



# Termogrup BG

## EOD

Manufacturer of modern  
heating equipment



WATER HEATER  
ELECTRIC BOILER  
"BEH-2"

4.5 - 24 kW  
WITH PUMP

# INSTRUCTION FOR EXPLOITATION



„Termogrup BG“ EOOD

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# 1. GENERAL INSTRUCTIONS

The instruction contains basic information about the construction and operation of the water heater electric boiler „Mini“ (abbreviated - BEH-2) and instructions for its operation. Specified is the installation and joining sequence as well as the settings methodology.

Possible malfunctions are listed, as well as recommendations for their elimination. Before the installation of BEH-2 and its commissioning should be carefully familiarized with this manual as the proper installation, settings and service of BEH-2 will ensure safe and trouble-free continuous operation.

The BEH-2 boiler is not intended for use by persons (including minors) with limited physical, sensory or mental abilities; operation is not recommended him and from those unfamiliar with the specifics of his work, with the exception of cases of immediate presence of authorized monitoring personnel responsible for their safety before the necessary instructions for the use of the apparatus are given.

Minors must be supervised by an adult to avoid playing with the device. Adh ere to the requirements of this guide and keep it for further reference use!

**1.1.** BEH-2 is designed for heating the heat carrier (water) in the heating system premises with forced circulation of the heat carrier. The permissible pressure of the heat carrier (water) in the system is 0.2 MPa (2 bar). The minimum manometric pressure before the circulation pump is 0.01 MPa (0.1 bar). BEH-2 was created for operation in residential and other premises of this type, taking into account the macroclimatic areas with temperate and cold climate.

**1.2.** It is recommended that the BEH-2 be operated in rooms with the following operating values of climatic factors:

atmospheric pressure 84...107 kPa (630...800 mm Hg);

temperature 10 °C – 35 °C (limit values 5 °C – 40 °C);

relative air humidity 60% at 20 °C.

In the air space of the premises, the presence of dust and also aggressive and flammable gases and vapors.

**1.3.** During the operation of the BEH-2, its operation must be checked regularly.

Do not allow the installation of BEH-2 in facilities where control by persons is not foreseen, responsible for the condition and operation of the equipment!

**1.4.** BEH-2 is produced by the company „Thermogroup BG EOOD“ in accordance with the requirements of European certificate TU U 28.2-31402141-001-2001;

**1.5.** An example of a conditional designation of the water heating electric device with a wall variant of implementation: BEH-2 – 6/220, where BEH-2 is a conditional designation; 6 – nominal used power, kW; 220 – nominal power supply voltage, V.

## 2. TECHNICAL PARAMETERS

**2.1.** The main technical data of the BEH-2 are indicated in table 1, the electrical principle scheme - on scheme 3, 4.

**2.2.** BEH-2 heats the heat carrier of the system with the help of tubular heating elements (TEN).

**2.3.** The BEH-2 device provides the ability to adjust the temperature for heating the coolant within the permissible range and its automatic maintenance with a width of the deviation in the range from 4°C to 8°C.

**2.4.** BEH-2 has Class 1 protection against electric shock. Degree of protection – IP22.

**TABLE 1 – BASIC TECHNICAL PARAMETERS**

PARAMETER NAME	MEANING							
Energy used	Electric							
Rated voltage of the power supply, V	220/380					380		
Mains current frequency, Hz	50							
Rated power of consumption, kW, full	4,5	6	9	12	15	18	24	
1st degree	1,5/1,5	2/2	3/3	4	5	6	15	
2nd degree	1,5/1,5	2/2	3/3	4	5	12	9	
3rd degree	1,5/1,5	2/2	3/3	4	5	-	-	
Heater type	TEN							
Efficiency: %, not less than	95							
Maximum temperature of heat carrier: °C	80							
Nominal pressure: MPa (bar)	0,2 (2)							
Nominal capacity of tank: L	2							
Connecting pipes: inch	G <sup>3</sup> / <sub>4</sub>							
Circulation pump	„WILO“							
Weight: kg, not more than	21							
Overall dimensions, mm Not more than Height x Length x Depth	755x215 x140					755x355 x140		
Section of the copper wires of power cable: mm	2x4/ 3x1,5+ 1x1,5	2x6/ 3x2,5 + 1x2,5	2x10/ 4x2,5	4x4		4x6		
Automatic circuit breaker incoming line, Bipolar/ Quadripolar, In, A (intercontact air distance should not be more less than 3 mm for each of the poles)	25/10	32/16	50/20	25	32	40	50	

## 3. SET

**3.1.** The supplied kit is presented in Table 2

**TABLE 2 - KIT**

TITLE	QUANTITY
Water heating electric boiler „BEH-2“	1
Instruction manual	1
Package	1

**3.2.** Cables and other installation materials for installation and connection of BEH-2 not included in the delivered set.

## 4. REQUIREMENTS FOR SAFETY

**4.1.** The BEH-2 model takes into account an international level of protection against danger caused by electrical, mechanical and thermal effects, possibility of ignition and radiation when working under normal operating conditions, according to this instruction.

**4.2.** It is prohibited to carry out technical maintenance and repair of BEH-2 at power supply included. On the stationary wiring, according to the rules for installation, an automatic circuit breaker must be installed (see Table 1), which guarantees the one-action disconnection of all poles from the supply network.

**4.3.** Before turning on the electrical power supply of the BEH-2, make sure that the complete absence of damages that threaten life and health, and also check the integrity of the ground wire and its secure contact with the terminal of grounding. Check the serviceability of the network and its voltage!

**4.4.** Attention! It is forbidden to turn on the BEH-2 before it is filled with water, with closed connecting valves (no water circulation), as well as in



the case of freezing of water in BEH-2 and in the heating system. The use of water from the system for food and household purposes.

**4.5.** In order to exclude violation of the strength and hermeticity of the heating system and BEH-2, with a possible increase in internal pressure during the installation of BEH-2, the installation of a pressure limiter is mandatory safety valve (included in the kit) of the heating system at a convenient for user location. If the pressure of the supply water is higher than 3.0 bar, then c power line must be installed a reducer.

**4.6.** It is strictly forbidden to install a shut-off valve between BEH-2 and the safety group (expansion tank, safety valve, air valve etc. similar).

**4.7.** It is forbidden to leave a working BEH-2 unattended for a long time.

**4.8.** Attention! To prevent accidents, all activities under installation, connection, repair and maintenance of BEH-2 must be carried out only by qualified specialists who have the competences and rights to them carry out.

## 5. DEVICE AND WORKING PRINCIPLE

**5.1.** BEH-2 consists of individual units housed in a steel body in the shape of parallelepiped (see scheme 2). The hull takes the loads that arise on time of transportation and operation.

**5.2.** Main elements of the construction of BEH-2: tank - made of steel with a rectangular shape, thermally insulated on its outer surface with steel pipes (with thread) for bringing the heat carrier into the tank and taking it to the heating system, and installed heating unit; lamp for the presence of power supply, thermostat; circuit breakers at heating levels; thermomanometer, drainage system. A self-return valve is installed on the tank thermal relay, limiting the temperature in inappropriate operating mode. After sufficient reduction of the temperature, the heating is switched on automatically. For carrying out installation work and visual inspection of the front panel of the casing take off To inspect or replace

parts using a drain system, the coolant is drained from the boiler.

**5.3.** The principle of operation of BEH-2 is as follows: A pump supplies the cold water to the lower inlet pipe of the tank, where they are heated in the heater block, and through the upper discharge pipe enters the heating system. The temperature of the water is set using the thermostat, the handle of which is located on the front panel. The set temperature is maintained automatically with a deviation within the limits in the interval  $4 - 8$  °C. The economic power consumption mode is selected from the user using the „heat“ button and the handle of the thermostat.

## 6. PREPARATION FOR WORK AND METHOD OF USE

**6.1.** The installation of BEH-2 on the wall, the connection to the electrical network and heating system and testing must be carried out by qualified specialists in compliance with the requirements of the project and all installation rules and exploitation. Before connecting the BEH-2, the heating system must to be thoroughly cleaned of possible contamination.

**ATTENTION!  
MUST JOIN TO THE SAFETY GROUND!**

The forced circulation of water through BEH-2 is carried out through circulation pump.

It must be installed in the heating system (see Sketch 1) (from kit) pressure limiting valve ( $P_{max} = 1.5 P_{nom} = 3$  bar).

**ATTENTION! THE LACK OF A SAFETY DEVICE OR  
DAMAGE TO IT DURING INSTALLATION MAY RESULT  
TO FAILURE OF BEH-2 AND INCORRECT MODE OF WORK!**

**6.2.** Remove the front panel by unscrewing the fixing screws, insert vertical BEH-2 in the pre-prepared place, mark the places for attaching the two metal anchor bolts (the location of the mounting holes is shown

in Scheme 2). Set BEH-2 aside and drill at the marked locations holes with a diameter of 8 mm. and a depth of not less than 35 mm., place the anchors bolts into the holes and secure them by tightening the nuts. Before final fitting on BEH-2, check the bearing capacity of the bolts and the wall (considering the weight of BEH-2 together with the water filled in it). Mount the BEH-2 with the anchor bolts and tighten with M6 nuts with spring washers! Connect BEH-2 to the heater system, connect the power supply electrical cable with a grounding wire in the compliance with the marking (F, N, PE/A, B, C, PE). Do an external inspection of the elements in order to detect and eliminate possible malfunctions.

**6.3.** After you are convinced of the presence of heat carrier in the heating system and in its tightness, turn on BEH-2 in the following order: Set the thermostat knob to the maximum position temperature (turn fully clockwise), check the voltage in mains and turn on the circuit breaker to supply electricity to the incoming BEH-2 line (on the BEH-2 housing, a signal lamp with the inscription „mains“ lights up - power supply) and successively (with intervals of 3 sec. - 5 sec.) turn on the buttons of the shutdown modes for heating: „1“, „2“, „3“. The TEN heating unit is switched on and the water is heated. Follow up the heating and circulation of the heat carrier.

**6.4.** The setting of the temperature of the heat carrier according to the values of the thermometer carried out with the handle of the thermostat and the buttons for the corresponding degree of heating. more the further operation of the BEH-2 goes in automatic mode, and the set temperature is maintains constantly within the range of 4 – 8 °C.

**6.5.** To turn off the BEH-2, it is necessary to turn the handle of the thermostat back clockwise to the end (position corresponding to tmin), the button is turned off „heating“, and after 3-5 minutes - and the automatic circuit breaker of the stationary wiring.

## 7. TECHNICALLY SERVICE

**7.1.** Before commissioning and also after two hours of operation from commissioning, as well as periodically: no less than once a month, a check for the reliable fastening of the wires, cables and the tightening of the threaded ones compounds. If necessary, tighten the connections, avoiding damage that would affected the future use of BEH-2.

**BEH-2 MAINTENANCE IS BEING PERFORMED  
ONLY BY SPECIALLY TRAINED PERSONNEL AFTER  
TURN OFF THE ELECTRICAL SUPPLY!**

**7.2.** The company that performs the installation and maintenance of the BEH-2 must have the necessary permits to carry out this activity.

**7.3.** Persons who have studied its principle are allowed to service the BEH-2 work, the construction, the sequence of work, and have been briefed on safety, and have also received permission to carry out this type of activity.

**7.4.** In order for the device and the units of the heating system to work without damage, caused by scale deposits or as a result of metal corrosion, circulation water and make-up water must be prepared accordingly in advance. Water quality indicators must meet the following criteria: total hardness not more than 20  $\mu\text{g-eq./k}$ ; content of mechanical impurities and free particles are not allowed. The choice of the way of water preparation is carried out by the user of the device or by the designer or the installation company.

**7.5.** It is necessary to periodically check the operability of the safety device valve, i.e. to check the water discharge at least once every 6 months.

## 8. RULES FOR STORAGE

**8.1.** Before operation, BEH-2 is stored indoors in a packed state.

The temperature in the room should be from 5 °C to 40 °C, relative humidity of air 60% at 20 °C. The air in the room should not contain aggressive substances flammable vapors and gases.

**8.2.** Unpacked BEH-2 can be stored during repairs and maintenance in the relevant premises.

**8.3.** BEH-2 moves in closed vehicles (cars, containers, wagons and the like)

**8.4.** Ambient air temperature during transportation: from – 10 to +50 °C, relative humidity up to 80% at a temperature of 25 °C.

**8.5.** After cessation of activity, the device and its packaging are handed over to corresponding points for paper and metal scrub.

## 9. POSSIBLE DEFECTS AND REMOVAL METHODS

**TABLE 3**

TITLE OF THE FAILURE	PROBABLE CAUSE	METHOD FOR REMOVAL	NOTES
When turned on on power supply net signaling lamp „network“ - power supply, no lights up	1) absent tension in the network; 2) the light does not works.	Check for presence of tension. Replacement of the faulty one element	The check and the replacement carried out by a specialist.
When turned on BEH-2 does not develop nominal power.	1) low tension in the network; 2) defective heater; 3) break in the electric one chain.	A check of the tension in the network Replacement of TEN Recovery integrity of the circuit.	The check and the replacement carried out by a specialist.
Low temperature of the heat carrier in the body of the heating system.	1) thermal power of BEH-2 fails to compensates high heat losses of the premises; 2) lack of circulation of the heat carrier.	Bringing in compliance of the heat power of BEH-2 and on the heating system; Checking of circulation.	Technical- the economic one calculate carried out by specialists; Checking out carried out by a specialist.

10.

CERTIFICATE OF ACCEPTANCE  
AND SALE OF THE APPLIANCE

Electric water heater BEH-2 –

.....

Factory number: .....

**Passed reception and transmission tests, meets the requirements and is recognized as fit for operation.**

Date of manufacture: .....

Date of sale: .....

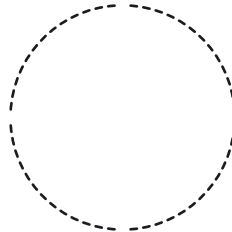
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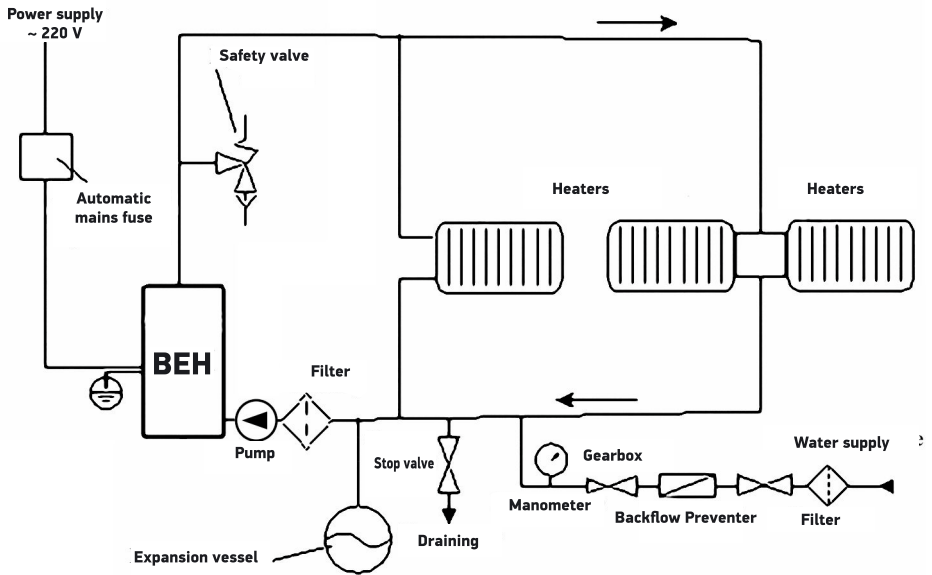
Person exercising contro:

.....

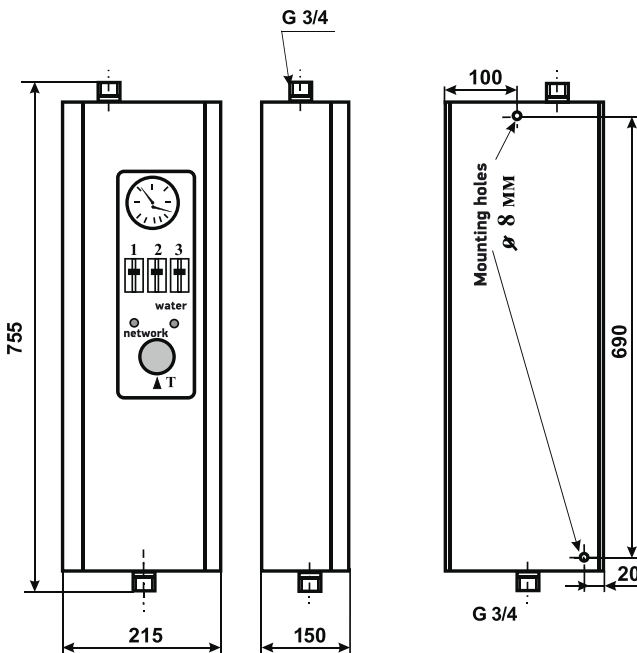
Signature: .....

Stamp OTC:



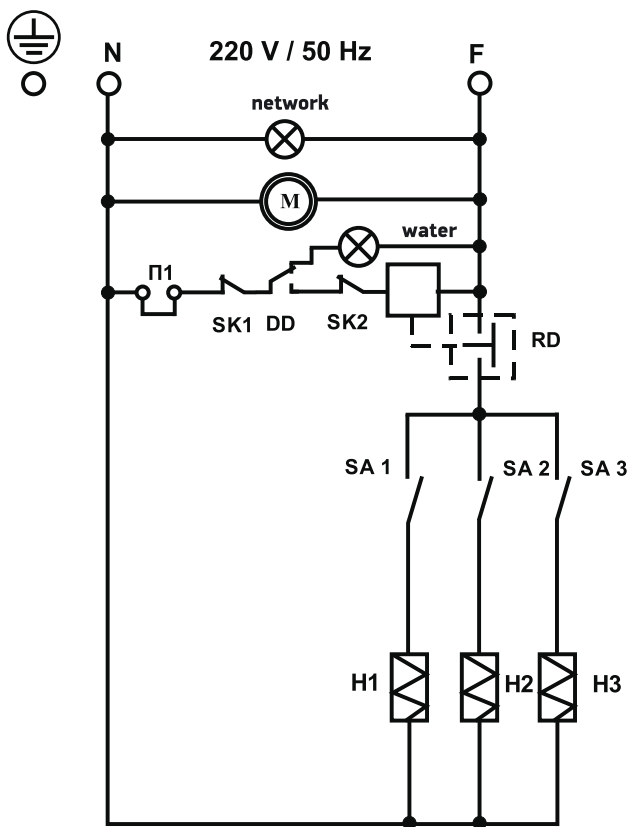


Scheme 1 - Recommended schematic diagram of the heating system.



Scheme 2 –  
Electric water heater  
device BEH-2





**Diagram 3 - Schematic diagram of BEH - 220 V**

RD – electromagnetic starter, ETI RD 25-40;

H1, H2, H3 – tubular electric heaters, TEN;

SK1 – thermostat contact with manual voltage recovery (for to restore the voltage, it is necessary to remove the protective casing of the boiler and press the thermostat button)

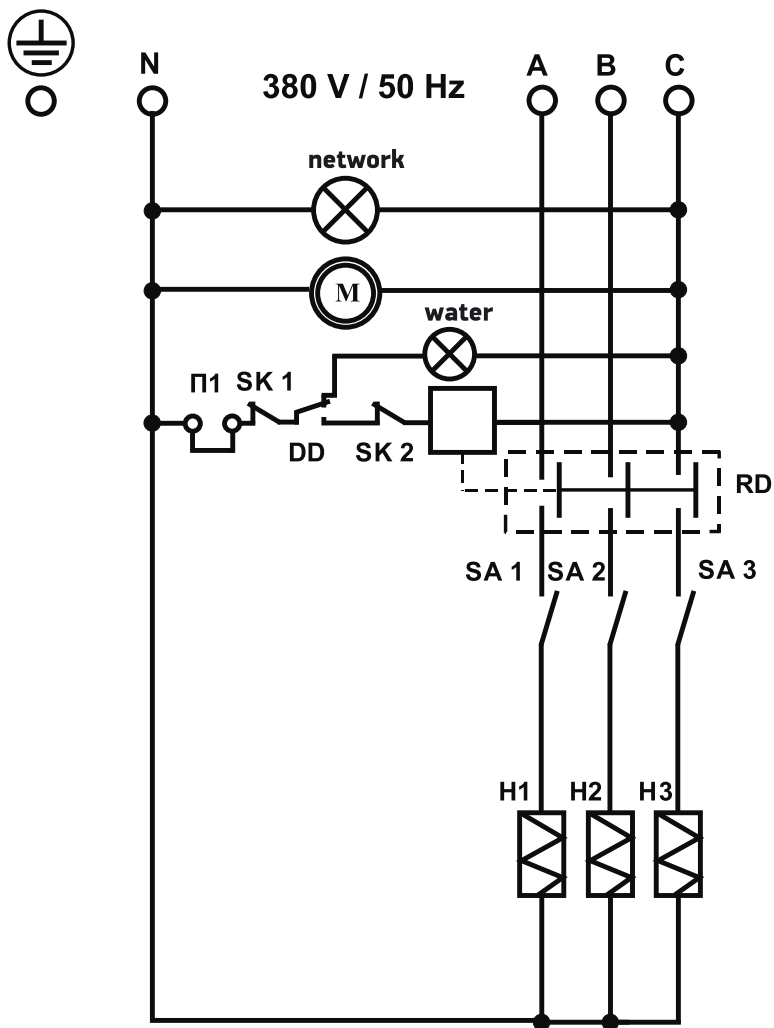
SK2 – electric heater contact;

SA1, SA2, SA3 - circuit breakers for „1“, „2“ and „3“ degrees of heating, P1 - fuse of

the contacts for connecting the room thermostat (when connecting thermostat fuse to be removed)

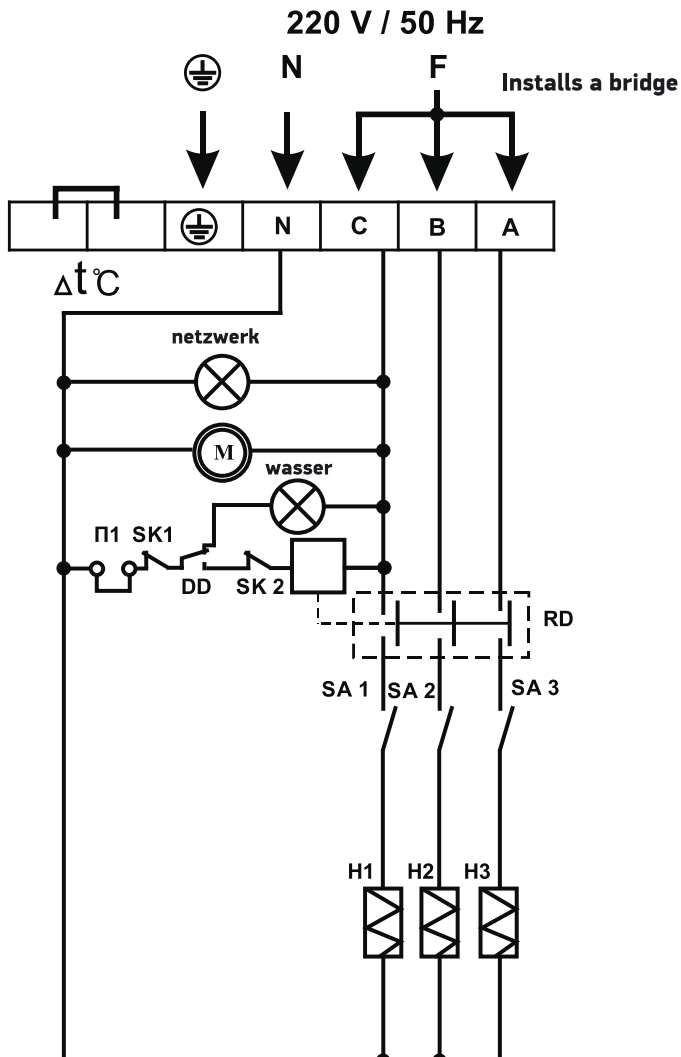
DD – pressure sensor

M – circulation pump motor



**Scheme 4 - basic wiring diagram 4.5 - 15 kW (380V)**

Other symbols are the same as in scheme 3

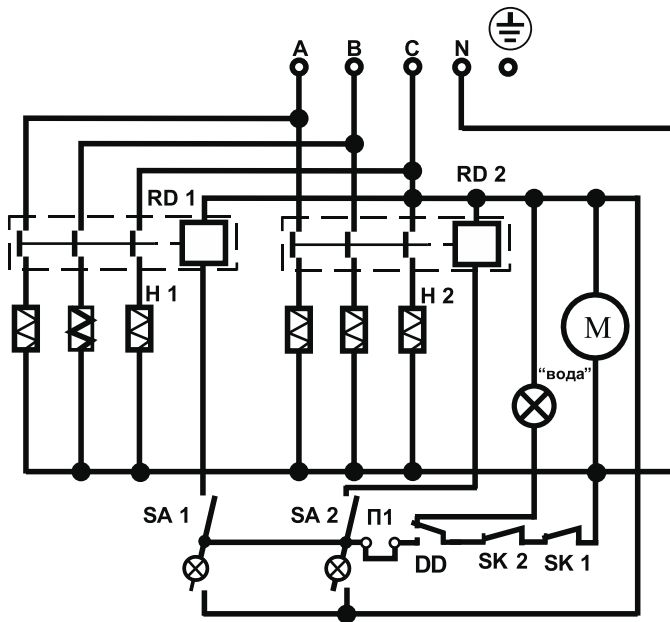


**Scheme 4a - basic electrical diagram (380V - 220 V)**

When connecting devices 4.5/ 380, 6/380 and 9/380 in a single-phase network with voltage

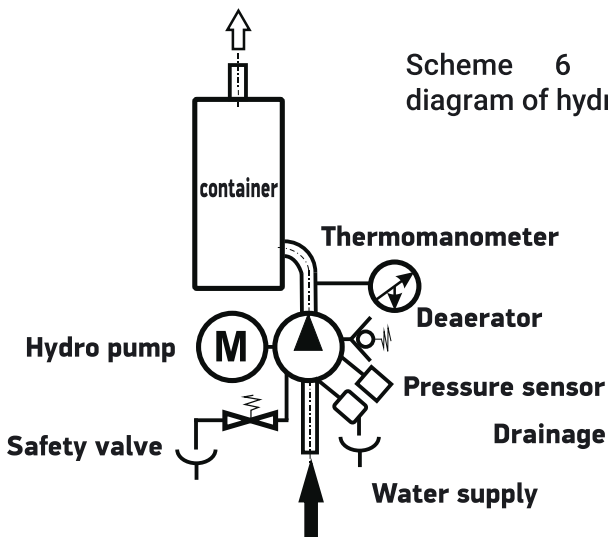
220 V a bridge must be installed - see the diagram. The wires for power supply must meet the requirements of the Rules for device of electrical engineering.

Other symbols are the same as in scheme 3



**Scheme 5 - basic wiring diagram 18 kW, 24 kW (380V - 220 V)**

RD1, RD2 – electromagnetic switches for the first and second stages of power. Other symbols are the same as in scheme 3



**Scheme 6 - schematic diagram of hydraulics**

## 11. WARRANTY FROM THE MANUFACTURER

**The product warranty is 2 years and the average service life is – 10 years, depending on the quality of the water used.**

The guarantee begins to run from the moment of commissioning, but not later than 2 month after purchase. If commissioning takes place 2 months later from the purchase, the warranty period is calculated from the date of issue of the invoice.

Performance and performance are guaranteed, subject to compliance installation and service instructions described above. All occurred irregularities related to non-observance of the installation and use manual are at fault solely to the user. In a situation where the user has not complied the user manual and this has led to the inoperability of the device, the user should pay the full cost of spare parts and repair costs. In the event of a malfunction claim, the service company (the trader) is obliged to provide a solution to the problem, and the deadline for this should not be exceeded to exceed 30 working days from the date of submission of the complaint. This guarantee is valid only on the territory of the Republic of Bulgaria and applies only to BEH.

**The user undertakes to provide the necessary conditions for the entry into operation of the equipment** and take into account its type and specifics in compliance with the requirements of the standards of legal and technical features, which are in effect:

1. connecting the equipment to the installation and applying pressure for testing;
2. charging water and ensuring ventilation of the facility;
3. verification of the physical and chemical properties of water in accordance with boiler water quality standards in the EU in order to avoid the occurrence of deposits or corrosion;
4. power supply, in accordance with the protection standards;
5. the installation is carried out according to the rules of safety and protection in compliance with the rules applied by the manufacturer.

**Warranty does not apply to:**

- 1.** installation and commissioning of a damaged device in the event of a lightning strike c power grid or other natural disasters (earthquakes, floods, landslides, etc.); rough handling, scratches, cracks and other damages (mechanical and/or electrical);
- 2.** user intervention or intervention of unauthorized persons on the device, the use in case of non-compliance with the instructions, violations in the delivery of electricity and water; in case the water does not meet domestic standards: corrosion due to condensation; the use of any type of liquid other than water; defects, caused by the freezing of the water supply system, the installation of the product in places with a temperature below 10°C; of defects caused by the lack of water under pressure; defects as a result of restoration of the paths for circulation of the water or poor power supply;
- 3.** the use of unfiltered water may cause damage to the boiler components, resulting in the loss of the warranty.

The manufacturer's responsibilities and obligations are specified in the warranty card.

# WARRANTY CARD

PLEASE ATTACH HERE  
THE RECEIPT SO THAT  
IT IS NOT LOST!

Invoice number: .....

Product: .....

Factory number: .....

**Buyer** /name and surname/: .....

Address: .....

Telephone: .....

e-mail: .....

**Seller company:** .....

Address: .....

Telephone: .....

e-mail: .....

**The assembly performs:** .....

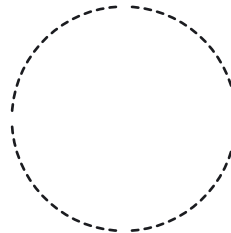
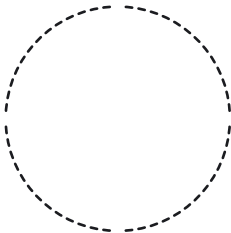
Installation date: .....

**Seller company**  
**/signature and stamp/:**

**Assemblyman**  
**/signature and stamp/:**

.....

.....

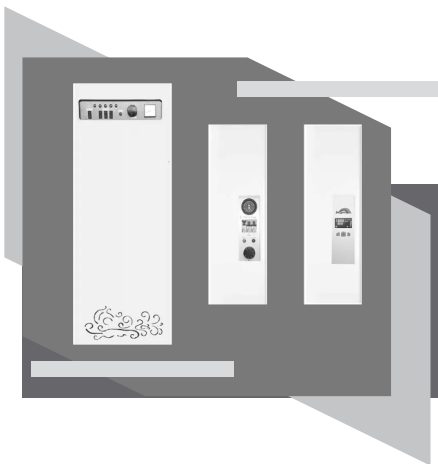


*I am familiar with the information  
described in the user manual.*

**Buyer /signature/:**

.....

**ATTENTION!** THE WARRANTY ONLY  
APPLIES IF THE USER HAS RECEIVED  
DOCUMENT OF PURCHASE (**INVOICE,**  
**RECEIPT**), ATTACHED TO THE WARRANTY  
CERTIFICATE, AS WELL AS **THE SIGNATURE**  
**AND STAMP OF THE INSTALLATION**  
**PERFORMER. THEIR LACK VOIDS THE**  
**WARRANTY!**



# TERMOGRUP BG EOOD

Manufacturer of modern  
heating equipment

**Termogrup BG EOOD** is a high-tech production and trading company. We create electric heating boilers. We are currently certified boilers with power from 4.5 to 24 kW. Our production is known in the European Union because of the revolutionary size of the boilers and their high quality, achieved thanks to the efforts of our engineers and technologists. We should not miss the low price that is another advantage compared to our competitors.

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The company's production and office  
are located in Dobrich, Bulgaria.



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