

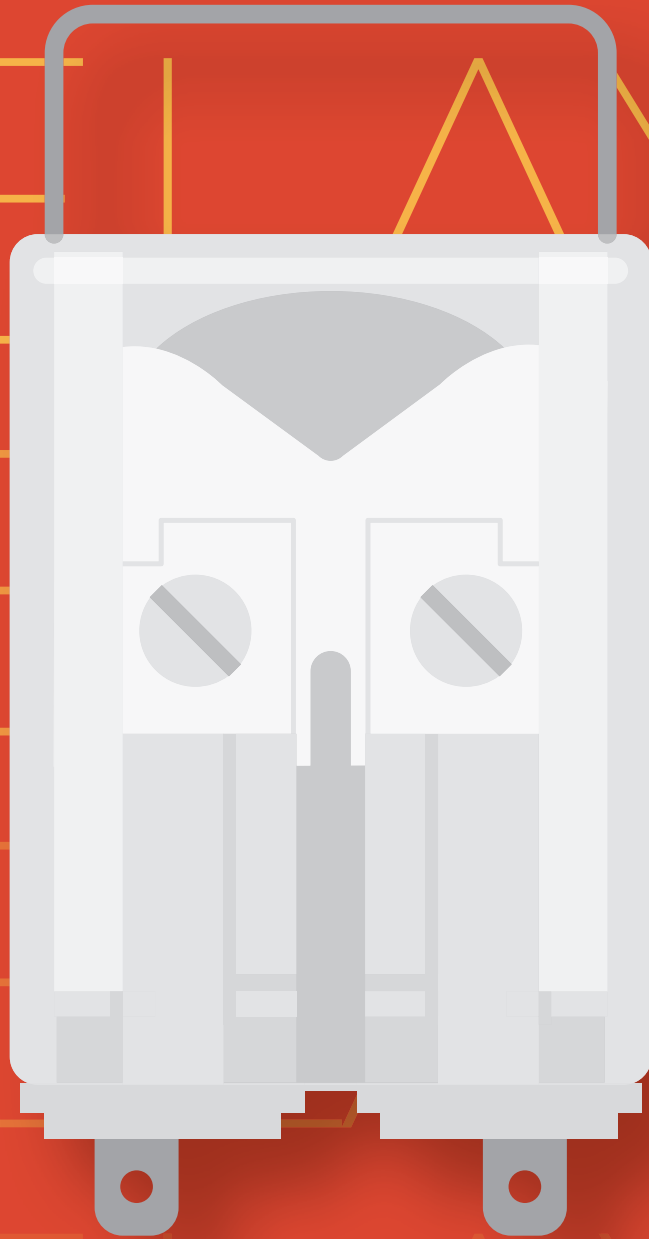
# RELAYS

# RELAYS

# RELAYS

# RELAYS

# RELAYS



# INSTANTANEOUS MONOSTABLE RELAYS WITH FORCIBLY GUIDED CONTACTS

INSTANTANEOUS  
MONOSTABLE

INSTANTANEOUS  
MONOSTABLE WITH  
FORCIBLY GUIDED CONTACTS

TIME DELAY  
(ON PICK-UP  
OR DROP-OUT)

EXPLANATION OF  
SOCKET NUMBERING

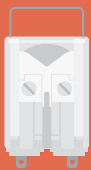
FRONT  
CONNECTION

BACK  
CONNECTION

PCB MOUNT

RETAINING CLIPS

KEYING PINS



RELAYS

## INSTANTANEOUS RELAYS WITH 2-4 FORCIBLY GUIDED CONTACTS

# RCG | RDG SERIES with forcibly guided contacts

### USER SECTORS



Power generation



Nuclear



Power transmission



Rolling stock



Fixed railway installations



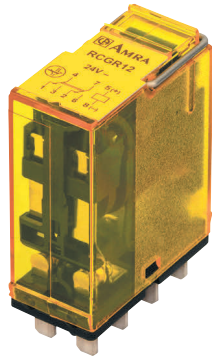
Shipbuilding



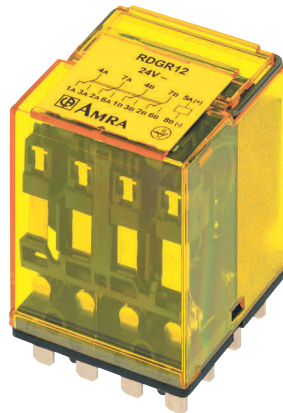
Petroleum industry



Heavy industry



RCG



RDG

### PRODUCT ADVANTAGES

- Forcibly guided (mechanically linked) contacts, relay compliant with EN 61810-3, type A
- Weld-no-transfer technology
- Compact plug-in monostable instantaneous relay
- Suitable for safety applications
- Solid and rugged construction for heavy or intensive duty, IP50 protection
- Self-cleaning knurled contacts
- Long electrical life expectancy
- New "HIGH POWER" magnetic arc blow-out for improved breaking capacity, as option
- Wide range of options: LED indicating power on, FLYBACK DIODE
- Retaining clip for secure locking of relay on socket
- Transparent cover, pull-out handle

### DESCRIPTION

The relays in the RCG / RDG line are **highly reliable products** featuring high performance, suitable for applications in very harsh and disturbed environments. They are provided with forcibly guided (mechanically linked) contacts. The component conforms to the **EN 61810-3 requirements, type A** relay (all contacts are mechanically linked). Forcibly guided contacts are also known as weld-no-transfer contacts. A typical application is the check reading of a contact for determining, with absolute certainty, the state of the other contacts in self-monitoring control systems.

Thanks to the exceptional breaking capacity, the relay is suitable for controlling **heavy duty loads** with intensive switching frequency where safety and electrical continuity is an all-important factor.

The versatility in manufacture allows producing relays with various voltages.

The types of contacts allow obtaining remarkable performance levels both for high, inductive loads or very low loads; the optional presence of the **magnetic arc blow-out** contributes considerably to the **breaking capacity**. The knurled contacts ensure **better self-cleaning characteristics and lower ohm resistance** thanks to the various points of electrical connection, thereby improving the electrical life of the component.

In relays with forcibly guided (mechanically linked) or weld-no-transfer contacts, special design and constructional measures are used to ensure that make (normally-open) contacts can not assume the same state as break (normally-closed) contacts.

- If, when powering up a relay, a NC contact fails to open, the remaining NO contacts must not close, maintaining a contact gap  $\geq 0.5$  mm.
- When the relay is de-energized, if a NO contact fails to open, the remaining NC contact must not close, maintaining a contact gap  $\geq 0.5$  mm.

**EN 61810-3** lays down the standard requirements for relays with forcibly guided contacts. This standard defines two types of relay with forcibly guided contacts, namely:

- Type A: Relay whose contacts are all mechanically linked (forcibly guided).
- Type B: Relay containing mechanically linked contacts and contacts which are not mechanically linked.

In the case of relays that include changeover contacts, either the make circuit or the break circuit of a changeover contact can be considered to meet the requirements of this standard.

Models	Number of contacts	Magnetic arc blow-out	HIGH POWER Magnetic arc blow-out
RCG.x2	2		
RCG.x6	2	•	
RCG.x8	2		•
RDG.x2	4		
RDG.x6	4	•	
RDG.x8	4		•

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

Coil specifications	RCG	RDG
Nominal voltages $U_n$ <sup>(1)</sup>	DC: 24-36-48-72-96-110-125	
Consumption at $U_n$	2.2 W	2.7 W
Operating range	80 - 115 % $U_n$	
Operating range for rolling stock version <sup>(2)</sup>	70 - 125 % $U_n$	
Type of duty	Continuous	
Drop-out voltage <sup>(3)</sup>	DC: > 5 % $U_n$	

<sup>(1)</sup> Other values on request.

<sup>(2)</sup> See "Ordering scheme" table for order code. Suitable for application on ROLLING STOCK. Operating range in accordance with EN60077.

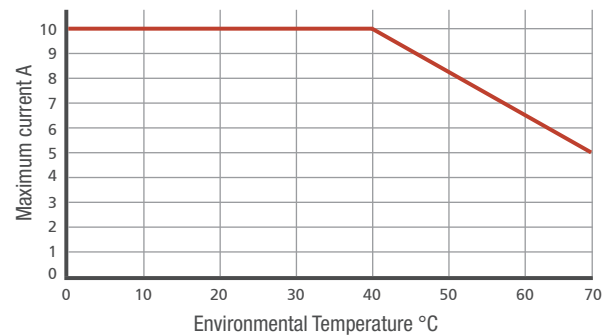
<sup>(3)</sup> Limit value for supply voltage, expressed as % of the nominal value, beneath which the relay is certainly de-energized.

Contact specifications	RCG	RDG		
Number and type	2 CO, form C	4 CO, form C		
Current	See the following chart			
Nominal	13 A for 1 min - 20 A per 1 s			
Maximum peak <sup>(1)</sup>	100 A for 10 ms			
Maximum pulse <sup>(1)</sup>				
Example of electrical life expectancy <sup>(2)</sup>	Standard: RCG.x2 / RDG.x2: 0.2 A - 110 V <sub>DC</sub> - L/R 40 ms - 5 x 10 <sup>5</sup> operations *			
* 1,200 operations / hour	With Magnetic arc blowout: RCG.x6 / RDG.x6: 0.5 A - 110 V <sub>DC</sub> - L/R 40 ms - 1.5 x 10 <sup>5</sup> operations *			
** 600 operations / hour	With <b>HIGH POWER</b> Magnetic arc blowout: RCG.x8 / RDG.x8: 0.7 A - 132 V <sub>DC</sub> - L/R 40 ms - 7 x 10 <sup>4</sup> operations **			
Minimum load	Standard contacts: 100 mW (10 V, 5 mA)			
Gold-plated contact	50 mW (5 V, 5 mA)			
Making capacity	30 A - 110 V <sub>DC</sub> - L/R 0 ms: 2,000 operations			
Maximum breaking voltage	250 V <sub>DC</sub> / 300 V <sub>AC</sub>			
Contact material	AgSnO <sub>2</sub> (mobile contacts) - AgNi (fixed contacts)			
Operating time at $U_n$ (ms) <sup>(3)</sup>	Standard	With diode	Standard	With diode
Pick-up (NC contact opening)	≤ 13	≤ 13	≤ 17	≤ 17
Pick-up (NO contact closing)	≤ 19	≤ 19	≤ 25	≤ 25
Drop-out (NO contact opening)	≤ 4	≤ 11	≤ 4	≤ 20
Drop-out (NC contact closing)	≤ 16	≤ 25	≤ 14	≤ 34

<sup>(1)</sup> The 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.

<sup>(2)</sup> For other examples, see electrical life expectancy curves.

<sup>(3)</sup> Unless specified otherwise, the operating times refer to the stabilization of the contact (including bounces).



⚡ Insulation	
Insulation resistance (at 500 V <sub>bc</sub> ) between electrically independent circuits and between these circuits and ground between open contact parts	> 1,000 MΩ > 1,000 MΩ
Dielectric withstanding voltage at industrial frequency between electrically independent circuits and ground between coil and contacts parts between open contact parts between adjacent contacts	4 kV (1 min) 3 kV (1 min) 2 kV (1 min) 3.5 kV (1 min)
Impulse withstand voltage (1.2/50 μs - 0.5 J) between electrically independent circuits and ground between open contact parts	5 kV 3 kV

⚙ Mechanical specifications		
Mechanical life expectancy	20 x 10 <sup>6</sup> operations	
Maximum switching rate	3,600 operations / hour	
Degree of protection (with relay mounted)	IP50	
	RCG	RDG
Dimensions (mm) <sup>(1)</sup>	40 x 20 x 50	40 x 40 x 50
Weight (g)	60	115

<sup>(1)</sup> Excluding output terminals

☀ Environmental specifications	
Operating temperature	Standard (-13 to 131) °F (-25 to 55) °C Version for railways, rolling stock (-13 to 158) °F (-25 to 70) °C, (85 °C for 10 min), (-40 °C as option)
Storage and shipping temperature	(-40 to 185) °F (-40 to 85) °C
Relative humidity	Standard: 75 % RH, Tropicalized: 95 % RH
Fire behavior	V0

📄 Standards and reference values	
EN 61810-1, EN 61810-7	Electromechanical elementary relays
EN 61810-3, type A	Relays with forcibly guided (mechanically linked) contacts, type A
EN 60695-2-10	Fire behavior
EN 60529	Degree of protection provided by enclosures
EN 61000-4	Electromagnetic compatibility

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 items of technical data are referred to ambient temperature 23 °C, atmospheric pressure 96 kPa and 50 % humidity. Tolerance for coil resistance, nominal electrical input and nominal power is ± 5 %.

🚂 Railways, rolling stock - Standards	📄 Applicable to the RCGR and RDGR series
EN 60077	Electric equipment for rolling stock — general service conditions and general rules
EN 50155	Electronic equipment used on rolling stock - T3 class
EN 61373 <sup>(1)</sup>	Shock and vibration tests, CAT 1, Class B
EN 45545-2	Fire behavior, HL3: CAT E10, Requirement R26, V0
ASTM E162, E662	Fire behavior

<sup>(1)</sup> Only for RDGR family: permissible opening time of contacts on a de-energized relay  $t < 100 \mu s$ .

## Configurations - Options

TROPICALIZATION	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.
GOLD PLATING	Surface treatment of the contacts, blades and output terminals with gold-cobalt alloy $\geq 2 \mu$ . This treatment ensures long-term capacity 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.
TRANSIL	Non-polarized component connected in parallel to the coil. Behavior is similar to that of a varistor with faster operating times.
LOW TEMPERATURE	Minimum operating temperature $-40 \text{ }^\circ\text{C}$ , only for rolling stock version (option "L").

## Ordering scheme

Product code	Application <sup>(1)</sup>	Configuration A	Configuration B	Label	Type of power supply	Nominal voltage (V) <sup>(2)</sup>	Finish <sup>(3)</sup>	Keying position <sup>(4)</sup>
RCG (2 contacts)	<b>E:</b> Energy <b>F:</b> Railway Fixed Equipment	1: Standard 2: Gold plating + Diode // + LED 3: Diode // 4: Gold plating 6: Gold plating + Diode // 7: Diode // + LED 8: Transil	2: Standard 6: With magnetic arc blow-out 8: With <b>HIGH POWER</b> magnetic arc blow-out	F	C: Vdc	024 - 036 048 - 072 096 - 110 - 125	<b>T:</b> Tropicalized coil  <b>L:</b> Low temperature	XX
RDG (4 contacts)	<b>R:</b> Railway Rolling Stock							

Example	<b>RCG</b>	<b>E</b>	<b>4</b>	<b>2</b>	<b>F</b>	<b>C</b>	<b>048</b>		
	RCGE42F-C048 = ENERGY series relay with 2 CO gold-plated contacts, 48 Vdc coil								
	<b>RDG</b>	<b>R</b>	<b>1</b>	<b>6</b>	<b>F</b>	<b>C</b>	<b>110</b>		
	RDGR16F-C110 = RAILWAY series relay, rolling stock, with 4 CO contacts, magnetic arc blow-out, 110 Vdc coil								

<sup>(1)</sup> **E = ENERGY:** All applications, except for railway. Suitable on energy production, transport and distribution plants, railways fixed equipment, petrochemical and heavy industry.

**F = RAILWAYS, FIXED EQUIPMENT:** Application on fixed power systems and electrical railway traction. Construction according to RFI (FS Group, Italy) specification no. RFI DPRIM STF IFS TE143 A, if applicable. For the list of RFI approved and conforming products, consult dedicated catalog "RAILWAY SERIES - RFI APPROVED"

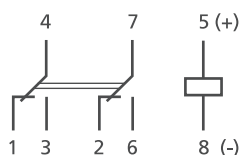
**R = RAILWAYS, ROLLING STOCK:** Application on board rolling stock (rail-tram-trolley vehicles). Electrical specifications according to EN 60077.

<sup>(2)</sup> Other values on request.

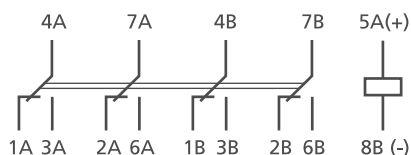
<sup>(3)</sup> Optional value.

<sup>(4)</sup> Optional value. The positive mechanical keying is applied according to the manufacturer's model.

## Wiring diagram

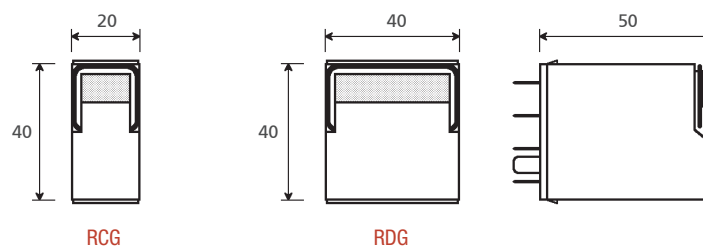


RCG



RDG

## Dimensions



## Electrical life expectancy

Some examples of electrical life expectancy.

RCG.12, RDG.12 (without magnetic arc blow-out)			
U	I (A)	L/R (ms)	Operations
110 V <sub>DC</sub>	0.2	40	500,000
220 V <sub>DC</sub>	0.2	10	80,000
U	I (A)	cosΦ	Operations
110 V <sub>AC</sub>	1	1	1,200,000
110 V <sub>AC</sub>	1	0.5	1,000,000
110 V <sub>AC</sub>	5	1	500,000
110 V <sub>AC</sub>	5	0.5	300,000
220 V <sub>AC</sub>	0.5	1	1,200,000
220 V <sub>AC</sub>	1	0.5	500,000
220 V <sub>AC</sub>	5	1	400,000
220 V <sub>AC</sub>	5	0.5	300,000

RCG.16, RDG.16 (with magnetic arc blow-out)			
U	I (A)	L/R (ms)	Operations
110 V <sub>DC</sub>	0.2	40	1,000,000
110 V <sub>DC</sub>	0.5	40	150,000
110 V <sub>DC</sub>	0.6	10	300,000
110 V <sub>DC</sub>	1	10	100,000
220 V <sub>DC</sub>	0.2	10	100,000
U	I (A)	cosΦ	Operations
110 V <sub>AC</sub>	1	1	2,000,000
110 V <sub>AC</sub>	1	0.5	1,500,000
110 V <sub>AC</sub>	5	1	950,000
110 V <sub>AC</sub>	5	0.5	500,000
220 V <sub>AC</sub>	0.5	1	2,000,000
220 V <sub>AC</sub>	1	0.5	800,000
220 V <sub>AC</sub>	5	1	600,000
220 V <sub>AC</sub>	5	0.5	500,000

RCG.16, RDG.16 (with magnetic arc blow-out)			
U	I (A)	L/R (ms)	Operations
24 V <sub>DC</sub>	1	0	5,100,000
24 V <sub>DC</sub>	2	0	3,900,000
24 V <sub>DC</sub>	3	0	2,900,000
24 V <sub>DC</sub>	4	0	2,600,000
24 V <sub>DC</sub>	5	0	2,200,000
24 V <sub>DC</sub>	1	20	2,700,000
24 V <sub>DC</sub>	2	20	2,100,000
24 V <sub>DC</sub>	3	20	1,500,000
24 V <sub>DC</sub>	3.5	20	1,000,000
24 V <sub>DC</sub>	1	40	2,000,000
24 V <sub>DC</sub>	2	40	1,500,000
24 V <sub>DC</sub>	3	40	1,100,000
24 V <sub>DC</sub>	3.5	40	800,000
110 V <sub>DC</sub>	0.3	0	1,000,000
110 V <sub>DC</sub>	0.5	0	700,000
110 V <sub>DC</sub>	1	0	190,000
110 V <sub>DC</sub>	0.3	20	450,000
110 V <sub>DC</sub>	0.5	20	260,000
110 V <sub>DC</sub>	1	20	100,000
110 V <sub>DC</sub>	0.3	40	300,000
110 V <sub>DC</sub>	0.5	40	180,000
110 V <sub>DC</sub>	0.6	40	150,000
110 V <sub>DC</sub>	0.7	40	100,000
132 V <sub>DC</sub>	0.7	40	70,000

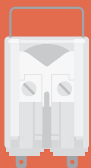
Switching frequency: 1,200 operations / hour.

Sockets and retaining clips		RCG	RDG	Retaining clip
Type of installation	Type of outputs	Model	Model	Retaining clip
Wall or DIN H35 rail mounting	Spring clamp	PAIR080	PAIR160	VM1831
	Screw	50IP20-I DIN	48BIP20-I DIN	VM1831
Flush mounting	Spring clamp	PRIR080	PRIR160	VM1831
	Double faston (4.8 × 0.8 mm)	ADF1	ADF2-BIPOK	VM1831
PCB-mount	Solder	65 <sup>(1)</sup>	65	VM1841

<sup>(1)</sup> Suitable for mounting 2 relays side by side.

### Mounting tips

- The preferred mounting position is on the wall, with the relay positioned horizontally in the reading direction on the nameplate.
- For correct use of the relays, they should be spaced apart by at least 5 mm in the horizontal direction and 20 mm in the vertical direction. This is to allow correct upward dissipation of the heat generated by the coil. Set these distances according to the socket used. Distances can be reduced depending on the environmental application conditions and on the relay duty cycle.
- For safe and secure operation, it is advisable to use retaining clips.
- No special maintenance is required.
- Condensation can form inside the relay when powered up and the outside ambient temperature is cold; this is quite normal and does not affect the operation of the relay. The plastic materials of the relay do not possess hygroscopic properties.



RELAYS

## INSTANTANEOUS RELAYS WITH 4 FORCIBLY GUIDED CONTACTS

# RGG SERIES with forcibly guided contacts

### USER SECTORS



Power generation



Nuclear



Power transmission



Rolling stock



Fixed railway installations



Shipbuilding



Petroleum industry



Heavy industry



RGG

### PRODUCT ADVANTAGES

- Forcibly guided (mechanically linked) contacts, relay compliant with EN 61810-3, type A
- Weld-no-transfer technology
- Plug-in monostable instantaneous relay
- Suitable for safety applications
- Solid and rugged construction for heavy or intensive duty
- Self-cleaning knurled contacts
- Very long electrical life expectancy and exceptional endurance
- Magnetic arc blow-out for higher breaking capacity
- Wide range of options: LED indicating power on, FLYBACK DIODE
- Retaining clip for secure locking of relay on socket
- Transparent cover, pull-out handle

### DESCRIPTION

The relays in the RGG line are **highly reliable products featuring high performance**, suitable for applications in very **harsh and disturbed environments**. They are provided with **forcibly guided** (mechanically linked) contacts. The component conforms to the **EN 61810-3** requirements, **type A relay** (all contacts are mechanically linked). Forcibly guided contacts are also known as weld-no-transfer contacts. A typical application is the check reading of a contact for determining, with absolute certainty, the state of the other contacts in self-monitoring control systems.

Thanks to the exceptional breaking capacity, the relay is suitable for controlling heavy duty loads with intensive switching frequency where safety and electrical continuity is an all-important factor.

The versatility in manufacture allows producing relays with any voltage in the range 12 to 230 V<sub>dc</sub> and with a great number of operating ranges adaptable to the various application requirements.

The types of contacts allow obtaining remarkable performance levels both for high, very inductive loads or very low loads; the optional presence of the **magnetic arc blow-out** contributes considerably to the **breaking capacity**. The knurled contacts ensure **better self-cleaning characteristics** and **lower ohmic resistance** thanks to the various points of electrical connection, thereby **improving the electrical life** of the component.

In relays with forcibly guided (mechanically linked) or weld-no-transfer contacts, special design and constructional measures are used to ensure that make (normally-open) contacts can not assume the same state as break (normally-closed) contacts.

- If, when powering up a relay, a NC contact fails to open, the remaining NO contacts must not close, maintaining a contact gap  $\geq 0.5$  mm.
- When the relay is de-energized, if a NO contact fails to open, the remaining NC contact must not close, maintaining a contact gap  $\geq 0.5$  mm.

**EN 61810-3** lays down the standard requirements for relays with forcibly guided contacts. This standard defines two types of relay with forcibly guided contacts, namely:

- Type A: Relay whose contacts are all mechanically linked (forcibly guided).
- Type B: Relay containing mechanically linked contacts and contacts which are not mechanically linked.

In the case of relays that include changeover contacts, either the make circuit or the break circuit of a changeover contact can be considered to meet the requirements of this standard.

Models	Number of contacts	Magnetic arc blow-out
RGG.x3X	4	
RGG.x7X	4	•

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

Coil specifications	RGGExyX / RGGFxyX	RGGRxyX <sup>(2)</sup>
Nominal voltages $U_n$ <sup>(1)</sup>	DC: 12-24-48-110-125-132-144-230	DC: 24-36-72-110
Consumption at $U_n$ (DC/AC)	3.5 W	
Operating range	80 - 120 % $U_n$	70 - 125 % $U_n$
Type of duty	Continuous	
Drop-out voltage <sup>(3)</sup>	DC: > 5 % $U_n$	

<sup>(1)</sup> Other values on request.

<sup>(2)</sup> Suitable for application on ROLLING STOCK. Operating range in accordance with EN60077.

<sup>(3)</sup> Limit value for supply voltage, expressed as % of the nominal value, beneath which the relay is certainly de-energized.

Contact specifications														
	Number and type	4 CO, form C												
Current	Nominal <sup>(1)</sup>	12 A												
	Maximum peak <sup>(2)</sup>	20 A for 1 min — 40 A for 1 s												
	Maximum pulse <sup>(2)</sup>	150 A for 10 ms												
Example of electrical life expectancy <sup>(3)</sup>		RGG.x3: 0.5 A - 110 V <sub>DC</sub> - L/R 40 ms - 10 <sup>5</sup> operations - 1,800 operations / hour RGG.x7: 1 A - 110 V <sub>DC</sub> - L/R 40 ms - 10 <sup>5</sup> operations - 1,800 operations / hour 1 A - 110 V <sub>DC</sub> - L/R 40 ms - 2 x 10 <sup>5</sup> operations - 600 operations / hour												
Minimum load	Standard contacts	200 mW (10 V, 10 mA)												
	Gold-plated contact	50 mW (5 V, 5 mA)												
Maximum breaking voltage		350 V <sub>DC</sub> / 440 V <sub>AC</sub>												
Contact material		AgCdO												
Operating time at $U_n$ (ms) <sup>(4)</sup>		<table border="1"> <thead> <tr> <th>RGG.13X-17X-43X-47X</th> <th>RGG.33X-37X-63X-67X-53X-57X</th> </tr> </thead> <tbody> <tr> <td>DC</td> <td>DC</td> </tr> <tr> <td>Pick-up (NC contact opening)</td> <td>≤ 20</td> </tr> <tr> <td>Pick-up (NO contact closing)</td> <td>≤ 35</td> </tr> <tr> <td>Drop-out (NO contact opening)</td> <td>≤ 10</td> </tr> <tr> <td>Drop-out (NC contact closing)</td> <td>≤ 53</td> </tr> </tbody> </table>	RGG.13X-17X-43X-47X	RGG.33X-37X-63X-67X-53X-57X	DC	DC	Pick-up (NC contact opening)	≤ 20	Pick-up (NO contact closing)	≤ 35	Drop-out (NO contact opening)	≤ 10	Drop-out (NC contact closing)	≤ 53
	RGG.13X-17X-43X-47X	RGG.33X-37X-63X-67X-53X-57X												
	DC	DC												
	Pick-up (NC contact opening)	≤ 20												
	Pick-up (NO contact closing)	≤ 35												
Drop-out (NO contact opening)	≤ 10													
Drop-out (NC contact closing)	≤ 53													
	≤ 20													
	≤ 35													
	≤ 10													
	≤ 53													

<sup>(1)</sup> On all contacts simultaneously, reduction of 30 %.

<sup>(2)</sup> The 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.

<sup>(3)</sup> For other examples, see electrical life expectancy curves.

<sup>(4)</sup> Unless specified otherwise, the operating times refer to the stabilization of the contact (including bounces).

Insulation		
Insulation resistance (at 500 V <sub>DC</sub> )	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)
	between adjacent contacts	2 kV (1 min) - 2.2 kV (1 s)
Impulse withstand voltage (1.2/50 μs - 0.5 J)	between electrically independent circuits and between these circuits and ground	5 kV
	between open contact parts	4 kV

INSTANTANEOUS MONOSTABLE  
INSTANTANEOUS MONOSTABLE WITH FORCIBLY GUIDED CONTACTS  
TIME DELAY (ON PICK-UP OR DROP-OUT)  
EXPLANATION OF SOCKET NUMBERING  
FRONT CONNECTION  
BACK CONNECTION  
PCB MOUNT  
RETAINING CLIPS  
KEYING PINS

## Mechanical specifications

	Mechanical life expectancy	10 x 10 <sup>6</sup> operations
Maximum switching rate	Mechanical	3,600 operations / hour
	Degree of protection (with relay mounted)	IP40
	Dimensions (mm) <sup>(1)</sup>	50 x 50 x 86
	Weight (g)	280

<sup>(1)</sup> Excluding output terminals

## Environmental specifications

Operating temperature	Standard	(-13 to 131) °F (-25 to 55) °C
	Version for railways, rolling stock	(-13 to 158) °F (-25 to 70) °C, (85 °C for 10 min), (-40 °C as option)
Storage and shipping temperature		(-58 to 185) °F (-50 to 85) °C
Relative humidity		Standard: 75 % RH, Tropicalized: 95 % RH
Fire behavior		V0

## Standards and reference values

EN 61810-1, EN 61810-2, EN 61810-7	Electromechanical elementary relays
EN 61810-3, type A	Relays with forcibly guided (mechanically linked) contacts, type A
EN 60695-2-10	Fire behavior
EN 60529	Degree of protection provided by enclosures
EN 61000	Electromagnetic compatibility

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 items of technical data are referred to ambient temperature 23 °C, atmospheric pressure 96 kPa and 50 % humidity. Tolerance for coil resistance, nominal electrical input and nominal power is  $\pm 5\%$ .

## Railways, rolling stock - Standards

Railways, rolling stock - Standards	Applicable to RGGRX version
EN 60077	Electric equipment for rolling stock — general service conditions and general rules
EN 61373 <sup>(1)</sup>	Shock and vibration tests, CAT 1, Class B
EN 45545-2	Fire behavior, CAT E10, Requirement R26, V0
ASTM E162, E662	Fire behavior

<sup>(1)</sup> Permissible opening time of contacts on a de-energized relay  $t < 3$  ms

## Railways, rolling stock - Special operating ranges

Nominal voltage	Minimum pick-up voltage	Maximum operating voltage	Order symbol <sup>(1)</sup>
24 V <sub>dc</sub>	16.8	32	Z01
36 V <sub>dc</sub>	23	42.5	Z01
72 V <sub>dc</sub>	55	96	Z01
110 V <sub>dc</sub>	77	144	Z01

<sup>(1)</sup> To order the relay with the special operating range, indicate the “Z0x” symbol in the “Keying position” field of the ordering scheme. The special range may be subject to operating specifications different from standard specifications. Please contact us for further information.

## 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 $\geq 2 \mu$ . This treatment ensures long-term capacity of the contact to conduct lower currents.
LED	LED indicator showing presence of power supply, wired in parallel with the coil.
FLYBACK DIODE	Component connected in parallel to the coil (type 1N4007) designed to dampen overvoltages generated by the coil when de-energized.
TRANSIL	Non-polarized component connected in parallel to the coil. Behavior is similar to that of a varistor with faster operating times.
LOW TEMPERATURE	Minimum operating temperature -50 °C, only for rolling stock version (option “L”).



## Ordering scheme

Product code	Application <sup>(1)</sup>	Configuration A	Configuration B	Label	Type of power supply	Nominal voltage (V) <sup>(2)</sup>	Finish <sup>(3)</sup>
RGG	<b>E:</b> Energy <b>F:</b> Railway Fixed Equipment <b>R:</b> Railway Rolling Stock	1: Standard 2: Gold plating + Diode // + LED 3: Diode // 4: Gold plating 5: LED 6: Gold plating + Diode // 7: Diode // + LED 8: Transil 9: Transil + LED 0: Gold plating + Transil + LED	3X: 4 CO contacts 7X: 4 CO contacts with magnetic arc blow-out	F	C: V <sub>DC</sub>	012 - 024 - 036 048 - 072 - 110 125 - 132 - 144 220	Z0x: Special operating range (only for "R" applications) T: Tropicalized coil L: Low temperature

Example	<b>RGG</b>	<b>E</b>	<b>3</b>	<b>7X</b>	<b>F</b>	<b>C</b>	<b>048</b>	<b>T</b>
	RGGE37XF-C048/T = ENERGY series relay with flyback diode, magnetic arc blow-out and 48 V <sub>DC</sub> tropicalized coil.							
	<b>RGG</b>	<b>F</b>	<b>5</b>	<b>3X</b>	<b>F</b>	<b>C</b>	<b>110</b>	
	RGGF53XF-C110 = RAILWAY series relay, fixed equipment, with LED indicator and 110 V <sub>DC</sub> coil.							

<sup>(1)</sup> **E = ENERGY:** All applications, except for railway. Suitable on energy production, transport and distribution plants, railways fixed equipment, petrochemical and heavy industry.

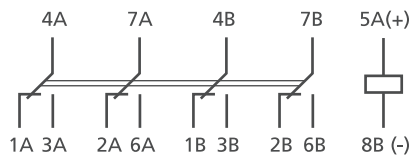
**F = RAILWAYS, FIXED EQUIPMENT:** Application on fixed power systems and electrical railway traction. Construction according to RFI (FS Group, Italy) specification no. RFI DPRIM STF IFS TE143 A, if applicable. For the list of RFI approved and conforming products, consult dedicated catalog "RAILWAY SERIES - RFI APPROVED"

**R = RAILWAYS, ROLLING STOCK:** Application on board rolling stock (rail-tram-trolley vehicles). Electrical specifications according to EN 60077.

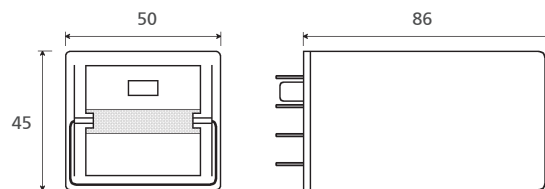
<sup>(2)</sup> Other values on request.

<sup>(3)</sup> Optional value: multiple selection possible (e.g. T-L).

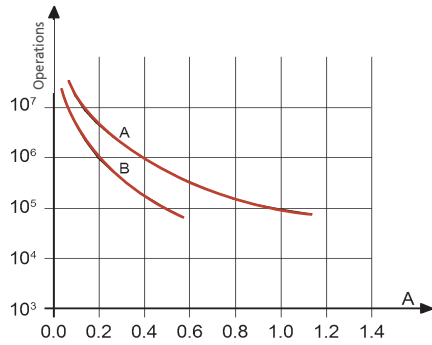
## Wiring diagram



## Dimensions



Some examples of electrical life expectancy



Contact loading: 110 V<sub>DC</sub>, L/R 40 ms

Curve A: RGG\_x7X

Curve B: RGG\_x3X

RGG.x3X			
U	I (A)	L/R (ms)	Operations
110 V <sub>DC</sub>	0.5	40	100,000
110 V <sub>DC</sub>	0.6	10	300,000
120 V <sub>DC</sub>	0.7	40	50,000
125 V <sub>DC</sub>	1.2	0	1,000,000
220 V <sub>DC</sub>	0.1	40	100,000
220 V <sub>DC</sub>	0.25	10	100,000
U	I (A)	cosΦ	Operations
110 V <sub>AC</sub>	1	1	2,000,000
110 V <sub>AC</sub>	1	0.5	1,500,000
110 V <sub>AC</sub>	5	1	1,000,000
110 V <sub>AC</sub>	5	0.5	500,000
220 V <sub>AC</sub>	0.5	1	2,000,000
220 V <sub>AC</sub>	1	0.5	600,000
220 V <sub>AC</sub>	5	1	650,000
220 V <sub>AC</sub>	5	0.5	600,000

RGG.x7X			
U	I (A)	L/R (ms)	Operations
24 V <sub>DC</sub>	1	0	7,000,000
24 V <sub>DC</sub>	1	40	3,000,000
24 V <sub>DC</sub>	2	40	2,000,000
24 V <sub>DC</sub>	5	0	3,000,000
24 V <sub>DC</sub>	5	40	200,000
24 V <sub>DC</sub>	9	0	800,000
U	I (A)	cosΦ	Operations
48 V <sub>DC</sub>	5	20	200,000
110 V <sub>DC</sub>	0.4	40	1,000,000
110 V <sub>DC</sub>	1	40	200,000 <sup>(1)</sup>
110 V <sub>DC</sub>	10	0	100,000
U	I (A)	cosΦ	Operations
220 V <sub>AC</sub>	5	0.5	100,000
220 V <sub>AC</sub>	10	1	100,000
230 V <sub>AC</sub>	1	0.7	2,500,000
230 V <sub>AC</sub>	3	0.7	1,200,000

Switching frequency: 1,200 operations / hour

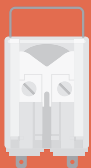
<sup>(1)</sup> 600 operations / hour

Sockets and retaining clips

Type of installation	Type of outputs	Model	Retaining clip
Wall or DIN rail mounting	Screw	48BIP20-I DIN	RG48
	Spring clamp	PAIR160	
Flush mounting	Screw	43IL	RG43
	Spring clamp	PRIR160	RG48
	Double faston (4.8 × 0.8 mm)	ADF2	

Mounting tips

- The preferred mounting position is on the wall, with the relay positioned horizontally in the reading direction on the nameplate.
- For correct use of the relays, they should be spaced apart by at least 5 mm in the horizontal direction and 20 mm in the vertical direction. This is to allow correct upward dissipation of the heat generated by the coil. Set these distances according to the socket used. Distances can be reduced depending on the environmental application conditions and on the relay duty cycle.
- For safe and secure operation, it is advisable to use retaining clips.
- No special maintenance is required.
- Condensation can form inside the relay when powered up and the outside ambient temperature is cold; this is quite normal and does not affect the operation of the relay. The plastic materials of the relay do not possess hygroscopic properties.



RELAYS

## INSTANTANEOUS RELAYS WITH 8 FORCIBLY GUIDED CONTACTS

# RMGX SERIES with forcibly guided contacts

### USER SECTORS



Power generation



Nuclear



Power transmission



Rolling stock



Fixed railway installations



Shipbuilding



Petroleum industry



Heavy industry



RMGR16X\_3

### PRODUCT ADVANTAGES

- Mechanically linked contacts, relay compliant with IEC **EN 61810-3, type A**
- Weld-no-transfer technology
- Plug-in monostable instantaneous relay
- Suitable for safety applications
- Solid and rugged construction for heavy or intensive duty
- Self-cleaning knurled contacts
- Very long electrical life expectancy and exceptional endurance
- Magnetic arc blow-out (optional) for higher breaking capacity
- Wide range of options: LED indicating power on, FLYBACK DIODE
- Transparent cover, with access for manual operation (standard) and pull-out handle
- Retaining clip for secure locking of relay on socket

### DESCRIPTION

**RMGX relays** are highly reliable products offering top performance, suitable for applications in particularly harsh and unsettled environments. Meeting the requirements of standard **EN 61810-3 type A**; the relay is equipped with mechanically linked contacts (forcibly guided), an indispensable feature for applications where there is a need to guarantee that make (NO) contacts will never assume the same status as break (NC) contacts. Forcibly guided contacts are also known as weld-no-transfer contacts. With change-over contacts, customers have the greatest possible flexibility in selecting the configuration (6 NC + 2 NO, 5 NC + 3 NO, etc.) best suited to their particular needs.

Thanks to its exceptional breaking capacity, the relay is suitable for **controlling heavy duty loads with intensive switching frequency**, where safety and continuity of operation are all-important. Manual operation as standard for all models, allowing tests to be conducted in the absence of any power supply. The contacts used are of a type designed to give top performance both with high and strongly inductive DC loads, and with particularly low loads; inclusion of the magnetic arc blow-out function (optional) helps to achieve a considerable increase in breaking capacity.

**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.

In relays with forcibly guided (mechanically linked) or weld-no-transfer contacts, special design and constructional measures are used to ensure that make (normally-open) contacts can not assume the same state as break (normally-closed) contacts.

- If, when powering up a relay, a NC contact fails to open, the remaining NO contacts must not close, maintaining a contact gap  $\geq 0.5$  mm.
- When the relay is de-energized, if a NO contact fails to open, the remaining NC contact must not close, maintaining a contact gap  $\geq 0.5$  mm.

**EN 61810-3** lays down the standard requirements for relays with forcibly guided contacts. This standard defines two types of relay with forcibly guided contacts, namely:

- Type A: Relay whose contacts are all mechanically linked (forcibly guided).
- Type B: Relay containing mechanically linked contacts and contacts which are not mechanically linked.

In the case of relays that include changeover contacts, either the make circuit or the break circuit of a changeover contact can be considered to meet the requirements of this standard.

Models	Number of contacts	Magnetic arc blow-out
RMG.x2X	6 CO + 2 NC	
RMG.x6X	6 CO + 2 NC	•

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

Coil specifications	RMGExyX - RMGFxyX	RMGRxyX <sup>(2)</sup>
Nominal voltages $U_n$ <sup>(1)</sup>	DC: 24-48-110-125-132-220	DC: 24-36-72-96-110
Consumption at $U_n$ (DC/AC)	3 W	
Operating range	80 - 120 % $U_n$	70 - 125 % $U_n$
Type of duty	Continuous	
Drop-out voltage <sup>(3)</sup>	DC: > 5 % $U_n$	

<sup>(1)</sup> Other values on request.

<sup>(2)</sup> Suitable for application on ROLLING STOCK. Operating range in accordance with EN60077.

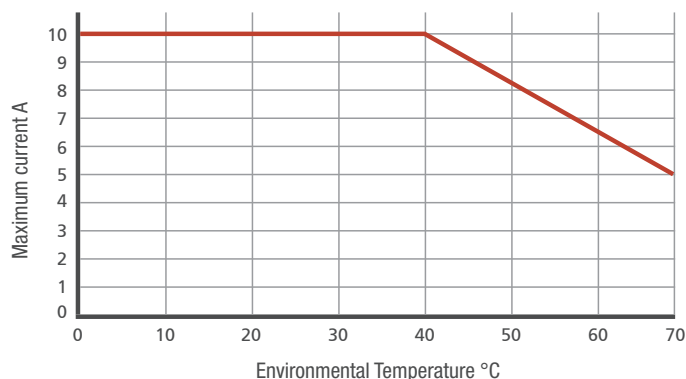
<sup>(3)</sup> Limit value for supply voltage, expressed as % of the nominal value, beneath which the relay is certainly de-energized.

Contact specifications		
	Number and type	6 CO + 2 NA, form C
Current	Nominal	See following graph
	Maximum peak <sup>(1)</sup>	20 A for 1 min - 40 A for 1 s
	Maximum pulse <sup>(1)</sup>	150 A for 10 ms
Example of electrical life expectancy <sup>(3)</sup>		RMG.x2X: 0.5 A - 110 V <sub>DC</sub> - L/R 40 ms - 10 <sup>5</sup> operations - 1,800 operations / hour RMG.x6X: 1 A - 110 V <sub>DC</sub> - L/R 40 ms - 10 <sup>5</sup> operations - 1,800 operations / hour
Minimum load	Standard contacts	200 mW (10 V, 10 mA)
	Gold-plated contact	50 mW (5 V, 5 mA)
Maximum breaking voltage		350 V <sub>DC</sub> / 440 V <sub>AC</sub>
Contact material		AgCdO
Operating time at $U_n$ (ms) <sup>(2)</sup>		DC
Pick-up (NC contact opening)		≤ 35
Pick-up (NO contact closing)		≤ 60
Drop-out (NO contact opening)		≤ 4
Drop-out (NC contact closing)		≤ 45

<sup>(1)</sup> The 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.

<sup>(2)</sup> Unless specified otherwise, the operating times refer to the stabilization of the contact (including bounces).

## Rated current contact



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

INSTANTANEOUS MONOSTABLE  
INSTANTANEOUS MONOSTABLE WITH FORCIBLY GUIDED CONTACTS  
TIME DELAY (ON PICK-UP OR DROP-OUT)  
EXPLANATION OF SOCKET NUMBERING  
FRONT CONNECTION  
BACK CONNECTION  
PCB MOUNT  
RETAINING CLIPS  
KEYING PINS



## Insulation

Insulation resistance (at 500 V <sub>bc</sub> ) between electrically independent circuits and between these circuits and ground between open contact parts	> 10,000 MΩ > 10,000 MΩ
Withstand voltage at industrial frequency between electrically independent circuits and between these circuits and ground between open contact parts between adjacent contacts	2 kV (1 min) - 2.2 kV (1 s) 2 kV (1 min) - 2.2 kV (1 s) 2 kV (1 min) - 2.2 kV (1 s)
Impulse withstand voltage (1.2/50 μs - 0.5 J) between electrically independent circuits and between these circuits and ground between open contact parts	5 kV 5 kV



## Mechanical specifications

Mechanical life expectancy	10 x 10 <sup>6</sup> operations
Maximum switching rate	3,600 operations / hour
Degree of protection	IP50 fitted to socket
Dimensions (mm) <sup>(1)</sup>	45 x 90 x 100
Weight (g)	280

<sup>(1)</sup> Excluding output terminals



## Environmental specifications

Operating temperature	Standard (-13 to 131) °F (-25 to 55) °C Version for railways, rolling stock (-13 to 158) °F (-25 to 70) °C, (85 °C for 10 min), (-40 °C as option)
Storage and shipping temperature	(-13 to 185) °F (-25 to 85) °C
Relative humidity	Standard: 75 % RH, Tropicalized: 95 % RH
Fire behavior	V0



## Standards and reference values

EN 61810-1, EN 61810-2, EN 61810-7 EN 61810-3, type A EN 60695-2-10 EN 60529	All-or-nothing relays Relays with forcibly guided (mechanically linked) contacts, type A Fire behavior 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 items of technical data are referred to ambient temperature 23 °C, atmospheric pressure 96 kPa 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 EN 61373 <sup>(1)</sup> EN 45545-2 ASTM E162, E662	Electric equipment for rolling stock — general service conditions and general rules Shock and vibration tests, CAT 1, Class B Fire behavior, CAT E10, Requirement R26, V0 Fire behavior
--	--

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



## 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 ≥ 2 μ. This treatment ensures long-term capacity of the contact to conduct lower currents.
LED	LED indicator showing presence of power supply, wired in parallel with the coil.
FLYBACK DIODE	Component connected in parallel to the coil (type 1N4007) designed to dampen overvoltages generated by the coil when de-energized.
TRANSIL	Non-polarized component connected in parallel to the coil. Behavior is similar to that of a varistor with faster operating times.
LOW TEMPERATURE	Minimum operating temperature -50 °C, only for rolling stock version (option "L").



## Ordering scheme

Product code	Application <sup>(1)</sup>	Configuration A	Configuration B	Label	Type of power supply	Nominal voltage (V) <sup>(2)</sup>	Finish <sup>(3)</sup>	Keying position <sup>(4)</sup>
RMG	<b>E:</b> Energy <b>F:</b> Railway Fixed Equipment <b>R:</b> Railway Rolling Stock	1: Standard 2: Gold plating + Diode // + LED 3: Diode // 4: Gold plating 5: LED 6: Gold plating + Diode // 7: Diode // + LED	2X: 6 CO contacts + 2 NO 6X: 6 CO contacts + 2 NO with magnetic arc blow-out	F	C: V <sub>dc</sub>	024 - 036 - 048 072 - 096 - 110 125 - 132 - 220	<b>T:</b> Tropicalized coil  <b>L:</b> Low temperature	XX

Example

<b>RMG</b>	<b>E</b>	<b>3</b>	<b>6X</b>	<b>F</b>	<b>C</b>	<b>048</b>	<b>T</b>	
RMGE36XF-C048/T = ENERGY series relay with back EMF suppression diode, magnetic arc blow-out and 48 V <sub>dc</sub> tropicalized coil.								
<b>RMG</b>	<b>R</b>	<b>7</b>	<b>2X</b>	<b>F</b>	<b>C</b>	<b>110</b>		
RMGR72XF-C110 = RAILWAY series relay, equipped with flyback diode and indicator LED and 110 V <sub>dc</sub> coil.								

<sup>(1)</sup> **E = ENERGY:** All applications, except for railway. Suitable on energy production, transport and distribution plants, railways fixed equipment, petrochemical and heavy industry.

**F = RAILWAYS, FIXED EQUIPMENT:** Application on fixed power systems and electrical railway traction. Construction according to RFI (FS Group, Italy) specification no. RFI DPRIM STF IFS TE143 A, if applicable. For the list of RFI approved and conforming products, consult dedicated catalog "RAILWAY SERIES - RFI APPROVED"

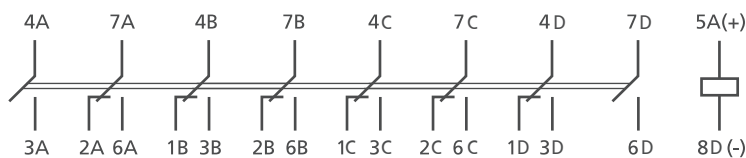
**R = RAILWAYS, ROLLING STOCK:** Application on board rolling stock (rail-tram-trolley vehicles). Electrical specifications according to EN 60077.

<sup>(2)</sup> Other values on request.

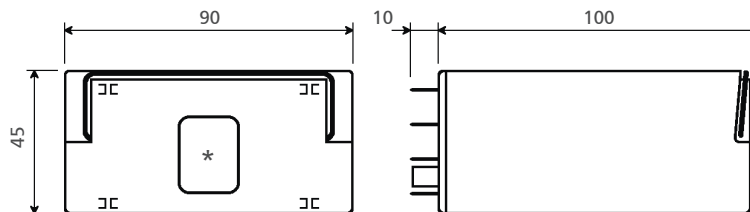
<sup>(3)</sup> Optional value.

<sup>(4)</sup> Optional value. The positive mechanical keying is applied according to the manufacturer's model.

## Wiring diagram

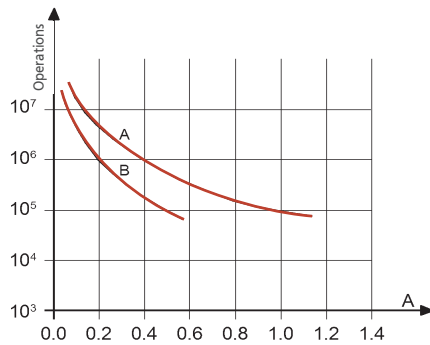


## Dimensions



(\*) access to the manual operating lever.

## Electrical life expectancy



Contact loading: 110 V<sub>DC</sub>, L/R 40 ms

Curve A: RMG.x6X

Curve B: RMG.x2X

RMG.x2X			
U	I (A)	L/R (ms)	Operations
110 V <sub>DC</sub>	0.5	40	100,000
110 V <sub>DC</sub>	0.6	10	300,000
120 V <sub>DC</sub>	0.7	40	50,000
125 V <sub>DC</sub>	1.2	0	1,000,000
220 V <sub>DC</sub>	0.1	40	100,000
220 V <sub>DC</sub>	0.25	10	100,000
U	I (A)	cosΦ	Operations
110 V <sub>AC</sub>	1	1	2,000,000
110 V <sub>AC</sub>	1	0.5	1,500,000
110 V <sub>AC</sub>	5	1	1,000,000
110 V <sub>AC</sub>	5	0.5	500,000
220 V <sub>AC</sub>	0.5	1	2,000,000
220 V <sub>AC</sub>	1	0.5	600,000
220 V <sub>AC</sub>	5	1	650,000
220 V <sub>AC</sub>	5	0.5	600,000

RGG.x7X			
U	I (A)	L/R (ms)	Operations
24 V <sub>DC</sub>	1	0	7,000,000
24 V <sub>DC</sub>	1	40	3,000,000
24 V <sub>DC</sub>	2	40	2,000,000
24 V <sub>DC</sub>	5	0	3,000,000
24 V <sub>DC</sub>	5	40	200,000
24 V <sub>DC</sub>	9	0	800,000
48 V <sub>DC</sub>	5	20	200,000
110 V <sub>DC</sub>	0.4	40	1,000,000
110 V <sub>DC</sub>	1	40	200,000
110 V <sub>DC</sub>	10	0	100,000
U	I (A)	cosΦ	Operations
220 V <sub>AC</sub>	5	0.5	100,000
220 V <sub>AC</sub>	10	1	100,000
230 V <sub>AC</sub>	1	0.7	2,500,000
230 V <sub>AC</sub>	3	0.7	1,200,000

Switching frequency: 1,200 operations / hour

## Sockets and retaining clips

Type of installation	Type of outputs	Model	Retaining clip
Wall or DIN rail mounting	Screw	96IP20-I DIN	RG48
	Spring clamp	PAIR320	
Flush mounting	Double faston (4.8 × 0.8 mm)	ADF4-E1	
	Spring clamp	PRIR321	

## Mounting tips

- The preferred mounting position is on the wall, with the relay positioned horizontally in the reading direction on the nameplate.
- For correct use of the relays, they should be spaced apart by at least 5 mm in the horizontal direction and 20 mm in the vertical direction. This is to allow correct upward dissipation of the heat generated by the coil. Set these distances according to the socket used. Distances can be reduced depending on the environmental application conditions and on the relay duty cycle.
- For safe and secure operation, it is advisable to use retaining clips.
- No special maintenance is required.
- Condensation can form inside the relay when powered up and the outside ambient temperature is cold; this is quite normal and does not affect the operation of the relay. The plastic materials of the relay do not possess hygroscopic properties.