MIKOTERM electronic

Manual for Installation and Use_EN

eMobile 10,8kW

Mobile electrical boiler for heating system

eMobile_10/2021

Content

1. Explanation of symbols and instructions for safe work

Important information

These user manual are part of the documentation and an inherent part of the described mobile electrical heating unit. They must always be stored at the location where the mobile electrical heating unit is being used.

These instructions contain important information on safe and professional installation, putting into operation and maintenance of the boiler.

These instructions are intended for purchasers, renters, installers, and operators of the mobile electrical heating unit who, on the basis of their expertise and experience, have knowledge in working with heating installations.

You should familiarize yourself with the safety instructions for your own protection against injury and follow them precisely.

Drawings and visualizations in this document are used to explain themobile electrical heating unit. To simplify understanding by the reader, some components are highlighted in color, offset or hidden. Details and coloring may differ from the components installed.

1.1 Explanation of symbols

	**Warnings are marked with a gray triangle in the text, and are framed.**
	**The risk of electric shock is indicated by the symbol of lightning in the triangle, and framed.**

Signal words at the beginning of the safety note indicate the manner and severity of the consequences that threaten unless there are applied measures to prevent danger.

- **NOTE** means that minor material damages may occur.
- **CAUTION** means that minor or medium-sized injuries may occur.
- **WARNING** means that serious injuries can occur.
- **DANGER** means that serious injuries and life risk can occur.

Important information, which does not pose a danger to people or things, is indicated by the symbol shown in the text below. They are limited by lines, above and below the text.

1.2 Instructions for safe work

Failure to follow the safety instructions can result in serious injuries - as well as to deadly consequences, material damages and damage to the environment.

Electric energy may cause life threatening injuries
Only electricians or correspondingly qualified experts may work on the power supply

- Provide a professional examination of the electrical installation before installing the device.
- All electrical operations must be carried out by a person authorized to carry out electrical operations, according to the relevant regulations.
- Ensure that putting into operation, as well as maintenance and repairs are carried out by an authorized service.
- The boiler can only be used for heating the heating water and for the indirect preparation of hot water. In order to ensure proper use, it is necessary to comply with operating instructions, data on the factory tile, and technical data.

Danger due to not respecting one's own safety in case of an emergency, eg. in the event of fire

- Never expose yourself to life threatening situations. Your own safety is always a priority.

Damage caused by wrong handling

- Handling errors can lead to injury of persons and/or damage to the installation.
- Make sure that only people who know how to handle properly the device have access to it.
- Installation and putting into operation, as well as maintenance and repair, must only be carried out by an authorized service centre with appropriate authorization for electrical works.

Installation and putting into operation

- Leave the installation of the device only to an authorized service centre.
- Install the device only in a room where freezing cannot occur, without high concentration of dust, e.g. from grinding, or high concentration of soot.
- Always start the boiler only if the installation is at an appropriate pressure and the operating pressure is correct. Do not close the safety valves in any case in order to avoid damage caused by too high pressure. During heating, the water can leak on the safety valve of the hot water circuit and hot water pipe.
- Do not store flammable materials or liquids near the device
- Keep a safe distance according to applicable regulations

Life-threathening danger from electric shock

- Before all works: disconnect the electric power supply. Secure youself from accidental turning on.
- Do not install this device in wet rooms.

Inspection / maintenance

- The electrical equipment of the mobile electrical heating unit must be inspected periodically. Loose connections and damaged cables as well as wires must be corrected/replaced immediately. Recommendation for the user: Make a a maintenance contract with an authorized service centre, that will perform annual maintenance and control checks

Original spare parts

- No liability can be claimed for damages arising because of the spare parts which are not supplied by the manufacturer.
- Use only original spare parts.

Material damages from freezing

- In the event of a risk of freezing, drain the water from the boiler, tank and pipes of the heating system. The risk of freezing does not exist only when the enter installation is dry.

Special risks - Danger of Burns and Scalds

- Only experts with special knowledge and experience in heating technology may work on heating equipment

Special risks - Risk of Stumbling or Falling

- There is a risk of stumbling and falling due to the connection hoses, pipes and connection cables connected to the mobile electrical heating unit.
- Place the connection hoses, pipes and connection cables in such a way that they no longer present a risk. If this is not possible, mark the floor accordingly.
- There is also a risk of slipping, stumbling and falling due to dirt, expelled water and objects lying in proximity.
- Clean the floor from dirt and expelled water after any work on the mobile electrical heating unit has been completed.
- Place objects lying in proximity in their places or aside.

1.3 Warranty and liability

Warranty and liability claims for personal and material damage are void if they are due to one or several of the following causes:

- Unintended use of the device
- Improper installation, commissioning, operation and maintenance of the device
- Operation of the device with defective safety devices or if the safety and protective devices are attached incorrectly or not functioning properly
- Non compliance with notes in the instructions for use regarding transport, storage, installation, commissioning, operation and maintenance of the device
- Unauthorized modification of the device
- Insufficient monitoring of parts which are subject to wear
- Repairs carried out improperly
- Disasters caused by foreign objects and force majeure
- Connection to systems with permeable plastic pipes in disregard of the system separation using a heat exchanger

1.4 Intended use

The "eMobile" mobile electrical heating unit is intended as temporary heat generator for closed heating systems. Nominal power is 10,8kW. The operating parameters of the mobile electrical heating unit are set in the integrated control (CPU). The mobile electrical heating unit is not intended for outdoor use. The mobile electrical unit exclusively can be used for heating water for heating systems, and for the indirect preparation of hot water (by heat exchanger), with a temperature of up to 80°C in households, businesses, industrial environments and public buildings.

Designated use also includes:

- Use the device in the manner described in the instructions for use
- Observation of maintenance and repair work prescribed by the manufacturer, that activities may only be performed by trained personnel authorized by the manufacturer
- Any usage other than this or beyond the intended use shall be considered unintended use. Manufacturer cannot be held liable for any damage resulting from such use. Such use shall be at the sole risk of the system owner
- The not authorized to make modifications user is to the mobile electrical heating unit
- The use of other media other than water is not permitted
- Heating drinking water is not permitted
- Set up the mobile electrical heating unit only if stability is ensured
- Ensure that children or persons who do not have the required skills and knowledge to use the mobile electrical heating unit will not use or play with it unsupervised not have the required skills and knowledge to use the mobile electrical heating unit will not use or play with it unsupervised

2. Device data

2.1 Overview of types

Model	Typ
eMobile_10,8kW mobile electrical heating unit	**10,8kW Cable**

2.2 Declaration of conformity

We declare that the devices have been tested in accordance with Directives 2014/35/EU (Low Voltage Directive, LVD) and 2014/30/EU (Electromagnetic Compatibility Directive, EMC).

2.3 Instructions for operation

Observe the following instructions when working with the heating installation:
- The boiler should work in the working area up to a maximum temperature of 80 °C, a minimum pressure of 0,6bar and a maximum pressure of 2,6bar, and should be monitored regularly.
- The boiler should only be handled by adults who are familiar with the instructions and the work of the boiler.
- Do not close the safety valve.
- Inflammable objects must not be placed on or near the boiler (within the safety distance).
- Clean the surface of the boiler only with non-combustible materials and agents.
- Do not keep inflammable things in the room intended for installation of the boiler (eg. petroleum, oil).
- No cover must be opened during operation.
- Keep a safe distance according to the local valid regulations.

2.4 Anti-freezing agents and inhibitors

It is not allowed to use anti-freezing agents or inhibitors. If the use of the anti-freezing agent cannot be avoided, there should be used anti-freezing products that are permitted for heating installations.

Use of anti-freezing agents:
- shortens the lifetime of the boiler and its parts
- shortens the lifetime of the boiler and its parts

2.5 Minimum spacing and flammability of construction materials

Depending on the applicable regulations, other minimum distances, other than those mentioned below, may be valued
- Follow the regulations on electrical installations and the minimum distances in force in the countries concerned.
- The minimum distance for heavily flammable and self-extinguishing materials is 200 mm
- The minimum distance for flammable materials is 400 mm

2.6 Tools, materials and auxiliary means

- For installation and maintenance of the boiler, standard tools from the field of heating, plumbing and electrical installations are required.

2.7 Product description ˝eMobile_10,8kW˝

1 - Handcart

2 - Chassis of the device

3 - Boiler front cover

4 - The cover of the device

5 – Electrical cable with plug (EUR16)

6 - Main switch (0 - 1)

7 - Inlet hydraulic connection "Geka" 1"

8 - Valve for inlet connection

9 – Manometer on inlet connection

10 - Output hydraulic connection "Geka" 1"

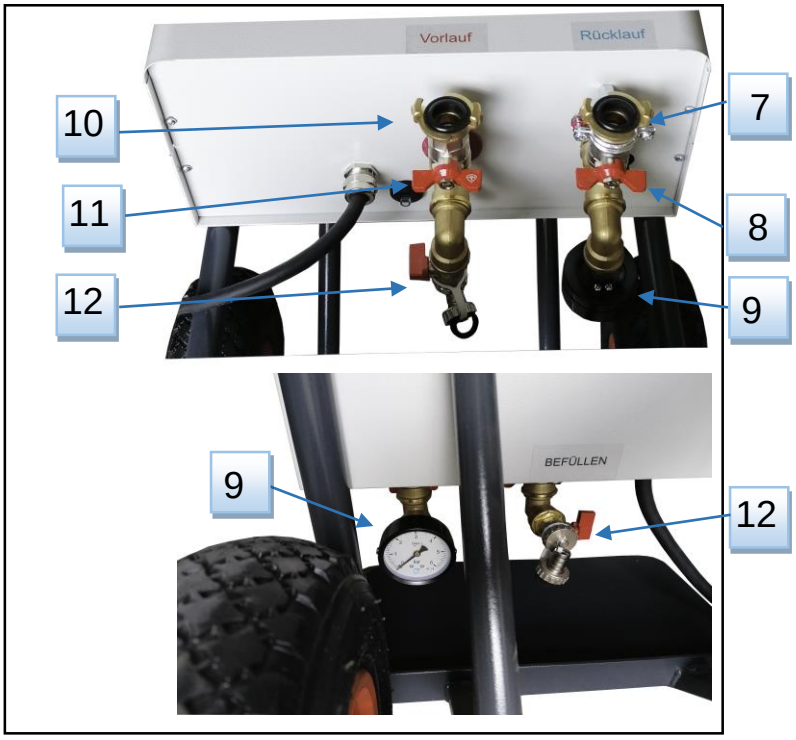
11 - Valve for output connection

12 - Valve for filling/drying tap on output connection

13 - Control panel

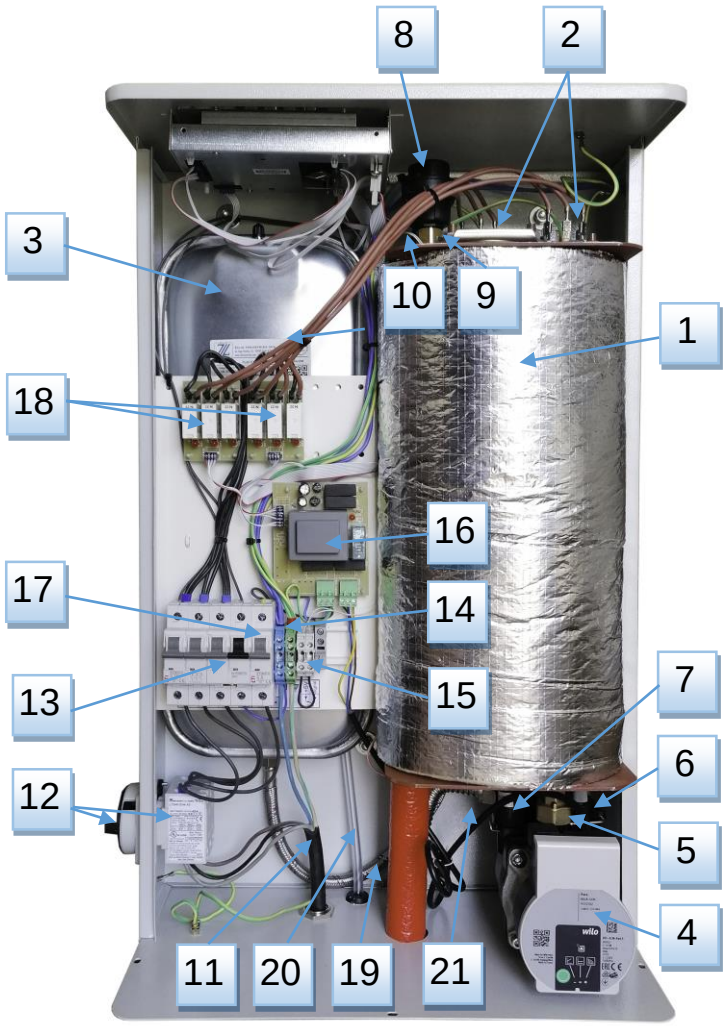
14 – Fuses hole

2.7.1 Dimension ˝eMobile_10,8kW˝

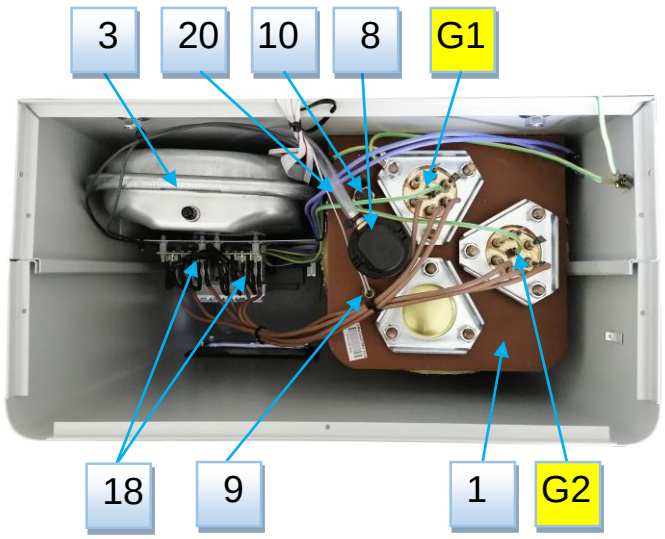


2.8 Boiler technical data ''eMobile_10,8kW''

Nominal power: 10,8kW (6×1,8kW)
Power supply: 3N~230/400V 50Hz
Nominal current: 3×15,6A
Temperature setting range: 10 ÷ 80 °C
Pressure range: 0,6bar ÷ 2,6bar
Safety valve: 3bar
Circulation pump:
High efficiency pump Wilo-Para MSL/3-46/SC (EEI≤0,2)
Expansion vessel: 8ℓ
Protection class: IP44



1 - Vessel of boiler with heaters V=12,5ℓ
2 - Electric heater
3 - Expansion vessel 8ℓ
4 - Circulation pump
5 - Safety valve: 3bar, mounted on pump
6 - Automatic air discharge valve mounted on pump
7 - Pressure sensor
8 - Automatic air discharge valve mounted on top side of boiler vessel
9 - Temperature sensor
10 - Safety thermostat (95 °C) with automatic reset
11 - Cable H07RN-F 5×2,5mm² Length: 5m, with EUR 16 Plug (3N~400V 16A)
12 - Main switch (0-1): Benedict LTS40 EH4 A3; I=40A
13 - Automatic 3-P Circuit breaker: ETIMAT6; 3-P; C16A; with shunt trip release (remote trigger) - safety device
14 - Clamps: N (neutral); PE (protective earth)
15 - Room thermostat terminals (clamps)
16 - Power supply board (230V AC / 24VDC+8VDC)
17 - Automatic Circuit breaker: ETIMAT6; 1-P; C2A;
18 - PCB with heater Relays
Relays: Finder 45.71.7... SPST; NO; 16A; 230VAC
19 - Flexible connection pipe of the expansion vessel
20 - Plastic drain pipe of air discharging valve
21 - Corrugated flexible safety valve drain pipe



G1 - Electric Heater 1 → 5,4kW (3 × 1,8kW)
G2 - Electric Heater 2 → 5,4kW (3 × 1,8kW)

3. Storage and transport

3.1 Storage

Store the mobile electrical heating unit eMobile in a waterproof, frost-free room in the original packaging.

Conditions of mobile electric heating unit before storage:
- The mobile electrical heating unit is fully drained
- The connection lines have been removed
- The drain taps are open

Conditions in the warehouse:
- Air temperature: +5 ÷ +50 °C
- Relative humidity: 15% ÷ 75%
- No condensation

3.2 Transport

The mobile electrical heating unit is easy to transport due to its handcart with inflated rubber tires. When transporting the mobile electrical heating unit, ensure that:

- The mobile electrical heating unit is fully drained
- The connection lines have been removed
- The connection cable is safely attached for transport
- The drain taps are open
- Shock and vibration are avoided

4. Installation and connection to hydraulic system

The mobile electical heating unit must be instaled by a suitably qualified expert according to the applicable standards and regulations
Manufacturer cannot be held responsible for damage due to installations errors from instalater

4.1 Description of instalation

- The mobile electrical heating unit may only be installed in a space that is suitable in terms of position, size, construction properties and type of use and where risks cannot arise. It mustbe designed in such a way that the device can be properly installed, operated and serviced.

- Install the device only in a room where freezing cannot occur, without high concentration of dust, e.g. from grinding, or high concentration of soot.

- The mobile electrical heating unit must be placed in such a way that unrestricted access is ensured at all times. The dimensions of the mobile electrical heating unit can be found in the Technical Data. Furthermore, a minimum distance of **500 mm** must be kept free on each side of the mobile electrical heating unit.

- Only install the mobile electrical heating unit on stable and level ground.

- Environmental conditions:
- Air temperature: +5 ÷ +45 °C
- Relative humidity: 20% ÷ 70%

Caution ! Damage to the mobile electrical heating unit due to unsuitable environmental conditions

Excessively low temperatures may lead to bursting of hoses, pipes and couplings, which may in turn cause leaks. Excessively high temperatures may damage the mobile electrical heating unit.

- In case of a change in environmental conditions, ensure sufficient acclimatization of the mobile electrical heating unit. The duration of the adaption process varies according to the ambient temperature difference. We recommend allowing the mobile electrical heating unit to acclimatize for 24 hours between unpacking and first use.

DANGER! Danger of death due to electric shock!

- Insufficient acclimatization of the mobile electrical heating unit can lead to the formation of water of condensation, which can cause short circuits in the electrical system (electronics). Acclimatize the mobile electrical heating unit according to the change in environment.

4.2 Hydraulic connection

This unit have a integrated expansion vessel, prior to every installation, before filling with water, you have to check:
- Pressure in the integrated expansion tank (1,5bar). If is pressure level below recommended – inflate expansion tank.
- Whether the expansion tank volume of the mobile electrical heating unit is sufficient for connection to the existing heating system. If required, an additional expansion tank must be installed.

Pressure can be monitoring on the mechanical thermomanometer mounted on inlet connection from back side of device. If You want monitoring pressure on display, before filling the system, the device must be connected to the electrical installation and switched on with main switch, in order to monitor the value of pressure in the installation. Set the temperature on minimum (10 °C), and set the power on 0kW.

DANGER: Injuries and/or material damages can occur by exceeding the pressure during the filling with water !

- High pressure can damage the control and safety devices as well as the vessel of device itself.
- Fill the boiler with pressure that corresponds to the pressure of the opening of the safety valve.
- Ensure that all control and safety parts for pressure control work properly.

DANGER: Danger to health due to mixing drinking water! Be sure to follow national regulations and norms to avoid mixing drinking water

NOTE: Damages to the installation due to poor water quality! Depending on the properties of the water, the heating installation may be damaged by corrosion or by the formation of limescale

NOTE: Material damages caused by temperature stress.
If you fill the boiler in a warm/hot condition, the temperature stresses can cause cracks due to straining. The boiler will start to leak water.
Fill the boiler only in cold condition (the temperature of starting line may be maximally 40°C).
Fill the boiler only through the quick valve on the boiler's pipe installation (return line).

4.3 Filling and venting the installation and the device with water

For filling installation and device wessel with water, folow the procedure:

- Connect the hose from the tap for filling/drying (3/4˝) on inlet connection.
- Open the filling/drying tap.
- Fill the boiler slowly. Follow the pressure on the mechanical thermomanometer on inlet connection from back side of device.
- Close the tap when the operating pressure is reached.
- Discharge the air from the installation via the valve on the radiator.
- When the operating pressure is lowered by discharging of air, the water must be refilled.
- Remove the hose from the tap for filling/drying.

- The pump in this device has an automatic air discharger and no action is required for air discharging from the pump.
- If, however, there is still air in the pump, set the pump switch to the air discharge position (see pump information at the end of the manual).

Caution! Damage to device due to improper venting!
Improper venting may lead to the generation of vapor bubbles in the heating system, which may cause an overpressure. Furthermore, hot water may be expelled from the bleeder. This pressure is released via the safety valve.

5 Electrical installation

Caution ! Before connect power supply cable to the plug, main switch on the electrical mobile heating unit must be to the ″0″ position.

An industrial plug (EUR16; 3-P + N + PE; 6h) on the cable is used for connection to the mains.

During switching on/off of the mains plug, the main switch on the boiler must be in position "0".

5.1 Electricall installation of the ’’eMobile_10,8kW’’

eMobile_10,8kW		
Position of the main switch	**Connection**	**Max. power**
1	3N~400V 16A	10,8 kW

6. Description of the CPU funstion and heating

6.1 Description of the symbols on display

On the front side of the boiler there is a microprocessor unit that controls the device:
Appearance of the microprocessor control unit (image 1):

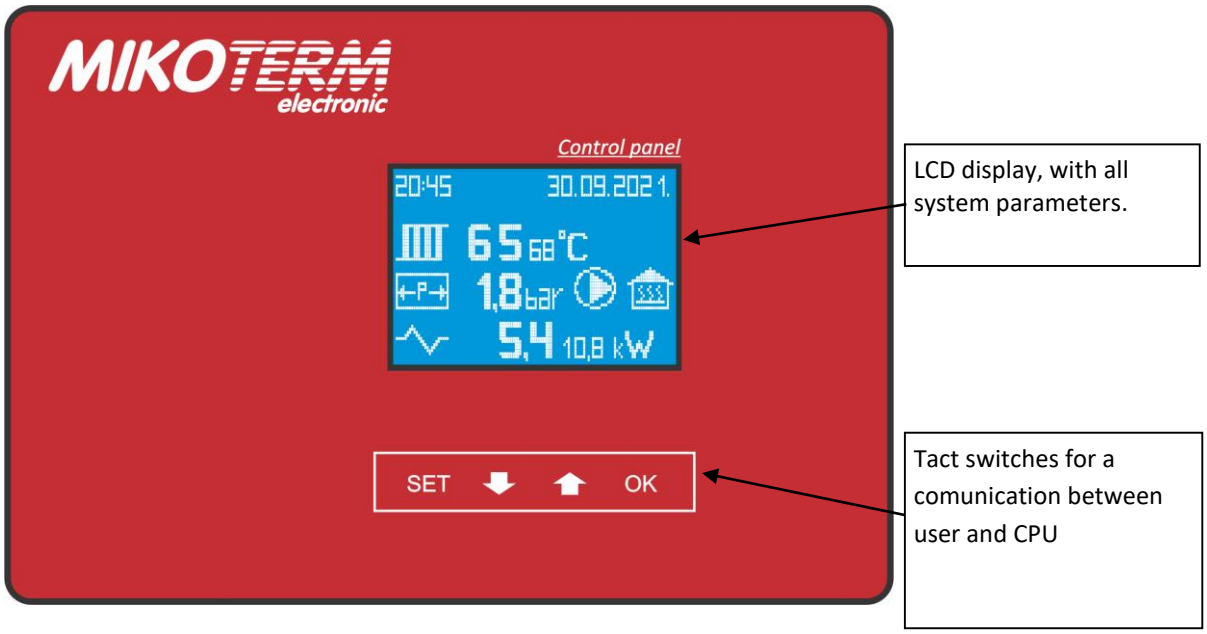
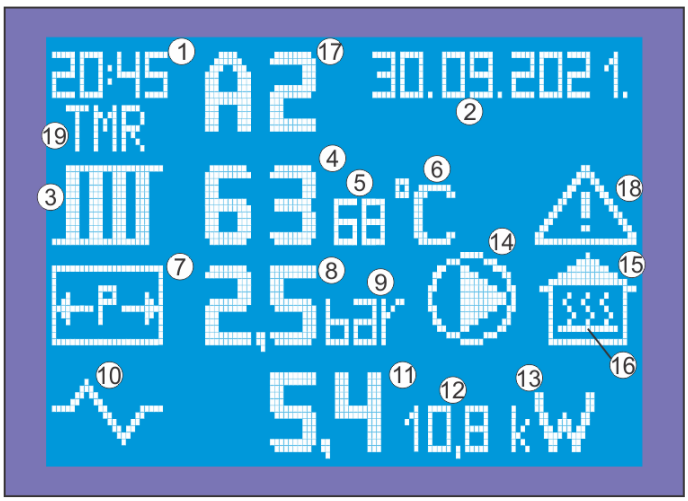


Image 1

All symbols which that can be on the display



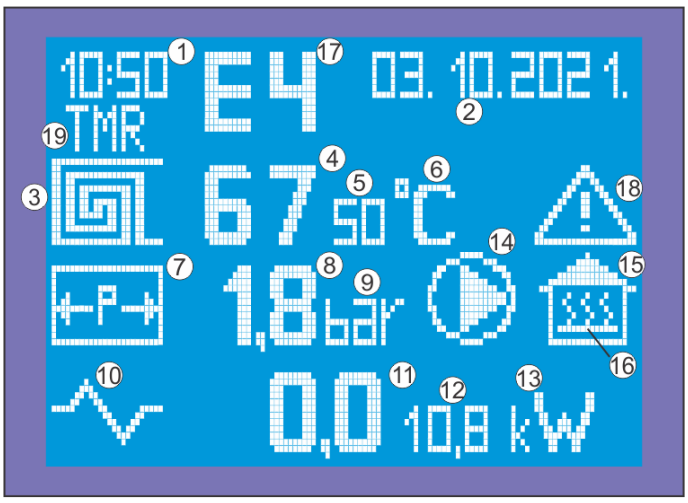


Image 2

1 - Time
2 - Date
3 - Boiler mode symbol: a) Radiator heating: b) Floor heating: c) Frost protection mode:
4 - CURRENT TEMPERATURE – The current system temperature, in °C (large digits)
5 - SET TEMPERATURE - System set temperature in °C (small digits)
6 - Temperature unit symbol (°C)
7 - Pressure vessel symbol
8 - CURRENT PRESSURE in system
9 - Pressure unit symbol (bar)
10 - Electric power symbol
11 - CURRENT POWER – currently engaged heater power (large digits).
12 - SET POWER - Adjusted power (small digits)
13 - Electric power unit (kW)
14 - Symbol of Circulating Pump operation
15 - Symbol of the house (heated space)
16 - Thermal radiation symbol (Room thermostat "on")
17 - If a sensor failure, or a temperature / pressure value outside the permitted range occurs, one of the warnings flashes:
A - Attention - in case of potential problem
E - Error – in case a problem occurs
18 - Warning symbol, flashing with symbol A or E
19 - TMR - The boiler operates according to a Timer

6.2 SETTINGS

When the boiler is switched on, the basic display (Image 3) apears on the screen. To enter the SETTINGS ( ) where it is possible to change boiler mode, activate/deactivate and set timer, set the time and date: keep the "SET" button pressed for 5 ~ 6 seconds. The settings display will appear on the screen (Image 4):

6.2.1 Boiler mode Settings

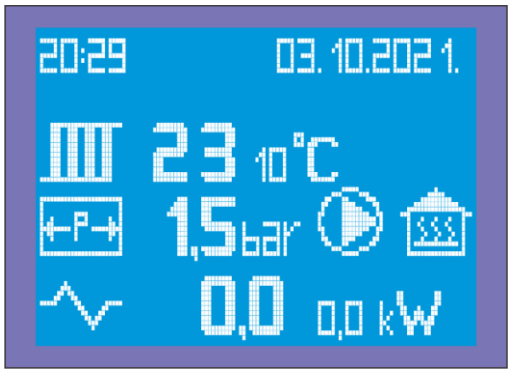


image 3

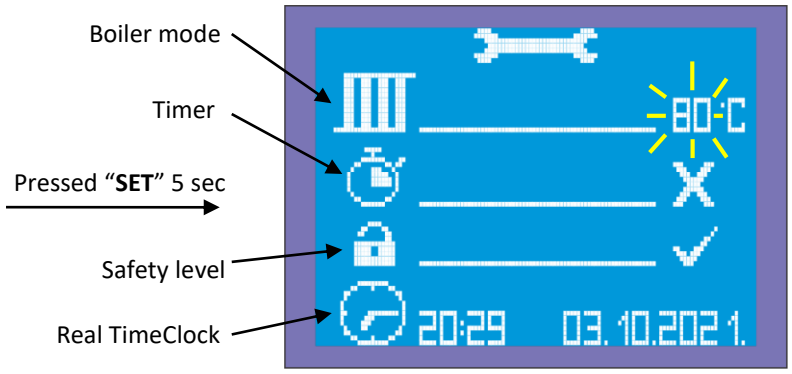


image 4

In this example (image 4), boiler work in "Radiator Heating" mode, with max. Set Temperature 80 °C - which flashing. For switch boiler mode to "Floor Heating" press briefly tact button "**-**" or "**+**". Symbol of boiler mode will change to spiral tube (image 5), and max. Set Temperature will be limited to 60 °C.

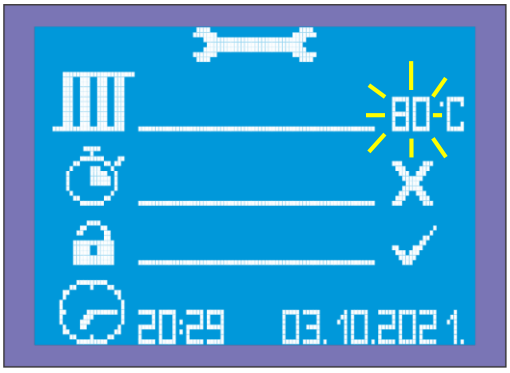
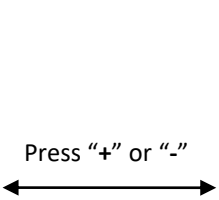


image 4



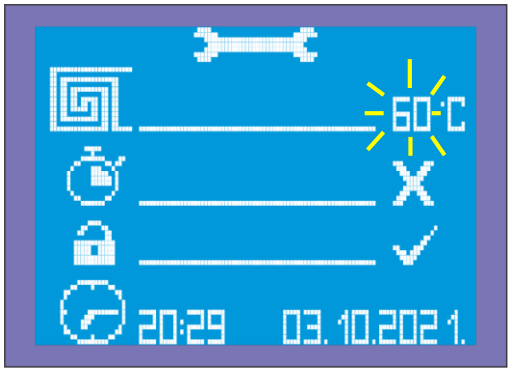


image 5

To save settings, and back to basic view, press briefly button "**SET**". To continue settings, press briefly button "**OK**".

Note: If the operating mode is changed, the timer settings will be reset.

6.2.2 Timer Settings

The boiler can operate in Timer mode, where heating is allowed only for a defined period of time.
In the "SETTINGS" menu, after setting the boiler mode, briefly press the "**OK**" button to continue setting the timer.
In this example (image 6), the symbol X - for disabled Timer mode started flashing, to the right of the Timer symbol ( ). Briefly press "**+**" or "**-**" button to enable the Timer mode - ✓ (image 7), then press "**OK**" button to confirm the selection.

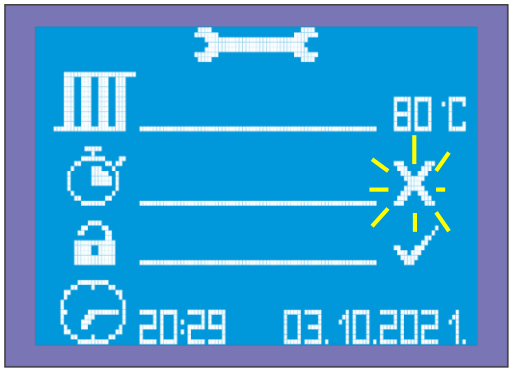
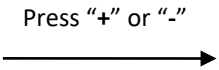


image 6



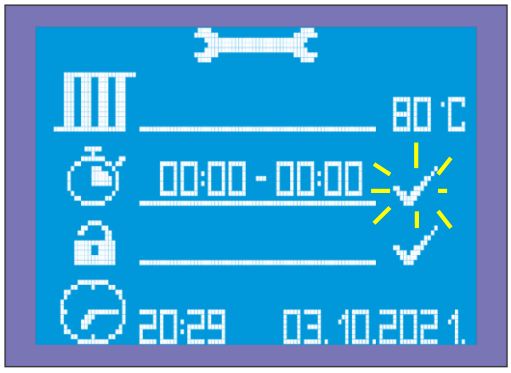


image 7

After confirming that the Timer mode is selected, the next step is to define the start of the boiler operation (image 8). The start time flashes, the hours are set first, then confirm with the "**OK**" button, and then set the minutes of the start time. Confirm by pressing the "**OK**" button and set the hours and minutes for the stop time.

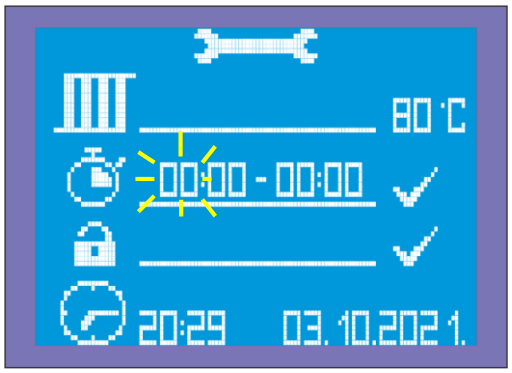


image 8

Press "+" or "-"

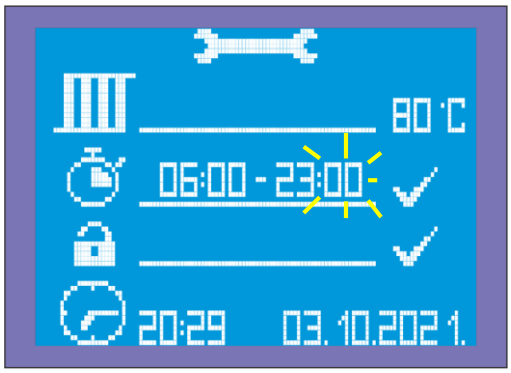


image 9

In this example (image 9), start time for enabled boiler operation is seted to **06**h:**00** minutes. The end time of the enabled boiler operation is set to **23**h:**00** minutes. So, in that period, the boiler can work - according to the selected operating mode (Radiator or Floor Heating), and according to the room thermostat. In the period from 23:00 to 06:00 the operation of the boiler is disabled. The devices are factory set to 00:00 - 00.00 which means that the Timer allows the boiler to work throughout the day. If two of the same times are set, for example: 22:50 - 22:50, the boiler also will be able to operate during the all day. To save settings, and back to basic view, press briefly button "**SET**" (Symbol "TMR" appears on the basic display, below the time - This means that the boiler is running according on a Timer). To continue settings, press briefly button "**OK**".

6.2.3 Safety settings at low temperatures

After confirming the Timer parameters, the next step is to define the "Safety level" (Padlock symbol). There are 3 levels of system protection against damage caused by low temperatures and frost, i.e. 3 ways to ensure safety in operation at low temperature (images 10, 11, 12).

Default setings are "✓", briefly press the "+" or "-" button to switch to another type of safety settings.

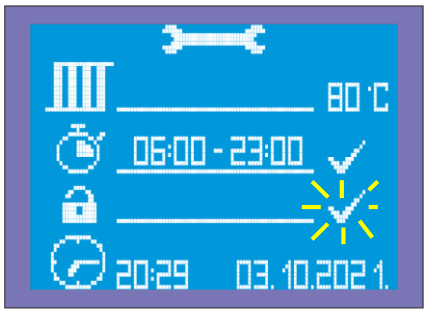


image 10

Press
+ or -

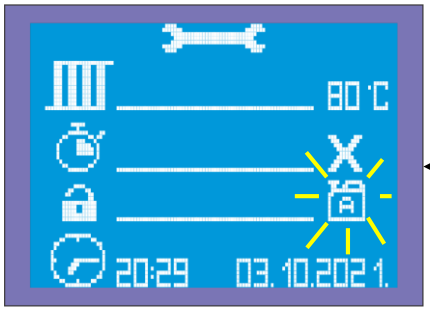


image 11

Press
+ or -

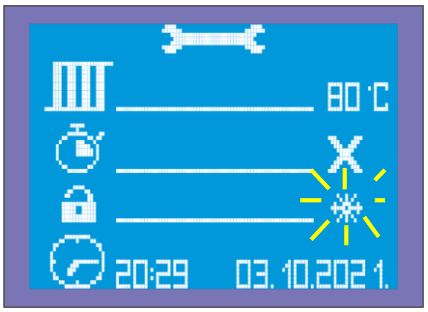


image 12

✓ - In this mode, the CPU does not allow the boiler to operate if the boiler temperature is < 3 °C, because it is possible that some part of the system is frozen. The operation of the circulation pump is also disabled (if the boiler temperature is < 3 °C), for the same reason. An error symbol (E3) will appear on the display.
So, boiler works according to the rules given for the defined mode in the first two items of the settings menu. If the boiler temperature is ≤5 ˚C on display flashes Warnning symbol (A3), If the boiler temperature is <3 ˚C CPU not allowing the operation of the boiler because there is a risk that some part of the system is frozen.

- This mode is intended for a system filled with a mixture of antifreeze and thus protected from freezing. Boiler works according to the rules given for the defined mode in the first two items of the settings menu, but a part of the program that blocks the operation of the boiler at a temperature of 3 °C or lower is switched off. In other words, operation of the boiler is allowed regardless of the possible low temperatures in the boiler. Also, there is no need to warn about approaching to the lower limit of the allowed temperature, as well as about the low temperature errors.

Note: Never activate this mode if the system is not filled with Glycol mixture (Antifreeze), due to the risk of serious damages.

- Frost protection mode. This regime is designed to protect the system without mixture of antifreeze from freezing in a shorter period (~10 days). E.g: during winter, when there is no need for heating in the house (the whole family is out of house for e.g. 10 days), but outdoor temperatures are low. There is a possibility that the system freezes if the heating is switched off and the system is not filled with mixture of antifreeze. The pump operates non-stop in this regime, the boiler maintains the system temperature of 7-10˚C by using 1/3 of the nominal power. When this regime is selected, the settings for the first two menu items are ignored. The boiler operate regardless of the room thermostat.

When is Frost protection mode is selected, and confirmed by briefly pressing the "SET" button, the display will appear (image 13):

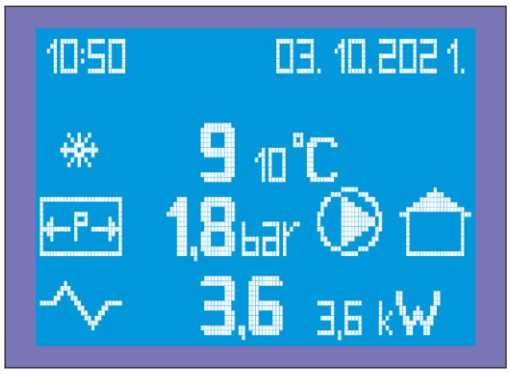


image 13

Note: Temperature and power settings are not permitted in frost protection mode.

6.2.4 Time and Date Settings

After completing the settings in "Safety" mode, briefly press the "**SET**" button to save the settings and return to the basic display. To continue the setting, briefly press the "**OK**" button - the screen will appear (image 14):

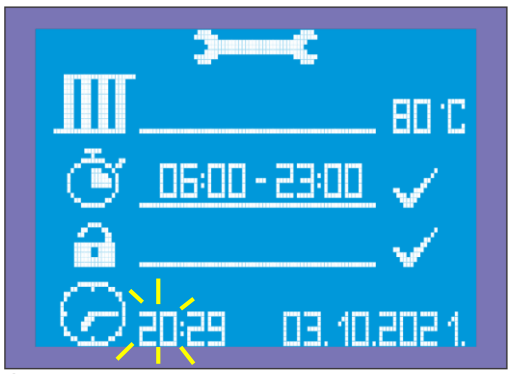


image 14

The hours (flashing) are set first, then confirm with the "**OK**" button, and then set the minutes. Confirm by pressing the "**OK**" button and set the year, month and date.
After finish settings of the time and date, if press the "**OK**" button - CPU will back allround to settings boiler operating mode.

6.3 Adjust the SET TEMPERATURE and SET POWER

The temperature can be set in normal heating mode.

1 - Briefly press ˝**SET**˝ button – the SET TEMP value: ˝10˝ (image 15) starts flashing.
2 - By ˝**+**˝ and ˝**-**˝ button adjust SET TEMP. value (set temperature range is from 10 to 80 °C).

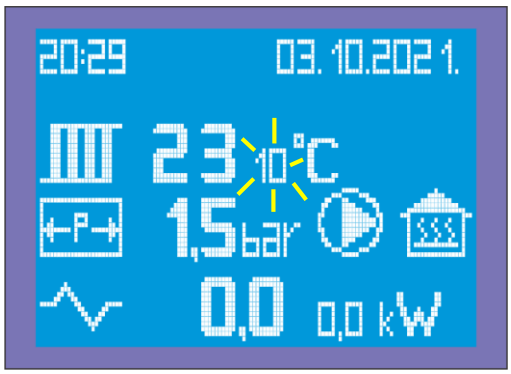


image15

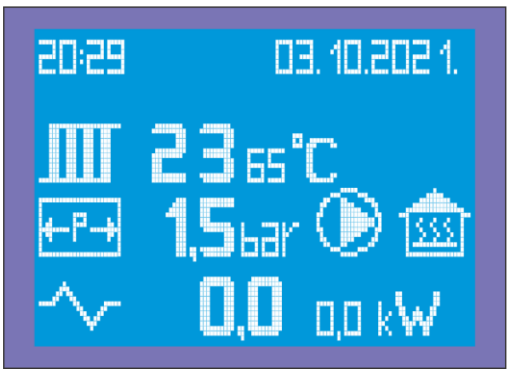


image 16

3a - Save the set value ("65" °C in this example) and exit the settings by briefly press ˝**SET**˝ button (image 16).

If you want to continue with settings, and switch to set power:

3b - Confirm the SET TEMP. value with ˝**OK**˝ button, this is also switch to settings SET POWER. Value of SET POWER "0,0kW" will start flashing (image 17).

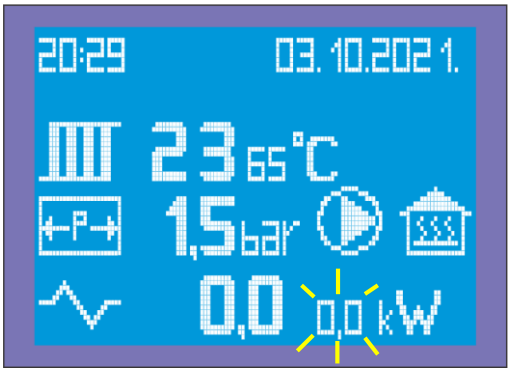


image 17

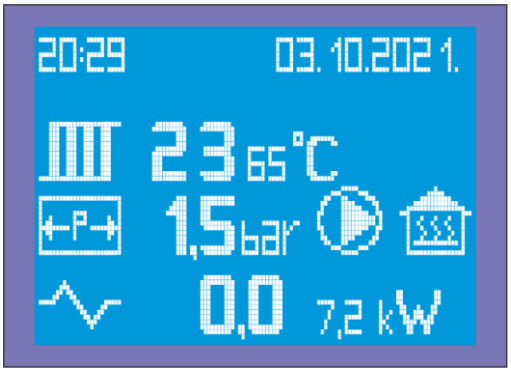


image 18

4 - By ˝**+**˝ and ˝**-**˝ button adjust SET POWER value (7,2kW in this example). Maximum allowed power depend from Rated power 10,8.
5a - Save the set values (SET TEMP. and SET POWER) and exit the settings by briefly press ˝**SET**˝ button (image 18).

If you want to continue with settings:

5b - Confirm the SET POWER value with ˝**OK**˝ button, and switch to SET TEMP. (The Set Temp. value will start flashing, this is a return to the beginning of settings - image 15).

6.4 THE WORKING PRINCIPLE

Electric boiler "eMobile" contains all elements of boiler substations ie. small mobile boiler rooms. The temperature sensor and the hydraulic water pressure sensor constantly measure the values in the system and send information to the microcontroller that processes them and controls the boiler based on them.

The microcontroller takes care of:

- Boiler operation is only allowed if the temperature and the pressure are witnin the permitted range.
- Equal load of phases, regardless of the Set boiler power.
- Equal operating time of output relays and heaters. In this way, the electrical network is symmetrically loaded, and all elements of the boiler work equally, thus achieving a longer lifetime of exploitation of the device. If necessary, the relays and heaters that have been switched on for a long time are switched off, and relays and heaters that were inactive switched on instead.
- The heaters are switched on and off successively, at intervals of 3 seconds, with the power divided into three (3) heating groups. The switching on / off temperatures of the heating groups were shifted by 3 ° C. The heating group can consist of one heater, or 2, or 3 heaters, depending on the power of the boiler. Also, the heating groups do not always consist of the same heaters, but are formed from heaters which, at the time of switching on/off, selected by the microcontroller based on the criteria for the minimum operating time of a particular heater, while respecting the equal (symmetrical) phase load.

6.5 WARNING AND ERROR CODES

A1 - Warning: approaching the lower limit of the allowed pressure (0.5 bar)
SHOULD BE DONE - Fill the system with water to the necessary pressure
A2 - Warning: approaching the upper limit of the allowed pressure (2.5 bar)
SHOULD BE DONE - Bring the system to the required pressure
A3 - Warning: approaching the lower limit of the allowed temperature (5 degrees) of the HEATING SYSTEM
SHOULD BE DONE - Switch on room thermostat and heaters or activate freezing protection regime
A4 - Warning: approaching the upper limit of the allowed temperature (80 degrees) of the HEATING SYSTEM
SHOULD BE DONE - Lower the power of the boiler, check whether the valves are open

E0 - Error: Control system failure - all switched off
E1 - Error: reached lower limit of the allowed pressure (0.2 bar) – all switched off
REMEDY – Fill the system with water to the necessary pressure, check the sealing of all connections
E2 - Error: reached upper limit of the allowed pressure (2.7 bar) - all switched off
REMEDY - Bring the system to the required pressure by discharging air and water when needed
E3 - Error: reached lower limit of the allowed temperature (3˚C) - all switched off
E4 - Error: reached upper limit of the allowed temperature (85˚C) – the pump is constantly on, the heaters are off.
REMEDY - Switch off the main fuses for powering the boiler with electricity, call the service center
E6 - Error: sensor of temperature of the boiler in break or short circuit - all switched off
REMEDY - Switch off the main fuses for powering the boiler with electricity, call the service center
E8 - Error: sensor of pressure in break or short circuit – all switched off
REMEDY - Switch off the main fuses for powering the boiler with electricity, call the service center

6.5.1 Graphical overview of operation of the device based on pressure and temperature

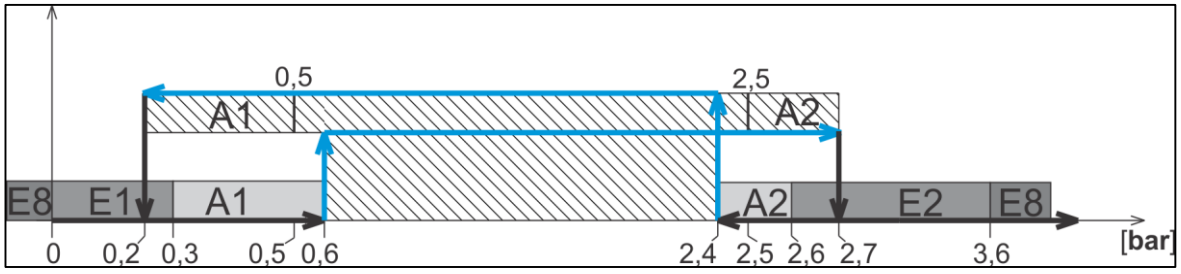


image 19

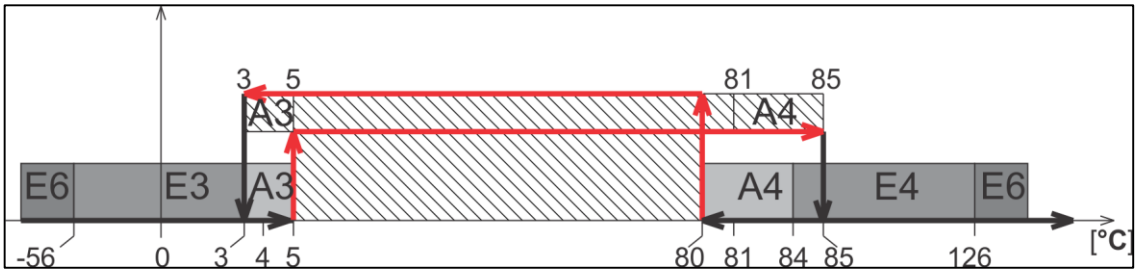


image 20

/// - Allowed heating

-Disallowed heating

7. Cleaning and maintenance

DANGER: Life danger from electric shock!

- ▶ You can perform electrical works only if you have appropriate qualification.
- ▶ Before opening the device: disconnect the heating system from the power supply by using the safety switch of the heating system and disconnect it from the main networkby using an appropriate fuse.
- ▶ Secure the heating installation from involuntary switching on.
- ▶ Comply with the regulations for installation.

WARNING: Material damages caused by unprofessional maintenance!

Insufficient or unprofessional maintenance of the boiler can lead to damages or destruction of the boiler, and thus to loss of warranty right.

- ▶ Ensure regular, thorough and professional maintenance of the heating installation.
- ▶ Protect electrical parts and operating units from water and moisture.

Use only original spare parts of the manufacturer or spare parts that are approved by the manufacturer. No liability is assumed for damages arising from spare parts which are not supplied by the manufacturer.

- ▶ Perform all works according to the inspection and maintenance record.
- ▶ Deficiencies need to be repaired immediately.

7.1 Cleaning the boiler

- ▶ Clean the device on the outside by a damp cloth.

7.2 Check the operating pressure, fill with water and discharge air from the installation

DANGER: Danger to health due to mixing drinking water!

- ▶ Be sure to comply with national regulations and norms for avoiding the mixing of drinking water (eg. with water from heating installations).
- ▶ Comply with EN 1717.

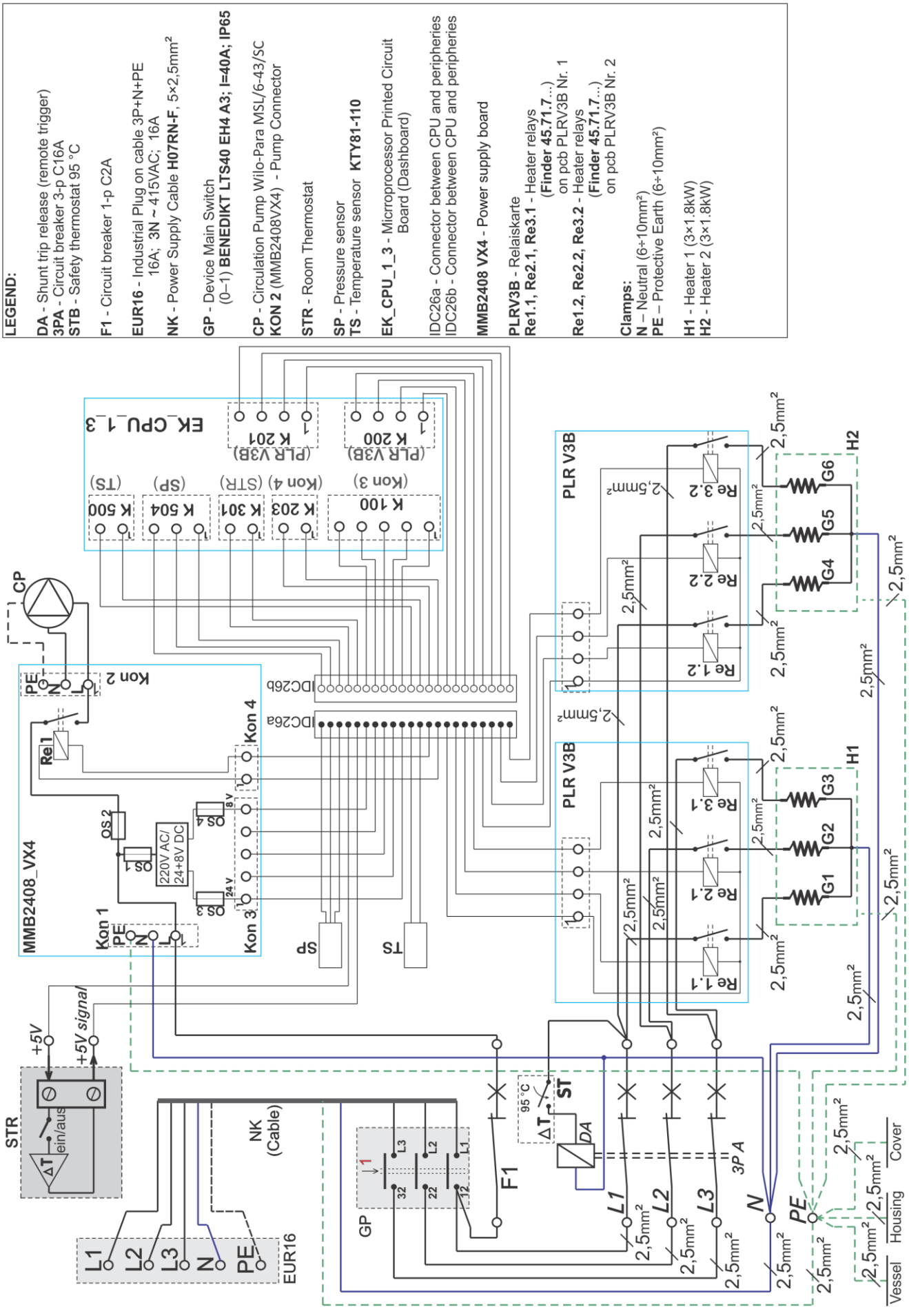
Establish the operating preasure of at least 1 bar, depending on the height of the height of the installation**.**

The volume of newly filled water decreases in the first days after the filling due to heating. This creates airbags that create interference in the heating system.

Inspection of operating pressure

- ▶ The operating pressure of the new heating installation should be controlled on a daily basis in the beginning. If necessary, add water to the heating system and discharge the air.
- ▶ After that, check the operating pressure once a month. If necessary, add water and discharge air from the heating system.
- ▶ Check the operating pressure. If the pressure of installation drops below 1 bar, it is necessary to fill it with water.
- ▶ Add water.
- ▶ Discharge air from the heating instalation.
- ▶ Check again the operating pressure

8. ELECTRICAL SCHEME



9. FAULTS AND THEIR REMEDY

Remedy of faults on the regulation and hydraulics must be carried out by an authorized company.

Use only original parts for repairs.

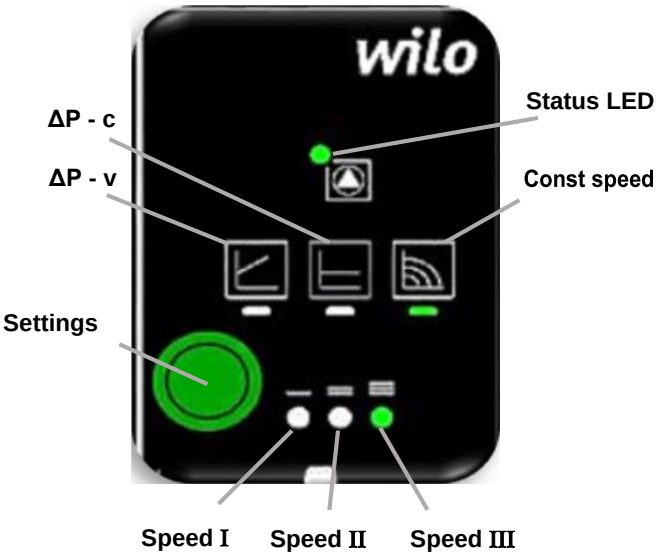
fault:	description:	cause:	take the following actions:
The boiler does not react after switching on the main switch	The display does not respond, the other components do not working	- boiler is disconnected from electricity - the fuses on the bottom panel are switched off - possible disappearance of the control phase - fault of the main switch ON / OFF	- 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 boiler does not heat or does not heat enough / the heating pump works	Everything on the display is in the recommended limits, but the boiler does not deliver hot water	- 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	- Check if all three phases come into the boiler - Check the set power of the boiler. - Replace the defective part - Replace the defective part
The boiler heats but it is very noisy	Increased noise level during operation	- Air in the system - Too low water flow - Possible occurrence of limescale on the heater	- Check if the air is discharged from the system and discharge it - Check the valves below the boiler and open them. - Clean the filter in front of the boiler - Remove heaters and clean them (this is not considered as a complaint within the warranty period)
The boiler is quickly switching off	It reaches the desired temperature too quickly and stops working	- Closed valves under the boiler - The pump's fuse has stopped working - Stuck pump - Defective pump	- Open the valves - Replace the defective part - Start the rotor of the pump - Replace the defective part
Large oscillations of the operating pressure	Too fast and too large changes in the operating pressure	- One valve is closed - Pressure in the expansion vessel is inadequate - Defective expansion vessel	- Open the valve - Check the pressure in the expansion vessel, and inflate the vessel to an appropriate value if it is necessary - Replace the defective part

10. Pump Wilo-Para MSL/6-43/SC

1. Composite OEM pump housing
2. Pump inlet MS ¾ 'SN
3. Pump output terminal composite ¾ " 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) an 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 atleast 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.

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

1.	Manufacturer	MIKOTERM DOO
2.	Brand name	eMobile
3.	Models	eMobile – 10,8 kW

4.	Room heating: Seasonal energy-efficiency class			D
5.	Room heating: Nominal heat output (*8) (*11)	P_{rated}	kW	10,8
6.	Room heating: Seasonal energy efficiency(*8)	η_s	%	37,71
7.	Annual energy consumption (*8)	Q_{HE}	kWh	12625
8.	Sound power level, indoor	L_{WA} indoor	dB(A)	32
9.	 All specific precautions for assembly, installation and maintenance are described in the operating and installation instructions. Read and follow the operating and installation instructions.			
10.	 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.			

(*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)"

Note

MIKOTERM d.o.o.

Bulevar Svetog Cara Konstantina 82

18000 Niš - Serbia

Tel.: +381 (18) 45 42 002; 34 09 702; 34 09 703;
e-mail: prodaja@mikoterm.com; office@mikoterm.com

www.mikoterm.com

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