

### **MANUAL**

*FOR ASSEMBLY AND OPERATION OF ELECTRIC FLOW-THROUGH BOILER/  
MODULE WITH ELECTRONIC CONTROL*

### **PASSPORT**

*OF ELECTRIC BOILER/ MODULE WITH ELECTRONIC CONTROL ECOTERMAL*

***MRL** 6, 8, 10, 12, 15, 22, 30 kW **MXL** 37, 45, 52, 60 kW*

***MODULE L** 6, 8, 10, 12, 15, 22, 30, 37, 45, 52, 60, 75, 90 kW*

***MRL/WH** 24 and 30 kW*

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Dear clients! ECOTERMAL Company 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 and modules with electronic control that will secure for your comfortable, ecologic and economic heating through their quality, reliable and modern automation.

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## **1. RECOMMENDATIONS:**

- This electrical boiler/module 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 an 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/module has IP 20 protection degree, which applies after an installation at place where it will be used.
- After unpacking the boiler/module, check delivery integrity and completeness.
- Check whether the boiler/module 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/module's assembly should meet the effective prescriptions, norms and to the present manual.
- Connection of the boiler/module 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/module.
- 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/module may operate at open system up to temperature of 95°C max and at closed system up to 110°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/module 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/module 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 15). It is recommended for safer

operation the electric boilers/modules to be mounted in systems operating with a pump securing enforced circulation of the heat medium.

### 3. TECHNICAL DESCRIPTION OF THE BOILER/MODULE

- ▶ Structure of the electric boiler/ module, WHS, see Fig. 3, 4, 5, 6, 7, 8 ,9 and 10 page 16-22.
- ▶ Equipment of the boilers/modules' models is shown in Tab. 9 page 25.
- ▶ Technical data, technical characteristics and dimensions of the electrical boiler/module, see Tab. 4, 5, 6 page 23 and Tab. 7, 8 page 24.

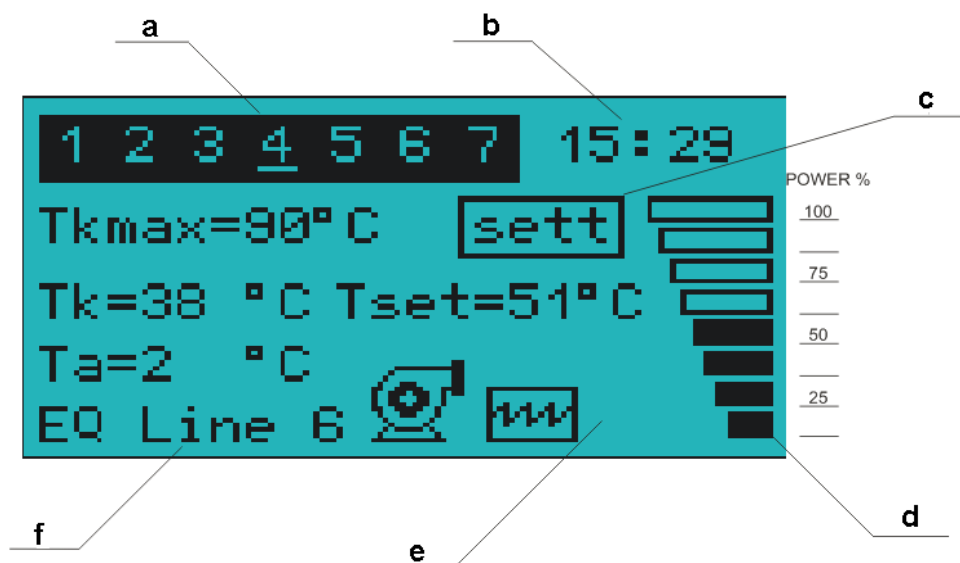
### 4. SYSTEM CONTROL

#### 4.1 Technical description

Present technical description is reviewing the operation principle and the characteristics of the control system of electric boiler/module with rated heaters' power till 90 kW. The system is carrying out the complex control of the local electrical water heating components in accordance with the ambient conditions – the boiler's/module's body in a set up regime, which is prolonging the life of the components and increasing the reliability.

#### 4.2. Control and signaling devices

4.2.1 Indication panel – LCD display with a resolution of 128x64 pixels (pos.1):



- a) Days of the week are indicated in this field, as the current one is underlined. The same field is being used to show control indications about emergency situations or about OFF regime;
- b) Present time. The same field is being used to indicate the start of the periods /operation and stop/ of the boiler/module during setting of the weekly program;
- c) Menu;
- d) Scale of a power;
- e) Field to display the icons:



- switched on circulation pump (1);



- switched on electrical heating elements (2);



- activated OFF regime (3);



- overheating thermostat (4);



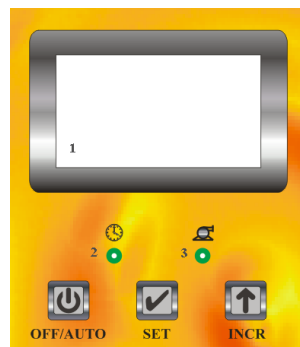
- low water level in the boiler body (5);



- the boiler body temperature water is below 15°C (6).

f) Indication about equi thermal curve, type of the room thermo regulator or selected manual mode for adjustment of Tset.

- Button **OFF/AUTO**. It switches on the system (boiler/module) in heating or long stay mode.
- Button **INCR**. It changes the values and options in the menu.
- Button **SET**. Selection and confirmation.
- Light indication about week program (pos. 2). It is being indicated in case of active period of the week program.
- Light indication about the state of the circulation pump (pos. 3). It is being indicated when the circulation pump is switched on.



#### 4.2.2 Room thermo regulator

- Two positional digital display. It shows the current or assigned air temperature at the place where it is mounted. The indication is in degrees centigrade.
- Button ASSAIGNED/CURRENT temperature. It shows the assigned temperature which the system try to keep in the premises or the present one.
- Knob for defining of the desired temperature.

#### 4.3 Operation mode and functions

**4.3.1 OFF regime.** It is used during continual boiler/module's stop. It can be chosen by the button AUTO/OFF on the indication panel. When the boiler/module is in OFF regime, the heating elements are switched off. The room thermo regulator does not affect to the general operation, but it measures and shows the real room temperature. Also, during that regime the circulation pump starts for 10 minutes a day in order to avoid its blocking, due to a fur accumulating. Generally the OFF regime is appropriate during long stop of the boiler/module operation, even during the winter. There is no risk of water freezing in the systems, due to all activated protections.

Going into OFF regime can be done by pressing and keeping of the button (for about 3 sec.), then the button is to be released, as on the display at field “a” appears a notification about the relevant operation mode. In case of switched on electrical heating elements during this mode, it starts their smooth stopping. On the display appears icon (3) after the last electrical heating element is being switched off.

**4.3.2 AUTO regime.** It provides a regular heating operation and it can be selected by the indication panel button AUTO/OFF if the boiler/module has been in a regime OFF before that. The heating element’s operation is provided by the selected program, by means of the weekly programmer or by a signal of the room thermo regulator.

**4.3.3 PUMP.** The pump is started when at least one heating section is switched on or the temperature of the boiler’s water exceeds 40°C. The circulation pump works until the accumulated energy in the boiler’s body will be transmitted to the radiators (until the temperature drops under 40°C). The pump will be started by force, when the boiler’s temperature drops below 15°C in order to pass the whole water volume in the system through the boiler temperature sensor. The pump operation is being indicated with icon (1) at pos. 3 of the display.

**4.3.4 HEATERS.** The maximum number of heating sections is 36. Consecutive switching on or off the sections is done in such a way that each subsequent one is connected to a neighboring phase of the power supply network in view of symmetric loading. If simultaneous switching of more than one section is needed, it is done consecutively and each coming is switched with 3 seconds delay towards the preceding one. This results in smooth loading or unloading of the power supply network, electric shocks are avoided and high noise resistance of the system is achieved. In case of switched on at least one heating section on the display appears icon (2).

**4.3.5 REGULATION.** The regulation of the heating capacity is fulfilled by room thermo regulator, regarding the outdoor temperature and adjusted equi-thermal curve, or manually by fixing Tset. As much as the real temperature becomes closer to the boiler’s one, more heating sections will be switched off. In case both temperatures are equalized there will be kept the necessary number of heating elements that is to provide the desired temperature level.

**4.3.6 WEEKLY PROGRAMMING.** It defines the operation and stop time periods of the boiler/module, according adjusted program.

#### **4.4 Protections and blockings**

**4.4.1 PROTECTION,** thermal emergency of the boiler’s body. It is carried out by an electromechanical blocking thermostat. Limit temperature – fixed, cannot be adjusted.

**REACTION.** Upon exceeding the limit temperature, all heaters are immediately compulsory switched off. The pump continues to work for 10 more minutes, after which it switches off. Signal OVERHEATING is shown on the indication panel by an icon (4). The protection is not self-recovering. It can be unblocked manually only after removal of the reason for tripping.

**4.4.2 PROTECTION** from low level of water in the boiler’s body. Because of various reasons (evaporation, leakage), the volume of the water in the pipes and radiators may decrease and the water level in the boiler’s body may drop under the one admissible for their safe operation.

**REACTION.** All heaters and the pump are immediately compulsory switched off. Signal LOW LEVEL is shown on the indication panel by an icon (5). Upon recovery of the level, the protection is waiting for 40 seconds, after that the heaters are smoothly switched on to the needed number.

**4.4.3 PROTECTION** against water freezing in the boiler’s body, pipes and radiators. Actual only in regime OFF.

**REACTION.** Upon dropping of the water’s temperature in the boiler’s body below 15°C, the circulation pump is switched on compulsory to constant operation. On the display is

shown icon (6). If in such status the temperature is lower than 6°C should be measured, all heaters are smoothly switched on (100% power). This shall continue until the temperature reached above 9°C. Then the heating is switched off again smoothly, but the pump is continuing to work while the temperature is staying below 15°C. Upon triggering the overheating protection, the action of the protection against freezing is blocked.

#### **4.5 Options of the equipment and specifics during operation**

**4.5.1** *Without room thermo regulator, but with built-in weekly programming.* The built-in weekly programming is setting the intervals of operation time and breaks of the boiler/module according to the set program. In the range of operating the boiler's controller is determined manually, and the set temperature is constantly. During the break, the boiler's regulator settings are 20°C and, therefore, the heating is off. In this case, it is recommended thermostat valves to be mounted on all radiators for individual regulation of the indoor temperature of each room. The boiler water's temperature is set up manually by the user and it is not depend on the outdoor temperature, but the thermostat valves affect on the boiler regulator and the electric power through dosing of the consumed heating power. During the operation, the boiler/module is in a determined mode, maintaining constant water's temperature by variable percentage of power.

**The disadvantage is that because manually setting the water temperature may be insufficiently or unnecessary high to perform the indoor assignments, set by thermostatic valves.**

**4.5.2** *With outdoor weekly programmable thermo regulator in type of CM 51 (HONEYWELL).*

The outdoor weekly programmable thermo regulator is mounted in the heated premises and it is determining the time intervals of operation and break of the boiler/module according to the preset program and the indoor temperature in the premises.

During the work mode the number of switch on heating sections, respectively boiler's water temperature depends on the time at which the thermo regulator will remain in ON or OFF mode. In connection with this condition, the inclusion or exclusion of each heater is in period of 3 minutes. This is valid only in case when the difference between the actual and maximum set boiler's water temperature is more than 9 degrees). The status of the thermo regulator is shown on the display of the system control. In the break mode the setting of the boiler's regulator is 20 degrees. In this option, it is possible thermostat valves to be mounted in all premises, except the one where the programmable thermo regulator is mounted in. The thermostat valves affect of the boiler's regulator and of the electric power through dosing of the consumed heating power, and the indoor (room) temperature is affecting of the duration of the boiler's operation intervals.

**The advantage of this option is the comfortable boiler's control directly from the room, and the disadvantage is its frequent switching on and off for the purpose of maintaining the indoor temperature.**

**4.5.3** *With proportional room thermo regulator and with built in weekly programming.*

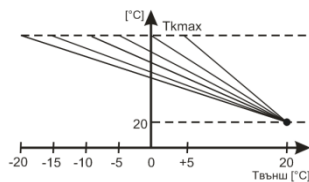
The proportional thermo regulator is mounted in one of the heated premises and the programmer, built-in in the system control, is setting the weekly program for switching on and off mode of the boiler/module. During the operation mode, the boiler's thermo regulator settings are variable and they are received by signal of the room thermo regulator and depend on the difference between the actual and the preset indoor temperature. The thermostat valves may be mounted in all premises, except the one where the room thermo regulator is mounted in. If thermostat valve is also mounted there, it should be opened to the max. During each operation of the program, the electric boiler/module is operating in defined mode and with water's temperature adapted to the maximum for maintenance of the indoor temperature preset by the room thermo regulator. Upon change of the outdoor temperature, the

boiler/module settings are also indirectly changing, so that during the previous seasons they are not unnecessary high, while in extreme conditions they are enough.

**The overconsumption of energy is eliminated and this option is the most effective in a view of protecting the resources of the installation.**

#### 4.5.4 With equi thermal regulation and built-in weekly programming.

In this case the system control operates without a room thermo regulator. The setting of the boiler's water temperature is being adjusted according the outdoor temperature sensor.



By lowering the ambient temperature in a range below +20°C, began raising the temperature of the boiler's water reaches a maximum value (**T<sub>kmax</sub>**) at the lower limit level of the equi-thermal range. The desired equi-thermal range depends on premise insulation and it has to be selected in relation to the curve number from Table 2.

The range from -20 up to +20°C is to be selected about premises with small heating losses, where the hottest temperature of the heating water is being reached when the outdoor temperature drops to -20 °C.

The range from +5 up to +20°C and 0 up to +20°C is to be selected for premises with big heating losses, as warehouses, halls, etc., where highest temperature of the heating water is being reached when the outdoor temperature drops down to +5 or 0°C.

The default setting is from -20 up to +20°C (curve 6). The outdoor temperature sensor is to be mounted at the outer north part of the building, in a way that it is not exposed to direct sun shine or other way of heating radiation, which can affect to the correct measurement of the sensor.

**4.5.5** The electric boiler/module can be equipped with a domestic hot water temperature sensor (WHS). As it provides WHS warming, as the control is being provided by the implemented thermostat in the boiler/module. In this case the number of switched on electrical heating elements depends on the difference between the assigned **T<sub>bset</sub>** and the actual temperature **T<sub>b</sub>**. The current temperature of WHS - **T<sub>b</sub>** is shown on the display at the place of **T<sub>set</sub>**. Reaching the assigned temperature of WHS is with a higher priority than the heating one. **Only for MRL/WHS.**

#### 4.6 Programming and adjustment

The adjustment and programming of the electrical boiler/module is to be done with buttons **INC** and **SET**.

With button **INC** from the menu is to be selected:

- **Sett** – adjustment of the assigned temperature of hot water **T<sub>bset</sub>** (when WHS system is used); The maximum water temperature in the boiler's body **T<sub>kmax</sub>**; Type of the room thermo regulator, selection of equi-thermal curve, manual assignation of the necessary water's temperature in the boiler's body;
- **Time** – adjustment of date and time;
- **Pr.N(Y)** – switch off and on the function – weekly programming;
- **Pr.1** – adjustment of weekly program 1;
- **Pr.2** – adjustment of weekly program 2;

Press **SET** button (for about 3 sec.) to start the adjustments. The relevant value will start blinking. The change of the value can be done by **INC** button, and the confirmation of the desired one by pressing **SET** button.

Note: Date and time values do not blink during their changes.

*Order of setting within **Sett** menu:*

1. Setting the of the water temperature **T<sub>bset</sub>**, in case of using WHS.
2. Setting the maximum temperature of the boiler's water **T<sub>kmax</sub>**.



3. Selection of the regulation type:
  - Equi-thermal regulation and selection of a curve (**EQ Line**, see Table 2);
  - Type of the room thermo regulator (**TR Type**, see Table 3);
  - Manual setting of the boiler's water temperature (**Manual**).
4. Setting of **Tset**, in case of manual assignation.

In all the rest options **Tset** is being defined automatically.

*Order of setting within **Time** menu:*

Adjustment of the day (**DD**), month (**MM**), year (**YY**), day of the week (**DOW**). The symbol in "a" field starts blinking during entering the day of the week, as its changing is to be done by **INCR** button.

*Deactivation and activation of the option – weekly programming*

By keeping pressed **SET** button in menu **Pr.N(Y)**, it starts blinking, and by **INCR** button it is being changed respectively to **Pr.N** – as the option is deactivated and even having an adjusted program it will not be fulfilled; **Pr.Y** – the option is activated.

Confirmed with **SET** button.

*Order of setting of the two week programs **Pr.1** and **Pr.2***

Setting of the starting time (beginning of the interval for a start of the boiler/module's operation), setting of the stopping time (beginning of the pause interval of the boiler/module), days of the week, during which the program will be activated. It can be selected all days of the week, only working days, holiday ones, as well without selected days – as in this case the program will not be activated. If at one program the time for starting/stopping of the boiler/module coincided, then the stopping has a priority. In case the time for starting regarding two programs is same then a valid one remains the assignation of the first program.

For example:

P1 time ON= P1 time OFF – valid is P1 OFF

P1 time ON= P2 time ON – valid is P1 ON

## **4.7. Connection Diagrams**

### **4.7.1 Terminals and couplings**

#### **4.7.2 Terminal for a connection of the circulation pump – X14.**

It is being used for connection of the circulation pump with operation supply voltage ~220V/50Hz and nominal current up to 8A.

#### **4.7.3 Terminal for a connection of proportional room thermo regulator – X9.**

- It is being used for connection of proportional room thermo regulator with three wire's cable 3x0,75sq.mm
- X9.1 – current signal 0-20mA
- X9.2 – common terminal

The power supply of the proportional room thermo regulator is being provided by terminal X7.2 for +16V DC, as jumper J3 is to be fixed preliminary in position 2.

#### **4.7.4 Terminal for a connection of the contact thermo regulator – X12;**

#### **4.7.5 Terminal for a connection of the heating control of WHS – X11;**

#### **4.7.6 Terminal for a connection of the sensor of WHS – X10 (type Pt-1000 non polar);**

#### **4.7.7 Terminal for a connection of the outdoor temperature sensor – X7 (type Pt-1000 non polar). Jumper J3 is to be fixed preliminary in position 1;**

#### **4.7.8 Terminal for a connection of the boiler's water temperature sensor– X6 (type Pt-1000 non polar);**

#### **4.7.9 Terminal for a connection of the water level sensor (ДН)– X8;**

#### **4.7.10 Terminal for a connection of the blocking thermostat (BT)– X1;**

#### **4.7.11 Terminal for a connection of the operation power supply - 220V/50Hz - X4;**

#### **4.7.12 Terminals for a connection of the electrical heating elements – X2, X3 and X5.**

Through the power relays is submitted phase to the first ends of heating sections. The second ends are connected to neutral. The nominal current trough each of those outputs is 16A.

#### **4.7.13 Coupling J1**

The coupling is being used for connection of 20 wire ribbon cable from the indication panel. First item of the cable gland must match the first item of J1.

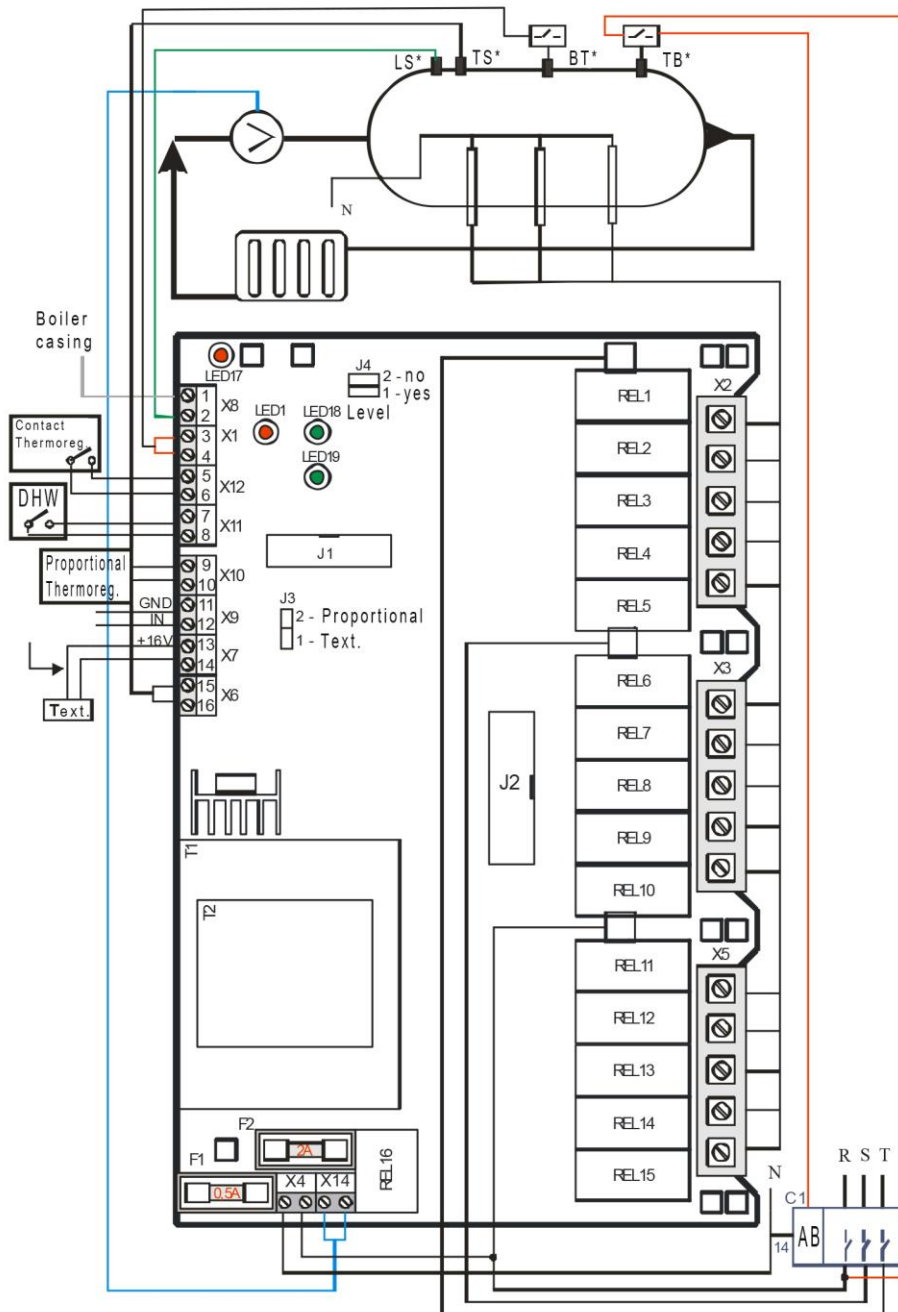
#### **4.8 Jumpers**

**4.8.1 Jumper J3.** The position of this jumper defines if the boiler/module will operate with proportional room thermo regulator - placed in position 2, or with outdoor temperature sensor and equi-thermal regulation - placed in position 1.

#### **4.8.2 Jumper J4.**

- When the jumper is placed in the position 1, the protection against low water level is activated.
- When the jumper is placed in the position 2, the protection against low water level is deactivated.

## SCHEME OF THE SYSTEM CONTROL



LS\* - Level Sensor  
 TS\* - Temperature Sensor  
 BT\* - Blocking Thermostat  
 TB\* - Thermal Breaker

PARAMETERS AND SETTINGS				
Symbol	Description	Range	Default settings	Users' settings
<b>Tbset</b>	Assigned temperature of the water (WHS)	30 ÷ 60° C	40° C	
<b>Tkmax</b>	Max. water's temperature in the boiler's body	40 ÷ 90° C	90° C	
<b>Tκ</b>	Current temperature of the water in the boiler's body	measured	-	
<b>Ta</b>	Outdoor temperature	measured	-	
<b>Tset</b>	Assigned temperature of the water in the boiler's body			
	<i>Manual assignation</i>	30 ÷ 90°C	30° C	
	<i>Equi-thermal regulation; heating of WHS;proportional thermo regulator</i>	calculated	-	
<b>Text.min</b>	During equi-thermal regulation – the outdoor temperature corresponding to the highest temperature of the water (see table 2)	5 ÷ -20° C	-10° C	

Table 1

T ext.min with equi thermal regulation	
Curve number	Range ° C
<b>1</b>	From +5 up to +20
<b>2</b>	From 0 up to +20
<b>3</b>	From - 5 up to +20
<b>4</b>	From -10 up to +20
<b>5</b>	From -15 up to +20
<b>6</b>	From -20 up to +20

Table 2

Room thermo regulator type	
Number	Type
<b>1</b>	Contact
<b>2</b>	Proportional

Table 3

## 5. OPERATION OF THE BOILER IN WHS MODE (DOMESTIC HOT WATER MODE)

The connection of the electrical boiler to plumbing is shown on Fig. 8, page 21, pos.17. When water consumption is obtained differential pressure between the input and outlet of the plate heat exchanger (pos. 17 and pos. 18, Fig. 8, page 21). Membrane leverage actuator shifts from extreme left to extreme right position, which moves in three-way diverting valve and circulation between the boiler starts body and plate heat exchanger. Micro switch sends a signal to the system control of the electric boilers operating mode for domestic hot water. All restrictions on the boiler connected to heating modes fell, and boiler starts working as fast heater, due to which, heating counter flow of hot water. In dropping the consumption of hot water (no differential between input and outlet), membrane leverage actuator to its initial position and three-way mixing valve allows circulation through the heating system. Micro switch restores settings in heating mode.

## **6. OPERATION MANUAL**

- User of the electrical boiler/module providing water supply and electricity to the installation.
- Watch for air tightness and control the working pressure in the system.
- Adjust the boiler or room temperature, depending on the operating principle of the installation and personal preferences.
- In deviation from the parameters signalised authorized service.
- The service is carried out by experts familiar with the organization, management and operation of the device.
- Upon stopping and restoring of the electrical power the boiler/module automatically starts again.

## **7. CONNECTING TO THE ELECTRIC NETWORK**

- Connecting the electric boiler/module to the power supply network 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/module power (see table 7, page 24).

## **8. COMMISSIONING**

- Boiler/module's startup is possible after performed control on the good working order of the connections to the heating system, check up of the electrical connections and the external line.
- Check up whether the valves and taps of the heating circuit are open, check up also the water pressure in the system. Switch on the automatic breaker of the electric boiler/module and preset the desired temperature of the boiler or the indoor thermo regulator. Servicing of the indoor thermo regulator is done according to the instructions thereto. The heating systems may be filled in by water or mixture of water and antifreeze only. Oil should not be used.

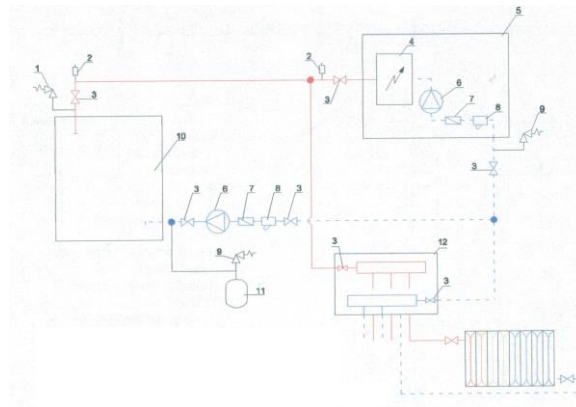
## **9. CONDITIONS OF COMMISSIONING AND UNDERTAKING WARRANTY MAINTENANCE – GENERAL TERMS:**

**The electric boiler/module is mounted by consoles only on a wall that can bear its weight. The boiler/module location should be selected in a manner to secure access – technological tolerance from its all four sides is shown on Fig. 9 and 10 page 22, the distances being different for the various rated powers.**

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 off 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. Banjo fitting connections should be mounted on the boiler/module input 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 warranty shall be effective as from the commissioning date, but not later than six months as from the date of the purchase.

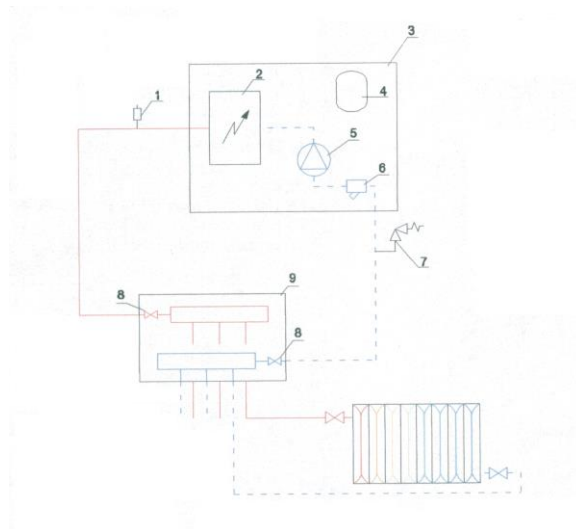
## Method of connecting the system with a solid fuel boiler



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

Fig. 1

## Method of connecting of floor (local) heating



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

Fig. 2

### Electric boiler MRL 6 - 30 kW

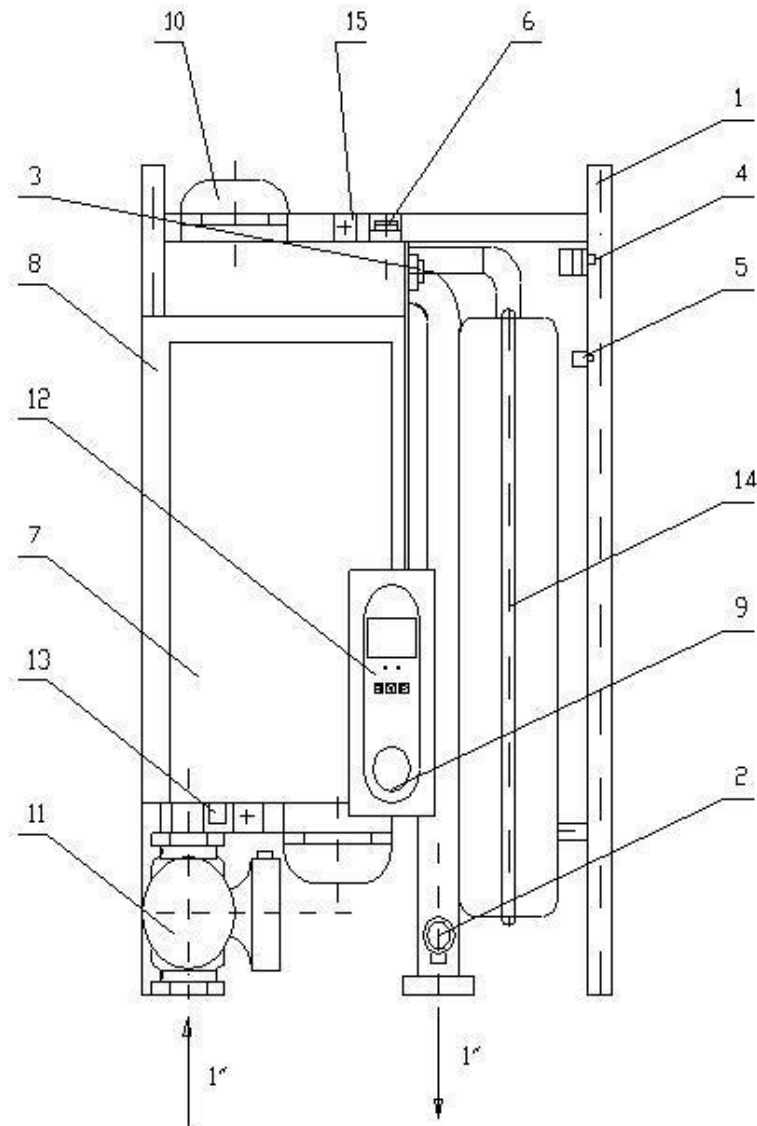


Fig. 3

1. Frame
2. Safety Valve by pressure 2.5 bar
3. Level sensor
4. Automatic breaker
5. Emergency (blocking) thermostat
6. Air bleeder
7. System control
8. Water Container
9. Pressure-gauge
10. Heaters
11. Circulation Pump
12. Control Panel
13. Pressure-gauge Valve
14. Expansion Tank
15. Thermostat Pocket



## Electric boiler MXL 37 - 60 kW

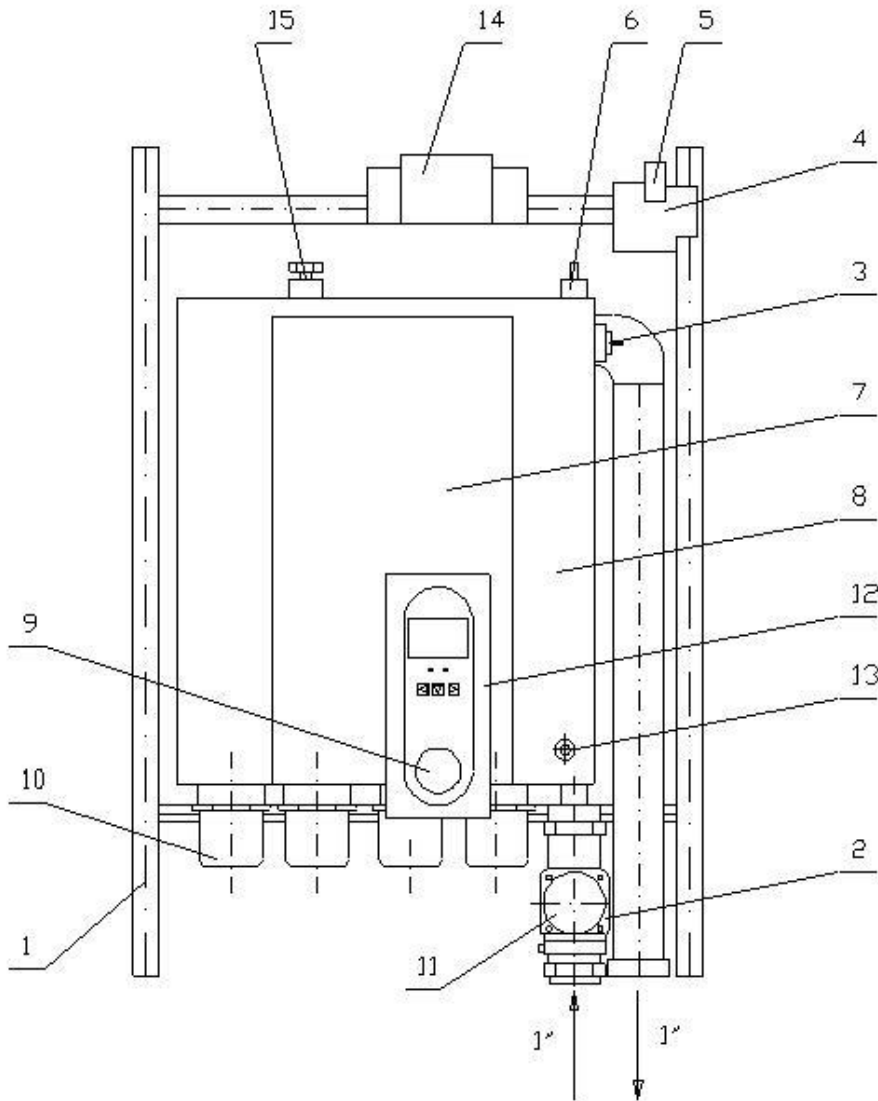


Fig. 4

1. Frame
2. Safety Valve by pressure 2.5 bar
3. Level Sensor
4. Automatic Breaker
5. Emergency (blocking) Thermostat
6. Air Bleeder
7. System control
8. Water Container
9. Pressure-gauge
10. Heaters
11. Circulation Pump
12. Control Panel
13. Pressure-gauge Valve
14. Power Wires
15. Thermostat Pocket

## MODULE L 6-30 kW

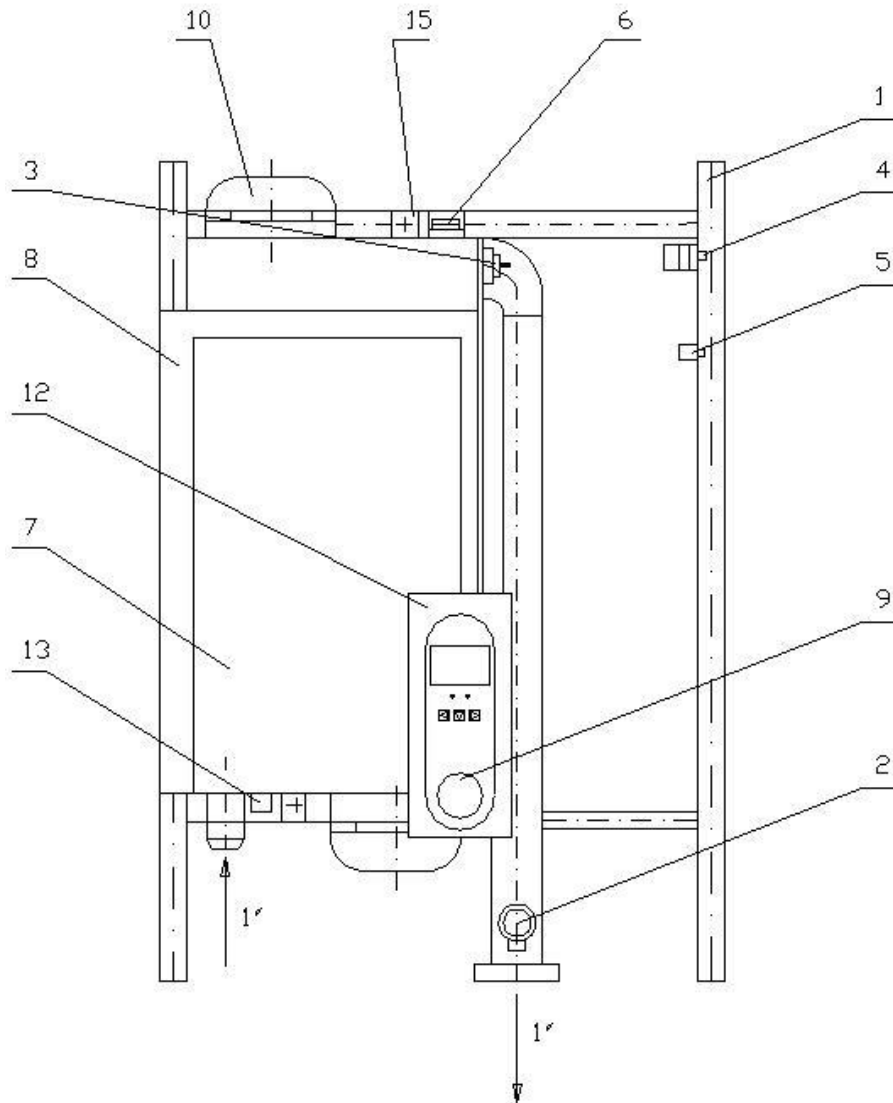


Fig. 5

1. Frame
2. Safety Valve by pressure 2.5 bar
3. Level Sensor
4. Automatic Breaker
5. Emergency (blocking) Thermostat
6. Air Bleeder
7. System control
8. Water Container
9. Pressure-gauge
10. Heater
12. Control Panel
13. Pressure-gauge Valve
15. Thermostat Pocket

## MODULE L 37-60 kW

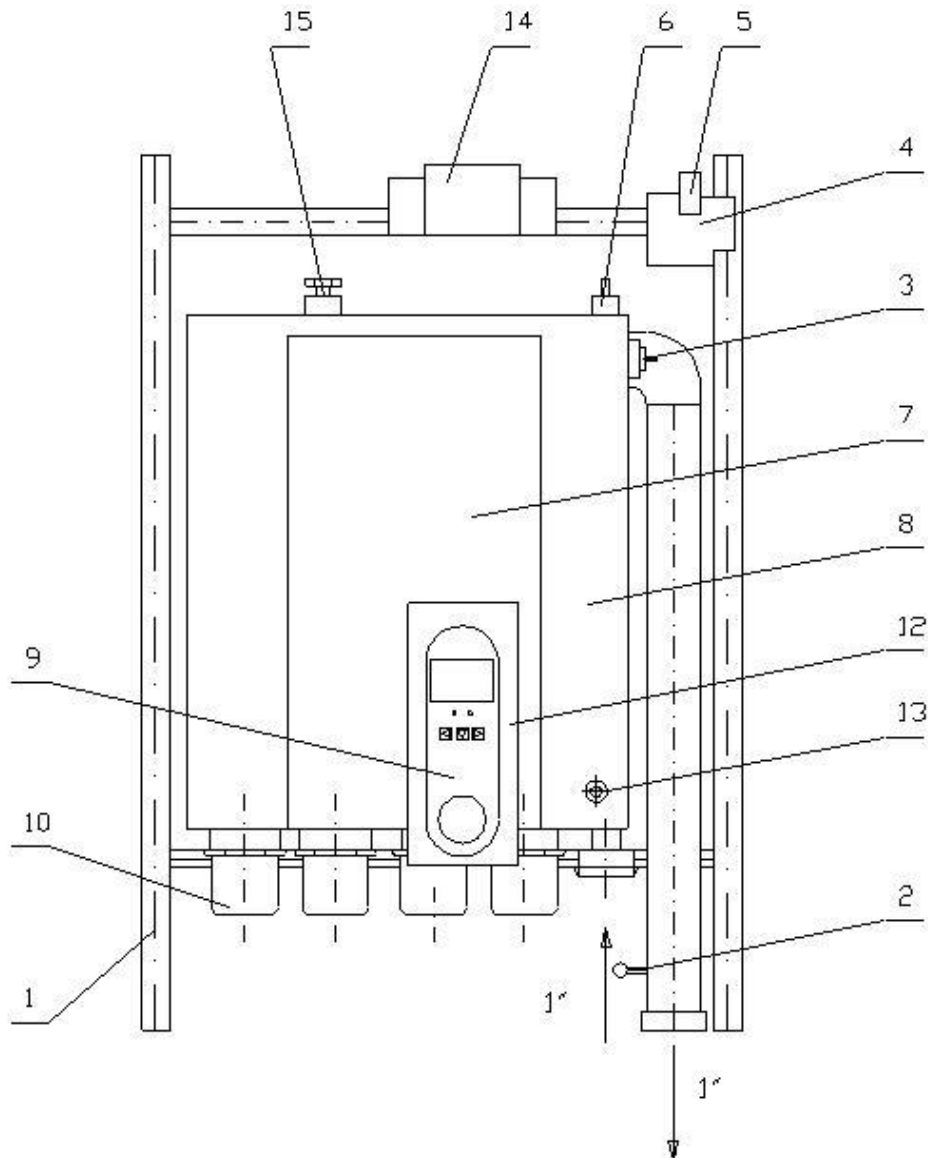


Fig. 6

1. Frame
2. Safety Valve by pressure 2.5 bar ½"
3. Level Sensor
4. Automatic Breaker
5. Emergency (blocking) Thermostat
6. Air Bleeder
7. System control
8. Water Container
9. Pressure-gauge
10. Heaters
12. Control Panel
13. Pressure-gauge Valve
14. Power Wires
15. Thermostat Pocket

## MODULE L 75 and 90 kW

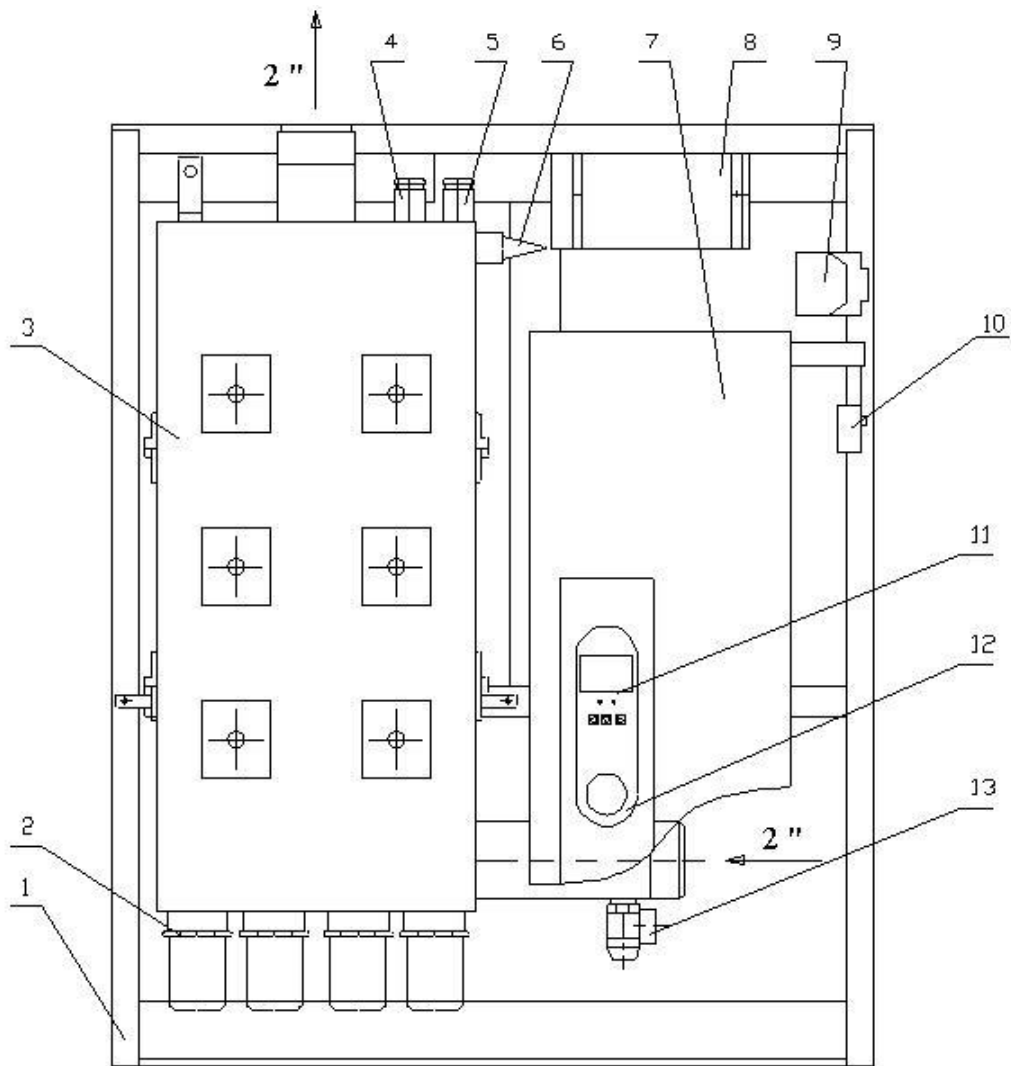


Fig. 7

1. Frame
2. Heaters
3. Water Container
4. Thermostat Pocket
5. Pressure-gauge Valve
6. Level Sensor
7. System control
8. Power Wires
9. Automatic Breaker
10. Emergency (blocking) Thermostat
11. Control panel
12. Pressure-gauge
13. Safety Valve by pressure 2.5 bar  $\frac{1}{2}$ "

**Electrical boiler MRL/WHS 24 and 30 kW**

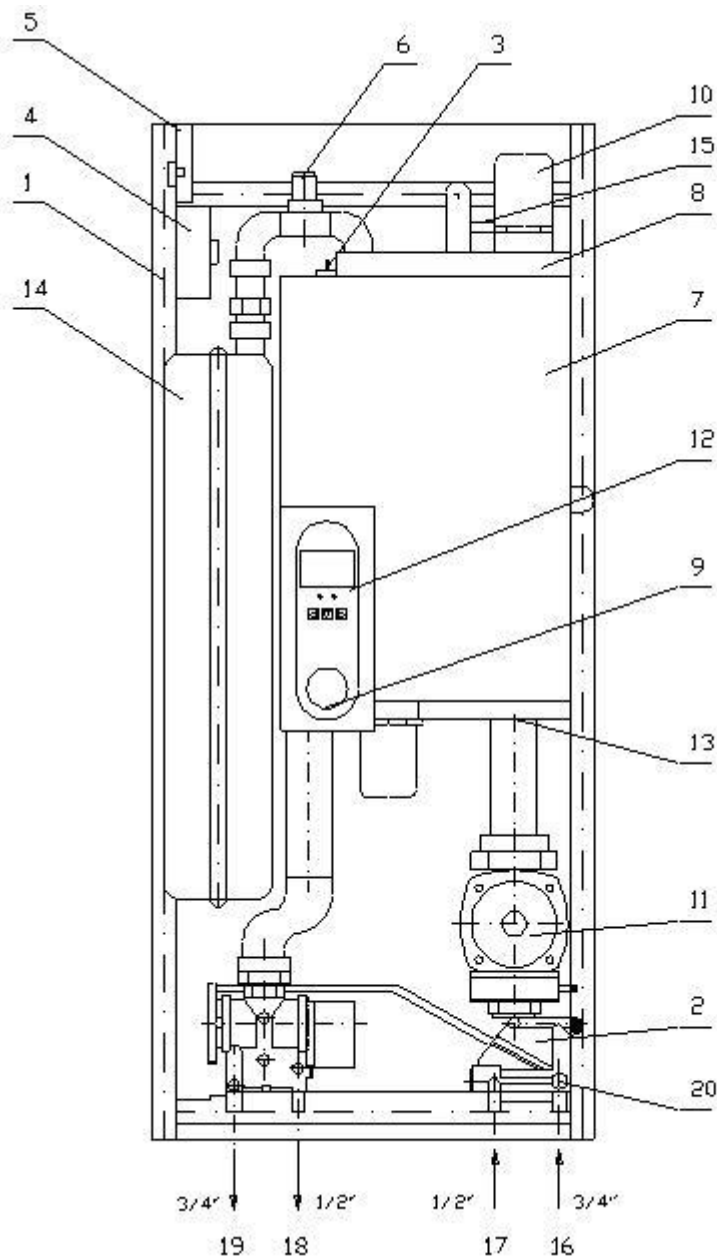
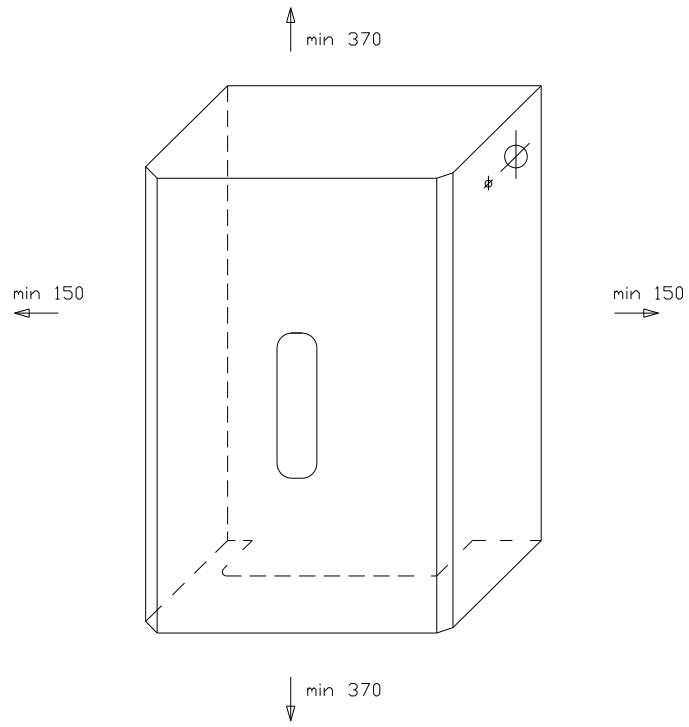


Fig. 8

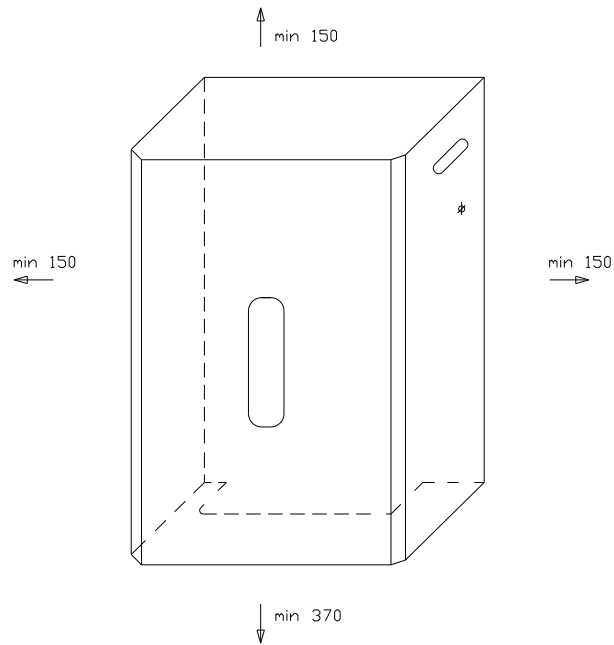
- |                                    |                                      |
|------------------------------------|--------------------------------------|
| 1. Frame                           | 11. Circulation pump                 |
| 2. Hydraulic unit                  | 12. Control panel                    |
| 3. Level sensor                    | 13. Pressure-gauge valve             |
| 4. Automatic Breaker               | 14. Expansion Tank                   |
| 5. Emergency (Blocking) Thermostat | 15. Thermostat Pocket                |
| 6. Air Bleeder                     | 16. Input heating - 3/4 "            |
| 7. System control                  | 17. Input cold water-plumbing - 1/2" |
| 8. Water Container                 | 18. Outlet hot water-plumbing - 1/2" |
| 9. Pressure-gauge                  | 19. Outlet heating 3/4 "             |
| 10. Heaters                        | 20. Safety valve 2.5 bar             |

**MRL; MRL/WH; MODULE 6 - 30 kW**



**Fig. 9**

**MXL;MODULE L 37-90 kW**



**Fig. 10**

## Dimensions of electric boilers/module with electronic control

<b>MRL 6 - 30</b>	<b>kW</b>	<b>6 - 30</b>
height	mm	700
length	mm	385
width	mm	260
<b>MODULE L 6 – 30</b>	<b>kW</b>	<b>6 - 30</b>
height	mm	645
length	mm	315
width	mm	270
<b>MXL/MODULE L 37 - 60</b>	<b>kW</b>	<b>37 - 60</b>
height	mm	780
length	mm	500
width	mm	295
<b>MODULE L 75, 90</b>	<b>kW</b>	<b>75, 90</b>
height	mm	795
length	mm	780
width	mm	325
<b>MRL/WHS</b>	<b>kW</b>	<b>24, 30</b>
height	mm	915
length	mm	385
width	mm	265

Tab. 4

## Technical characteristics

Maximum power	kW	<b>6,8</b>	<b>10,12</b>	<b>15</b>	<b>22</b>	<b>30</b>	<b>37</b>	<b>45</b>	<b>52</b>	<b>60</b>	<b>75</b>	<b>90</b>
Commutation level	-	6	6	6	9	12	15	18	21	24	30	36
Boiler's body volume	dm <sup>3</sup>	8,9	8,9	8,9	8,9	8,9	26	26	26	26	49,6	49,6
Power supply	V	240/400	240/400	400	400	400	400	400	400	400	400	400

Tab. 5

## Technical data

Maximum operating pressure	<b>Bar</b>	<b>2,5</b>
Test pressure	<b>Bar</b>	<b>4,0</b>
Regulation of heat medium temperature	°C	<b>30–90</b>
Room temperature control	°C	<b>5–30</b>
Connection pipes dimensions for el. boiler/module 6-60	G	<b>1”</b>
Connection pipes dimensions for el. module 75, 90	G	<b>2”</b>
Connection plumbing dimensions for WHS	G	<b>1/2 “</b>
Connection heating dimensions for WHS	G	<b>3/4”</b>
Efficiency index	%	<b>99,30</b>

Tab. 6

### Cross-section of power supply cables and automatic breakers

P [kW]	I <sub>heater</sub> [A]	Cross-section [mm <sup>2</sup> ]	I <sub>breaker</sub> [ 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
22	31,25	(3 x 6 + 4) + 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	1x50/1x32
45	62,50	(3 x 16 + 10) + 1 x 16	1x63/1x32
52	72,92	(3 x 16 + 10) + 1 x 16	1x63/1x50
60	83,33	(3 x 25 + 16) + 1 x 25	2x63
75	104,17	(3 x 25 + 16) + 1 x 25	2x63/1x32
90	125	(3 x 35 + 25) + 1 x 35	3x63

Tab. 7

### Weight of the boilers' models

Electrical boilers			Electrical modules		
Model	Power, kW	Weight, kg	Model	Power, kW	Weight, kg
6 MRL	6	30.5	6 L	6	22.0
8 MRL	8		8 L	8	
10 MRL	10		10 L	10	
12 MRL	12		12 L	12	
15 MRL	15	31.0	15 L	15	22.5
22 MRL	22	32.5	22 L	22	24.0
30 MRL	30	34.0	30 L	30	26.0
37 MXL	37	48.0	37 L	37	45.0
45 MXL	45	49.0	45 L	45	46.0
52 MXL	52	50.0	52 L	52	47.0
60 MXL	60	52.0	60 L	60	49.0
24MRL/WHS	24KW	43.0	75 L	75	75.0
30MRL/WHS	30 KW	43.0	90 L	90	80.0

Tab. 8



### Equipment of the boilers' models

EQUIPMENT	МОДЕЈИ				
	MRL	MXL	Module L 6 - 60	Module L 75, 90	WHS 24, 30
Expansion tank	√	—	—	—	√
Circulation pump	√	√	—	—	√
Water filter	√	√	—	—	√
Safety valve	√	√	√	√	√
Weekly programmer	√	√	√	√	√
Low level protection	√	√	√	√	√
Emergency (blocking) thermostat	√	√	√	√	√
Air bleeder	√	√	√	—	√
Hydraulic unit	—	—	—	—	√
Mounting brackets	√	√	√	√	√

Tab. 9

**\* Note: The manufacturer reserves the right to make changes of the product.**

01.04.2014