ECOTERMAL®

Heat makes the home - we the heat

MANUAL

FOR ASSEMBLY AND OPERATION OF ELECTRIC FLOW-THROUGH BOILER WITH RELAY CONTROL

PASSPORT

OF ELECTRIC BOILER WITH RELAY CONTROL ECOTERMAL
***MR** 6, 8, 10, 12, 15, 18, 22, 24 30 kW **MX** 37, 45, 52, 60 KW*
***MODULE** 6, 8, 10, 12, 15, 18, 22, 24, 30, 37, 45, 52, 60 KW*

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Dear clients! „ECOTERMAL" Ltd. is thanking you for the good choice you made! Please get familiar in detail with the present manual in order to use the full scale of the advantages of the electric boilers with relay control that will secure for you comfortable, ecologic and economic heating through their quality, reliable and modern automation.

CONTENTS: **Page**

1. RECOMMENDATIONS

- This Electrical Boiler is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the Electrical Boiler by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the Electrical boiler.
- It is necessary one to be familiar and to observe the safety operation and assembly manual.
- Electrical boiler has IP 20 protection degree, which applies after an installation at place where it will used.
- After unpacking the boiler, check delivery integrity and equipment..
- Check whether the boiler type corresponds to your needs.
- It is recommendable for each assembly a project to be drafted.
- The assembly may be carried out only by and expert authorized for such activity.
- Boiler assembly should meet the effective prescriptions, norms and to the present manual.
- Connection of the boiler to the power network (if necessary) should be harmonized with the local power supplier, which should be done by the consumer prior to the purchase of the boiler.
- Adjustment and commissioning should be carried out only by a service technician approved by the producer.
- Upon incorrect assembly, damages may occur and the producer shall not be liable thereof.
- In case of failure contact the service organization. Unprofessional intervention may damage the boiler.
- For correct functioning, safety and long-term operation secure prophylactics at least once a year.
- In case of damages incurred by unprofessional assembly, as well as upon noncompliance with the regulations and the operation manual, the producer is not liable and shall not provide guarantee service.
- The heating installation should have air bleeds at all necessary places.
- It is not allowed to make any changes whatsoever on the electrical diagram of the product, except for connection of the indoor temperature controller, the equithermal controller or at telephone control.
- Hydraulic and warm tests should be carried out of each heating installation upon commissioning.
- The electric boiler may operate at open system up to temperature of 95^{o}C max and at closed system up to 110^{o}C at pressure of 1.8 bar in a self-contained heating circuit.
- The assembly organization is obliged to get the client familiar with the operational rules of the heating system as a whole.

2. INTRODUCTION

The flow-through electric boiler ECOTERMAL is a modern ecological source of heat designated for story and central heating of small and average size houses and production facilities. The main advantages of heating with electric power are mostly cost effectiveness, high efficiency, environmental friendliness and compactness. Electric boiler can be used in every system of central or story (local) heating in a direct, accumulating or hybrid system. It can be integrated also in existing heating systems, in parallel with solid fuel boiler (exemplary diagrams are shown on Fig. 1 and 2, page 6). It is recommended for safer operation the electric boilers to be mounted in systems operating with a pump securing enforced circulation of the heat medium.

3. TECHNICAL DESCRIPTION OF THE BOILER

➤ Structure of the electric boiler/ module, see Fig. 3 page 7, Fig. 4 page 8, Fig. 5 page 9, Fig. 6 page 10.
➤ Equipment of the boilers' models is shown in Tab. 6 page 15.
➤ Technical data and technical characteristics of the electric boiler/module, see Tab. 1, 2, 3 and Tab. 4 page 14, and Tab 5 page 15.

4. PRINCIPLE OF OPERATION

The control system performs its functions by effecting on two of the components of the water heating: the heaters and the circulation pump
There are two main operating modes:
- Boiler Temperature Control Operating Mode
Each electrical boiler/module contains temperature controller. The temperature set-point value can be adjusted between 30°C and 90°C. Upon reach of the setpoint, the temperature controller switches off the heaters. When the temperature of the boiler's water goes below the set point, the heaters are switched back on. The temperature overheat protection is provided by a blocking /emergency/ thermostat. If there is a temperature rise up to 105° C, caused by any reason, the blocking thermostat turns off the heaters and ALARM message is displayed. The thermostat must be switched back to normal operating mode only by authorized service engineer, who has to provide detection and removal of the fault causing the thermostat switch off.
- Room Temperature Control Operating Mode
The room temperature controller is installed in the premise where you need the temperature to be precisely controlled. The control unit is installed in the boiler. When the set room temperature is above the current temperature of the premise, the heater and the circulating pump are switched on. Upon reach of the set room temperature, the controller switches off the heater and the pump. The power of the boiler is calculated such that at the lowest environment temperature for the region it could provide room temperature of 25° C.
Number of comutation:
➤ 6 to 60 kW - two-levels
This principle of control does not allow major amplitude in water temperature in the boiler body in the established mode of work.
Models from 6 to 60 kW can bind to the ON / OFF room thermo regulator (see Fig.8 page12).

5. OPERATION MANUAL

- The customer has to provide water supply and electricity to the installation.
- The customer monitors for leaks and controls the operating pressure in the system.
- Adjust the boiler or room temperature depending on the operating principle of the installation and personal preferences.
- Upon departure from the parameters calls to authorized service.

- The service is performed by specialists familiar with the structure, management and operation of the device.
- When the electric power stops and restores again, the electric boiler automatically starts again.

6. CONNECTING TO THE ELECTRIC NETWORK

- Connecting the electric switchboard to the power supply network and the boiler electric installation assembly should be carried out only by an expert with the necessary qualification. The power supply is connected through not severable joint according to the connection diagram. The cross-section of the power supply cable should be selected in accordance with the boiler power (see table 4 page 14).

7. COMMISSIONING

Boiler's startup is possible after performed control on the good working order of:
- the connections to the heating system,
- checking of the system pressure,
- checking of the electrical connections,
- checking whether the valves and taps of the heating system are opened,
- switch on the automatic fuse of the electric boiler,
- preset the desired temperature of the boiler and the room thermo regulator.

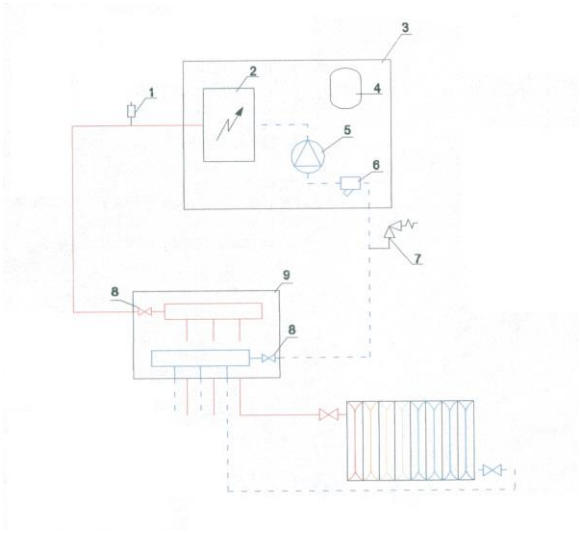
Servicing of the room thermo regulator is done according to the instructions thereto.
The heating systems may be filled in only by water or mixture of water and antifreeze.

8. CONDITIONS OF COMMISSIONING AND UNDERTAKING GUARANTEE MAINTENANCE – GENERAL TERMS:

The electrical boiler/module is mounted with the help of consoles only on a wall that can bear its weight. The boiler location should be selected in a manner to secure access – technological tolerance from its all four sides is shown on Fig. 9 and 10 at page 13.

1. The boiler/module should be mounted at a place suitable for servicing (free access thereto) and possibility of opening the front lid.
2. The boiler/module should be mounted suspended on the wall at minimum height of 1 m of the floor.
3. Water filter should be mounted at the cold water intake before the pump by observing the direction marked on the filter itself, in accordance with the attached manufacturer's instructions.
4. The boiler/module should not be contaminated with building materials.
5. Fitting connections should be mounted on the boiler/module intake and the outlet.
6. Hydraulic test should be carried out at an index of 1.25 above the operating pressure.
7. Upon assembly, it is necessary the adjustments of the boiler and the blocking thermostats to be checked up. The actual control is done during the warm test.
8. The guarantee shall be effective as from the commissioning date, but not later than six months as from the date of the purchase.

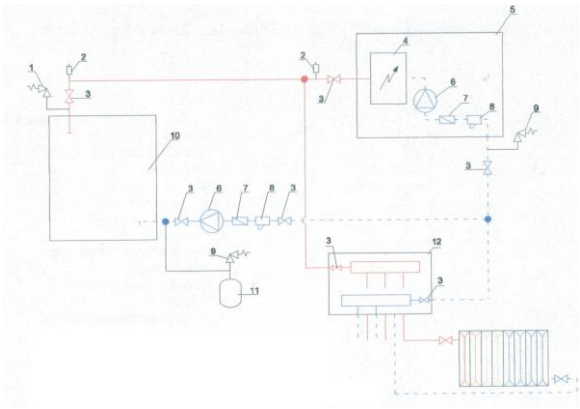
Method of connecting of story (local) heating



1. Air bleeder
2. Electric heater
3. Electric boiler
4. Expansion tank
5. Circulation pump
6. Water filter
7. Safety valve
8. Shut off valve
9. Manifold Box

Fig. 1

Method of connecting the system to a solid fuel boiler



1. Safety valve by temperature
2. Air bleeder
3. Shut off valve
4. Electric heater
5. Electric boiler
6. Circulation pump
7. Return valve
8. Water filter
9. Safety valve by pressure
10. Solid fuel boiler
11. Expansion tank
12. Manifold Box

Fig. 2

ELECTRICAL BOILER MR 6 ÷ 30 kW

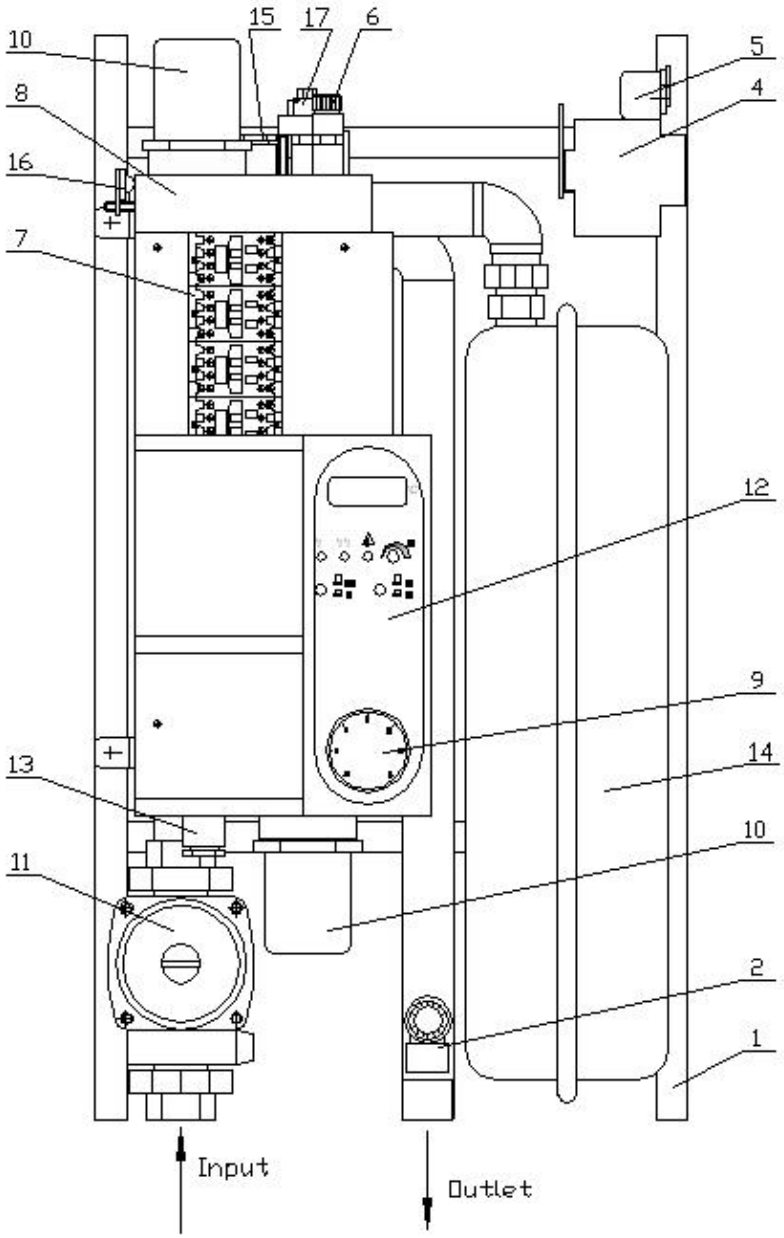


Fig. 3

1. Frame
2. Safety Valve by pressure 2.5 bar
4. Automatic breaker with additional protection
5. Emergency (blocking) thermostat
6. Air bleeder
7. System control –contactors
8. Water Container
9. Pressure-gauge
10. Heaters
11. Circulation Pump
12. Control Panel
13. Pressure-gauge Valve
14. Expansion Tank
15. Thermostat Pocket
16. Thermostat -bimetallic
17. Pressure switch

ELECTRICAL BOILER MX 37 ÷ 60 kW

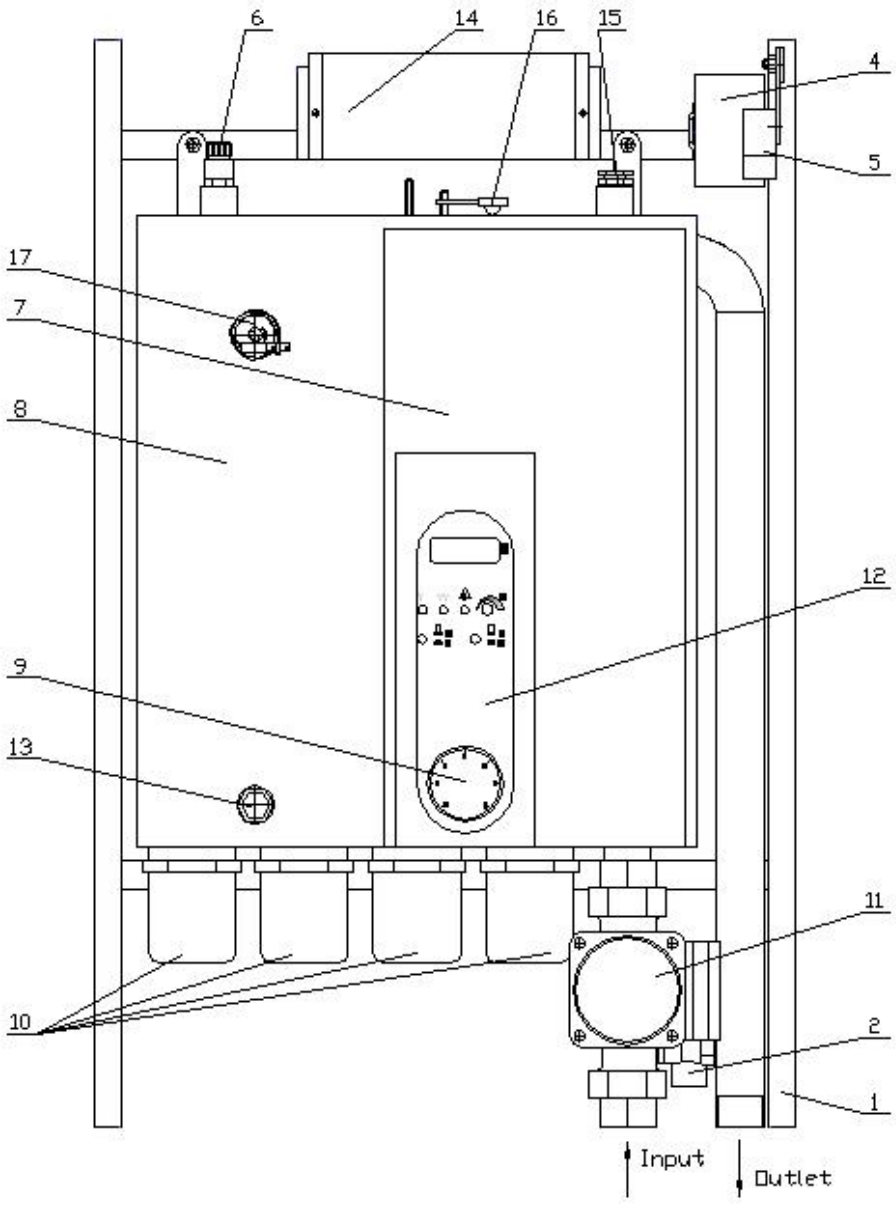


Fig. 4

1. Frame
2. Safety Valve by pressure 2.5 bar
4. Automatic breaker with additional protection
5. Emergency (blocking) thermostat
6. Air bleeder
7. System control –contactors
8. Water Container
9. Pressure-gauge
10. Heaters
11. Circulation Pump
12. Control Panel
13. Pressure-gauge Valve
14. Power Wires
15. Thermostat Pocket
16. Thermostat -bimetallic
17. Pressure switch

ELECTRICAL MODULE K 6 ÷ 30 kW

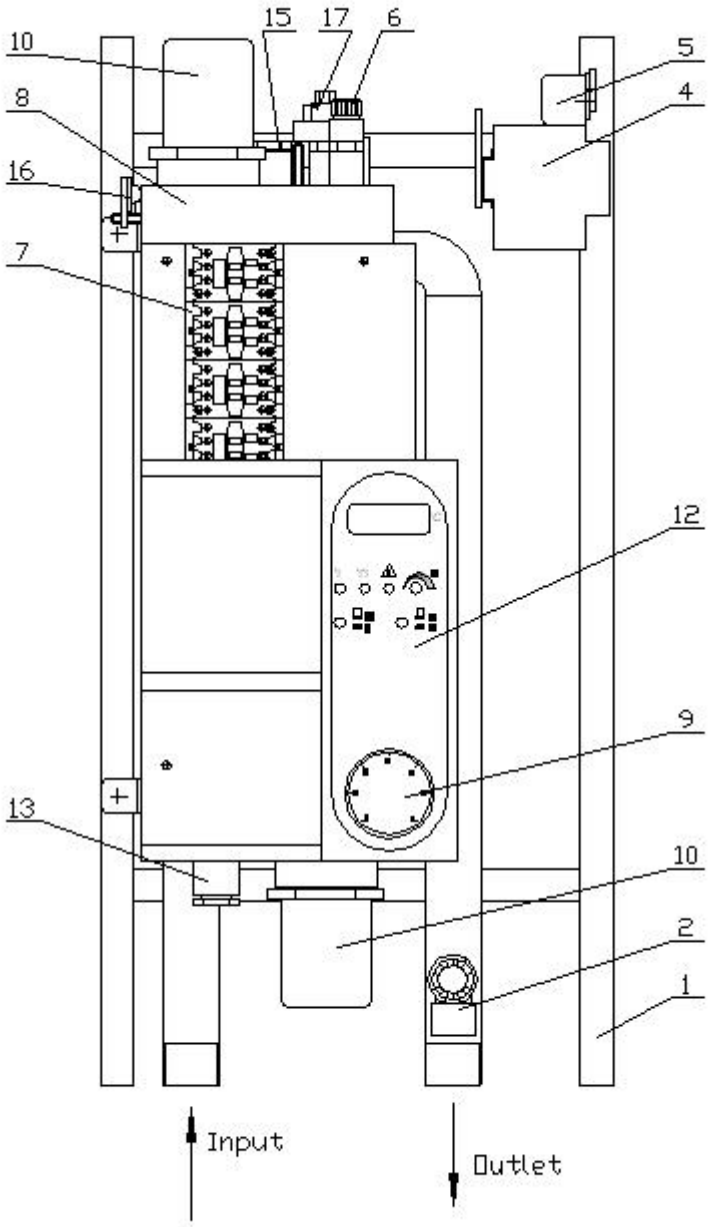


Fig. 5

1. Frame
2. Safety Valve by pressure 2.5 bar
4. Automatic breaker with additional protection
5. Emergency (blocking) thermostat
6. Air bleeder
7. System control –contactors
8. Water Container
9. Pressure-gauge
10. Heaters
12. Control Panel
13. Pressure-gauge Valve
15. Thermostat Pocket
16. Thermostat -bimetallic
17. Pressure switch

MODULE K 37 ÷ 60 kW

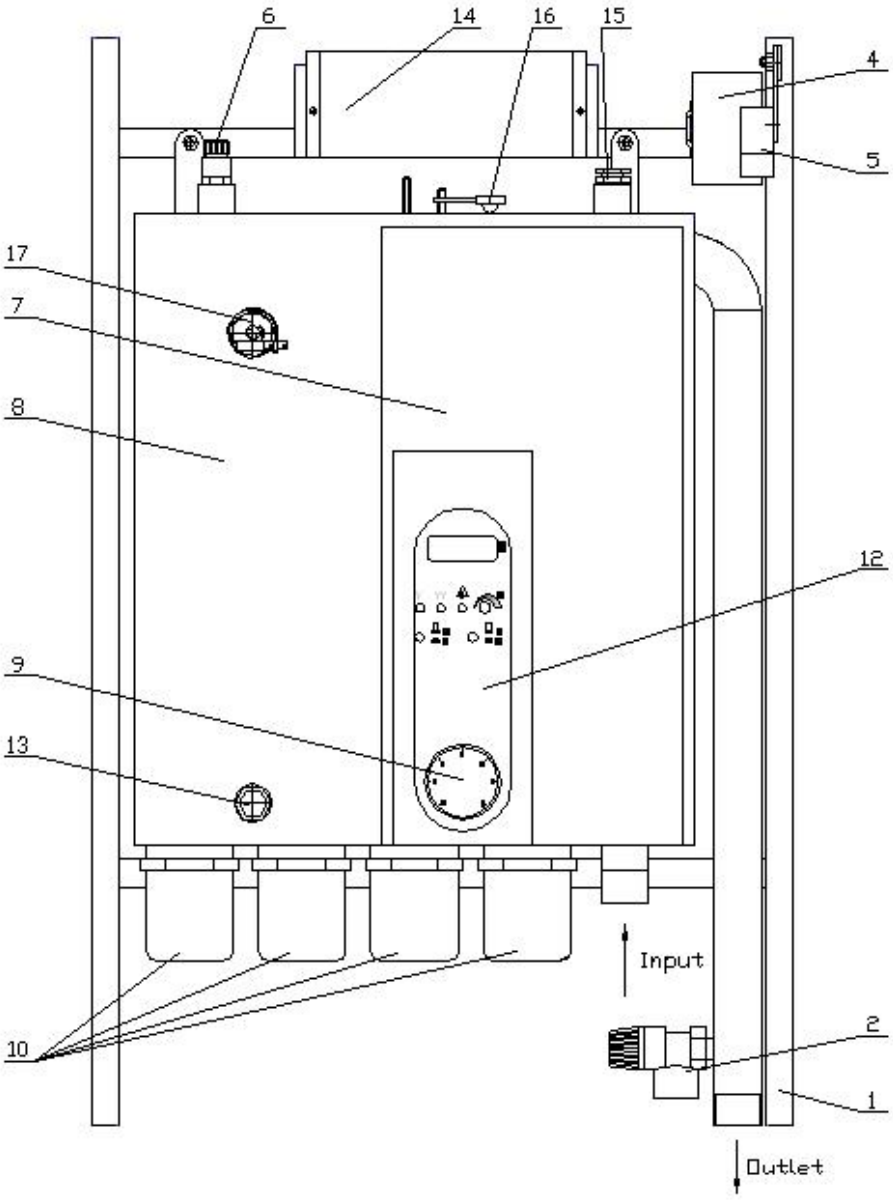


Fig. 6

1. Frame
2. Safety Valve by pressure 2.5 bar
4. Automatic breaker with additional protection
5. Emergency (blocking) thermostat
6. Air bleeder
7. System control –contactors
8. Water Container
9. Pressure-gauge
10. Heaters
12. Control Panel
13. Pressure-gauge Valve
14. Power Wires
15. Thermostat Pocket
16. Thermostat -bimetallic
17. Pressure switch

CONTROL PANEL 6 – 60 kw

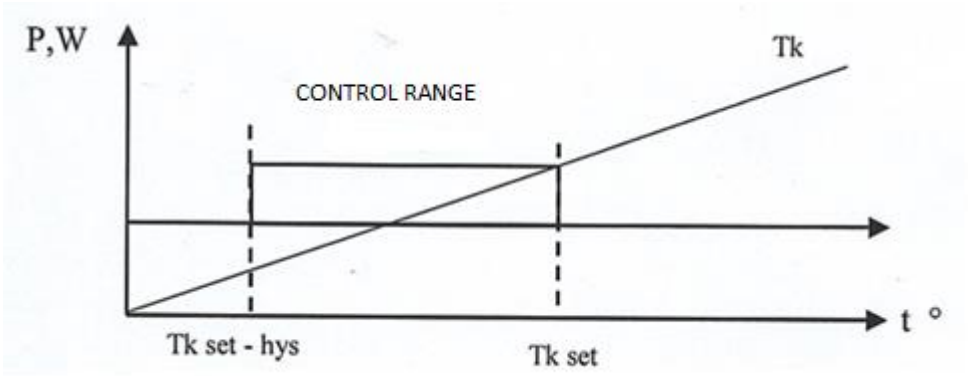
CONTROLLER FOR WATER HEATER WITH A CONTACTOR

1.Service

This device has been intended for heating operation control for electric water heaters and boilers, where heating elements will be powered via contactors.

2.Method of operation

It maintains water temperature in the water heater or boiler according to the set point and hysteresis curve by heating operation on/off action. The electric heaters can be distributed in sections of max four contactors; every section will be controlled by a TRAC output. At temperature value of Tk lower than the control range, all relay outputs are active; when this value reaches the control range, the relay outputs will be de-energized stepwise, and for Tk set , the last one will go off. If heating stops, the pump will shut down within a period of 10 minutes.



3. Front panel

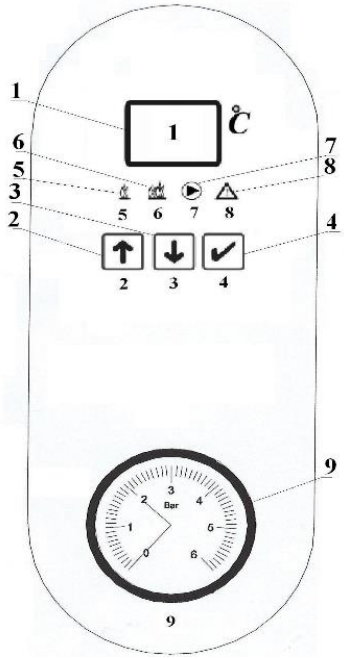


Fig. 7

1 – Indication
2 – Forward change button
3 – Reverse change button
4 – Enter / exit programming mode
5,6 – Heater on indicators
7 – Pump indicator
8 – Thermostat failure indicator
9 – Pressure gauge

4. Programming

Using the "↑" or "↓" buttons, scroll until the desired parameter is displayed. Press the "✓" button to enter program mode, the value displayed starts flashing. Using the "↑" or "↓" you can change the settings. To confirm the changes, press the "✓"button again.
The P4 and P5 parameters are locked; to access these, press and hold down the "✓" button for approximately 5 seconds. The parameters will be automatically locked within 15 seconds after the last pressing of a button.

Name	Designation	Range	Current value (notes)
Boiler temperature setting	P1	5 – 90 °C	
Turndown ½ output	P2	0 – inactive 1 - active	
Hysteresis	P3	2 – 20 °C	
Adjustment oftemperature measurement	P4	-10 to 10 °C	
Number of outputs	P5	1 – 4	

5. Electrical connections and technical data sheet

Technical parameters:

Supply voltage	230V AC 50Hz
Contactor outputs	230V AC / 0,5A
Temperature sensor	LM335 (-20 to +120 °C)
Measuring range	0 to 99 °C
Unit measure	1 °C
Humidity	80% max
Protection class	**IP2**

CONTROL DIAGRAM 6 – 60 KW

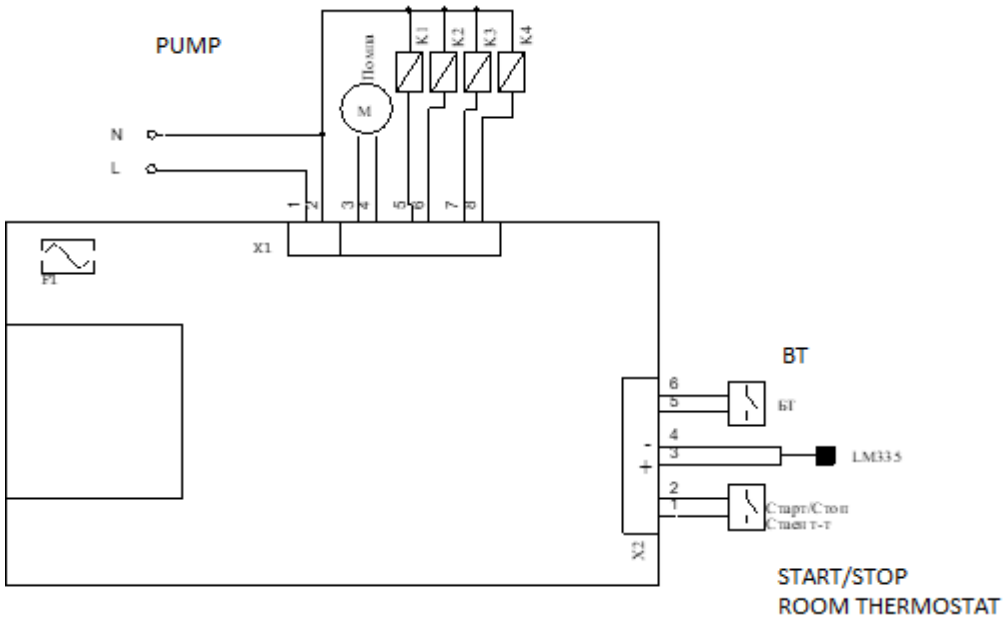


Fig. 8

When the Start/Stop or BT outputs remain unused, a jumper will be made between the associated terminals.

Boiler/Module 6÷30 kW

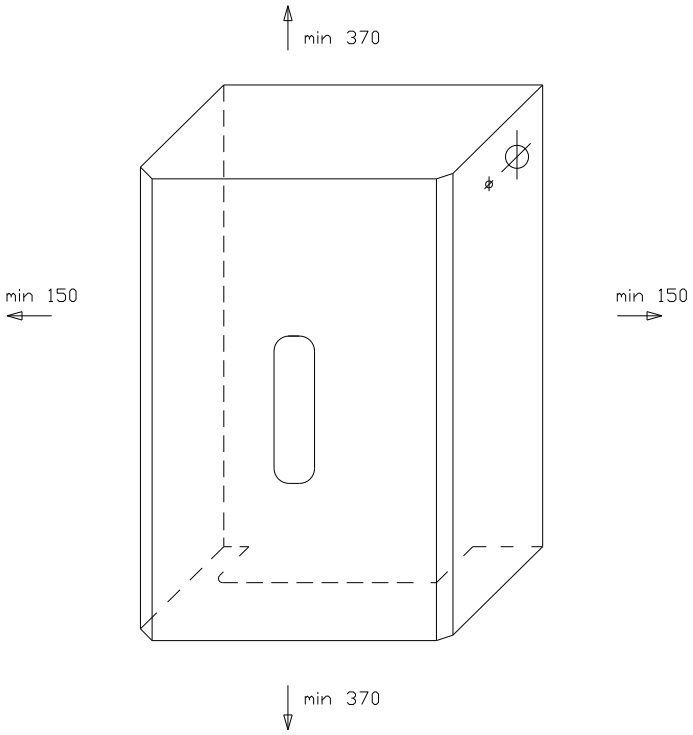


Fig. 9

Boiler/Module 37÷60 kW

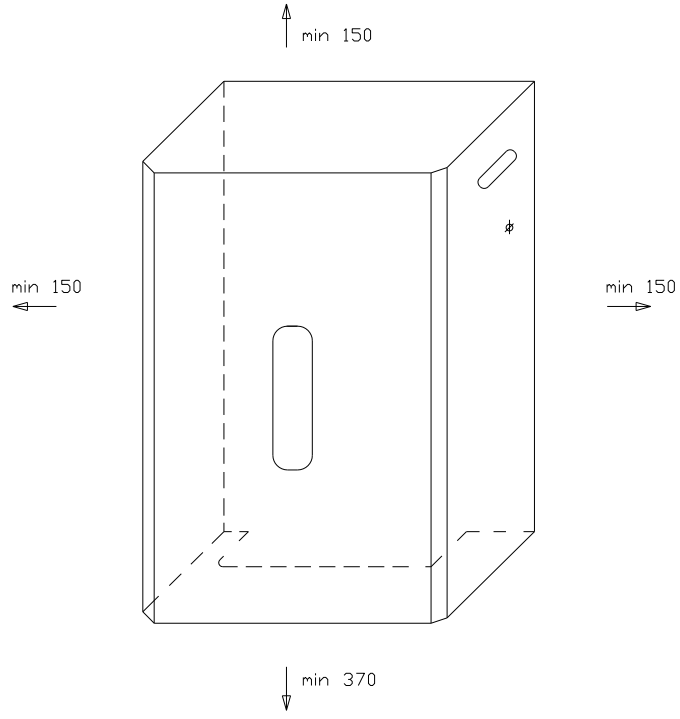


Fig. 10

Dimensions of electric boilers/modules with relay control

MR 6 - 30	**kW**	**6 - 30**
height	**mm**	700
length	**mm**	385
width	**mm**	280
Module K 6 – 30	**kW**	**6 - 30**
height	**mm**	645
length	**mm**	315
width	**mm**	280
MX / Module 37 - 60	**kW**	**37 - 60**
height	**mm**	780
length	**mm**	500
width	**mm**	295

Tab. 1

Technical characteristics of electrical boilers/modules with relay control

Maximum power	**kW**	**6,8**	**10,12**	**15,18,22**	**24,30**	**37, 45**	**52, 60**
Commutations level	**pcs**	**2**	**2**	**2**	**2**	**2**	**2**
Boiler body volume	**dm^3**	**8,9**	**8,9**	**8,9**	**8,9**	**26**	**26**
Supply voltage	**V**	**240/400**	**240/400**	**400**	**400**	**400**	**400**

Tab. 2

Technical data of electric boilers/modules with relay control

Maximum operating pressure	**Bar**	**2,5**
Test pressure	**Bar**	**4,0**
Regulation of heat medium temperature	**°C**	**30–90**
Room temperature control	**°C**	**5–30**
Connection pipes dimensions 6 – 60 kW	**G**	**1”**
Efficiency index	**%**	**99,30**

Tab. 3

Cross-section of power supply cables to electric network

P [kW]	**I_{heater} [A]**	**Cross-section [mm^2]**	**$I_{breaker}$ [A]**
6	**8,33**	**5 x 2,5**	**10**
8	**11,11**	**5 x 2,5**	**16**
10	**13,89**	**(3 x 2,5 + 1,5) + 1 x 4**	**20**
12	**16,67**	**(3 x 4 + 2,5) + 1 x 4**	**25**
15	**20,83**	**(3 x 4 + 2,5) + 1 x 6**	**32**
18	**25,00**	**(3 x 6 + 4) +1 x10**	**40**
22	**31,25**	**(3 x 6 + 4) +1 x10**	**50**
24	**33,33**	**(3 x 10 + 6) + 1 x 10**	**50**
30	**41,67**	**(3 x 10 + 6) + 1 x 10**	**63**
37	**52,08**	**(3 x 10 + 6) + 1 x 16**	**1 x 50/1 x 32**
45	**62,50**	**(3 x 16 + 10) + 1 x 16**	**1 x 63/1 x 32**
52	**72,92**	**(3 x 16 + 10) + 1 x 16**	**1 x 63/ 1 x 50**
60	**83,33**	**(3 x 25 + 16) + 1 x 25**	**2 x 63**

Tab. 4

Weight of the electrical boiler/module models

Electrical boilers			Electrical modules		
Model	Power, kW	Weight, kg	Model	Power, kW	Weight, kg
6 MR	6	31,0	6 K	6	22,0
8 MR	8		8 K	8	
10 MR	10		10 K	10	
12 MR	12		12 K	12	
15 MR	15	31,5	15 K	15	22,5
18 MR	18	32,5	18 K	18	24,0
22 MR	22	33,0	22 K	22	24,0
24 MR	24	35,0	24 K	24	26,0
30 MR	30	35,0	30 K	30	26,0
37 MX	37	48,0	37 K	37	45,0
45 MX	45	49,0	45 K	45	46,0
52 MX	52	50,0	52 K	52	47,0
60 MX	60	52,0	60 K	60	49,0

Tab. 5

Equipment of the boilers' models

	Model		
EQUIPMENT	**MR**	**MX**	**Module K 6 – 60 kW**
Expansion tank	√	–	–
Circulation pump	√	√	–
Safety valve	√	√	√
Emergency (blocking) thermostat	√	√	√
Air bleeder	√	√	√
Mounting brackets	√	√	√

Tab. 6

Note: The manufacturer reserves the right to make construction changing of the product.

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