⚠ Use a suitable transport vehicle, e.g. a trolley with a tightening strap.

	**NOTE:** Material damage may be caused due to freezing!
	⚠ The boiler should be installed only in a room in which freezing cannot occur.

4.1. Caution when assembling the boiler

	**NOTE:** Material damage may be caused for failure to adhere to the following instructions!
	Adhere to the instructions for the boiler and all installed components

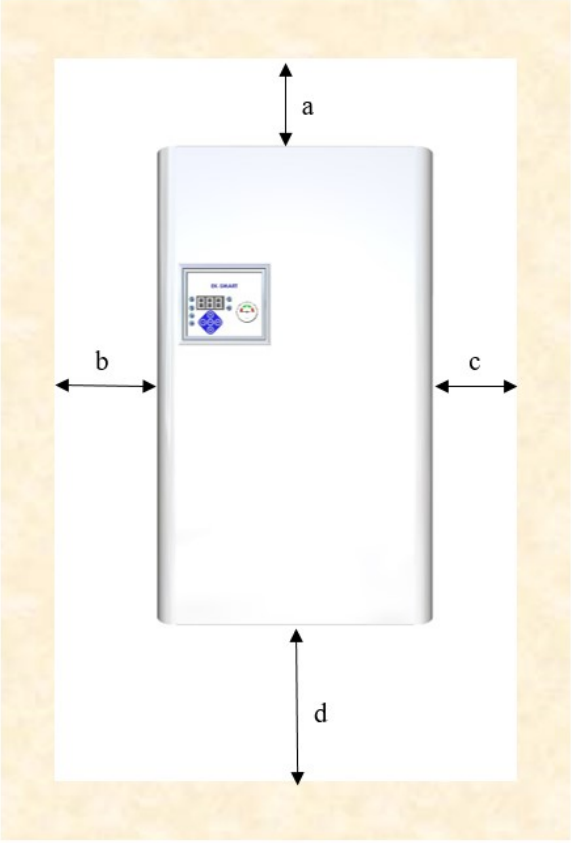
Prior to installing, pay attention to the following:

- All electrical connections, protection measures and fuses should be connected by a professional from the authorised service, complying with all the norms and regulations, as well as local regulations in effect.
- EK Smart boiler has a built-in automatic fuse, the characteristics of which are given in the Table 3: Technical data.
- Electrical connection must be linked as per the connection schemes.
- After the prescribed installation of the boiler, the ground wire should be connected.
- Prior to any works on the heating installations, the power supply should be disconnected.
- Unskilled and unauthorised attempts of connecting under voltage may cause material damage on the boiler, which may further lead to dangerous electric shocks.

4.2. Clearance around the boiler to floor, wall and ceiling

	DANGER: Risk of fire due to flammable materials or liquids!
	⚠ Do not store flammable materials or liquids in the vicinity of the boiler.
	⚠ Inform the end-user about the regulations in effect relating to minimum clearance from easily flammable materials (more information in the table 2)

- Comply with the regulations on electrical installations and minimum clearance that are in effect in the relevant country.
- Mount the boiler on the wall in such a way that there remains free space, as shown in picture 6.



Picture 3. *Minimum clearance after the assembly of the boiler*

a=60mm;
b=c=150mm;
d=500mm

4.3. Removal of the boiler front casing

Prior to any intervention (removal of the casing), disconnect the boiler from the installation.

Boiler casing may be removed for easy handling and installation. Boiler removal is performed in the following way:

1. Unscrew the screws at the left, as shown in the picture.
2. Unscrew the screws at the right, as shown in the picture.
3. Remove the boiler front casing by easily pulling it towards yourself.

***Picture** 7. Opening of the boiler (removing the boiler front casing)*

4.4. Assembly of the boiler

The boiler should be assembled on the wall in a vertical position.

The manufacturer is not responsible for damage caused as a result of unprofessional assembly.

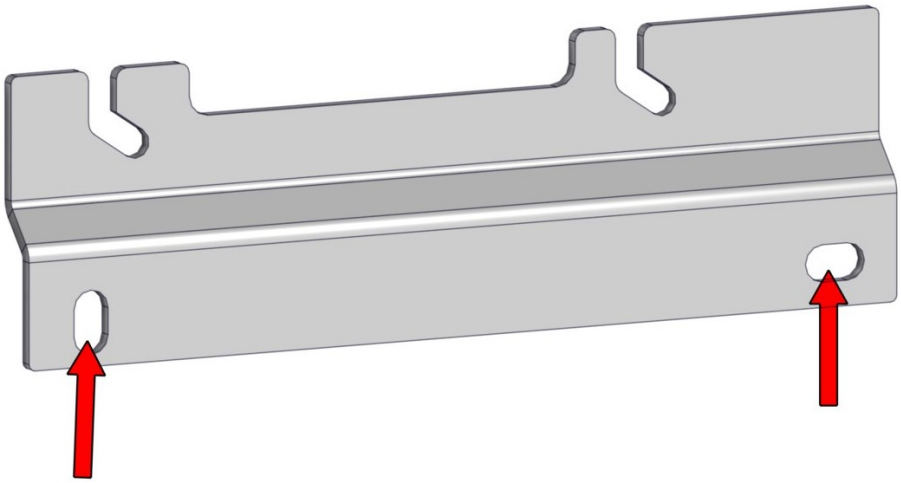
	NOTE: Material damage may be caused by inadequate assembly on the wall!
	⚠ Adequate fastener tools should be used.

This section describes the assembly of the boiler on the wall.

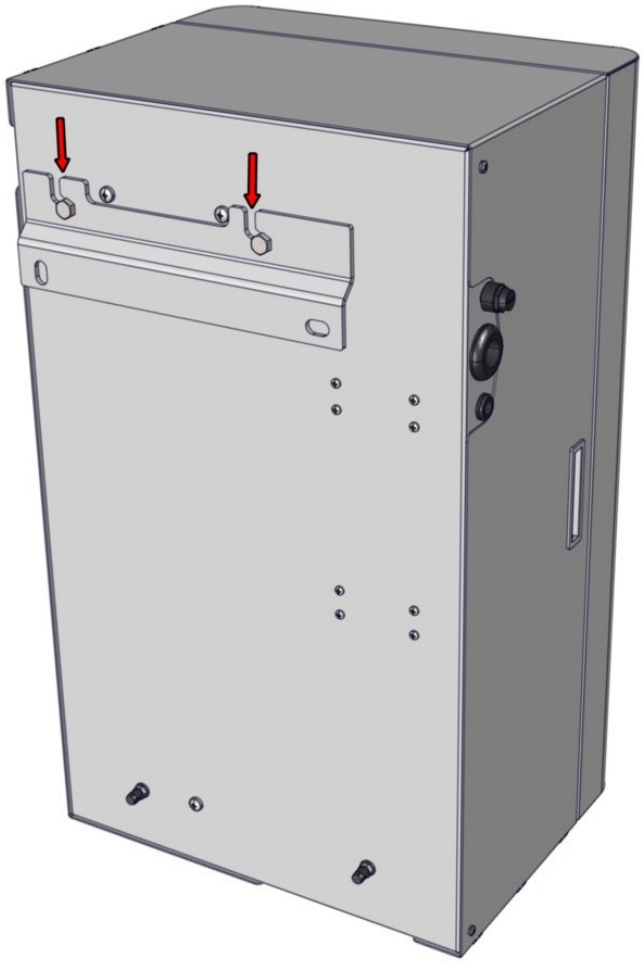
NOTE: The boiler must be assembled vertically on the wall.

For mounting the boiler on the wall, a steel bracket is used (Figure 5), which must be mounted on the wall with plastic plugs on the marked openings which are an integral part of the boiler delivery or with screws suitable for a non-standard type of wall.

Then carefully mount the boiler to the wall, tighten the screws on the back of the boiler if necessary.



Picture 5. *Dimensions*

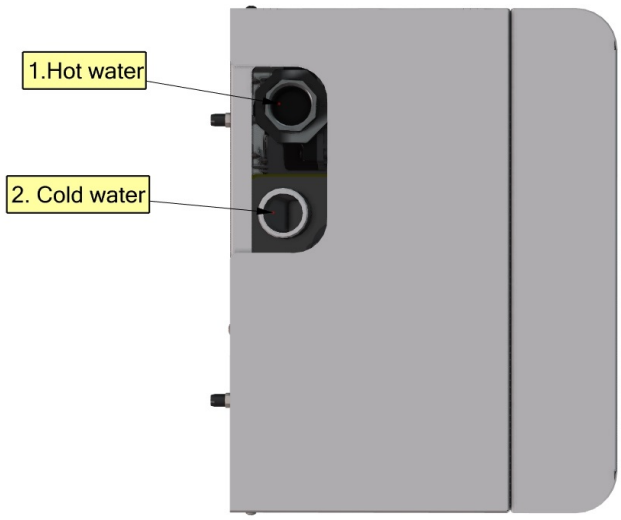


Picture 6. *Mounting the boiler to the bracket*

5. Boiler hydraulic scheme

Heat pipes should be connected in the following manner:

- Connect the hot water connection to the connection 1, picture 7.
- Connect the cold water connection to the connection 2, picture 7.



Picture 7. *Water connection*

Filling the boiler with heating water and testing welded joints and tightness:

Testing tightness should be carried out before commissioning the boiler.

⚠	**DANGER:** Injuries and/or material damage may be caused by exceeding pressure during testing tightness! High pressure may damage regulation and safety devices, as well as the cylinder
	⚠ Fill the boiler up to the pressure that corresponds to the opening pressure of safety valve.
	⚠ Comply fully to the pressure of built-in components.
	⚠ After testing the tightness, open the valves again.
	⚠ Check whether all pressure regulators and installation safety elements work properly

	**DANGER:** Health risks due to mixing the drinking water and water from heating installation!
	⚠ Comply with the existing regulations and norms related to avoiding mixing drinking water and water from heating installation.
	⚠ Comply with the norm EN1717.

	**DANGER:** Risk of fire due to flammable materials or liquids!
	⚠ Do not store flammable materials or liquids in the vicinity of the boiler.
	⚠ Inform the end-user about the regulations in effect relating to minimum clearance from easily flammable materials (more information in the table 2).

	**NOTE:** Damage on installations caused by poor quality of water! Depending on the water characteristics, there might be damages of corrosion or lime scale on the heating installations.
	⚠ Comply with the requests relating to filling water as per VDI2035, i.e. as per the design documentation and catalogue.

	**NOTE:** Material damage caused by temperature strain. If the boiler is filled in a warm state, thermal stress may lead to cracks. The boiler will start to leak.
	⚠ Fill the boiler only in cold state (the temperature of the flow may be maximum 40°C)

- Check the pre-pressure of the expansion vessel.
- Open the filling and drainage tap.

- Slowly fill the boiler.
- At the same time monitor the pressure on the manometer. When the working pressure has been reached, close the filling and drainage tap.
- Purge the boiler through air vent.
- Purge the installation through a valve on the radiator.
- Once the working pressure has been reduced by purging of air, the water in the system must be refilled.
- Test the tightness in accordance with the regulations in effect.
- Check whether all safety elements work properly.
- If the tightness has been tested and no leakage has been observed, regulate the right working pressure.
- Take off the hose from the filling and drainage tap.
- Note down the value of the working pressure and water quality in the instruction for use.

During the first filling or refilling or changing the water

- Comply with the request related to filling water.

Purging and unblocking the heating pump

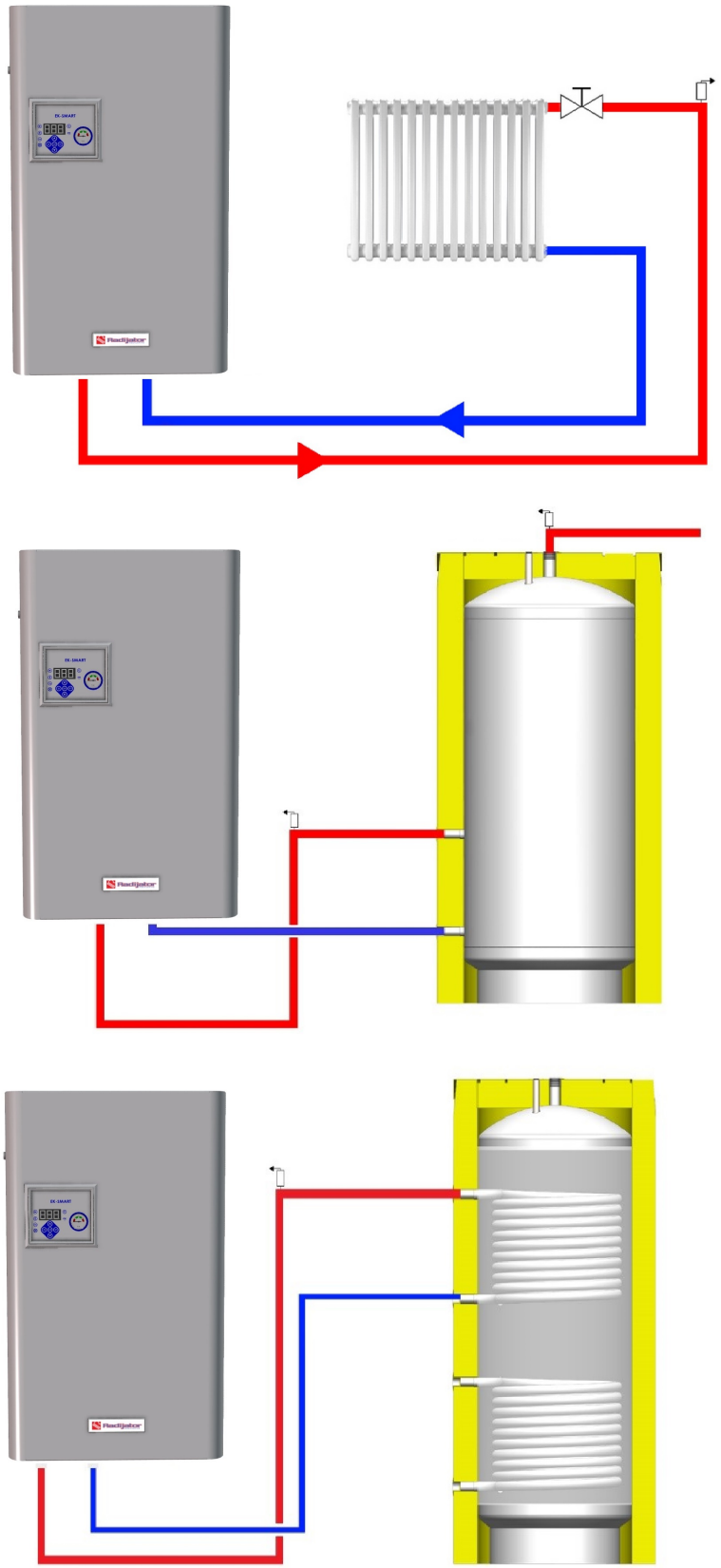
- Pump installed in this boiler has an automatic manner of purging, therefore, there is no need to undertake any actions to purge the pump.

When the heating pump is blocked, please do the following:

- If the pump gets blocked after a long period of inactivity, you should unscrew the front stopper and turn the camshaft using the screwdriver.
- Do this operation carefully to avoid the damage.

Purging the boiler and installation

- Through the screw on the air vent, carefully release the vent and purge the boiler. This vent is automatic, therefore, if the filling of the installation and the boiler is carried out properly, additional manual purging will not be necessary.
- Boiler electrical wiring diagram.



Picture 8. *Hydraulic scheme*

6. Electrical wiring diagram

WARNING

- ⚠ Only qualified person can do the works on electric installations.
- ⚠ Prior to opening the boiler, disconnect the power supply from all poles and ensure that it is not accidentally connected again.
- ⚠ Comply with the regulations for installation.

IMPORTANT INFORMATIONS

- Electric boiler is connected to the permanent electrical installation as per the connection scheme and with a certain cross-section of voltage cable. Connection should be made via outer switch for separating poles with minimum distance between contacts of 3mm.
- During connecting the boiler to electrical installation, observe the connection schemes. Cables must have the prescribed cross-section, and the fuses must have the prescribed power.
- Models EK 06 Smart EU, EK 09 Smart EU, EK 12 Smart EU, EK 16 Smart EU, EK 18 Smart EU, EK 21 Smart EU, EK 24 Smart EU, EK 27 Smart EU maz be connected to a Three Phase connection (400V 3N ~).
- Modes EK 06 Smart MONO i EK 09 Smart MONO may also be connected to a Single Phase connection (230V N ~).

6.1. Position of electrical cable grommets in the boiler

This boiler is equipped with set of electrical cable grommets. The grommets are located on the left.

A set of grommets consists of two rings, with the large ring being intended for voltage cable and the smaller ring for equipment shown in the hydraulic scheme.

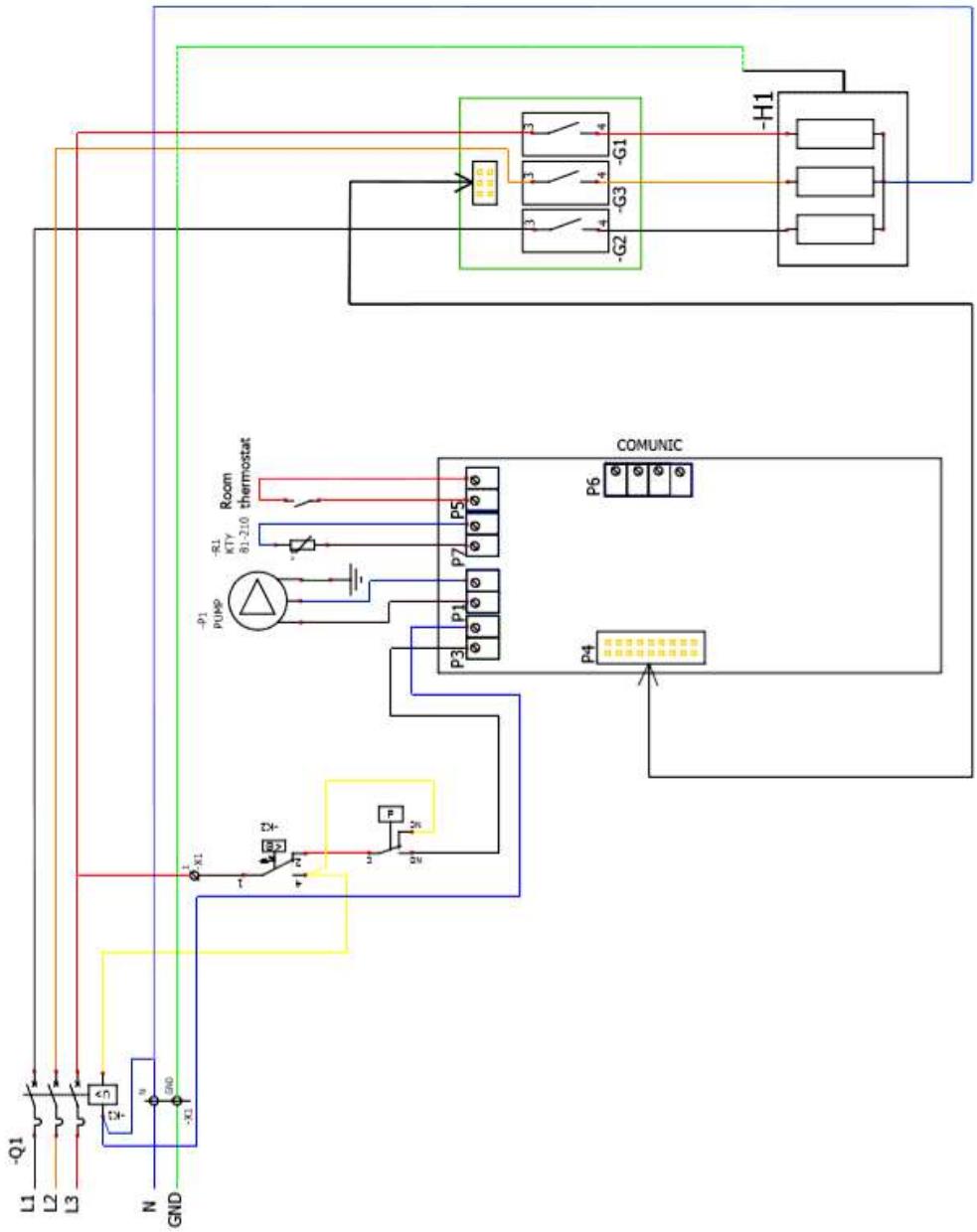
6.2. Connecting the electric boiler to permanent electrical installation

	**WARNING**
	⚠ The boiler is exclusively connected to permanent electrical installation according to the existing standards for electrical installations.
	⚠ Connecting the boiler to permanent electrical installation must be performed through the device for power supply disconnection from the network which has a space between contacts of 3mm in all fields that provide complete disconnection under III category overvoltage conditions.

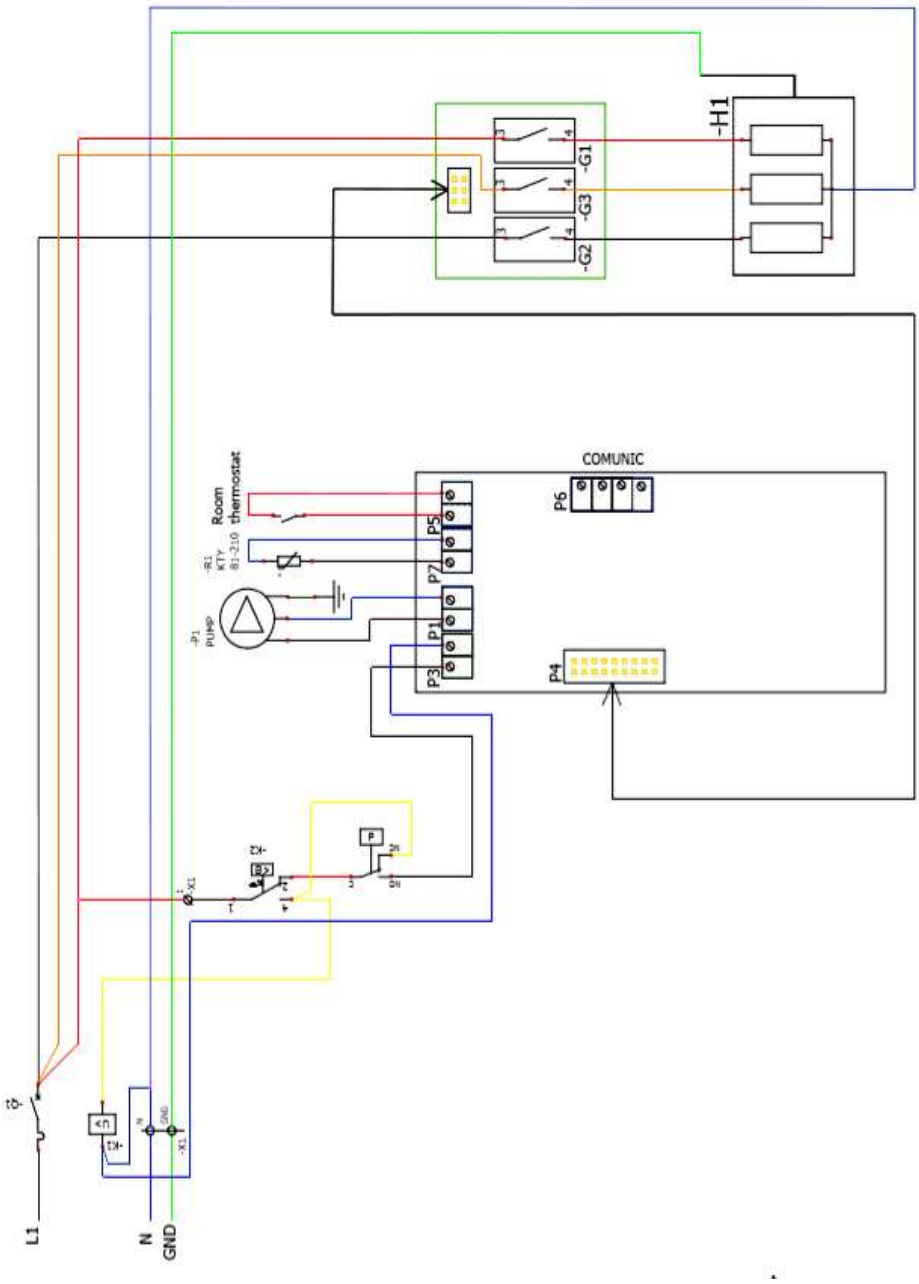
- Connection is carried out according to the connection scheme, with a certain cross-section of voltage cable.
- Instead of classic clamp for connecting voltage cable, the boiler contains three-way automatic switches in which the voltage cable is connected.
- The set of tree-way automatic switches is supplemented by remote voltage relay, this providing a safety assembly unit which, in addition to short-term over-current protection, also reacts to thermal overload (a signal from safety thermostat activates voltage relay) and in the same moment, interrupts the power supply of all three phases to the boiler.
- In models EK 06 Smart MONO EU and EK 09 Smart MONO EU phase conductor is connected to single-pole switch (L1).
- In models EK 06-27 Smart EU phase conductors are connected to three-way switch (L1, L2, and L3).
- Neutral zero conductor is connected to the adequate clamp with the sign N. The clamp of the zero conductor is blue in colour.

	**ATTENTION!** When connecting phase conductors it is mandatory to tighten well the screw in automatic switches in order to make as better link as possible between cable and clamps.
	DANGER! If the link between cable and clamp is not tight, there may be incontrollable heating of the switch and eventually result in breakdown.
	NOTE! Remote voltage relay is connected by the manufacturer and nothing in additionally connected to it.

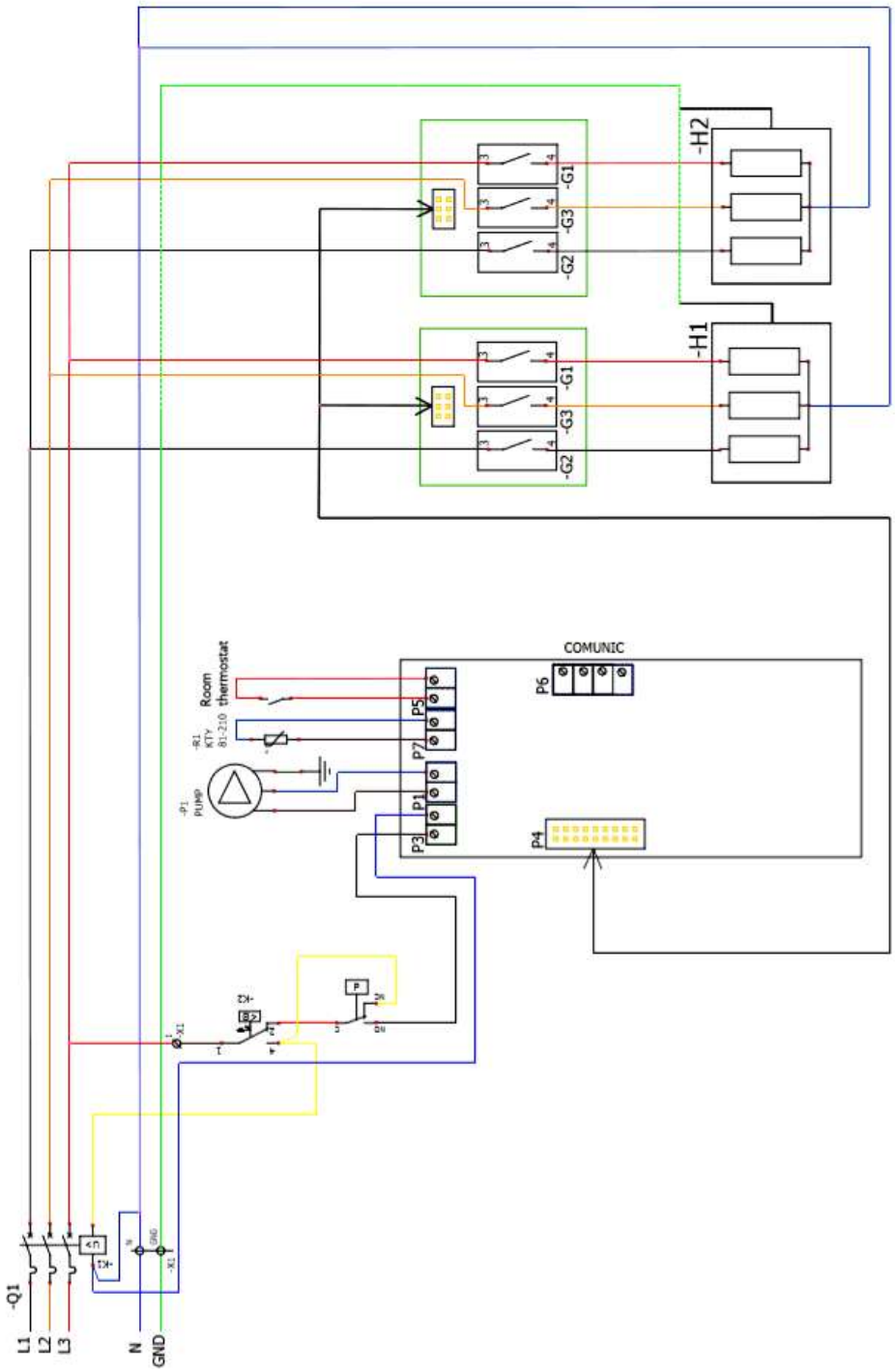
- When connecting the voltage cable in the boiler, through any of the chosen sets of grommets, carefully pull the cable to three-way automatic switches, taking care not to damage sets of cables inside the boiler.
- Additional equipment shown in the hydraulic scheme is connected as per the wishes of the user.
- After connecting the voltage cable and/or additional equipment, before closing the boiler, i.e. before the assembly of the front casing, the set of switches and remote voltage relay should be lifted to ensure power supply in the boiler.



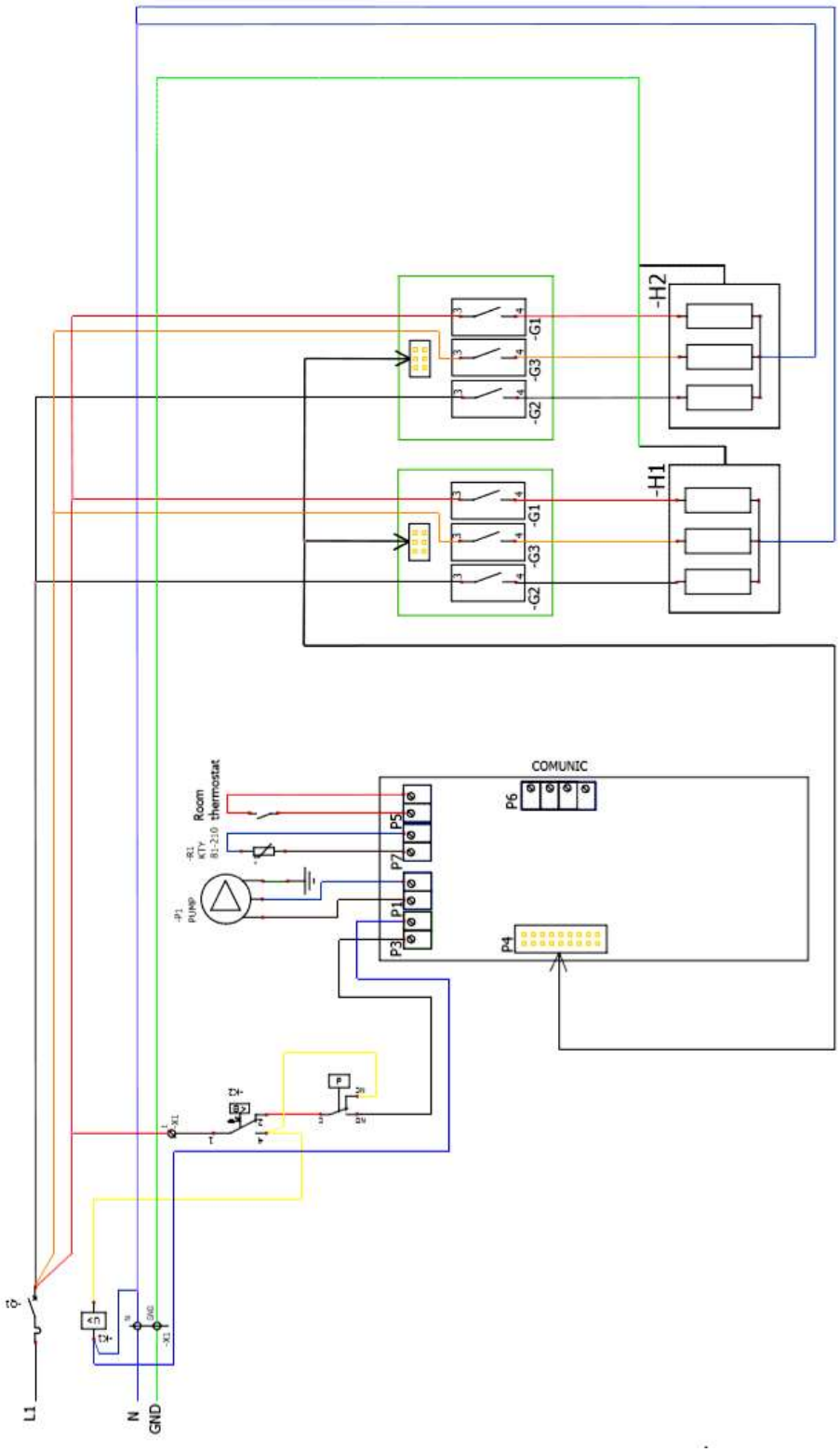
Picture 9. *Electrical wiring diagram EK 06 Smart EU*



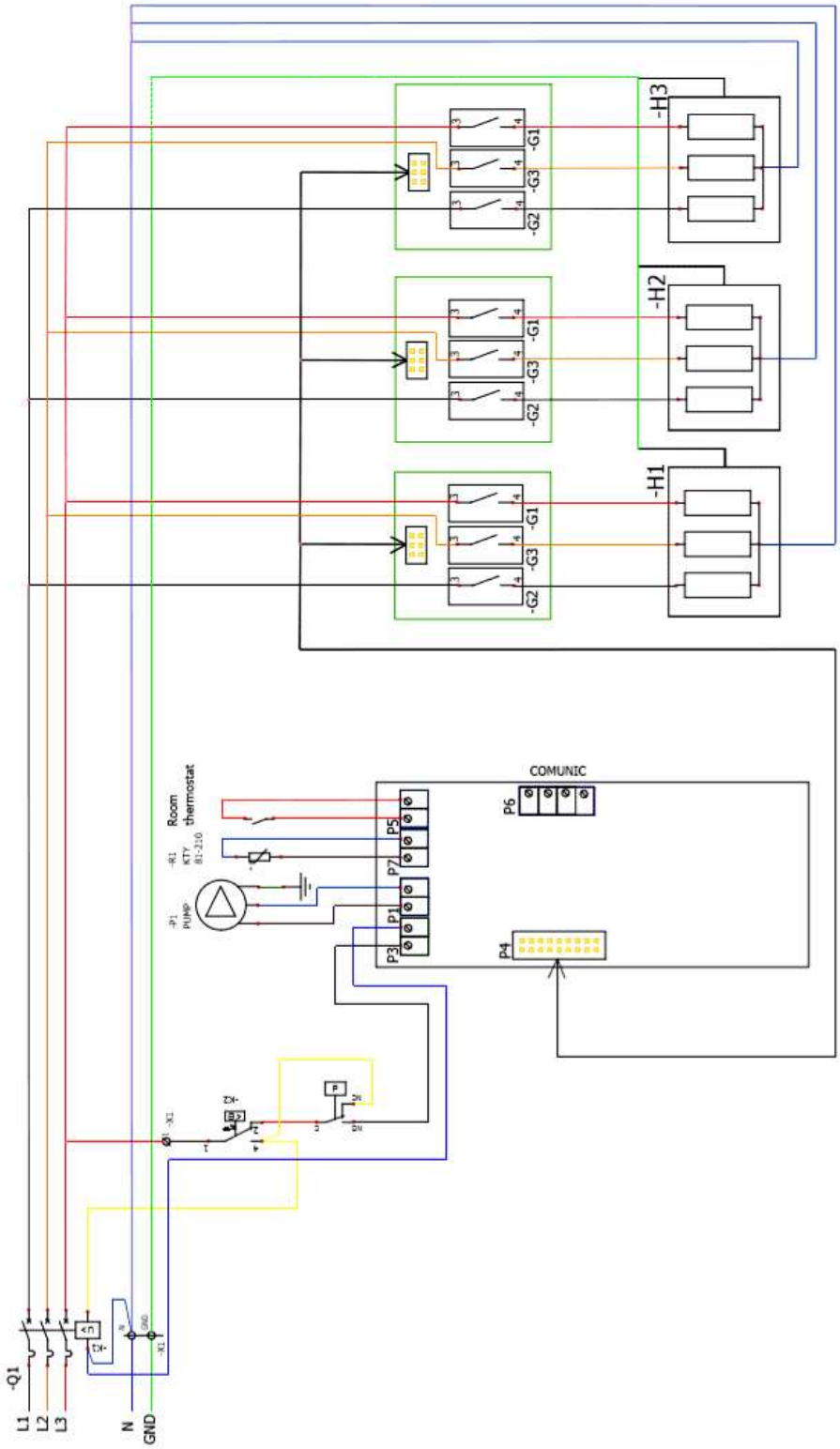
Picture 10. *Electrical wiring diagram EK 06 Smart MONO EU*



Picture 11. *Electrical wiring diagram EK 09 Smart EU, EK 12 Smart EU, EK 16 Smart EU*



Picture 12. *Electrical wiring diagram EK 09 Smart MONO EU*



***Picture 13**. Electrical wiring diagram EK 18 Smart EU, EK 21 Smart EU, EK 24 Smart EU*

LEGEND:

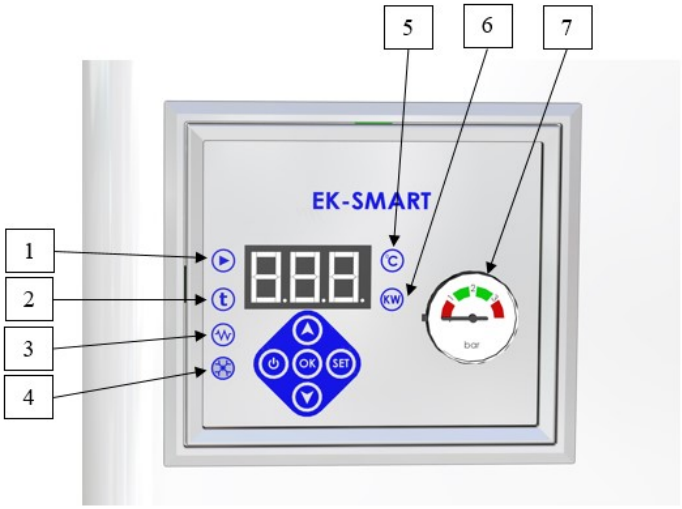
Q1	Circuit breaker	G1, G2, G3	Relays 20A
K1	Voltage release	H1, H2, H3	Heaters
X1	Terminal Blocks	**EK Smart EU** EK 06 Smart EU: H1=3x2kW EK 09 Smart EU: H1=H2=3X1,5kW EK 12 Smart EU: H1=H2=3X2kW EK 16 Smart EU: H1=H2=3X2,667kW EK 18 Smart EU: H1=H2=H3=3X2kW EK 21 Smart EU: H1=H2=H3=3X2.333kW EK 24 Smart EU: H1=H2=H3=3X2.667kW EK 27 Smart EU: H1=H2=H3=3X3kW	
X1-1	Terminal Blocks-blue		
X1-2	Terminal Blocks-ground		
X1-3	Fuse terminal block 2A		
K2	STB - safety thermostat		
P1	Pump		
P5	Room thermostat connection point		
R1	Water temperature sensor KTY 81-210		
P	Pressure switch		

7. Operating the boiler

7.1. Safety instructions

- ⚠ The user may use and adjust only the functions found in the user menu turn on and turn off the boiler. All other adjustments should be performed by a professional (authorized service technician).
- ⚠ Only adults acquainted with the instruction and the manner of work of the boiler may operate the boiler.
- ⚠ Be careful not to let children without supervision stay in the vicinity of the boiler during operation.
- ⚠ Do not leave or store flammable materials.
- ⚠ The user must comply with the instruction for use.
- ⚠ Authorized professional who performed the heating installation is obliged to inform the user about handling, adequate and safe work of the boiler.

7.2. Overview of elements for operating the boiler



Picture 14. *Display look*

1. Position 1 is lighting when pump is active;
2. Position 2 is lighting when room thermostat is active;
3. Position 3 is lighting when system is in heating mode;
4. Position 4 is lighting when system is anti freezing mode;
5. Position 5 is lighting when display shows temperature in boiler
6. Position 6 is lighting when display shows power
7. Position 7 is pressure gauge

In the operating mode, under normal conditions, the values of current water temperature in °C and current boiler power in kW interchange on the display. Depending on which of these values is currently on the display, the adequate LED indicator also beams. The temperature and power interchange approximately every 3 seconds.

7.3. Alarm

Warning bearing the A sign are alarms. Their role is to signalize a potential problem, and that the parameters are approaching border values for safe work of the system.

A1 – Temperature is too low, that is **≤ 12°C**

A2 – Temperature is too high, that is **≥85°C**

7.4. Blockade

Warning with the sign E is blockade. Blockade means that one of the vital parameters has crossed the critical value for safe work of the boiler. Blockade also appears if the controller detects short circuit/interruption or illogical readout of the temperature. In such a situation, the controller automatically turns off all relay outputs. Reset of the blockade is performed by pressing the ON/OFF button. Turn off the controller, remove the cause of the blockade and turn on the controller again.

E1 –Temperature too low that is **≤ 0°C**

E2 –Temperature too high that is **≥ 90°C**

E3 – Boiler temperature sensor failure

In case of alarm or blockade, the following is shown on the display:

- **For 1.5 seconds**, the temperature value is displayed and the temperature indicator beams
- **For 2.5 seconds**, the error code is displayed and both indicators, for temperature and power beam
- **For 1.5 seconds**, the current power value is displayed and the power indicator beams
- **For 2.5 seconds**, the error code is displayed and both indicators, for temperature and power beam

In the user menu, it is possible to set the following parameters:

- Temperature (”t“ symbol on the display), ranging from 2F28+F29 to 80°C (F28 and F29 are parameter in service menu).
- Power (”P“ symbol on the display), ranging from 1 to the number of heating elements
- Mode (symbol on the display ”Fun“, from function) – the value of this parameter set on 1 denotes the heating mode, the value set on 2 denotes antifreeze protection

To set the operating parameters, press the ”SET“ key. By pressing multiple times or holding the ”SET“ key, the symbols ”t, P, FUn“ will interchange on the display.

By releasing the ”SET“ key, the symbols ”t, P, Fun“ will interchange on the display.

By releasing the ”SET“ key, you will stop at the desired function. Current valid value recorded for given parameter will soon be shown on the display. By pressing the keys ”UP“ (upwards arrow) and ”DOWN“ (downwards arrow), you may change the value of the recorded parameter for the chosen function. When you set the desired value of the parameter, you may leave the menu immediately by pressing ”OK“ key or you may change the values of

other parameters. If you do not wish to leave the menu after you have set the value of one parameter, press ”SET“ key again, the set value of the parameter will be recorded and you will move to the next parameter from the menu which you may also change and so on.
If you set the value of some parameter and do not press ”OK“, after ten seconds the device will automatically exit the menu and recorded the set value of the parameter.

7.5. Service menu

Press and hold the ”SET“ key, then shortly press the ”UP“ key. The sign ”PAS“ (from password) will appear on the display, soon the sign ”000“ will appear on the display and then the password should be entered. Electronics does not have the option of changing the password.

When you enter the password, press ”OK“ and the symbols of parameters from the service menu will appear on the display.

7.6. Resetting the boiler

For resetting the boiler, press and hold ”OK“ key for a few seconds.

7.7. Turning the boiler on/off

When there is no need for the boiler to work, press ON/OFF button and hold it for at least half a second. All relay outputs will turn off, as well as the display of the device. When you wish to turn on the boiler again, press the button again. The device will check the temperature condition whether it is higher than Tmin, and if it is, the device will start, and if it is not, a message will appear on the display. Checking whether the T>Tmin when turning on the boiler is not performed in the antifreeze protection mode.

7.8. Automation deblockade of pump

The pump will run every day at the same time, it will be the time of the day when you switch boiler off. If you set the boiler off mode at 6 p.m. the timer will activate the pump every day for 15 minute starting at around 6 p.m.
Important: Do not cut power supply off between heating season.

7.9. Room thermostat

Settings (intended for service technicians):

1. Install the room thermostat at the adequate connection.
2. HIDDEN MENU: Set parameter F04 on 1.
3. Check whether position 2 (symbol **„t”**) blinking on the main display.
4. When signal from room thermostat is active in the symbol **„t”** (position 2) flash red.
5. When the room thermostat is switched off, pump will be working for three minute more.

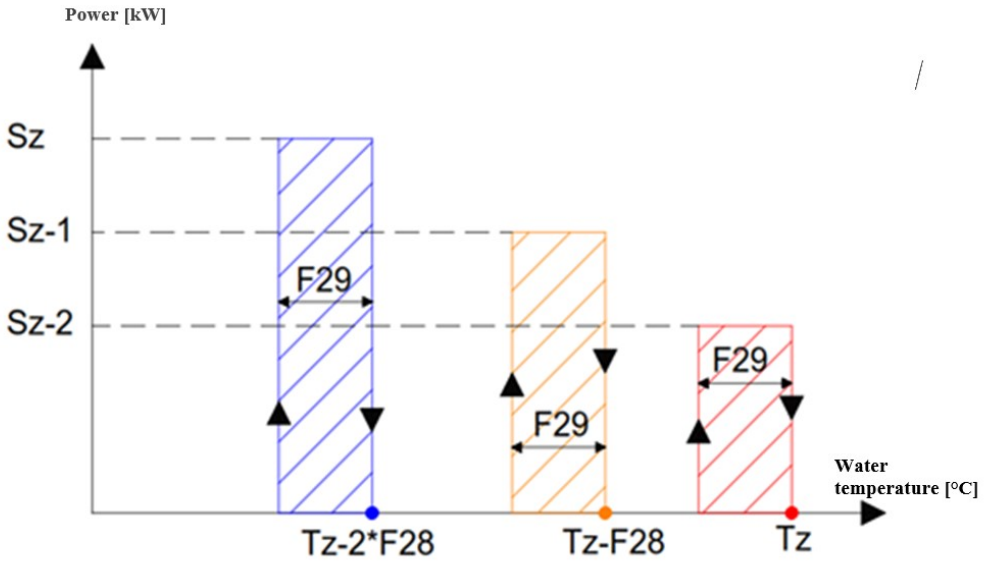
8. Hidden menu

Press and hold MENU key, then shortly press the “UP” key. The sign “PAS” (from password) will appear on the display, soon the sign “000” will appear on the display and then the password should be entered.

Parameters of the hidden menu				
	Factory value	**Scope of setting**	**Unit**	**DESCRIPTION**
F01	3/6/9	3/6/9	**-**	Number of relay outputs supported by automation system
F02	2,0	1,0-3,0	**kW**	Power of one heating element built-in in the boiler
F04	0	0 or 1	**-**	**ROOM THERMOSTAT** 0 –room thermostat is installed 1 –room thermostat is not installed
F05	0	0 or 1	**-**	**ANTIFREEZE PROTECTION LIQUID** 0 –antifreeze protection liquid is poured in 1 –antifreeze protection liquid is not poured in
F06	45	0 to 99	**°C**	Temperature at which the pump turns on
F07	3	0 to 99	**°C**	Minimum temperature of water in the boiler at which the boiler starts up; if the water temperature is lower than that set by parameter F07, it is impossible to turn on the boiler.
F12	12	0 to 99	**°C**	Minimum value of temperature for alarm
F13	0	0 to 99	**°C**	Minimum value of temperature for blockade
F14	85	0 to 99	**°C**	Maximum value of temperature for alarm
F15	90	0 to 99	**°C**	Maximum value of temperature for blockade
F16	5	0 to 99	**°C**	Set temperature of water in boiler for antifreeze protection mode
F19	3	0 to 6	**kW**	Boiler power in the antifreeze protection mode
F28	0,8	0-99	**°C**	Hysteresis for heating elements**
F29	0,4	0-99	**°C**	Hysteresis for heating elements ***
F30	3	1-20	**min**	Time of rotation of heating elements

Hysteresis for heating elements – more about this parameter in the section principle of operating the electric boiler.

- **Sz** – set boiler power;
- **Sz-1** – boiler power reduced by one level of power;
- **Sz-2** – boiler power reduced by two.



Picture 15. *Output power of the boiler in the function of temperature and hysteresis*

9. Boiler commissioning

NOTE: First commissioning must be carried out by an expert – authorised service technician.

- Before commissioning, check the tightness of the hydraulic network. All the valves in the network, including thermostat if any, must be in a position (open) which enables smooth water circulation through the boiler and pipe network. The pressure in the system must be within the limits prescribed by the Instruction.
- Check whether the device is properly connected to the electrical network. Check whether all switches on the device and turned off (0), and the regulation thermostat is at the far-left position.
- Turn on the fuses in the distribution cabinet of the house electrical wiring.
- Turn on the automation system of the boiler by pressing ON/OFF button.
- If the room thermostat is connected to the boiler, it should also be turned on.

10. Cleaning and maintenance of boiler

	**WARNING:** Material damage caused by unprofessional maintenance! Insufficient or unprofessional maintenance of the boiler may result in damage or destruction of the boiler, as well as in the loss of guarantee.
	⚠ Ensure regular, comprehensive and professional maintenance of the heating installation. ⚠ Protect electrical components and working units from water damp.

Use only original spare parts of the manufacturer or those approved by the manufacturer. For damages resulting from the use of spare parts not delivered by the manufacturer, the manufacturer does not hold any liability.

Cleaning the boiler

The boiler should be cleaned on the outside using a wet cloth.

The quantity of newly filled water is reduced in the first days after filling, as a result of heating. It, thus, creates airbags which obstruct the work of the heating installation.

Testing the working pressure

- Working pressure of the new heating installation should be checked daily at the beginning. In case of need, fill up the heating installation with water and purge it.
- Later, working pressure should be checked once a month. In case of need, fill up the heating installation with water and purge it.
- Test the working pressure. If the pressure drops under 1bar, fill up the installation with water.
- Purge the heating installation.
- Check the working pressure again.

Fill up with water and purge the installation

	**WARNING:** Material damage caused by temperature strain. If the heating installation is filled in a warm state with cold water, it may result in cracks.
	⚠ Heating installation should be filled only in cold state (temperature of the flow is maximum 40°C).

	**WARNING:** Material damage caused by frequent filling up of water! Due to frequent filling up of the heating installation with water, depending on the water characteristics the installation may be damaged by corrosion or lime scale.
	⚠ Tightness of the heating installation and functional operation of the expansion vessel should be tested.

- Connect the hose to the filling and drainage tap.
- Fill the hose with water and set the connection of the hose of the filling and drainage tap.
- Tighten the hose with a hose clamp and open the filling and drainage tap.
- Slowly fill the heating installation. At the same time, monitor the pressure value on manometer.
- During the filling, purge the system.
- When the working pressure has been reached, close the filling and drainage tap.
- When the pressure value has been reduced by purging, the water must be filled up.
- Remove the hose from the filling and drainage tap.

11. Operating problems and solutions

1. Boiler is working, but the temperature is unsatisfactory?

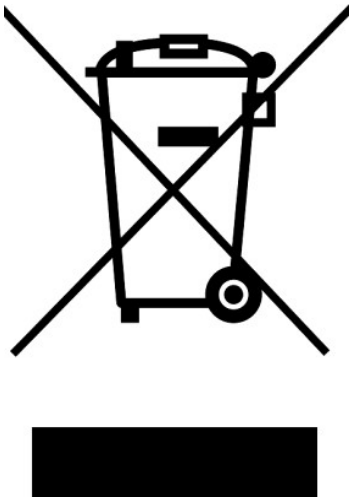
   - Boiler power is insufficient => Increase the power by selecting another group of heating elements.
   - Selected temperature is insufficient => Increase the temperature on controller
   - There is excess air in the system => Purge the whole system.
   - One of the heating elements is faulty => Call the repair service in order to do the replacement.
   - The boiler does not have all three phases => Call a professional to check.

2. Heating is not functioning and the boiler shows a certain temperature?

   - A valve or coil in the system is closed and the flow disabled => Check the valves and open them if necessary.
   - Ball valve on voltage/return line is closed => you must open the valves.
   - Pump is not working or is blocked for some reason=> Call a professional for repair.

12. Product disposal after use

Crossed-out “wheelie-bin” symbol on the label of this product means that the product should not be disposed of with other household waste. In order to prevent potential negative consequences for the environment and human health, please separate this product from other waste, so that it could be recycled in a way that is environmentally-friendly.



In accordance with the WEEE Directive 2012/19/EU (Waste Electrical and Electronic Equipment),Law on Environmental Protection (*Official Gazette of the Republic of Serbia, No.*135/2004, 36/2009,36/2009– as amended,72/2009– as amended,43/2011- decision of the Constitutional Court and 14/2016), Law on Waste Management (*Official Gazette of the Republic of Serbia, No*.36/2009,88/2010and14/2016) and Rulebook on the list of electrical and electronic products, measures restricting or prohibiting the use of electric and electronic equipment containing hazardous substances, the manner and procedure for management of waste originating from electrical and electronic products (*Official Gazette of the RS*, No. 99/2010).

13. Designing manual

Systems to which the boiler may be connected

- All the systems for space heating that are designed for temperatures lower than 80°C.
- Closed heating systems.
- Systems in which there is a solid fuel boiler.

	**ATTENTION! When connecting a boiler to such a system, it is compulsory to pat attention that both pumps in the system push water in the same direction in order to prevent collision of flows.**

Potential great hydraulic system strains, as well as cracking of some components.

- It may be used as a device for heating sanitary water in the accumulation boiler through the heat exchanger.
- It may also be used in certain technological processes on condition that there is no need for water temperature above 60°C.
- It must not be used for direct heating of sanitary water.

14. Warranty

1. **Co. "Radiator Engineering" covers different warranty periods for different parts (as specified further on) only if the following conditions of the warranty are fulfilled:**

   - The boiler must be connected to the aforementioned hydraulic diagram from the Technical instructions;
   - Wiring connection must be performed in accordance with the Technical Instructions;
   - The user must comply with the stated instructions on use and maintenance of the boiler.

2. **Warranty statement**

   We hereby declare:
   - That the product has the prescribed and declared quality properties.
   - We undertake, at the request of the buyer, if the request for repair is submitted in due time within the warranty period, to perform, at our expense, all repairs of failures so that the product works in accordance with the declared properties.
   - That the product will work impeccably during the warranty period, if the instructions for use, operation and assembly are observed.
   - That in the warranty period, we will be ready to remove all product failures and keep in stock all the necessary spare parts.
   - The warranty period starts from the DAY OF PURCHASE AND LASTS for 60 MONTHS OR 72 MONTHS FROM THE DATE OF PRODUCTION (the date of production is on the sticker on the back of the boiler).
   - The 60 MONTHS WARRANTY IS VALID ONLY IF THE BOILER IS REGULARLY SERVICED BY THE CENTRAL SERVICE OF CO. "Radiator Engineering", within the period specified for the product (in the text below).
   - The warranty is valid if the warranty card has been verified by the Seller, if the date of purchase has been entered and the attached bill presented. IT IS ALSO IMPORTANT TO HAVE THE ORDER FOR COMMISSIONING (certified by the Authorised Service).

3. **Warranty period of 12 months applies to the following parts:**

   - Heating elements of electro-boiler, under normal conditions of exploitation.

4. **Warranty period of 18 months applies to the following parts:**

   - Automatic switch; name: Acti9iC60
   - Voltage relay; name: IMX + off
   - Contactors; name: Acti9iCT

5. **Warranty period of 24 months applies to the following parts:**

   - Expansion vessel
   - Pump

6. **Warranty period does not apply:**

- If a regular service is not performed after each heating season;
- For replacement of parts within regular annual maintenance in accordance with the instructions;
- In case of defects caused by the customer due to improper handling of the product;
- For mechanical defects made during transport and during use (solid objects);
- If the product has been installed improperly, contrary to the applicable regulations in this area;
- If it has been established that the hydraulic scheme has not been made according to the recommendations of the company "Radiator Engineering";
- If the customer was using the product over the declared properties and under normal circumstances.

7. **The warranty period shall cease to be valid:**

- If it has been established that the failures have been repaired by an unauthorized person or an unauthorized service.
- If the original parts were not used in the repair;
- W hen the warranty period expires.

8. **When reporting failure, it is obligatory to provide the following information:**

- Name and type of product,
- Date of purchase,
- Factory number of the boiler,
- A brief description of the failure, or shortcomings,
- The correct address and contact telephone, email.

9. **Regular annual service**

Regular service is performed at the end of every heating season in the period from 15th April to 31st August and is charged according to the set Price list of the company "Radiator Engineering".