

# RMGW

## INSTANTANEOUS RELAYS, WELD-NO-TRANSFER 8 CONTACTS

### FORCIBLY GUIDED CONTACTS

### APPLICATIONS



Shipbuilding



Petroleum industry



Heavy industry



Power generation



Power distribution



Railway equipment



Rolling stock



### OVERVIEW

- Forcibly guided (mechanically linked) contacts, as per standard **NF 62-002 (§12.3.10)**
- Weld-no-transfer technology
- Plug-in monostable instantaneous relays
- Suitable for safety applications
- Solid and rugged construction for heavy or intensive duty
- Self-cleaning knurled contacts
- Very high electrical life expectancy and exceptional endurance
- Magnetic arc blow-out (optional) for higher breaking capacity
- Wide option range: signalling LED, FLYBACK DIODE, varistor, etc.
- Transparent cover, with access for manual operation (standard) and pull-out handle
- Retaining clip for secure locking of relay on socket

### DESCRIPTION

RMGW relays are highly reliable products featuring high performance, suitable for applications in very harsh and disturbed environments such as **ROLLING STOCK** applications.

Forcibly guided contacts are tested as per standard **NF F62002 (§12.3.10)**. Forcibly guided contacts are also known as weld-no-transfer contacts.

Equipped by 8 C/O contacts: the user have the greatest possible flexibility in designing (6 NC + 2 NO, 5 NC + 3 NO, etc.).

Wide contact gap for a very high breaking capacity, electrical life expectancy and insulation.

The operating temperature range is -40°C to +85°C . RMG can operate in environment with high thermal shocks.

Manual operation as standard for all models, allowing tests to be conducted in the absence of any power supply.

The contacts are designed to obtain remarkable performances both for high, inductive loads or very low loads. Each contact is able to switch from 5mA – 10V even without contact gilding

The knurled surface ensures an excellent self-cleaning effect, a lower ohmic resistance thanks to the various points of electrical contact, and will also improve 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.

In this relay range, with forcibly guided contact (mechanically linked) special design and constructional measures are used to ensure that make (NO) contacts cannot assume the same state as break (NC) contacts.

Testing method is according to **NF F62002 (§12.3.10)**:

- The NC contact is kept closed. Relay is energized with a voltage of 150% of  $U_{max}$  ( $150\% * 125\% U_{nom} = 188\% U_{nom}$ ). NO contact should NOT close with a test load of 220V 50Hz, 10 mA.
- The NO contact is kept closed. NC contact should NOT close with a test load of 220V 50Hz, 10 mA.

### STANDARD COMPLIANCE

EN 61810-3	ASTM E162, E662
EN 60077	EN 61810-1
EN 50155	EN 61810-7
EN 61373	EN 60695-2-10
EN 45545-2	EN 60529

MODELS	NUMBER OF CONTACTS	MAGNETIC ARC BLOW-OUT
RMG.x2W	8 SPDT	
RMG.x6W	8 SPDT	•

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

COIL DATA	RMGExyW - RMGFxyW	RMGRxyW
Nominal voltages Un	DC : 24-48-110-125-132-220 <sup>(1)</sup>	DC : 24-36-72-96-110 <sup>(2)</sup>
Consumption at Un (DC/AC)	3W	
Operating range	DC : 80÷115% Un	DC : 70÷125% Un
Type of duty	Continuous	
Drop-out voltage <sup>(3)</sup>	DC : > 5% Un	

(1) Other values on request.

(2) Suitable for application on rolling stock. Operating range in compliance with EN 60077 standard.

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

CONTACT DATA	RMG.12W-16W-42W-46W	RMG.32W-36W-62W-66W-52W-56W
Number and type	8 SPDT, form C	
Current	See following graph	
Nominal	20A for 1min - 40A for 1s	
Maximum peak <sup>(1)</sup>	150A for 10ms	
Maximum pulse <sup>(1)</sup>		
Example of electrical life expectancy	RMG.x2W : 0.5A - 110Vdc - L/R 40ms - 10 <sup>5</sup> operations - 1.800 operations / hour RMG.x6W : 1A - 110Vdc - L/R 40ms - 10 <sup>5</sup> operations - 1.800 operations / hour	
Minimum load <sup>(2)</sup>	Standard contacts	200mW (10V, 10mA)
	Gold-plated contacts <sup>(3)</sup>	50mW (5V, 5mA)
Maximum breaking voltage	350 VDC / 440 VAC	
Contact material	AgCdO	
Operating time at Un (ms) <sup>(4)</sup>	DC	
Pick-up (NC contact opening)	≤ 20	
Pick-up (NO contact closing)	≤ 40	
Drop-out (NO contact opening)	≤ 6	
Drop-out (NC contact closing):	≤ 60	

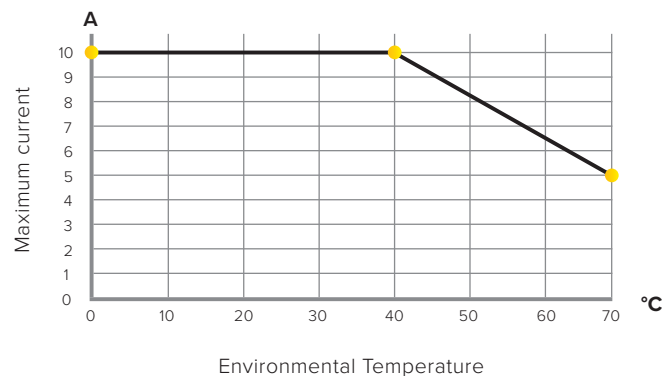
(1) Maximum peak and pulse currents are those currents that can be handled, for a specified time, by the contact. They do not refer to steady or interrupted currents.

(2) 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.

(3) 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.

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

## RATED CURRENT CONTACTS



Note: reduction of 30% on all the contacts simultaneously.

## INSULATION



Insulation resistance (at 500VCD)	
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.) - 2,2kV (1 s)
between open contact parts	2 kV (1 min.) - 2,2kV (1 s)
between adjacent contacts	2 kV (1 min.) - 2,2kV (1 s)
Impulse withstand voltage (1,2/50μs - 0,5J)	
between electrically independent circuits and between these circuits and ground	5 kV
between open contact parts	5 kV

## MECHANICAL SPECIFICATIONS



Mechanical life expectancy	10x10 <sup>6</sup> operations
Maximum mechanical switching rate	3600 operations/h
Degree of protection	IP50 fitted to socket
Dimensions (mm)	45x90x100 <sup>(1)</sup>
Weight (g)	380

(1) Output terminals excluded.

## ENVIRONMENTAL SPECIFICATIONS



Standard operating temperature	standard	-25 to +55 °C
Version for railways, rolling stock (RMGR)		-25 to +70°C (+85°C for 10 min) -40°C as option
Storage and shipping temperature		-25 to +85°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	All-or-nothing relays
EN 60695-2-10	Fire behaviour
EN 60529	Degree of protection provided by enclosures

Unless otherwise specified, products are designed and manufactured 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%.

## RAILWAYS, ROLLING STOCK - STANDARDS APPLICABLE TO RMGRX VERSION



EN 60077	Electric equipment for rolling stock - General service conditions and general rules
EN 50155	Electronic equipment used on rolling stock
EN 61373 <sup>(1)</sup>	Shock and vibration tests, cat 1, class B
NF F62-002 (§12.3.10)	Weld-no-transfer contacts, test method
EN 45545-2	Fire behaviour, cat E10, requirement R26, V0
ASTM E162, E662	Fire behaviour

(1) Opening of NC contacts allowed only at de-energized relay t<3ms.

## CONFIGURATIONS - OPTIONS



<b>TROPICALIZATION</b>	Surface treatment of coil with protective coating for use in conditions of RH 95%. This treatment serves to give the coil added protection against corrosion that could occur as a result of moisture reacting with certain chemical agents such as those found in acid or saline atmospheres.
<b>GOLD PLATING</b>	Surface treatment of contacts, blades and output terminals with gold, thickness ≥ 2μ. This treatment ensures long-term capacity of the contact to conduct low levels of current, even in adverse ambient conditions.
<b>LED</b>	LED indicator showing presence of power supply, wired in parallel with the coil.
<b>FLYBACK DIODE</b>	Component connected in parallel with the coil designed to suppress overvoltages generated by the coil when de-energized.
<b>LOW TEMPERATURE</b>	Minimum operating temperature -40°C, only for rolling stock version (option "L").



## ORDERING SCHEME

PRODUCT CODE	APPLICATION <sup>(1)</sup>	CONFIGURATION A	CONFIGURATION B	TYPE OF POWER SUPPLY	NOMINAL VOLTAGE (V) <sup>(2)</sup>	FINISH <sup>(3)</sup>	KEYING POSITION CODE <sup>(4)</sup>
RMG	<b>E:</b> Energy <b>F:</b> Railway Fixed Equipment <b>R:</b> Railway Rolling stock	<b>1:</b> Standard <b>2:</b> Gold plating + Diode // + Led <b>3:</b> Diode // <b>4:</b> Gold plating <b>5:</b> Led <b>6:</b> Gold plating + Diode // <b>7:</b> Diode // + Led <b>9:</b> Transil + Led	<b>2W:</b> 8 SPDT contacts  <b>6W:</b> 8 SPDT contacts with magnetic arc blow-out	<b>C:</b> Vdc	024 - 036 - 048 072 - 096 - 110 125 - 132 - 220	<b>T:</b> Tropicalized coil  <b>L:</b> Low temperature	XX

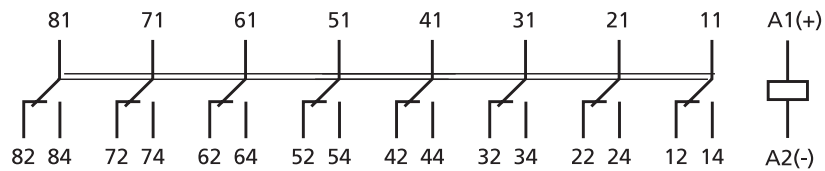
Example

RMG	E	3	6W	C	048	T	
RMGE36W-C048/T = ENERGY series relay with back EMF suppression diode, magnetic arc blow-out and 48Vdc tropicalized coil.							
RMG	R	7	2W	C	110		
RMGR72W-C110 = RAILWAY series relay, equipped with flyback diode and indicator Led and 110Vdc coil.							

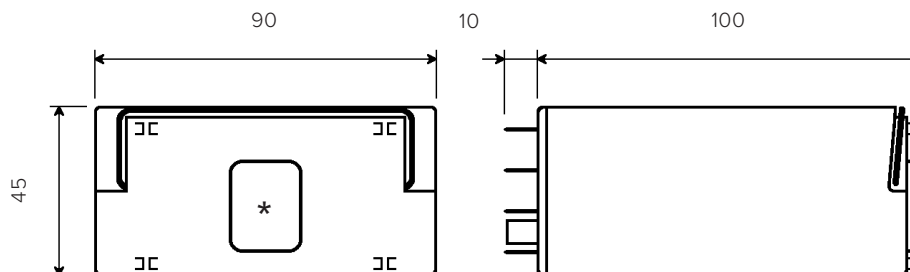
- ENERGY:** all applications except for railway.  
**RAILWAYS, FIXED EQUIPMENT:** application on fixed power systems and electrical railway traction. Construction according to RFI (FS Group, Italy) specification n° RFI DPRIM STF IFS TE 143 A, if applicable for list of RFI approved and conforming products, consult dedicated catalogue "RAILWAY SERIES - RFI APPROVED"  
**RAILWAYS, ROLLING STOCK:** Application on board rolling stock. Electrical characteristics according to EN60077.
- Other values on request.
- Optional value.
- Optional value. The positive mechanical keying is applied according to the manufacturer's model.



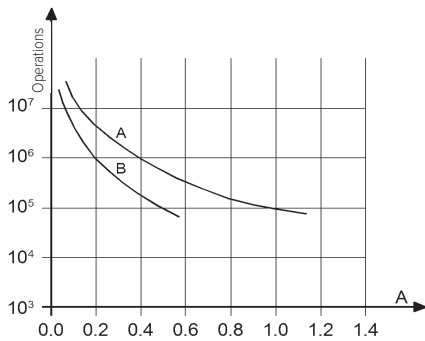
## WIRING DIAGRAM



## DIMENSIONS



(\*) access to the manual operating lever



Contact loading: 110Vdc, L/R 40 ms  
 Curve A: RMG.x6X  
 Curve B: RMG.x2X

RMG.x2W			
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

RMG.x6W			
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	10	0	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: 1200 operations/hour

SOCKETS AND RETAINING CLIPS

RETAINING CLIP



Type of installation	Type of outputs	Model	
Wall or DIN rail mounting	Screw	96IP20-I DIN	RMC48
	Spring clamp	PAIR320	
Flush mounting	Double faston (4.8 x 0.8 mm)	ADF4-E1	
	Spring clamp	PRIR321	

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.

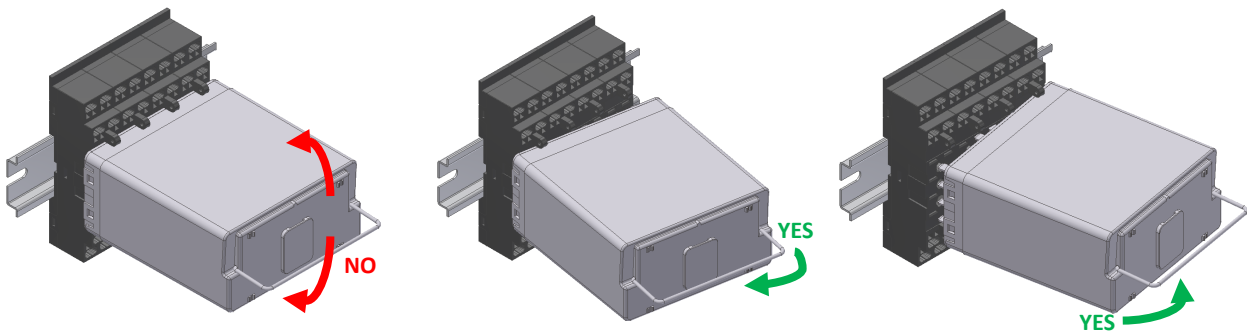
Condensation is possible inside the relay when energized and the outside ambient temperature is cold; this is quite normal and does not affect the operation of the relay. Plastic materials of relay do not possess hygroscopic properties.

## 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](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 +85°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.