



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



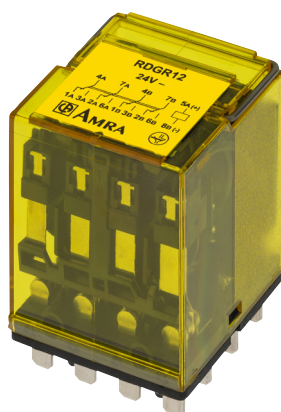
Petroleum industry



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 ≥ 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 ≥ 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 Un	DC: 24-36-48-72-96-110-125 ⁽¹⁾	
Consumption at Un	2.2 W	2.7 W
Operating range	80 ÷ 115 % Un	
Operating range for rolling stock version ⁽²⁾	70 ÷ 125 % Un	
Type of duty	Continuous	
Drop-out voltage ⁽³⁾	DC: > 5% Un	

(1) Other values on request.

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

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

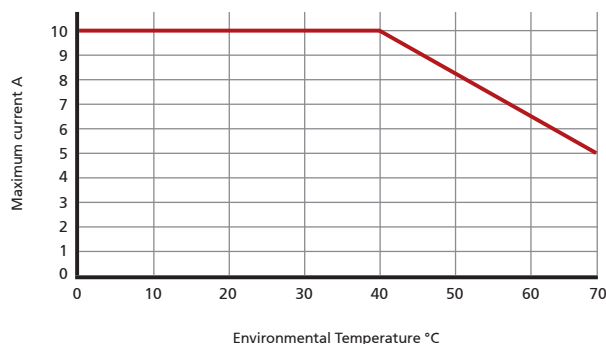


Contact specifications	RCG		RDG	
Number and type	2 CO, form C		4 CO, form C	
Current	See the following chart			
Nominal	13A for 1min - 20A per 1s			
Maximum peak ⁽¹⁾	100A for 10ms			
Maximum pulse ⁽¹⁾				
Example of electrical life ⁽²⁾	Standard :		RCG.x2 / RDG.x2: 0.2A - 110Vdc - L/R 40ms - 5x10 ⁵ man. *	
* 1.200 oper./h	With Magnetic arc blowout:		RCG.x6 / RDG.x6: 0.5A - 110Vdc - L/R 40ms - 1.5x10 ⁵ man. *	
** 600 oper./h	With HIGH POWER Magn. arc blowout:		RCG.x8 / RDG.x8: 0.7A - 132Vdc - L/R 40ms - 7x10 ⁴ oper. **	
Minimum load	100mW (10V, 5mA)			
Standard contacts	50mW (5V, 5mA)			
Gold-plated contact				
Making capacity	30 A - 110Vdc - L/R 0 ms: 2,000 operations			
Maximum breaking voltage	250 Vdc / 300 Vac			
Contact material	AgSnO ₂ (mobile contacts) - AgNi (fixed contacts)			
Operating time at Un (ms) ⁽³⁾	Standard	Avec 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

(1) The max. 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) For other examples, see electrical life expectancy table.

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





Insulation

Insulation resistance (at 500Vdc) 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 adjacent contacts between open contact parts	4 kV (1 min) 3 kV (1 min) 3.5 kV (1 min) 2 kV (1 min)
Impulse withstand (1.2/50µs - 0.5J) between electrically independent circuits and ground between open contact parts	5 kV 3 kV



Mechanical specifications

Mechanical life expectancy	20x10 ⁶ operations	
Maximum switching rate	Mechanical	3,600 operations / h
Protection rating (with relay mounted)	IP50	
	RCG	RDG
Dimensions (mm)	40x20x50 ⁽¹⁾	40x40x50 ⁽¹⁾
Weight (g)	60	115

(1) Excluding output terminals



Environmental characteristics

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



Standards and reference values

EN 61810-1, EN 61810-7 EN 61810-3, type A EN 60695-2-10 EN 60529 EN 61000-4	Electromechanical elementary relays Relays with forcibly guided (mechanically linked) contacts, type A Fire behavior Degree of protection provided by enclosures Electromagnetic compatibility
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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 ±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 ⁽¹⁾	Shock and vibration tests, Cat 1, Class B
EN 45545-2	Fire behavior, HL3 : Cat E10 (Requirement R26)
ASTM E162, E662	Fire behavior

(1) only for RDGR family: permissible opening time of contacts on a de-energized relay t<100µs



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 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°C, only for rolling stock version (option "L").



Ordering scheme

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

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

1. **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 TE143 A, if applicable for list of RFI approved and conforming products, consult dedicated catalog "RAILWAY SERIES - RFI APPROVED"

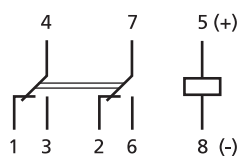
RAILWAYS, ROLLING STOCK: application on board rolling stock. Electrical characteristics according to EN60077.

2. Other values on request.

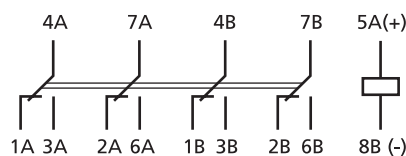
3. Optional value.

4. Optional value. The positive mechanical keying is applied according to the manufacturer's model.

Wiring diagram

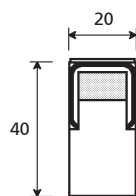


RCG

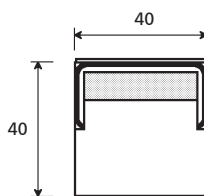


RDG

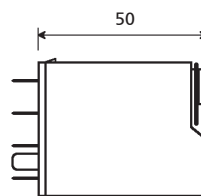
Dimensions



RCG



RDG



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
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

RCG.16, RDG.16 (with magnetic arc blow-out)			
U	I (A)	L/R (ms)	Operations
110Vdc	0.2	40	1,000,000
110Vdc	0.5	40	150,000
110Vdc	0.6	10	300,000
110Vdc	1	10	100,000
220Vdc	0.2	10	100,000
U	I (A)	cosφ	Operations
110Vac	1	1	2,000,000
110Vac	1	0.5	1,500,000
110Vac	5	1	950,000
110Vac	5	0.5	500,000
220Vac	0.5	1	2,000,000
220Vac	1	0.5	800,000
220Vac	5	1	600,000
220Vac	5	0.5	500,000

RCG.18, RDG.18 (with HIGH POWER magnetic arc blow-out)			
U	I (A)	L/R (ms)	Operations
24Vdc	1	0	5,100,000
24Vdc	2	0	3,900,000
24Vdc	3	0	2,900,000
24Vdc	4	0	2,600,000
24Vdc	5	0	2,200,000
24Vdc	1	20	2,700,000
24Vdc	2	20	2,100,000
24Vdc	3	20	1,500,000
24Vdc	3.5	20	1,000,000
24Vdc	1	40	2,000,000
24Vdc	2	40	1,500,000
24Vdc	3	40	1,100,000
24Vdc	3.5	40	800,000
110Vdc	0.3	0	1,000,000
110Vdc	0.5	0	700,000
110Vdc	1	0	190,000
110Vdc	0.3	20	450,000
110Vdc	0.5	20	260,000
110Vdc	1	20	100,000
110Vdc	0.3	40	300,000
110Vdc	0.5	40	180,000
110Vdc	0.6	40	150,000
110Vdc	0.7	40	100,000
132Vdc	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 ⁽¹⁾	65	VM1841

(1) 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 maximum reliability in 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.