MIKOTERM electronic

Guidebook for installation, handling and maintenance – ENG

eTK 6÷45kW

Electric boiler for heating systems with microprocessor control

FU-eTK-16/2025

Content

1. Description of symbols and 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

Further symbols

Symbol	Meaning
▶	Action step
→	Directives to other places in document or to other documents
•	Enumeration/Entry from the list
–	Enumeration/Entry from the list (2.)

Table 1

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 toprofessionals.
- Installation and commissioning, and maintenance and repair, must be done only by service authorised for electrical works.

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 security valves in order to avoid damage caused by too high pressure. During warming water can leak on security valve of the hot water circuit and hot water pipes.
- 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.

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

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

- Clean outside of device with wet cloth

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:

eTK	**6÷45kW**

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).

2.1.2 Regular application

The boiler can be used only for heating the water for heating system and for indirect use of hot water. 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 0.5bar to max pressure of 3.0bar, 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

The use of anti-freeze agents and inhibitors is not recommended, as they reduce the transfer of thermal energy and shorten the life of the boiler, as well as the entire heating system. If the use of antifreeze cannot be avoided, antifreeze agents that are permitted for heating installations should be used.

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.

- Comply with regulations of electrical installations and minimum distances which are in force in the subject country
- Minimum distance for heavy inflammable and self-extinguishing materials is 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:	Normally 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 2: *Ignitable materials and composition of elements according to DIN 4102*

2.8 Product description

The body of the boiler is made of welded steel sheet, and the shell of the boiler is made of pickled sheet, surface protected by the process of electrostatic plasticization, with thermal insulation between the body and the shell of the boiler.
The boiler is fixed to the wall using the supplied mounting set. Built-in thermal insulation in the boiler shell reduces heat loss. At the same time, thermal insulation also protects against noise.

Safety elements (automatic venting pot, safety thermostat) as well as heaters are mounted on the upper plate of the boiler. Depending on the type of boiler, heaters of different power are used. The set power of the boiler can be adjusted as needed. The possible values of the set power by model, as well as the choice of the set power, are given and described in chapter 7.3.2
The boiler can be installed as an integral part of the central heating system, floor heating, hybrid or storage systems.

2.9 Waste disposal

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

2.10 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 eTK	1
Assembly Set	1
Instructions for handling	1

2.11 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

2.12 Dimensions and technical data

2.12.1 Dimensions and technical data for boiler eTK

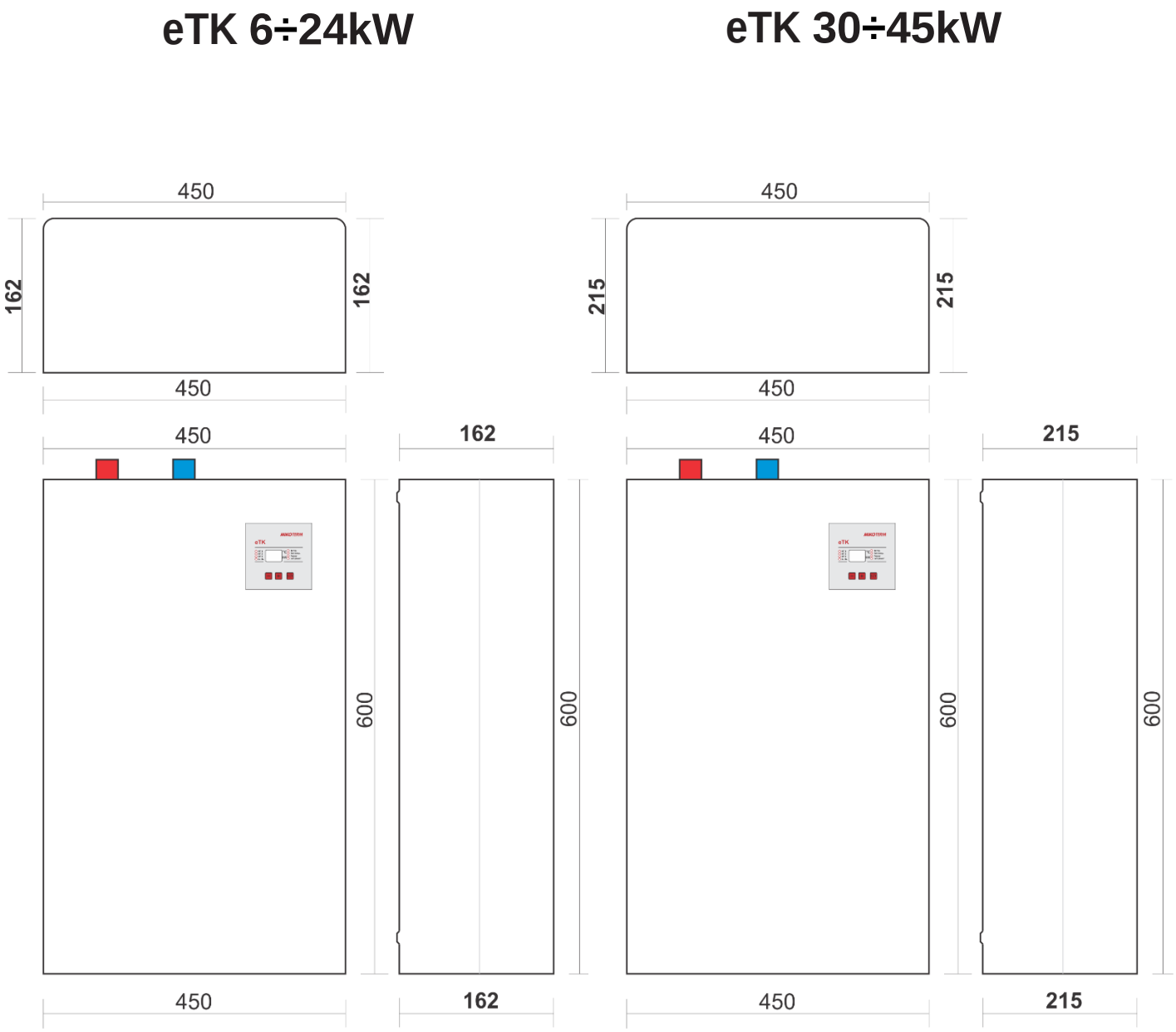


Image 2: *Dimensions eTK 6÷24kW and 30÷45kW*

2.12.2 Constituent parts of boiler power 6 to 24kW

1 IN	Return boiler's line 1″ (DN25) SN
2 OUT	Start boiler's line 1″ (DN25) SN
3	Boiler's exchanger
4	Electric heaters, three-phase, connected in ″Y″
5	Safety assembly for connecting the power cord
6	Terminals for connection, neutral (N) and protective (PE) lines
7	Connection ½″ UN (for Safety Valve)
8	Clamps for connecting the room thermostat
9	Power cable entry
10	Relays / Contactors for switching on electric heaters
11	Senzor temperature
12	Safety thermostat (ST)
13	Switch for device (ON/OFF)
14	Control panel with LCI3.2 interface
15	Microprocessor board LCTR3.2 (CPU)
16	Fuse F1 (T200mA)
17	Fuse F2 (T2A)
18	Fuse F3 (T500mA)
19	Fuse F4 (T500mA)
20	Fuse F5 (T500mA)
21	Relay R1 (External pump relay)
22	Relay R4 ÷ R6 - Contactor / heater activation (at 6kW)
23	Connector J1 (External Pump Connector)

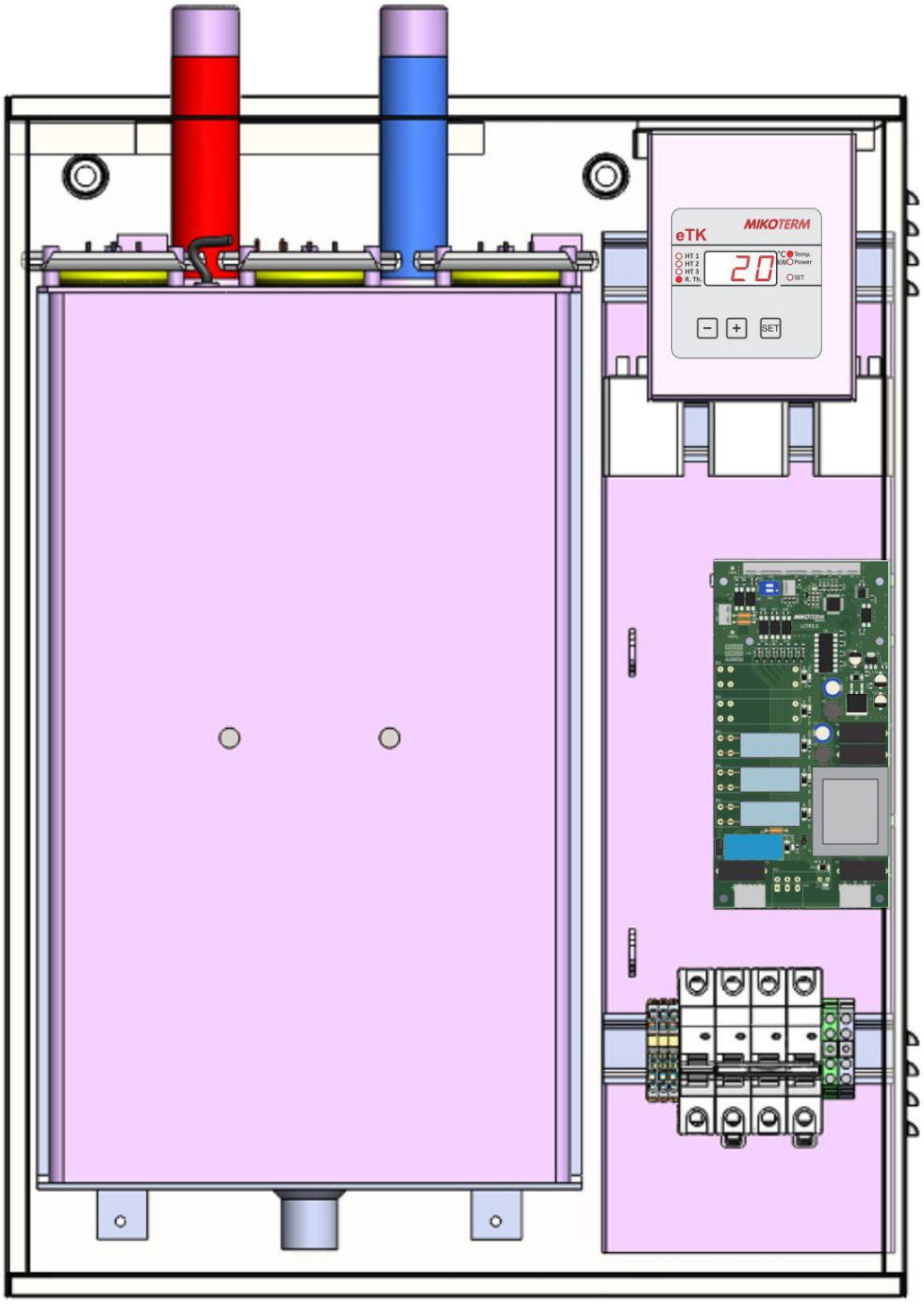


Image 2a: *The look of the open boiler eTK 6÷24kW*

2.12.2 Constituent parts of boiler power 30 to 45kW

1 IN	Return boiler's line 1˝ (DN25) SN
2 OUT	Start boiler's line 1˝ (DN25) SN
3	Boiler's exchanger
4	Electric heaters, three-phase, connected in ˝Y˝
5	Safety assembly for connecting the power cord
6	Terminals for connection, neutral (N) and protective (PE) lines
7	Connection ½˝ UN (for Safety Valve)
8	Clamps for connecting the room thermostat
9	Power cable entry
10	Contactors for switching on electric heaters
11	Senzor temperature
12	Safety thermostat (ST)
13	Switch for device (ON/OFF)
14	Control panel with LCI3.2 interface
15	Microprocessor board LCTR3.2 (CPU)
16	Fuse F1 (T200mA)
17	Fuse F2 (T2A)
18	Fuse F3 (T500mA)
19	Fuse F4 (T500mA)
20	Fuse F5 (T500mA)
21	Relay R1 (External pump relay)
22	Relay R2 ÷ R6 - Contactor activation
23	Connector J1 (External Pump Connector)

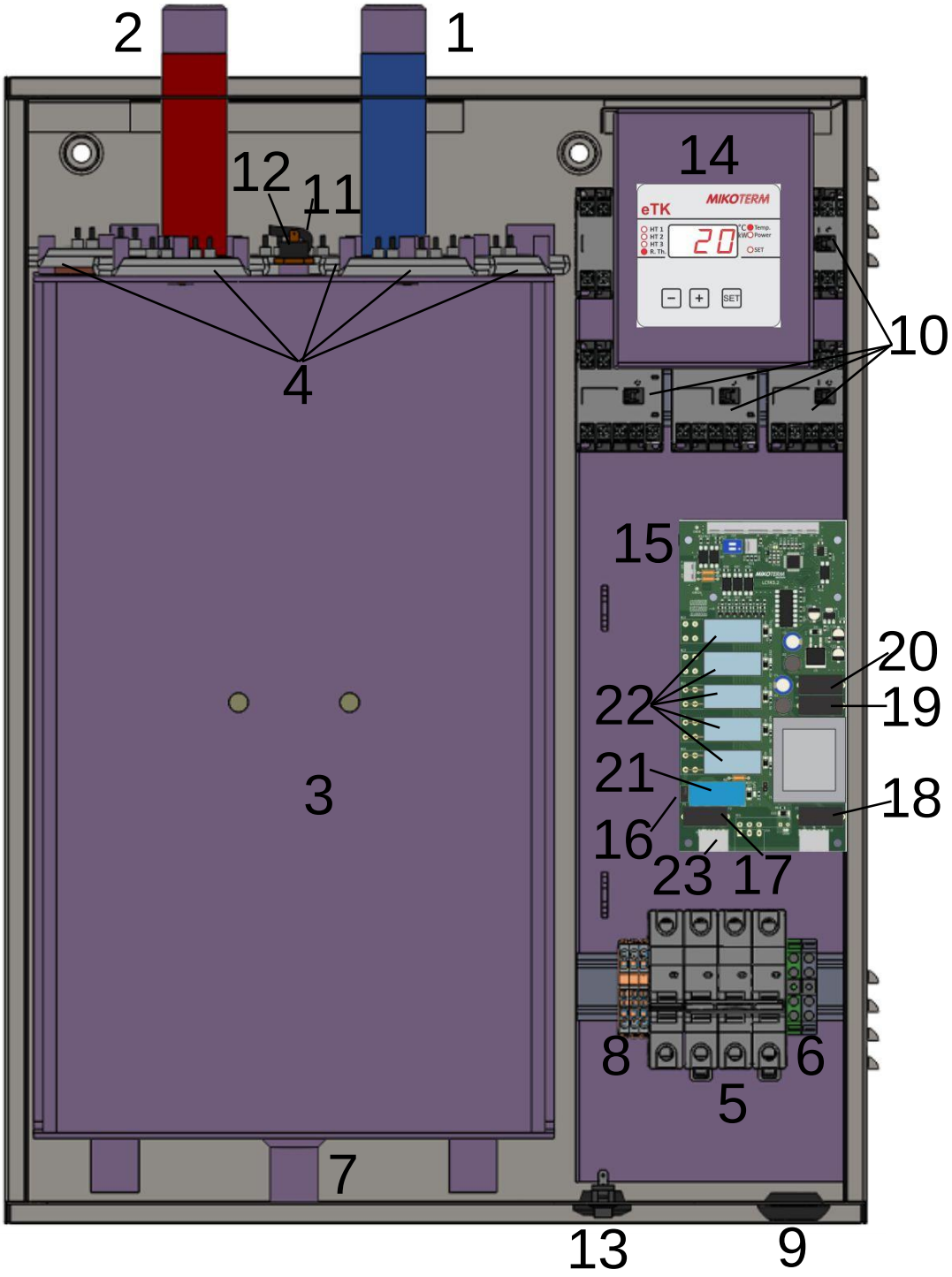
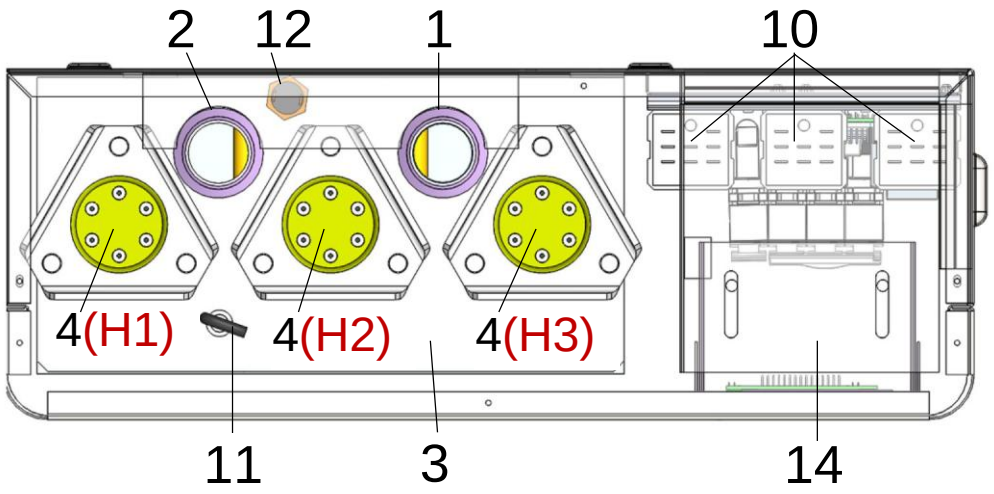


Image 2b: *The look of the open boiler eTK30÷45kW*

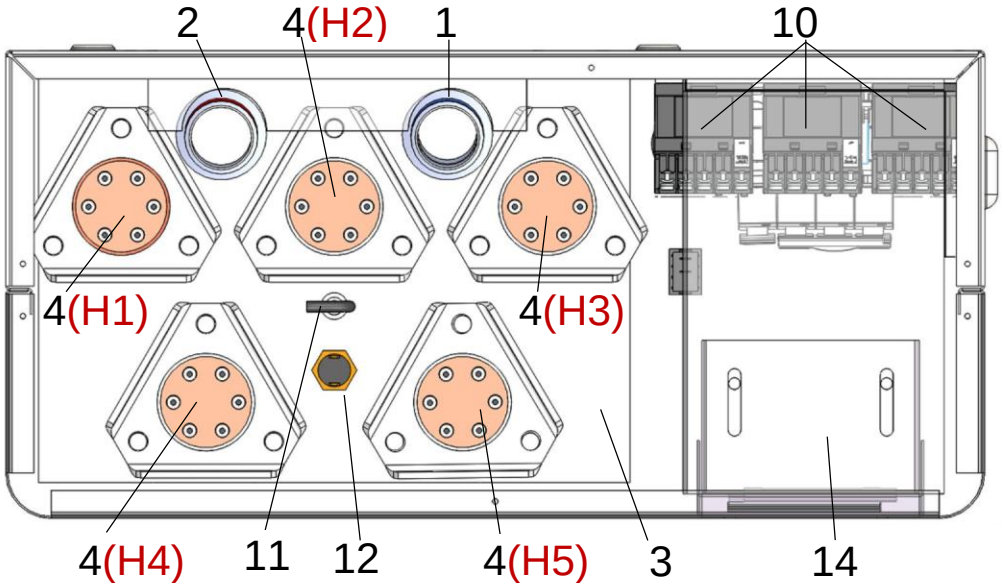
2.12.4 Heater and sensor positions for boilers 6 to 24kW

1 UL Return boiler's line 1″ (DN25) SN
2 IZ Start boiler's line 1″ (DN25) SN
3 Boiler's exchanger
4 Electric heaters, three-phase, connected in ″Y″
10 Contactors for switching on electric heaters
11 Senzor temperature
12 Safety thermostat (ST)
14 Control panel with LCI3.2 interface



2.12.5 Heater and sensor positions for 30 to 45 kW

1 UL Return boiler's line 1″ (DN25) SN
2 IZ Start boiler's line 1″ (DN25) SN
3 Boiler's exchanger
4 Electric heaters, three-phase, connected in ″Y″
10 Contactors for switching on electric heaters
11 Senzor temperature
12 Safety thermostat (ST)
14 Control panel with LCI3.2 interface



2.12.2 Technical data eTK 30 to 45 kW

	Units	eTK 6kW	eTK 9kW	eTK 12kW	eTK 18kW	eTK 24kW	eTK 30kW	eTK 36kW	eTK 40kW	eTK 45kW
Power	kW	6	9	12	18	24	30	36	40	45
Usability level	%	99	99	99	99	99	99	99	99	99
Number of power grades		3	3	3	3	3	5	5	5	5
Division of power grades	kW	3×2	3×3	3×4	3×6	3×8	5×6	5×7,2	5×8	5×9
Network voltage	V AC	3N ~ 400/230V 50Hz								
Ingress Protection rating		IP20								
Dimensions	HxLxW	600×450×162					600×450×215			
Needed fuses for three phase supply voltage	A	3×16	3×20	3×25	3×32	3×40	3×50	3×63	3×63	3×80
Minimum cable cross-section for three phase power supply	mm²	5×2,5	5×2,5	5×4	5×4	5×6	5×10	5×10	5×16	5×16
Needed fuses for single phase supply voltage	A	1×32	1×50	-	-	-	-	-	-	-
Minimum cable cross-section for single phase power supply	mm²	3×4	3×6	-	-	-	-	-	-	-
Water volume in boiler	ℓ	14,2					21			
Max allowed working pressure	bar	3								
Min allowed working pressure	bar	0,5								
Temperature range	°C	10 ÷ 80								
Safety thermostat	°C	95								
Connection of start line		1" SN (DN25)								
Connection of return line		1" SN (DN25)								
Device mass (without water)	Kg	20	21	21	21	22	28	28	28	29
Microprocessor Unit		EK_CPU_LCTR3.2 / LCI3.2								

Table 3: Technical data of Device

Important: if connecting to mono phase power please consult technical person about technical issues.

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 fusses 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-authorised 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
- ► Let know the user the valid regulations for minimum distances from burnable materials (section 2.7)

- Comply with regulations on electric installations and minimum distances in force in subject countries
- Place boiler on the wall in such manner to leave free space as illustrated in the Image 3

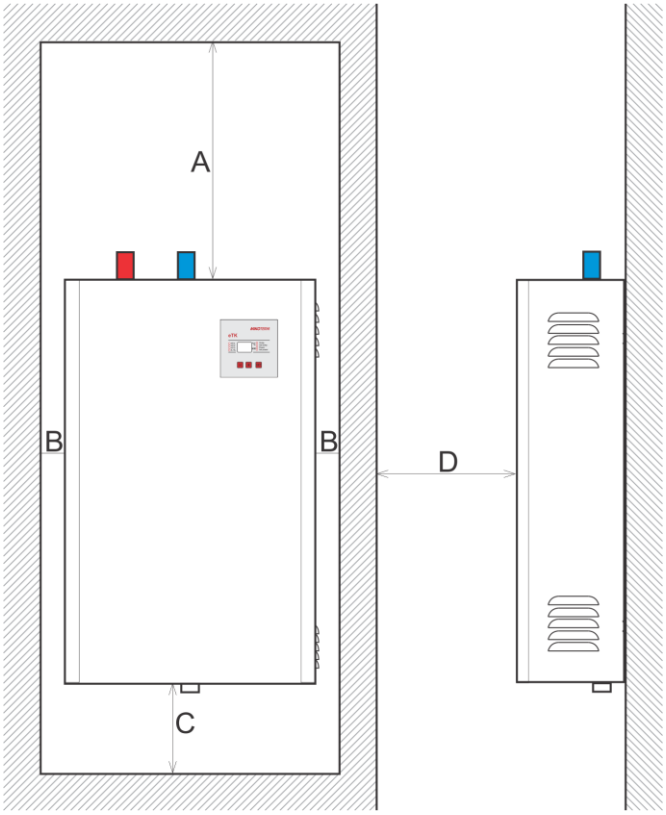


Image 3 **:** *Minimum distance during installation*

A = 500mm / B = 50mm / C = 200mm / D = 500mm

4.3 Demounting front boiler casing

Boiler casing can be removed for simple handling and installation (image 4)

- ► Unscrew 3 bolts at top lid
- ► Unscrew 3 bolts at bottom lid
- ► With slow pulling toward you demount front casing of the boiler

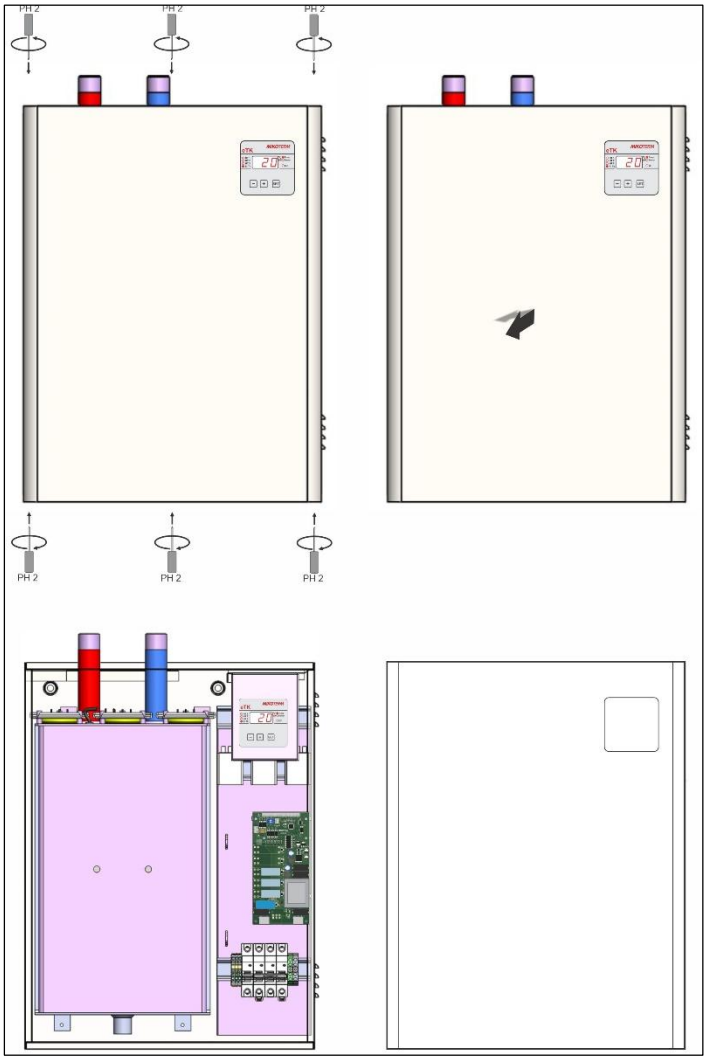


Image 4 : *Opening the boiler (Demounting front casing)*

4.4 Mounting boiler

NOTE: Material damage occurred by irregular installation on the wall!

- ► It is necessary to use proper material for fixing

This chapter describes boiler mounting on the wall

- Draw position of drilling holes for mounting set respecting minimum distances (image 3)
- Drill holes upon dimensions given in (image 2)
- Put into drilled holes plastic dowel enclosed in device packaging (or adequate dowel for unusual kind of wall)
- Then screw bolts into delivered dowels (or other) in such way that are left out from the wall min 5 mm-max 10mm
- Carefully hang device on the wall
- Make sure that boiler is placed vertically
- Fixed boiler on the wall by mounting set and screw

4.5 Hydraulic attachments execution

NOTE: Material damages caused by permeable connections!

- ► Attachment duct lines install without connecting on boiler connections

Heating duct lines connect as follows:

- ► Connect return line on connection IN
- ► Connect start line on connection OUT

4.6 Systems on which the eTK boiler can be connected

- All systems for heating the space designed for 80/60 temperature regime (or lower)
- Closed heating systems
- Systems with boiler on solid fuel

ATTENTION! When connecting the boiler to a solid fuel boiler system, where the same pump is used for both boilers, the pump should be electrically connected according to the connection diagram given in section 5.5. This ensures that the pump for both boilers is switched on correctly.

Excessive temperature stresses of the boiler are possible, as well as damage to the heater, seals and boiler vessel.

- It can be used as heating device for water in accumulating boilers over exchanger.
- It can also be used in certain technological processes providing that there is no need for water temperature higher than 60°C.
- It must not be used for direct heating of domestic hot water.

4.7 Filling the installations and watertight testing

The eTK boiler does not contain a manometer, so when filling the installation with water, the pressure must be monitored on the manometer installed on the heating installation.

4.7.1 Filling the boiler with heating water and sealing test

Waterproof should be tested prior to put on the boiler.

DANGER: Injuries and/or material damages can occur with overpressure when testing watertight!
High pressure can damage regulatory and safety devices and reservoir.

- ► After filling with water set the boiler on pressure that is equal to the opening pressure of safety valve
- ► Comply with maximum pressure of installed components
- ► After testing sealing, open again closing valves
- ► Make sure that all pressures, regulatory and safety parts work correctly

DANGER: Health threat due to mix of drinking water!

- ► It is demanding to respect state norms and regulations on avoiding mix drinking water (with water from heating installations)
- ► Comply with EN 1717

NOTE: Installation damage due to bad quality of water! Heating installation can be damaged by corrosion or scale depending on water characteristics.

- ► Comply with filling requests for water according to VDI 2035 or project documentation and catalogue

NOTE: Material damage due to temperature tension.

- ► If you fill the boiler in hot condition, temperature tension can cause cracks due to tensions. Boiler will start to leak
- ► Fill the boiler only in cold condition (temperature of empty duct can be max 40 °C)
- ► Fill the boiler only through quick valve on pipe installation (return line) of the boiler

- The installation should be vented via valves on the radiators
- Open the filling and emptying tap
- Slowly fill the boiler. In doing so, monitor the increase in pressure
- When the operating pressure is reached, close the tap.
- Bleed the installation via the valve on the radiator
- When the operating pressure drops by venting, the water must be topped up
- Carry out a leak test in accordance with local regulations
- After testing for leaks, open any items that have closed due to filling
- Check that all safety components are working properly
- If the boiler has been tested for leaks and no leaks have been observed, set the correct operating pressure
- Remove the hose from the filling and emptying tap
- Enter the operating pressure and water quality values in the Operating Instructions

During the first filling of repeated filling or when change the water

- Comply with requests for filling water

4.7.2 Heating pump air emission and de-blocking

This device does not have a circulating pump in it.
When the external heat pump is blocked, do the following:

- Carefully try to unlock the pump shaft with a suitable screwdriver

4.7.3 Boiler and installation air emission

• This unit does not have built-in venting.
• Ventilation must be installed on the installation.

5. Electric connecting

DANGER: Life threat from electric shock!

- Electric works must be done only by qualified person
- Turn off voltage supply before opening device and secure it against accidental turn on
- Comply with assembly regulations

When connecting boiler on electric installation take care on connections scheme and connecting plans. Respect mandatory diameters of cables and fusses power outside the boiler

This device is manufactured for connection to three-phase power supply (3N ~ 400/230V 50Hz)
Only devices with nominal power 6kW and 9kW, where the cross-section of the connecting cable must be according to Table 5a

5.1 Positions of introducer for the introduction of the power cable

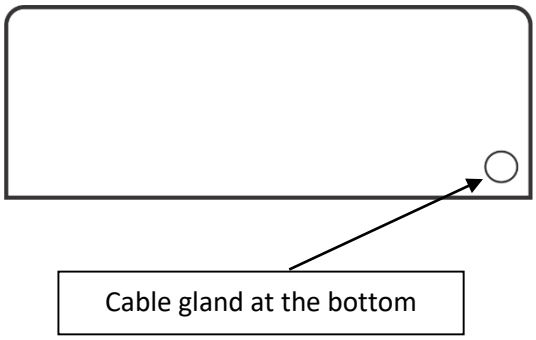


Image 5: *Display of the cable gland position on the boiler*

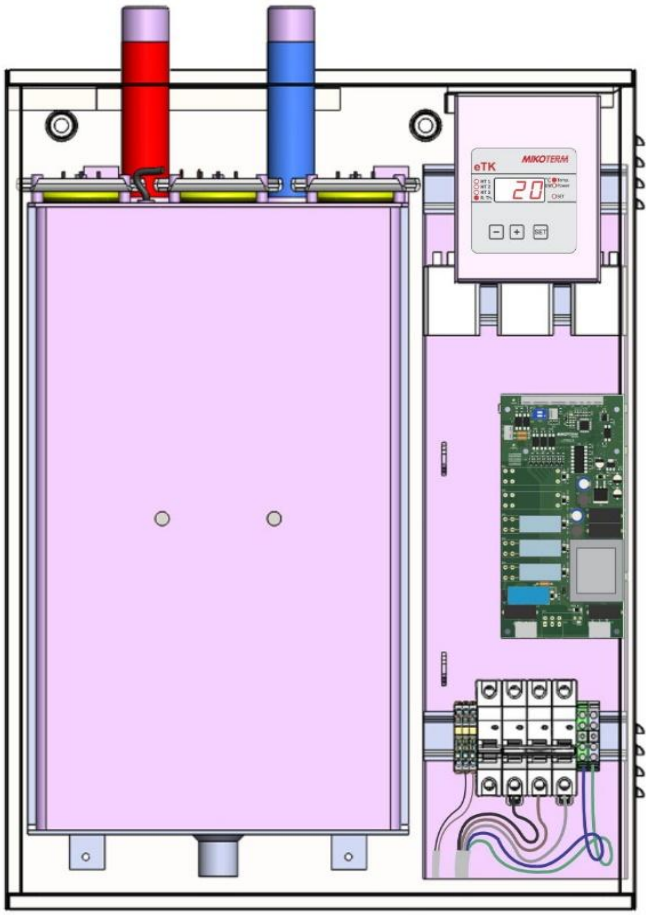


Image 6: *Connected cable*

SINGLE PHASE POWER SUPPLY table 5a

1N ~ 230V 50Hz	*eTK 6*	*eTK 9*
In[A]	*1 × 26,2*	*1 × 39,3*
Fuses [A]	*1 × 32*	*1 × 50*
Min. cable cross section	*3×4mm²*	*3×6mm²*

Table 5a: Nominal current, required el. fuses and cross-section of required voltage cables of **6 and 9 kW boilers for single-phase power supply**

THREE-PHASE POWER SUPPLY table 5b

3N ~ 400/230V 50Hz	*eTK 6*	*eTK 9*	*eTK 12*	*eTK 18*	*eTK 24*	*eTK 30*	*eTK 36*	*eTK 40*	*eTK 45*
In[A]	*3 × 8,7*	*3 × 13,1*	*3 × 17,4*	*3 × 26,2*	*3 × 34,8*	*3 × 43,5*	*3 × 52,2*	*3 × 58*	*3 × 65,2*
Fuses [A]	*3 × 16*	*3 × 20*	*3 × 25*	*3 × 32*	*3 × 40*	*3 × 50*	*3 × 63*	*3 × 63*	*3 × 80*
Min. cable cross section	*5×2,5mm²*	*5×2,5mm²*	*5×4mm²*	*5×4mm²*	*5×6mm²*	*5×10mm²*	*5×10mm²*	*5×16mm²*	*5×16mm²*

Table 5b: Nominal current required el. fuses and cross-section of required power cables for **three-phase power supply**

5.2 Connecting power (voltage) cable

- The connection is made according to the assembly scheme in figures 7, 8 and 9.
- In the boiler, instead of classic regular clamps for connecting the phase conductors of the power cable, there is a three-pole automatic fuse (MCB) to which the phase conductors of the power cable are connected. The MCB was upgraded with a remote voltage release, so that a safety circuit was obtained that, in addition to short-term current protection, also reacts to thermal overload: The signal from the safety thermostat activates the voltage release, which turns off the MCB and interrupts all 3 phases.
- Phase conductors are connected to three-pole fusses (L1, L2, and L3)

WARNING! When connecting phase conductors it is demanding to tight well screws in automatic fusses to achieve better join between cable and clamp

DANGER! If there is no good joint between cable and clamp, then uncontrolled warning of fusses can occur and its termination at the end

- When introducing a power cable into the boiler, through any selected set of glands, carefully patch the cable to the three-pole automatic fuses to avoid damaging the cable sets inside the device

NOTE! Only qualified person may execute connecting this device

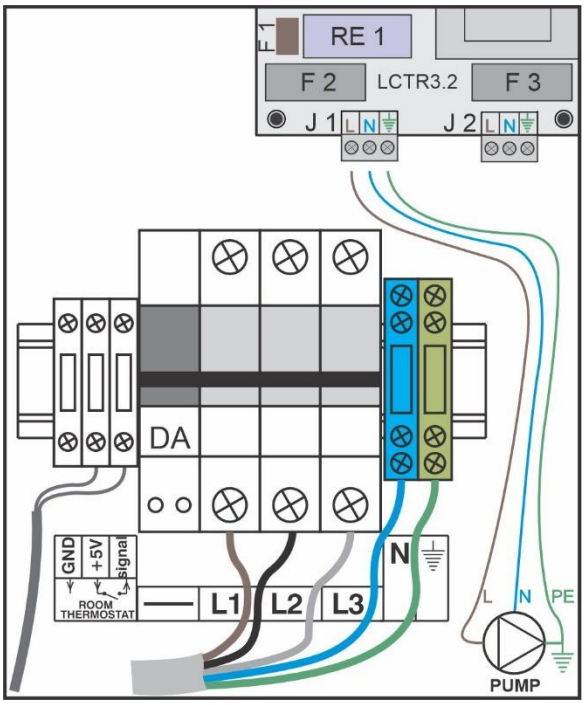


Image 7:
Scheme of boiler connecting on three-phase power supply

- Neutral (zero) duct line is connected to corresponding row immobilizer (N). Row immobilizer of zero duct line is of blue colour
- Grounding duct line should be connected in the row immobilizer clearly labeled with grounding symbol. Row immobilizer of the duct line for grounding is of green-yellow colour

NOTE: Remote voltage trigger is connected by manufacturer within safety set of this device and **no cable** should be connected with it

5.3 Scheme of power cable connecting

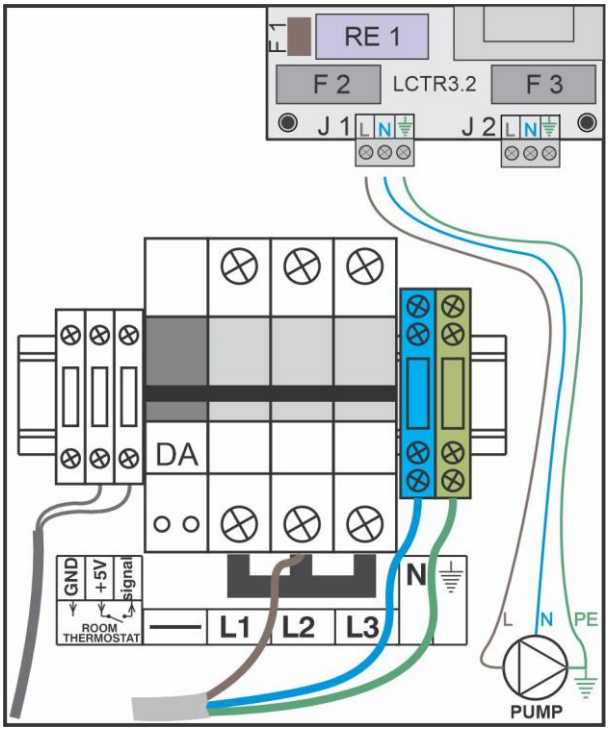


Image 8:
Scheme of connecting the boiler to a single-phase power supply - ONLY FOR POWER 6kW and 9kW

NOTE: Room thermostat is connected on additional clamps (+5V and Signal) and it interrupts voltage of 5V DC that comes from boiler table microprocessor

- ► It is recommended to use room thermostats with independent power supply like batteries
- ► This boiler is not predicted to work without room thermostat or external control unit

- When you are finished connecting the power cord and room thermostat, the fuse set must be lifted together with the remote voltage trigger before the unit is closed (before assembling the front panel) to ensure the power supply to the boiler

5.4 Connect external control of boiler (room thermostat)

NOTE: Room thermostat is connected on additional clamps (+5V and Signal) and it interrupts voltage of 5V DC that comes from boiler table microprocessor

- It is recommended to use room thermostats with independent power supply like batteries
- This boiler is not predicted to work without room thermostat or external control unit

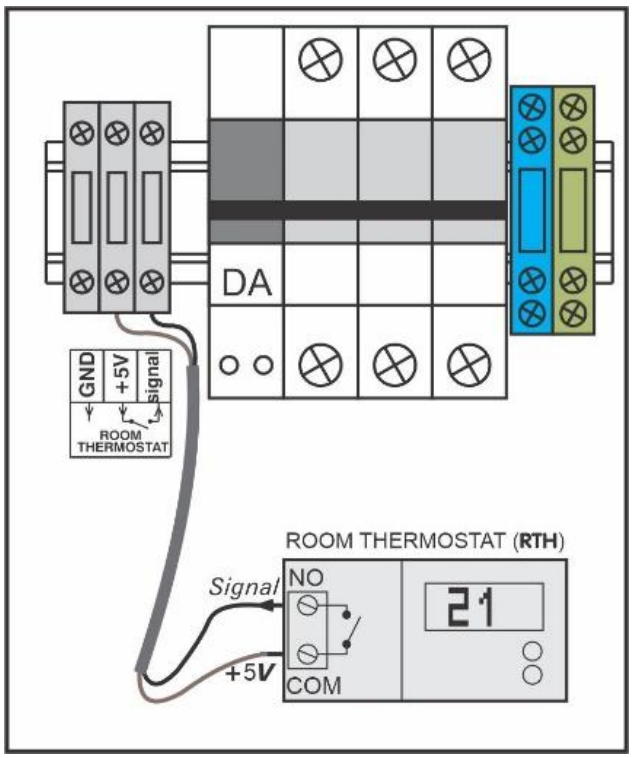
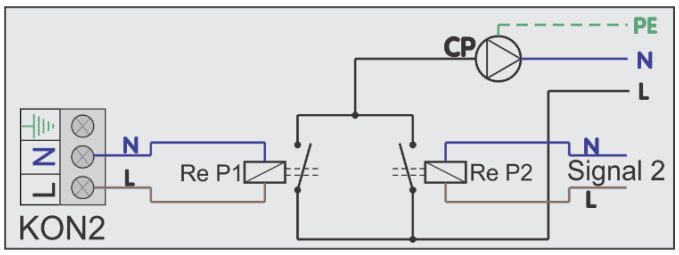


Image 8: *Room thermostat connection diagram*

NOTE! Use a room thermostat with a voltage-free contact system

5.5 Connecting a common pump for 2 boilers

When there is only an electric boiler in the heating system, it is recommended to connect the external circulation pump as shown in Figures 7 and 8. The pump connected in this way is controlled by the microprocessor thermoregulator (CPU) as follows: It is switched on by the signal from the room thermostat, and after the room thermostat is turned off, the pump remains on for another 2 minutes in order to remove the dissipated thermal energy from the heater. This prevents overheating of the boiler, which can occur after the heater is turned off if the pump is turned off at the same time.
In case of exceeding the allowed temperature in the boiler (80 °C), the CPU will also turn on the pump (regardless of the state of the room thermostat) in order to ˝cool down˝ the boiler with the flow of water and prevent further increase in boiler temperature.
In general, the control of the pump by the CPU is adapted to the needs of the electric boiler and in the function of protecting the boiler and the whole system. If the same pump is used by both an electric boiler and a solid fuel boiler, it is recommended to connect it according to the following scheme:



COMMON PUMP CONNECTION FOR 2 BOILERS
The signal from the microprocessor thermoregulator via KON2 turns on Relay P1. Signal 2 comes from the solid fuel boiler (or from the adjoining) thermostat and turns on Relay P2.
The contact systems of both relays transmit the same phase to the Pump. If any Signal for switching on the pump is active - the pump is switched on. If there are signals for turning on the pump from both boilers - the pump turns on safely. This connection of the pump ensures its operation that corresponds to both boilers.

5.6 Electric schemes of connection

All quoted cross-sections of cables are minimal. Cross-sections that should be placed depend on length of the line and placing mode.

- Cable cross-sections should be dimensioned according to

Legend	
3P A	Three-pole automatic fuse
DA	Remote power trigger
ST	Safety thermostat (Klixon) 95 °C
RTH	Room thermostat
RS 1, RS 2, RS 3	Connecting clamps of room thermostat **WARNING: voltage 5V DC**
P1	Main switcher ON/OFF
J1	External pump connection connector
RK1, RK2, RK3	Relay contact (for **9,12** and **18**kW)
K1 ÷ K6	Contactor (for **24,30,36,40** and **35**kW)
H1	Heater -3×1500W for boiler of: **9** kW -3×2000W for boiler of: **12**,**18,30** kW -3×2667W for boiler of: **24, 40** kW -3×2400W for boiler of: **36** kW -3×3000W for boiler of: **45** kW
H2	Heater -3×1500W for boiler of: **9** kW -3×2000W for boiler of: **6,12**,**18,30**kW -3×2667W for boiler of: **24, 40** kW -3×2400W for boiler of: **36** kW -3×3000W for boiler of: **45** kW
H3	Heater -3×2000W for boiler of: **18,30** kW -3×2667W for boiler of: **24, 40** kW -3×2400W for boiler of: **36** kW -3×3000W for boiler of: **45** kW
H4	Heater -3×2000W for boiler of: **30** kW -3×2400W for boiler of: **36** kW -3×2667W for boiler of: **40** kW -3×3000W for boiler of: **45** kW
H5	Heater -3×2000W for boiler of: **30** kW -3×2400W for boiler of: **36** kW -3×2667W for boiler of: **40** kW -3×3000W for boiler of: **45** kW

Legend	
LCTR 3.2	Microprocessor Thermoregulator (CPU)
SW 1	DIP switch for CPU configuration
F 1	El. fuse 230V T200mA Coil contact.
F 2	El. fuse 230V T2A External Pump
F 3	El. fuse 230V T500mA Transformer
F 4	El. fuse 24V T500mA Coil relays
F 5	El. fuse 8V T500mA µController
J 2	Power connector (230V AC)
J 7	Temperature sensor connector
TS	Temperature sensor
J 12, J13	Interface connectors (LCI3.2)
J 6	Room thermostat (RTH) connector
RE 1	Relay for switching on the external circuit. Pumps
RE 6	– Relay for incl. 1. heater rod (6kW boiler) – Relay for switching on RK1 (9, 12 and 18kW) – Relay for switching on K1 (24, 30, 36, 40 and 45kW)
RE 5	– Relay for incl. 2nd heater rod (6kW boiler) – Relay for switching on RK2 (9, 12 and 18kW) – Relay for switching on K2 (24, 30, 36, 40 and 45kW)
RE 4	– Relay for incl. 3. heater rod (6kW boiler) – Relay for switching on RK3 (9, 12 and 18kW) – Relay for switching on K3 (24, 30, 36, 40 and 45kW)
RE 3	– Relay for switching on K4 (30, 36, 40 and 45kW)
RE 2	– Relay for switching on K5 (30, 36, 40 and 45kW)

Table 6: *Legend of eTK connection and electrical diagrams*

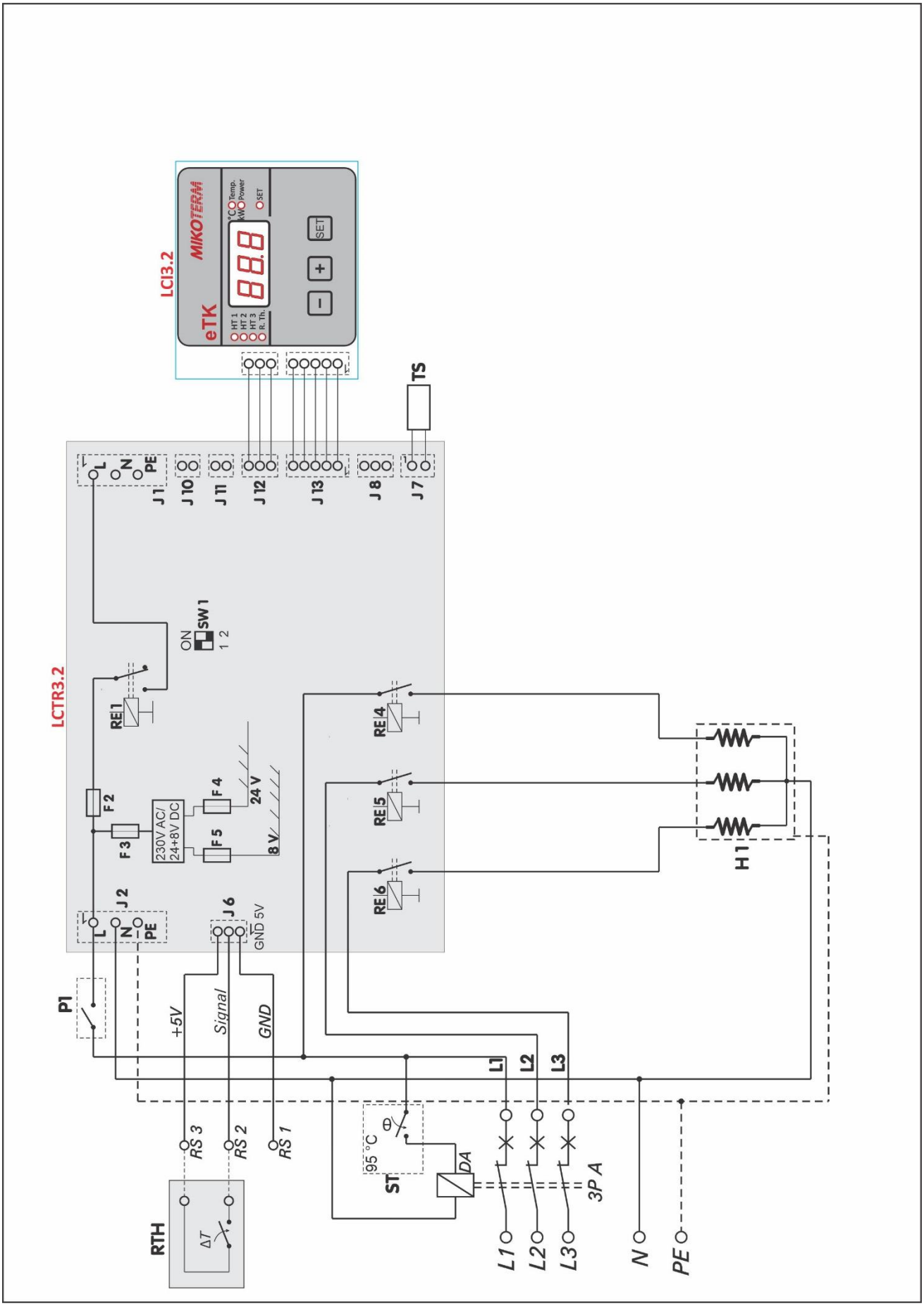


Image 10: *Boiler electric scheme* ***eTK*** *with nominal power of* ***6****kW*

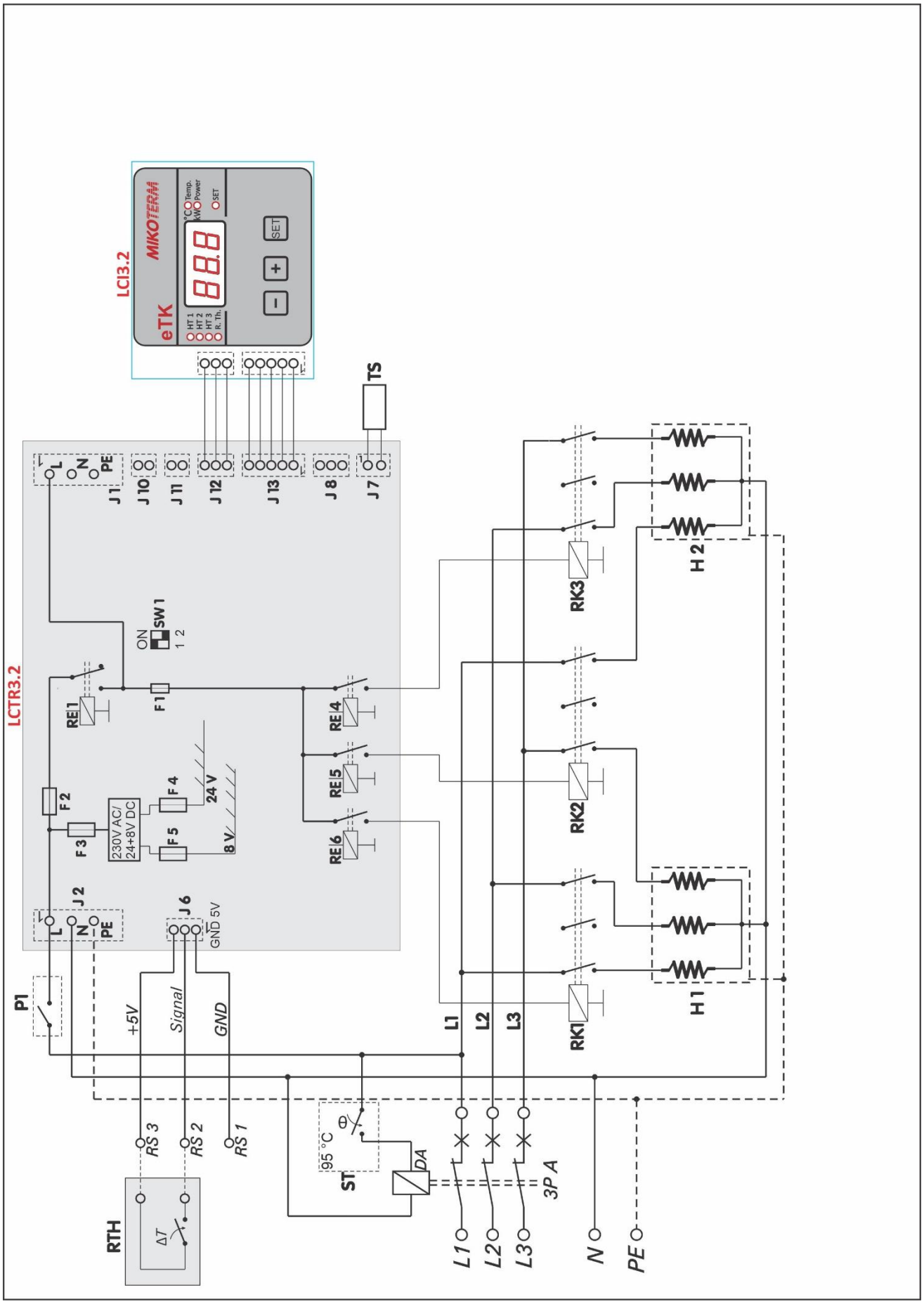


Image 11: *Boiler electric scheme* ***eTK*** *with nominal power of* ***9****kW and* ***12****kW*

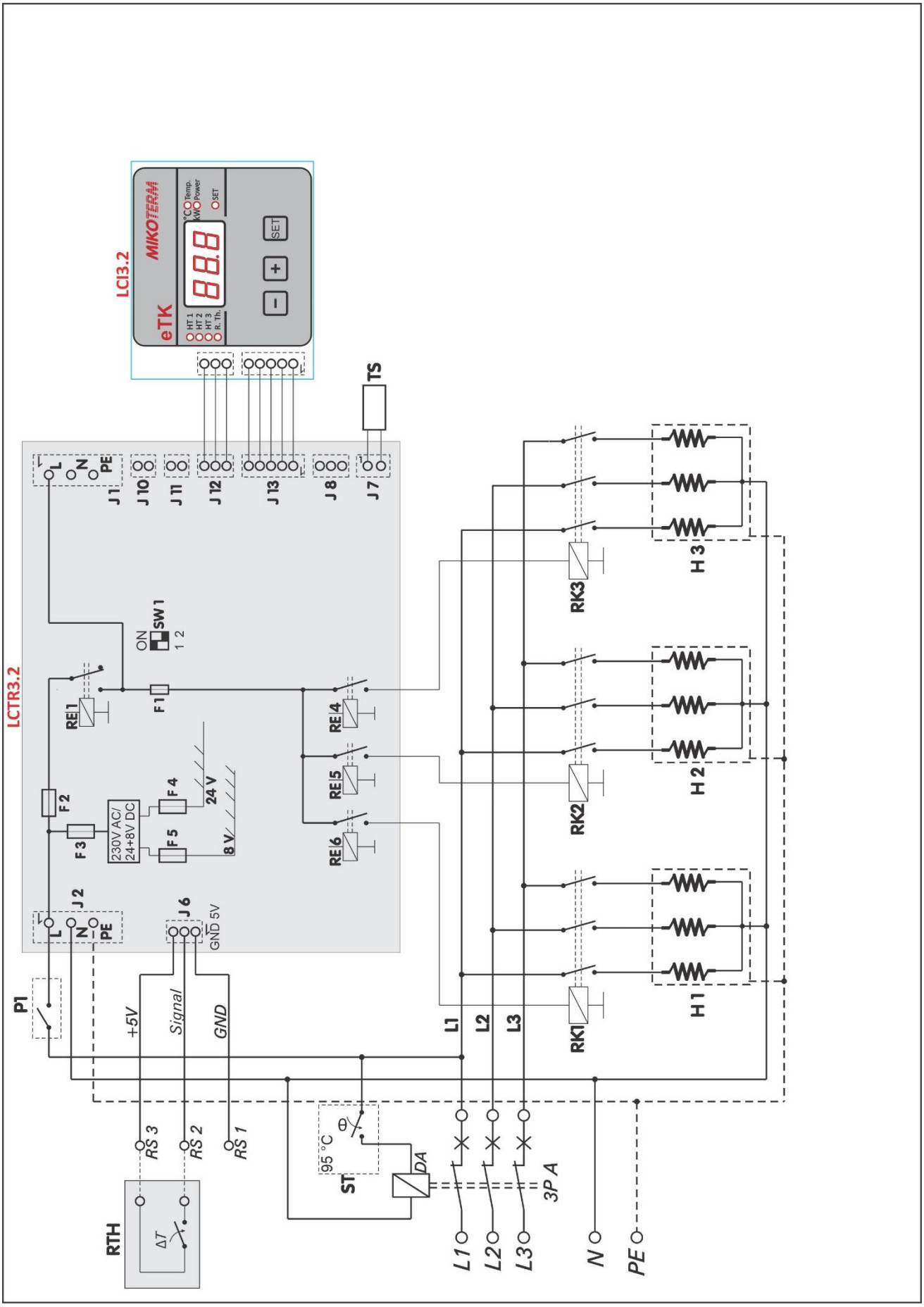


Image 12: *Boiler electric scheme* ***eTK*** *with nominal power of* ***18****kW*

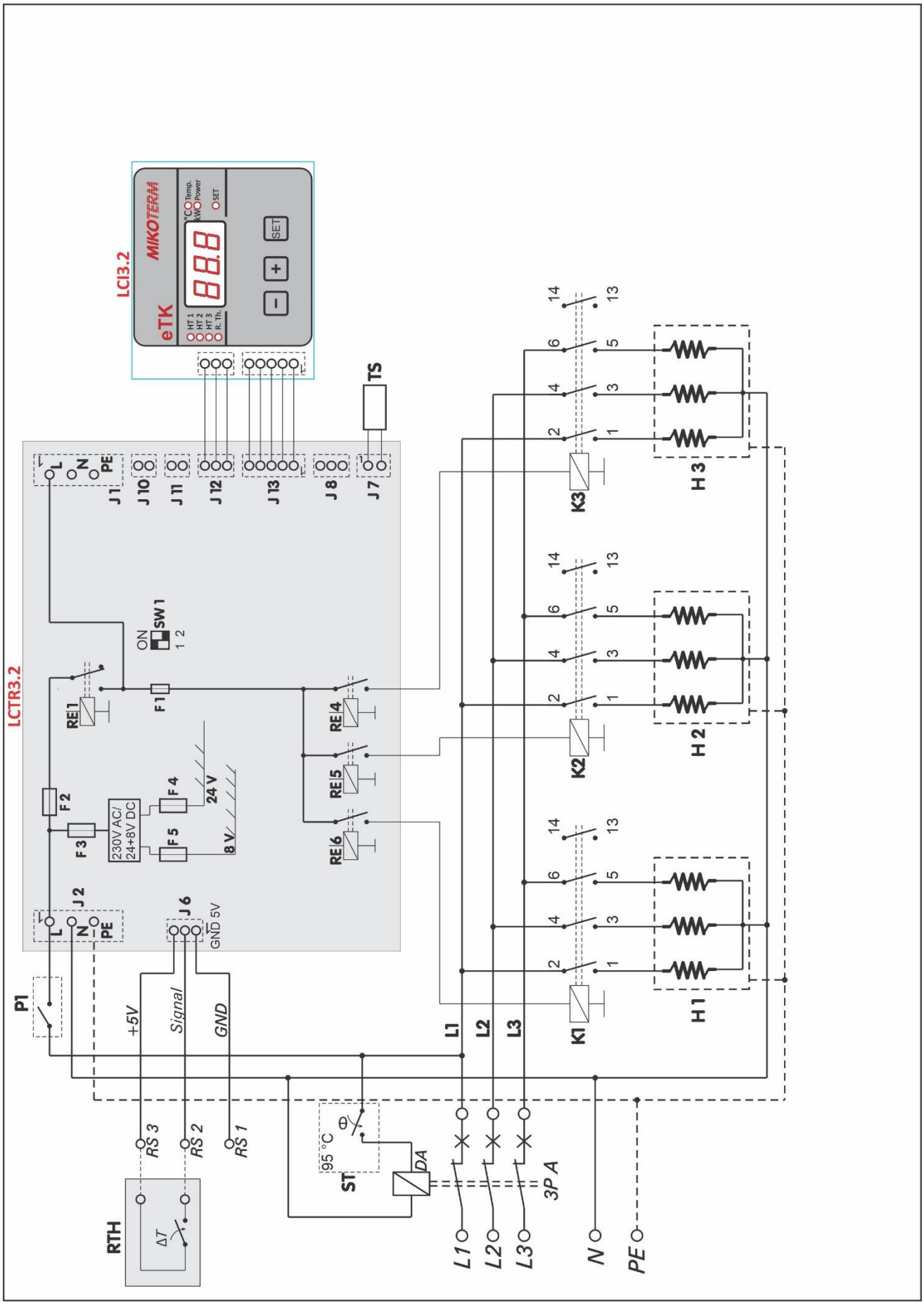


Image 13: *Boiler electric scheme* ***eTK*** *with nominal power of* ***24****kW*

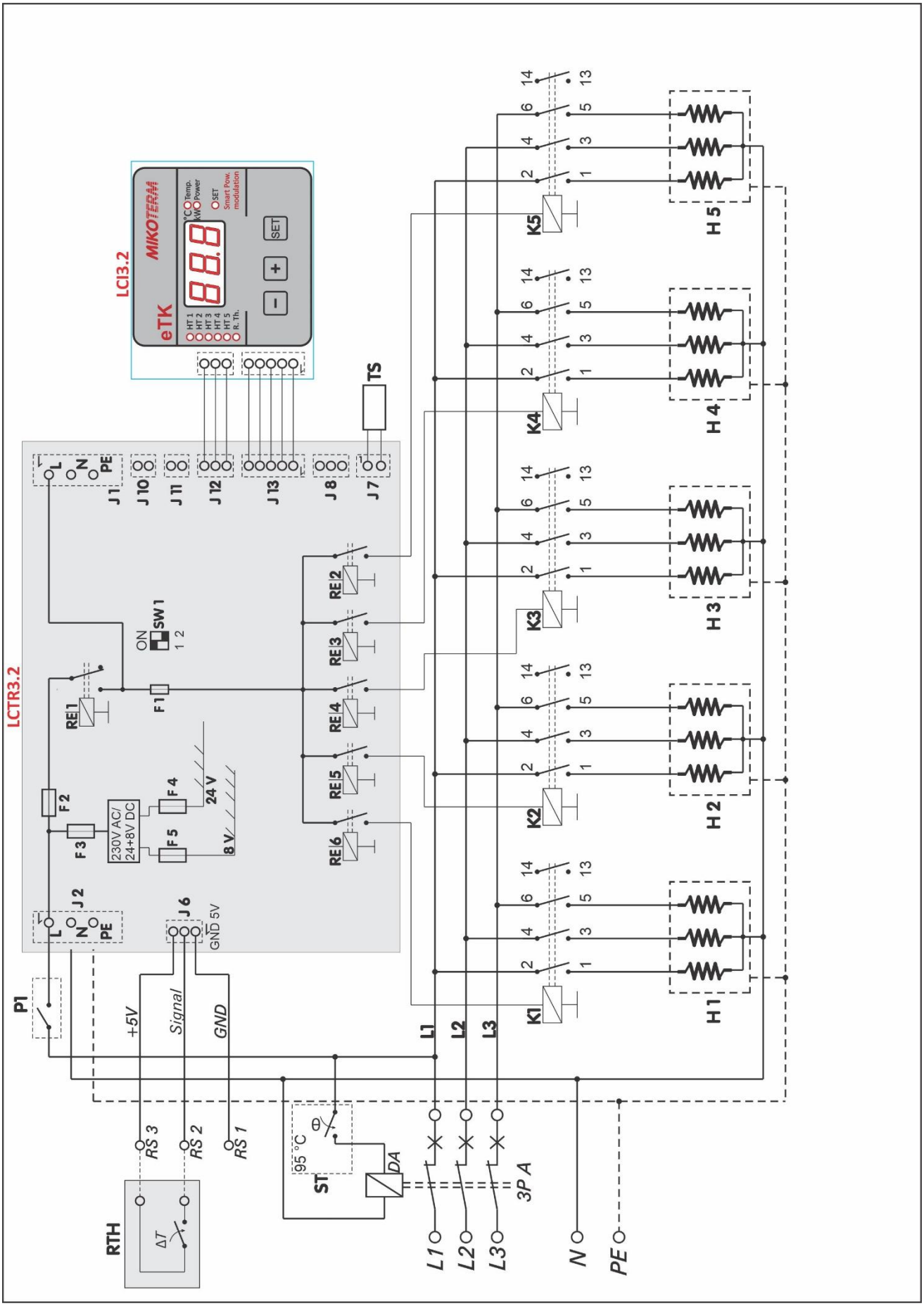


Image 14: *Boiler electric scheme* ***eTK*** *with nominal power of* ***30****kW,* ***36****kW,* ***40****kW and* ***45****kW*

6. Commissioning

When complete below described works fill in the Commissioning log (chapter 6.3).

6.1 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 0.5 bars

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

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

6.2 First turn on

NOTE: Material damage due to incorrect handling!

► Instruct client/user how to handle device

- Before the first start-up, check whether the heating installation is filled with water and vented. For normal operation of the device, it is necessary to set the working pressure to the value when filling and venting the heating system:
- P = 0.5bar + 0.1×L (L - height of the water column of the installation in m)
- Check the electrical connection and whether the cross-section of the power cable corresponds to the nominal power, the length of the cables and the installation method.
- Turn on the main switch (on the bottom of the device) and the room thermostat (if connected to the boiler).
-
- All digits from 0 to 9 will alternately appear on the display, and all LEDs will alternately turn on briefly - to check correctness.
- Turn on the circulation pump of the heating system
- The device comes factory set to min. The temperature of 10 °C and power 0kW. Set the desired temperature and power.

6.3 Start-up log

1.	Boiler type	
2.	Serial number	
3.	Set thermostat regulation	
4.	Fill and air-vent heating installation and check sealing of all connectors	
5.	Establish working pressure Check expansion dish pressure	_____ bar _____ bar
6.	Test safety devices	☐
7.	Set electric connection according to local regulations	☐
8.	Test function	☐
9.	Users informed, technical documentation submitted	☐
10.	Notes	
11.	Certificate of professional turn on device	Service seal / Signature / Date

***Table* 5:** *Start-up log*

7. Heating installation handling

7.1 Working Instruction

Safety Instructions

- Only adults familiar with instructions and working mode may operate the boiler
- Make sure there are no children in the boiler area
- Do not dispose or store inflammable materials within safe distance of 400 mm round the boiler
- Inflammable materials must not be placed on the boiler
- User must comply with instructions for operating the boiler
- User may only turn on the boiler (except the first start-up), adjust temperature on the regulating device and turn off the boiler. All other operations must be performed by authorised service
- Authorised person who performed installation is obliged to inform the user about handling and correct and safe work of boiler
- In the event of alert situation, explosion, fire, gas or steam leaking, the boiler must not work
- Be aware of inflammable characteristics of components (Instructions on installations and maintenance)

7.2 Overview of the elements to adjust

7.2.1 Device functions

- eTK is a classic type of electric boiler, without a circulation pump and expansion vessel. The construction of eTK is robust, and the built-in components are of top quality. It is enriched with a microprocessor thermoregulator, which is the most important difference compared to the previous model (TK)
- The safety of the device is at the maximum level, because a protective circuit is installed - the same as with the "mTronic" and "eCompact Plus" models
- Communication of the user, as well as the installer (servicer) with the device is done through the user interface where you can easily see and adjust all the important parameters of the device
- Genuine software allows for longer service life. The microcontroller continuously monitors the information received from the sensor, measures the operating time of the heater, and based on that evenly loads all vital components
- Also, the microcontroller monitors the dynamic growth of temperature and based on that and the set power optimizes the engaged power of the boiler - which means minimal electricity consumption. Energy

7.2.2 Basic interface view

All boilers of the eTK series have the same user interface, although boilers with a nominal power of 30÷45kW have 2 more LEDs than boilers with a nominal power of up to 24kW, due to more built-in heaters.
The current temperature is constantly shown on the display of the device, which is indicated by the LED that lights up next to the inscription "Temp".
The review of other parameters is performed using the "-" and "+" keys, while the status LEDs indicate which parameter is displayed:
- Set temperature: LED "Temp" and LED "SET" are lit.
- Current boiler power: "Power" LED lights up.
- Set power of the boiler: LED "Power" and LED "SET" are lit.
The parameters that can be adjusted are: Set temperature and Set power of the boiler. To enter the setting, use the ˝SET˝ key. The same key is used to save the new set value of the parameter and exit the settings.

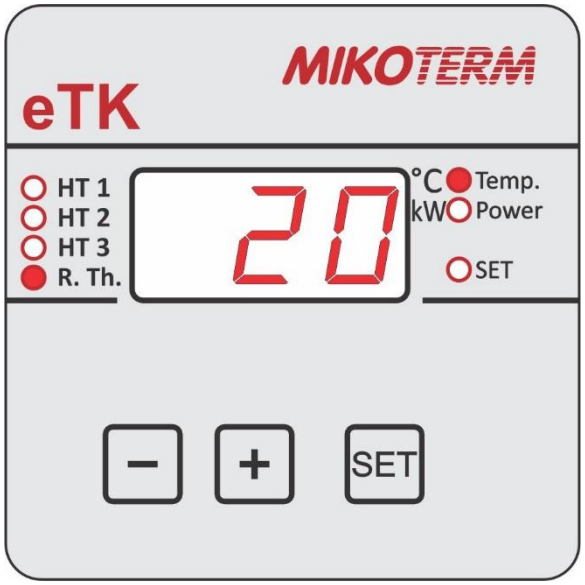


Image 15a: *Control panel view eTK 6÷24kW*

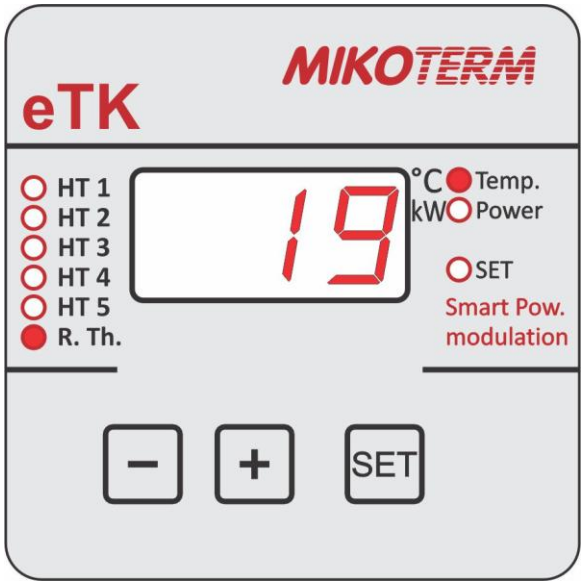


Image 15b: *Control panel view eTK 30÷45kW*

Status LEDs on the left (lit continuously):
- HT 1 : LED for indicating the operation of the heater no. 1
- HT 2 : LED for indicating the operation of the heater no. 2
- HT 3 : LED for indicating the operation of the heater no. 3
- HT 4 : LED for indicating the operation of the heater no. 4 (only 30÷45kW)
- HT 5 : LED for indicating the operation of the heater no. 5 (only 30÷45kW)
- R. Th. : Indicates the room thermostat is on

Status LEDs on the right side:
- Temp. : Indicates that the display shows Temperature [°C] (LED state "SET" defines which temperature is displayed)
- Power: Indicates that the display shows power [kW] (LED state "SET" defines which power is displayed)
- SET : When it does not light up, the display shows the current value, when it lights up continuously, the default value is displayed, and when it blinks, the parameter value is being set.

Keys:
- ‘’-’’ Key to decrease the value of the parameter and move down through the MENU
- "+" key for increasing the parameter value and moving up through the MENU

"SET": Key for entering parameter setting and confirmation.

7.2.3 Parameter overview

As already mentioned, the current temperature is constantly shown on the basic display of the device, which is indicated by the LED that lights up next to the inscription "Temp". Viewing other parameters is done using the "-" and "+" keys, while the status LEDs indicate which parameter is displayed.

7.2.3.1 Overview of set temperatures

To view the set temperature, the shortest way from the basic display is by briefly pressing the "-" key, after which its value will be shown on the display, which is indicated by 2 status diodes that are on at the same time and light up continuously: LED "Temp" and LED "SET" (image 16).

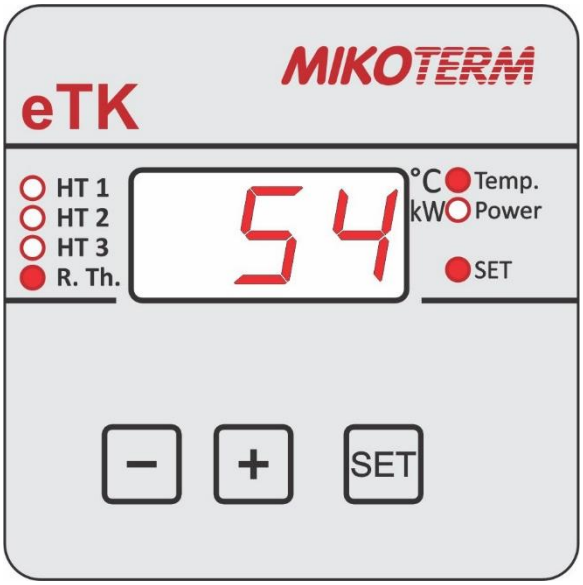


Image 16: *Overview of the set temperature eTK 6÷24kW*

7.2.3.2 Overview of current boiler power

To view the Current Boiler Power, the shortest way from the basic display is by pressing the "-" key twice. The current value of the boiler power will be shown on the display, which is indicated by the status LED "Power" which lights up continuously (image 17).

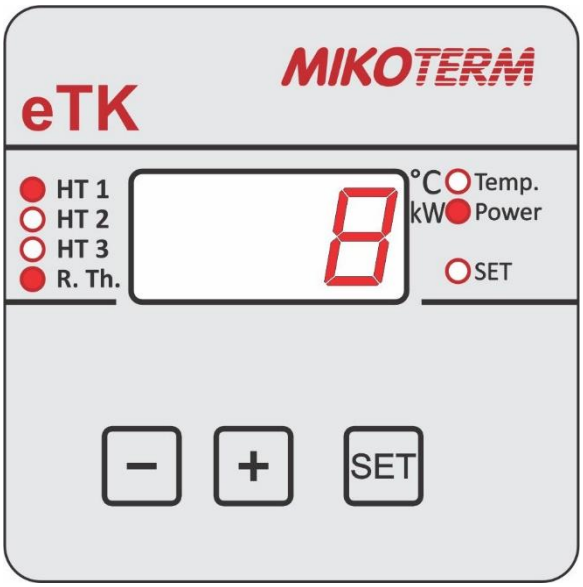


Image 17: *Overview Current boiler power eTK 6÷24kW*

7.2.3.3 Overview of boiler setpoint power

To view the set power of the boiler, it can be accessed from the basic display with 3 short presses on the "-" button or 1 short press on the "+" button, after which its value will be shown on the display, which is indicated by 2 status diodes that are on at the same time and light up continuously: LED "Power" and LED "SET" (images 18a and 18b).

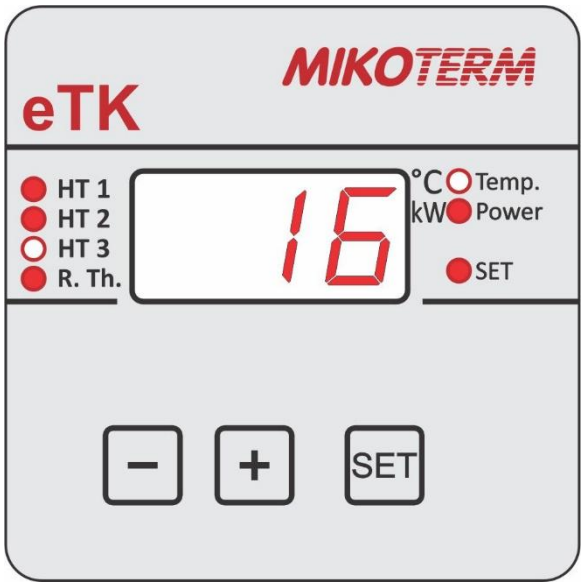


Image 18a: *Overview of the set power of the boiler eTK 6÷24kW*

Image 18b: *Overview of the set power of the boiler eTK 30÷45kW*

After 15 seconds from the last press of any key, the display automatically returns to the basic display.During the inspection of the Boiler set power, as well as other parameters, the status diodes on the right indicate with a continuous light which parameter is shown on the display. When setting the parameter values (chapter 7.3), the status LED "SET" will blink, which is a clear difference between the display during the review and the setting, which may be identical in other parts.The status LEDs on the left side always indicate the current state of the room thermostat and heater, whether the interface is the basic display, parameter overview or setting.

7.3 Heating regulation

- Electric heaters are switched on at the request of the room thermostat
- When the boiler reaches the set temperature of the water in the system, the heaters are turned off (with a gap of 3 seconds to eliminate shocks to the electrical network). When the current water temperature drops 2°C below the set - the heaters are turned on again, but not all, but only part of the set power (depending on the nominal power of the boiler and the number of ″steps″ regulation). The controller monitors the dynamic increase in temperature and, based on this, determines the minimum engaged power of the heater, which is sufficient to maintain the set temperature of the boiler, that is, minimizes the consumption of electricity. energy. Microprocessor regulation measures the operating time of each heater, replaces the heater operation (if there is an inactive heater available) after 30 minutes of continuous operation. With this mode of operation, all heaters and relays are evenly loaded, and their working life is significantly extended.
- When the room temperature is reached, the microprocessor controller turns off the heaters.

7.3.1 Setting the set temperature of the boiler

On the basic display of the control panel, the LED ″Temp.″ lights up, which means that the display shows the current temperature. To enter the setting of the set parameters, press the ″SET″ button briefly: the ″Temp″ LED continues to light up continuously, and the LED marked ″SET″ starts blinking, and the Set temperature value appears on the display. Using the "-" and "+" keys, it is possible to increase or decrease the set temperature of the boiler image 19). Each key press increases or decreases the set temperature of the boiler by 1°C. The adjustment range is 10°C ÷ 80°C.
In order for the change to be accepted, it must be confirmed by pressing the ″SET″ key. If the change is not confirmed, within 15 sec. from pressing any key (except ″ SET ″), the boiler continues to operate at the old value of the set temperature and exits the setting mode.
When the change of the set temperature is confirmed by pressing the ″SET″ key, it switches to the setting of the Set Power, and if this is not desired, by pressing the ″SET″ key again, it exits the settings mode and returns to the normal operating mode with the new value of the boiler set temperature.

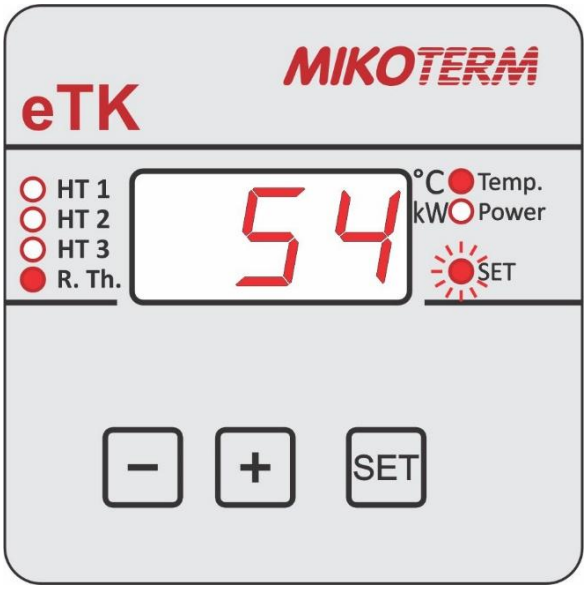


Image 19: Setting the set boiler temperature

7.3.2 Setting the default boiler power

To enter the setting of the set parameters from the basic display, press the ″SET″ button briefly: the ″Temp″ LED is still continuously lit, and the LED marked ″SET″ starts blinking, which means that it is possible to set the Set temperature (described in the previous chapter). If you don't want to change the Set temperature, but only the Set power, you should briefly press the ″SET″ button once more - now the LED next to the ″Power″ symbol lights up and the LED with the ″SET symbol blinks, and the value of the Set power appears on the display - which means that it is possible to increase or decrease the Set power of the boiler using the ``-" and ``+" buttons (picture 20). Each key press increases or decreases the Boiler's Set power by 1 power step (see table 8).

In order for the change to be accepted, it must be confirmed by pressing the ″SET″ key. If the change is not confirmed, within 15 sec. from pressing any key (except ″ SET ″), the boiler continues to operate at the old value of the Set power and exits the setting mode.

When the change to the Set Power is confirmed by pressing the ″SET″ key, the display returns to the basic display, i.e., the value of the current temperature is displayed.

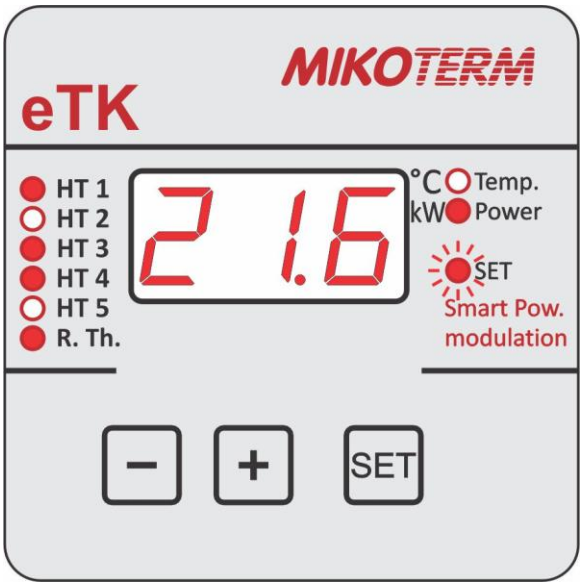


Image 20: Setting the Set Power (Example eTK 36kW)

Boiler power	Power steps (kW)	Possible set power (kW)
6kW	2+2+2	2 - 4 - 6
9kW	3+3+3	3 - 6 - 9
12kW	4+4+4	4 - 8 - 12
18kW	6+6+6	6 - 12 - 18
24kW	8+8+8	8 - 16 - 24
30kW	6 + 6 + 6 + 6 + 6	6 - 12 - 18 - 24 - 30
36kW	7,2+7,2+7,2+7,2+7,2	7,2 - 14,4 - 21,6 - 28,8 - 36
40kW	8 + 8 + 8 + 8 + 8	8 - 16 - 24 - 32 - 40
45kW	9 + 9 + 9 + 9 + 9	9 - 18 - 27 - 36 - 45

Table 8: Power and power setting steps

7.3.3 Low temperature warnings and errors

If the temperature in the system drops to T ≤ 4°C, the boiler continues to work normally, but the current temperature display and the Warning display ″A3″ alternate on the display (image 21). It is necessary that the temperature rises to T ≥ 5°C, so that the warning automatically stops appearing on the display.

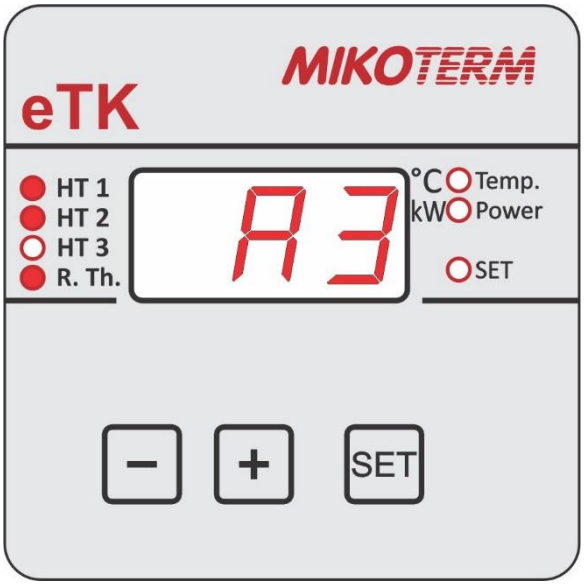


***Image 21**: Warning A3 - temperature close to the limit of permissible low values*

If the temperature in the system drops to T ≤ 2°C, all heaters are turned off (heater operation blocked), and the current temperature value and error ″E3″ are displayed on the display, instead of warning A3 (picture 22). At temperature values ≤ 2°C, there is a risk of freezing and damage to the boiler, which is why the operation of the device is blocked. In order for the boiler to continue normal operation, it is necessary for the temperature to rise to T ≥ 5°C.

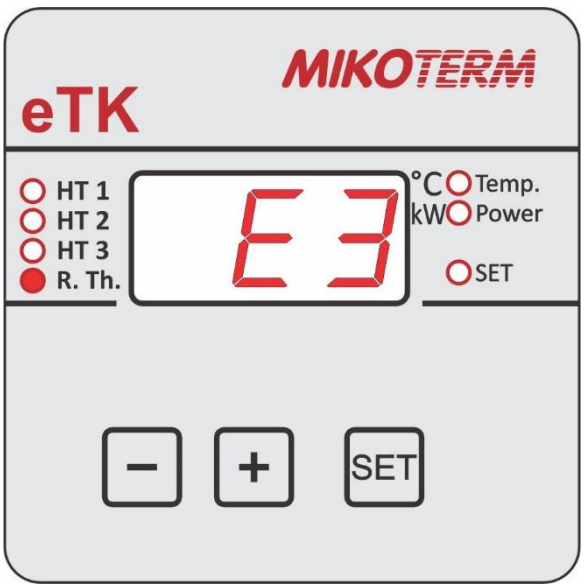


***Image 22:** Error E3 - temperature below the limit low values allowed*

WARNING! If the heating system is not functioning, freezing may occur

- ▶ it is mandatory to secure the system
- ▶ unload the complete installation

The display of the current temperature on the display is possible for values T ≥ -50°C (due to the measuring range of the temperature sensor). For temperatures below -50 °C, or in the event that the temperature sensor is short-circuited (which is more likely than if the temperature is lower than -50 °C), the message ″LE″ (picture 23a) appears on the display, which periodically alternates with the display of the error code ″E6″ (image 23b).

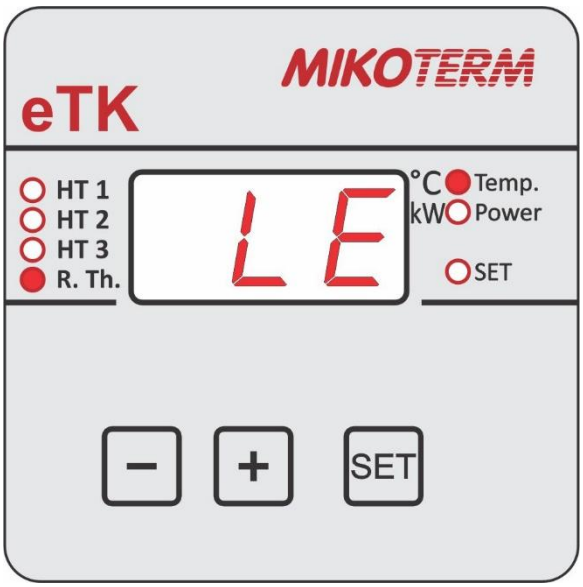


***Image 23a:** Temperature below -50 °C, or sensor short circuit*

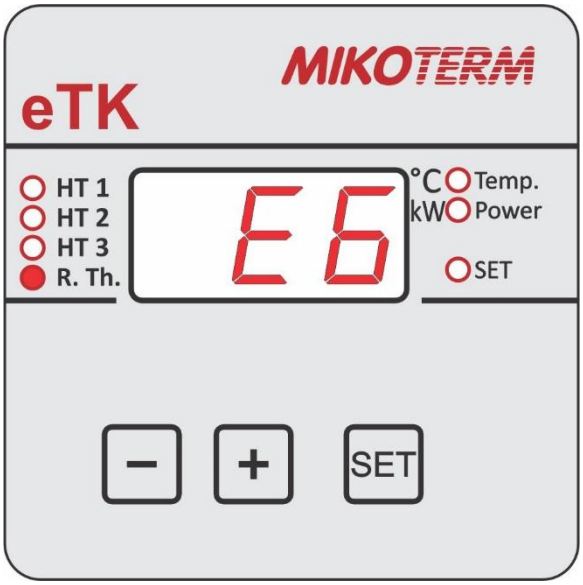


***Figure 23b:** Temperature below -50 °C, or sensor short circuit*

In this case, the operation of the heater is blocked, so protect the system from freezing and contact the service for troubleshooting, because it is most likely a faulty temperature sensor.

WARNING! Material damage from freezing

7.3.4 High temperature warnings and errors

If the temperature rises to T > 80°C, the operation of the heater is blocked, and the current temperature and Warnings ″A4″ alternate on the display of the device (image 24). The temperature must drop below T ≤ 80 °C, so that the warning automatically stops appearing on the display.

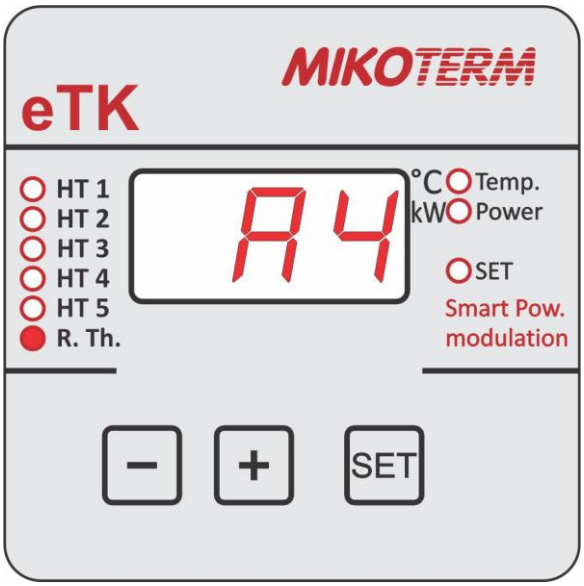


Image 24: *Warning A4 - temperature close to unacceptably high value*

If the temperature rises to T ≥ 85°C, the operation of the heater is blocked, the signal for turning on the external circulation pump is on (regardless of the state of the room thermostat), and the current temperature value and the error ″E4″ (image 25) alternate on the display, instead of warning A4. It is necessary for the temperature to drop to T < 80 °C for the boiler to automatically stop indicating this error and operate normally.

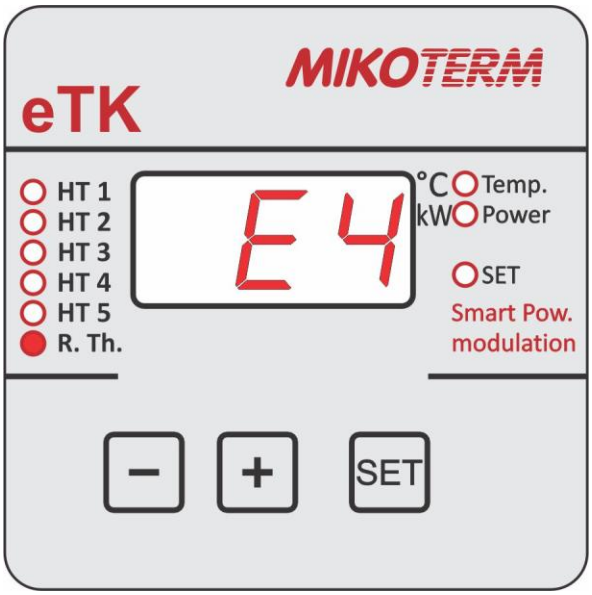


Image 25: *Error E4 - Temperature above permissible, danger of thermal overload*

If the temperature rises to T ≥ 125 °C, it goes out of the measuring range of the sensor, so in that case the display will alternate between the display ″HE″ (image 26a) and the error code ″E6″ (image 26b), which means that either the temperature in the boiler is T ≥ 125 °C or the temperature sensor is broken.

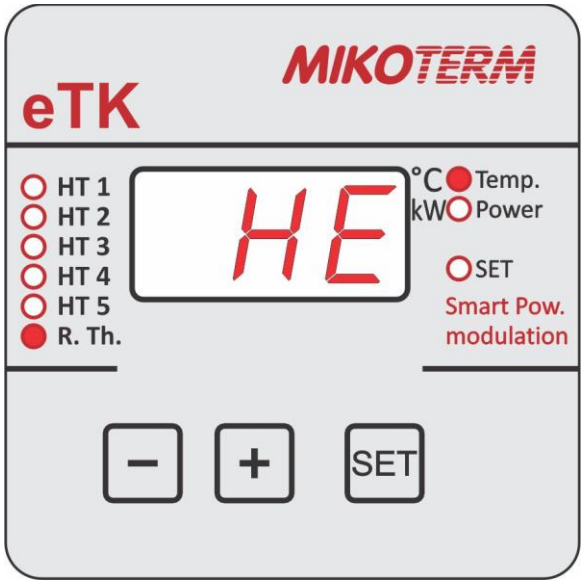


Image 26a: *Temperature above the limit of the measuring range*

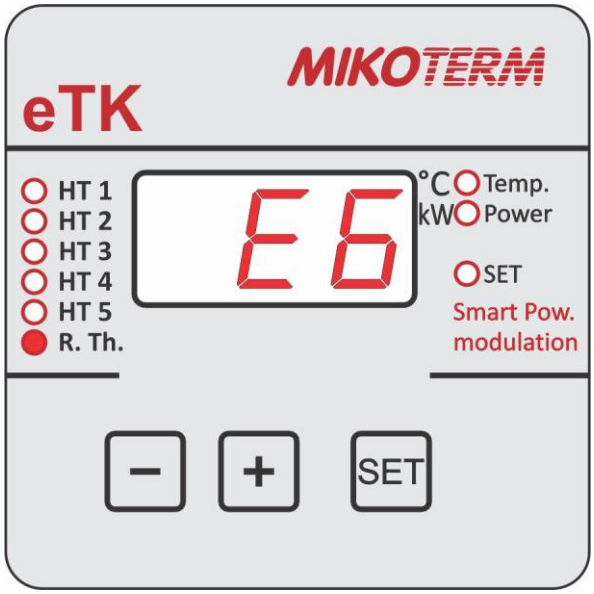


Image 26b: *Error E6: Temperature above the measurement limit*

In this case, all heaters are turned off, as well as the signal to turn on the external circulation pump.
It is necessary to disconnect the device from the power supply and call a service technician to determine and eliminate the cause of the problem.

WARNING! Material damage from overheating.

7.3.5 Warning and error symbols and codes

A3 - **WARNING:** Approaching the lower limit (T < 4°C) of the temperature of the heating system up to which operation is allowed.
The boiler continues to work normally, but measures should be taken to prevent it from entering the work block.
Measure to remove the warning: Check the set temperature and power, as well as the correctness of the relay / contactor and heater and the condition of the room thermostat. In order for the boiler to automatically stop indicating this warning, the temperature must increase to T ≥ 5°C.

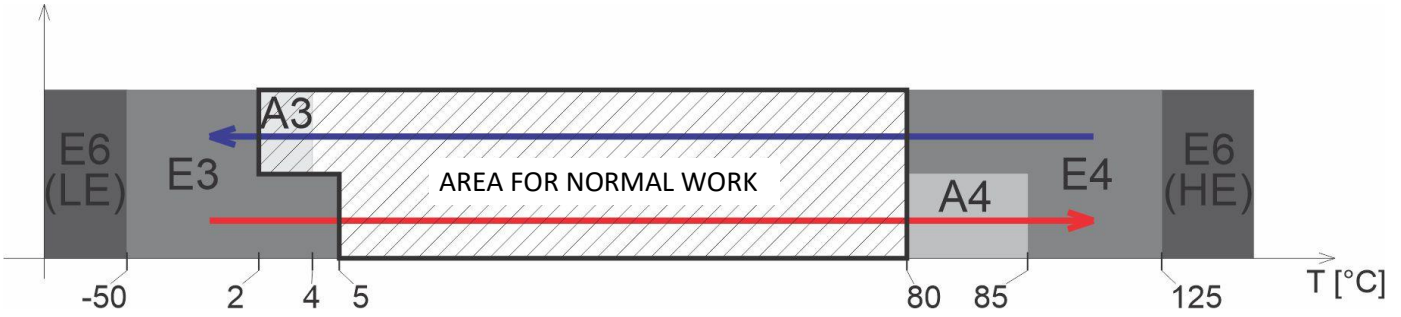
E3 - **ERROR:** Exceeding the lower limit (T ≤ 2°C) of the temperature of the heating system up to which operation is allowed.
The operation of the boiler is blocked.
Troubleshooting measure: Check the set temperature and power, as well as the correctness of the relay / contactor and heater and the state of the room thermostat. In order for the boiler to automatically come out of the blocking operation, the temperature must increase to T ≥ 5°C. If all settings are normal, but the boiler does not respond - turn off the boiler power supply and call a service technician.

LE (E6) - ERROR: The alternating display of these 2 errors means that the temperature of the heating system is below -50°C or the temperature sensor is short-circuited. The operation of the boiler is blocked.
Remedy: Switch off the boiler and call a service technician.

A4 - **WARNING:** The temperature of the heating system is above the regulation range, in the area of 80°C < T < 85°C - which is not a normal condition. The operation of the heater is blocked, and the signal for the circulation pump is constantly on.
Measure to eliminate the warning: Check the correctness of the circulation pump, whether the valves in the heating system are open, as well as the correctness of the relay / contactor. In order for the boiler to automatically stop indicating this warning, the temperature must be reduced to T < 80°C. If the pump is working, the valves are open and the boiler does not reduce the temperature - turn off the boiler and call the service technician.

E4 - **ERROR:** The temperature of the heating system is T ≥ 85°C - which is not a normal condition. The operation of the heater is blocked, and the signal for the circulation pump is constantly on.
Measure to eliminate the warning: Check the correctness of the circulation pump, whether the valves in the heating system are open, as well as the correctness of the relay / contactor. In order for the boiler to automatically exit this error, the temperature must be reduced to T < 80°C. If the pump is working, the valves are open and the boiler does not reduce the temperature - turn off the boiler and call the service technician.

HE (E6) - ERROR: The alternating display of these 2 errors means that the temperature of the heating system is T ≥ 125°C or the temperature sensor is broken. The operation of the boiler is blocked.
Remedy: Switch off the boiler and call a service technician.



Graphic representation of the area of normal operation and blocking of operation conditioned by temperature (→ temperature increases / ← temperature decreases)

7.3.6 Room temperature regulator

This device is not designed for work without room temperature regulator. Room thermostat must be installed in reference room.
Managing temperature of all rooms is done by this remote control. Radiators in reference room should not be equipped by thermo-static valves or these must always be open. All radiators in other rooms must be equipped by thermostat valves. Connecting room-regulator is described in chapter 5.4. When mounting room-regulator in reference room you must comply with manufacturer instructions.

7.3.7 Heating discontinuity

With short-time discontinuity of heating working regime the boiler temperature must be decreased using thermo-regulator of the boiler. To prevent heating installations freezing temperature of the boiler must not be set below 5°C. With longer discontinuity of heating working regime of the boiler must be cut off the power (chapter 7.4).

7.4 Boiler out of power

If heating installation is not in drive, it could freeze with low temperatures.

- Protect heating installations against freezing
- If there is danger of freezing and boiler is not in drive, discharge entire installation
- Main power breaker on lower plate put in position „0“ (put off)

8. Cleaning and maintenance

DANGER! Life threat of electric power shock!

- ► Electric power work must be done only by qualified person
- ► Before opening device: turn heating installation off electric power supply using safety switcher and disconnect it from power supply net through corresponding fuse
- ► Secure heating installation against accidental turn on
- ► Comply with instructions for installation

WARNING: Material damage due to unprofessional maintenance!

Insufficient or unprofessional maintenance of boiler can lead to damage or destruction and to loss of Warranty rights

- ► Secure regular, entire and professional maintenance of heating installation
- ► Electric parts and work units protect against water and humidity

Use only spare parts delivered by the manufacturer or those approved by manufacturer. There will be no responsibility for damage occurred due to spare parts not delivered by the manufacturer

Control examination log is provided on chapter 8.4

- Perform works in accordance with log on control and maintenance
- All deficiencies remove immediately

8.1 Boiler cleaning

Clean this device externally with wet cloth

8.2 Check working pressure; re-fill water and air-vent installation

DANGER: Health threat due to mix of drinking water!

- ► It is demanding to respect state regulations to avoid mix of drinking water (with water from heating installations)
- ► Comply with EN 1717

Establish a working pressure of at least 1 bar, depending on the height of the highest point of the installation. If, due to the height of the installation, the operating pressure is greater than 1 bar (eg 1.5 bar) before the system is filled with water, it is necessary to lift the air intake in the expansion vessel to the same value - 1.5 bar

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

Testing working pressure

- Working pressure of new heating installation should control on daily basis at the beginning of its work. If needed, re-fill water and air vent the system
- Later check working pressure once per month. If needed, re-fill water and air vent the system
- Check working pressure. If it decreases below 0,5 bar re-fill water
- Re-fill the water
- Air vent the heating installation
- Check working pressure again

8.3 Re-fill the water and air-vent the installation

WARNING: Material damage due to heat tension. Filling heating installations in warm condition can produce cracks due to tension

► Fill heating installation only in cold condition (temperature of starting duct lines of max 40 °C)

WARNING: Material damage due to frequent re-filling!

Due to frequent water re-filling installations can be damaged by corrosion and carbonate layers depending on water characteristics

► Test sealing and watertight of heating installations and expansion dish on functionality

- Connect hose on water faucet
- Fill the hose with water and connect to connector for filling/draining
- Tighten the hose and open the water faucet for filling/draining
- Slowly fill the heating installation while following up with pressure (manometer)
- During filling procedure air vents the system
- When reach working pressure close the drainage faucet
- When reach working pressure close the drainage faucet
- Remove the hose from filling/drainage faucet

8.4 Inspection and maintenance

The commissioning, inspection and maintenance record serves as an attachment for copying

- Executed works should be authorised by signature and date

At least once a year perform maintenance or when a check shows the status of installations that require maintenance

	Inspection and maintenance works when needed	Date: _____	Date: _____	Date: _____
1.	Check condition of installations	☐	☐	☐
2.	Visual and functional control	☐	☐	☐
3.	Making working pressure • Check pre-pressure of expansion dish • Working pressure set on … • Heating installation air vent • Check safety heating valve	☐ _____ bar ☐ ☐	☐ _____ bar ☐ ☐	☐ _____ bar ☐ ☐
4.	Clean water filter	☐	☐	☐
5.	Check if there is any damage on electric duct lines	☐	☐	☐
6.	Check if electric control connections and used elements are fitted; tighten it if needed	☐	☐	☐
7.	Check thermo-regulator on boiler	☐	☐	☐
8.	Check function of safety parts	☐	☐	☐
9.	Check remote control function	☐	☐	☐
10.	Check insulation of the rod heater	☐	☐	☐
11.	Check function of grounding device	☐	☐	☐
12.	Check insolation of electric switchboard	☐	☐	☐
13.	Check heating pump function	☐	☐	☐
14.	Make final control of inspection works and document results of measuring and inspecting	☐	☐	☐
15.	Certification of professionally conducted inspection	Seal/Signature	Seal/Signature	Seal/Signature

***Table* 7:** *Inspection and maintenance log*

9. Environment protection /Waste disposal

One of the basic concepts of business is environment protection. Quality of products, thriftiness and environment protection are equally valuable goals for us.
It is critical to strictly comply with law and regulations on environment protection. In order to protect environment and respecting economy concepts we use only the best technique and materials.

Packaging

Regarding packaging, we respect system of recycling which is specific in certain states and which secure optimal recycling
All materials applied for packaging do not harm environment and It is possible to recycle it.

Old devices

Old devices contain valuable materials that can recycle. Structures are easily demountable and plastic materials are labeled. In such manner structures can be sorted and deliver for recycling.

10. Troubles and troubleshooting

Troubleshooting on regulations and hydraulics must be done by an authorised firm

For repairs use only original spare parts

TROUBLE	DESCRIPTION	CAUSE	MEASURE
Boiler does not react after turn on of main switcher	Display does not react, other components do not work	• Boiler is out of power supply • Fuses on bottom plate are off • Vanishing of managing phase • Damage of main fuse ON/ OFF	• Provide power supply • Turn on fuses • Check if fuses have three phases on output • Change damaged part
Boiler does not heat or insufficiently heat/heating pump works	All on display are within recommended values but boiler does not make hot water	• Lack of 1 or 2 phases • Small power of boiler • Some relay damaged • Some heater damaged	• Check all three phases • Check set power of boiler • Change damaged part • Change damaged part
Boiler heats but it is very noisy	Higher level of noise during work	• Air in the system • Small water flow • Possible carbonate layer on heater	• Check if the system is air vented and vent it • Check valves below boiler and open it • Clean filter below boiler • Take out heaters and clean it (this is not included in claims during warranty period)
Boiler turns on quickly	Reaches temperature too quickly and turns on	• Valves below the boiler off • Pump fuse stop to work • Pump jammed • Pump inaccurate	• Open valves • Change inaccurate part • Start pump rotor • Change inaccurate part
Great oscillations of working pressure	Too fast and too big changes of working pressure	• One valve off • Expansion dish pressure inadequate • Inaccurate dish	• Open the valve • Check pressure in expansion dish and if needed set dish pressure adequately • Change inaccurate part

***Table* 8:** *Troubles and troubleshooting*

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

1.	Manufacturer		MIKOTERM DOO
2.	Brand name		eTK
3.	Models	**I**	eTK 6kW
		II	eTK 9kW
		III	eTK 12kW
		IV	eTK 18kW
		V	eTK 24kW
		VI	eTK 30kW
		VII	eTK 36kW
		VIII	eTK 40kW
		IX	eTK 45kW

				I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**
4.	Room heating: Seasonal energy-efficiency class			D	D	D	D	D	D	D	D	D
5.	Room heating: Nominal heat output(*8) (*11)	P_{rated}	kW	6	9	12	18	24	30	36	40	45
6.	Room heating: Seasonal energy efficiency(*8)	η_S	%	37,39	37,55	37,66	37,76	37,82	37,87	37,93	37,98	38,01
7.	Annual energy consumption(*8)	Q_{HE}	kWh	6600	11022	13266	22088	28756	34228	42786	47233	50128
8.	Sound power level, indoor	L_{WA} indoor	dB(A)	32	35	35	41	41	46	46	46	46
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)"

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