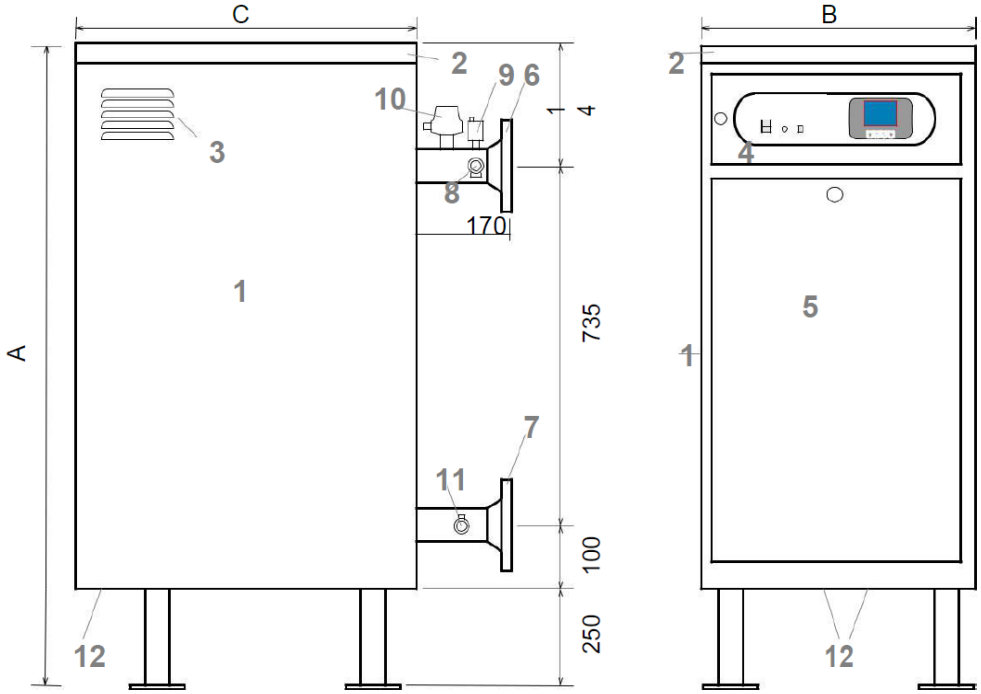
FLEXIHEAT UK LTD
www.flexiheatuk.com
01202 822221

# Electric boilers 70 to 100kW

Electric boilers with a power of 70, 80, 90, 100kW are compact devices designed for heating of several residential or commercial buildings. The boiler is made of steel sheet, and the steel components are also integral (flanges, hamburger arch, mufov, knives, etc.). It was tested at a pressure of 6bar, and max. operating pressure is 4bar. The flanges with which the boiler is connected to the heating installation are located on the back of the boiler. On the return tube of the boiler (bottom) there is a tap for charging and draining, and on the flow pipe (upper) a safety valve 4bar and an automatic air valve.
The outer shell of the boiler is made of decapitated sheet metal, protected by the electrostatic plasticization process. 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 lower door covers a distribution board with a complete boiler control and regular terminals to which the power supply cable is connected, as well as auxiliary terminals for connecting the circulation pump and operating conditions (room thermostat or the like). The lower door must be closed during operation of the boiler, and the access to the complete automation covered by it is permitted only to an expert person.
Our commercial electric hot water boilers are equipped with a "multistage protection system" that permanently monitors the water temperature and pressure in the heating system, in case of approaching the pressure or temperature of unauthorized values, the corresponding warnings are displayed in the LCD display and in the event of exceeding these limit values of pressure or temperature of these electric boilers it will turn automatically turn the boiler off, and in the third level of protection, the system automatically cuts off the complete power supply to the electric boilers using voltage triggers, which guarantees safety

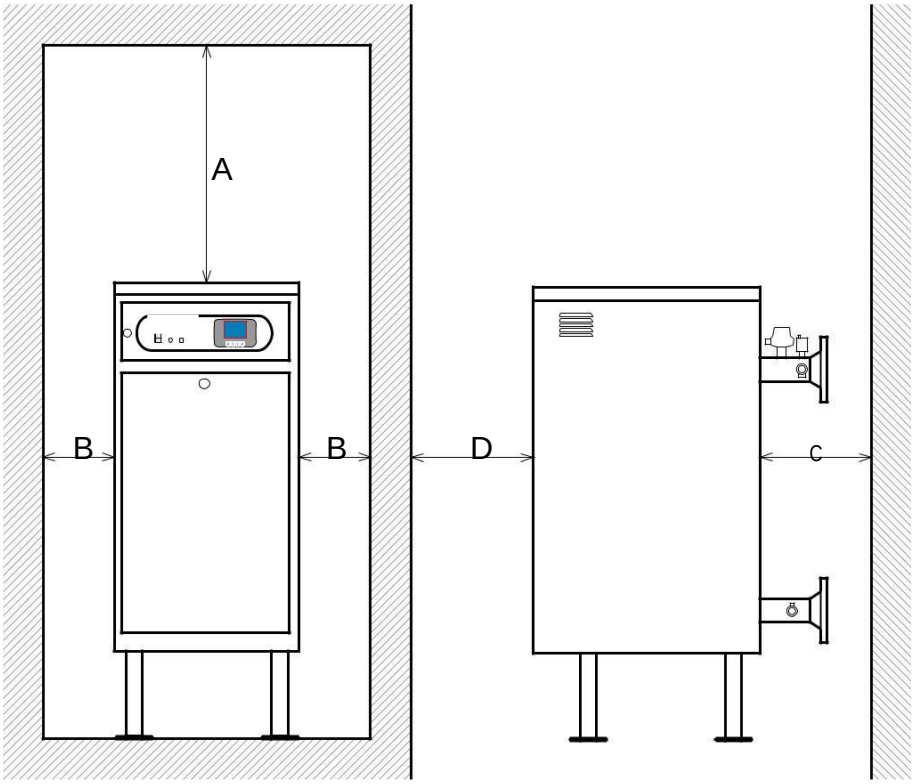
| **Technical characteristics** | | **70kW** | **80kW** | **90kW** | **100kW** |
|---|---|---|---|---|---|
| Dimensions | **A** | 1240mm | 1240mm | 1240mm | 1240mm |
| | **B** | 500mm | 500mm | 500mm | 500mm |
| | **C** | 650mm | 650mm | 650mm | 650mm |
| Weight - Dry | | 92kg | 106kg | 110kg | 120kg |
| Water content in Litres | | 95 | 95 | 95 | 95 |
| Heaters | | 7×10kW | 8×10kW | 9×10kW | 10×10kW |
| Heat groups | | 7×10kW | 8×10kW | 9×10kW | 10×10kW |
| Connection voltage | | 3N ~ 400V 50Hz | 3N ~ 400V 50Hz | 3N ~ 400V 50Hz | 3N ~ 400V 50Hz |
| Flow & Return Connections | | DN50 (2''); PN 16 | DN50 (2''); PN 16 | DN50 (2''); PN 16 | DN50 (2''); PN 16 |
| 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 |
| Safety valve | | 1 × ½ set at 4 bar | 1 × ½ set at 4 bar | 2 × ½ set at 4 bar | 2 × ½ set at 4 bar |
| Degree of protection | | IP 20 | IP 20 | IP 20 | IP 20 |
| Working temperature | | 10 - 90 ºC | 10 - 90 ºC | 10 - 90 ºC | 10 - 90 ºC |
| Security thermostat | | 95 ºC | 95 ºC | 95 ºC | 95 ºC |
| Fuses of heaters | | 7 × 3P C25A | 8 × 3P C25A | 9 × 3P C25A | 5 × 3P C40A |
| Max rated current | | 3 × 101.5A | 3 × 116A | 3 × 130A | 3 × 145A |
| Required main fuses | | 3 × 125 A | 3 × 125 A | 3 × 160 A | 3 × 160 A |
| Need a cable to connect | | Cu 3 × 50 $mm^2$ | Cu 3 × 70 $mm^2$ | Cu 3 × 70 $mm^2$ | Cu 3 × 70 $mm^2$ |
| Required protective circuit | | Cu 1 × 25 $mm^2$ | Cu 1 × 25 $mm^2$ | Cu 1 × 35 $mm^2$ | Cu 1 × 35 $mm^2$ |

FLEXIHEAT UK LTD
www.flexiheatuk.com
01202 822221




Legend:
1) Boiler cover
2) Boiler top cover
3) Ventilation vents
4) Control Panel
5) Door distribution panel
6) Flow connection
7) Return connection
8) Safety valve
9) Automatic air valve
10) Optional - flow switch 1½ (control: 5.2 - 15.8m3 / h)
11) Taps for filling and draining ½"
12) Cable glands

## Minimum dimensions of free space for boiler installation

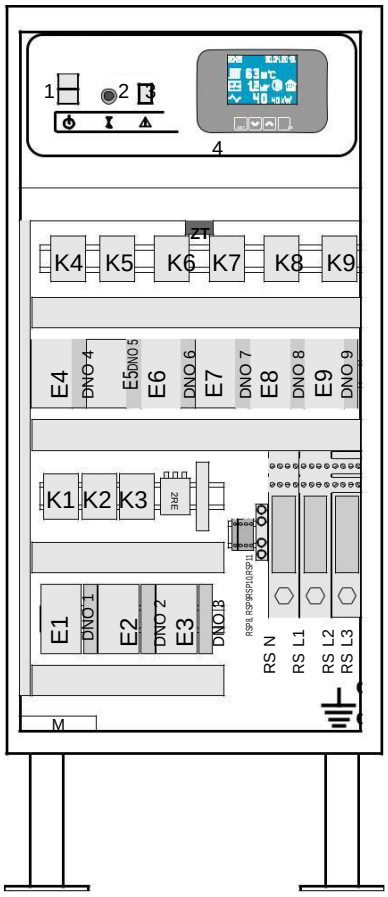



A=700mm / B=500mm / C=700mm / D=1000mm

FLEXIHEAT UK LTD
www.flexiheatuk.com
01202 822221

## Distribution of components on the switchboard

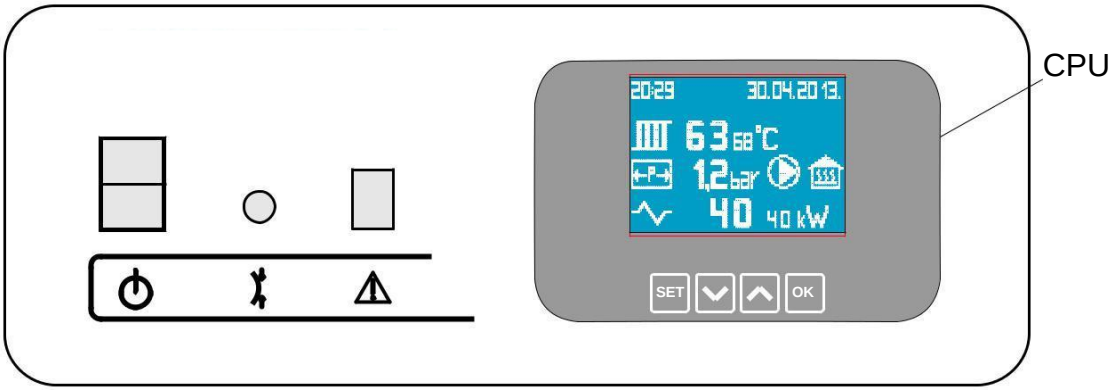
Example: 90kW commercial electric boiler (The number of contactors and automatic fuses depends on the power of the boiler)




Legend:

-1 - Main switch
-2 - Safety Thermostat (95 ° C)
-3 - Signal bulb overheating
-4 - Microprocessor thermoregulator EK_CPU_1_3
-ZT - Protection thermostat for boiler control -K1, ..., K9 - Contactor
-E1 + DNO1, ..., E9 + DNO9- Safety circuit -EA - Control circuit fuse
-RE 2 - Safety Relay
-RS L 1 - RS L 3 - Straight terminal terminals of the power cable phase conductors (70mm²)
-RS N - Regular Nozzle Clamp (35mm²)
-RSP 8, RSP 9 - Connection terminals of the pump control
-RSP 10, RSP 11 - Connection clamps for external conditions for boiler operation
- 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 safety circuits are activated. The power supply of the device is switched off so that the security of the device is complete.

⚠ - 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 operation of the boiler). Communication with a microprocessor thermoregulator with 4 buttons.

## The working principle

Temperature and hydraulic pressure sensors 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, it is possible to set the value in the range of 10 ÷ 90 ° C.

The power of the boiler is set in steps of 10kW, or the heaters are arranged in several heating groups (depending on the nominal boiler power). The switching on and off of the heating groups is successive, with a 3sec spacing with an engaged power divided by 3 degrees temperature shifted by 3 ° C. The heating groups do not have a certain sequence of inclusion, but the microprocessor makes a decision on their inclusion and exclusion based on the time of each heating group operation. Thus, a uniform distribution of the operating time of each heating group is achieved, 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 10 and RSP 11) 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 8 and RSP 9. 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.

FLEXIHEAT UK LTD
www.flexiheatuk.com
01202 822221

## 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.

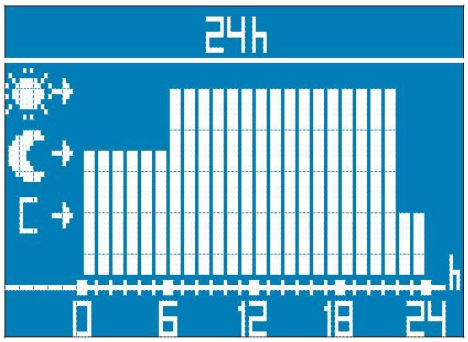


Image 1

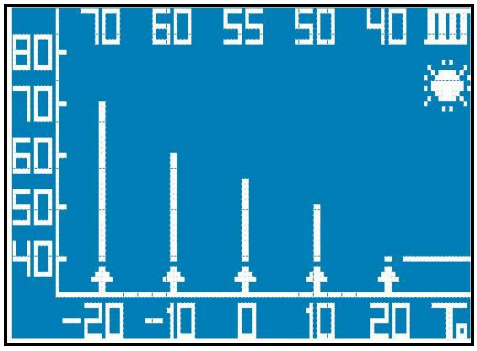


Image 2

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.