

MIKOTERM electronic



Guidebook for installation, handling and maintenance – ENG

eCompact

Electric block-boiler for heating systems with thermoregulatory microprocessor - IN WALL

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1. Instructions for safe work

1.1 Description of symbols

Warnings



Warnings in text are marked by gray triangle, background warnings are framed



Electric shock danger is marked by lightning symbol in warning triangle

The signal words at the beginning of the warning mean the way and level of consequences if protective measures are not applied

- **NOTE** means that smaller material damages may occur
- **CAUTION** means that smaller to middle injuries may occur
- **WARNING** means that heavy injuries may occur
- **DANGER** means that heavy injuries may occur

Important information



Important information, meaning no danger for people and things, are marked by the symbol displayed in the following text. These are limited by lines, above and below the text.

1.2 Instructions for safe work

General safety instructions

Non-compliance with safety instructions may cause heavy injuries – or lethal outcomes and material damages and environment pollution.

- Electrical installation should be examined by an expert prior to the device assembly.
- All electric works should be performed by authorised person in accordance with corresponding regulations
- Commissioning and maintenance and repairs should be done by authorised service only
- Technical acceptance of installations should be performed in accordance with corresponding regulations

Danger because of disrespecting security rules in alert situations, for example fire.

- Never expose your-self to life danger. Own security always has priority

Damage occurred because of wrong handling

Wrong handling may lead to injuries of persons and/or installation damage.

- Make sure that device is available only to professionals
- Installation and commissioning, and maintenance and repair, must be done only by service authorised for electrical works
- The manufacturer assumes no liability for damage resulting from improper installation of the unit by the installer.

Installation and commissioning

- Placement of device can be done only by authorised service
- Boiler can be turned on only if installation is with corresponding pressure level and working pressure regular. Do not close the safety valves in any way to avoid damage caused by excessive pressure. During the warm-up period, the water on the safety valve of the hot water circuit and the hot water pipe may leak. Periodically check the pressure in the heating system. Ensure that the pressure is always within the values given in the manual, regardless of whether the device has elements that protect it from low or high pressure operation.
- Install this device only in the room where freezing is not possible to occur
- Do not store or dispose inflammable materials or liquids in the vicinity of this device
- Keep safe distance in accordance with valid regulations
- Never cover the appliance with a fire hazard
- Never close the device on your own. Always consult an expert for any changes to the device environment
- It is recommended to install an additional control device - room thermostat. It will allow you to maintain a stable room temperature value and therefore full comfort in your living space. Using a room thermostat saves electricity. Energy. Note that increasing the room temperature for each grade C increases energy consumption by approximately 7%. Never cover the room thermostat. The air circulation around it must be enabled for its operation to be correct. Follow the installation instructions that came with the room thermostat

Life threat of electric power shock

- Secure electric power connecting is done by authorised service! Comply with connecting scheme
- Prior to any work: turn off electric power supply. Secure against accidental turn on
- Do not mount this device in moist rooms

Control examination / Maintenance

- Recommendation for user: conclude agreement on maintenance with authorised service to perform annual maintenance and controlling examinations
- User is responsible for safety and environmental acceptance of the installation
- Comply with safety work instruction as given in the chapter *Cleaning and Maintenance*

Authentic spare parts

There shall not be undertaken any responsibility for damage occurred due to spare parts not delivered by the manufacturer

- Use only original spare parts

Material damages due to freezing

- When there is damage due to freezing drain water from the boiler, tank and pipelines for heating. Danger of freezing does not exist only when entire installation is dry. If there is a possibility of freezing, for example due to occasional use of the heating system (cottages, etc.), add antifreeze to the system. Use only the means permitted for heating installations.

Instructions for service

- Inform users about mode of work of device and instruct them in maintenance
- Inform users not to perform any modifications or repair on their own
- Warn users that children cannot stay near heating installations
- Fill in and submit Commissioning log and Handover log attached in this document
- Deliver technical documentation to the user

Waste disposal

- Dispose packaging materials in ecologically Acceptable manner
- Secure device in ecologically acceptable manner and in authorised place

Cleaning

- Only clean the sheat of the device when the power supply is switched off. Do not use abrasives or sharp objects to clean. Do not use solvents or thinners for cleaning. Only clean the formwork with a soft damp cloth and soap

2. Device data

These instructions contain important information about safe and professional assembly, commissioning and maintenance of the boiler.

These instructions are for installers who have knowledge for work with heating installations due to their professionalism and experience.

2.1 Typology

These instructions are related to the following kind of device:

eCompact Uz	6, 9, 12, 16 kW
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2.1.1 Statement on compliances

We hereby state that devices are tested in accordance with the following directives: 2014/35/EU (low voltage directive, LVD) and 2014/30/EU (electro-magnetic compatibility directive, EMC). The device is manufactured by an organization that implements the international quality management system ISO 9001: 2015, as well as the ISO 14001 and ISO 45001 systems, certified by a reputable certification body: TUV NORD. However, in the event of improper or improper use, there may be a risk to the life and health of the user or third parties, or interference with the operation of the device, damage to it or damage to other material values.

2.1.2 Regular application

The boiler **eCompact** can be used only for heating the water for heating system and for indirect use of hot water. **Any other use is considered unintended and the manufacturer assumes no responsibility for any damage that may result from the unintended use or non-compliance with this manual.** To ensure correct use it is mandatory to comply with instructions for handling, data on the factory plate and technical data.

2.2 Instructions for mounting



Use only original spare parts of the manufacturer or spare parts approved by the manufacturer. There shall not be any responsibility for damages caused by spare parts which have not been delivered by the manufacturer

When mounting heating installations keep with the following instructions:

- Valid regulations in construction industry
- Regulations and norms on safety-technical equipment of heating installations
- Changes on the place of mounting according to valid regulations propisima

2.3 Instructions for work

When working with heating installation follow next instructions:

- ▶ Boiler should work in working range up to max temperature of 80 °C and min pressure of 0.9 bar to max pressure of 2.6bar, which should be controlled on regular basis.
- ▶ Boiler should be handled only by adults who are familiar with instructions and work of the boiler.
- ▶ Do not close safety valve.
- ▶ Inflammatory objects must not be put on the boiler surface or close to it (within safety distance).
- ▶ Boiler surface clean only with non-inflammatory products.
- ▶ Inflammatory substances do not keep in the room for boiler installation (e.g. petroleum, oil, etc.).
- ▶ During the work no one lid must be open.
- ▶ Keep safe distance in accordance with regulations.

2.4 Inhibitors and anti-frost products

It is not allowed to use protective products against frost neither inhibitors. If it is not possible to avoid anti-frost protection then should use anti-frost products allowed for heating installations.



Anti-frost products:

- ▶ Reduce lifetime of the boiler and its parts
- ▶ Reduce heat transmission

2.5 Norms, regulations and standards

This product is in compliance with the following regulations:

- EN 50110-1:2013 – Operation of electrical installations - Part 1: General requirements
- EN 55014-1:2017; EN 55014-2:2015 – Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission - Part 2: Immunity - Product family standard
- EN 60335-1:2016 Household and similar electrical appliances - Safety - Part 1: General requirements
- EN 61000-3-2:2019 Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions
- EN 61000-3-3:2014/A1:2020 Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems.



Children aged 8 years and older, persons with reduced physical, motor or mental abilities, persons with a lack of experience or insufficient training, can use such devices if they are supervised or given instructions related to the safe use of the device, as well as presented the dangers arising from it. Devices should not be cleaned or subjected to user maintenance by children without proper supervision.

2.6 Tools, materials and auxiliary measures

Standard tools for heating installations, water supply and electric-installations are needed for mounting and maintenance of the boiler.

2.7 Minimum distances and burnable construction materials

Depending on valid regulations, other minimum distances could be applied, different than mentioned below.

- ▶ Pridržavajte se propisa o elektroinstalacijama i minimalnim razmacima koji su na snazi u određenim državama
- ▶ Minimalni razmak za teško zapaljive i samogaseće materijale iznosi 200 mm

Inflammability of components		
A	Non-inflammable	
A1:	Non-inflammable	Asbestos, stone, wall tiles, baked clay, plaster (with no organic additives)
A2:	With smaller quantity of added elements (organic components)	Plaster cardboards plates, base felt, glass fibres, plates of ACUMIN, ISOMIN, RAIOT, LOGNOS, VELOX, AND HERACLITUS
B	Inflammable	
B1:	Hardly inflammable	Beech, oak, veneered wood, felt, HOBREX, VERSALIT and UMAKART plates
B2:	Normally inflammable	Pine, larch and spruce, veneered wood

B3: Inflammable

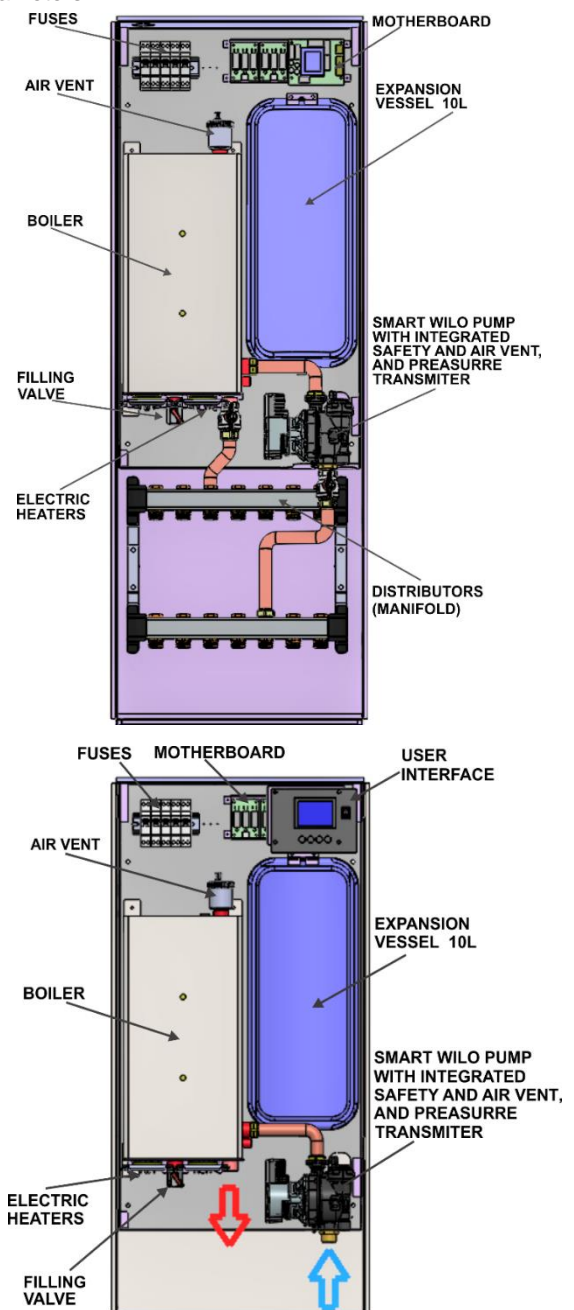
Asphalt, cardboard, cellulose materials, tar-paper, plywood plates, cork plates, polyurethane, polystyrene, polyethylene, floor fibre materials

Table: Ignitable materials and composition of elements according to DIN 4102

2.8 Product description

The **eCompact Uz** type electric boiler is a modern microprocessor controlled block boiler designed for centralized heating systems. The device is made using many years of experience in the production of electric boilers, using quality components from renowned domestic and international manufacturers, in compliance with the applicable European quality standards.

In addition to the elements of classical el. the boiler in its assembly contains: expansion dish, pump WILO PARA, safety valve, drain faucet, pressure and temperature sensor, automatic air vent, display with an overview of all system parameters.



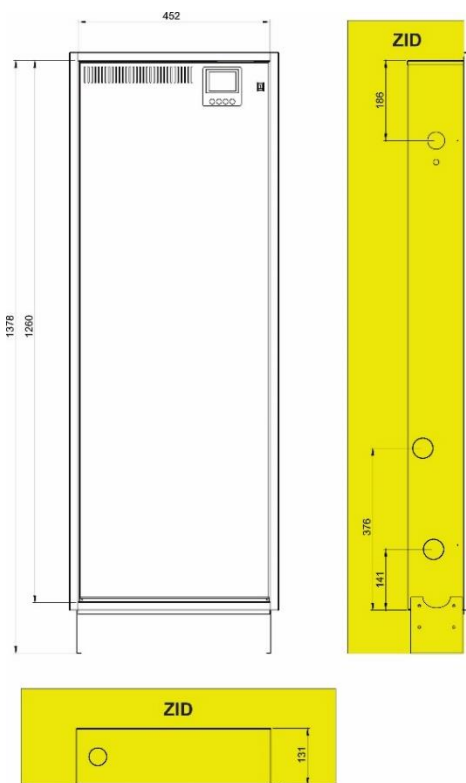
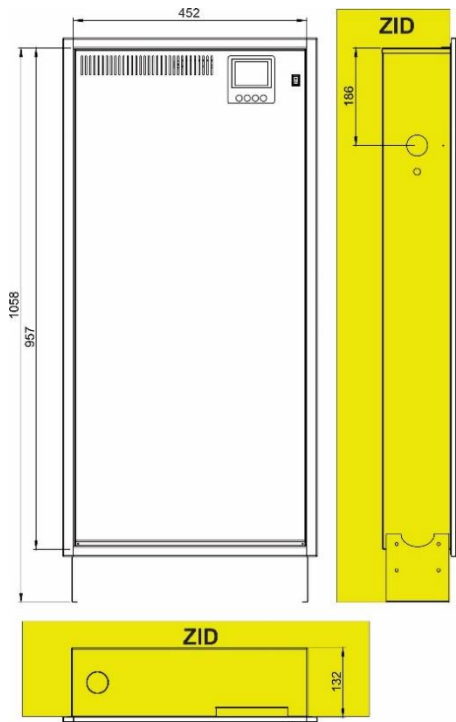
2.9 Waste disposal

- Dispose packaging materials in ecologically sound manner
- Components that should be changed dispose in ecologically sound manner

2.10 Factory plate

Factory data plate is placed on the external side of the boiler and contains the following technical data: boiler type, batch / catalogue number, power, input power, maximum temperature, working pressure, water volume, mass, electric power supply, protection grade, manufacturer.

2.11 Dimensions



2.12 Delivery scope

When delivery the boiler stick to the following:

- Check if packaging is damaged during delivery
- Check if delivery is complete

Part	Pieces
Boiler eCompact Uz	1
Instructions for handling	1

2.13 Technical data

	Unit	eCompact 6 kW	eCompact 9 kW	eCompact 12 kW	eCompact 16 kW
Power	kW	6	9	12	16
Usability level	%	99	99	99	99
Division of power grades	kW	3×2	6×1,5	6×2	6×2,7
Network voltage	V AC	3N-400V/230V 50Hz			
Protection level		IP20			
Rated current for three phase connection	A	3x8,7	3x13,1	3x17,4	3x23,2
Rated current for single phase connection	A	26,1	39,3		
Main fuses required for three-phase power supply	A	3x16	3x25	3x25	3x32
Main fuses required for mono-phase power supply	A	1x32	1x50		
Minimum cable cross-section for three phase power supply	mm ²	5×2,5	5×2,5	5×4	5×4
Minimum cable cross-section for single phase power supply	mm ²	3x4	3x6		
Safety valve	bar	3			
Max allowed working pressure	bar	2,6			
Min allowed working pressure	bar	0,3			
Temperature range	°C	10 ÷ 80			
Safety thermostat	°C	95			
Boiler vessel volume	ℓ	9			
Expansion vessel volume	ℓ	10			
Connection of start line		DN20 (3/4")			
Connection of return line		DN20 (3/4")			
Device weight without and with manifold (without water)	Kg	28/30	28/30	28/30	28/30
Dimensions without and with manifold	mm	957x452x132 / 1260x452x132 (Visina x Širina x Dubina)			
Microprocessor Unit		EK_CPU_1_3			

3. Transportation



NOTE: Transport damages

- ▶ Pay attention on instructions for transportation on packaging
- ▶ Use adequate transportation means, i.e. carts for bags with tighten strip. The product should be **in horizontal position** during transportation
- ▶ Avoid shocks or collisions

- Packed boiler put on carts for bags if needed secure it with strip and drive it to its mounting place
- Remove packaging
- Remove packaging materials and dispose it in ecologically acceptable manner

4. Installation of device



CAUTION: Human or material damages occurred because of irregular installation!

- ▶ Never install boiler without expansion dish (AG) and safety valve
- ▶ Boiler must not be installed in protective zone of important area or at the place of bath



NOTE: Material damage due to freezing!

- ▶ Boiler must be installed only in room safe of freezing

4.1 Be careful prior to assembly



NOTE: Material damage occurred due to incompliance with further instructions!

- ▶ Respect instructions for boiler and all installed components

Prior to installing take care of the following:

- All electrical connectors, protective measures and fuses should be done by professional person respecting all valid norms, regulations and local laws
- Electric connector should be done according to the connecting plans
- After corresponding installation of device execute grounding of the plant
- Before opening device and all works turn off electric supply
- Non-professional and non-authorized attempts to connect device under voltage can produce material damage of device and hazardous electrical shocks

4.2 Distances

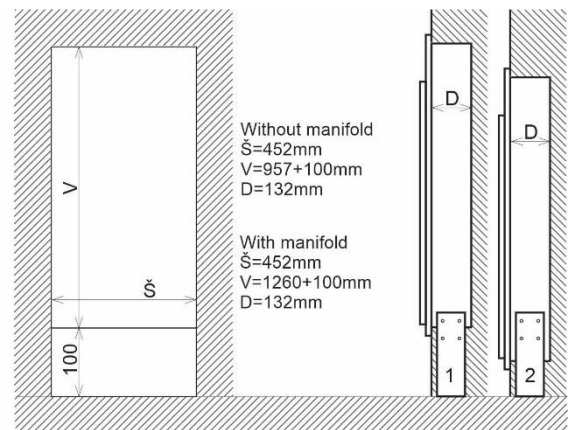


DANGER: Fire threat due to burnable materials and liquids!

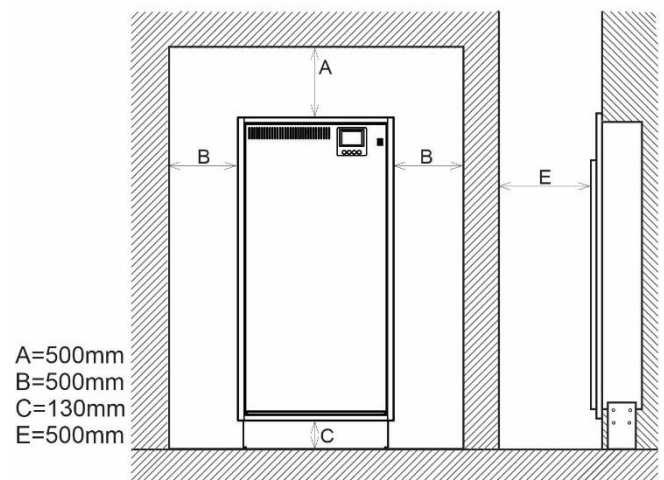
- ▶ Do not dispose burnable materials and liquids close to the boiler
- ▶ Upoznajte korisnika s važećim propisima za minimalne razmake od lako zapaljivih materijala (poglavlje 2.7)

- Comply with regulations on electric installations and minimum distances in force in subject countries

The total height of the boiler and thus the dimension of the installation opening depends on the choice of one of the 2 possible positions of the side supports of the boiler. The minimum height without divider is 957mm, and the maximum is 1057mm, while the minimum height with divider is 1260mm, and the maximum is 1360mm. According to the required space under the boiler for storing supply and return lines, one of the 2 possible positions of the support should be selected and thus define the dimension of the installation opening.

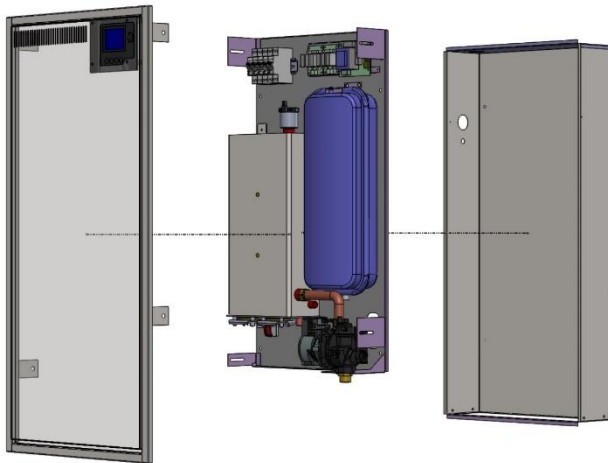


Minimum dimensions of free mounting space



4.3 Boiler installation

The **eCompact Uz** electric boiler is designed for wall mounting. The wall must be made of solid material, with a minimum thickness of 150 mm, and must not be mounted on plasterboard walls. Before installation, it is necessary to remove the front cover and the decorative frame from the boiler, as well as remove the mounting-bearing plate from the outer wall box, so that the installation can be performed correctly. First, the outer wall box is inserted into the installation hole, leveled and fixed, for which pur-foam can be used. The mounting plate is then inserted into the wall box and fastened with four screws. After the connection to the hydraulic and electrical installation is completed, the decorative frame and the front cover are returned to the boiler and their fitting to the wall is adjusted. When removing the front cover, it must be placed against the wall, in the immediate vicinity of the boiler, because there is a display with the corresponding cables on it. If the cables are disconnected due to pulling, it is necessary to return them to the appropriate places. Failure to do so may result in damage to the electronics.



4.4 Connecting to a hydraulic network

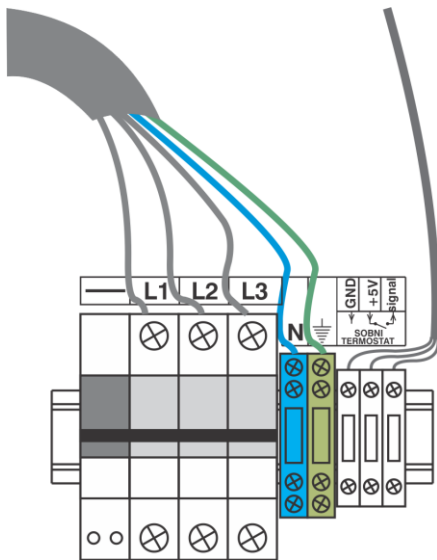
The connection of this unit to the hydraulic system must be carried out by a qualified person - a qualified installer.

The appliances are equipped with a 10l / 1bar expansion vessel. Check that this volume is sufficient before mounting the unit. If this is not the case, then another expansion vessel of the required volume must be added to the hydraulic network. It is advisable to install valves on the inlet and outlet ports (DN 20) so that the boiler can be separated from the hydraulic network for easy maintenance or eventual service. The devices are equipped with a safety valve (3bar) integrated on the circulation pump. It is advisable to install a drainage pipe at the outlet of the safety valve and, with the fall from the boiler, to the drainage sy

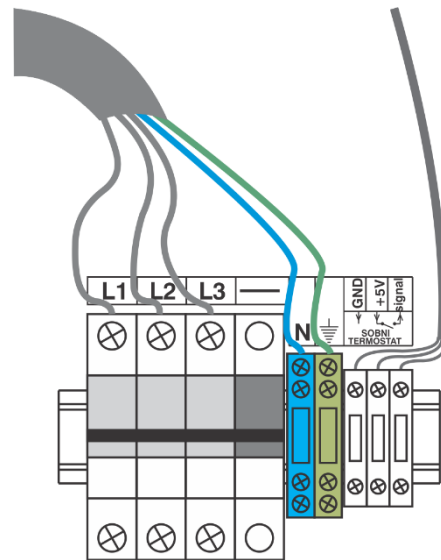
4.5 Connecting to the electric network

The connection of this device to the electrical network must be carried out by a qualified electrician. The devices are designed for a 3 x 230 / 400V connection. The rated voltage of each phase must be 230V. Network voltages greater than 253V or less than 190V may interfere with the device. An electrical switch or appliance must be installed on the electrical installation, in accordance with the rules of fixed wiring, to ensure that the appliance is completely interrupted under Category III surge conditions.

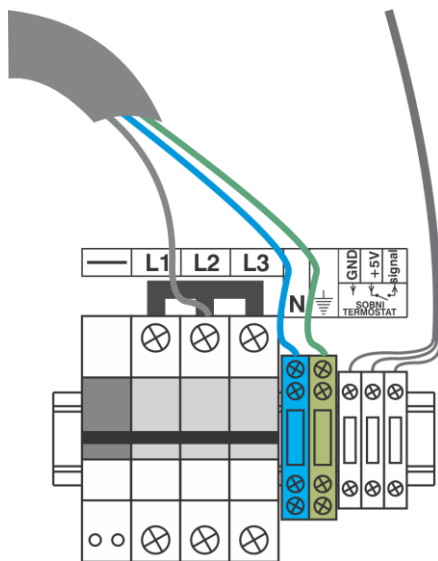
The power cable and the room thermostat cable can be inserted from the left or right side above the boiler vessel. The phase conductors are connected to the fuses and the neutral and protective conductors to the corresponding regular terminals next to the fuses. The remote voltage fuse is factory connected and nothing is connected to it. A three-pole automatic fuse with an upgraded remote voltage trigger, makes a safety circuit that, in addition to current protection, responds to thermal overload (signal from the safety thermostat that activates the voltage trigger) and switches off the boiler (all three phases) if the boiler overheats.



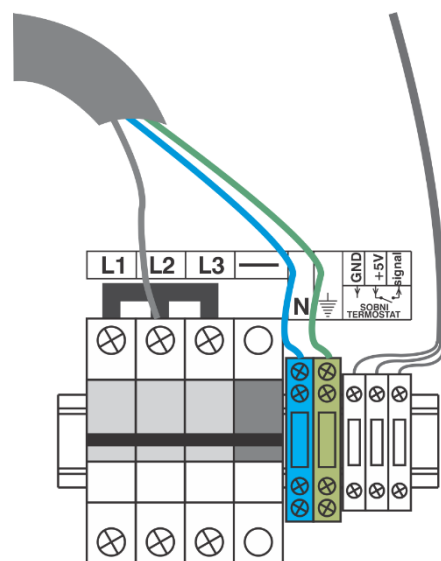
Scheme of boiler connecting on three-phase power supply
NOARK fuses



Scheme of boiler connecting on three-phase power supply
ETI fuses



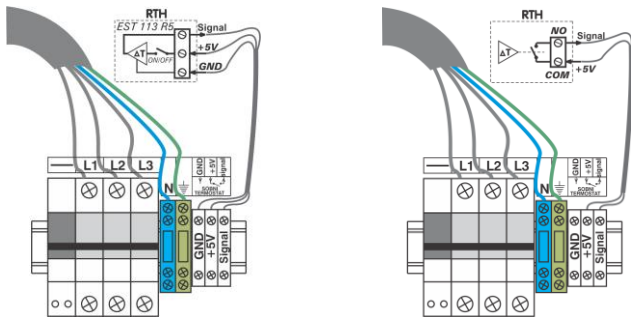
Scheme of boiler connecting to single-phase power supply –
ONLY FOR POWER OF 6kW AND 9kW
NOARK fuses



Scheme of boiler connecting to single-phase power supply –
ONLY FOR POWER OF 6kW AND 9kW
ETI fuses

4.5.1 Connect the external control of the boiler (room thermostat)

The room thermostat connects to the regular clamps. It interrupts the 5V DC signal voltage coming from the boiler control panel. The EST 113 R5 is a precision electronic **Mikotherm** thermostat designed for these boilers, or use room thermostats with a voltage-free contact system, for example, digital thermostats with battery power. **THERMOSTATS THAT SUPPLY WITH 230V AC AND THOSE THAT VOLTAGE ON THE CONTACT SYSTEM OF THERMOSTATS SHOULD NOT BE USED.**



electrical network is protected from phase asymmetry, and all elements of the boiler work evenly, thus achieving a longer service life of the device. The operating temperature is set in steps of 1 °C, and it is possible to set a value in the range of 10 ÷ 80 (50) °C. The heater is turned on and off successively, with an interval of 3 seconds, with power divided by 3 groups shifted in temperature by 3 °C each. The circulation pump turns on at the command of the room thermostat, and turns off also at the command of the room thermostat with extended operation of 2 minutes due to the removal of heat energy dissipated from the heater after switching off.

- **Frost protection mode:** In this mode the circulation pump is constantly switched on, the boiler power is fixed - 1/3 nominal and cannot be changed, and the operating temperature is also fixed 10 degrees C and cannot be changed. Room thermostat has no effect on operation. Activation of this mode is described in section 6.5.

If the current temperature exceeds 80 °C in the "Radiator" mode, i.e. 50 °C in the "Floor" heating mode, the boiler works normally and warnings appear on the display that the normal operating range has been exceeded. If the temperature exceeds 85 °C in the "Radiator" mode, i.e. 55 °C in the "Floor" heating mode, all heaters are turned off, the pump works continuously regardless of the room thermostat until the temperature returns to normal values. If the temperature continues to rise, at 95 °C in the "Radiator" mode, i.e. 60 °C in the "Floor" heating mode, the safety thermostat reacts and gives an impulse to the remote voltage trigger, the safety circuit is activated and the three-pole automatic fuses break full power supply of the boiler el. energy. In order for the boiler to continue working, the fuses must be activated (raised) manually, which must be done by a service technician after eliminating the malfunction that caused the overheating.

If the current temperature drops to 5 °C, the boiler continues to work normally, but warning signs appear on the display, and if the temperature in the system drops to 3 °C, the heater and pump are not allowed to work, i.e. the boiler is disabled when the system temperature is below 3 °C, due to the risk that some part of the system is frozen.

4.6 Device Functions

The **eCompact** type electric boiler contains all the elements of a small boiler room, as well as many advanced features. Temperature and hydraulic pressure sensors monitor changes in the system and send information to the microcontroller that processes and controls the operation of the boiler.

User communication with the device is facilitated and enhanced by displaying all system parameters on the graphical display and simple command with four keys.

For normal operation of the device, the pressure in the cold system must be 1.2 bar (+/- 0.4 bar). If the pressure is less than 0.7 bar, a warning will appear on the display, and if it falls below 0.3 bar, the boiler will be turned off with information on the display about the error. If the pressure is higher than 2.4 bar, a warning will appear on the display, and if it rises above 2.6 bar, the boiler will be turned off with an error message on the display. If for some reason the pressure in the system exceeds 3bar, the safety valve reacts.

When the hydraulic installation is at the appropriate pressure, the boiler can operate normally in 2 basic modes. The first is the heating mode, and the second is the installation protection mode from freezing.

- **Heating mode:** Depending on the type of heating system, the "Radiator" mode can be selected, where the max. possible Boiler temperature limited to 80 °C, or "Floor" heating mode where max. Boiler temperature limited to 50 °C (chapter 6.5). In both of these modes, the operation of the boiler can be time-limited by the internal timer (chapter 6.5) to a certain period during the day.

The default boiler power can be changed in the steps shown in the boiler power selection table. The microcontroller takes care of the symmetrical load of the phases regardless of the set power, as well as the uniform load of the output relays and heaters. If necessary, turn off relays and heaters that have been on for a long time, and turn on relays and heaters that have been inactive for a long time instead. In this way, the

4.6.1 Heating pump air emission and de-blocking

▶ The pump **Wilo-Para MSL/6-43/SC / Mikoterm GPA15-7.5 III Pro Z178** in this device has an automatic air discharger and no action is required for air discharging from the pump. If not fully vented, access manual venting according to the instructions in **Chapter 11**

When the **WILO MSL 12/5 oem 3P** pump (installed in the eCompact Uz boiler) is blocked, proceed as follows:

- ▶ Unscrew the large center screw on the front of the pump.
- ▶ Try to carefully release the shaft with a screwdriver inserted into the hole that covered the central screw.
- ▶ Turn the screwdriver a few turns until the pump rotor starts to rotate slightly.
- ▶ Replace the center screwdriver.



NOTE: Releasing the central screwdriver may cause a small amount of hot water to leak from the pump propeller rotor. Perform these operations on a cold heating system.

Chapter 11.

4.6.2 Boiler and installation air emission

On the top plate of the boiler there is an air vent. This pot is automatic, so if you follow the rule of slow charging installation and boiler, additional manual venting will not be necessary.

4.7 Boiler power selection table

Model	Nominal power	The step of adjusting the set power	Selectable power
eCompact 6	6 kW	2 kW	0 kW; 2 kW; 4 kW; 6 kW
eCompact 9	9 kW	1,5 kW	0 kW; 1,5 kW; 3 kW; 4,5 kW; 6 kW; 7,5 kW; 9 kW
eCompact 12	12 kW	2 kW	0 kW; 2 kW; 4 kW; 6 kW; 8 kW; 10 kW; 12 kW
eCompact 16	16 kW	2,7 kW	0 kW; 2,7 kW; 5,4 kW; 8,1 kW; 10,8 kW; 13,5 kW; 16,2 kW

5. Commissioning

When complete below described works fill in the Commissioning log (chapter 5.3).

5.1 Before commissioning



NOTE: Material damage occurred due to unprofessional operating!
Start-up without sufficient quantity of water destroys device

- ▶ Turn on the boiler and use it only if there is sufficient quantity of water



Boiler must work with minimum pressure of 0.7 bars

Before turn on, test if the following elements and joints are connector correctly and work correctly:

- Watertight of heating installation
- All pipes connected into ducts
- All electric connectors

5.2 First turn on



NOTE: Material damage due to incorrect handling!

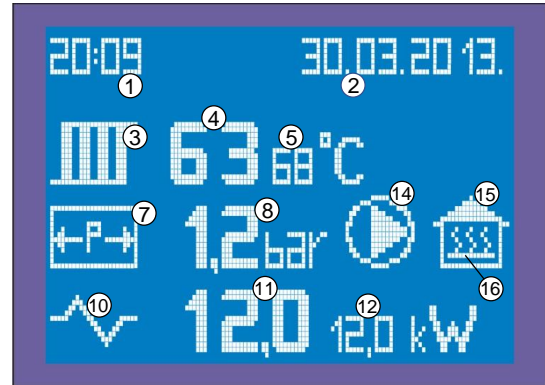
- ▶ Instruct client/user how to handle device

- Prior to turn on check if heating installation is filled with water and air-vent
- Turn on the main switch (located on the control panel). Microcontroller need 10 seconds to process the information from the sensors and displays the values on the display

5.3 Commissioning log

1.	Boiler type	
2.	Serial number	
3.	Set thermostat regulation	<input type="checkbox"/>
4.	Fill and discharge the air from the heating installation and check the impermeability of all connectors	<input type="checkbox"/>
5.	Establishing operating pressure Check the pressure of the expansion container	_____ bar _____ bar
6.	Test safety devices	<input type="checkbox"/>
7.	Set the electric connection according to local regulations	<input type="checkbox"/>
8.	Check of the functions of the device	<input type="checkbox"/>
9.	Users informed, technical documentation submitted	<input type="checkbox"/>
10.	Notes	
11.	Confirmation of professional putting into operation	Seal of service technician / signature / date

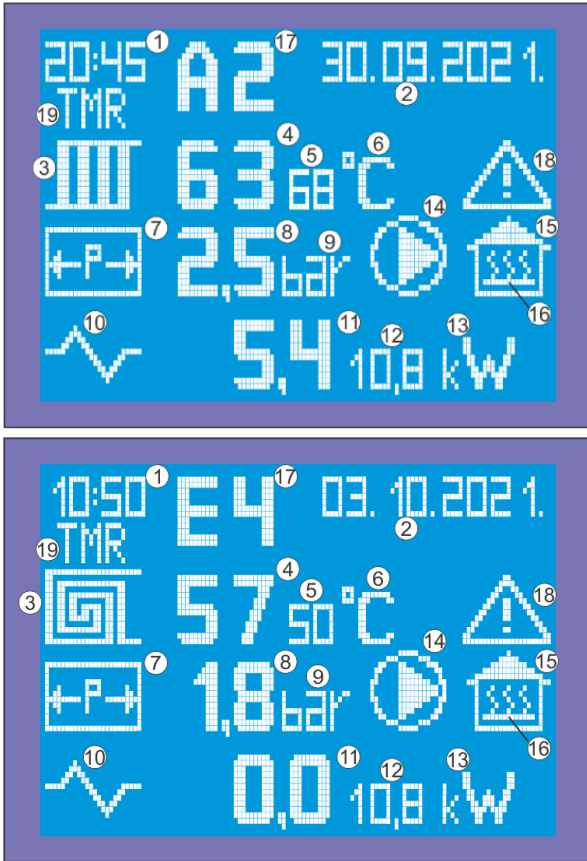
- All parameters of the heating system and the unit itself will appear on the display



- 1 - Time;
- 2 - Date;
- 3 - The radiator (or underfloor heating) symbol - next to it is the temperature display;
- 4 - Current system temperature;
- 5 - The temperature of the system;
- 7 - Pressure vessel symbol;
- 8 - Pressure in the system;
- 10 - Electric power symbol;
- 11 - Current boiler power;
- 12 - Default boiler output;
- 14 - Pump operation information: on-screen symbol - pump on;
- 15 - Heated space symbol (house)
- 16 - Room thermostat status information - If this symbol is on the display, the thermostat is on;
- After 3 minutes of the last key press, the display illumination is reduced to 10% of normal, and pressing any key returns to normal.

6. Setting the boiler operation

6.1 Symbols that may appear on display



- 1 - Time
- 2 - Date
- 3 - Radiator symbol (or floor heating) - temp. system
- 4 - Current temperature of the system (possible display from 99 to 99 °C)
- 5 - Set temperature (possible display from 10 to 80 / 50 integer)
- 6 - Symbol of measuring unit of temperature (°C)
- 7 - The symbol of the container under pressure
- 8 - Pressure in the system (possible display from 0 to 3.6 bar with one decimal)
- 9 - Symbol of measuring unit of pressure (bar)
- 10 - Symbol of electricity
- 11 - Current power of the boiler in kW (display with one decimal)
- 12 - The set power of the boiler in kW (displayed with one decimal)
- 13 - Symbol of measuring unit of electricity (kW)
- 14 - Symbol of the circulation pump (appears only when the pump is switched on)
- 15 - Symbol of space that is heated (house)
- 16 - Symbol of switched on room thermostat
- 17 - Warning symbols (A0-A4) or error symbols (E0-E8)
- 18 - Symbol of danger (appears when the value of pressure or temperature exceeds the permitted limits)
- 19 - TMR : Time-limited boiler operation symbol - appears if this function is activate

6.2 Warning symbols (codes)

- A1** - warning: Approaching the lower limit of the allowed operating pressure (0.3 ÷ 0.6 bar)
- A2** - warning: Approaching the upper limit of the allowed pressure (2.4 ÷ 2.6 bar)
- A3** - warning: Approaching the lower limit of the allowed temperature (3 ÷ 5°C)
- A4** - Approaching the upper limit of the allowed temperature (80÷85 °C / 50÷55 °C for Floor heating)

6.3 Error symbols (codes)

- E0** - error: The set parameters are not within the limits (this situation is practically impossible if the eeprom is not empty and the boiler is switched on for the first time)
- E1** - error: Pressure value below the lower limit (0.3 bar) ALL SWITCHED OFF
- E2** - error: Pressure value above the upper limit (2.6 bar) ALL SWITCHED OFF
- E3** - error: Temperature value of the boiler equal or below the lower limit (3°C) ALL SWITCHED OFF
- E4** - error: Boiler temperature higher than the upper limit (85 °C) -HEATERS OFF, PUMP OPERATING CONTINUOUSLY(85 °C for "Radiator" mode / 55 °C for "Floor heating" mode)
- E5** - error: Temperature value of the boiler equal or below the lower limit (3°C) INFORMATIVE
- E6** - error: Temperature sensor of the boiler in break or in short circuit ALL SWITCHED OFF
- E7** - error: Temperature sensor in break or in short circuit ALL SWITCHED OFF
- E8** - error: Sensor of the pressure in break or in short circuit ALL SWITCHED OFF

6.4 Protection against impermissible pressure and temperature values

When the system pressure is less than 0.7 or greater than 2.4 bar the instantaneous pressure value is flashing, a warning sign (triangle) flashes and a warning code:

- A1 for operating pressure below 0.7 bar
- A2 for operating pressure above 2.4 bar

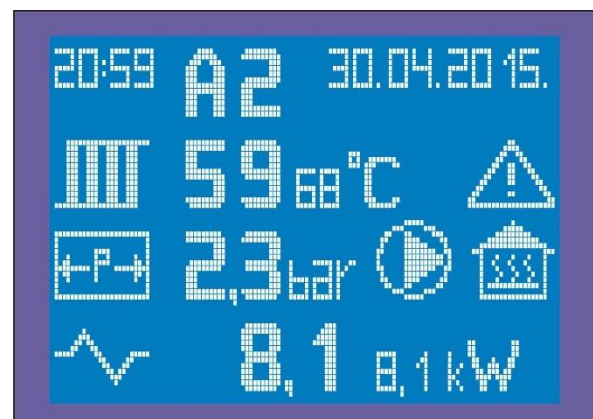
The boiler is still operating normally.

If the pressure value is below 0.2 bar or above 2.6 bar, the heaters and the pump are switched off (after 2 minutes) and the warning code goes into the error code:

- E1 for operating pressure below 0.3 bar
- E2 for operating pressure above 2.6 bar

In order for the boiler to continue operating, it is necessary to supplement the system to a pressure greater than or equal to 0.7 bar, or to reduce the pressure below 2.4 bar.

An example of an A2 warning in the following image:



When the temperature in the system is less than 5°C or greater than 80°C, the current temperature value flashes, a warning sign (triangle) flashes and the warning code:

- A3 for temp. below 5°C
- A4 for temp. above 80°C (50 °C for floor heating)

If the temperature drops below 3°C, the heaters and the pump are switched off (after 2 minutes) and the warning code goes into the error code:

- E3 for temperatures below 3°C

If the temperature rises above 85°C, the heaters are switched off, the pump operates regardless of the room thermostat to reduce overheating, and the warning code goes into the fault code:

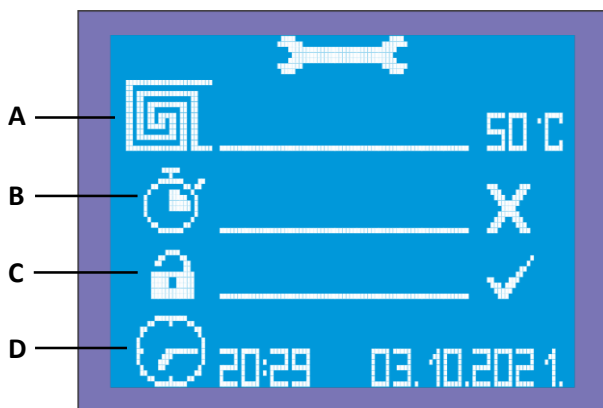
- E4 for temperatures above 85°C (55 °C for Underfloor heating).

In order for the boiler to continue to operate, it is necessary to return the temperature to normal limits. If the program protection against overheating does not stop the temperature rise for some reason, a special safety thermostat at 95°C (60 °C for floor) will signal the protection circuit and the automatic fuses interrupt the power supply to the boiler. In order to continue operating, the fuses must be activated (raised) manually, which must be done by a service technician after repairing the fault that led to overheating.



6.5 Setting the operating mode

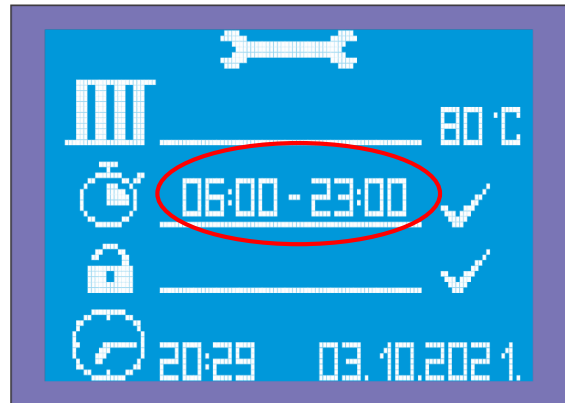
Press the SET key for 3 seconds to set the boiler mode. After that, the display will appear as in the picture



A) Heating mode symbol - "Radiator" (Max. Boiler Temp. 80 °C) or pipe "snake" for Underfloor heating (Max. Boiler Temp. 50 °C) In the example from the picture, Underfloor heating is selected.

B) Timer Symbol (TMR) - Time-limited operation of the boiler: Off (X) - operation of the boiler is allowed always / active (✓) - operation of the boiler is allowed only in a certain period of time that needs to be defined. When this function is activated, next to the timer symbol, the start and end times of the boiler operation permit (in hh:mm format) appear, which need to be defined. The selection is made with the keys and and confirmation and moving to the next setting with the "OK" key.

The following image shows the appearance of the display when setting the period during which boiler operation is allowed:



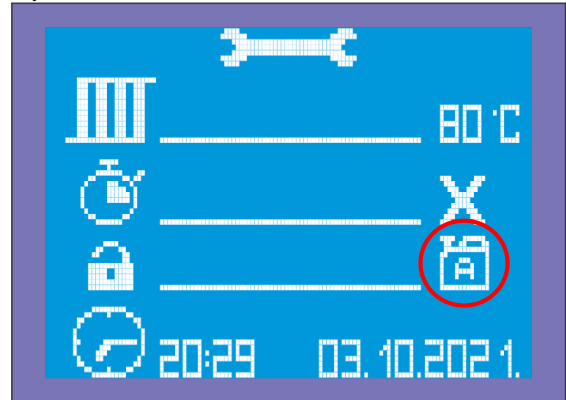
In the example from the picture, the time period from 6:00 a.m. to 11:00 p.m., in which boiler operation is allowed, is selected. Of course, the room thermostat must be turned on for the boiler to work. During the rest of the day, boiler operation is not allowed - regardless of the state of the room thermostat.

C) Choosing a level of safety at low temperatures

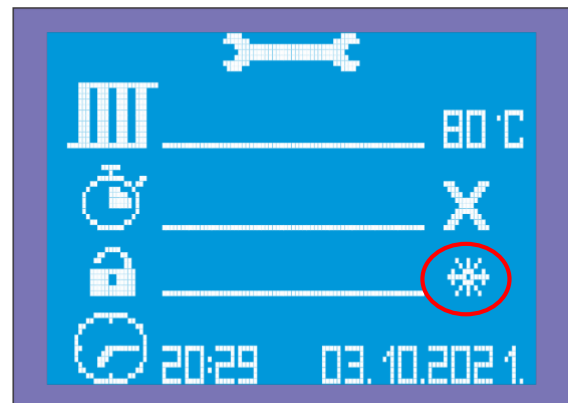
Possible conditions:

- ✓ PROGRAMMING - the boiler is not allowed to start and operate if the temperature T in it is lower than 3°C
- INSTALLATION IS FILLED WITH ANTI-FREEZER - It is allowed to start and operate the boiler even when T is lower than 3°C
- * FROST PROTECTION MODE

The image below shows the display with the selected setting for a system filled with antifreeze:



The image below shows the display with the selected operating mode in which the hydraulic installation is protected from freezing:

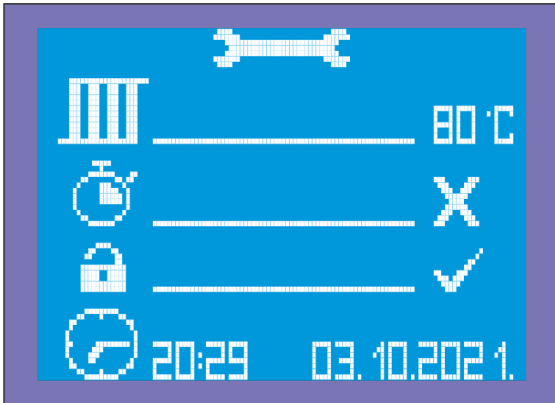


D) Clock symbol - setting the time and date Use the keys to set the time and date and confirm with the "SET" key.

6.6 Description of operating mode

6.6.1 Radiator heating

If the boiler is installed in a system where operating temperatures up to 80 °C are required, the mode marked with the radiator symbol should be selected in the settings (see the image below).

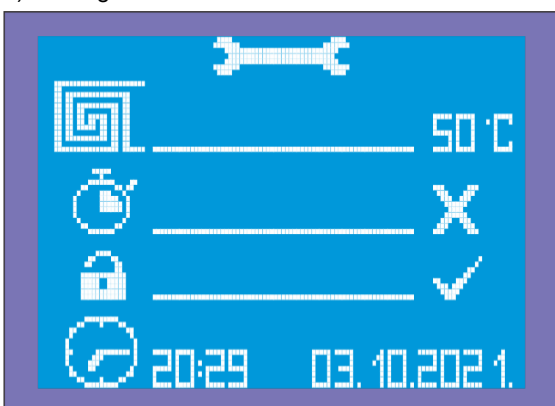


As mentioned earlier, in the settings it is necessary to choose one of two levels of security at low temperatures. The value of the Factory setting is as in the picture (✓), i.e. it is not allowed to start and operate the boiler at temperatures lower than 3 °C. Only if the system is filled with the appropriate glycol mixture, the second level of safety can be activated (⊠) in which the start-up and operation of the boiler is allowed regardless of the low temperature of the heating system - because glycol does not allow freezing.

In order for the setting to be accepted, it must be confirmed by pressing the SET key, which exits the setting.

6.6.2 Underfloor heating

If the boiler is installed in a system where operating temperatures of up to 50 °C are required, in the settings you should select the mode marked with the tube "snake" symbol (see the picture below), which symbolizes low-temperature (floor) heating.



6.6.3 System freeze protection mode

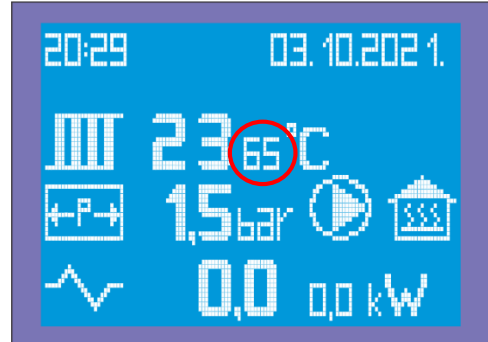
If the system is not filled with antifreeze, and is currently not in use, and there is a risk of low outside temperatures, this mode can be activated, which with minimal electricity consumption of energy ensures that the system does not freeze.

In this mode, the circulation pump is constantly on, the boiler power is fixed - 1/3 nominal and cannot be changed, and the operating temperature is also fixed at 10 °C and cannot be changed. The room thermostat has no effect on the operation.

6.7 Setting the heating parameter

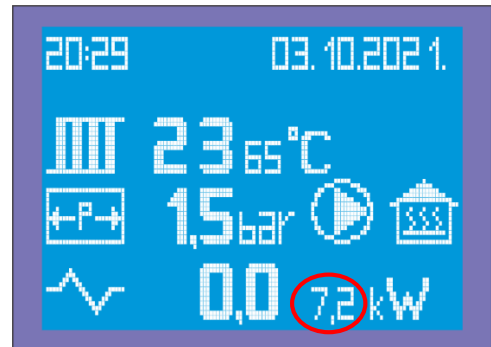
6.7.1 Setting the default boiler temperature

To set the default boiler temperature and power, briefly press the SET key. The set temperature starts flashing and can be adjusted using the ⊠ and ⊡ buttons. Each time you press one of the keys, the temperature is increased or decreased by 1°C. 10°C to 80°C values can be selected.



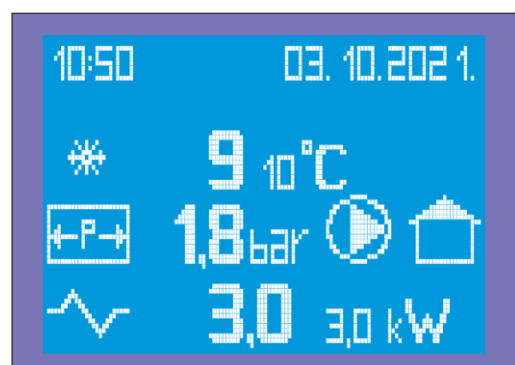
6.7.2 Setting the default boiler power

After setting the temperature, pressing the OK button switches to the setting the default boiler power whose value starts flashing.



Each key press ⊠ either ⊡ increases or decreases the set power by one power step. If it is only necessary to change the power and not the temperature, when the temperature value flashes press OK and thus goes to the boiler power setting. In order for the setting to be accepted, it must be confirmed by pressing the SET key. If the changes are not confirmed, after 15 seconds of pressing any button (except SET), the controller resumes operation according to the old setpoint value and exits the adjustment mode. Once the parameter values have been set in this mode, the microprocessor remembers until the setting switches off the heating in the mode menu. In the next setting, in the operating mode menu, when the heating is switched on, the set temperature and heating power must be set.

In system freeze protection mode, it is not possible to set either the set temperature or the set power. The boiler works as described in chapter 6.6.3 and the display is as shown in the picture below:



6.8 Room thermostat

If a room thermostat is used, it must be installed in the reference room. The temperature control of all rooms heated by the system is via this remote control. Radiators in the reference room must not be equipped with thermostatic valves or they must always be OPEN. All radiators in other rooms must be fitted with thermostatic valves.

6.9 Termination of the work of the heating system

In case of short-term interruption of the heating operation, the boiler temperature must be lowered by means of a thermostatic boiler controller. To prevent the installation of the heating system from freezing, the room thermostat temperature must not be set below 7°C. The boiler must be switched off when the heating operation is interrupted for a long time

6.10 Switching off the boiler



WARNING! Material damage from frost!
If the heating system is inoperative, freezing may occur at low temperatures

- ▶ Protect the heating system from freezing
- ▶ If there is a risk of frost and the boiler is not functioning, empty the complete installation

- Set the main switch on the control panel to "0" (off)
- Protect the heating system from freezing. Completely empty all water pipes.

7. Possible problems, causes and measures to be taken

PROBLEM	CAUSE	MEASURE
The boiler does not react after switching on the main switch	<ul style="list-style-type: none"> • Boiler is disconnected from electricity • The fuses on the bottom panel are switched off • Possible disappearance of the control phase • Fault of the main switch ON/OFF 	<ul style="list-style-type: none"> • Ensure power supply voltage • Switch on the fuses • Check on the fuses if there are all three phases at the exit • Replace the defective part
The circulation pump does not operate when the main switch and the room thermostat are switched on	<ul style="list-style-type: none"> • Defective room thermostat • Mechanically blocked impeller of the circulation pump • Defective circulation pump 	<ul style="list-style-type: none"> • Replace room thermostat • Unblock the circulation pump impeller • Replace the circulation pump
The boiler does not heat or does not heat enough / the heating pump works	<ul style="list-style-type: none"> • Lack of 1 or 2 phases • The power of the boiler is too low • Fault in one of the relays • Fault in one of the heaters 	<ul style="list-style-type: none"> • Check if all three phases come into the boiler • Check the set power of the boiler. • Replace the defective part
The boiler heats up but quickly shuts off. It reaches a set temperature quickly but the radiators are cold	<ul style="list-style-type: none"> • Closed valve under boiler • Mechanically blocked impeller of the circulation pump • Defective circulation pump 	<ul style="list-style-type: none"> • Open the valve under the boiler • Unlock the impeller of the circulation pump • Replace the circulation pump
Large oscillations of working pressure	<ul style="list-style-type: none"> • Closed valve under boiler • Insufficient pressure in expansion vessel • Defective expansion vessel 	<ul style="list-style-type: none"> • Open the valve under the boiler • Check the pressure in the expansion vessel and, if necessary, inflate the vessel on the appropriate value • Replace the expansion vessel

8. Pump

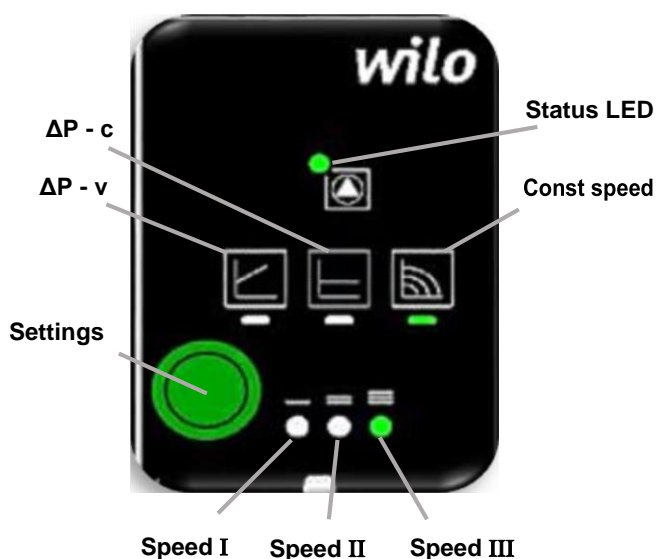
8.1 Pump Wilo-Para MSL/6-43SC



- 1. Composite OEM pump housing
- 2. Pump inlet MS ¼ "SN
- 3. Pump output terminal composite ¼ " SN
- 4. Automatic air vent
- 5. Safety valve 3bar
- 6. Pressure sensor
- 7. Pump head with electronics
- 8. Pump Mode Selector Button (settings)
- 9. Drain faucet

Wilo Para MSL / 6-43 / SC is a circulating pump for heating systems, heating systems for family houses and other similar systems. The most important characteristics of this pump are:

- Maximum flow rate: 2.1 m³ / h
- Maximum water column height: 6.8 m
- Maximum media temperature (at ambient temperature 58 ° C): 100 ° C
- Maximum glycol concentration in the system: 50%
- Minimum and maximum rotor speed: 2430 ~ 4300 rpm
- Minimum and maximum pump power: 3 W ~ 43W
- Minimum and maximum pump current (230V AC): 0.04 4 0.44A
- Energy Efficiency Index (EEI): ≤ 0.2
 (This energy efficiency index in practice means that the Wilo-Para pump consumes up to 80% less electricity compared to earlier versions of the same class pumps that did not have electronic power regulation).



	LED display	Control mode	Pump curve
1.		Constant speed	II
2.		Constant speed	I
3.		Variable differential pressure Δp-v	III
4.		Variable differential pressure Δp-v	II
5.		Variable differential pressure Δp-v	I
6.		Constant differential pressure Δp-c	III
7.		Constant differential pressure Δp-c	II
8.		Constant differential pressure Δp-c	I
9.		Constant speed	III

Faults, causes and remedies

The troubleshooting must only be carried out by a qualified specialist, and work on the electrical connection must only be carried out by a qualified electrician.

Faults	Causes	Remedy
Pump is not running although the power supply is switched on	Electrical fuse defective	Check fuses
	No voltage supply at pump	Rectify the power interruption
Noisy pump	Cavitation due to insufficient suction pressure	Increase the system pressure within the permissible range
		Check the delivery head and set it to a lower head if necessary
Building does not warm up	Thermal output of the heating surfaces is too low	Increase setpoint
		Change the control mode from Δp -c to Δp -v

Fault signals

- The fault signal LED indicates a fault.
- The pump switches off (depending on the fault) and attempts a cyclical restart.

LED	Faults	Causes	Remedy
Lights up red	Blocking	Rotor blocked	Activate manual restart or contact customer service
	Contacting/winding	Winding defective	
Flashes red	Under/overvoltage	Power supply too low/high on mains side	Check mains voltage and operating conditions, and request customer service
	Excessive module temperature	Module interior too warm	
	Short-circuit	Motor current too high	
Flashes red/green	Generator operation	Water is flowing through the pump hydraulics, but there is no mains voltage at the pump	Check the mains voltage, water quantity/pressure and the ambient conditions
	Dry run	Air in the pump	
	Overload	Sluggish motor, pump is operated outside of its specifications (e.g. high module temperature). The speed is lower than during normal operation.	

Activating factory setting

The factory setting is activated by pressing and holding the operating button whilst switching off the pump.

- Press and hold the operating button for at least 4 seconds.
- All LEDs flash for 1 second.
- The LEDs for the last setting flash for 1 second.

Decommissioning

Shutting down the pump

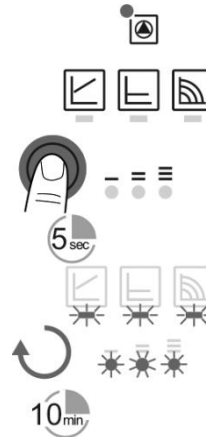
Shut down the pump immediately if the connecting cable or other electrical components are damaged.

- Disconnect the pump from the power supply.
- Contact a service technician.

Maintenance

Cleaning

- Carefully remove dirt from the pump on a regular basis using a dry duster.
- Never use liquids or aggressive cleaning agents.



Manual restart

The pump attempts an automatic restart upon detecting a blockage.

If the pump does not restart automatically:

- Activate manual restart via the operating button: press and hold for 5 seconds, then release.

- The restart function is initiated, and lasts max. 10 minutes.

- The LEDs flash in succession clockwise.

- To cancel, press and hold the operating button for 5 seconds.

If the fault cannot be remedied, contact an authorized service center.



NOTICE

After the restart, the LED display shows the previously set values of the pump.



Venting

- Fill and vent the system correctly.

If the pump does not vent automatically:

- Activate the pump venting function via the operating button: Press and hold for 3 seconds, then release.

The pump venting function is initiated and lasts 10 minutes.

The top and bottom LED rows flash in turn at 1 second intervals.

- To cancel, press and hold the operating button for 3 seconds.



NOTICE

After venting, the LED display shows the previously set values of the pump.



Lock/unlock the button

- To activate the key lock, press and hold the operating button for 8 seconds until the LEDs for the selected setting briefly flash, then release.

- LEDs flash constantly at 1-second intervals.

- The key lock is activated: pump settings can no longer be changed.

- The key lock is deactivated in the same manner as it is activated.



NOTICE

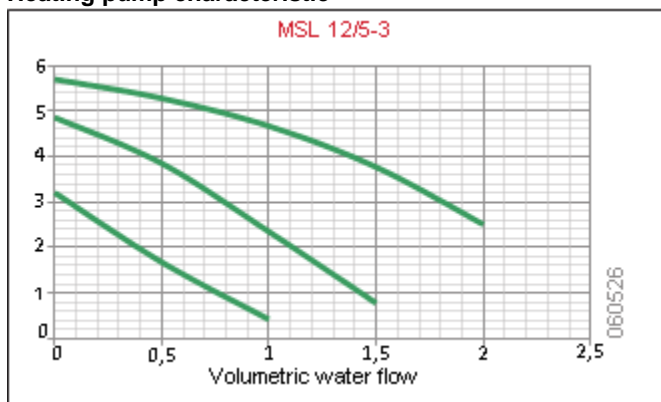
All settings/displays are retained if the power supply is interrupted.

8.2 The pump WILO MSL 12/5 oem 3P

Total height of the water column of the heating pump

The total height of the water column of the heating pump is shown in the following diagram with the corresponding upper and lower limit values.

Heating pump characteristic



Basic characteristics of the WILO MSL 12/5 oem 3P pump

	n l / m	P1 W	I A	Capacitor µf / VDB
MSL12/5	max 2310	84	0,37	2 /400
	2040	59	0,28	
	min 1560	40	0,18	

Table: WILO data, Germany

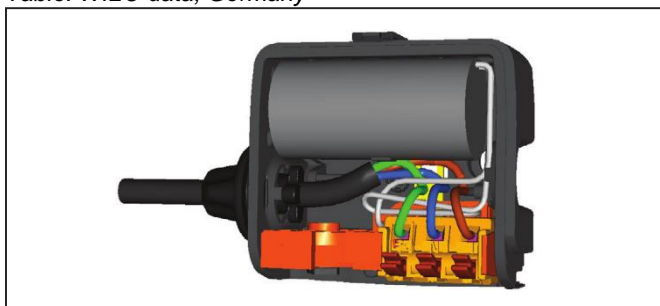


Image: Pump Wilo MSL

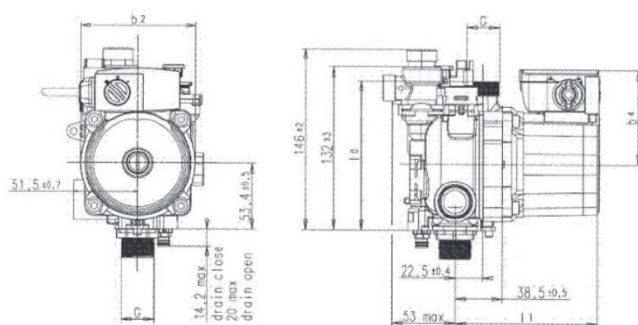


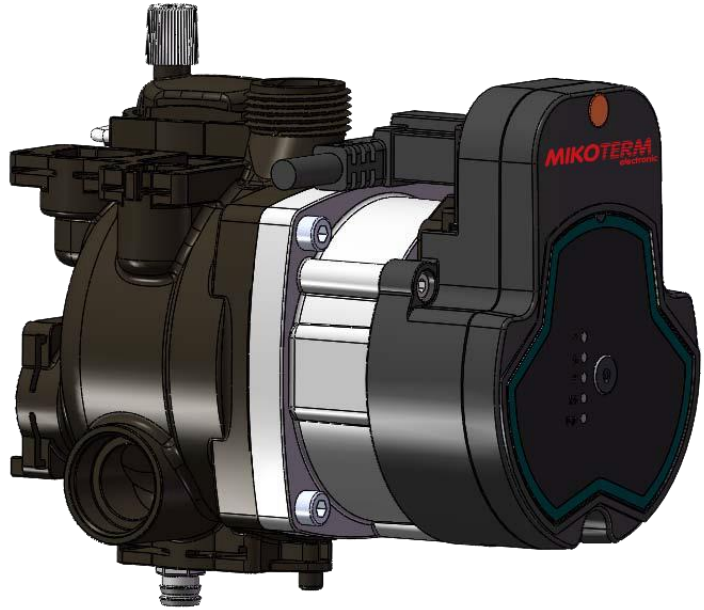
Image: Connecting the pump power cable

8.3 Mikoterm GPA15-7.5 III Pro Z178 High efficiency pump

Power at different control modes

Head	5m	6m	7m	7.5m
Power	33W	39W	52W	60W

- Energy efficiency index
EEI≤0.20-part3 (motor housing material: **bronze**)
- Power supply: 230V, 50Hz single phase AC power
- Maximal system pressure: ≤0.3MPa
- Insulation class: H
- Protect class: IP44
- Operation ambient temperature: 0°C~70°C
- Delivered liquid temperature: 2°C~95°C



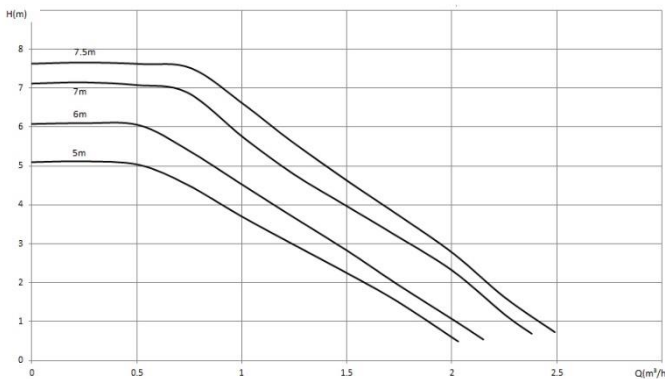
Failure code

The green light flicks by failure.

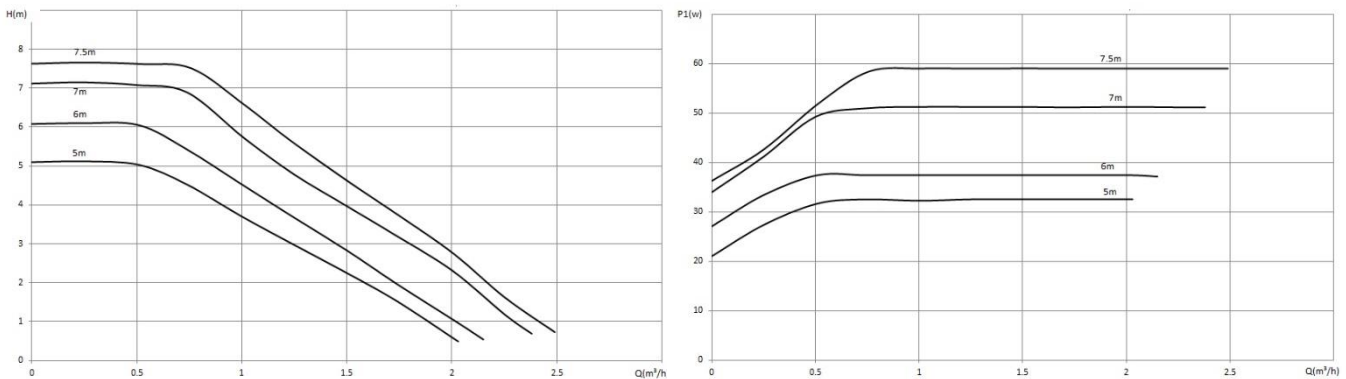
Failure code	Failure description
The gear light flashes once	Over voltage protection, re-start the pump after voltage resumes normal (over voltage setting: 270±5V).
Gear light blinks 2 times	Under voltage protection, re-start the pump after voltage resumes normal (under voltage setting: 165±5V).
Gear light blinks 3 times	Over-current protection, re-start the pump after 8s.
Gear light blinks 4 times	Phase loss protection, re-start the pump after 8s.
Gear light blinks 5 times	Block protection, re-start the pump after 8s.
Gear light blinks 6 times	Light-load protection, re-start the pump after 8s.
Gear light blinks 7 times	Over-temperature protection, re-start the pump after ambient temperature resumes to operation range for 5s
	Overheat protection, in the rated voltage, frequency, high temperature environment, high temperature water operation, IPM module surface temperature is higher than 120 ± 5 °C, the pump is reduced to 0.5 times of rated power operation, the temperature is lower than 115 ± 5 °C, the pump returns to normal operation.

Note: By failure the power should be switched off, in order to check out the failure. After troubleshooting turn on the switch and re-start the pump.

Flow-head curves





Flow-power curves



9. Product data sheet (in accordance with EU regulation no. 811/2013)

1.	Manufacturer		MIKOTERM DOO
2.	Brand name		eCompact Uz
3.	Models	I	eCompact Uz 6kW
		II	eCompact Uz 9kW
		III	eCompact Uz 12kW
		IV	eCompact Uz 16kW

				I	II	III	IV
4.	Room heating: Seasonal energy-efficiency class			D	D	D	D
5.	Room heating: Nominal heat output(*8) (*11)	P_{rated}	kW	6	9	12	16
6.	Room heating: Seasonal energy efficiency(*8)	η_s	%	37,43	37,62	37,72	37,79
7.	Annual energy consumption(*8)	Q_{HE}	kWh	6600	11022	13266	18688
8.	Sound power level, indoor	L_{WA} indoor	dB(A)	32	32	32	32
9.	 <p>All specific precautions for assembly, installation and maintenance are described in the operating and installation instructions. Read and follow the operating and installation instructions.</p>						
10.	 <p>All of the data that is included in the product information was determined by applying the specifications of the relevant European directives. Differences to product information listed elsewhere may result in different test conditions. Only the data that is contained in this product information is applicable and valid.</p>						

(*8) For average climatic conditions

(*11) For boilers and combination boilers with a heat pump, the nominal heat output "Prated" is the same as the design load in heating mode "Pdesignh", and the nominal heat output for an auxiliary boiler "Psup" is the same as the additional heating output "sup(Tj)"

MIKOTERM DOO

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18252 Merosina, Serbia

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