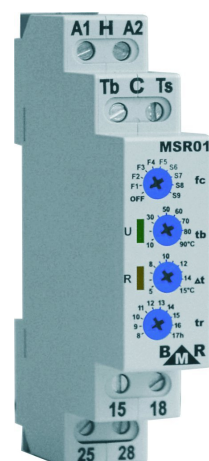


# B M R MSR01

Water heating controller with solar panel support



version 1.4

## Content

1. Device description.....	3
2. Device interface.....	3
2.1. Inputs.....	3
2.2. Low tariff.....	3
2.3. Outputs.....	3
3. Adjustable parameters.....	3
4. Functions.....	4
5. Device connection.....	5
6. Working status and error indication.....	6
7. Technical features.....	7

## 1. Device description

MSR01 is designed for water heating control in hot water cylinder with immersion heater and solar panel support. The device controls cylinder charging according to actual temperature in solar panel and according to requested temperature in the cylinder. Electrical charging process can be controlled by centralized telecontrol signal.

Device has implemented functions, which control cylinder charging optimally according to set conditions. Functions for service, easy start and system component function test are available, too.

Device is in the one module design for DIN rail mounting.

## 2. Device interface

### 2.1. Inputs

To the regulator all needed sensors are delivered.

- **Ts** – input for temperature sensor of water in solar panel.
- **Tb** – input for temperature sensor of water in electric boiler.
- **C** – common terminal of temperature sensors.
- **H** – input for centralized telecontrol signal (CRC – centralized ripple control).
- **A1, A2** – device power supply 100 – 230 VAC.

### 2.2. Low tariff

MSR01 detects low tariff signal sent via network (centralized telecontrol of load). This signal can be used for blocking the cylinder charging by electrical energy during high tariff period. Device will allow cylinder charging by electrical energy only during low tariff period.



#### Important

*In order to block centralized telecontrol signal (CRC) the connection between the CRC terminal and A2 must be realized. For application where CRC signal is not present it should be done automatically. For application where user wants to have possibility start electric heating even in high tariff is present it should be realized by switch.*

### 2.3. Outputs

Output relays are realized by changeover contacts 240 VAC / 16 A.

- **Rs (terminals No.: 15, 18)** – relay which controls solar pane valve.
- **Rb (terminals No.: 25, 28)** – relay for switching electrical heating of cylinder.

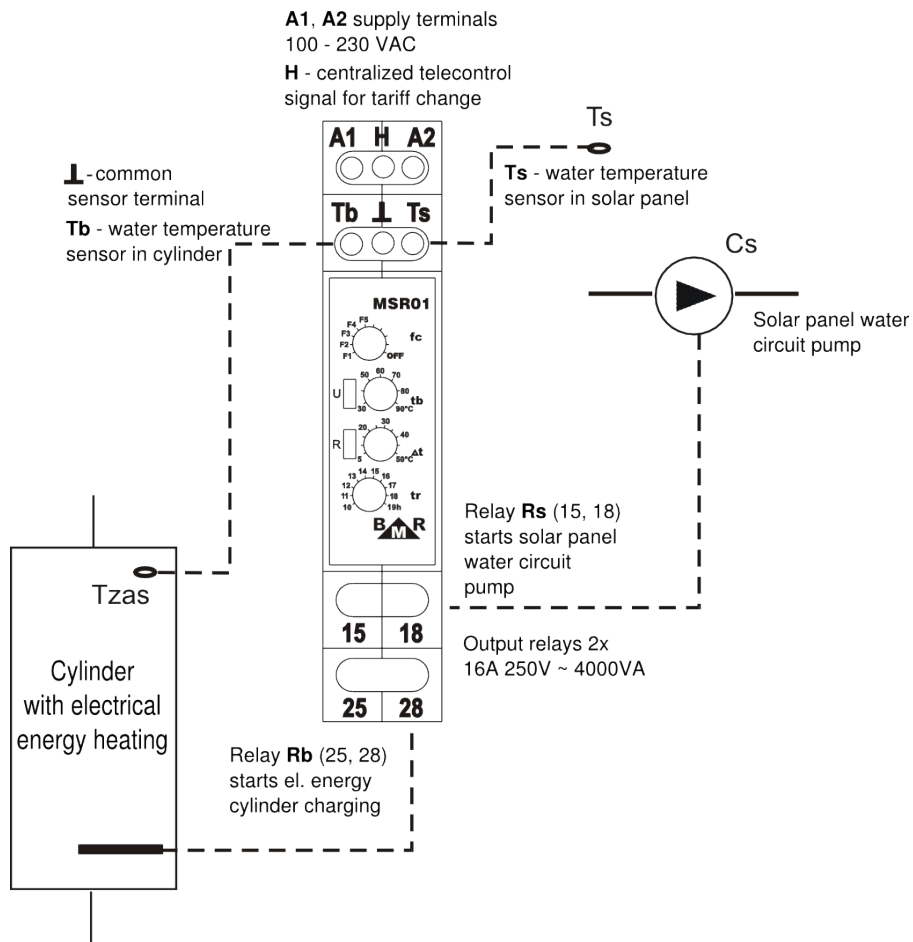
## 3. Adjustable parameters

Values and functions are set by rotary buttons.

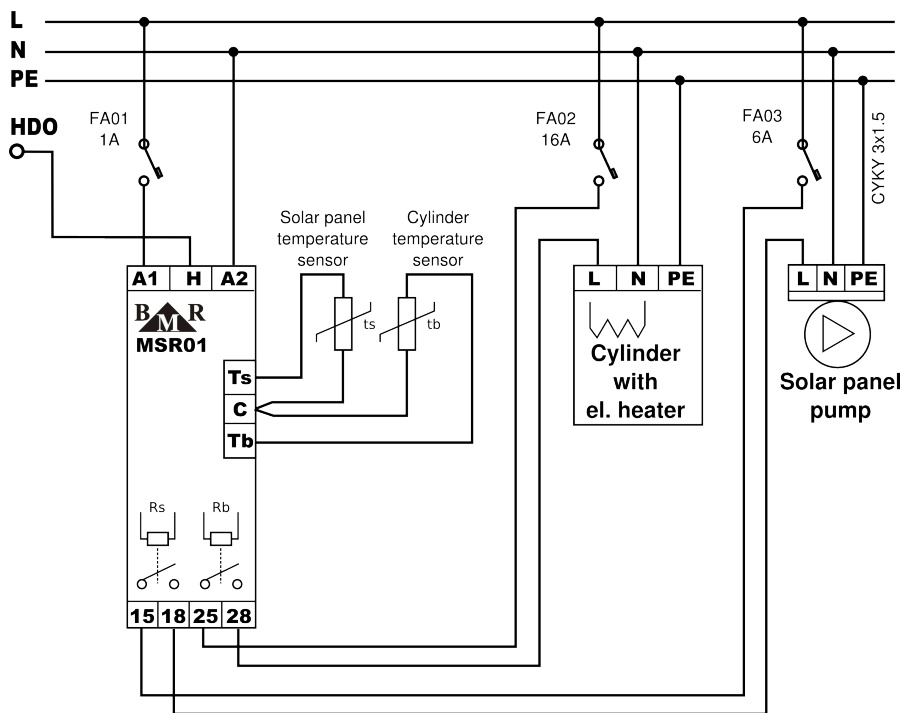
- **tb** – setting of requested temperature in cylinder.
- **$\Delta t$**  – Temperature difference setting between water temperature in solar panel and actual water temperature in cylinder. Solar panel water must have higher set value than water in cylinder, otherwise it is considered that solar panel does not supply needed caloric and MSR01 will prefer charging by electrical energy.
- **tr** – Recharging time. It is time counted in hours when it is presumed that solar panel will supply caloric again (for example night). If solar panel does not start to supply caloric within this time, electrical energy charging will be used. This value is valid only with appropriate functions.



### 5. Device connection



Picture 2 – Schematic diagram



Picture 3 – Connection diagram

## 6. Working status and error indication

Green LED	Yellow LED	Description
ON	OFF	<b>Rs</b> – disconnected <b>tr</b> – recharge timing disconnected <b>HDO</b> – low tariff detected
ON	blink	<b>Rs</b> – connected, charging by solar panel <b>Rb</b> – disconnected <b>tr</b> – recharge timing disconnected <b>HDO</b> – tariff detection without usage
ON	ON	<b>Rs</b> – disconnected <b>Rb</b> – connected, charging by electrical energy <b>tr</b> – recharge timing disconnected <b>HDO</b> – low tariff detected
blink	OFF	<b>Rs</b> – disconnected <b>tr</b> – recharge timing disconnected <b>HDO</b> – high tariff detected
blink	blink	<b>Rs</b> – disconnected <b>Rb</b> – disconnected <b>tr</b> – recharge timing connected <b>HDO</b> – tariff detection without usage
blink	ON	<b>Rs</b> – disconnected <b>Rb</b> – connected, charging by electrical energy <b>tr</b> – recharge timing disconnected <b>HDO</b> – high tariff detected

Table 1 – Device operating states

Green LED	Yellow LED	Description
OFF	OFF	Fatal error
OFF	blink	Temperature sensor error

Table 2 – Device error states

Green LED	Yellow LED	Description
ON	OFF	Sensor OK
OFF	ON	Short circuit on sensor
OFF	blink	Sensor connection interrupted

Table 3 – Device error states during the sensor S8, S9 service test

## 7. Technical features

Parameter	Value
Supply voltage:	100 ... 230 VAC
Supply terminals:	A1, A2
Centralized telecontrol signal terminal:	H
Power consumption:	max. 1,5 VA
Supply voltage indication:	green LED
Operation status indication:	yellow, green LED
Cylinder temperature setting range:	10 ... 90 °C
Temperature difference setting range:	5 ... 15 °C
Recharging time setting:	8 ... 17 hours
<b>Output parameters:</b>	
Number and type of contacts:	2 x switching contact
Nominal current:	16 A
Switching power:	max. AC 4000 VA
Trigger current:	30 A
Nominal voltage / max. switching voltage:	250 VAC / 440 VAC
Mechanical lifetime:	3 x 10 <sup>6</sup>
Electrical lifetime:	1 x 10 <sup>4</sup> 250 VAC, 8 A
<b>Others:</b>	
Working temperature:	-20 ... +55 °C
Storage temperature:	-40 ... +70 °C
Working position:	any
Mounting:	IEC 60715 (DIN 35)
Protection degree:	IP 40 on panel / IP 20 terminals
Electrical strength:	4 kV
Input wire diameter with / without cavern:	max. 2 x 1,5 mm <sup>2</sup> ; 1 x 2,5 mm <sup>2</sup> / max. 2 x 1,5 mm <sup>2</sup> ; 1 x 2,5 mm <sup>2</sup>
Weight:	75 g
Dimensions:	90 x 18 x 65 mm
Standards:	IEC 60255-6, IEC 61010