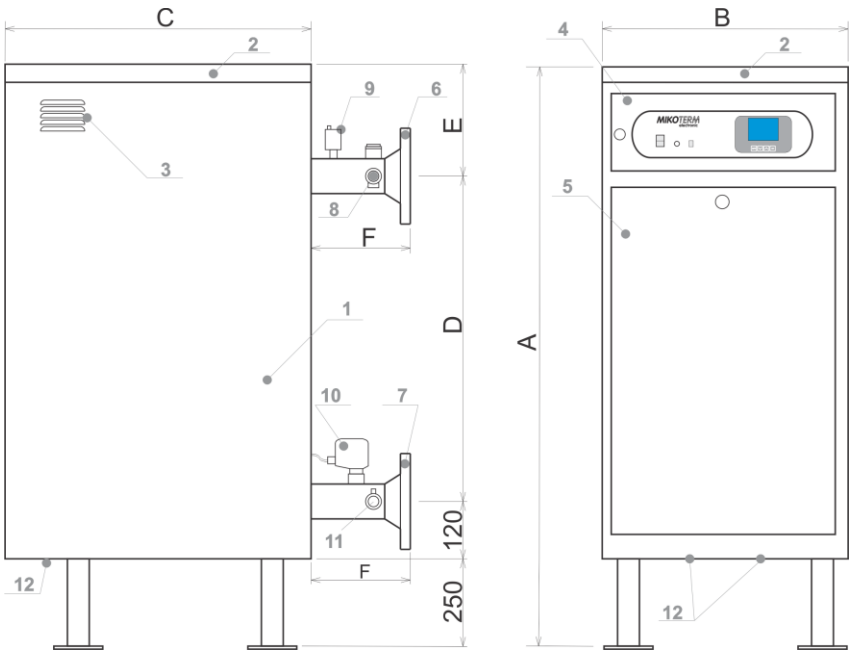
MIKOTERM electronic

Electric boilers TK-Profesional 120 ÷ 240kW

Electric boilers TK-Profesional power 120, 140, 160, 180, 200, 240kW are compact devices designed for heating of several residential or commercial buildings. The boiler court is made of steel sheet, tested at a pressure of 6bar, and max. operating pressure is 4bar. The flanges by which the boiler is connected to the heating installation are located on the back of the boiler. On the return pipe of the boiler (lower) there is a tap for filling and emptying and a flow indicator (Flow switch), and on the pressure pipe (upper) there are safety valves and an automatic vent valve.
The outer shell of the boiler is made of decapitated sheet metal, protected by electrostatic plasticization. On the front there are doors that cover the dashboard and doors that cover the distribution board.
On the dashboard there is a main switch for the boiler, a safety thermostat, a signal light and a microprocessor thermoregulator with LCD display on which the given and current values of the parameters of the system are constantly displayed. The microprocessor thermoregulator provides precise measurement and maintenance of the temperature during operation, as well as intelligent control of the operation of the heaters.
The bottom doors cover a distribution board with a complete boiler control and regular terminals for connecting the power cable, as well as auxiliary clamps for connecting the circulation pump and external operating conditions (room thermostat or the like). The lower door must be closed during operation of the boiler, and the access to them and the complete automation they cover is permitted only to the professional face.
Protective elements: The boilers are equipped with a " Multistage protection " protection system, which permanently monitors the temperature and pressure in the system, in the case of approaching the pressure or temperature of the unauthorized values, displays the appropriate warnings in the display, and in case of exceeding the pressure values of the pressure or temperature off all heaters, or in the third degree of protection, excludes the complete power supply of the device by means of protective circuits, which guarantees safety.

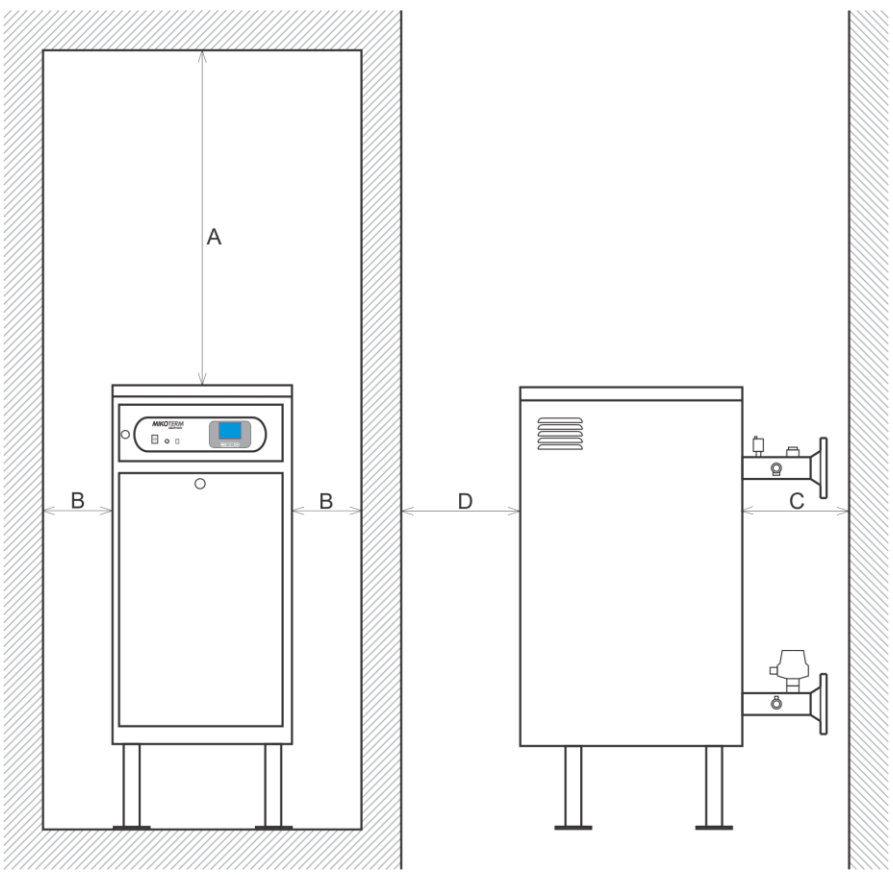
Technical characteristics		**120kW**	**140kW**	**160kW**	**180kW**	**200kW**	**240kW**
Dimensions	**A**	1500mm	1500mm	1500mm	1500mm	1500mm	1500mm
	B	600mm	600mm	600mm	600mm	600mm	600mm
	C	750mm	750mm	750mm	750mm	750mm	750mm
	D	810mm	765mm	765mm	765mm	765mm	765mm
	E	330mm	365mm	365mm	365mm	365mm	365mm
	F	210mm	270mm	270mm	270mm	270mm	270mm
Weight		150kg	170kg	190kg	220kg	240kg	270kg
Volume of the court		130ℓ	130ℓ	130ℓ	170ℓ	170ℓ	170ℓ
Heaters		12×10kW	14×10kW	8×20kW	9×20kW	10×20kW	12×20kW
Heat groups		6×20kW	7×20kW	8×20kW	9×20kW	10×20kW	6×40kW
Connection voltage		3N ~ 400V 50Hz	3N ~ 400V 50Hz	3N ~ 400V 50Hz	3N ~ 400V 50Hz	3N ~ 400V 50Hz	3N ~ 400V 50Hz
Connections to the hydraulic net		DN65 (2½");PN16	DN80 (3"); PN16	DN80 (3"); PN16	DN80 (3"); PN16	DN80 (3"); PN16	DN80 (3"); PN16
Min and Max operating pressure		0,4 bar ÷ 4 bar	0,4 bar ÷ 4 bar	0,4 bar ÷4 bar	0,4 bar ÷ 4 bar	0,4 bar ÷ 4 bar	0,4 bar ÷ 4 bar
Safety valve		2 × ½" 4 bar	2 × ½" 4 bar	2 × ¾" 4 bar	2 × ¾" 4 bar	2 × ¾" 4 bar	2 × ¾" 4 bar
Degree of protection		IP 20	IP 20	IP 20	IP 20	IP 20	IP 20
Working temperature		10 ÷ 90 C	10 ÷ 90 C	10 ÷ 90 C	10 ÷ 90 C	10 ÷ 90 C	10 ÷ 90 C
Security thermostat		95 ºC	95 ºC	95 ºC	95 ºC	95 ºC	95 ºC
Fuses of heaters		6 × 3P C40A	7 × 3P C40A	8 × 3P C40A	9 × 3P C40A	10 × 3P C40A	12 × 3P C40A
Max rated current		3 × 174A	3 × 203A	3 × 232A	3 × 261A	3 × 290A	3 × 348A
Required main fuses		3 × 200 A	3 × 250 A	3 × 250 A	3 × 300 A	3 × 315 A	3 × 400 A
Need a cable to connect.		2 kabla Cu 3 × 50mm^2	2 kabla Cu 3 × 70mm^2	2 kabla Cu 3 × 70mm^2	3 kabla Cu 3 × 50mm^2	3 kabla Cu 3 × 70mm^2	3 kabla Cu 3 × 70mm^2
Required protective circuit		Cu 1 × 50 mm^2	Cu 1 × 50 mm^2	Cu 1 × 50 mm^2	Cu 1 × 70 mm^2	Cu 1 × 70 mm^2	Cu 1 × 70 mm^2



Legend:

1. Wrap the boiler
2. Boiler cover
3. Ventilation blinds
4. Door of the control panel
5. Door distribution board
6. Pressure line: flange with a throat DN80
7. Return line: flange with a throat DN80
8. Safety valve
9. Automatically bleeding valve
10. Flow indicator (flow switch)
11. Filling filler and discharge ½''
12. Cable glands

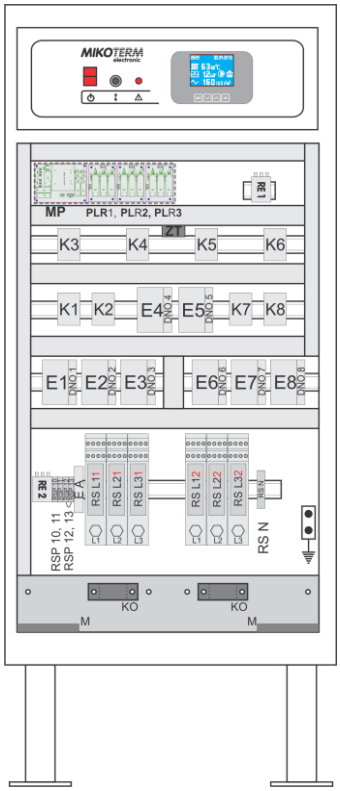
Minimum dimensions of free space for boiler installation



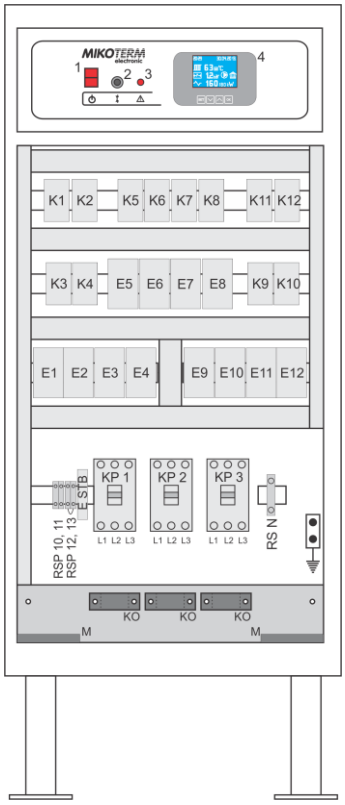
A=700mm / B=500mm / C=700mm / D=1000mm

Distribution of components on a switchboard

The number of contactors and automatic fuses depends on the power of the boiler



Power boilers 120÷160kW



Power boilers 180÷240kW

Legend:

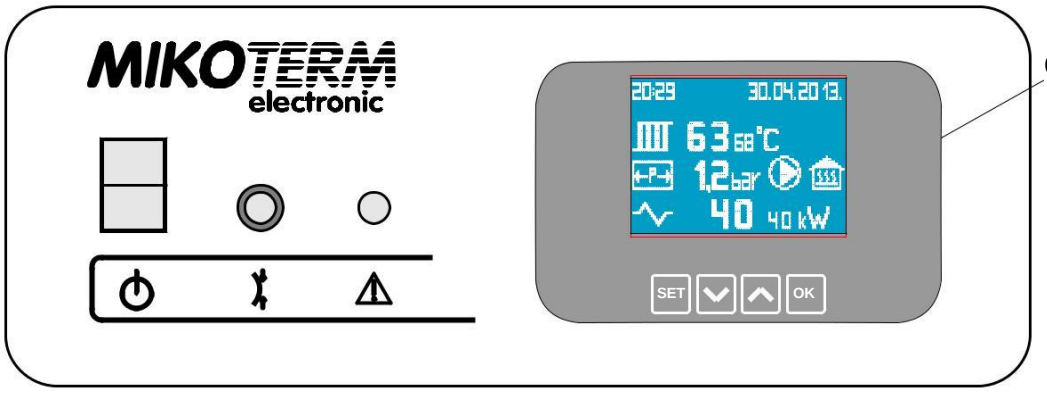
1 - Main switch
2 - Safety thermostat with manual reset
3 - Signal bulb overheating
4 - Microprocessor thermoregulator EK_CPU_1_3
-MP - Network board (power supply for CPU and relay boards)
-PLR - Relay board (contactor on)
-ZT - Protective thermostat
-K1, ..., KX- Contactors for switching the heaters
-E1, ..., EX- Automatic circuit breakers

120÷160kW:
-DNO1, ..., DNOX – Remote Voltage Trigger upgraded to Automatic Fuse
-RSL11 ÷ RSL23 – Regular terminal for connecting power cables

180÷240kW:
-KP1, KP2, KP3 - Compact Switch for connecting power cables with built-in power trigger

-EA - Control circuit fuse
-RS N - Regular terminal of zero water
-RSP **10**, RSP **11** - Connection clamps for external conditions for boiler operation
-RSP **12**, RSP **13** - Connection clamps for external conditions for boiler operation
-RSP **14**, RSP **15 (OPTIONAL)** - Sensor connection clamps for external conditions for boiler operation
-KO- Cable clamp
-M - Ventilator

Boiler boards



- The main switch - includes the boiler and provides a condition for the inclusion of heating groups.

- Safe thermostat with manual reset set to 95 ° C. If the temperature in the boiler reaches 95 ° C, this thermostat includes a safety relay, through which the security circuits are activated (voltage switches upgraded to automatic fuses). The automatic fuses are switched off when the contactor and the power supply are interrupted.

- Thermal overload warning lamp (overheating) of the boiler. It turns on when the safety thermostat is activated.

CPU - Microprocessor thermoregulator - it is used by the operating temperature and power of the boiler, monitoring the current and current values of temperature and power, as well as the current system pressure, the circulation pump status (on / off) and the state of external operating conditions (allowed boiler operation / not permitted boiler operation), outdoor temperature (optional).

Principle of work

Temperature sensors, hydraulic pressure (and external temperature - optional) monitor changes in the system and send information to the microcontroller that processes them and controls the operation of the boiler.

Communication of the user with the device is facilitated and improved by displaying all the parameters of the system on the graphic LCD display and simple commanding with the four keys.

The operating temperature is set in steps of 1 ° C, and it is possible to set the value in the range of 10 ÷ 90 ° C. In OTC mode (optional outdoor temperature control mode), two independent working curves can be set (5 index points are set) and one fixed temperature. In this way, the operation of the boiler is programmed at a 24-hour level, where it is possible to select one of two working curves or a fixed temperature value for each hour. The power of the boiler is set in steps of 20kW (for a boiler of 240kW in 40kW steps), or heaters are arranged in several heating groups (depending on the nominal boiler power). The heating and switching off of the heating groups is successive, with a 3sec distance with a split Engaged power at 3 degrees temperature shifted by 3 ° C. There are no heating groups a particular microprocessor decides on their inclusion and exclusion on the based on the working time of each heating group. This ensures a uniform division of work time heating groups, resulting in a longer lifetime of the device.

The thermoregulator can also control the operation of the circulation pump. The pump is switched on when the external condition for the operation of the boiler (which is connected to the auxiliary terminals RSP 12 and RSP 13) is active. This is also a condition for the operation of heating groups. The pump remains switched on for 2 minutes after switching off the external operating conditions due to the heat dissipated heat transfer from the heater. The control voltage for switching the circulation pump (230V 50Hz) is sent to the auxiliary terminals RSP 10 and RSP 11. Also, the thermoregulator switches on the pump regardless of the external operating condition if the boiler temperature exceeds 90 ° C, in order to reduce the temperature in the boiler.

Running the boiler temperature to outdoor temperature - O.T.C. mode

In general, devices in this series can be ordered with a version of a microprocessor thermoregulator that has the ability to operate the boiler temperature according to the outdoor temperature - "Outdoor Temperature Compensation", hereinafter O.T.C. mode. In addition to the boiler, an external temperature sensor in the plastic protective box is installed, which is mounted on the outside of the building and connects with a 2-core cable with a boiler.

In OTC mode it is possible to set two independent curves (set with 5 reference points) and one fixed temperature. In this mode, the operation of the boiler is programmed at a 24-hour level, where it is possible to select one of two working curves or a fixed temperature value for each hour (Figure 1). In the example from Figure 1, in the period from 00 ÷ 06h, the boiler temperature will slip over the economic curve, during a period of 06-22h for a comfortable working curve, and in the period of 22 ÷ 24h, it will set the fixed value of the set temperature.

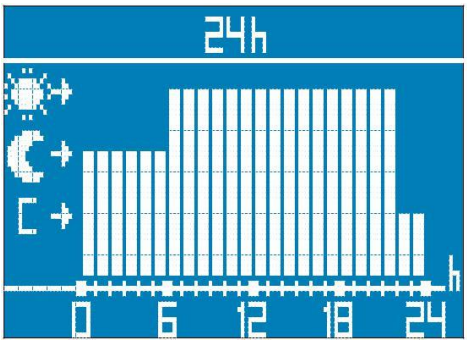


Image 1

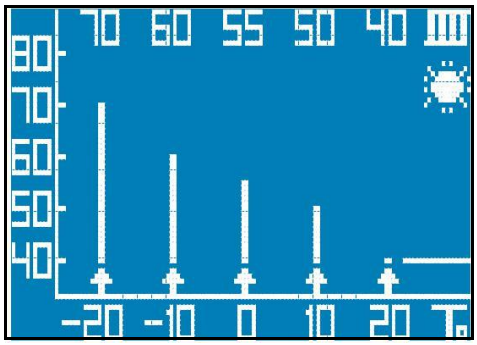


Image 2

A comfortable working curve (indicated by the symbol of the sun) is intended for use during the day. The economic curve (indicated by the symbol of the month) for use during the night - when the outside temperatures are lower, but the lower the temperature of the heated space is needed, the application of the same curve that was used during the day would be uneconomic. Of course, this is only the most commonly used logic, and depending on the characteristics of the object, the type of heating system and other specific conditions, the periods of use of the working curves can be distributed in any way - it is possible to switch to the use of another curve or a fixed thermometer at any hour.

The working curves can be formed as desired - it is for the user to select the optimum form of working curves according to the particular object and the particular type of heating, as well as the periods in which they will be used.
Figure 2 shows the adjustment of the comfort curve. The values are set to 5 reference points:

1) External temp. To = -20 ° C → temp. boiler 70 ° C
2) External temp. To = -10 ° C → temp. boiler 60 ° C
3) External temp. To = 0 ° C → temp. boiler 55 ° C
4) Outside temp. To = 10 ° C → temp. boiler 50 ° C
5) Outside temp. To = 20 ° C → temp. boiler 40 ° C

The microcontroller '' merging '' these 5 points generates a curve that will "slide" the boiler's boom temperature. In the same way, another (economical) work curve is assigned. The principle of forming a working curve is such that it is possible to set a practically unlimited number of curves of different forms. This way of setting labor curves, as well as the possibility of combining them, makes the OTC a word applicable in every concrete situation, on objects different for their purpose, type of heating system, spatial orientation, etc. If necessary, the user can execute corrections of the initially assigned working curves, as well as 24h programming, in a simple and quick way, adjust the boiler, and therefore the whole heating system to obtain optimal heating comfort in the most economical way.