



RELAYS

RGK SERIES with forcibly guided contacts

USER SECTORS



Power generation



Nuclear



Power transmission



Rolling Stock



Fixed railway installations



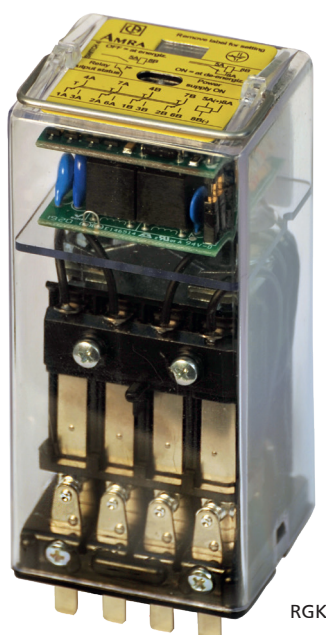
Shipbuilding



Petroleum industry



Heavy industry



RGK



PRODUCT ADVANTAGES

- Plug-in monostable timed relay, "pick-up" or "drop-out" function
- Forcibly guided (mechanically linked) contacts, relay compliant with EN 61810-3, tipo A
- Weld-no-transfer technology
- Wide time setting range from 0.1s to more than 16 hours, great accuracy over the entire adjustment range
- Suitable for safety applications
- Operation with d.c. and/or a.c. power supply
- Self-cleaning knurled contacts
- Magnetic arc blow-out for higher breaking capacity
- Led optical indicators monitoring power supply and timer status

DESCRIPTION

The relays in the **RGK series** 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 system. Timing is managed by high reliability electronic, made with professional components. The electronic is immune to strong EMC interference, typical of high voltage electricity distribution stations.

Switching times ranging from 0.1s to over 16 hours, providing extreme accuracy over the entire setting range. This is made possible by the fact that the relay offers intermediate scales, which the user can select by means of rotary switches. The timing function can be set in two modes: "pick-up" or "drop-out".

The types of contacts allow obtaining remarkable performance levels both for high, very inductive loads or very low loads; the 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 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 ≥ 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 defines the requirements for relays with forcibly guided contacts. This standard defines two types of relay with forcibly guided contacts:

- 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	Function
RGK.x7X	4	•	Pick-up / Drop-out

MONOSTABLE
INSTANTANEOUS



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

Coil specifications	RGKE	RGKR
Nominal voltages Un	AC/DC: 24-36-48-72-96-110-125-230 ⁽¹⁾	
Consumption at Un (DC/AC)	3.5W	
Operating range	80...120% Un	70...125% Un
Type of duty	Continuous	
Drop-out voltage ⁽²⁾	> 5% Un	

INSTANTANEOUS
MONOSTABLE WITH
FORCIBLY GUIDED
CONTACTS

BISTABLE

(1) Other values on request.

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

FAST-ACTING
(MONOSTABLE
AND BISTABLE)

Contact specifications	
Number and type	4 CO, form C
Current	12A
Nominal ⁽¹⁾	20A for 1min - 40A for 1s
Maximum peak ⁽²⁾	150A for 10ms
Maximum pulse ⁽²⁾	
Example of electrical life expectancy ⁽³⁾	1A - 110Vdc - L/R 40 ms - 10 ⁵ operations - 1,800 operations/hour
Minimum load	200 mW (10 V, 10 mA)
Standard contacts	50 mW (5 V, 5 mA)
Gold-plated contact	
Maximum breaking voltage	350 VDC / 440 VAC
Contact material	AgCdO
Operating time at Un (ms) ⁽⁴⁾	DC / AC
Pick-up (NC contact opening)	≤ 20
Pick-up (NO contact closing)	≤ 35
Drop-out (NO contact opening)	≤ 10
Drop-out (NC contact closing)	≤ 53

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

TIME DELAY WITH
FORCIBLY GUIDED
CONTACTS

MEASUREMENT

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

(2) 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.

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

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

SOCKET
NUMBERING
EXPLANATIONS

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)
between adjacent contacts	2 kV (1 min) - 2.2 kV (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	4 kV

FRONT
CONNECTION

BACK
CONNECTION

Mechanical specifications	
Mechanical life expectancy	10x10 ⁶ operations
Maximum switching rate	3,600 operations/h
Mechanical	
Degree of protection	IP40
Dimensions (mm)	45x50x112 ⁽¹⁾
Weight (g)	300

PCB MOUNT

RETAINING CLIPS

(1) Excluding output terminals

KEYING



Environmental specifications

Operating temperature	Standard	-25 to 55°C
Version for railways, rolling stock		-25 to 70°C
Storage and shipping temperature		-40 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 61812	Electromechanical elementary relays
EN 61810-3, type A	Relays with forcibly guided (mechanically linked) contacts
EN 61812-1	Timer relays
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 96kPa and 50% humidity.
Tolerance for coil resistance, nominal electrical input and nominal power is $\pm 7\%$.



Railways, rolling stock - Standards

EN 60077	Electric equipment for rolling stock - General service conditions and general rules
EN 50155	Electronic equipment used on rolling stock
EN 61373 ⁽¹⁾	Shock and vibration tests, Cat 1, Class B
EN 45545-2	Fire behavior, Cat E10, Requirement R26, V0
ASTM E162, E662	Fire behavior

(1) Permissible opening time of contacts on a de-energized relay $t < 3\text{ms}$.



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 $\geq 2\mu$. This treatment ensures long-term capacity of the contact to conduct lower currents.



Ordering scheme

Product code	Application ⁽¹⁾	Configuration A	Configuration B	Label	Type of power supply	Nominal voltage (V) ⁽²⁾	Finish ⁽³⁾
RGK	E: Energy R: Railway, Rolling Stock	1: Standard 4: Gold plating	7X: 4 CO contacts with magnetic arc blow-out	F	T: Vdc + Vac 50 Hz	024 - 036 - 048 072 - 096 - 110 125 - 230	T: Tropicalized coil

(1) **ENERGY**: all applications except for rolling stock applications.

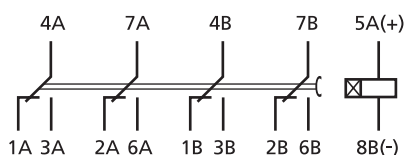
RAILWAYS, ROLLING STOCK: application on board rolling stock (wire-rail-tramway vehicles). Electrical characteristics according to EN60077.

(2) Other values on request.

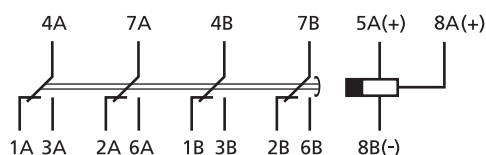
(3) Optional value.

RGK	E	1	7X	F	T	048	T
RGKE17XF-T048T = ENERGY series standard relay and 48Vdc tropicalized coil.							
RGK	R	4	7X	F	T	110	
RGKR47XF-T110 = ROLLING STOCK railway series relay, gold-plated contacts and 110Vdc coil.							

Wiring diagram

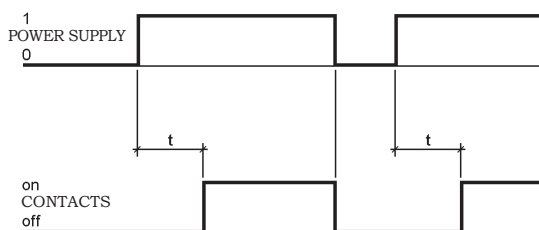


Pick-up diagram

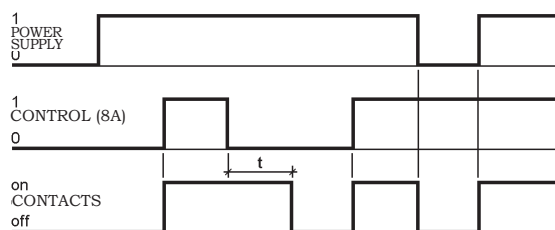


Drop-out diagram

Functional diagram



Pick-up delay



Drop-out delay



Time delay - Switching time setting

Time setting	By means of DIP switches and selectors
Time setting range	100 ms ... 990 min
Intermediate scales	6 (0.99 - 9.9 - 99 - 990 seconds / 99 - 990 minutes)
Resolution of switching time setting	1/100 of selected scale
Operating accuracy (0.8...1.1 Un, t=20°C) ⁽¹⁾	± 3 % at the beginning of scale - ±0.5 % at full scale time
Accuracy, repeatability	± 2 %
Reset	< 200 ms
Insensitivity to voltage drops	< 100 ms
Indication	Red led = presence of power supply Green led = status of relay outputs (lights up with relay energized)

(1) Additional error for drop-out versions: 100 ms

Time lag and function are set through a 4-bit DIP switch and two rotary selectors located on the front of the relay (see "FRONT"). These are accessible by removing the relay identification plate.

SETTINGS – Removing the plate

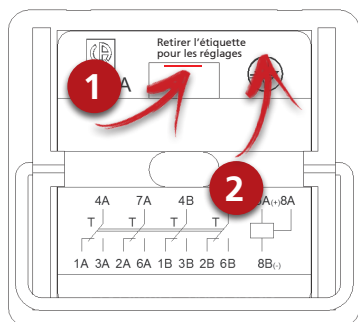
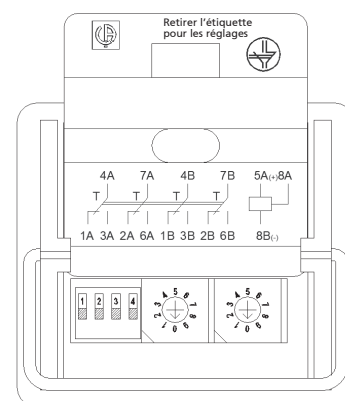


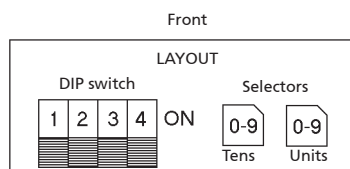
Plate is placed on the front of the cover.

To remove the plate:

1. Slightly lift the plate, by acting on the point shown in picture
2. Push upwards the plate.



SETTINGS – Time lag and function



1-2-3 = select scale
4 = select function
OFF = Pick-up
ON = Drop-out

Scales / Setting range			Switch position		
Min	Max	Unit of measure	1	2	3
10	99	Hundredths (0.01s)	OFF	ON	OFF
1	99	Tenths (0.1s)	OFF	ON	ON
1	99	Seconds	ON	OFF	OFF
1	99	Seconds x 10	ON	OFF	ON
1	99	Minutes	ON	ON	OFF
1	99	Minutes x 10	ON	ON	ON

Table 1

Function : acts on DIP switch no. 4.

- OFF: Pick-up function
- ON: Drop-out function

Time lag :

Settings are possible from 100 ms up to 990 minutes.

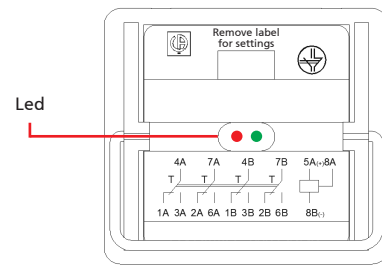
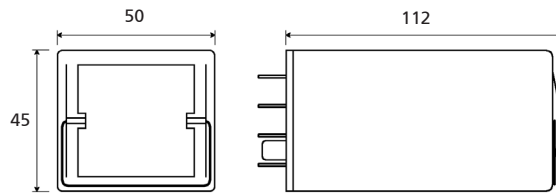
1. Selects the RANGE: acts on DIP switch no. 1, 2, 3.

2. Selects the TIME LAG: acts on rotary selectors

Selects the RANGE: 6 ranges are available. Move DIP switches 1, 2, 3 to "ON" or "OFF" position to obtain the desired range, as shown in TABLE 1. The range should be the next higher than the value of the required time lag. E.g. Time lag: 1'14" = 74 seconds. Closest range: 99 seconds.

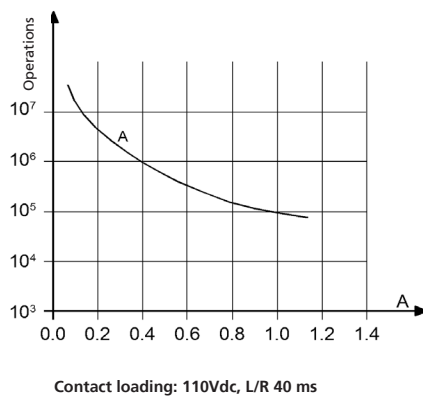
Selects the TIME LAG: time lag could be set by step of 1% of the selected range. Move rotary selectors to obtain the desired time. E.g. Time lag: 1'14" = 74 seconds. "TENS" selector on "7" + "UNIT" selector on "4".

Dimensions



Electrical life expectancy

Some examples of electrical life expectancy



RGK.x7X			
U	I (A)	L/R (ms)	Operations
24 Vdc	1	0	7,000,000
24 Vdc	1	40	3,000,000
24 Vdc	2	40	2,000,000
24 Vdc	5	0	3,000,000
24 Vdc	5	40	200,000
24 Vdc	9	0	800,000
48 Vdc	5	20	200,000
110 Vdc	0.4	40	1,000,000
110 Vdc	1	40	100,000
110 Vdc	10	0	100,000
U	I (A)	cosφ	Operations
220 Vac	5	0.5	100,000
220 Vac	10	1	100,000
230 Vac	1	0.7	2,500,000
230 Vac	3	0.7	1,200,000

Sockets and retaining clips

Type of installation	Type of outputs	Model	Retaining clip
Wall or DIN rail mounting	Screw	48BIP20-I DIN	RGL48
	Spring clamp	PAIR160	
Flush mounting	Spring clamp	PRIR160	RGL48
	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 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.