

RGM

INSTANTANEOUS MONOSTABLE RELAYS, WITH 4 CHANGE-OVER CONTACTS

APPLICATIONS



Shipbuilding



Petroleum industry



Heavy industry



Power generation



Power distribution



Railway equipment



OVERVIEW

- Compact plug-in monostable instantaneous relays
- Solid and rugged construction for intensive duty
- Self-cleaning knurled contacts, C/O type with long travel
- High electrical life expectancy
- Maximum continuous current 12 A
- Magnetic arc blow-out for improved breaking capacity
- Fitted with mechanical optical contact status indicator as standard
- Wide variety of configuration and customization
- Retaining clip for secure locking of relay on socket
- Transparent cover, pull-out handle
- Positive mechanical keying for relay and socket

DESCRIPTION

RGM relay, with 4 changeover contacts and as option 1 NO or NC contact, are highly reliable products featuring high performance, suitable for applications in very harsh and disturbed environments, such as per electrical transformer stations.

The mechanical design of the relay is such as to allow the development of numerous custom solutions, in the event that the standard models do not fully respond to the required performance parameters.

The construction of the relays and careful choice of the materials ensure long life and considerable ruggedness even in harsh operating environments.

Wide range of coil's nominal voltage are available. The manufacturing versatility allows to adapt power supply to customer needs.

Contacts are designed to obtain remarkable performances both for high, inductive loads or very low loads. Contact is able to switch from 5mA – 5V.

The knurled surface ensures an excellent self-cleaning effect, lower ohmic resistance thanks to the various points of electrical contact, improving also the electrical life of the component.

The magnetic arc blow-out contributes to increase breaking capacity: the relay is suitable for controlling heavy duty loads with intensive switching frequency.

Many options are available: manual operation to allow the execution of tests in the absence of power supply, flyback coil protection diode, led, gold plated contacts...

A wide range of sockets allow to find the optimal solutions for any electrical panel's construction need.

As per all AMRA relays, RGM relays are assembled under controlled manufacturing process in which every step of production is verified by the next step in succession. 100% of relay are tested at the end of production stage.

STANDARD COMPLIANCY

EN 60695-2-10
EN 60529

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



MODELS	NUMBER OF CONTACTS	MAGNETIC ARC BLOW-OUT
RGM.x3	4	
RGM.x4	4 + 1 NO	
RGM.x5	4 + 1 NC	
RGM.x7	4	•
RGM.x8	4, long travel	•



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



COIL DATA	RGME _{xy} - RGMF _{xy}	RGME _{x8}
Nominal voltages at Un	DC: 12-24-48-110-125-132-144-220 ⁽¹⁾ - AC: 12-24-48-110-125-220-230-380-440 ⁽¹⁻²⁾	
Consumption at Un	3 W / 6.5 VA ⁽³⁾ - 11.5 VA ⁽⁴⁾	3.5 W / 8 VA ⁽³⁾ - 13 VA ⁽⁴⁾
Operating range	DC: 80...120% Un - AC: 85...110% Un	
Type of duty	Continuous	
Drop-out voltage ⁽⁵⁾	DC: > 5% Un - AC: > 15% Un	

(1) Other values on request.

(2) Maximum value, AC = 380V 50Hz - 440V 60Hz.

(3) In operation.

(4) On pick-up.

(5) Limit value for supply voltage, expressed as % of the nominal value, beneath which the relay is certainly de-energized.



CONTACT DATA		4 SPDT, form C							
Current	Nominal ⁽¹⁾	12A ⁽²⁾							
	Maximum peak ⁽³⁾	20A for 1min - 40A for 1s							
	Maximum pulse ⁽³⁾	150A for 10ms							
Example of electrical life expectancy ⁽⁴⁾		RGM.x3-x4-x5: 0.5A - 110Vdc - L/R 40ms - 10 ⁵ operations - 1,800 operations/hour RGM.x4-x5 (NC or NO auxiliary contact): 0.2A - 110Vdc - L/R 40ms - 10 ⁵ operations - 1,800 operations/hour RGM.x7: 1A - 110Vdc - L/R 40ms - 10 ⁵ operations - 1,800 operations/hour RGM.x8: 1A - 125 Vdc - L/R 40ms - 10 ⁶ operations - 600 operations/hour							
Minimum load ⁽⁵⁾	Standard contacts	200mW (10V, 10mA)							
	Gold-plated contacts ⁽⁶⁾	50mW (5V, 5mA)							
Maximum breaking voltage		350 VDC / 440 VAC							
Contact material		AgCdO							
Operating time at Un (ms) ⁽⁷⁾		RGM.13-17-43-47	RGM. 33-37-63-67	RGM.18	RGM.38	RGM.14-44	RGM. 34-64	RGM. 15-45	RGM. 35-65
		DC - AC	DC	DC - AC	DC	DC - AC	DC	DC - AC	DC
	Pick-up (NC contact opening)	≤ 20 - ≤ 11	≤ 20	≤ 20 - ≤ 11	≤ 20	≤ 16 - ≤ 11	≤ 16	≤ 16 - ≤ 11	≤ 16
	Pick-up (NO contact closing)	≤ 35 - ≤ 30	≤ 35	≤ 40 - ≤ 35	≤ 40	≤ 35 - ≤ 30	≤ 35	≤ 35 - ≤ 30	≤ 35
	Drop-out (NO contact opening)	≤ 10 - ≤ 20	≤ 47	≤ 10 - ≤ 20	≤ 47	≤ 10 - ≤ 25	≤ 47	≤ 10 - ≤ 25	≤ 47
	Drop-out (NC contact closing)	≤ 53 - ≤ 65	≤ 85	≤ 60 - ≤ 70	≤ 95	≤ 70 - ≤ 75	≤ 100	≤ 70 - ≤ 75	≤ 100
	Pick-up (NC auxiliary contact opening)	-	-	-	-	-	-	≤ 16 - ≤ 12	≤ 20
	Pick-up (NO auxiliary contact closing)	-	-	-	-	≤ 33 - ≤ 25	≤ 33	-	-
Drop-out (NO auxiliary contact opening)	-	-	-	-	≤ 30 - ≤ 45	≤ 46	-	-	
Drop-out (NC auxiliary contact opening)	-	-	-	-	-	-	≤ 70 - ≤ 75	≤ 95	

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

(2) Models RGM.x4 / RGM.x5 only: 5° NO or NC contact: nominal current 5 A.

(3) 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.

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

(5) 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. The use of gold plated contacts is recommended in the case of very low loads.

(6) A gold contact, if subjected to high loads, degrades superficially. In this case, the characteristics of the standard contact must be considered. This does not affect the operation of the relay.

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



INSULATION		
Insulation resistance (at 500Vdc)	between electrically independent circuits and between these circuits and ground	> 10,000 MΩ
	between open contact parts	> 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)
	between open contact parts	2 kV (1 min) - 2.2 kV (1 s) ⁽¹⁾
	between adjacent contacts	2 kV (1 min) - 2.2 kV (1 s)
Impulse withstand (1.2/50µs - 0.5J)	between electrically independent circuits and ground	5 kV ⁽²⁾
	between open contact parts	3 kV ⁽²⁾

For auxiliary contacts (NO - NC) of models RGM.x4 and RGM.x5:

(1) 1kV.

(2) 2kV.

MECHANICAL SPECIFICATIONS

Mechanical life expectancy		20x10 ⁶ operations
Maximum switching rate	Mechanical	3,600 operations/hour
Degree of protection (with relay mounted)		IP40
Dimensions (mm)		45x50x86 ⁽¹⁾
Weight (g)		270

(1) Output terminals excluded.

ENVIRONMENTAL CHARACTERISTICS

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

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, the products are designed and manufactured according to the requirements of the above-mentioned European and International standards.

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

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

CONFIGURATIONS - OPTIONS

TROPICALIZATION	Surface treatment of the coil with protective coating for use with RH 95%.
GOLD PLATING	Surface treatment of the contacts, blades and output terminals with gold-cobalt alloy ≥ 2μ. This treatment ensures long-term ability of the contact to conduct lower currents.
LED	LED indicator showing presence of power supply. Flyback diode mounted as standard.
FLYBACK DIODE	Component connected in parallel to the coil (type BYW56) designed to dampen overvoltages generated by the coil when de-energized.
LEVER FOR MANUAL OPERATION	Allows manual operation of the relay, with the cover closed, using a screwdriver. If the lever is fitted, there will be no luminous optical indicator.

ORDERING SCHEME

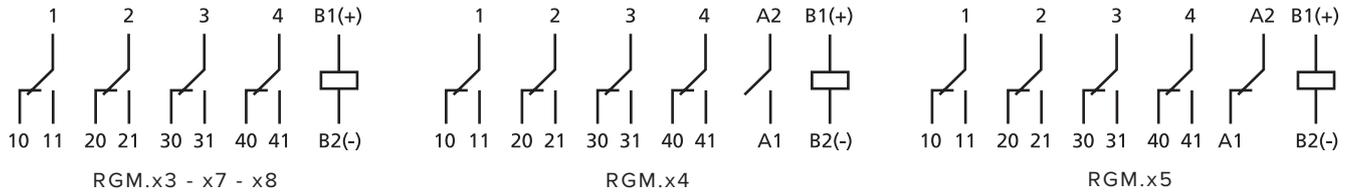
PRODUCT CODE	APPLICATION ⁽¹⁾	CONFIGURATION A	CONFIGURATION B	TYPE OF POWER SUPPLY	NOMINAL VOLTAGE (V) ⁽²⁾	FINISH ⁽³⁾	KEYING POSITION CODE ⁽⁴⁾
RGM	E: Energy F: Railway Fixed equipment	1: Standard 3: Diode // 4: Gold plating 5: Led 6: Gold plating + Diode // 7: Diode // + Led	3: 4 SPDT contacts 4: 4 SPDT contacts + 1 NO auxiliary contact 5: 4 SPDT contacts + 1 NC auxiliary contact 7: 4 SPDT contacts with magnetic arc blow-out 8: 4 SPDT contracts, long travel with magnetic arc blow-out	C: Vdc A: Vac 50 Hz H: Vac 60 Hz	012 - 024 - 048 110 - 125 - 132 144 - 220 - 230 380 - 440	T: Tropicalized coil M: Manual operation ⁽⁵⁾	XX

Example	RGM	E	3	7	C	048	TM	
	RGME37-C048/TM = ENERGY series relay with flyback diode, magnetic arc blow-out, 48Vdc tropicalized coil and manual operating lever.							
	RGM	F	1	3	A	110		OOG
RGMF17-A110-OOG = RAILWAY series relay, fixed equipment, with 110V 50Hz coil and keying position OOG.								

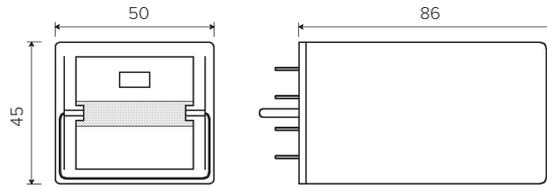
- ENERGY:** All applications except for railway.
RAILWAYS, FIXED EQUIPMENT: application on fixed power systems and electrical railway traction.
For list of RFI compliant and type-approved products, consult dedicated catalogue "RAILWAY SERIES - RFI APPROVED".
Also available is the **STATIONS** series, with ENEL approved material meeting LV15/LV16 specifications.
For list of ENEL compliant and type-approved products, consult dedicated catalogue "STATIONS SERIES - LV15-LV16-LV20"
- Other values on request. Voltages 380V and 440V available as Vac only.
- Optional value. Multiple selection possible (e.g. TM).
- Option value. The positive mechanical keying is applied according to the manufacturer's model.
- With manual operation, no optical indicator.



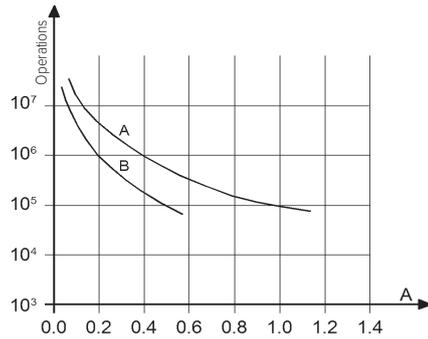
WIRING DIAGRAM



DIMENSIONS



ELECTRICAL LIFE EXPECTANCY



Contact loading: 110Vdc, L/R 40 ms
 Curve A: RGM.x7
 Curve B: RGM.x3-4-5 (NO/NC contact excluded)

RGM.x8			
U	I (A)	L/R (ms)	Operations
125Vdc	1	40	1,000,000
125Vdc	5	40	5,000

RGM.x3 - RGM.x4 - RGM.x5			
U	I (A)	L/R (ms)	Operations
110Vdc	0.5	40	100,000
110Vdc	0.6	10	300,000
120Vdc	0.7	40	50,000
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

RGM.x7			
U	I (A)	L/R (ms)	Operations
24Vdc	1	0	7,000,000
24Vdc	1	40	3,000,000
24Vdc	2	40	2,000,000
24Vdc	5	0	3,000,000
24Vdc	5	40	200,000
24Vdc	9	0	800,000
48Vdc	5	20	200,000
110Vdc	0.4	40	1,000,000
110Vdc	1	40	100,000
110Vdc	1	40	350,000 ⁽¹⁾
110Vdc	10	0	100,000
220Vdc	0.5	40	100,000
U	I (A)	cosφ	Operations
220Vac	5	0.5	100,000
220Vac	10	1	100,000
230Vac	1	0.7	2,500,000
230Vac	3	0.7	1,200,000

Switching frequency: 1,200 operations/hour

⁽¹⁾ 2 series contacts



SOCKETS AND RETAINING CLIPS

Type of installation	Type of outputs	Model	
Wall or DIN rail mounting	Screw	PAVG161	VM1221
Flush mounting	Double faston (4.8 x 0.8 mm)	PRDG161	
	Screw	PRVG161	



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 - 500mA. 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
 - o Gold plated contacts: Minimum current = 10mA
- **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.

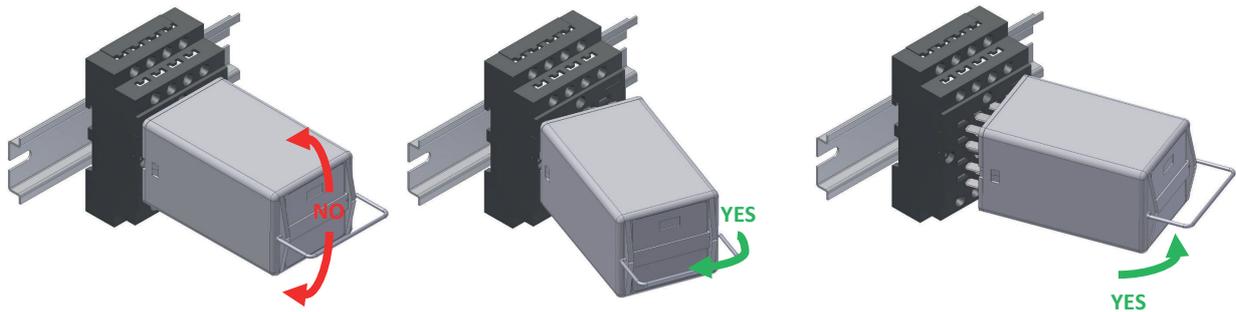
Condensation is possible inside the relay when energized and the outside ambient temperature is cold; this is quite normal and does not affect the operation of the relay. Plastic materials of relay do not possess hygroscopic properties.

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.

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. Humidity can reach peaks of 95%. In any case, there must be no condensation. Before use, please read carefully "OPERATION" section.