

SUMMARY OF MODELS

**Installation contactors and relays, Impulse relays
switch depending on applied voltage or impulse**



Type	RSI	RPI	MIG	MIR
I_{th}, I_e	20, 25, 32, 40, 63 A	8, 16 A	20, 32, 63 A	16 A
Arrangement of contacts	10, 11, 20, 02, 40, 31, 04	001, 002, 003	10, 11, 20, 40, 31	001
Maximum load of each contact for:				
AC-1	63 A / 230 V	16 A / 250 V	63 A / 230 V	16 A / 250 V
AC-5a	22 A / 230 V	1.6 A / 230 V	22 A / 230 V	1.6 A / 230 V
AC-5b	5 000 W / 230 V	1000 W / 230 V	7 000 W / 230 V	460 W / 230 V
DC-1	63 A / 24 V	16 A / 24 V	63 A / 24 V	-

Timers

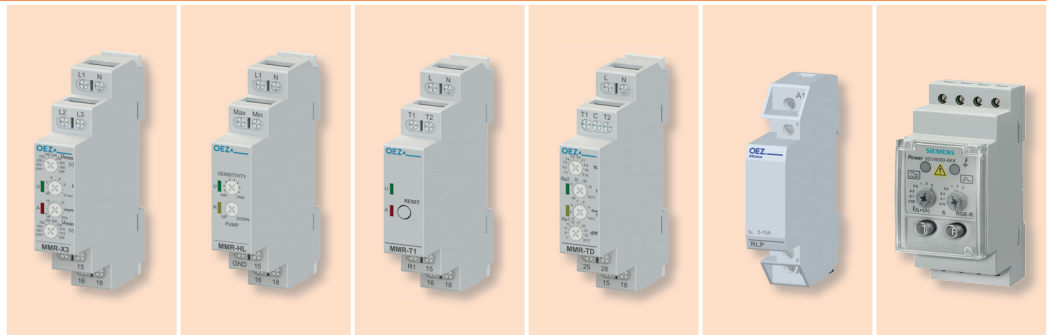
switch according to internal program in real time



Type	MAE-A	MAN-A	MAE-D	MAN-D	MAA-D
Design	Analog	Analog	Digital	Digital	Digital
Arrangement of contacts	001, 100	001, 100	001, 002	001, 002	001, 002
Permanent operation/off	Yes	Yes	Yes	Yes	Yes
Run reserve	-	100 hours	3 years	5 years	5 years
Menu language	-	-	EN	CS, EN, DE, PL, RU, IT, FR, ES, PT, NL, DA, FI, NO, SV, TR	
Number of programs	-	-	28	56	56
Program test	-	-	Yes	Yes	Yes
Holiday mode	-	-	-	Yes	Yes
Random switching mode	-	-	-	Yes	Yes
PIN code protection	-	-	-	Yes	Yes
Astro function	-	-	-	-	Yes

SUMMARY OF MODELS

**Monitoring relays
switch depending on monitored physical quantity**



Type	MMR-U3 MMR-X3	MMR-HL	MMR-T1	MMR-T2 MMR-TD	RLP	5SV8
Rated voltage U_c	AC 230 V	AC 230 V	AC 230 V	AC 230 V	-	AC 230 V
Arrangement of contacts	001	001	001	200	10, 01	001, 002, 40
Operating voltage of contact	AC 250 V	AC 250 V	AC 250 V	AC 250 V	AC 250 V	AC 230 V
Operating current of contact	8 A	16 A	8 A	16 A	16 A	6 A
Monitored quantity	Voltage	Level	Temperature	Temperature	Current	Residual current
Function	- Overvoltage - Undervoltage - Phase failure - Phase sequence *) - Asymmetry *)	- Liquid drawing off - Liquid filling	- Motor protection - Local reset - Remote RESET - Auto reset	- From -25 °C - Up to +95 °C - 2 channels	- Disconnection at reach of: 5 ÷ 15 A 10 ÷ 28 A 26 ÷ 63 A	- Indication at reach of: 0.03 ÷ 30 A (adjustable)

*) only X3 design

**Stair switches and multiple-function time relays
switch according to set function and time**



Type	MQA	MQB	MQC	MCR-MA	MCR-MB	MCR-TK
Rated voltage U_c	AC 230 V	AC 230 V	AC 230 V	AC/DC 12 ÷ 230 V	AC/DC 12 ÷ 230 V	AC/DC 12 ÷ 230 V
Arrangement of contacts	100	100	100	001, 003	001, 003	001
Operating voltage of contact	AC 250 V	AC 250 V	AC 250 V	AC 250 V	AC 250 V	AC 250 V
Operating current of contact	16 A	16 A	16 A	8 A	8 A	8 A
Time setting	0.5 ÷ 10 min	0.5 ÷ 10 min	3 ÷ 60 min	0.1 s ÷ 100 hr	0.1 s ÷ 100 hr	0.1 s ÷ 10 days
Function	Stair switch	Stair switch	Stair switch	Time relay	Time relay	Timing relays
		- extension of time 4 times by holding the push-button for > 1s	- premature switching off by pressing the push-button	- 9 functions	- 18 functions	- adjustable mark-to-space ratio

INSTALLATION RELAYS RPI



Installation relays RPI-16...

- For switching of electrical circuits by application of control voltage on the coil.
- For control of electric appliances up to 16 A – electric boilers, convection heaters, water-heaters, storage heaters and also low power lighting circuits.
- There is ensured such electrical isolation between the control circuit (coil) and main circuit (contact) as

it is between inlet and outlet lead of the safety transformer.

- Light indication at contacts closing.
- Noiseless switching.
- Contacts: 1 make-and-break.
- Control voltage: AC/DC 24 V, AC 230 V.

Arrangement of contacts ¹⁾	Control voltage U _c	Colour of indication	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
001	AC/DC 24 V	red	RPI-16-001-X230-SC	OEZ:43251	1	0.070	1
	AC 230 V	green	RPI-16-001-X230-SE	OEZ:43250	1	0.070	1

¹⁾ Each digit indicates successively the number of make, break and break-make contacts

Installation relays RPI-08...

- For switching of electrical circuits by application of control voltage on the coil.
- For control of electric appliances up to 8 A – electric boilers, convection heaters, water-heaters, storage heaters and also low power lighting circuits.
- There is ensured such electrical isolation between the control circuit (coil) and main circuit (contact) as it is between inlet and outlet lead of the safety transformer.

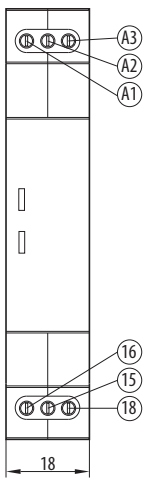
- Light indication at contacts closing.
- Noiseless switching.
- Contacts: 2 make-and-break.
Control voltage: AC/DC 24 V, AC 230 V (X230).
- Contacts: 3 make-and-break.
Control voltage: AC 24 ÷ 230 V, DC 24 ÷ 220 V (UNI).

Arrangement of contacts ¹⁾	Control voltage U _c	Colour of indication	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
002	AC/DC 24 V	red	RPI-08-002-X230-SC	OEZ:43253	1	0.070	1
	AC 230 V	green	RPI-08-002-X230-SE	OEZ:43252	1	0.070	1
003	AC 24 ÷ 230 V	red	RPI-08-003-UNI-SC	OEZ:43255	1	0.070	1
	DC 24 ÷ 220 V	green	RPI-08-003-UNI-SE	OEZ:43254	1	0.070	1

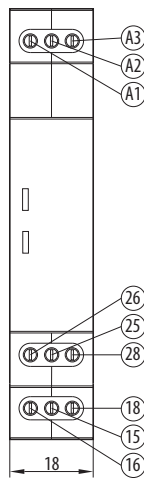
¹⁾ Each digit indicates successively the number of make, break and break-make contacts

Dimensions

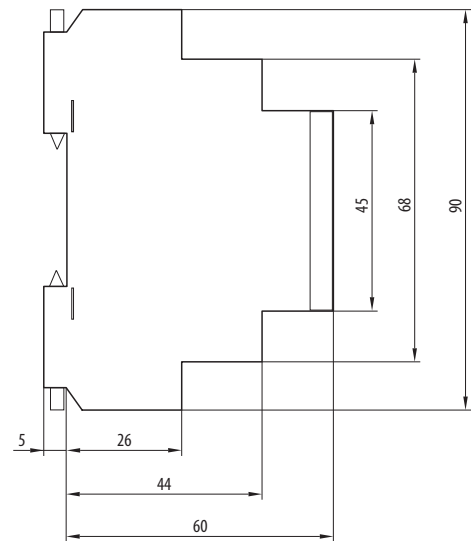
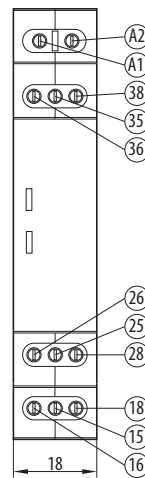
RPI-16-001-...



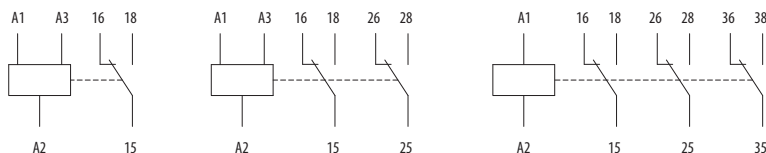
RPI-08-002-...



RPI-08-003-...






Diagram



INSTALLATION RELAYS RPI

Specifications

Type		RPI-16-001-X230	RPI-08-002-X230	RPI-08-003-UNI
Standards		EN 60669-2-2	EN 60669-2-2	EN 60669-2-2
Approval marks				
Main circuit (contact)				
Arrangement of contacts ¹⁾		001	002	003
Rated operating voltage/current	U _c /I _c	AC - 1	250 V / 16 A	250 V / 8 A
		DC - 1	24 V / 16 A	24 V / 8 A
Max. switched power		AC	4 000 VA	2 000 VA
		DC	384 W	192 W
Min. voltage/current		DC 5 V / 100 mA	DC 5 V / 100 mA	DC 5 V / 100 mA
Switched power of relay		AC - 3	1 kW	200 W
		AC - 5a	288 W (cos φ = 0.8)	-
		AC - 5b	1 kW	200 W
		RPI-...-SC	red LED	red LED
Indication of closed contacts		RPI-...-SE	green LED	green LED
Mechanical endurance		20 000 000 operating cycles	5 000 000 operating cycles	5 000 000 operating cycles
Electrical endurance		AC 50 000 operating cycles, DC 30 000 operating cycles	100 000 operating cycles	100 000 operating cycles
Connection – conductor rigid and flexible		0.2 ÷ 2.5 mm ²	0.2 ÷ 2.5 mm ²	0.2 ÷ 2.5 mm ²
Torque		0.5 Nm	0.5 Nm	0.5 Nm
Control circuit (coil)				
Rated voltage	U _c	terminals A1, A2	AC/DC 24 V	AC/DC 24 V
		terminals A2, A3	AC 230 V	AC 230 V
Input power at U _c		AC 24 V	0.31 VA	0.30 VA
		DC 24 V	0.34 W	0.34 W
		AC 230 V	3.24 VA	3.45 VA
		DC 220 V	-	-
Rated frequency	f _n	50 Hz	50 Hz	50 Hz
Connection – conductor rigid and flexible		0.2 ÷ 2.5 mm ²	0.2 ÷ 2.5 mm ²	0.2 ÷ 2.5 mm ²
Torque		0.5 Nm	0.5 Nm	0.5 Nm
Other data				
Mounting on "U" rail according EN 60715 – type		TH35	TH35	TH35
Degree of protection		IP20	IP20	IP20
Ambient temperature		-20 ÷ +55 °C	-20 ÷ +55 °C	-20 ÷ +55 °C
Working position		arbitrary	arbitrary	arbitrary

¹⁾ Each digit indicates successively the number of make, break and break-make contacts

IMPULSE MEMORY RELAYS MIG

Impulse relay - mechanical

- For switching of electric circuits by impulse command from more points in a corridor, on stairs, in the whole house etc.
- Power impulse relay with I_m up to 63 A and control voltage AC 24 V and AC 230 V.
- Mainly for control of high power lighting circuits, see the tables below.
- The lighting circuits can be controlled by push-buttons instead of a combination of crossbar and three-way switches.
- Saving on the cost of wires - it is possible to use smaller cross-sections for the control circuit than for power circuit.
- It brings higher comfort of control - for example it is possible to switch off all lights by one push-button when leaving the house (by means of OD-MIG-C01 central control block and OD-MIG-C02 multi-level central control block).
- Possibility of manual switching from the front of the device (I-0). The switch lever indicates contact state.
- Possibility of permanent manual switching off the relay coil from the front of the device. If the switch is in OFF position, it is not possible to control the relay electrically. This can be used in maintenance or similar activity.
- High number of contacts; the version with up to four contacts is sufficient for switching most circuits. Further increase in the number of contacts can be performed by installation of the auxiliary switch PS-MIG-1100 on the side of the relay.



Impulse relay 20 A

Arrangement of contacts ¹⁾	Rated control voltage U_c	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
10	AC 230 V	MIG-20-10-A230	OEZ:43184	1	0.135	1
11	AC 230 V	MIG-20-11-A230	OEZ:43185	1	0.135	1
20	AC 230 V	MIG-20-20-A230	OEZ:43186	1	0.135	1

¹⁾ Each digit indicates successively the number of make and break contacts

Impulse relay 32 A

Arrangement of contacts ¹⁾	Rated control voltage U_c	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
11	AC 230 V	MIG-32-11-A230	OEZ:43190	1	0.135	1
	AC 24 V	MIG-32-11-A024	OEZ:43257	1	0.135	1
20	AC 230 V	MIG-32-20-A230	OEZ:43191	1	0.135	1
	AC 24 V	MIG-32-20-A024	OEZ:43258	1	0.135	1
31	AC 230 V	MIG-32-31-A230	OEZ:43256	2	0.195	1
	AC 24 V	MIG-32-31-A024	OEZ:43259	2	0.195	1
40	AC 230 V	MIG-32-40-A230	OEZ:43193	2	0.195	1
	AC 24 V	MIG-32-40-A024	OEZ:43260	2	0.195	1

¹⁾ Each digit indicates successively the number of make and break contacts

Impulse relay 63 A

Arrangement of contacts ¹⁾	Rated control voltage U_c	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
31	AC 230 V	MIG-63-31-A230	OEZ:43269	4	0.400	1
	AC 24 V	MIG-63-31-A024	OEZ:43271	4	0.400	1
40	AC 230 V	MIG-63-40-A230	OEZ:43270	4	0.400	1
	AC 24 V	MIG-63-40-A024	OEZ:43272	4	0.400	1

¹⁾ Each digit indicates successively the number of make and break contacts

IMPULSE MEMORY RELAYS MIG



Accessories

Auxiliary switch PS-MIG-1100

- Mainly for the indication of position of main contacts.
- Contacts: 1 make + 1 break.
- Installation: by means of plastic latches, and tightening the screw on the right side of the impulse relay.
- It is possible to mount one auxiliary switch on one impulse relay.
- They are suitable for application in SELV and PELV circuits - sufficient insulation is provided between the circuit breaker and the auxiliary switch..
- Width: 9 mm.
- AC-15, AC-21: $I_e = 6\text{ A}$, $U_e = 250\text{ V}$.

Type	Order code	Number of modules	Weight [kg]	Package [pcs]
PS-MIG-1100	OEZ:43208	0.5	0.030	1

Central control block OD-MIG-C01

- It enables central control of relays.
- It contains a switch and diodes, which ensure correct transfer of the signal to the impulse relays - see the diagram and connection examples.
- Installation: by means of plastic latches, and tightening the screw on the right side of the impulse relay.
- Description: each impulse memory relay is locally controlled by push-buttons (local control); each level or set of impulse memory relays is controlled simultaneously from relevant point (central control).
- Rated operating voltage: AC 250 V.

Type	Order code	Number of modules	Weight [kg]	Package [pcs]
OD-MIG-C01	OEZ:43210	0.5	0.030	1

Multi-level central control block OD-MIG-C02

- It enables multi-level central control of relays.
- It contains diodes, which ensure correct transfer of the signal to the impulse relays - see the diagram and connection examples.
- Max. number of MIG impulse relays in a group controlled by 1 piece of OD-MIG-C02:
 - 20 pcs (for MIG with $U_c = \text{AC } 230\text{ V}$)
 - 2 pcs (for MIG with $U_c = \text{AC } 24\text{ V}$)
- Mounting: on „U“ rail.
- Description: each impulse memory relay is locally controlled by push-buttons (local control); each level or set of impulse memory relays is controlled simultaneously from relevant point (central control); all levels are jointly controlled by a single command from a point (multi-level central control).
- Rated operating voltage: AC 250 V.

Type	Order code	Number of modules	Weight [kg]	Package [pcs]
OD-MIG-C02	OEZ:43211	0.5	0.030	1

Compensation block OD-MIR-BK

- It enables control of the MIG relay up to 50 control push-buttons with glow lamp/LED. With 0.5 mA / push-button, max. consumption is $50 * 0.5 = 25\text{ mA}$.
- Connection: parallel with MIG (compensation block OD-MIR-BK is a common accessory with impulse relay MIR), see page E27.
- Rated voltage: AC 230 V
- Max. voltage: AC 400 V.
- Capacity: $3x\ 1\ \mu\text{F}$.

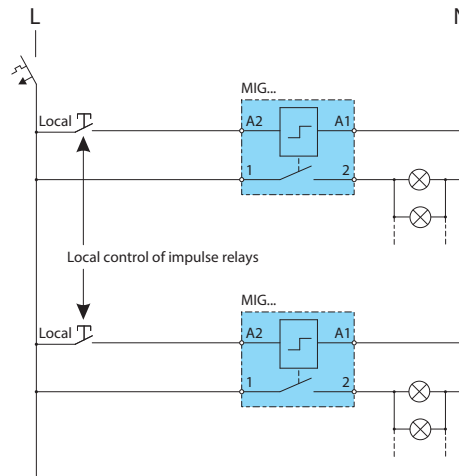
Type	Order code	Number of modules	Weight [kg]	Package [pcs]
OD-MIR-BK	OEZ:35676	1	0.055	1

IMPULSE MEMORY RELAYS MIG

Connection examples

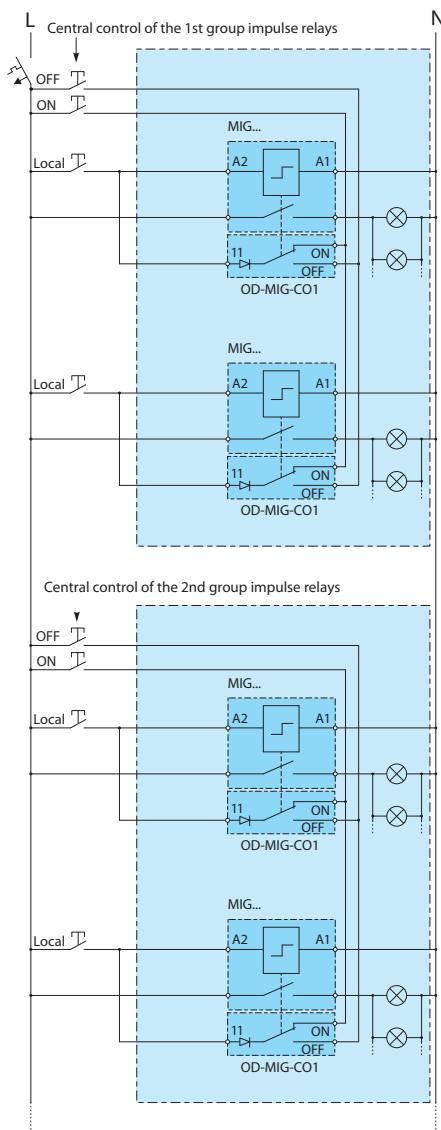
Local control

Each impulse relay is locally controlled by push-buttons.



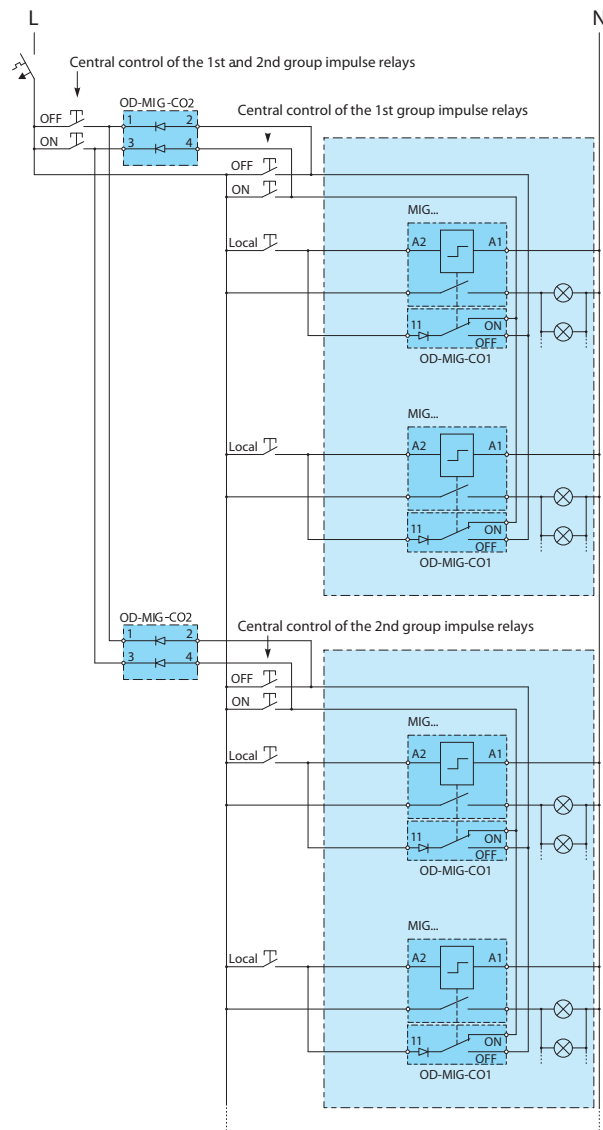
Local + central control

Each impulse relay is locally controlled by push-buttons (local control); each level or set of impulse relays is controlled simultaneously from relevant point (central control).






Local + central + multi-level central control

Each impulse relay is locally controlled by push-buttons (local control); each level or set of impulse relays is controlled simultaneously from relevant point (central control); all levels are jointly controlled by a single command from a point (multi-level central control).



IMPULSE MEMORY RELAYS MIG

Specifications

Type		MIG-20	MIG-32	MIG-63		
Standards		EN 60669-2-2	EN 60669-2-2	EN 61095 EN 60947-4-1		
Approval marks						
Main circuit (contact)						
Arrangement of contacts ¹⁾		10, 11, 20	11, 20, 31, 40	31, 40		
Rated thermal current	I_{th}	20 A	32 A	63 A		
Rated operating voltage	U_e	440 V	440 V	440 V		
Rated operating current	I_e	AC-1/AC-7a	20 A	63 A		
		AC-2	10 A	32 A		
		AC-3/AC-7b	7 A	30 A		
Switched power ²⁾	P_e	AC-1/AC-7a	1-phase AC 230 V	4.4 kW	7 kW	13.8 kW
			3-phase AC 400 V	-	21 kW	41.5 kW
		AC-2	1-phase AC 230 V	1.5 kW	2.4 kW	4.8 kW
			3-phase AC 400 V	-	7.2 kW	14.4 kW
		AC-3/AC-7b	1-phase AC 230 V	0.5 kW	1.1 kW	3.7 kW
			3-phase AC 400 V	-	5.5 kW	15 kW
Min. switched voltage/current		10 V / 100 mA	10 V / 100 mA	10 V / 100 mA		
Max. switching frequency		AC-1, AC-7a	600 operating cycles/hr	450 operating cycles/hr	360 operating cycles/hr	
		AC-2	120 operating cycles/hr	120 operating cycles/hr	120 operating cycles/hr	
		AC-3, AC-7b	600 operating cycles/hr	450 operating cycles/hr	360 operating cycles/hr	
		DC-1	300 operating cycles/hr	300 operating cycles/hr	300 operating cycles/hr	
		no load	900 operating cycles/hr	450 operating cycles/hr	450 operating cycles/hr	
Power loss at I_e (1 pole)		1.5 W	3 W	3.5 W		
Mechanical endurance		10 000 000 operating cycles	10 000 000 operating cycles	10 000 000 operating cycles		
Electrical endurance		100 000 operating cycles	100 000 operating cycles	100 000 operating cycles		
Maximum backup fuse gL/gG against short-circuit, coordination type 1		20 A	32 A	63 A		
Connection - conductor rigid and flexible		1 ÷ 10 mm ²	1 ÷ 10 mm ²	2.5 ÷ 25 mm ²		
Torque		1.2 Nm	1.2 Nm	2 Nm		
Screw head type		PZ2	PZ2	PZ2		
Control circuit (coil)						
Rated control voltage	U_c	AC 230 V	AC 24; 230 V	AC 24; 230 V		
Operating range U_c		90 ÷ 110 %	90 ÷ 110 %	90 ÷ 110 %		
Impulse length		min. 50 ms and max. 1 hr	min. 50 ms and max. 1 hr	min. 50 ms and max. 1 hr		
Dwell between two impulses		min. 150 ms	min. 150 ms	min. 150 ms		
Power loss for longer impulse ³⁾		4 W	4 W	4 W		
Rated frequency	f_c	50/60 Hz	50/60 Hz	50/60 Hz		
Max. total load of push-buttons with orientation lighting (glow lamps, LEDs etc.) ⁴⁾		2.5 mA	2.5 mA	2.5 mA		
Connection - conductor rigid and flexible		1 ÷ 4 mm ²	1 ÷ 4 mm ²	1 ÷ 4 mm ²		
Torque		0.6 Nm	0.6 Nm	0.6 Nm		
Screw head type		PZ1	PZ1	PZ1		
Other data						
Rated insulation voltage	U_i	440 V	440 V	440 V		
Rated impulse withstand voltage	U_{imp}	4 kV	4 kV	4 kV		
Mounting on "U" rail according EN 60715 - type		TH35	TH35	TH35		
Degree of protection		IP20	IP20	IP20		
Ambient temperature		-25 ÷ + 55 °C	-25 ÷ + 55 °C	-25 ÷ + 55 °C		
Separation of coil-contact circuits for application of SELV/PELV		✓	✓	✓		
Central control		✓	✓	✓		
Multi-level central control ⁵⁾		✓	✓	✓		

¹⁾ Each digit indicates successively the number of make and break contacts

²⁾ Switched power is shown for categories AC-5a a AC-5b in tables on pages E23 and E24

³⁾ Information for the case when the relay is excited by a long impulse, although a short impulse is sufficient for the change of the contact condition; in case of the short impulse, the power loss is not applied

⁴⁾ Common orientation lighting (glow lamp/LED) on one push-button takes 0.5 mA, altogether it is possible to connect 5 push-buttons with orientation lighting (5 x 0.5 = 2.5 mA).
To increase the number of push-buttons use the OD-MIR-BK compensation block

⁵⁾ The OD-MIG-CO2 block for multi-level central control is necessary to use for multi-level central control. Max. number of MIG impulse relays in a group controlled by 1 piece of OD-MIG-CO2: 20 pcs (for MIG with $U_c = 230 V$) and 2 pcs (for MIG with $U_c = 24 V$)

IMPULSE MEMORY RELAYS MIG

Switching of lights - maximum number of light fittings per one contact at AC 230 V, 50 Hz (utilization category AC-5a, AC-5b)

Impulse memory relay

Impulse memory relay Type	Lighting fitting										
	15 W 0.07 A	25 W 0.11 A	40 W 0.17 A	60 W 0.26 A	75 W 0.33 A	100 W 0.44 A	150 W 0.65 A	200 W 0.87 A	300 W 1.3 A	500 W 2.17 A	1 000 W 4.35 A
MIG-20	133	80	50	33	27	20	13	10	7	4	2
MIG-32	233	140	88	58	47	35	23	18	12	7	4
MIG-63	467	280	175	117	93	70	47	35	23	14	7

Maximum total current of sources for LED

Impulse memory relay Type	Max. total current
MIG-20	6 A
MIG-32	12 A
MIG-63	25 A

Maximum number of fluorescent tubes

Impulse memory relay Type	Uncompensated			Compensated in parallel			DUO connection		
	18 W 0.37 A	36 W 0.43 A	58 W 0.67 A	18 W (4,5 µF) 0.19 A	36 W (4,5 µF) 0.29 A	58 W (7 µF) 0.46 A	2x 18 W 0.26 A	2x 36 W 0.48 A	2x 58 W 0.78 A
MIG-20	43	37	24	22	22	14	62	33	21
MIG-32	43	37	24	33	33	21	62	33	21
MIG-63	86	74	48	73	73	47	123	67	41

Maximum number of fluorescent tubes with electronic ballast

Impulse memory relay Type	With electronic ballast							
	18 W 0.09 A	36 W 0.16 A	58 W 0.25 A	80 W 0.40 A	2x 18 W 0.17 A	2x 36 W 0.31 A	2x 58 W 0.48 A	2x 80 W 0.76 A
MIG-20	67	38	24	15	35	19	13	8
MIG-32	133	75	48	30	71	39	25	16
MIG-63	278	156	100	63	147	81	52	33

Maximum number of high-pressure mercury discharge lamps

Impulse memory relay Type	Uncompensated							Compensated in parallel						
	50 W 0.6 A	80 W 0.8 A	125 W 1.2 A	250 W 2.2 A	400 W 3.3 A	700 W 5.4 A	1 000 W 7.5 A	50 W (7 µF) 0.3 A	80 W (8 µF) 0.4 A	125 W (10 µF) 0.6 A	250 W (18 µF) 1.2 A	400 W (25 µF) 1.8 A	700 W (40 µF) 3.4 A	1 000 W (60 µF) 4.8 A
MIG-20	27	20	13	7	5	3	2	14	13	10	6	4	3	2
MIG-32	27	20	13	7	5	3	2	21	19	15	8	6	4	3
MIG-63	53	40	27	15	10	6	4	47	41	33	18	13	8	6

IMPULSE MEMORY RELAYS MIG

Maximum number of metal halide discharge lamps

Impulse memory relay	Uncompensated							Compensated in parallel						
	35 W 0.5 A	70 W 1.0 A	150 W 1.8 A	250 W 3.0 A	400 W 4.6 A	1 000 W 9.7 A	2 000 W 12.2 A	35 W (6 µF) 0.23 A	70 W (12 µF) 0.42 A	150 W (20 µF) 0.77 A	250 W (32 µF) 1.26 A	400 W (45 µF) 2.0 A	1 000 W (85 µF) 5.0 A	2 000 W (125 µF) 10.5 A
MIG-20	32	16	9	5	3	2	1	17	8	5	3	2	1	-
MIG-32	32	16	9	5	3	2	1	25	13	8	5	3	2	1
MIG-63	64	32	18	11	7	3	3	55	28	17	10	7	4	3

Maximum number of high-pressure sodium discharge lamps

Impulse memory relay	Uncompensated				Compensated in parallel				with electronic ballast			
	150 W 1.8 A	250 W 3 A	400 W 4.4 A	1 000 W 10.3 A	150 W (20 µF) 0.77 A	250 W (32 µF) 1.26 A	400 W (45 µF) 2 A	1 000 W (100 µF) 5.1 A	150 W 0.72 A	250 W 1.3 A	400 W 2 A	1 000 W 5 A
MIG-20	13	5	4	1	5	3	2	-	8	5	3	1
MIG-32	13	5	4	1	8	5	3	1	17	9	6	2
MIG-63	27	11	7	3	17	10	7	3	35	19	13	5

Maximum number of low-pressure sodium discharge lamps

Impulse memory relay	Uncompensated						Compensated in parallel					
	18 W 0.4 A	35 W 0.6 A	55 W 0.6 A	90 W 0.9 A	135 W 0.9 A	180 W 0.9 A	18 W (5 µF) 0.35 A	35 W (20 µF) 0.28 A	55 W (20 µF) 0.35 A	90 W (26 µF) 0.55 A	135 W (40 µF) 0.8 A	180 W (40 µF) 1 A
MIG-20	40	27	27	18	18	18	20	5	5	4	3	3
MIG-32	40	27	27	18	18	18	30	8	8	6	4	4
MIG-63	80	53	53	36	36	36	66	17	17	13	8	8

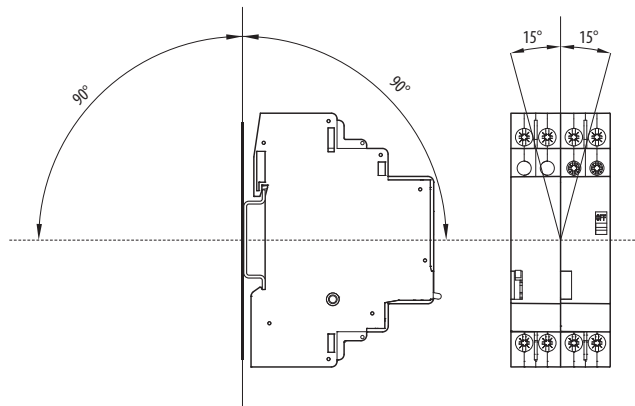
Switching of resistance or slightly inductive load in DC circuits (utilization category DC-1 ($L/R \leq 1$ ms))

Impulse memory relay	Operating voltage U_e	Contact load			
		1 contact	2 contacts in series	3 contacts in series	4 contacts in series
MIG-20	DC 24 V	20 A	20 A	-	-
	DC 48 V	15 A	18 A	-	-
	DC 60 V	10 A	15 A	-	-
	DC 110 V	5 A	8 A	-	-
	DC 220 V	0,5 A	4 A	-	-
MIG-32	DC 24 V	32 A	32 A	32 A	32 A
	DC 48 V	25 A	28 A	32 A	32 A
	DC 60 V	20 A	22 A	28 A	32 A
	DC 110 V	7 A	12 A	22 A	25 A
	DC 220 V	0,7 A	6 A	18 A	20 A
MIG-63	DC 24 V	63 A	63 A	63 A	63 A
	DC 48 V	35 A	42 A	63 A	63 A
	DC 60 V	30 A	34 A	60 A	63 A
	DC 110 V	10 A	16 A	35 A	63 A
	DC 220 V	1,2 A	10 A	30 A	63 A

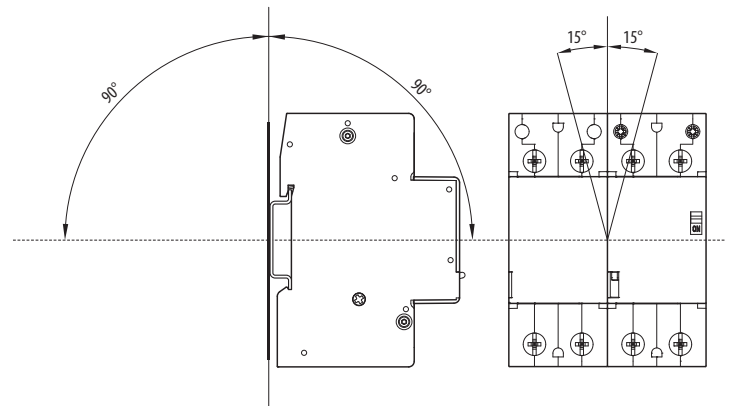
IMPULSE MEMORY RELAYS MIG

Working position

MIG-20
MIG-32



MIG-63

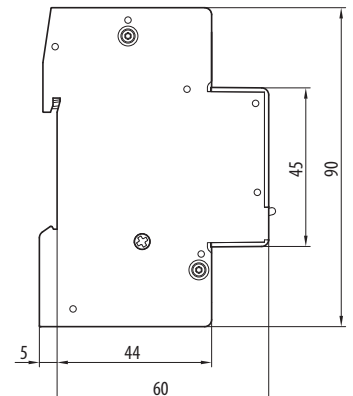
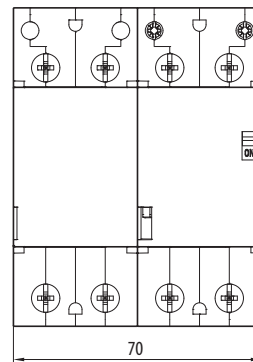
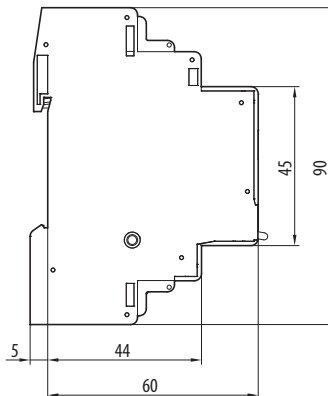
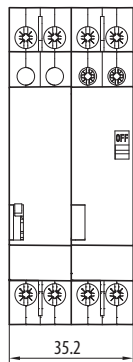
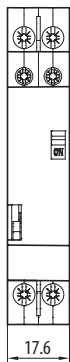


Dimensions

MIG-20
MIG-32 (11, 20)*

MIG-32 (31, 40)*

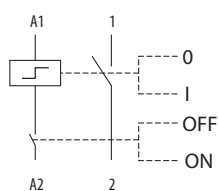
MIG-63



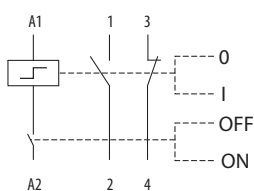
* Arrangement of contacts

Diagram

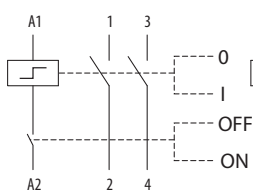
MIG--10....



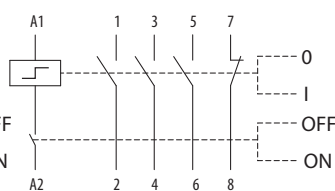
MIG--11....



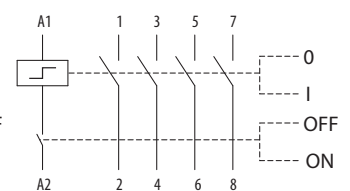
MIG--20....



MIG--31....



MIG--40....



IMPULSE MEMORY RELAYS MIG

Specifications

Type		PS-MIG-1100	OD-MIG-C01	OD-MIG-C02
Standards		EN 60947-5-1	EN 60947-5-1	EN 60947-5-1
Approval marks				
Contacts				
Arrangement of contacts ¹⁾		11	001	-
Rated thermal current	I_{th}	6 A	-	-
Rated operating voltage	U_e	AC 230 V	AC 230 V	AC 230 V
Rated operating current	I_e	AC-15 1-phase AC 230 V 6 A	-	-
Rated frequency	f_n	50/60 Hz	50/60 Hz	50/60 Hz
Min. switched voltage/current		12 V / 5 mA	-	-
Electrical endurance at I_e		100 000 operating cycles	-	-
Mechanical endurance		1 000 000 operating cycles	1 000 000 operating cycles	-
Power loss at I_e		0.3 W	-	-
Maximum backup fuse gL/gG against short-circuit, coordination type 1		6 A	-	-
Min. distance between open contacts		> 3 mm	-	-
Connection - conductor rigid		1 ÷ 4 mm ²	1 ÷ 4 mm ²	1 ÷ 4 mm ²
Connection - conductor flexible		1 ÷ 4 mm ²	1 ÷ 4 mm ²	1 ÷ 4 mm ²
Torque		0.8 Nm	0.8 Nm	0.8 Nm
Screw type		PZ1	PZ1	PZ1
Screw type				
Rated insulation voltage	U_i	AC 440 V	AC 250 V	AC 250 V
Rated impulse withstand voltage	U_{imp}	4 kV	-	-
Degree of protection		IP20	IP20	IP20

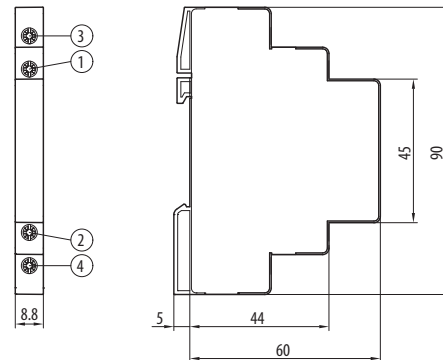
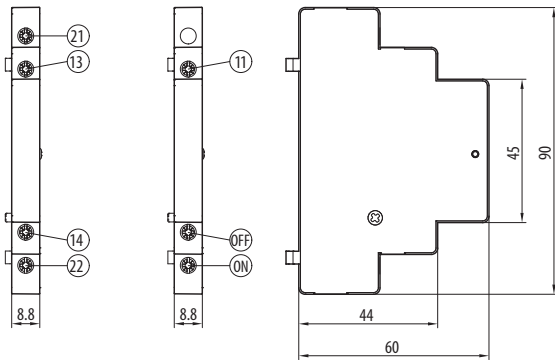
¹⁾ Each digit indicates successively the number of make, break and break-make contacts

Dimensions

PS-MIG-1100

OD-MIG-C01

OD-MIG-C02



Diagram

PS-MIG-1100



OD-MIG-C01



OD-MIG-C02



IMPULSE MEMORY RELAYS MIR



Impulse relay - electronic

- For electric circuit switching up to 16 A by impulse command from more points in a corridor, on stairs, in the whole house etc.
- Mainly for control of low power lighting circuits, with accent on limitation of noise in switching.
- The lighting circuits can be controlled by push-buttons instead of a combination of crossbar and three-way switches.
- Saving on the cost of wires - it is possible to use smaller cross-sections for the control circuit than for power circuit.
- It brings higher comfort of control - for example it is possible to switch off all lights by one push-button when leaving the house.
- The relay does not need permanent power supply; it is supplied only for the time of control impulse duration.
- The position of the make-and-break contact can only be changed by applying an impulse on the following inputs (supply voltage failures have no effect):
 - ON/OFF input - each impulse led on this input changes the contact position (local control of the impulse relay)
 - ON input - each impulse led on this input switches the contact to position 11-14
 - OFF input - each impulse led on this input switches the contact to position 11-12.

Type	Order code	Number of modules	Weight [kg]	Package [pcs]
MIR-16-001-A230	OEZ:35675	1	0.085	1



Accessories

Compensation block OD-MIR-BK

- It enables control of relay by more than 15 control push-buttons with glow discharge tube.
- Connection: parallel with MIR.
- Rated voltage: AC 230 V.
- Max. voltage: AC 400 V.
- Capacity: 3x 1 µF.

Type	Order code	Number of modules	Weight [kg]	Package [pcs]
OD-MIR-BK	OEZ:35676	1	0.055	1




Multi-level central control block OD-MIR-CO

- It enables multi-level central control of MIR.
- Rated voltage: AC 230 V.
- Each impulse memory relay is locally controlled by push-buttons (local control); each level or set of impulse memory relays is controlled simultaneously from relevant point (central control); all levels are jointly controlled by a single command from a point (multi-level central control).

Type	Order code	Number of modules	Weight [kg]	Package [pcs]
OD-MIR-CO	OEZ:35677	1	0.05	1

IMPULSE MEMORY RELAYS MIR

Specifications

Type	MIR-16-001-A230		
Standards	EN 61812-1		
Approval marks			
Main circuit (contact)			
Arrangement of contacts ^{1) 2)}	001		
Rated operating voltage	U_e		AC 250 V
Rated current	I_n	AC-1	16 A
		AC-5a	2 A
Max. switched power ²⁾			4 000 VA
Lamp load max.			460 W / 230 V
Max. fluorescent tube load	compensated $\cos \varphi = 0.8$		8x 36 W
	uncompensated $\cos \varphi = 0.5$		25x 36 W, 13x 65 W
Min. switched power			50 mW (10 V / 5 mA)
Rated frequency	f_n		50 Hz
Mechanical endurance			10 000 000 operating cycles
Electrical endurance			100 000 operating cycles
Switching frequency			10 operating cycles/min
Connection			0.2 ÷ 2.5 mm ²
Torque			0.5 Nm
Control circuit			
Rated voltage	U_c		AC 230 V
Rated frequency	f_n		50 Hz
Min. excitation time			200 ms
Max. excitation time			unlimited
Min. time period between pulses			1 s
Max. number of push-buttons with glow lamp 1.1 mA			15 pcs ³⁾
Connection			0.2 ÷ 2.5 mm ²
Torque			0.5 Nm
Other data			
Mounting on "U" rail according to EN 60715 - type			TH 35
Degree of protection			IP20
Ambient temperature			-20 ÷ + 50 °C
Working position			Arbitrary

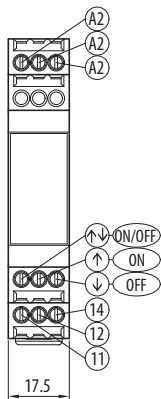
¹⁾ Each digit indicates successively the number of make, break and break-make contacts

²⁾ Different contact sequence or load increase can be solved by the use of installation contactors RSI

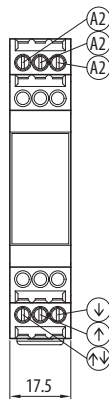
³⁾ On ON input and OFF output there must be the same number of push-buttons with a glow discharge tube. For the number of push-buttons with a glow discharge tube higher than 15 it is necessary to use the compensation block OD-MIR-BK

Dimensions

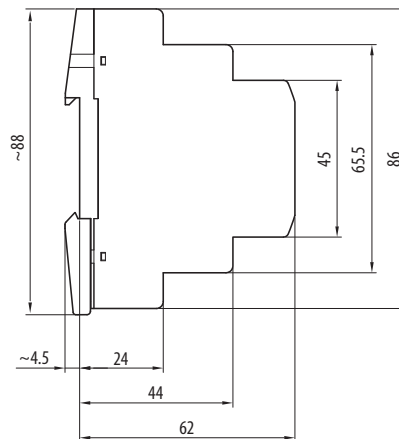
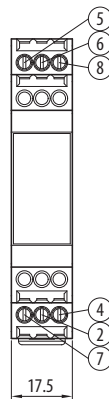
MIR-16-001-A230



OD-MIR-BK

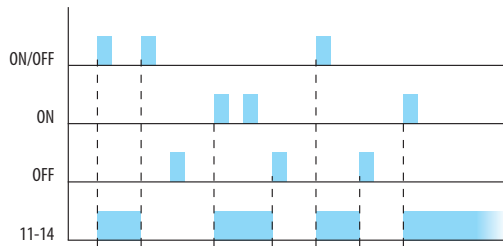


OD-MIR-CO

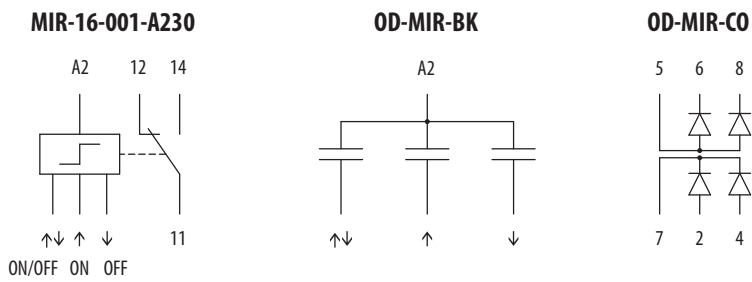


IMPULSE MEMORY RELAYS MIR

Graph



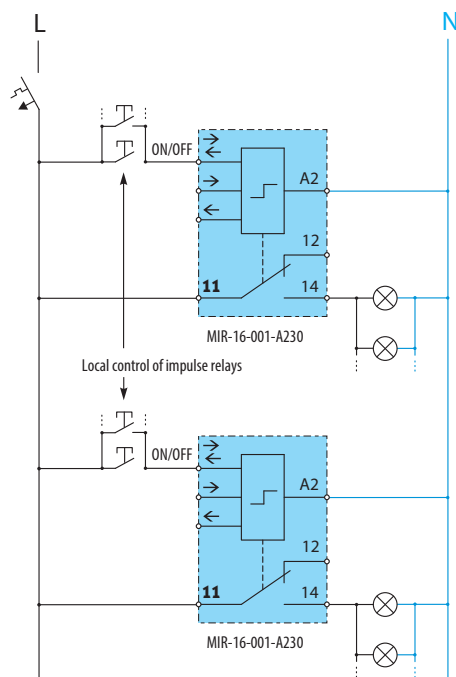
Diagram



Connection examples

Local control

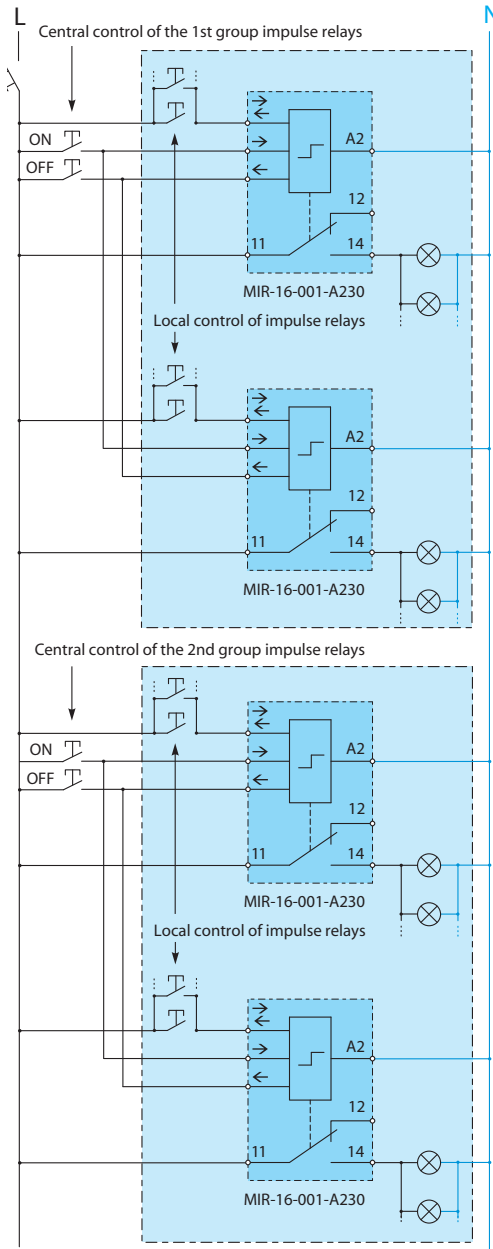
- Each impulse relay is locally controlled by push-buttons.



IMPULSE MEMORY RELAYS MIR

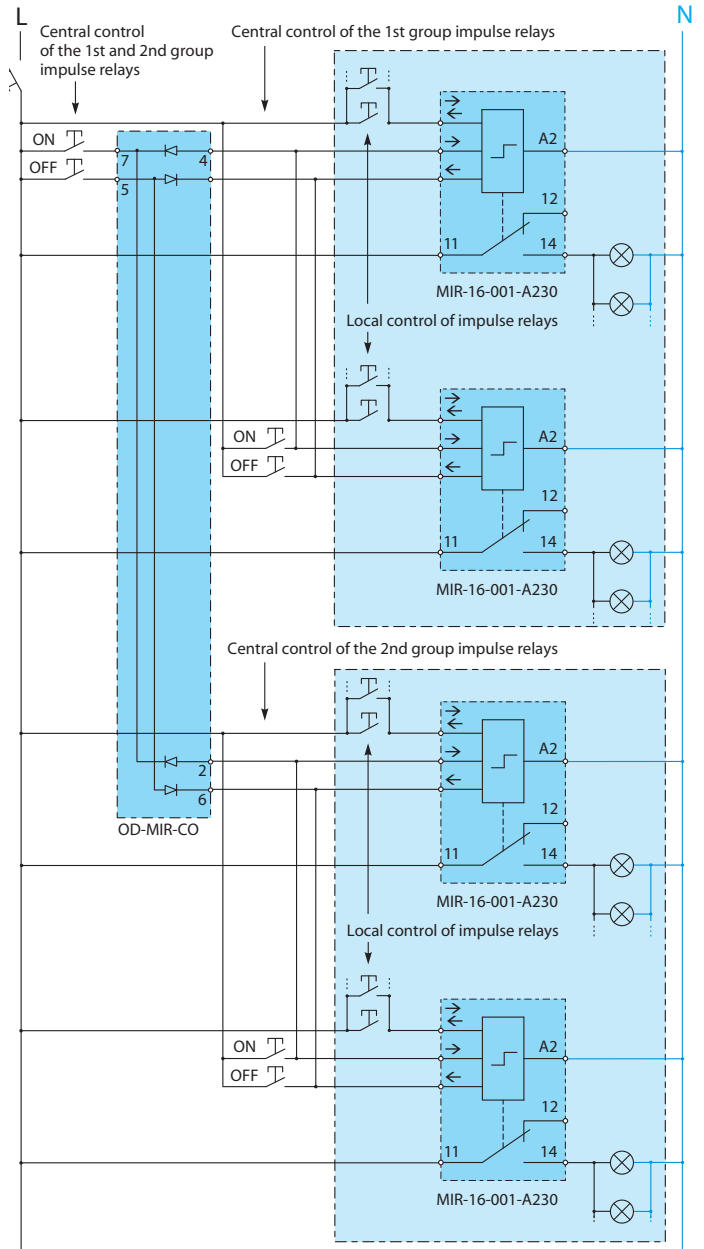
Local + central control

- Each impulse relay is locally controlled by push-buttons (local control); each level or set of impulse relays is controlled simultaneously from relevant point (central control).



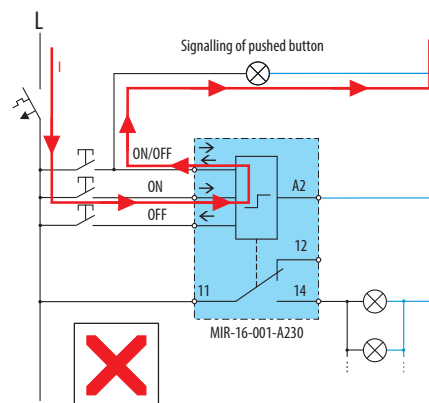
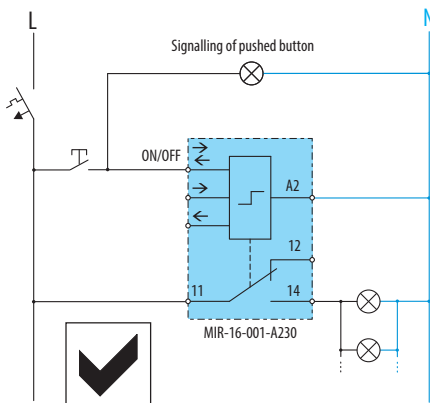
Local + central + multi-level central control

- Each impulse relay is locally controlled by push-buttons (local control); each level or set of impulse relays is controlled simultaneously from relevant point (central control); all levels are jointly controlled by a single command from a point (multi-level central control).



Connection of signalling of pushed button

- When the connection of signalling of pushed button is done according to the figure relay can be controlled only by ON/OFF input. In such case of signalling connection when the ON or OFF button is pushed the current is closed through the relay electronics and thus can damage it.



TIME RELAYS MCR



Multiple-function time relays

- For switching of electric circuits up to 8 A depending on the set time, function and connection.
- Time range: 0.1 s ÷ 100 hr.
- Large number of functions with various control options: delayed operation, impulse after switching on, interval relay starting with pause/impulse, reaction to connecting/disconnecting delay, reaction to connection/disconnection of supply voltage, reaction only to control impulse edge,...
- Universal supply voltage:
AC 12 ÷ 230 V / DC 12 ÷ 220 V (MCR-...-001-UNI),
AC 24 ÷ 230 V / DC 24 ÷ 220 V (MCR-...-003-UNI).
- Time and function setting by knobs and change-over switches on the front panel of the device.
- The TEST function making possible permanent change-over of output contacts (check of electric circuit functionality).
- Light indication at contacts closing (yellow LED).
- Light indication of presence of supply voltage (green LED).
- Each impulse led on input TL causes restart of timing depending on the set function.
- In DC circuits the (+) conductor must be connected to terminal A1, and (-) to terminal A2.

Number of functions	Arrangement of contacts ¹⁾	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
9	001	MCR-MA-001-UNI	OEZ:43239	1	0.105	1
	003	MCR-MA-003-UNI	OEZ:43240	1	0.105	1
18	001	MCR-MB-001-UNI	OEZ:43241	1	0.105	1
	003	MCR-MB-003-UNI	OEZ:43242	1	0.105	1

¹⁾ Each digit indicates successively the number of make, break and break-make contacts



Timing relays

- For periodical switching of electrical circuits up to 8 A according to two mutually independent set times.
- Time range: 0.1 s ÷ 10 days.
- Universal supply voltage:
AC 12 ÷ 230 V / DC 12 ÷ 220 V.
- Possibility of selection of start of timing - delayed operation / impulse for switching on.
- Light indication at contacts closing (yellow LED).
- Light indication of presence of supply voltage (green LED).
- In DC circuits the (+) conductor must be connected to terminal A1, and (-) to terminal A2.

Arrangement of contacts ¹⁾	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
001	MCR-TK-001-UNI	OEZ:43243	1	0.105	1

¹⁾ Each digit indicates successively the number of make, break and break-make contacts

TIME RELAYS MCR

Description of MCR-MA, MCR-MB

Knobs for function selection F1-F9

- By means of the knobs it is possible to set the requested function of the time relay F1 ÷ F8 and TEST (F9).
- In selection of functions F10 ÷ F18 it is necessary to put the knob to position OFF.

Indication of presence of supply voltage

- Supply voltage presence is indicated by continuously lighting green LED.

Indication of output relay contact closing

- Yellow continuously lighting LED indicates closing of the contact 15-18.

Knobs for function selection F10-F18

- By means of the knobs it is possible to set the requested function of the time relay F10 ÷ F18.
- In selection of functions F1 ÷ F9 it is necessary to put the knob to position OFF.
- The MCR-MA design does not contain this knob.

Terminals A1-A2 for connection of supply voltage

- Rated voltage U_n : AC/DC 12 ÷ 230 V or AC/DC 24 ÷ 220 V.
- In AC circuits L and N conductors can be arbitrarily connected to terminals A1, A2.
- In DC circuits the (+) conductor must be connected to terminal A1, and (-) to terminal A2.

Terminal TL for control of relay

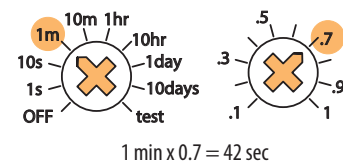
- Control impulse can be excited by connection of A1-TL.
- Min./max. excitation time: 15 ms / unlimited.

Control knobs

- For switching time setting
- upper knob defines time range: 1 s, 10 s, 1 min, 10 min, 1 hr, 10 hr, 100 hr
- lower knob for setting of a multiple of the time range (0.1 ÷ 1).

minimum set time: 0.1 s
maximum set time: 100 hr

Example of time setting:



Description of MCR-TK

Control knobs t1, t2

- Minimum set time t_1 or t_2 : 0.1 s.
- Maximum set time t_1 or t_2 : 10 days.
- Stability of t_1 and t_2 set value at permanent power supply - max. 2% t_1 or t_2 .

Indication of presence of supply voltage

- Supply voltage presence is indicated by continuously lighting green LED.

Indication of output relay contact closing

- Yellow continuously lighting LED indicates closing of the contact 15-18.

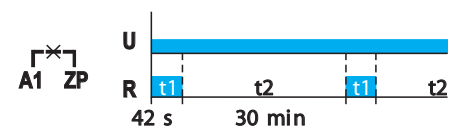
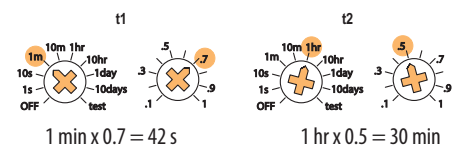
Terminals A1-A2 for connection of supply voltage

- Rated voltage U_n : AC/DC 12 ÷ 230 V.
- In AC circuits L and N conductors can be arbitrarily connected to terminals A1, A2.
- In DC circuits the (+) conductor must be connected to terminal A1, and (-) to terminal A2.

Terminal ZP

- For setting of relay start.
- If the terminal is not interconnected, the relay starts in the mode of impulse after switching.
- If the terminal is interconnected with terminal A1, the relay starts in delayed operation mode.

Example of time setting:



TIME RELAYS MCR

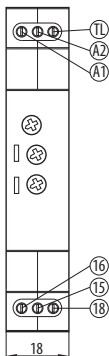
Specifications

Type		MCR-MA	MCR-MB	MCR-TK
Standards		EN 61812-1	EN 61812-1	EN 61812-1
Approval marks				
Main circuit (contact)				
Arrangement of contacts ¹⁾		001; 003	001; 003	001
Rated operating voltage/current	U_c/I_c	AC-1	250 V / 8 A	250 V / 8 A
		DC-1	24 V / 8 A	24 V / 8 A
Max. switched power		AC-1	2 000 VA	2 000 VA
		DC-1	192 W	192 W
		AC-3	200 W	200 W
		AC-5b	200 W	200 W
Max. switched voltage		AC 400 V (5 A)	AC 400 V (5 A)	AC 400 V (5 A)
		DC 150 V (0,3 A)	DC 150 V (0,3 A)	DC 150 V (0,3 A)
Max. switched voltage		DC 5 V / 100 mA	DC 5 V / 100 mA	DC 5 V / 100 mA
Indication of closed contact		yellow LED	yellow LED	yellow LED
Mechanical endurance		5 000 000 operating cycles	5 000 000 operating cycles	5 000 000 operating cycles
Electrical endurance		100 000 operating cycles	100 000 operating cycles	100 000 operating cycles
Connection – conductor rigid and flexible		0.2 ÷ 2.5 mm ²	0.2 ÷ 2.5 mm ²	0.2 ÷ 2.5 mm ²
Torque		0.5 Nm	0.5 Nm	0.5 Nm
Control circuit (coil)				
Rated voltage	U_c	type MCR-...-1-...	AC 12 ÷ 230 V / DC 12 ÷ 220 V	AC 12 ÷ 230 V / DC 12 ÷ 220 V
		type MCR-...-3-...	AC 24 ÷ 230 V / DC 24 ÷ 220 V	AC 24 ÷ 230 V / DC 24 ÷ 220 V
Dwell between applied U_c		0.1 s	0.1 s	3 s
Consumption		at AC 12 / 230 V	0.7 VA / 2.1 VA	0.7 VA / 2.1 VA
		at DC 12 / 220 V	0.9 W / 1.2 W	0.9 W / 1.2 W
Supply voltage indication		green LED	green LED	green LED
Rated frequency	f_n	50 Hz	50 Hz	50 Hz
Connection – conductor rigid and flexible		0.2 ÷ 2.5 mm ²	0.2 ÷ 2.5 mm ²	0.2 ÷ 2.5 mm ²
Torque		0.5 Nm	0.5 Nm	0.5 Nm
Control impulse				
Excitation ²⁾		through interconnection of A1-TL	through interconnection of A1-TL	-
Min. excitation time		15 ms	15 ms	-
Max. excitation time		unlimited	unlimited	-
Consumption		at AC 12 / 230 V	0.5 VA / 0.5 VA	-
		at DC 12 / 220 V	1 W / 1 W	1 W / 1 W
Time circuit				
Range		0.1 s ÷ 100 hr	0.1 s ÷ 100 hr	0.1 s ÷ 10 days
Method of setting t		control knobs on the front panel	control knobs on the front panel	control knobs on the front panel
Stability of set value at permanent power supply		max. 2 % t	max. 2 % t	max. 2 % t
Other data				
Mounting on "U" rail according to EN 60715 – type		TH35	TH35	TH35
Degree of protection		IP20	IP20	IP20
Ambient temperature		-20 ÷ +55 °C	-20 ÷ +55 °C	-20 ÷ +55 °C
Working position		arbitrary	arbitrary	arbitrary

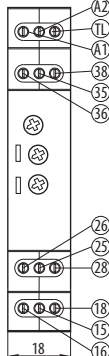
¹⁾ Each digit indicates successively the number of make, break and break-make contacts

Dimensions

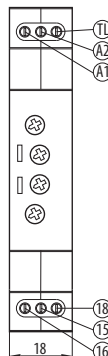
MCR-MA-001-UNI



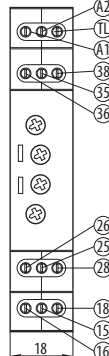
MCR-MA-003-UNI



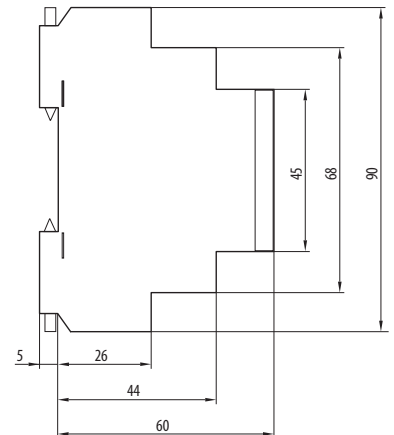
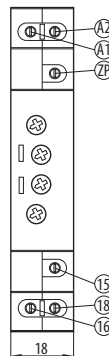
MCR-MB-001-UNI



MCR-MB-003-UNI

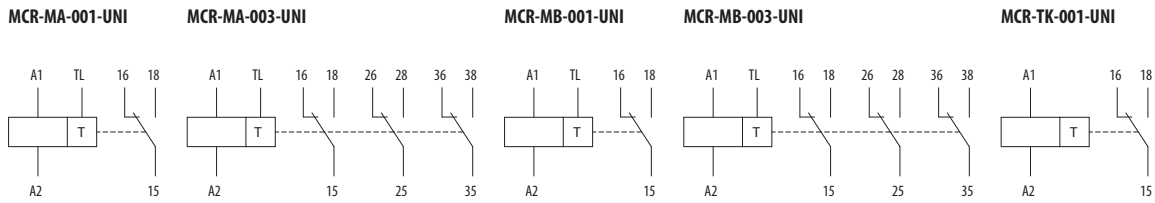


MCR-TK-001-UNI



TIME RELAYS MCR

Diagram



Graphs of functions

MCR-MA...

F1		F4		F7	
F2		F5		F8	
F3		F6		F9	TEST = ON

MCR-MB...

F1		F7		F13	
F2		F8		F14	
F3		F9	TEST = ON	F15	
F4		F10		F16	
F5		F11		F17	
F6		F12		F18	

MCR-TK...

				TEST = ON
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Note: Letter „R“ in the graphs indicates making of contacts 15-18, or 25-28 and 35-38.

TIMERS



Timers – economical

- For real time load switching up to 16 A / 250 V.
- Change-over switch automatic run / permanent operation / permanent off.

Analog MAE-A

- Daily program.
- Switching time setting: by plastic plates along the perimeter of the knob.
- Shortest switching interval 15 min.
- Without run reserve.

Digital MAE-D

- Weekly and daily program.
- Switching time setting: by push-buttons on the front panel of the device.
- Shortest switching interval: 1 s.
- Run reserve 3 years, replaceable battery.

Design		Arrangement of contacts ¹⁾	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
Analog	mini	100	MAE-A16-100-A230-MINI	OEZ:43078	1	0.082	1
	standard	001	MAE-A16-001-A230	OEZ:43067	3	0.153	1
Digital	1-channel	001	MAE-D16-001-A230	OEZ:43068	2	0.139	1
	2-channel	002	MAE-D16-002-A230	OEZ:43069	2	0.161	1

¹⁾ Each digit indicates successively the number of make, break and break-make contacts

Timers - standard

- For real time load switching up to 16 A / 250 V.
- Change-over switch automatic run / permanent operation / permanent off.

Analog MAN-A

- Daily program.
- Switching time setting: by plastic plates along the perimeter of the knob.
- Shortest switching interval 15 min.
- Run reserve 100 hours.
- Weekly and daily program.

Digital MAN-D

- Switching time setting: by push-buttons on the front panel of the device.
- Shortest switching interval: 1 s.
- Run reserve 5 years, replaceable battery.
- Selection of one of 15 languages including Czech.

Design		Arrangement of contacts ¹⁾	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
Analog	mini	100	MAN-A16-100-A230-MINI	OEZ:43070	1	0.085	1
	standard	001	MAN-A16-001-A230	OEZ:43071	3	0.155	1
Digital	1-channel	001	MAN-D16-001-A230	OEZ:43072	2	0.173	1
	2-channel	002	MAN-D16-002-A230	OEZ:43073	2	0.197	1

¹⁾ Each digit indicates successively the number of make, break and break-make contacts

TIMERS



Timers Astro

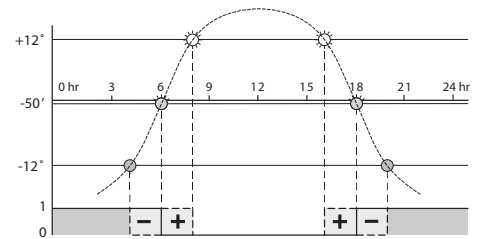
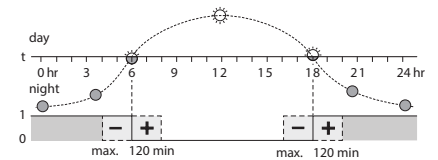
- For real time load switching up to 16 A / 250 V.
- Digital - Astro.
- Weekly and daily program.
- Switching time setting: by push-buttons on the front panel of the device.
- Switching on and off at sunrise/sunset.
- Combination of Astro function with switching according to internal clock.
- Shortest switching interval: 1 s.
- Change-over switch automatic run / permanent operation / permanent off.
- Run reserve 5 years, replaceable battery.
- Selection of one of 15 languages including Czech.

Design	Arrangement of contacts ¹⁾	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
Digital	1-channel	001	MAA-D16-001-A230	OEZ:43074	2	0.173
	2-channel	002	MAA-D16-002-A230	OEZ:43075	2	0.197

¹⁾ Each digit indicates successively the number of make, break and break-make contacts

Setting the switching time

- Timer Astro makes it possible to shift the switching on/off time by means of time correction by up to 120 minutes. The contact switching is shifted against the sunset/sunrise by a set time. Time correction does not take into account the different length of twilight in the summer and winter.
- Timer Astro makes it possible to shift the switching on/off time by means of angular correction by up to 12 minutes. The contact switching is shifted against the sunset/sunrise depending on the sun position to the horizon. Angular correction eliminates different length of twilight in the summer and winter. Angular correction enables switching at the same brightness throughout the year.



Example of switching of shop-window lighting

Switching of shop-window lighting, the setting, for example:

- We set the switching on the shop-window lighting 15 minutes before sunset by means of Astro function with manual correction -15 minutes, so that the shop-window is well illuminated still before dusk.

- To save energy, we set the shop-window switching off at 23:00 and switching on at 4:00. This setting is on the basis of the internal time of the timer.
- For sunrise, we set the switching off the shop-window lighting by means of the Astro function (without correction).

Accessories of digital program timers MAN, MAA

- USB adapter for programming the timer by means of PC.
- Data key to backup and copy the set program.
- Applicable for MAN-D16 and MAA-D16.

Type	Description	Order code	Weight [kg]	Package [pcs]
OD-MA-USB	USB adapter	OEZ:43077	0.111	1
OD-MA-DK	Data key	OEZ:43076	0.015	1

TIMERS

Specifications of analog program timer

Type	Economical		Standard	
	MAE-A16-100-A230-MINI	MAE-A16-001-A230	MAN-A16-100-A230-MINI	MAN-A16-001-A230
Standards	EN 60730-1 EN 60730-2-7	EN 60730-1 EN 60730-2-7	EN 60730-1 EN 60730-2-7	EN 60730-1 EN 60730-2-7
Approval marks				
Main circuit (contact)				
Arrangement of contacts ¹⁾	100	001	100	001
Rated operating voltage U_c	AC 250 V	AC 250 V	AC 250 V	AC 250 V
Rated current I_c	16 A	16 A	16 A	16 A
Switched power				
AC-1	3 680 W	3 680 W	3 680 W	3 680 W
AC-3	1 000 W	1 000 W	1 000 W	1 000 W
AC-5a uncompensated	1 400 VA	1 400 VA	1 400 VA	1 400 VA
AC-5a compensated	58 W / 7 μ F	58 W / 7 μ F	58 W / 7 μ F	58 W / 7 μ F
AC-5b	1 000 W	1 000 W	1 000 W	1 000 W
Min. switched power	4 V / 1 mA	4 V / 1 mA	4 V / 1 mA	4 V / 1 mA
Rated frequency f_n	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Mechanical endurance	20 000 000 operating cycles	20 000 000 operating cycles	20 000 000 operating cycles	20 000 000 operating cycles
Electrical endurance	100 000 operating cycles	100 000 operating cycles	100 000 operating cycles	100 000 operating cycles
Connection - conductor rigid	1.5 ÷ 4 mm ²	1.5 ÷ 4 mm ²	1.5 ÷ 4 mm ²	1.5 ÷ 4 mm ²
Connection - conductor flexible	1.5 ÷ 2.5 mm ²	1.5 ÷ 2.5 mm ²	1.5 ÷ 2.5 mm ²	1.5 ÷ 2.5 mm ²
Torque	1.2 Nm	1.2 Nm	1.2 Nm	1.2 Nm
Time circuit				
Min. switching interval	15 min	30 min	15 min	30 min
Min. time unit	15 min	15 min	15 min	15 min
Program	daily	daily	daily	daily
Run accuracy	according to network frequency 50 Hz	according to network frequency 50 Hz	±2 s/day	±2 s/day
Switching accuracy	±5 min	±5 min	±5 min	±5 min
Run reserve	-	-	100 hr	100 hr
Battery type	-	-	NiMH	NiMH
Possibility of battery replacement	-	-	yes	yes
Charging time	-	-	min. 48 hr	min. 48 hr
Supply circuit				
Rated control voltage U_c	AC 230 V	AC 230 V	AC 230 V	AC 230 V
Operating range	85 ÷ 110 % U_c	85 ÷ 110 % U_c	85 ÷ 110 % U_c	85 ÷ 110 % U_c
Rated frequency f_n	50 Hz	50 Hz	50/60 Hz	50/60 Hz
Rated power loss P_v	0.85 W	0.85 W	0.6 W	0.6 W
Connection - conductor rigid	1.5 ÷ 4 mm ²	1.5 ÷ 4 mm ²	1.5 ÷ 4 mm ²	1.5 ÷ 4 mm ²
Connection - conductor flexible	1.5 ÷ 2.5 mm ²	1.5 ÷ 2.5 mm ²	1.5 ÷ 2.5 mm ²	1.5 ÷ 2.5 mm ²
Torque	1.2 Nm	1.2 Nm	1.2 Nm	1.2 Nm
Other data				
Mounting on "U" rails according 60715 - type	TH 35	TH 35	TH 35	TH 35
Degree of protection	IP30	IP30	IP30	IP30
Ambient temperature	-10 ÷ +55 °C	-10 ÷ +55 °C	-10 ÷ +55 °C	-10 ÷ +55 °C
Ambient temperature	arbitrary	arbitrary	arbitrary	arbitrary

¹⁾ Each digit indicates successively the number of make, break and break-make contacts

TIMERS

Specifications of digital program timer

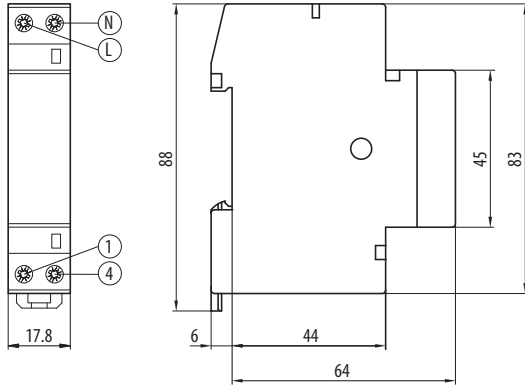
Type	Economical		Standard		Astro	
	MAE-D16-001-A230	MAE-D16-002-A230	MAN-D16-001-A230	MAN-D16-002-A230	MAA-D16-001-A230	MAA-D16-002-A230
Standards	EN 60730-1 EN 60730-2-7	EN 60730-1 EN 60730-2-7	EN 60730-1 EN 60730-2-7	EN 60730-1 EN 60730-2-7	EN 60730-1 EN 60730-2-7	EN 60730-1 EN 60730-2-7
Approval marks						
Main circuit (contact)						
Arrangement of contacts ¹⁾	001	002	001	002	001	002
Rated operating voltage U_e	AC 250 V	AC 250 V	AC 250 V	AC 250 V	AC 250 V	AC 250 V
Rated current I_e	16 A	16 A	16 A	16 A	16 A	16 A
Switched power						
AC-1	4 000 W	4 000 W	3 680 W	3 680 W	3 680 W	3 680 W
AC-3	1 800 W	1 800 W	2 000 W	2 000 W	2 000 W	2 000 W
AC-5a uncompensated	2 500 VA	2 500 VA	2 000 VA	2 000 VA	2 000 VA	2 000 VA
AC-5a compensated	60 W / 7 μ F	60 W / 7 μ F	600 W / 70 μ F	600 W / 70 μ F	600 W / 70 μ F	600 W / 70 μ F
AC-5b	1 200 W	1 200 W	2 000 W	2 000 W	2 000 W	2 000 W
Min. switched voltage/current	12 V / 100 mA	12 V / 100 mA	12 V / 100 mA	12 V / 100 mA	12 V / 100 mA	12 V / 100 mA
Rated frequency f_n	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Mechanical endurance	10 000 000 operating cycles	10 000 000 operating cycles	10 000 000 operating cycles	10 000 000 operating cycles	10 000 000 operating cycles	10 000 000 operating cycles
Electrical endurance	100 000 operating cycles	100 000 operating cycles	100 000 operating cycles	100 000 operating cycles	100 000 operating cycles	100 000 operating cycles
Connection - conductor rigid	1 \div 4 mm ²	1 \div 4 mm ²	1.5 \div 4 mm ²	1.5 \div 4 mm ²	1.5 \div 4 mm ²	1.5 \div 4 mm ²
Connection - conductor flexible	0.5 \div 2.5 mm ²	0.5 \div 2.5 mm ²	1.5 \div 2.5 mm ²	1.5 \div 2.5 mm ²	1.5 \div 2.5 mm ²	1.5 \div 2.5 mm ²
Torque	1.2 Nm	1.2 Nm	1.2 Nm	1.2 Nm	1.2 Nm	1.2 Nm
Time circuit						
Min. switching interval	1 min	1 min	1 s	1 s	1 s	1 s
Min. time unit	1 min	1 min	1 s	1 s	1 s	1 s
Program	weekly	weekly	weekly	weekly	weekly	weekly
Automatic summer/winter time change	yes	yes	yes	yes	yes	yes
Number of memory places	28	14 on each channel	56	28 on each channel	56	28 on each channel
Pre-set blocks in the week	Mo-Su, Mo-Fr, Sa-Su, individual	Mo-Su, Mo-Fr, Sa-Su, individual	Mo-Su, Mo-Fr, Sa-Su, individual	Mo-Su, Mo-Fr, Sa-Su, individual	Mo-Su, individual	Mo-Su, individual
Run accuracy	\pm 1 s/day	\pm 1 s/day	\pm 0.1 s/day	\pm 0.1 s/day	\pm 0.1 s/day	\pm 0.1 s/day
Run reserve	3 years	3 years	5 years	5 years	5 years	5 years
Battery type	Lithium	Lithium	Lithium	Lithium	Lithium	Lithium
Possibility of battery replacement	yes	yes	yes	yes	yes	yes
Supply circuit						
Rated control voltage U_c	AC 230 V	AC 230 V	AC 230 V	AC 230 V	AC 230 V	AC 230 V
Operating range	85 \div 110 % U_c	85 \div 110 % U_c	85 \div 110 % U_c	85 \div 110 % U_c	85 \div 110 % U_c	85 \div 110 % U_c
Rated frequency f_n	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Rated power loss P_v	0,9 W	1,3 W	1 W	1,5 W	1 W	1,5 W
Connection - conductor rigid	1 \div 4 mm ²	1 \div 4 mm ²	1.5 \div 4 mm ²	1.5 \div 4 mm ²	1.5 \div 4 mm ²	1.5 \div 4 mm ²
Connection - conductor flexible	0.5 \div 2.5 mm ²	0.5 \div 2.5 mm ²	1.5 \div 2.5 mm ²	1.5 \div 2.5 mm ²	1.5 \div 2.5 mm ²	1.5 \div 2.5 mm ²
Torque	1.2 Nm	1.2 Nm	1.2 Nm	1.2 Nm	1.2 Nm	1.2 Nm
Other data						
Mounting on "U" rails according 60715 - type	TH 35	TH 35	TH 35	TH 35	TH 35	TH 35
Degree of protection	IP20	IP20	IP20	IP20	IP20	IP20
Ambient temperature	-20 \div +55 °C	-20 \div +55 °C	-20 \div +55 °C	-20 \div +55 °C	-20 \div +55 °C	-20 \div +55 °C
Working position	arbitrary	arbitrary	arbitrary	arbitrary	arbitrary	arbitrary

¹⁾ Each digit indicates successively the number of make, break and break-make contacts

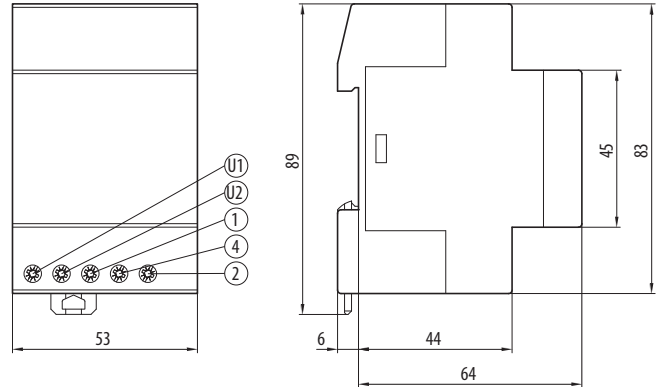
TIMERS MAE, MAN, MAA

Dimensions

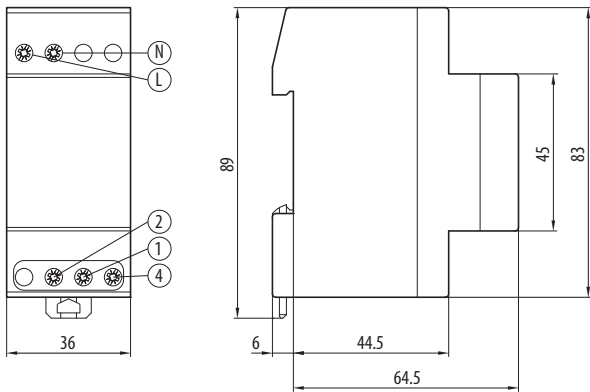
MAE-A16-100-A230-MINI
MAN-A16-100-A230-MINI



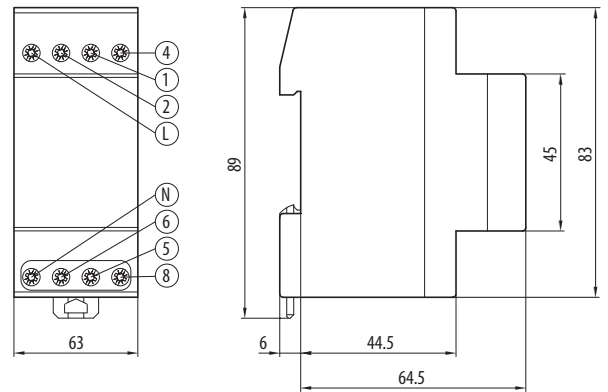
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MAN-A16-001-A230



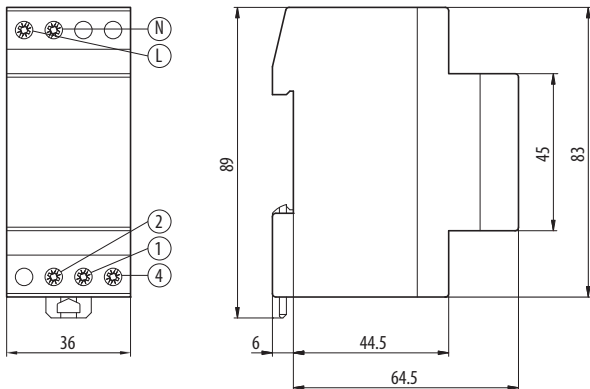
MAE-D16-001-A230



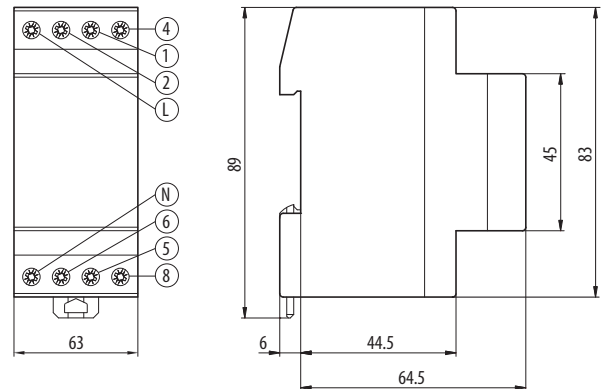
MAE-D16-002-A230



MAN-D16-001-A230



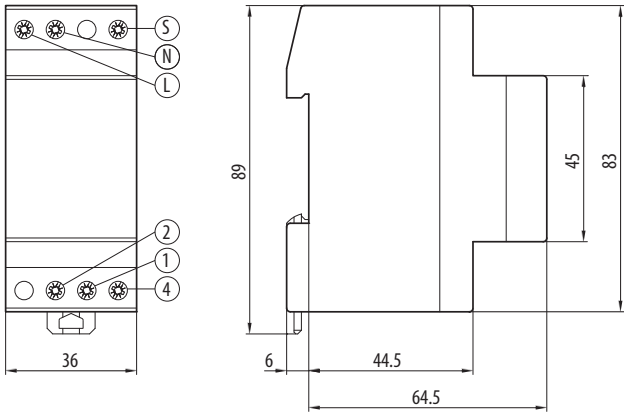
MAN-D16-002-A230



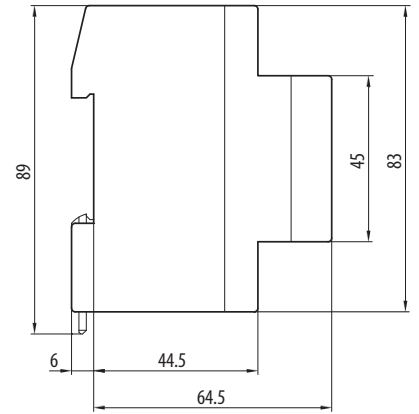
TIMERS

Dimensions

MAA-D16-001-A230

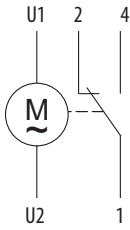


MAA-D16-002-A230

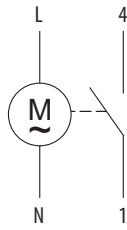


Diagram

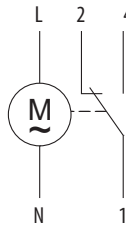
**MAE-A16-001-A230
MAN-A16-001-A230**



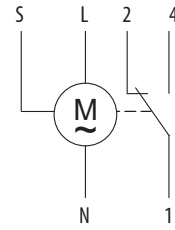
**MAE-A16-100-A230-MINI
MAN-A16-100-A230-MINI**



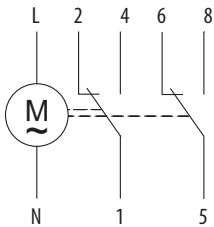
**MAE-D16-001-A230
MAN-D16-001-A230**



MAA-D16-001-A230



**MAE-D16-002-A230
MAN-D16-002-A230
MAA-D16-002-A230**



STAIR SWITCHES

**Stair switches MQA-..**

- Mainly for control of lighting circuits from more points in a corridor, on stairs, in the whole house etc.
- Possibility of 3-wire or 4-wire connection.
- Contacts: 1 make.
- Easy time setting (0.5 ÷ 10 min) by the knob on the front panel of the device.
- Max. 50 control push-buttons with glow lamp 1 mA.

Type	Order code	Number of modules	Weight [kg]	Package [pcs]
MQA-16-100-A230	OEZ:37210	1	0.086	1

Stair switches MQB-..

- Mainly for control of lighting circuits from more points in a corridor, on stairs, in the whole house etc.
- Possibility of 3-wire or 4-wire connection.
- Time setting (0.5 ÷ 10 min) by the knob on the front panel of the device.
- Contacts: 1 make.
- Max. 50 control push-buttons with glow lamp 1 mA.
- Warning before expiration of the set time - 20 and 40 seconds before expiration of the set time the stair switch warns by indicator short blinking of oncoming end of timing.
- If the control push-button is pressed longer than 1 s, the stair switch will switch on for a time four times longer than the set time.

Type	Order code	Number of modules	Weight [kg]	Package [pcs]
MQB-16-100-A230	OEZ:37211	1	0.086	1




Stair switches MQC-..

- Mainly for control of lighting circuits from more points in a corridor, on stairs, in the whole house etc.
- Possibility of 3-wire or 4-wire connection.
- Time setting (3 ÷ 60 min) by the knob on the front panel of the device.
- Max. 50 control push-buttons with glow lamp 1 mA.
- Contacts: 1 make.
- Warning before expiration of the set time - 20 and 40 seconds before expiration of the set time the stair switch warns by indicator short blinking of oncoming end of timing.
- The timing is terminated by pressing the push-button again before 40 seconds to the end of the set time. The timing cycle is restarted by pressing the push-button again 40 or less seconds to the end of the set time.

Type	Order code	Number of modules	Weight [kg]	Package [pcs]
MQC-16-100-A230	OEZ:37830	1	0.086	1

STAIR SWITCHES

Specifications

Type		MQA-16-100-A230	MQB-16-100-A230	MQC-16-100-A230
Standards		EN 60669 EN 61812-1	EN 60669 EN 61812-1	EN 61812-1 EN 61812-1
Approval marks				
Main circuit (contact)				
Arrangement of contacts ¹⁾		10	10	10
Rated operating voltage	U_e	AC 250 V	AC 250 V	AC 250 V
Rated current	I_n	AC-1 16 A	16 A	16 A
Inductive load	$\cos\phi$ 0,6	10 A	10 A	10 A
Lamp load max.		2 000 W	2 000 W	2 000 W
Max. fluorescent tube load	uncompensated	20 pcs 58 W	20x 58 W	20x 58 W
	compensated in series	40 pcs 58 W	40 pcs 58 W	40 pcs 58 W
	duo-connection	2x 20 pcs 58 W	2x 20 pcs 58 W	2x 20 pcs 58 W
	EVG = electronic ballast	5 pcs 20 W	5 pcs 20 W	5 pcs 20 W
Min. switched voltage/current		10 V / 300 mA	10 V / 300 mA	10 V / 300 mA
Rated frequency	f_n	50/60 Hz	50/60 Hz	50/60 Hz
Connection		1.5 ÷ 6 mm ²	1.5 ÷ 6 mm ²	1.5 ÷ 6 mm ²
Torque		1.2 Nm	1.2 Nm	1.2 Nm
Control circuit				
Rated control voltage	U_c	AC 230 V	AC 230 V	AC 230 V
Range of control voltage		90 ÷ 110 % U_c	90 ÷ 110 % U_c	90 ÷ 110 % U_c
Rated frequency	f_n	50 Hz	50 Hz	50 Hz
Power loss	at idle state	0.7 W	1 W	1 W
	at timing process	3.5 W	1.7 W	1.7 W
Time setting		0.5 ÷ 10 min	0.5 ÷ 10 min	3 ÷ 60 min
Min. excitation time		30 ms	30 ms	30 ms
Max. excitation time ²⁾		unlimited	unlimited	unlimited
Max. number of push-buttons with glow lamp 1 mA		50 pcs	50 pcs	50 pcs
Reset by next impulse		yes	yes	yes
Additional extension of the set time		no	yes ³⁾	no
Warning before end of timing		no	yes ⁴⁾	yes ⁴⁾
Connection		1.5 ÷ 6 mm ²	1.5 ÷ 6 mm ²	1.5 ÷ 6 mm ²
Torque		1.2 Nm	1.2 Nm	1.2 Nm
Other data				
Mounting on "U" rail according to EN 60715 - type		TH 35	TH 35	TH 35
Degree of protection		IP20	IP20	IP20
Ambient temperature		-10 ÷ + 50 °C	-10 ÷ + 50 °C	-10 ÷ + 50 °C
Working position		arbitrary	arbitrary	arbitrary

¹⁾ Each digit indicates successively the number of make and break contacts

²⁾ The device is able to withstand permanent load either in switching the manual change-over switch on the front panel of the device or in control push-button locking

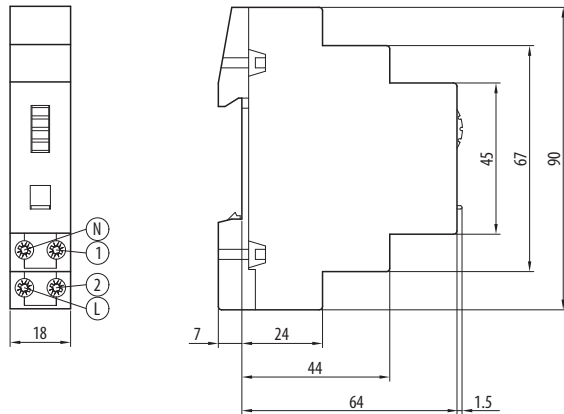
³⁾ If the control push-button is closed for more than 1 s, the set time is extended four times

⁴⁾ 20 and 40 seconds before expiration of the set time the stair switch warns by indicator short blinking of oncoming end of timing

STAIR SWITCHES

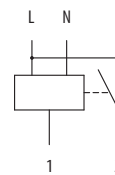
Dimensions

MQA-16-100-A230, MQB-16-100-A230, MQC-16-100-A230



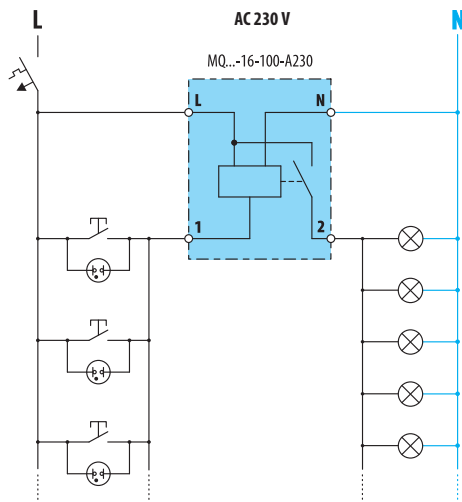
Diagram

MQA-16-100-A230
MQB-16-100-A230
MQC-16-100-A230



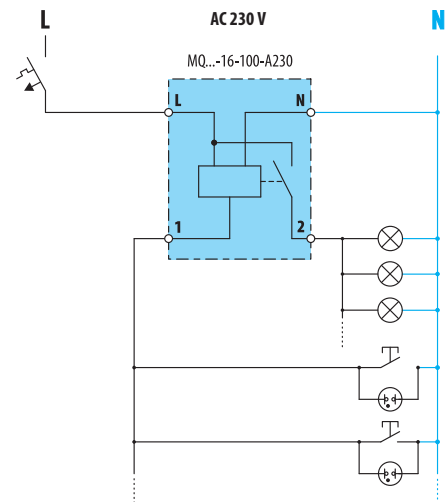
Connection examples

4-wire connection



Stair switch is controlled by switching of the phase conductor.
This connection is used mainly in new installations.

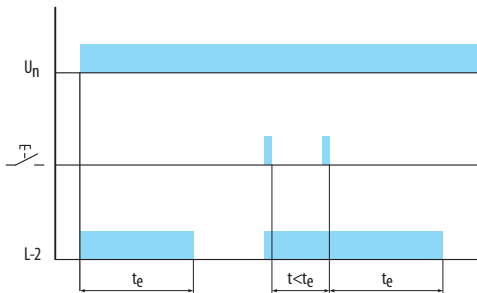
3-wire connection



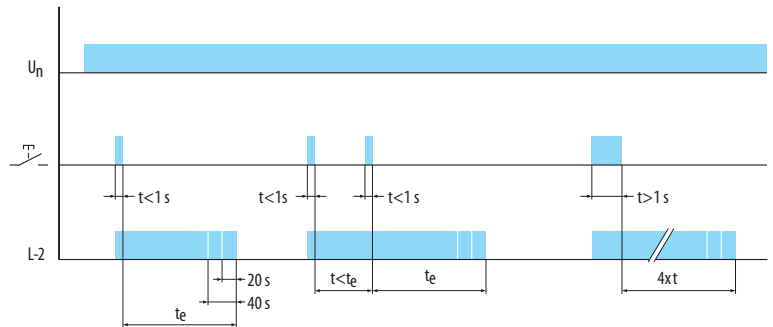
Stair switch is controlled by switching of the N-conductor.
This connection is used only in old installations.

Graph

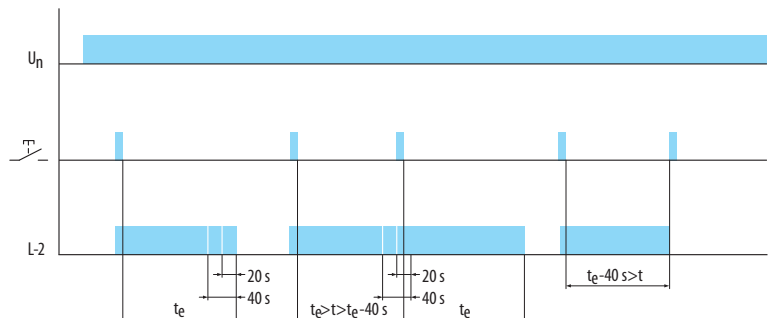
MQA-16-100-A230



MQB-16-100-A230



MQC-16-100-A230



Note:
in case of blocking of the control push-button in closed position, the stair switches remain in closed condition continuously.

MONITORING RELAY



Voltage monitoring relays 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.
- Overvoltage and undervoltage monitoring can be switched off separately. Then the relay reacts only to phase failure only.
- Light indication of presence of supply voltage (green LED).
- Light indication at contacts closing (red LED).

Type	Order code	Number of modules	Weight [kg]	Package [pcs]
MMR-U3-001-A230	OEZ:43244	1	0.091	1



Voltage monitoring relays 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.
- Overvoltage, undervoltage and asymmetry monitoring can be switched off separately. Then the relay reacts only to phase sequence and phase failure only.
- Light indication of presence of supply voltage (green LED).
- Light indication at contacts closing (red LED).

Type	Order code	Number of modules	Weight [kg]	Package [pcs]
MMR-X3-001-A230	OEZ:43245	1	0.091	1

MONITORING RELAY

Description of MMR-U3

Terminals L1, L2, L3 and N for connection of the monitored voltage

- U_c : AC 230/400 V.
- In 1-phase application, connect the terminals L1, L2 and L3.

Indication of presence of supply voltage

- Supply voltage presence is indicated by continuously lighting green LED.

Error indication

- Red LED.
- 1 blink... error in phase 1.
- 2 blinks... error in phase 2.
- 3 blinks... error in phase 3.

Overvoltage level setting

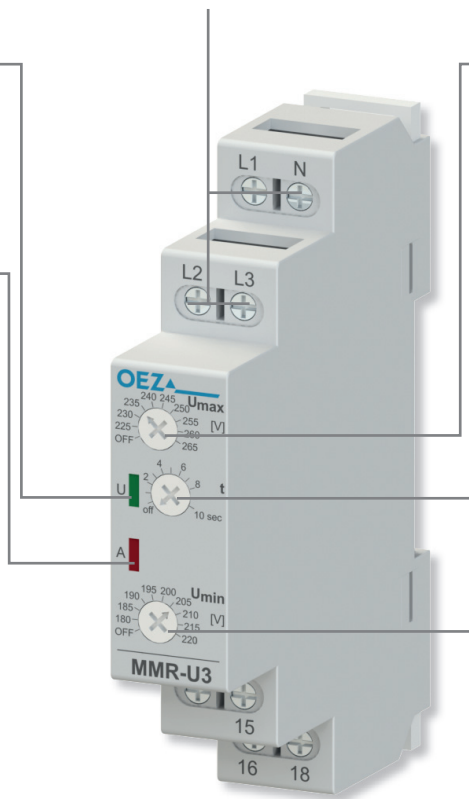
- Range AC 225 ÷ 265 V step 5 V.
- It can be switched off.

Setting of delay of reaction to error

- Range 0 ÷ 10 s step 1 s.
- It can be switched off.

Undervoltage level setting

- Range AC 180 ÷ 220 V step 5 V.
- It can be switched off.



Description of MMR-X3

Terminals L1, L2, L3 and N for connection of the monitored voltage

- U_c : AC 230 / 400 V.

Indication of presence of supply voltage

- Supply voltage presence is indicated by continuously lighting green LED.

Error indication

- Red LED.
- 1 blink... error in phase 1.
- 2 blinks... error in phase 2.
- 3 blinks... error in phase 3.

Undervoltage level setting

- Range AC 180 ÷ 220 V step 5 V.
- It can be switched off.

Overvoltage level setting

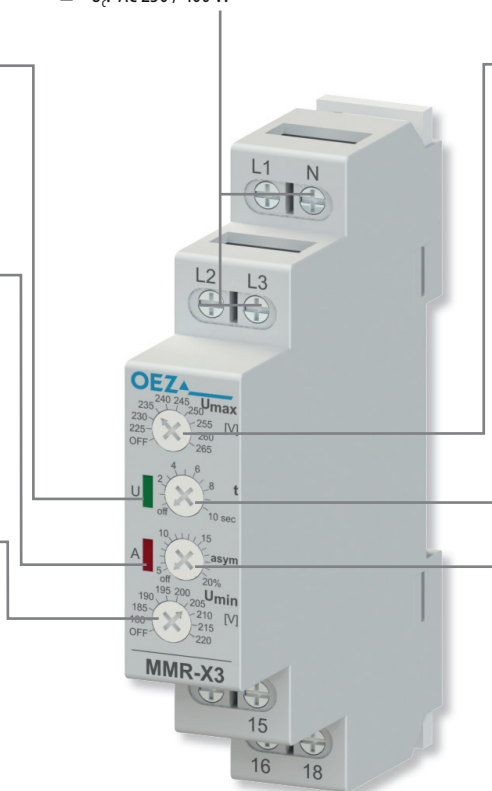
- Range AC 225 ÷ 265 V step 5 V.
- It can be switched off.

Setting of delay of reaction to error

- Range 0 ÷ 10 s step 1 s.
- It can be switched off.

Asymmetry size setting

- Range 5 ÷ 20 % step 1 %.
- It can be switched off.



MONITORING RELAY

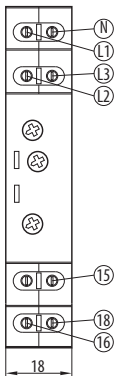
Specifications

Type		MMR-U3	MMR-X3
Standards		EN 60255-56 IEC 61010	EN 60255-56 IEC 61010
Approval marks			
Main circuit (contact)			
Arrangement of contacts ¹⁾		001	001
Rated operating voltage/provid	U_n/I_n	250 V / 8 A	250 V / 8 A
Max. switched power	AC-1	2 000 VA	2 000 VA
	AC-3	200 W	200 W
	AC-5b	200 W	200 W
		AC 400 V	AC 400 V
Max. switched voltage		AC 400 V	AC 400 V
Connection – conductor rigid and flexible		0.2 ÷ 2.5 mm ²	0.2 ÷ 2.5 mm ²
Torque		0.5 Nm	0.5 Nm
Mechanical endurance		3 000 000 operating cycles	3 000 000 operating cycles
Electrical endurance		10 000 operating cycles	10 000 operating cycles
Supply circuit			
Rated voltage	U_c	AC 230 V	AC 230 V
Input power		max. 1.5 VA	max. 1.5 VA
Supply voltage indication		green LED	green LED
Rated frequency	f_n	50 Hz	50 Hz
Connection – conductor rigid and flexible		0.2 ÷ 2.5 mm ²	0.2 ÷ 2.5 mm ²
Torque		0.5 Nm	0.5 Nm
Measuring circuit			
Monitored voltage		AC 230/400 V	AC 230/400 V
Error indication		red LED	red LED
Adjustable delay		0 s ÷ 10 s	0 s ÷ 10 s
Adjustable undervoltage level		180 ÷ 220 V	180 ÷ 220 V
Adjustable overvoltage level		225 ÷ 265 V	225 ÷ 265 V
Adjustable value of asymmetry		-	5 ÷ 20 %
Method of setting		control knobs on the front panel	control knobs on the front panel
Connection – conductor rigid and flexible		0.2 ÷ 2.5 mm ²	0.2 ÷ 2.5 mm ²
Torque		0.5 Nm	0.5 Nm
Other data			
Galvanic isolation	input/output	4 kV	4 kV
Mounting on "U" rail according to EN 60715 – type		TH35	TH35
Degree of protection		IP20	IP20
Ambient temperature		-20 ÷ +55 °C	-20 ÷ +55 °C
Working position		arbitrary	arbitrary

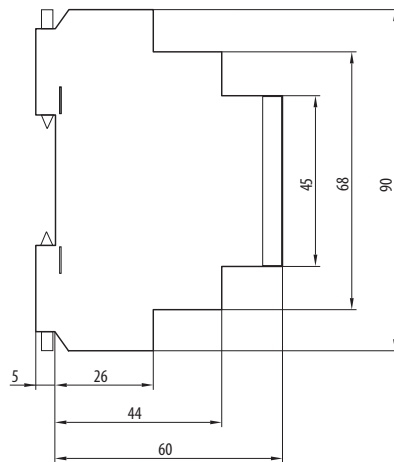
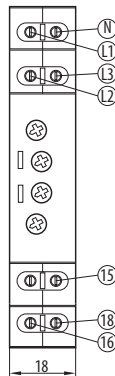
¹⁾ Each digit indicates successively the number of make and break contacts

Dimensions

MMR-U3-...



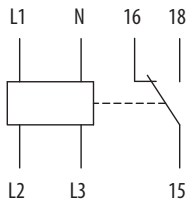
MMR-X3-...



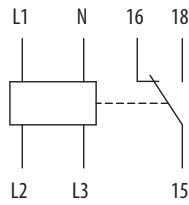
MONITORING RELAY

Diagram

MMR-U3-...

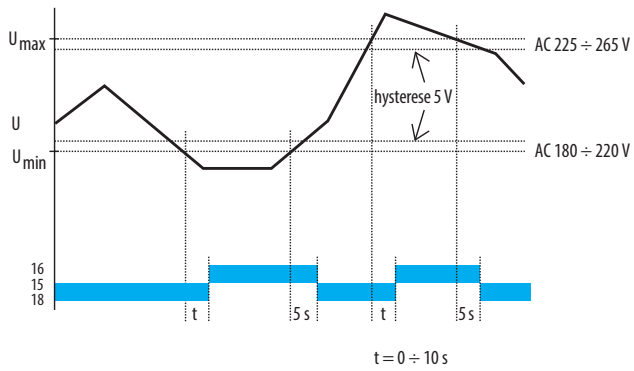


MMR-X3-...

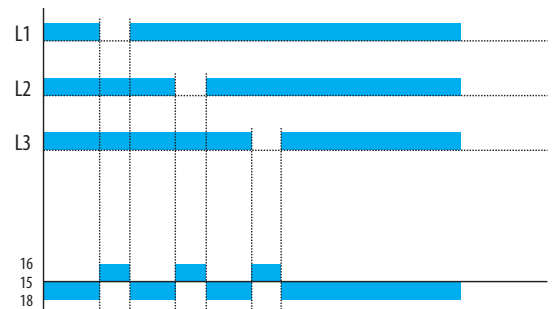


Graph

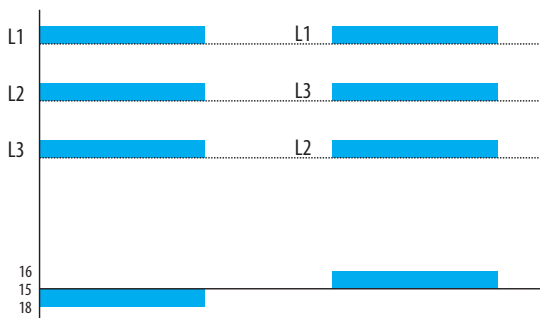
Monitoring of overvoltage and undervoltage MMR-U3, MMR-X3



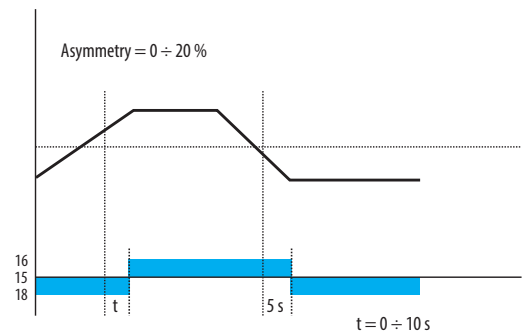
Phases failure monitoring MMR-U3, MMR-X3



Monitoring of phase sequence MMR-X3



Asymmetry monitoring MMR-X3



MONITORING RELAY




Priority current relays

- They monitor the strength of current in the circuit and close/open the contact (terminals 1, 2) at a jump exceeding of a guaranteed switched current.
- They make it possible to interrupt the power supply of one (non-priority) circuit, if the current of the other (priority) circuit jumps to a set value.
- They are most frequently installed in distribution systems where concurrent operation of more appliances is not possible because of risk of exceeding a permitted power input.
- For example, the relays can disconnect electric heating, a storage block heater from the network if an instantaneous water heater is switched – therefore it is possible to select a main circuit breaker and conductors for a lower power input.
- They make it possible to increase the number of appliances for existing installations.
- In the circuits with electronic (e.g. thyristor) control, they cannot be used directly, but with a time-delay relay – see connection examples.
- Maximum current through the current coil: depending on design 15 A, 28 A, 63 A.
- Maximum current through the contact: 16 A.

Operating current range I_n	Arrangement of contacts ¹⁾	Type	Order code	Number of modules	Weight [kg]	Package [pcs]
5 ÷ 15 A	01	RLP-15-01	OEZ:35548	1	0.115	1
	10	RLP-15-10	OEZ:35549	1	0.115	1
10 ÷ 28 A	01	RLP-28-01	OEZ:35550	1	0.115	1
	10	RLP-28-10	OEZ:35551	1	0.115	1
26 ÷ 63 A	01	RLP-63-01	OEZ:35552	1	0.115	1
	10	RLP-63-10	OEZ:35553	1	0.115	1

¹⁾ Each digit indicates successively the number of make and break contacts

Specifications

Type	RLP-..	
Approval marks		
Contact (terminals 1,2)		
Arrangement of contacts ¹⁾	10, 01	
Rated voltage/current	AC-1	U_e/I_n AC 250 V/16 A
Electrical endurance	75 000 operating cycles	
Switching frequency	max. 1200 operating cycles/hr	
Connection	0.75 ÷ 2.5 mm ²	
Torque	0.8 Nm	
Current coil (terminals A1, A2)		
Operating current range	I_n	5 ÷ 15 A, 10 ÷ 28 A, 26 ÷ 63 A
Guaranteed switched current for I_n ²⁾	operating current range 5 ÷ 15 A	≥ 5 A
	operating current range 10 ÷ 28 A	≥ 10 A
	operating current range 26 ÷ 63 A	≥ 26 A
Guaranteed unswitched current for I_n ²⁾	operating current range 5 ÷ 15 A	≤ 2 A
	operating current range 10 ÷ 28 A	≤ 6 A
	operating current range 26 ÷ 63 A	≤ 16 A
Connection - terminals A1, A2	0.75 ÷ 16 mm ²	
Torque	2 Nm	
Power loss	3 W	
Other data		
Isolation voltage	U_i	AC 400 V
Mounting on "U" rail according to EN 60715 - type	TH 35	
Degree of protection	IP20	
Ambient temperature	-20 ÷ 50 °C	
Working position	arbitrary	

¹⁾ Each digit indicates successively the number of make and break contacts

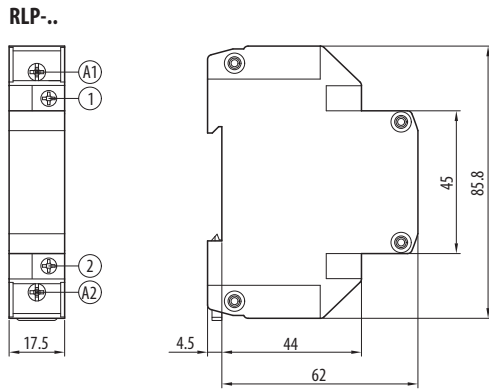
²⁾ Only for jump increase in current

Selection RLP-.. according to power output of the switched appliance

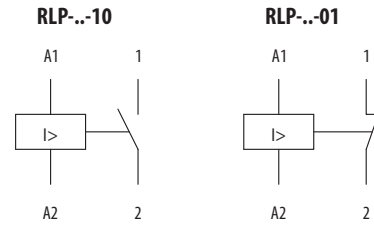
Voltage	Appliance		type RLP-..
	Power output [kW]		
AC 230 V	1.2 ÷ 3.4		RLP-15-..
	2.3 ÷ 6.4		RLP-28-..
	6.0 ÷ 14.5		RLP-63-..
AC 400 V	3.4 ÷ 10.0		RLP-15-..
	6.9 ÷ 19.3		RLP-28-..
	18.0 ÷ 43.5		RLP-63-..

MONITORING RELAY

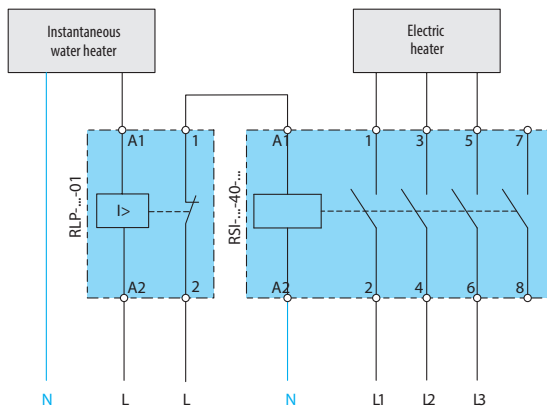
Dimensions



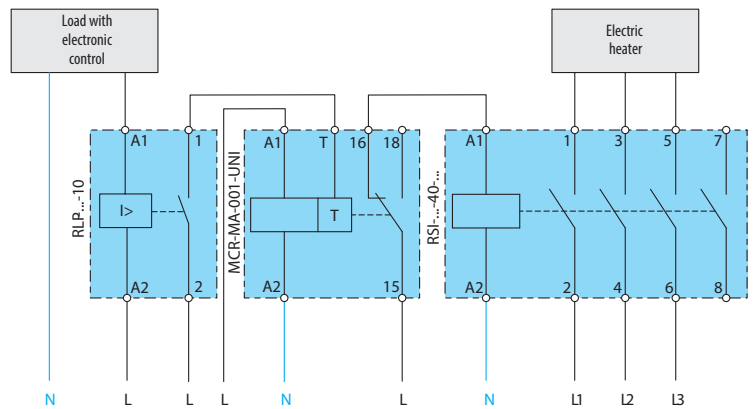
Diagram



Connection examples



- **Example of blocking of current taking by electrical heating:**
In case of switching an instantaneous water heater (priority appliance) the guaranteed switching current of the priority relay is exceeded, and its contact opens. The coil of the contactor RSI loses voltage, and opens the power contacts, by which it disconnects the electrical heating, thus reducing overall current consumption.



- **Example of blocking of consumption by a load with electronic control:**
In this case the function of the relay can be disturbed by the electronic control (the relay switches in the rhythm of the electronic control). For this reason we recommend connecting a time relay with a delayed function in the circuit of the control contact. In case of switching a load the guaranteed switching current of the priority relay is exceeded, and its contact closes. This will start the time relay, and disconnects the contactor coil for a preset time.

MONITORING RELAY



Analog residual current monitor 5SV8000-6KK

- Designed for monitoring of leakage current (residual/fault current) and protection against fire e.g. due to worsened insulation or sneak currents.
- Possibility of setting of residual current $I_{\Delta n}$ and setting of limit time of inactivity of $t_{\Delta n}$ (see parameters) by means of rotary switches.
- Mounting on „U“ rail.
- Measurement by means of external summation current transformer.
- Circuit breaker switching off by means of shunt trip or undervoltage release.

Local signalling

- First LED signals functionality of the relay and current transformer:
LED is lighting - the relay is in order
LED does not light - the relay is not supplied
LED is blinking - interrupted connection between the relay and the transformer, or broken secondary winding.
- The second LED signals magnitude of the passing current:
LED is lighting - signalling reach of 100 % residual current
LED is blinking - blinking period increases with increasing residual current.

Remote signalling

- By means of make-and-break contact (CO).
- Serves for signalling of reach of the set value of $I_{\Delta n}$ and/or for circuit breaker switching off via undervoltage release or shunt trip.

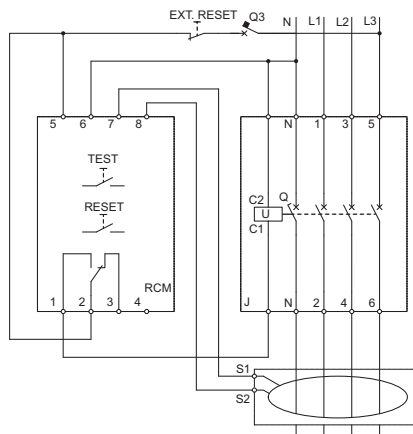
Control

- The TEST push-button serves for testing of the function of both the relay and circuit breaker - disconnects the circuit.
- If the relay trips (switches the circuit breaker off) it is necessary to reset it by the „RESET“ push-button, or interrupt its supply and thus perform the remote reset.
- The setting can be sealed.

Type	Order code	Description	Number of modules	Weight [kg]	Package [pcs]
5SV8000-6KK	OEZ:42658	Analog, setting $I_{\Delta n}$ and $t_{\Delta n}$	2	0.180	1

Diagram

Wiring diagram with a shunt trip



Wiring diagram with an undervoltage release

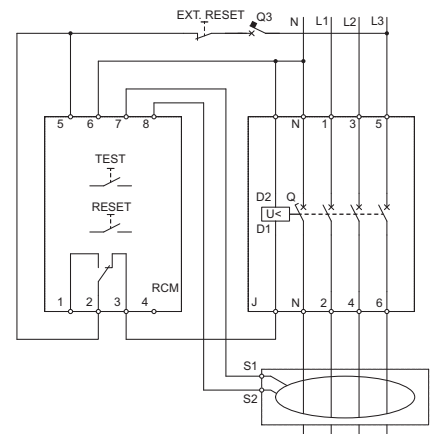


Diagram description

Symbol	Description
J	miniature circuit breaker
RCM	monitoring relay
TEST	test push-button of the relay
RESET	local reset push-button
EXT. STOP/RESET	remote reset push-button or STOP push-button ¹⁾
S1,S2	terminals of current transformer
Q3	protection of relay LPN-2C-1

¹⁾ STOP push-button only in combination with an undervoltage release

MONITORING RELAY



Digital residual current monitor 5SV8001-6KK

- Designed for monitoring of leakage current (residual/fault current) and protection against fire e.g. due to worsened insulation or sneak currents.
- Possibility of setting of residual current I_{dn} and setting of maximum inactivity time t_{dn} by means of push-buttons and the display (see table).
- Presentation of cause of trip and of current value of residual current on the display.

- Mounting on „U“ rail.
- Measurement by means of external transformer.
- Circuit breaker switching off by means of shunt trip or undervoltage release.
- Possibility of setting of characteristic S - selective.

Local signalling

- The first LED signals functionality of the relay and trip in reach of the set residual current:
LED gives a green light - the relay is supplied
LED gives a red light - signalling of reach of 100 % residual current
- The second LED signals reach of relative low set value:
LED gives a yellow light - signalling of reach of the set value.

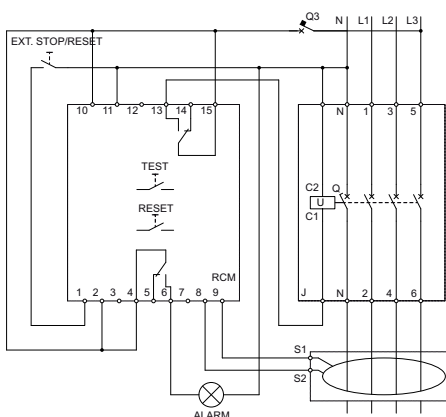
Remote signalling

- By means of make-and-break contact (CO).
- Serves for signalling of reach of the set value of I_{dn} and/or for circuit breaker switching off via undervoltage release or shunt trip.
- Possibility of remote switching off by applying voltage AC/DC 110 ÷ 230 V on potential free terminals number 1 and 2.
- The TEST push-button serves for testing of the function of both the relay and circuit breaker - disconnects the circuit.
- If the relay trips (switches the circuit breaker off) it is necessary to reset it by the „RESET“ push-button, or interrupt its supply and thus perform the remote reset.
- The setting can be sealed.

Type	Order code	Description	Number of modules	Weight [kg]	Package [pcs]
5SV8001-6KK	OEZ:42659	Digital, setting I_{dn} and t_{dn}	3	0.260	1

Diagram

Wiring diagram with a shunt trip



Wiring diagram with an undervoltage release

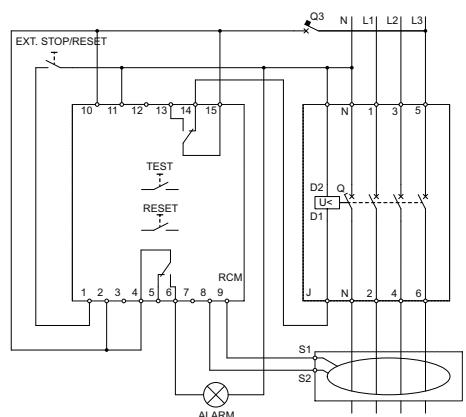


Diagram description

Symbol	Description
J	miniature circuit breaker
RCM	monitoring relay
TEST	test push-button of the relay
RESET	local reset push-button
EXT. STOP/RESET	remote reset push-button or STOP push-button
S1, S2	terminals of current transformer
ALARM	signalling of I_{dn} adjusted value reaching
Q3	protection of relay LPN-2C-1

MONITORING RELAY



Digital residual current monitor 5SV8200-6KK

- Designed for monitoring of leakage current (residual/fault current) and protection against fire e.g. due to worsened insulation or sneak currents.
- Possibility of setting of residual current $I_{\Delta n}$ and setting of maximum inactivity time t_{dt} by means of push-buttons and the display (see table).

Local signalling

- The first LED signals functionality of the relay and trip in reach of the set residual current:
LED gives a green light - the relay is supplied
LED gives a red light - signalling of reach of 100 % residual current
- The second LED signals reach of relative low set value:
LED gives a yellow light - signalling of reach of the set value.

- Presentation of cause of trip and of current value of residual current on the display.
- Mounting on „U” rail.
- Measurement by means of external transformer, it is possible to connect up to 4 transformers.
- Circuit breaker switching off by shunt trip.
- Possibility of setting of characteristic S - selective.

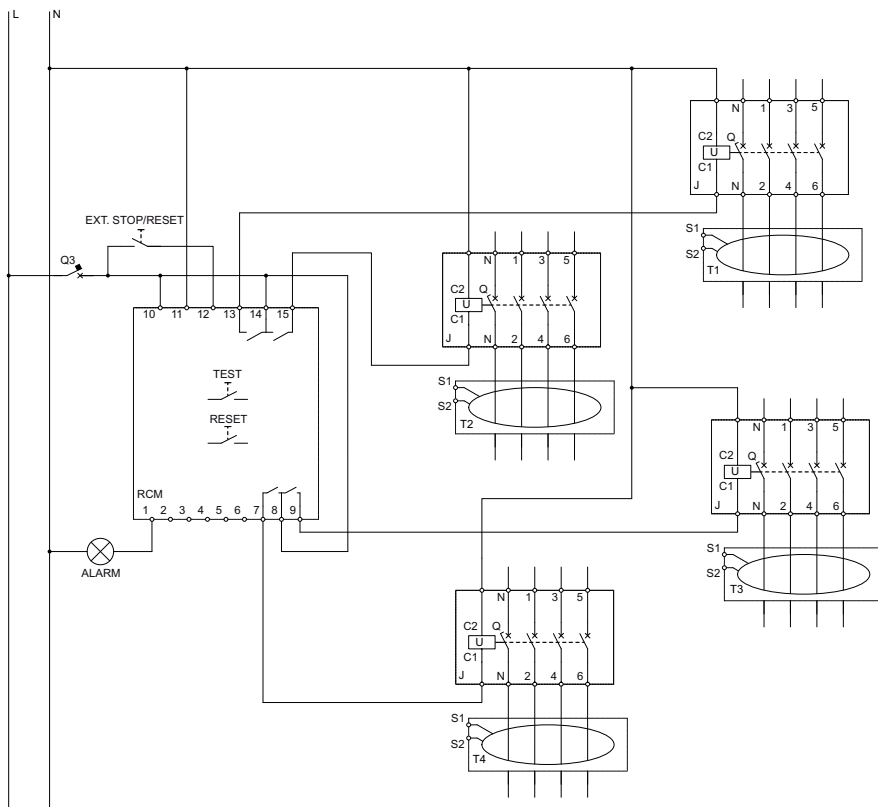
Remote signalling

- By means of make-and-break contact (CO).
- Serves for signalling of reach of the set value of $I_{\Delta n}$ and/or for circuit breaker switching off via undervoltage release or shunt trip.
- Possibility of remote switching off by applying voltage AC/DC 110 ÷ 230 V on potential free terminal number 12.
- The TEST push-button serves for testing of the function of both the relay and circuit breaker - disconnects the circuit.
- If the relay trips (switches the circuit breaker off) it is necessary to reset it by the „RESET” push-button, or interrupt its supply and thus perform the remote reset.
- The setting can be sealed.

Type	Order code	Description	Number of modules	Weight [kg]	Package [pcs]
5SV8200-6KK	OEZ:42660	Digital, setting $I_{\Delta n}$ and t_{dt} , 4-channel thermostat	3	0.260	1

Diagram

Wiring diagram with a shunt trip - connection of miniature circuit breakers

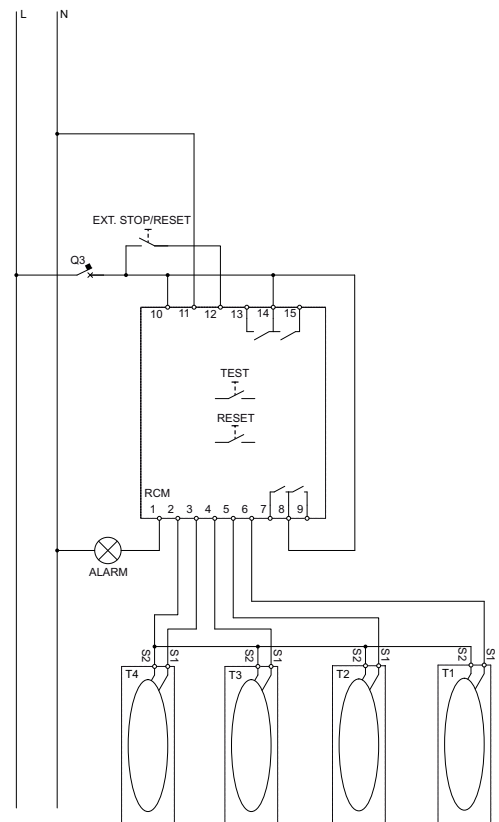


Description schématu

Symbol	Description
J	miniature circuit breaker
RCM	monitoring relay
TEST	test push-button of the relay

Symbol	Description
RESET	local reset push-button
EXT. STOP/RESET	remote reset push-button or STOP push-button
S1, S2	terminals of current transformer

- connection of current transformer



Symbol	Description
ALARM	signalling of $I_{\Delta n}$ adjusted value reaching
Q3	protection of relay LPN-2C-1

MONITORING RELAY

Specifications

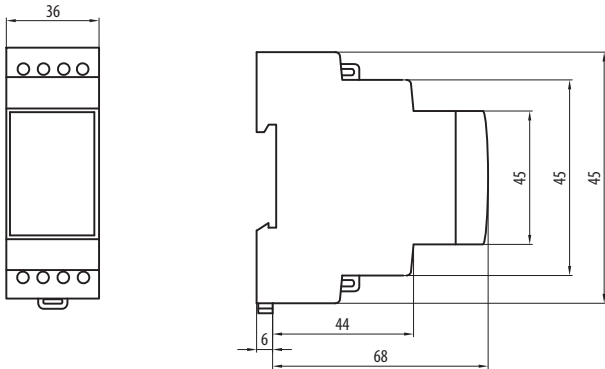
Type	5SV8 000-6KK	5SV8 001-6KK	5SV8 200-6KK
Standards	EN 62020 IEC 62020	EN 62020 IEC 62020	EN 62020 IEC 62020
Approval marks			
Number of independent circuits	1	1	4
Rated residual current	0,03 ÷ 5 A	0,03 ÷ 30 A	0,03 ÷ 30 A
Maximum inactivity time	0.02 ÷ 5 s	0.02 ÷ 10 s	0.02 ÷ 10 s
Type	A (up to $I_{dn} = 3A$) AC (I_{dn} od 3 up to 5 A)	A (up to $I_{dn} = 3A$) AC (I_{dn} od 3 up to 30 A)	A (up to $I_{dn} = 3A$) AC (I_{dn} od 3 up to 30 A)
Rated operating voltage U_e	AC 230 V	AC 230 V	AC 230 V
Operating voltage range	AC 164 ÷ 284 V	AC 164 ÷ 284 V	AC 164 ÷ 284 V
Rated frequency f_n	50 Hz	50 Hz	50 Hz
Input power	3 VA	6 VA	6 VA
Mounting on "U" rail according to EN 60715 - type	TH 35	TH 35	TH 35
Degree of protection - on the front panel	IP41	IP41	IP41
Degree of protection - of conductors terminal	IP20	IP20	IP20
Other specifications			
External remote trip/reset	-/yes	yes/yes	yes/yes
Local signalling reaching of relative low value I_{dn} (ALARM)	yes	yes	yes
Remote signalling reaching of relative low value I_{dn} (ALARM)	-	yes	yes
Local signalling:			
supply	yes	yes	yes
ALARM	yes	yes	yes
Failure	yes	yes	yes
value I_{dn}	yes	yes	yes
Display	-	yes	yes
Sealing of control panel setting	yes	yes	yes
Transformer internal diameter	30 ÷ 210 mm	30 ÷ 210 mm	30 ÷ 210 mm
Max. length of conductors to the transformer (screened conductor)	10 m	10 m	10 m
Control circuit (inputs - external switching off / reset)			
Rated operating voltage U_c	-	AC/DC 110 ÷ 230 V	AC 230 V
Operating voltage range	-	AC/DC 110 ÷ 284 V	AC 230 ÷ 284 V
Input power	-	0.7 W	0.7 W
Control circuit (outputs)			
Arrangement of contacts ¹⁾	001	002	40
Rated operating voltage U_e	AC 230 V	AC 230 V	AC 230 V
Rated current I_e	6 A	6 A	6 A
Max. switched power - AC-1	1 500 VA	1 500 VA	1 500 VA
Electrical endurance	10x 106 operating cycles	10x 106 operating cycles	10x 106 operating cycles
Rated frequency	50 Hz	50 Hz	50 Hz
Connection			
Connection - conductor Cu - rigid (solid, stranded) ¹⁾	0.2 ÷ 2 mm ²	0.2 ÷ 2 mm ²	0.2 ÷ 2 mm ²
Torque	0.5 ÷ 0.6 Nm	0.5 ÷ 0.6 Nm	0.5 ÷ 0.6 Nm
Operating conditions			
Ambient temperature $^{\circ}C$	-10 ÷ +50 $^{\circ}C$	-10 ÷ +50 $^{\circ}C$	-10 ÷ +50 $^{\circ}C$
Relative humidity	5 ÷ 95 %	5 ÷ 95 %	5 ÷ 95 %
Max. sea level	2 000 m	2 000 m	2 000 m

¹⁾ Each digit indicates successively the number of make, break and break-make contacts

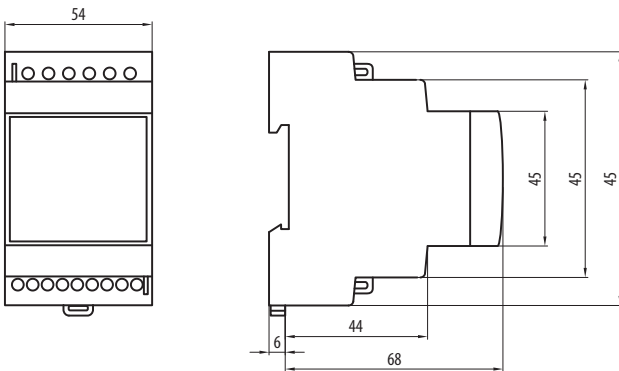
MONITORING RELAY

Dimensions

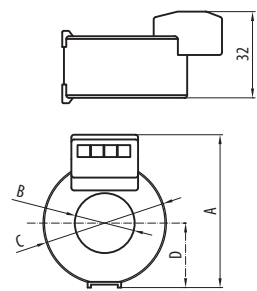
Residual current monitor 5SV8000-6KK



Residual current monitor 5SV8001-6KK, 5SV8200-6KK

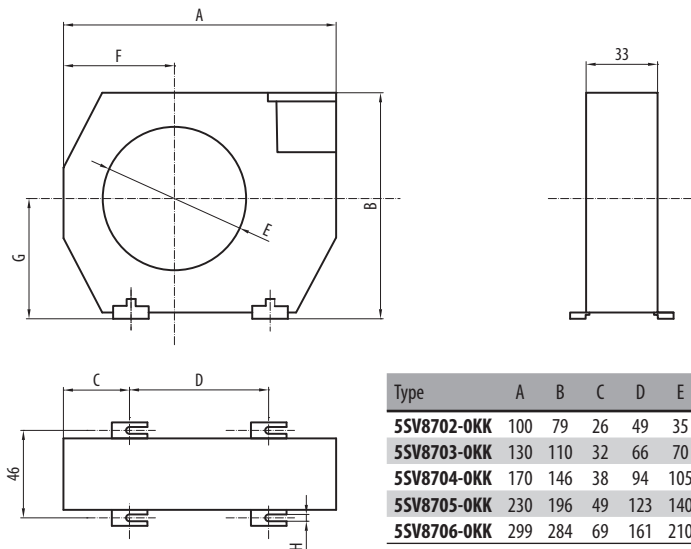


Measuring current transformers 5SV8700-0KK, 5SV8701-0KK



Type	A	B	C	D
5SV8700-0KK	60	20	46	24
5SV8701-0KK	70	30	59	30

Measuring current transformers 5SV87...-0KK



Type	A	B	C	D	E	F	G	H
5SV8702-0KK	100	79	26	49	35	35	43	6.5
5SV8703-0KK	130	110	32	66	70	52	57	6.5
5SV8704-0KK	170	146	38	94	105	72	73	6.5
5SV8705-0KK	230	196	49	123	140	97	98	6.5
5SV8706-0KK	299	284	69	161	210	141	142	6.5

MONITORING RELAY




Level relays MMR-HL

- For control of maximum or minimum level of a conductive liquid in a tank.
- High rated current 16 A.
- 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).
- Maximum distance of electrodes is 100 m with the set sensitivity of 100 %. If sensitivity is decreased, it is possible to extend the maximum length up to 1000 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).
- After connection of the relay, we recommend setting the sensitivity (knob SENSITIVITY) to maximum. If the yellow LED is blinking, there is not sufficient signal-to-noise ratio, and it is necessary to decrease sensitivity (by turning the SENSITIVITY knob to the left) until the LED stops blinking.
- If the LED is blinking even at minimum sensitivity, the correct functionality is not guaranteed. In such as it is necessary to take measure to reduce noise (other cable, placing the relay closer to the monitored place, etc.). If the LED is not blinking, the relay is ready to work.
- It is suitable to check the signal-to-noise ratio regularly. In worsening of conditions (noise increase) the yellow LED will begin blinking.
- The probes are not included in the delivery.
- Functional even at temperature -20 °C.

Type	Order code	Number of modules	Weight [kg]	Package [pcs]
MMR-HL-001-A230	OEZ:43246	1	0.091	1

Specifications

Type	MMR-HL		
Standards	EN 60255-56 IEC 61010		
Approval marks			
Main circuit (contact)	001		
Arrangement of contacts ¹⁾	001		
Rated operating voltage/current	U_e/I_e	AC-1	250 V / 16 A
Max. switched power		AC-1	4 000 VA
		AC-3	1 kW
		AC-5a	288 W ($\cos \varphi = 0.8$)
		AC-5b	1 kW
Max. switched voltage		AC 400 V	
Indication of contact state		yellow LED	
Connection – conductor rigid and flexible		0.2 ÷ 2.5 mm ²	
Torque		0.5 Nm	
Mechanical endurance		3 000 000 operating cycles	
Electrical endurance		10 000 operating cycles	
Supply circuit			
Rated voltage	U_c	AC 230 V	
Input power		max. 1.5 VA	
Supply voltage indication		green LED	
Rated frequency	f_n	50 Hz	
Connection – conductor rigid and flexible		0.2 ÷ 2.5 mm ²	
Torque		0.5 Nm	
Measuring circuit			
Error indication		yellow LED is blinking	
Operating voltage in measuring loop		AC 12 V	
Adjustable sensitivity		5 k Ω ÷ 100 k Ω	
Delay for elimination of ripple		1.5 s	
Method of setting		control knobs on the front panel	
Connection – conductor rigid and flexible		0.2 ÷ 2.5 mm ²	
Torque		0.5 Nm	
Other data			
Galvanic isolation	input/output	4 kV	
	input/probes	4 kV	
	output/probes	4 kV	
Mounting on "U" rail according to EN 60715 – type		TH35	
Degree of protection		IP20	
Ambient temperature		-20 ÷ +55 °C	
Working position		arbitrary	

¹⁾ Each digit indicates successively the number of make and break contacts

MONITORING RELAY

Description

Indication of presence of supply voltage

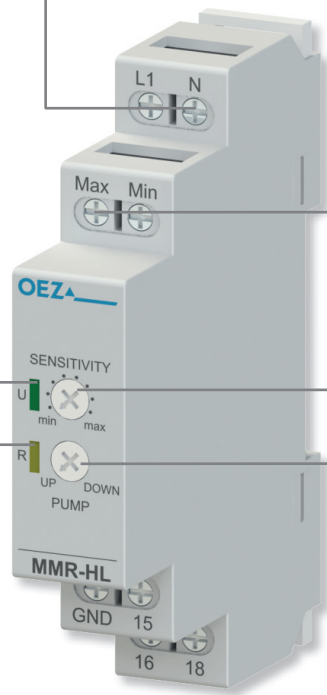
- Supply voltage presence is indicated by continuously lighting green LED.

Indication of signal-to-noise ratio or relay closing

- Yellow LED.
- Insufficient signal-to-noise ratio - blinking.
- Relay closed - lights.

Terminals L and N for connection of supply voltage

- U_c : AC 230 V.



Terminals Max, Min and GND for probe connection

- Range 0 ÷ 10 s step 1 s.
- It can be switched off.

Sensitivity setting

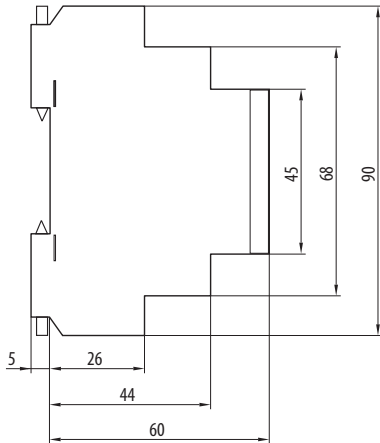
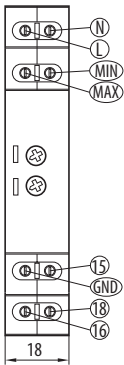
- 5 ÷ 100 kΩ.

Setting of function

- UP ... liquid filling.
- Down ... liquid drawing off.

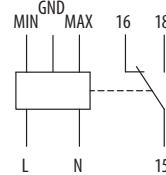
Dimensions

MMR-HL-...

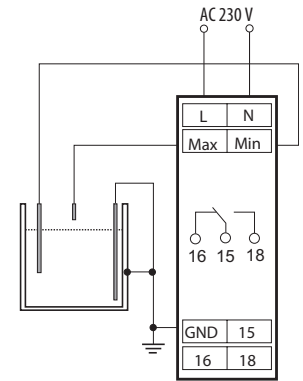


Diagram

MMR-HL-...

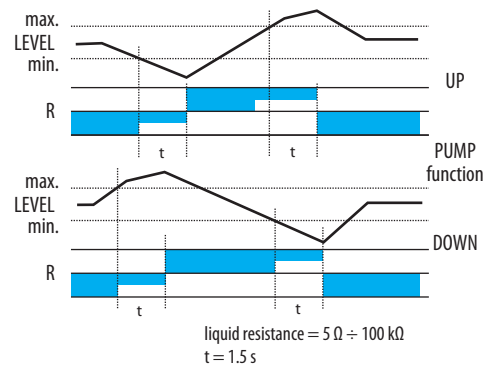


Wiring diagram



Graph

Level monitoring MMR-HL-001-A230



MONITORING RELAY




Thermistor relay MMR-T1

- 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.
- After exceeding the value of the thermistor resistance 3.3 kΩ the relay switches over the contact. The re-switching is only possible after the thermistor resistance decrease 1.8 kΩ in three ways:
 - by pressing the RESET push-button
 - by pressing the remote RESET push-button connected to terminals T1-R1
 - by automatic RESET (it is necessary to connect terminals T1 and R1).

Type	Order code	Number of modules	Weight [kg]	Package [pcs]
MMR-T1-001-A230	OEZ:43247	1	0.091	1

Specifications

Type	MMR-T1		
Standards	EN 60255-56 IEC 61010		
Approval marks			
Main circuit (contact)			
Arrangement of contacts ¹⁾	001		
Rated operating voltage/current	U_e/I_e	AC-1	250 V / 8 A
Max. switched power		AC-1	2 000 VA
		AC-3	200 W
		AC-5b	200 W
Max. switched voltage	AC 400 V		
Indication of contact state	red LED		
Connection – conductor rigid and flexible	0.2 ÷ 2.5 mm ²		
Torque	0.5 Nm		
Mechanical endurance	3 000 000 operating cycles		
Electrical endurance	10 000 operating cycles		
Supply circuit			
Rated voltage	U_c	AC 230 V	
Input power	max. 1.5 VA		
Supply voltage indication	green LED		
Rated frequency	f_n	50 Hz	
Connection – conductor rigid and flexible	0.2 ÷ 2.5 mm ²		
Torque	0.5 Nm		
Measuring circuit			
Error indication	red LED		
Resistance range of PTC thermistor, working state	50 Ω ÷ 3.3 kΩ		
Resistance range of PTC thermistor, alarm state	> 3.3 kΩ nebo < 50 Ω		
Method of setting	control knobs on the front panel		
Connection – conductor rigid and flexible	0.2 ÷ 2.5 mm ²		
Torque	0.5 Nm		
Other data			
Galvanic isolation	input/output	4 kV	
	output/probes	4 kV	
Mounting on "U" rail according to EN 60715 – type	TH35		
Degree of protection	IP20		
Ambient temperature	-20 ÷ +55 °C		
Working position	arbitrary		

¹⁾ Each digit indicates successively the number of make and break contacts

MONITORING RELAY

Description

Indication of presence of supply voltage

- Supply voltage presence is indicated by continuously lighting green LED.

Indication of contact switching over

- Contact switching over is indicated by red LED.

Terminal R1 for remote/automatic reset

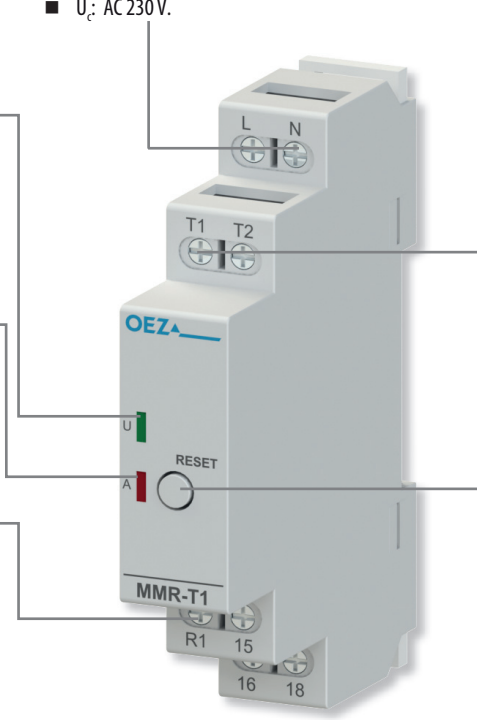
Terminals L and N for connection of supply voltage

- U_c : AC 230V.

Terminals T1 and T2 for probe connection

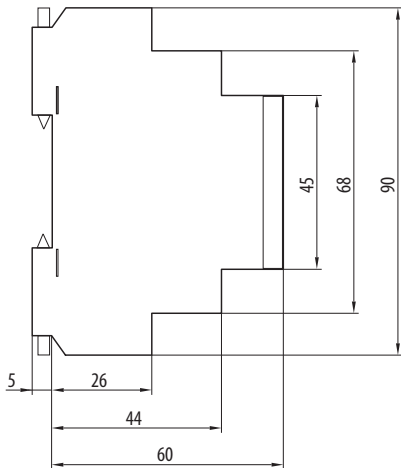
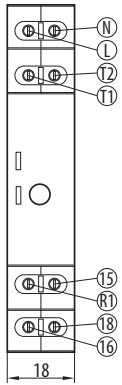
- Probes are included in the engine.

Local reset push-button



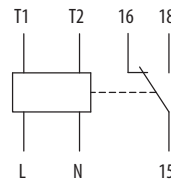
Dimensions

MMR-T1-...

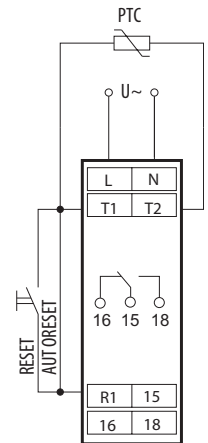


Diagram

MMR-T1-...

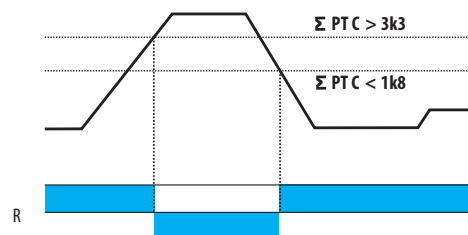


Wiring diagram

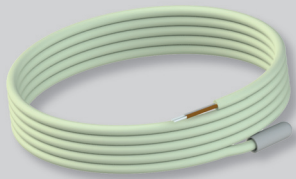


Graph

Engine winding temperature monitoring MMR-T1-001-A230



MONITORING RELAY



Thermostats

- 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 OD-MMR-T3N probes.

Type	Order code	Number of modules	Weight [kg]	Package [pcs]
MMR-T2-001-A230	OEZ:43248	1	0.211	1
MMR-TD-001-A230	OEZ:43249	1	0.211	1

Thermal probes

- Accessory for MMR-T2 and MMR-TD.
- Temperature probe OD-MMR-T3N - standard temperature probe with plastic cap for use up to max. temperature of 100 °C. Cable length 3 m.
- Temperature probe OD-MMR-T3S - temperature probe with metallic cap and silicon supply cable for use up to max. temperature of 150 °C. Cable length 3 m.

Type	Order code	Cord Length	Weight [kg]	Package [pcs]
OD-MMR-T3N	OEZ:43725	3 m	0.050	1
OD-MMR-T3S	OEZ:43726	3 m	0.05	1

MONITORING RELAY

Description MMR-T2

Indication of presence of supply voltage

- Supply voltage presence is indicated by blinking green LED.

Indication of contact switching over

- Contact switching over is indicated by yellow LED and green LED for contact 1 and contact 2 respectively.

Terminals L and N for connection of supply voltage

- U_c: AC 230 V.

Terminals T1, T2 and C for probe connection

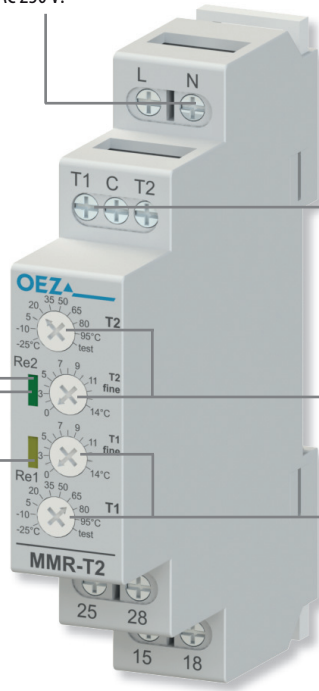
- OD-MMR-T3N ... up to 100 °C.
- OD-MMR-T3S ... up to 150 °C

Temperature setting T2

- Upper disk defines temperature range -25 ÷ +95 °C.
- Lower knob enables fine setting 0 + 14 °C with step of 1 °C.

Temperature setting T1

- Lower knob defines temperature range -25 ÷ +95 °C.
- Upper disk enables fine setting 0 + 14 °C with step of 1 °C.



Description of MMR-TD

Indication of presence of supply voltage

- Supply voltage presence is indicated by blinking green LED.

Indication of contact switching over

- Contact switching over is indicated by yellow and green LED.

Terminals L and N for connection of supply voltage

- U_c: AC 230 V.

Terminals T1, T2 and C for probe connection

- OD-MMR-T3N ... up to 100 °C.
- OD-MMR-T3S ... up to 150 °C

Functions selection

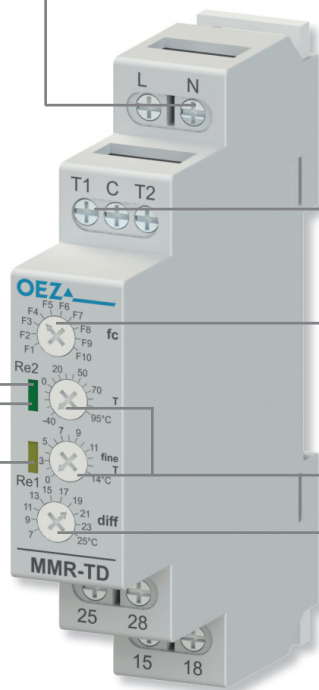
- F1 ... F6 thermal functions.
- F7 ... F10 service functions.

Temperature setting T

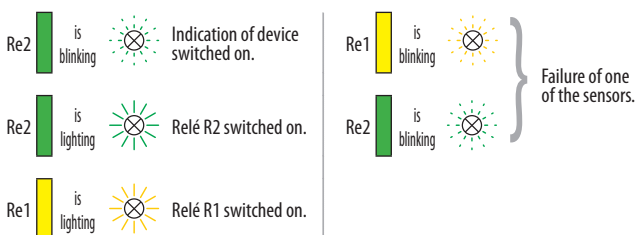
- Upper disk defines temperature range -25 ÷ +95 °C.
- Lower knob enables fine setting 0 + 14 °C with step of 1 °C.

Difference setting

- For some of the functions.



Operating states of MMR-T2, MMR-TD



MONITORING RELAY

Specifications

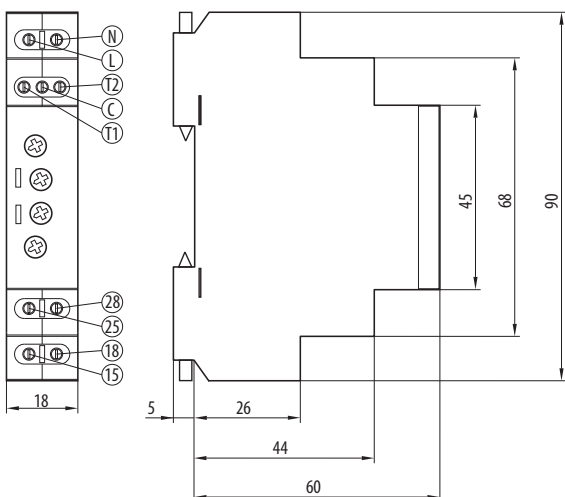
Type		MMR-T2	MMR-TD
Standards		EN 60255-56 IEC 61010	EN 60255-56 IEC 61010
Approval marks			
Main circuit (contact)			
Arrangement of contacts ¹⁾		200	200
Rated operating voltage/current	U_e/I_e	AC-1 250 V / 16 A	250 V / 16 A
Max. switched power		AC-1 4 000 VA	4 000 VA
		AC-3 1 kW	1 kW
		AC-5a 288 W (cos φ = 0,8)	288 W (cos φ = 0,8)
	AC-5b 1 kW	1 kW	
Max. switched voltage		AC 400 V	AC 400 V
Indication of contact state		green/yellow LED	green/yellow LED
Connection – conductor rigid and flexible		0.2 ÷ 2.5 mm ²	0.2 ÷ 2.5 mm ²
Torque		0.5 Nm	0.5 Nm
Mechanical endurance		3 000 000 operating cycles	3 000 000 operating cycles
Electrical endurance		10 000 operating cycles	10 000 operating cycles
Supply circuit			
Rated voltage	U_c	AC 230 V	AC 230 V
Input power		max. 1.5 VA	max. 1.5 VA
Supply voltage indication		green LED is blinking	green LED is blinking
Rated frequency	f_n	50 Hz	50 Hz
Connection – conductor rigid and flexible		0.2 ÷ 2.5 mm ²	0.2 ÷ 2.5 mm ²
Torque		0.5 Nm	0.5 Nm
Measuring circuit			
Error indication		green/yellow LED is blinking	green/yellow LED is blinking
Adjustable delay		0 s ÷ 10 s	0 s ÷ 10 s
Adjustable undervoltage level ²⁾		180 ÷ 220 V	180 ÷ 220 V
Adjustable overvoltage level ²⁾		225 ÷ 265 V	225 ÷ 265 V
Temperature measuring range		-25 ÷ +95 °C	-25 ÷ +95 °C
Method of setting		control knobs on the front panel	control knobs on the front panel
Connection – conductor rigid and flexible		0.2 ÷ 2.5 mm ²	0.2 ÷ 2.5 mm ²
Torque		0.5 Nm	0.5 Nm
Other data			
Galvanic isolation	input/output	4 kV	4 kV
	input/probes	4 kV	4 kV
	output/probes	4 kV	4 kV
Mounting on "U" rail according to EN 60715 – type		TH35	TH35
Degree of protection		IP20	IP20
Ambient temperature		-20 ÷ +55 °C	-20 ÷ +55 °C
Working position		arbitrary	arbitrary

¹⁾ Each digit indicates successively the number of make and break contacts

Dimensions

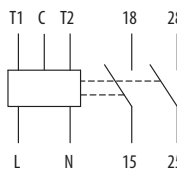
MMR-T2-...

MMR-TD-...

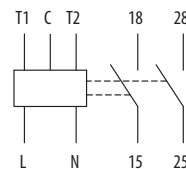


Diagram

MMR-T2-...

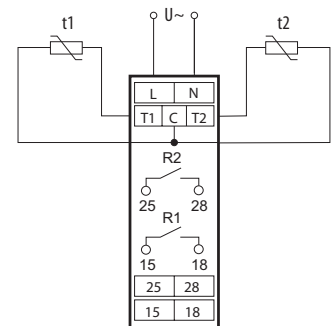


MMR-TD-...



Wiring diagram

MMR-T2, MMR-TD

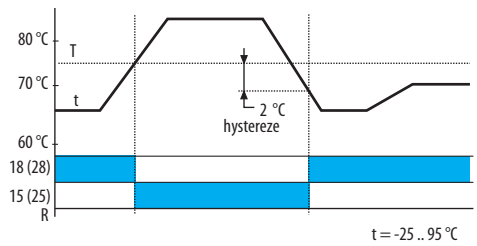


MONITORING RELAY

Graphs of functions

The function of the double thermostats MMR-T2 200-A230

T = 75 °C
 t < T => R1 ON
 t ≥ T => R1 OFF
 t - 2 °C ≤ T => R1 ON



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

<p>Function F1 Differential thermostat</p> <p>T = -40 °C t1 - t2 > D + 1 °C => R1 ON t1 - t2 < D => R1 OFF t2 - t1 > D + 1 °C => R2 ON t2 - t1 < D => R2 OFF</p> <p>T ≠ -40 °C (T = 68 °C) t1 - t2 > D + 1 °C } => R1 ON t2 < T</p> <p>t1 - t2 < D °C => R1 OFF t2 > T + 1 °C => R1 OFF</p>	<p>Function F2 Two-stage thermostat</p> <p>T = 60 °C D = 11 °C t1 > T => R1, R2 ON T - D < t1 < T => R1 ON, R2 OFF t1 < T - D => R1, R2 OFF</p>
<p>Function F4 Single-channel zone thermostat</p> <p>T = 60 °C D = 11 °C t1 < T - D => R1 ON t1 > T => R1 OFF</p> <p>T = 60 °C D = 11 °C t1 < T - D => R1, R2 ON t1 > T => R1, R2 OFF</p>	<p>Function F5 Two-channel zone thermostat</p> <p>T = 60 °C D = 11 °C t1 < T - D => R1 ON t1 > T => R1 OFF t2 < T - D => R2 ON t2 > T => R2 OFF</p>
<p>Function F6 Thermostat is heating/cooling</p> <p>T = 25 °C D = 7 °C t1 > T => R1 ON t1 < T - 2 °C => R1 OFF t1 < T - D => R2 ON t1 > T - D + 2 °C => R2 OFF T - D < t1 < T => R1, R2 OFF</p>	<p>Function F7 Service relay 1</p> <p>Relay 1 switched on</p> <p>Function F8 Service relay 2</p> <p>Relay 2 switched on</p>
<p>Function F9 Service sensor 1</p> <p>Re1 ⊗ Sensor without failure. Re1 ⊗ Sensor interrupted. Re1 ⊗ Sensor short-circuited.</p>	<p>Function F10 Service sensor 2</p> <p>Re1 ⊗ Sensor without failure. Re1 ⊗ Sensor interrupted. Re1 ⊗ Sensor short-circuited.</p>