

# RGR • RGMV RMMZ • RMMV

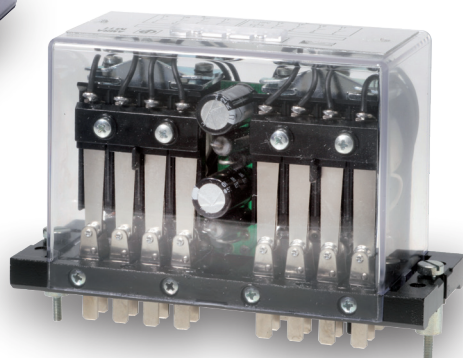
FAST-ACTING SERIES

## FAST-ACTING MONOSTABLES RELAYS

### 2-4-8 CONTACTS



RGMV13



RMMV12

## APPLICATIONS



## OVERVIEW

- Fast-acting monostables relays
- Solid and rugged construction for heavy and intensive duty
- Self-cleaning knurled contacts, C/O type with long travel
- High electrical life expectancy and exceptional endurance
- Self-cleaning knurled contacts
- Direct current operation
- Retaining clip or fixing screws for secure locking of relay on socket
- Transparent cover, pull-out handle or fixing/pulling screws
- Label holder in cover for customer's use
- Positive mechanical keying for relay and socket

## DESCRIPTION

Fast-acting monostable relays are available in 6 models with different types and numbers of contacts. This family of relays is able to guarantee high speed switching of contacts during pick-up or during drop-out, depending on the model. All models are based on the electromechanical design of the G series, except for the RGRE, which utilizes reed contact technology. These relays can be operated off a d.c. power supply.

In an instantaneous monostable relay, the closure of an NO contact takes normally between 15 and 40 ms, depending on the particular product specifications. By contrast, a fast-acting relay is able to close the contact in a time of between 2.5 and 10 ms.

The operating time is measured from the moment when the coil is energized/de-energized until completion of the change in status and stabilization of the contact, including bounces. A 'bounce' is an intermediate position assumed by the contact during the course of stabilization in its final position. Unless specified otherwise, the operating times indicated for AMRA relays include the duration of the bounce. It is advisable to discuss this aspect thoroughly, with the manufacturer, when selecting the component.

Knurled contacts ensure not only better self-cleaning characteristics, but also lower ohmic resistance thanks to multiple points of electrical connection, thereby extending the electrical life expectancy of the component.

Typical sectors of use are among the most demanding, such as, for example, electricity generating stations, electrical transformer stations, fixed equipment for railways, or industries using continuous production processes (chemical and petrochemical, rolling mills, cement factories, etc.). The performance and reliability of the product have secured its approval with ENEL and other multi-utilities.

Fast-acting relays are often incorporated into circuits of special importance, such as those providing protection and breaker functions on a power line in the event of faults occurring. With this in mind, the operating speed is an essential parameter for electrical system designers. The contacts are connected to multifunction digital protection devices or recording instruments (disturbance recorders).

Like all AMRA relays, models of the fast-acting monostable series are assembled as part of a controlled manufacturing process in which every step of production is verified by the next step in succession. In effect, each relay is calibrated and tested individually, by hand, in such a way as to guarantee top reliability.

## STANDARD COMPLIANCY

EN 60695-2-10  
EN 60529

EN 61810-1  
EN 61810-2  
EN 61810-7



MODELS	TYPE	NUMBER OF CONTACTS	NOMINAL CURRENT	OPERATING TIME <sup>(1)</sup>	
				PICK-UP	DROP-OUT
RGRE12	Monostable	2 SPDT (reed)	2A	≤ 2.5ms	≤ 3ms
RGMV12	Monostable	4 SPDT	10A	≤ 8ms	≤ 45ms
RGMV13	Monostable	4 NC	10A	-	≤ 8ms
RMMV12	Monostable	8 NO	10A	≤ 6ms	-
RMMV13	Monostable	4 NO + 4 NC	10A	≤ 6ms (NO)	≤ 6ms (NC)
RMMZ11	Monostable	8 SPDT	10A	≤ 8 + 5ms	≤ 50ms

(1) Unless specified otherwise, the operating time signifies until stabilization of the contact (including bounces).



**FOR PRODUCT CODE CONFIGURATION, SEE THE "ORDERING SCHEME" TABLE**



COIL DATA	RGRE12	RGMV12	RGMV13	RMMV12	RMMV13	RMMZ11
Nominal voltages Un	DC: 24 - 48 - 110 - 125 - 220 - 250 <sup>(1)</sup>					
Consumption at Un	1 W	4 W		7 W		
Operating range	DC: 80...120% Un	DC: 80...110% Un				
Type of duty	Continuous					
Drop-out voltage <sup>(2)</sup>	DC : > 5% Un					

(1) Other values on request.

(2) Limit value for supply voltage, expressed as % of the nominal value, beneath which the relay is certain to be de-energized.



CONTACT DATA	RGRE12	RGMV12	RGMV13	RMMV12	RMMV13	RMMZ11
Number and type	2 SPDT, form C REED	4 SPDT, form C	4 SPST, form C	8 NO	4 NO + 4NC	8 SPDT, form C
Current						
Nominal <sup>(1)</sup>	2A	10A				
Maximum peak <sup>(2)</sup>	-	20A for 1min - 40A for 1s				
Maximum pulse <sup>(2)</sup>	-	150A for 10ms				
Example of electrical life expectancy <sup>(3)</sup>	0.1A - 110Vdc - L/R=40ms - 10 <sup>5</sup> operations 1,800 operations/hour	0.3A - 110Vdc - L/R=40ms - 10 <sup>5</sup> operations 1,800 operations/hour				
Minimum load <sup>(4)</sup>	200mW (10V, 10mA)	200mW (10V, 10mA)				
Maximum breaking voltage	300 V	350 VDC / 440 VAC				
Contact material	Rh	AgCdO				
Operating time at Un (ms) <sup>(5)</sup>						
Pick-up (NO contact closing)	≤ 2.5	≤ 8	-	≤ 6	≤ 6	≤ 8 + 5 <sup>(6)</sup>
Drop-out (NC contact closing)	≤ 3	≤ 45	≤ 8	-	≤ 6	≤ 50

(1) On all contacts simultaneously, reduction of 30%.

(2) Maximum peak and pulse currents are those currents that can be handled, for a specified time, by the contact. They do not refer to steady or interrupted currents.

(3) For other examples, see electrical life expectancy curves.

(4) Values referred to a new product, measured in laboratory. The ability to maintain this performance over the time depends on the environmental conditions and the contact' frequency use.  
For a correct contact use, refer to the chapter "Installation, operation and maintenance".

(5) Unless specified otherwise, operating times are understood as comprising stabilization of the contact (inclusive of bounces).

(6) Bounces = 5 ms.



INSULATION	
Insulation resistance (at 500Vdc) between electrically independent circuits and between these circuits and ground	> 10,000 MΩ
Withstand voltage at industrial frequency between electrically independent circuits and between these circuits and ground	2 kV (1 min) - 2.2 kV (1 s)
Impulse withstand (1.2/50μs - 0.5J) between electrically independent circuits and ground	5 kV

MECHANICAL SPECIFICATIONS		RGRE12	RGMV12	RGMV13	RMMV12	RMMV13	RMMZ11
Mechanical life expectancy		20x10 <sup>6</sup> operations	20x10 <sup>6</sup> operations		10x10 <sup>6</sup> operations		
Maximum switching rate	Mechanical	3,600 operations/hour	1,800 operations/hour				
Degree of protection		IP40					
Dimensions (mm)		45x50x112 <sup>(1)</sup>	45x50x112 <sup>(1)</sup>	45x50x86 <sup>(1)</sup>	132x58x84 <sup>(1)</sup>		
Weight (g)		190	320	270	530		

(1) Output terminals excluded.

ENVIRONMENTAL SPECIFICATIONS	
Operating temperature	-25 to 55°C
Storage and shipping temperature	-25 to 70°C
Relative humidity	Standard: 75% RH - Tropicalized: 95% RH
Fire behaviour	V0

See the "Operation" chapter of this document for more information and operating notes.

STANDARDS AND REFERENCE VALUES	
EN 61810-1, EN 61810-2, EN 61810-7	Electromechanical elementary relays
EN 60695-2-10	Fire behaviour
EN 60529	Degree of protection provided by enclosures

Unless otherwise specified, products are designed and manufactured according to the requirements of the European and International standards indicated above.

In accordance with EN 61810-1, all items of technical data are referred to ambient temperature 23 °C, atmospheric pressure 96kPa and 50% humidity.

Tolerance for coil resistance, nominal electrical input and nominal power is ±7%.

CONFIGURATIONS – OPTIONS	
TROPICALIZATION	Surface treatment of the coil with protective coating for use with RH 95%.
LEVER FOR MANUAL OPERATION	Allows manual operation of the relay, with the cover closed, using a screwdriver (RMMZ11 only).

ORDERING SCHEME					
PRODUCT CODE	CONFIGURATIONS	TYPE OF POWER SUPPLY	NOMINAL VOLTAGE (V) <sup>(1)</sup>	FINISH <sup>(2)</sup>	KEYING POSITION CODE <sup>(3)</sup>
RGRE	12: 2 SPDT reed contacts	C: Vdc	024 - 048 - 110 125 - 220 - 250	T: Tropicalized coil M: Manual operation <sup>(4)</sup>	xxx
RGMV	12: 4 SPDT contacts 13: 4 NC contacts				
RMMV	12: 8 NO contacts 13: 4 NO contacts + 4 NC contacts				
RMMZ	11: 8 SPDT contacts				

Example	RGMV	12	C	110	
	RGMV12-C110 = Fast-acting monostable relay with 4 change-over contacts and 110Vdc coil.				
	RMMZ	11	C	048	T
	RMMZ11-C048 = Fast-acting monostable relay with 8 change-over contacts and 48Vdc tropicalized coil.				

1. Other values on request.

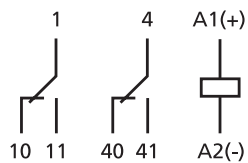
2. Optional value. Multiple selection possible (e.g. TM).

3. Optional value. Positive mechanical keying is defined according to the manufacturer's model.

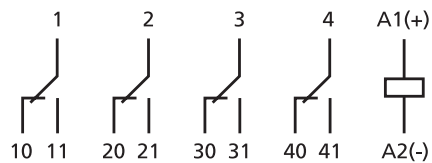
4. RMMZ11 only.



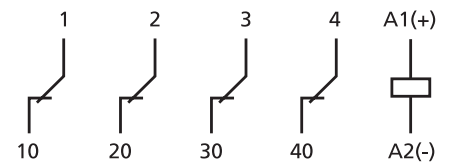
## WIRING DIAGRAM



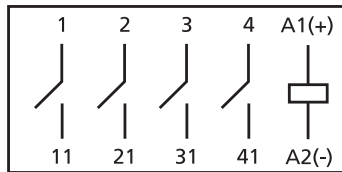
RGRE12



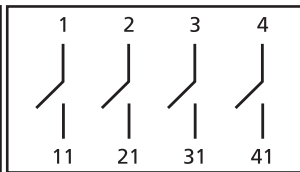
RGMV12



RGMV13

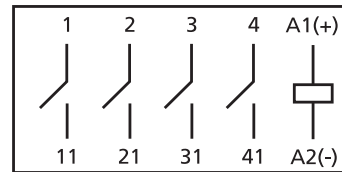


A

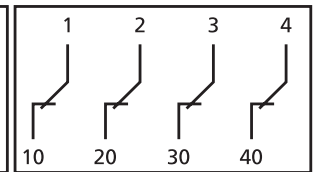


B

RMMV12

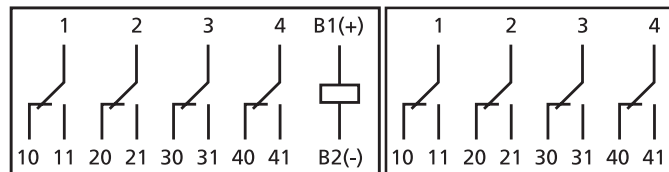


A

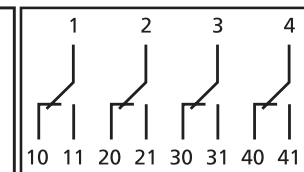


B

RMMV13



A

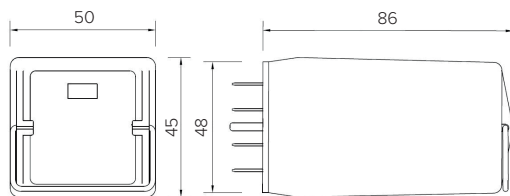


B

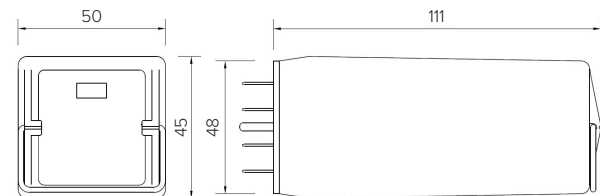
RMMZ11



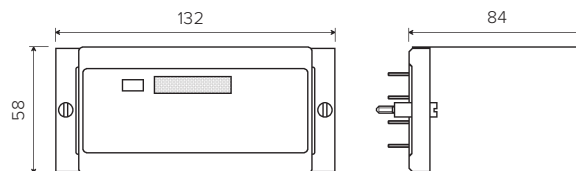
## DIMENSIONS



RGMV13



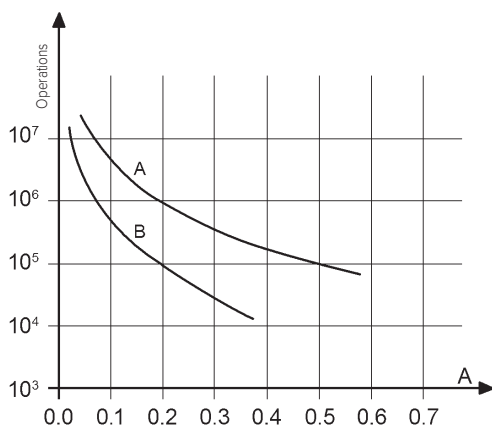
RGRE12 - RGMV12



RMMV12 - RMMV13 - RMMZ11



## ELECTRICAL LIFE EXPECTANCY



Contact loading: 110Vdc, L/R 40 ms

Curve A: RMMZ11

Curve B: RGMV12-RGMV13, RMMV12-RMMV13

RMMZ11			
U	I (A)	L/R (ms)	Operations
110Vdc	0.5	40	100,000
110Vdc	0.6	10	300,000
120Vdc	0.7	40	100,000
125Vdc	1.2	0	1,000,000
220Vdc	0.1	40	100,000
220Vdc	0.25	10	100,000
U	I (A)	cosφ	Operations
110Vac	1	1	2,000,000
110Vac	1	0.5	1,500,000
110Vac	5	1	1,000,000
110Vac	5	0.5	500,000
220Vac	0.5	1	2,000,000
220Vac	1	0.5	600,000
220Vac	5	1	650,000
220Vac	5	0.5	600,000

Switching frequency: 1,200 operations/hour

RGMV12 - RGMV13			
U	I (A)	L/R (ms)	Operations
110Vdc	0.2	40	500,000
220Vdc	0.2	10	80,000
U	I (A)	cosφ	Operations
110Vac	1	1	1,200,000
110Vac	1	0.5	1,000,000
110Vac	5	1	500,000
110Vac	5	0.5	300,000
220Vac	0.5	1	1,200,000
220Vac	1	0.5	500,000
220Vac	5	1	400,000
220Vac	5	0.5	300,000

Switching frequency: 1,200 operations/hour

(\*) 600 operations/hour

SOCKETS AND RETAINING CLIPS		RGRE - RGMV12 - RGMV13		RMMV12 - RMMV13 - RMMZ11	
Type of installation	Type of outputs	Socket	Clip for RGRE / RGMV12	Clip for RGMV13	Socket
Wall or DIN rail mounting	Screw	PAVG161	VM1222	VM1221	PAVM321
Flush mounting	Double faston (4.8 x 0.8 mm)	PRDG161	VM1222	VM1221	PRDM321
	Screw	PRVG161	VM1222	VM1221	PRVM321

## INSTALLATION, OPERATION AND MAINTENANCE

### Installation

Before installing the relay on a wired socket, disconnect the power supply.

The preferential mounting position is on the wall, with the relay positioned horizontally in the "reading orienting" of marking so that the label is readable in the correct sense.

Spacing: the distance between adjacent relays depends on use' conditions.

If a relay is used in the "less favorable" conditions that occur with "simultaneously":

- Power supply: the maximum allowed, permanently
- Ambient temperature: the maximum allowed, permanently
- Current on the contacts: the maximum allowed, permanently
- Number of contacts used: 100%

it is strongly recommended to space relay at least 5 mm horizontally and 20 mm vertically, to allow for proper upward heat' dissipation and increase the longevity of the component.

Actually, relays could be used in less severe conditions. In this case, the distance between adjacent relays can be reduced or abolished. A correct interpretation of the use' conditions allows the optimization of the available spaces. Contact AMRA for more information.

To increase relay' longevity, we recommend mounting relays intended for "continuous use" (permanent power supply), alternating them with relays intended for less frequent use.

For a safe use, the retaining clip is recommended.

For use on rolling stock, relays have been tested to EN 61373 standard equipped with retaining clip(s).

### Operation

**Before use:** if relay is not used, for example after long storage periods, contact resistance may increase due to a natural and slight oxidation or polluting deposits.

In order to restore the optimal conductivity and for standard contacts (NOT gold plated) it is recommended to switch several time a load of at least 110Vdc - 100mA or 24Vdc - 2A. The contacts will be "cleaned" thanks to the electric arc generated during the current interruption and the mechanical self-cleaning action.

The common contact rubs against the fixed poles (NO and NC contacts) both when opening and when closing, which ensures a self-cleaning action.

An increase in contacts' resistance, in most cases, does not represent a problem. Many factors contribute to the correct use of contact and consequently to the relay' long-term reliability:

- **Load:** the current switching generates an electric arc with cleaning effects. For proper electrical cleaning and performance keeping we recommend:
  - o Standard contacts: Minimum current = 20mA (20V)
  - o Gold plated contacts: Minimum current = 10mA (20V)
- **Operating frequency:** relays are components that can operate with a wide range of switching frequency. High frequency operation also allows a continuous cleaning effect by "sliding" (mechanical cleaning). In case of low frequency operation (for example few time a day), we advise:
  - o Use of contact with currents twice compared to those indicated.
  - o For currents lower than 10mA, use gold plated contacts and connect 2 contacts in parallel, in order to reduce the equivalent contact resistance
- **Pollution:** the presence of pollution can cause impurities on contact surface. Electric charges attract organic molecules and impurities that are deposited on the contact surface. Electrical and mechanical cleaning, respectively, burn and remove such impurities. In pollution presence, the minimum recommended currents must be respected. In extreme cases, provide double the cleaning current.

While a contact open high loads, impurities develop inside the relay due to the formation and interruption of the electric arc. These impurities are greater the higher the load and the more frequent the switching operation. These impurities could deposit on the adjacent contacts and alter the initial conductivity characteristics. If all contacts are used with similar loads, this is not a problem. Please, contact AMRA for further informations.

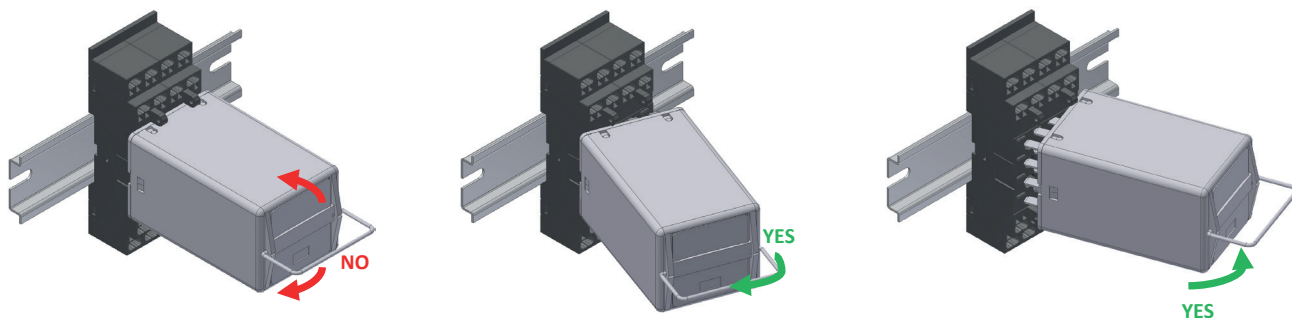
The possible formation of condensation inside the relay, when it is powered and the external ambient temperature is cold, is a normal phenomenon that has no effect on the electrical safety of the relay. In case of polluted or saline atmosphere, any condensation deposits on the contacts can degrade their performance in terms of conductivity.

## Maintenance

No maintenance is required.

In case of normal relay wear (reaching the end of electrical or mechanical life), the relay cannot be restored and must be replaced.

To check the component, relay removal must be carried out with slight lateral movements. An “up and down” movement can cause terminals damage.



Often the malfunctions are caused by power supply with inverted polarity, by external events or by use with loads exceeding the contact performance.

In case of suspected malfunction, energize relay and observe if mechanical operation of contacts / relay mechanism is performed. Pay attention to the power supply polarity, if relay is equipped with polarized components (example: diode, led).

- In case of expected operation, clean the contacts (see paragraph "OPERATION") and check if the circuit load ranges within the contact performance. If necessary, replace with relays with gold contacts. Note: the electrical continuity of contacts must be checked with adequate current.
- If it does not work, we recommend to use a relay of the same model and configuration.

If an investigation by AMRA is required, pull-out the relay from the socket, don't remove the cap, avoid any other manipulation and contact us. You will be asked for the following data: environmental conditions, power supply, switching frequency, contact load, number of operations performed.

The fault can be described through the "TECHNICAL SUPPORT" section of the website [www.amra-chauvin-arnoux.it](http://www.amra-chauvin-arnoux.it).

In any case, the relay cannot be repaired by the user.

## Storage

Storage conditions must guarantee the environmental conditions (temperature, humidity and pollution) required for the product conservation, in order to avoid deterioration.

The product must be stored in an environment sheltered from atmospheric agents and not polluted, with an ambient temperature between -25 and +70°C with max 75% RH. In any case, there must be no condensation. Before use, please read carefully "OPERATION" section.