

# MONITORING, LEVEL AND THERMAL RELAYS MMR



### Voltage monitoring relay MMR-U3

- For overvoltage, undervoltage, phase failure monitoring.
- The relay is equipped with an output make-and-break contact 8 A.
- It can be also used for one-phase circuits.
- Light indication of presence of supply voltage (green LED) and of closed contact (red LED).
- Control voltage: AC 230 V.

Control voltage U <sub>e</sub>	Arrangement of contacts <sup>1)</sup>	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
AC 230 V	001	MMR-U3-001-A230	OEZ:43244	1	0.091	1

<sup>1)</sup> Each digit indicates successively the number of make, break and break-make contacts



### Voltage monitoring relay MMR-X3

- For overvoltage, undervoltage, phase failure, phase sequence and asymmetry monitoring.
- The relay is equipped with an output make-and-break contact 8 A.
- Light indication of presence of supply voltage (green LED) and of closed contact (red LED).
- Control voltage: AC 230 V.

Control voltage U <sub>e</sub>	Arrangement of contacts <sup>1)</sup>	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
AC 230 V	001	MMR-X3-001-A230	OEZ:43245	1	0.091	1

<sup>1)</sup> Each digit indicates successively the number of make, break and break-make contacts



### Level relays MMR-HL

- For control of maximum or minimum level of a conductive liquid in a tank.
- They can be used for liquid filling (function UP) or drawing off (function DOWN). If the tank is from a conductive material, it can be used instead of GND probe.
- Alternating current is used for measuring to eliminate electrolysis of the liquid and oxidation of probes. Working voltage in the measuring loop is 12 V.
- Light indication of presence of supply voltage (green LED).
- Control voltage: AC 230 V.
- Maximum distance of electrodes is 100 m with the set sensitivity of 100 %. If sensitivity is decreased, it is possible to 1 000 m. This is true with cable capacity up to 100 nF/km. In both cases it is necessary to exclude parallel run with power cables (the distance shall be at least 20 cm between the cables).
- The probes are not included in the delivery.

Control voltage U <sub>e</sub>	Arrangement of contacts <sup>1)</sup>	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
AC 230 V	001	MMR-HL-001-A230	OEZ:43246	1	0.091	1

<sup>1)</sup> Each digit indicates successively the number of make, break and break-make contacts

### Thermal relays (thermistor) MMR-T1

- MMR-T1 are designed for the control of temperature of winding of a motor on the basis of measuring the resistance of PTC thermistor, which is built in the motor.

Control voltage U <sub>e</sub>	Arrangement of contacts <sup>1)</sup>	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
AC 230 V	001	MMR-T1-001-A230	OEZ:43247	1	0.081	1

<sup>1)</sup> Each digit indicates successively the number of make, break and break-make contacts

### Thermal relays (thermostats) MMR-T2, MMR-TD

- MMR-T2 control temperature independently for two channels, compare it with a set reference temperature, and switch the output contacts with hysteresis of 2 °C.
- MMR-TD multiple-function differential thermostats equipped with six most frequently used functions and four service functions.
- The delivery includes two 3 m probes.

Control voltage U <sub>e</sub>	Arrangement of contacts <sup>1)</sup>	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
AC 230 V	200	MMR-T2-200-A230	OEZ:43248	1	0.211	1
AC 230 V	200	MMR-TD-200-A230	OEZ:43249	1	0.211	1

<sup>1)</sup> Each digit indicates successively the number of make, break and break-make contacts

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## Specifications

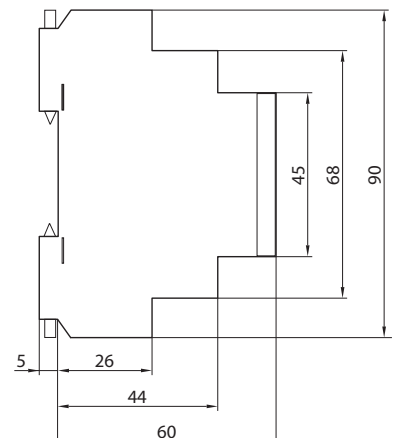
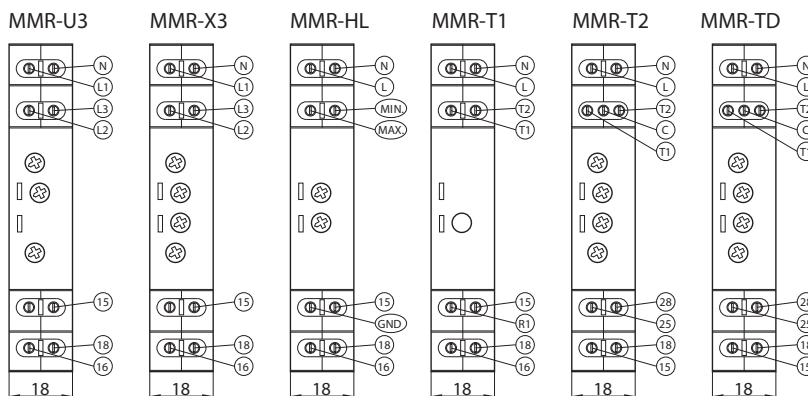
Type		MMR-U3; MMR-X3	MMR-HL	MMR-T1	MMR-T2; MMR-TD
Standards		EN 60255-56; IEC 61010	EN 60255-56; IEC 61010	EN 60255-56; IEC 61010	EN 60255-56; IEC 61010
Approval marks					
<b>Main circuit (contact)</b>					
Arrangement of contacts <sup>1)</sup>		001	001	001	200
Rated operating voltage/current	$U_e/I_c$	AC - 1 250 V / 8 A	250 V / 16 A	250 V / 8 A	250 V / 16 A
Max. switched power		AC 2 000 VA	4 000 VA	2 000 VA	4 000 VA
Switched power of relay	AC - 3	200 W	1 kW	200 W	1 kW
	AC - 5a	-	288 W (cos $\varphi = 0.8$ )	-	288 W (cos $\varphi = 0.8$ )
	AC - 5b	200 W	1 kW	200 W	1 kW
Max. switched voltage	AC	400 V	400 V	400 V	400 V
Indication of contact state		-	yellow LED	red LED	green/yellow LED
Connection – conductor rigid and flexible		0.2 ÷ 2.5 mm <sup>2</sup>	0.2 ÷ 2.5 mm <sup>2</sup>	0.2 ÷ 2.5 mm <sup>2</sup>	0.2 ÷ 2.5 mm <sup>2</sup>
Mechanical endurance		3 000 000 cycles	3 000 000 cycles	3 000 000 cycles	3 000 000 cycles
Electrical endurance		10 000 cycles	10 000 cycles	10 000 cycles	10 000 cycles
Torque		0.5 Nm	0.5 Nm	0.5 Nm	0.5 Nm
<b>Supply circuit</b>					
Rated voltage	$U_c$	AC 230 V	AC 230 V	AC 230 V	AC 230 V
Input power		max. 1.5 VA	max. 1.5 VA	max. 1.5 VA	max. 1.5 VA
Supply voltage indication		green LED	green LED	green LED	green LED is blinking
Rated frequency	$f_n$	50 Hz	50 Hz	50 Hz	50 Hz
Connection – conductor rigid and flexible		0.2 ÷ 2.5 mm <sup>2</sup>	0.2 ÷ 2.5 mm <sup>2</sup>	0.2 ÷ 2.5 mm <sup>2</sup>	0.2 ÷ 2.5 mm <sup>2</sup>
Torque		0.5 Nm	0.5 Nm	0.5 Nm	0.5 Nm
<b>Measuring circuit</b>					
Error indication		red LED	yellow LED is blinking <sup>2)</sup>	red LED	green/yellow LED is blinking
Adjustable delay		0 s ÷ 10 s	-	-	-
Adjustable undervoltage level <sup>3)</sup>	AC	180 ÷ 220 V	-	-	-
Adjustable overvoltage level <sup>3)</sup>	AC	225 ÷ 265 V	-	-	-
Adjustable value of asymmetry <sup>3)</sup>		5 ÷ 20 %	-	-	-
Working voltage in the measuring loop		-	AC 12 V	-	-
Adjustable sensitivity		-	5 k $\Omega$ ÷ 100 k $\Omega$	-	-
Delay for elimination of ripple		-	5 s	-	-
Resistance range of PTC thermistor, working state		-	-	50 $\Omega$ ÷ 3.3 k $\Omega$	-
Resistance range of PTC thermistor, alarm state		-	-	> 3.3 k $\Omega$ nebo < 50 $\Omega$	-
Temperature measuring range		-	-	-	-25 ÷ +95 °C
Method of setting		control knobs on the front panel	control knobs on the front panel	control knobs on the front panel	control knobs on the front panel
Connection – conductor rigid and flexible		0.2 ÷ 2.5 mm <sup>2</sup>	0.2 ÷ 2.5 mm <sup>2</sup>	0.2 ÷ 2.5 mm <sup>2</sup>	0.2 ÷ 2.5 mm <sup>2</sup>
Torque		0.5 Nm	0.5 Nm	0.5 Nm	0.5 Nm
<b>Other data</b>					
Galvanic isolation	input/output	4 kV	4 kV	4 kV	4 kV
	input/probes	4 kV	4 kV	-	4 kV
	input/probes	4 kV	4 kV	4 kV	4 kV
Mounting on "U" rail according to EN 60715 – type		TH35	TH35	TH35	TH35
Degree of protection		IP20	IP20	IP20	IP20
Ambient temperature		-20 ÷ +55 °C	-20 ÷ +55 °C	-20 ÷ +55 °C	-20 ÷ +55 °C
Working position		arbitrary	arbitrary	arbitrary	arbitrary

<sup>1)</sup> Each digit indicates successively the number of make, break and break-make contacts

<sup>2)</sup> It is necessary to decrease sensitivity

<sup>3)</sup> It can be switched off

## Dimensions





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## Graphs of functions

The function of the differential thermostat MMR-TD-200-A230

<p><b>Function F1</b> Differential thermostat</p> <p><math>T = -40\text{ }^{\circ}\text{C}</math>  <math>t1 - t2 &gt; D + 1\text{ }^{\circ}\text{C} \Rightarrow R1\text{ ON}</math>  <math>t1 - t2 &lt; D \Rightarrow R1\text{ OFF}</math>  <math>t2 - t1 &gt; D + 1\text{ }^{\circ}\text{C} \Rightarrow R2\text{ ON}</math>  <math>t2 - t1 &lt; D \Rightarrow R2\text{ OFF}</math></p> <p><math>T \neq -40\text{ }^{\circ}\text{C}</math> (<math>T = 68\text{ }^{\circ}\text{C}</math>)  <math>t1 - t2 &gt; D + 1\text{ }^{\circ}\text{C}</math>  <math>t2 &lt; T \Rightarrow R1\text{ ON}</math></p> <p><math>t1 - t2 &lt; D\text{ }^{\circ}\text{C} \Rightarrow R1\text{ OFF}</math>  <math>t2 &gt; T + 1\text{ }^{\circ}\text{C} \Rightarrow R2\text{ OFF}</math></p>	<p><b>Function F2</b> Two-stage thermostat</p> <p><math>T = 60\text{ }^{\circ}\text{C}</math>  <math>D = 11\text{ }^{\circ}\text{C}</math>  <math>t1 &gt; T \Rightarrow R1, R2\text{ ON}</math>  <math>T - D &lt; t1 &lt; T \Rightarrow R1\text{ ON}, R2\text{ OFF}</math>  <math>t1 &lt; T - D \Rightarrow R1, R2\text{ OFF}</math></p>	
<p><b>Function F4</b> Single-channel zone thermostat</p> <p><math>T = 60\text{ }^{\circ}\text{C}</math>  <math>D = 11\text{ }^{\circ}\text{C}</math>  <math>t1 &lt; T - D \Rightarrow R1\text{ ON}</math>  <math>t1 &gt; T \Rightarrow R1\text{ OFF}</math></p> <p><math>T = 60\text{ }^{\circ}\text{C}</math>  <math>D = 11\text{ }^{\circ}\text{C}</math>  <math>t1 &lt; T - D \Rightarrow R1, R2\text{ ON}</math>  <math>t1 &gt; T \Rightarrow R1, R2\text{ OFF}</math></p>	<p><b>Function F5</b> Two-channel zone thermostat</p> <p><math>T = 60\text{ }^{\circ}\text{C}</math>  <math>D = 11\text{ }^{\circ}\text{C}</math>  <math>t1 &lt; T - D \Rightarrow R1\text{ ON}</math>  <math>t1 &gt; T \Rightarrow R1\text{ OFF}</math>  <math>t2 &lt; T - D \Rightarrow R2\text{ ON}</math>  <math>t2 &gt; T \Rightarrow R2\text{ OFF}</math></p>	
<p><b>Function F6</b> Thermostat is heating/cooling</p> <p><math>T = 25\text{ }^{\circ}\text{C}</math>  <math>D = 7\text{ }^{\circ}\text{C}</math>  <math>t1 &gt; T \Rightarrow R1\text{ ON}</math>  <math>t1 &lt; T - 2\text{ }^{\circ}\text{C} \Rightarrow R1\text{ OFF}</math>  <math>t1 &lt; T - D \Rightarrow R2\text{ ON}</math>  <math>t1 &gt; T - D + 2\text{ }^{\circ}\text{C} \Rightarrow R2\text{ OFF}</math>  <math>T - D &lt; t1 &lt; T \Rightarrow R1, R2\text{ OFF}</math></p>	<p><b>Function F7</b> Service relay 1</p> <p>Relay 1 switched on</p>	<p><b>Function F8</b> Service relay 2</p> <p>Relay 2 switched on</p>
<p><b>Function F9</b> Service sensor 1</p> <p>Re1   Sensor without failure.</p> <p>Re1   Sensor interrupted.</p> <p>Re1   Sensor short-circuited.</p>	<p><b>Function F10</b> Service sensor 2</p> <p>Re1   Sensor without failure.</p> <p>Re1   Sensor interrupted.</p> <p>Re1   Sensor short-circuited.</p>	