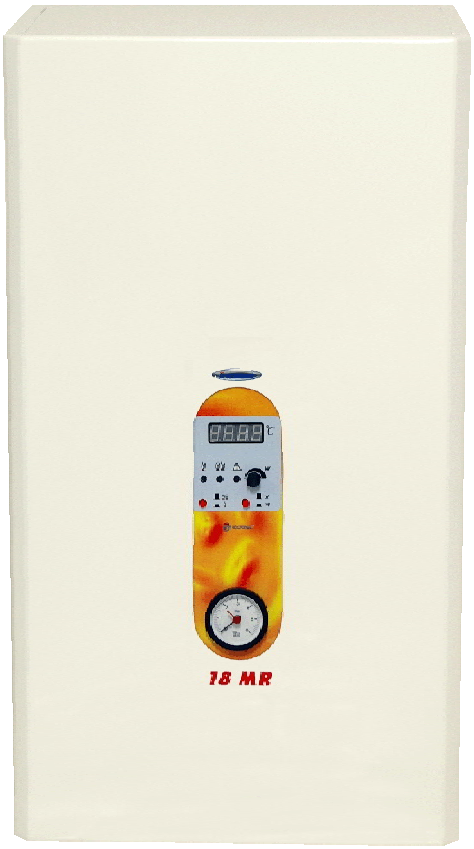
ECOTERMAL®

*Heat makes the home - we the heat*




**MANUAL**

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

## 1. 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 4). 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.

## 2. TECHNICAL DESCRIPTION OF THE BOILER

➤ Structure of the electric boiler/ module, see Fig. 3 page 5, Fig. 4 page 6, Fig. 5 page 7, Fig. 6 page 8 and Fig. 7 page 9.
➤ Equipment of the boilers' models is shown in Tab. 6 page 18.
➤ Technical data and technical characteristics of the electric boiler/module, see Tab. 1, 2 and 3 page 16 and Tab. 4, 5 page 17.

## 3. 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.
Electrical boilers/modules with relay control have a different number of comutation levels as follows:
➤ 6 to 60 kW - two-levels
➤ 75 and 90 kW - three-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.10

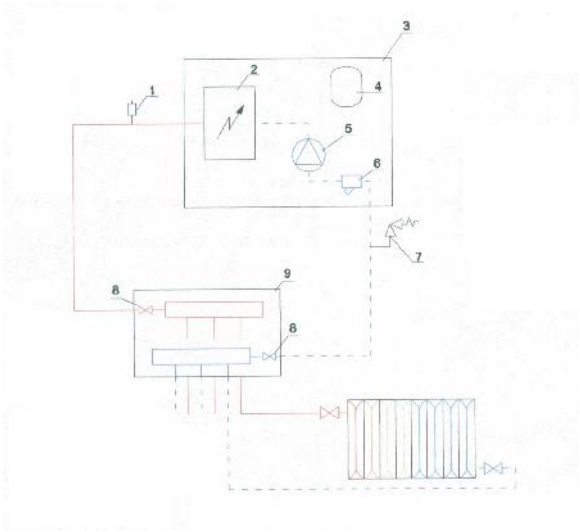
page.12). Models from 75 kW and 90 kW can bind to a proportional room thermo regulator (see Fig. 11 page 13).

## 4. 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. 13 and 14 at page 15.

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 (boiler fixture), 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.

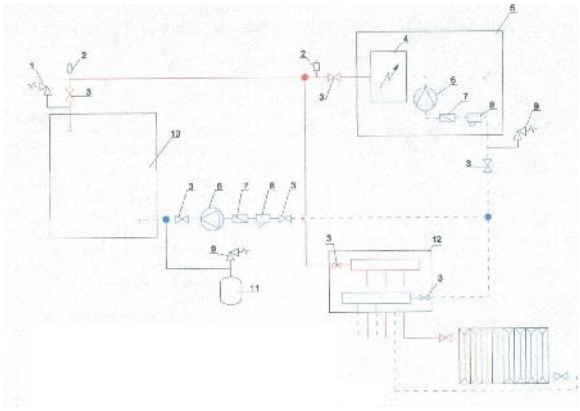
**Method of connecting of story (local) heating**



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

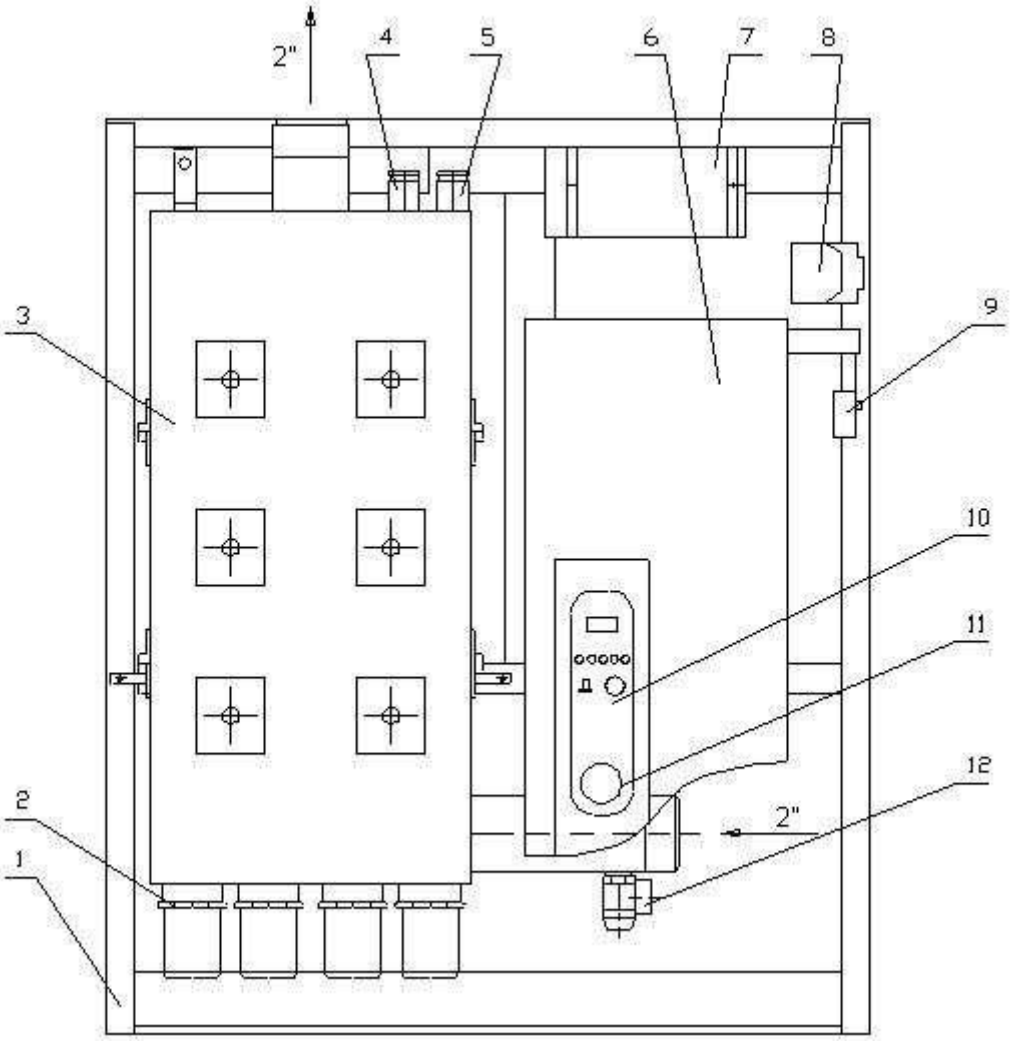
**Method of connecting the system to a solid fuel boiler**



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

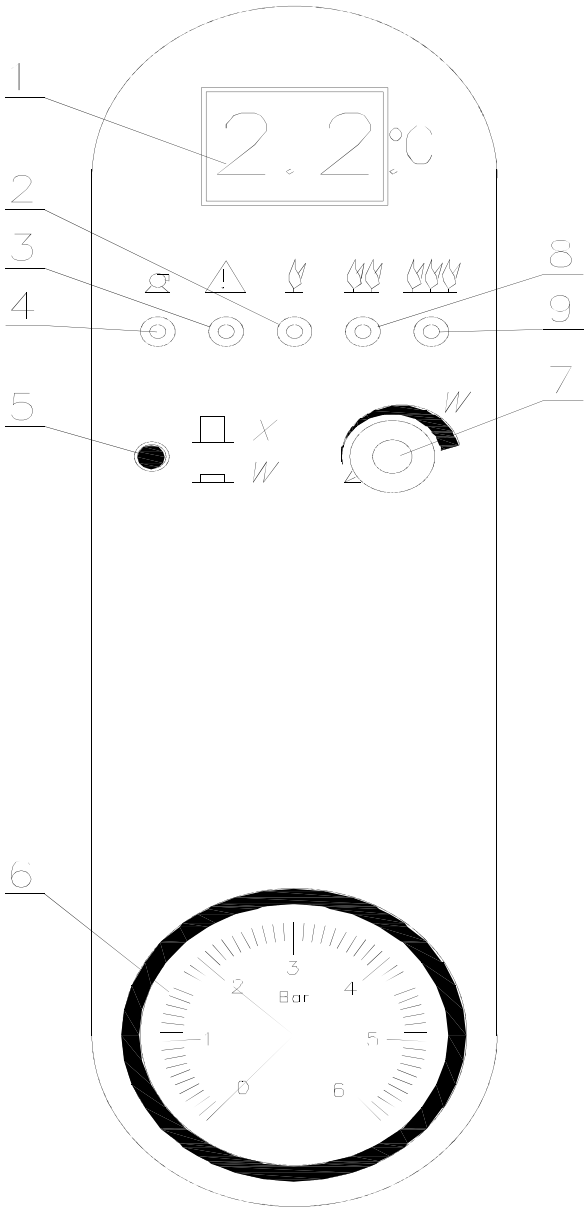
**MODULE K 75 ÷ 90 kW**




1. Frame
2. Heaters
3. Water Container
4. Thermostat pocket
5. Pressure-gauge Valve
6. System control
7. Power Wires
8. Automatic Breaker
9. Emergency (blocking) Thermostat
10. Control panel
11. Pressure-gauge
12. Safety Valve 2.5 bar, ½”

Fig. 7

**CONTROL PANEL 75 kW and 90 kW**




1. Digital Display
2. LED Indication– First Stage ON
3. LED Indication of activated emergency thermostat
4. LED Indication of circulation pump condition
5. Button – set/current temperature
6. Pressure-gauge
7. Potentiometer of boiler's temperature
8. LED Indication– Second Stage ON
9. LED Indication– Third Stage ON

Fig. 9

**SYSTEM CONTROL 75 kW and 90 kW**

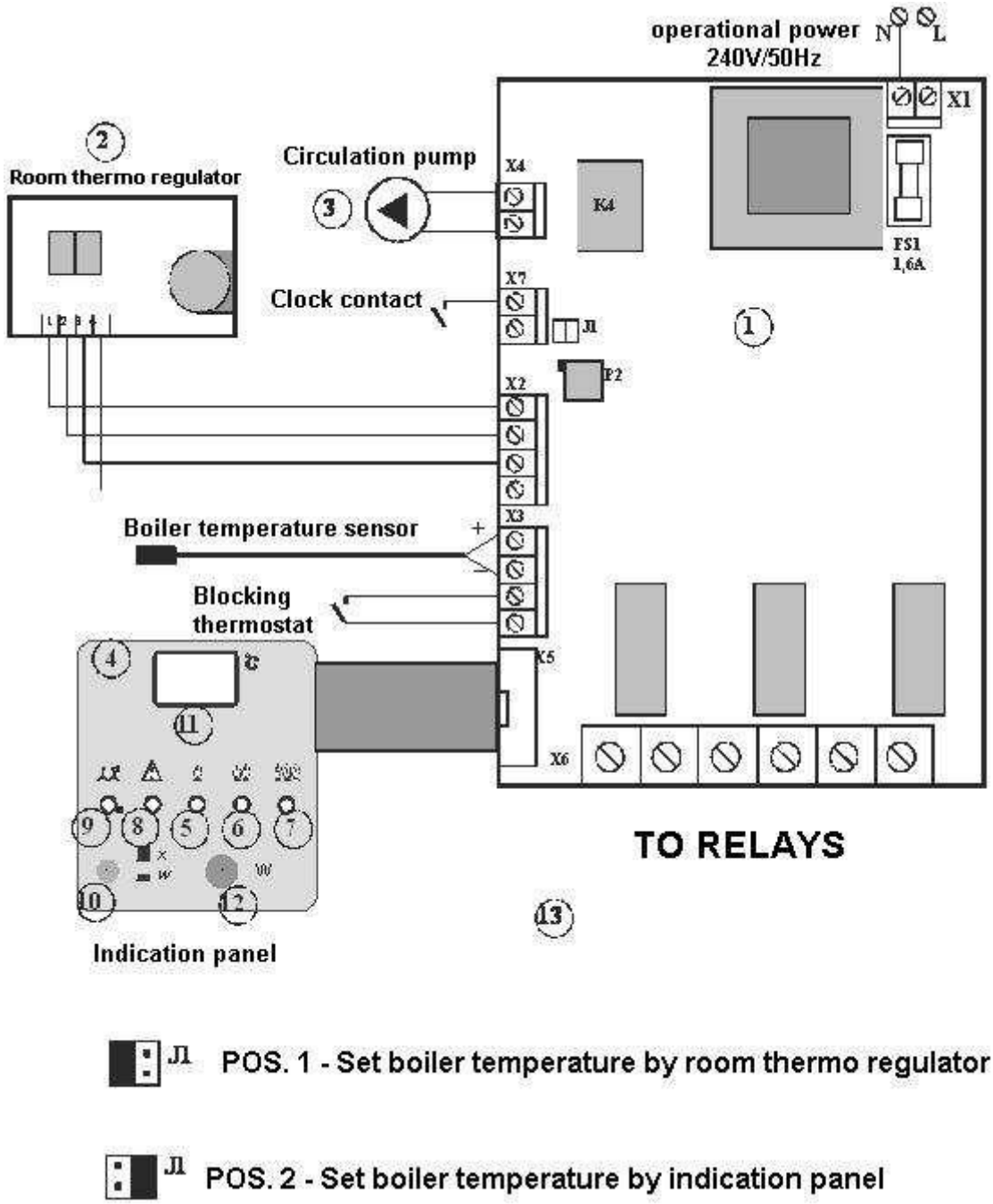
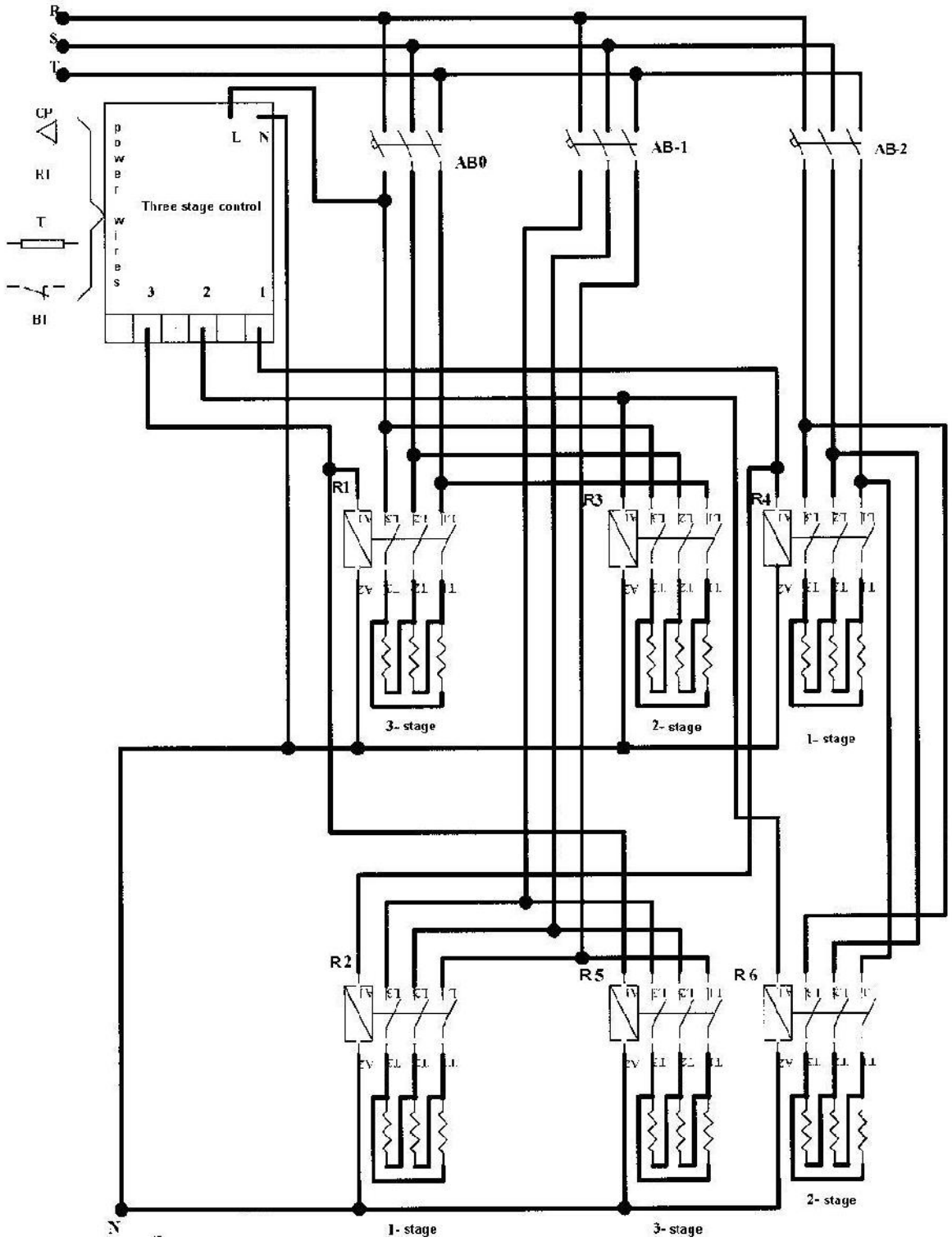



Fig. 11

To power wire X1 is getting operational power 240V/50Hz. It is secured by built-in breaker FS1 - 1,6 A. The three cables labeled R, S and T, must be submitted three phases of the contactors for power - pos.13. Relays are connected to power wires X6 in scheme with a total zero. X7 is connected to contact external clock for timing of operation of the boiler in a closed contact. In case that clock is not used, these power wires are short-circuit with a bridge. X3 is connected to the boiler temperature sensor. The sensor is polar, you must follow the indicated polarity when connected. In a reverse connection does not fail, but the temperature is unreal. X2 is connected to the **proportional** room thermo regulator.

**SYSTEM CONTROL 75 kW and 90 kW**




BT – Blocking (emergency) Thermostat
RT – Room Thermo regulator
T – Temperature sensor
CP – Circulation pump
R – Relay
AB – automatic breaker

Fig. 12

## 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 |
| **Module K 75 - 90** | **kW** | **75 - 90** |
| height | **mm** | 800 |
| length | **mm** | 790 |
| width | **mm** | 320 |

Tab. 1

## Technical characteristics of electrical boilers/modules with relay control

| **Maximum power** | **kW** | **6,8** | **10,12** | **15** | **22,30** | **37, 45** | **52, 60** | **75, 90** |
|---|---|---|---|---|---|---|---|---|
| **Boiler body volume** | **$dm^3$** | **8,9** | **8,9** | **8,9** | **8,9** | **26** | **26** | **49,6** |
| **Supply voltage** | **V** | **240/400** | **240/400** | **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”** |
| **Connection pipes dimensions 75 - 90 kW** | **G** | **2”** |
| **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 | 8,7 | 5 x 2,5 | 10 |
| 8 | 11,6 | 5 x 2,5 | 16 |
| 10 | 14,5 | ( 3 x 2,5 + 1,5 ) + 1 x 4 | 20 |
| 12 | 17,4 | ( 3 x 4 + 2,5 ) + 1 x 4 | 25 |
| 15 | 21,8 | ( 3 x 4 + 2,5 ) + 1 x 6 | 32 |
| 22 | 31.25 | (3 x 6 + 4) +1 x10 | 50 |
| 30 | 43,5 | ( 3 x 10 + 6 ) + 1 x 10 | 63 |
| 37 | 53.6 | ( 3 x 10 + 6 ) + 1 x 16 | 1 x 50/1 x 32 |
| 45 | 60,9 | ( 3 x 16 + 10 ) + 1 x 16 | 1 x 63/1 x 32 |
| 52 | 78,3 | ( 3 x 16 + 10 ) + 1 x 16 | 1 x 63/ 1 x 50 |
| 60 | 91 | ( 3 x 25 + 16 ) + 1 x 25 | 2 x 63 |
| 75 | 114 | (3 x 25 + 16) + 1 x 25 | 2 x 63/1x32 |
| 90 | 135,4 | (3 x 35 + 25) + 1 x 35 | 3 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 |
| 22 MR | 22 | 33,0 | 22 K | 22 | 24,0 |
| 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 |
| | | | 75 K | 75 | 75,0 |
| | | | 90 K | 90 | 80,0 |

Tab. 5

**Equipment of the boilers' models**

| | Model | | | |
|---|---|---|---|---|
| **EQUIPMENT** | **MR** | **MX** | **Module K 6 – 60 kW** | **Module K 75, 90 kW** |
| **Expansion tank** | √ | – | – | – |
| **Circulation pump** | √ | √ | – | – |
| **Water filter** | √ | √ | – | – |
| **Safety valve** | √ | √ | √ | √ |
| **Emergency (blocking) thermostat** | √ | √ | √ | √ |
| **Air bleeder** | √ | √ | √ | – |
| **Mounting brackets** | √ | √ | √ | √ |

Tab. 6

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