

Instantaneous monostable relay 2-4-6-8-12 contacts

1.1

POK SERIES



POK



BIPOK



TRIPOK



QUADRIPOK

OVERVIEW

- Compact plug-in monostable instantaneous relays
- Solid and rugged construction for heavy or intensive duty
- Considerable long-life
- Independent and self-cleaning contacts
- Separate arc breaking chambers
- Magnetic arc blow-out standard
- Excellent shock and vibration resistance
- Option for use in geothermal sites available
- Also available in current-monitoring version
- Also available in PCB-mount version
- Wide variety of configurations and customizations
- Wide range of sockets
- Retaining clip for secure locking of relay on socket
- Transparent cover, pull-out handle
- Positive mechanical keying for relay and socket

APPLICATIONS



Shipbuilding



Petroleum industry



Heavy industry



Power generation



Power distribution



Railway equipment



Rolling stock

DESCRIPTION

The POK series is made up of 5 basic models, created from a single module with 2 contacts that can be used in multiple combinations to provide solutions with 2 - 4 - 6 - 8 and 12 change-over contacts.

The construction of the relays and careful choice of the materials are such that they ensure long life and considerable ruggedness even in harsh operating environments and in the presence of strong temperature fluctuations.

A specific treatment (P5GEO or P6GEO) combining coil tropicalization with gold-plated contacts allows the use of these items in geothermal electric power stations, as relays for signalling functions, for controlling intermediate devices and for all non-power circuits. Excellent electrical and mechanical performance levels allow the product to be used in the most demanding of sectors such as, for example, control and signalling functions in electricity generating stations, electrical transformer stations, rail transport or in industries with continuous production processes (chemical industry, petroleum industry, rolling mills, cement factories, etc.). Above all, the excellent ability to withstand shock and vibration allow their use on rolling stock.

Safe and reliable operation is guaranteed by

- Contact terminals without connecting braids and soldered joints. The terminals connecting with the socket are provided by a direct extension of the contacts.
- Mechanism without return springs.
- Adoption of all-metallic operating mechanism, unaffected by the thermal ageing that typically degrades organic materials, such as plastics.
- Excellent shock and vibration resistance.
- Notable resistance to high operating temperatures and high thermal shocks.

The self-cleaning contacts are independent, being anchored neither one to another nor to a common operating mechanism. Positioned in separate chambers, they enable better breaking of the arc. In addition, they are equipped with magnetic arc blow-out, guaranteeing a particularly efficient break of direct current loads. The common contact is mounted to a separate return device, consisting in a flexible blade designed to ensure uniformity of the pressures on break contacts. Given their dimensions and specifications, POK relays provide the logical complement to power relays of the OK series.

Models	Number of contacts	Nominal current	Rolling stock application
POK	2	5 A	•
POKS	2	10 A	•
BIPOK	4	5 A	•
BIPOKS	4	10 A	•
TRIPOK	6	5 A	•
TRIPOKS	6	10 A	•
QUADRIPOKS	8	10 A	•
ESAPOKS	12	10 A	

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

Coil data	POK - POKS	BIPOK - BIPOKS	TRIPOK - TRIPOKS	QUADRIPOKS	ESAPOKS
Nominal voltages Un ⁽¹⁾	DC: 12-24-36-48-72-96-110-125-132-144-220		AC: 12-24-48-110-127-220-230		
Max. consumption at Un (DC/AC)	2.5W / 3.5 VA	3W / 4 VA	3.5W / 5.5 VA	6W / 8 VA	7W / 11 VA
Operating range ⁽¹⁾	DC: 80...115% Un		AC: 85...110% Un		
Rolling stock version ^{(2) (3)}	DC: 70...125% Un				
Type of duty	Continuous				
Drop-out voltage ⁽⁴⁾	DC: > 5% Un		AC: > 15% Un		

1. Other values on request. For ESAPOKS, values > 24V.

2. See "Ordering scheme" table for order code.

3. For operating ranges different to that specified by EN60077, refer to table "Railways, rolling stock - Special operating ranges".

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

Contact data	POK - POKS	BIPOK - BIPOKS	TRIPOK - TRIPOKS	QUADRIPOKS	ESAPOKS
Number and type	2 SPDT, Form C	4 SPDT, Form C	6 SPDT, Form C	8 SPDT, Form C	12 SPDT, Form C
	POK - BIPOK - TRIPOK		POKS - BIPOKS - TRIPOKS - QUADRIPOKS - ESAPOKS		
Current	Nominal ⁽¹⁾		10 A		
	Maximum peak (1 min) ⁽²⁾		20 A		
	Maximum pulse (10 ms) ⁽²⁾		150 A		
Example of electrical life expectancy ⁽³⁾	1800 operations/h		1 A - 110 Vdc - L/R 0 ms : 10 ⁵ operations		
	0.2 A - 110 Vdc - L/R 40 ms : 10 ⁵ operations		0.5 A - 110 Vdc - L/R 40 ms : 10 ⁵ operations		
Minimum load	Standard contacts		500 mW (20V, 20 mA)		
	Gold-plated contact P4GEO ⁽⁴⁾		100 mW (10V, 5 mA)		
	Gold-plated contact P8 ⁽⁴⁾		50 mW (5V, 5 mA)		
Maximum breaking voltage	250 Vdc / 350 Vac				
Contact material	AgCu		Ag / AgCu		
Operating time at Un (ms) ^{(5) (6)}	DC - AC				
Pick-up (NO contact closing)	≤ 20 - ≤ 20	≤ 25 - ≤ 25	≤ 25 - ≤ 25	≤ 25 - ≤ 25	≤ 25 - ≤ 25
Drop-out (NC contact closing)	≤ 15 - ≤ 20	≤ 20 - ≤ 40	≤ 20 - ≤ 45	≤ 20 - ≤ 40	≤ 20 - ≤ 45

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 values, see electrical life expectancy curves.

4. Specifications of contacts on new relay

a. Plating material: **P4GEO**: gold-nickel alloy (>6μ) **P8**: gold-cobalt alloy (>5μ), knurled contact

b. When the gold-plated contact is subject to heavy loads, it will be degraded on the surface. In this case, the characteristics of the standard contact should be taken into consideration. This does not impair relay operation.

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

6. Addition of a flyback diode connected in parallel with the coil (DC version only) causes an increase in operating time when the relay drops out.

Insulation	
Insulation resistance (at 500Vdc)	
between electrically independent circuits and between these circuits and ground	> 1,000 MΩ
between open contact parts	> 1,000 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	1 kV (1 min) - 1.1 kV (1 s)
between adjacent contacts	2.5 kV (1 min) - 3 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	3 kV

Mechanical specifications



Mechanical life expectancy		DC: 20 x 10 ⁶ AC: 10 x 10 ⁶ operations			
Maximum switching rate		3,600 operations / hour			
Degree of protection (with relay mounted)		IP40			
	POK-POKS	BIPOK-BIPOKS	TRIPOK-TRIPOKS	QUADRIPOKS	ESAPOKS
Dimensions (mm) ⁽¹⁾	20 x 50 x 45	40 x 50 x 45	60 x 50 x 45	80 x 61 x 45	120 x 50 x 45
Weight (g)	~ 90	~ 170	~ 250	~ 340	~ 520

1. Output terminals excluded.

Environmental specifications



Operating temperature	Standard	-25° to +55°C
	Version for railways, rolling stock	-25° to +70°C
Storage and shipping temperature		-50° to +85°C
Relative humidity		Standard: 75% RH - Tropicalized: 95% RH
Resistance to vibrations		5g - 10 to 55 Hz - 1 min
Resistance to shock		20g - 11 ms
Fire behaviour		V0

Standards and reference values



EN 61810-1, EN 61810-2, EN 61810-7 EN 60695-2-10 EN 50082-2 EN 60529	Electromechanical elementary relays Fire behaviour Electromagnetic compatibility Degree of protection provided by enclosures
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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 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



EN 60077	Electric equipment for rolling stock - General service conditions and general rules
EN 50155	Electronic equipment used on rolling stock
EN 61373	Shock and vibration tests, Cat 1, Class B
EN 45545-2	Fire behaviour, Cat E10, Requirement R26, V0
NF F 16-101/102	Fire behaviour, Cat A1 rolling stock
ASTM E162, E662	Fire behaviour
UNI CEI 11170-3	Fire behaviour, Level of risk 4

Railways, rolling stock - Special operating ranges for POK(s) - BIPOK(s) relays ⁽¹⁾



Nominal voltage	Minimum pick-up voltage	Maximum operating voltage	Order symbol ⁽¹⁾
24 Vdc	18	33	Z01
24 Vdc	16	32	Z02
24 Vdc	16,8	32	Z03
24 Vdc	19	30	Z04
36 Vdc	28	46	Z01
72 Vdc	55	104	Z01
72 Vdc	55	96	Z02
110 Vdc	77	144	Z01

(1) 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

P2	Tropicalization of the coil with epoxy resin for use with 95% RH (@ T 50 °C). This treatment also protects the coil against corrosion which could occur by combination of the humidity with certain chemical agents, such as those found in acid atmospheres (typical of geothermal power stations) or saline atmospheres.
P4GEO	Gold plating of contacts with gold-nickel alloy, thickness $\geq 6\mu$. This treatment ensures long-term capacity of the contact to conduct lower currents in harsh ambient conditions such as acid atmospheres (typical of geothermal power stations) or saline atmospheres.
P5GEO	P4GEO gold-plating of contacts + P2 coil tropicalization.
P6GEO	P4GEO type gold-plating, but applied to contacts, contact terminals and output terminals + P2 coil tropicalization.
P7	AgCdO (silver cadmium oxide) contacts.
P8	Gold plating of contacts with gold-cobalt alloy, thickness $\geq 5\mu$, knurled fixed contact. This finish allows further improvement of the performance provided by gold-plated contact, compared to P4GEO treatment.
LED	LED indicator showing presence of power supply, wired in parallel with the coil.
FLYBACK DIODE	Polarized component connected in parallel with the coil (type 1N4007 or BYW56 for rolling stock version) designed to suppress overvoltages generated by the coil when de-energized.
VARISTOR	Non-polarized component connected in parallel with the coil, designed to suppress overvoltages higher than the clamping voltage, generated by the coil when de-energized.
TRANSIL	Non-polarized component connected in parallel with the coil. Behaviour 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").
C.S.	PCB-mount version (for POK-POKS-BIPOK-BIPOKS only).



Ordering scheme

Model	Number of SPDT contacts	Product code	Application ⁽¹⁾	Configuration A	Configuration B	Type of power supply	Nominal voltage (V) ⁽²⁾	Keying position ⁽³⁾ / option
POK	2 - 5A	POK	E: Energy	1: Standard	0: Standard	C: Vdc A: Vac 50 Hz H: Vac 60 Hz	012 - 024 - 036 048 - 072 - 096 100 - 110 - 125 127 - 132 - 144 220 - 230	XXX CS = PCB-mount version L = low temperature
POKS	2 - 10A	POKS	F: Railway Fixed Equipment	2: Diode //	2: P2			
BIPOK	4 - 5A	BPOK		3: Varistor	4: P4 GEO			
BIPOKS	4 - 10A	BPOKS		4: Led	5: P5 GEO			
TRIPOK	6 - 5A	TPOK		5: Diode // + Led	6: P6 GEO			
TRIPOKS	6 - 10A	TPOKS	R: Railway Rolling Stock	6: Varistor + Led	7: P7			
QUADRIPOKS	8 - 10A	QPOK		7: Transil	8: P8			
ESAPOKS	12 - 10A	EPOK		8: Transil + Led				

Example

TPOKS	E	3	0	A	230	
TPOKSE30-A230 - TRIPOKS relay, ENERGY series, nominal voltage 230 Vac, equipped with varistor						
BPOKS	R	5	8	C	024	
BPOKSR58-C024 - BIPOKS relay, ROLLING STOCK series, nominal voltage 24 Vdc, equipped with diode, LED, with P8 finish (gold-plated contacts)						
POK	R	1	0	C	110	L
POKR10 - C110 L - POK relay, rolling stock series, nominal voltage 110 Vdc with option "L" (low temp.)						

(1) **ENERGY:** all applications except for railways.

RAILWAYS, FIXED EQUIPMENT: application on fixed power systems and electrical railway traction. Construction according to RFI (FS Group) specification no. RFI DPRIM STF IFS TE 143 A, if applicable. For list of RFI approved and conforming products, consult dedicated catalogue "RAILWAY SERIES – RFI APPROVED".

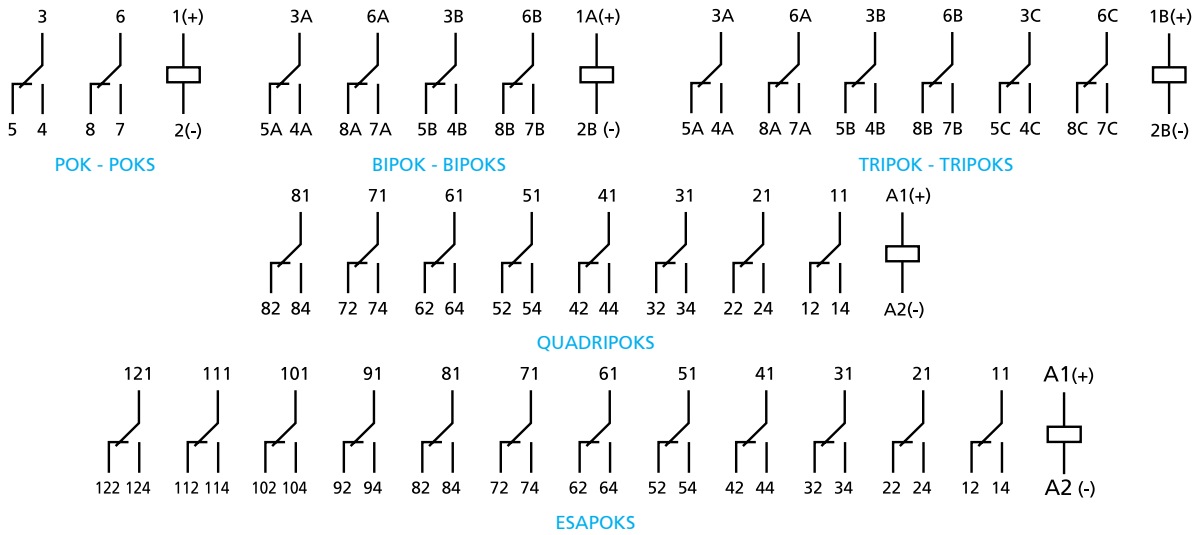
RAILWAYS, ROLLING STOCK: excluding ESAPOKS. Application on board rolling stock (rail-tram-trolley vehicles). Electrical characteristics according to EN60077.

Also available is the STATIONS series, with ENEL approved material meeting LV15/LV16 specifications. For the list of ENEL approved and conforming products, consult the dedicated catalogue "STATIONS SERIES – LV15-LV16-LV20".

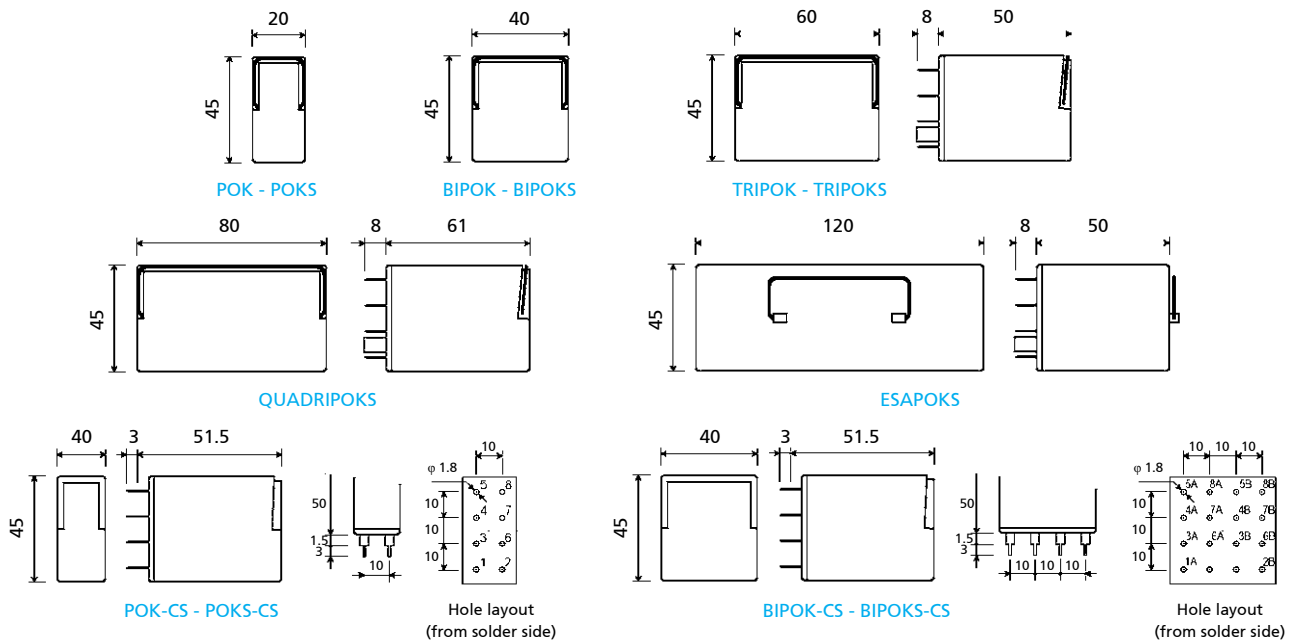
(2) Other values on request.

(3) Optional value. PCB-mount version available for POK - POKS - BIPOK - BIPOKS only. Multiple selection possible (e.g. CS - L). The positive mechanical keying is applied according to the manufacturer's model (not available for PCB-mount versions).

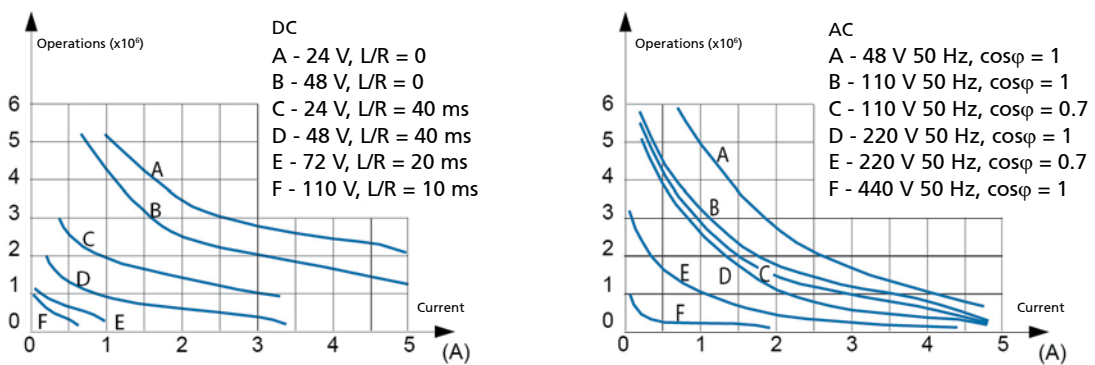
Wiring diagram



Dimensions



Electrical life expectancy



Some examples of electrical life expectancy

- 48Vdc - 5 A - L/R = 10 ms : 5×10^5 operations
- 80Vdc - 5 A - Resistive : 5×10^5 operations
- 110Vdc - 0.5 A - L/R = 10 ms : 5×10^5 operations

- 220Vdc - 0.2 A - L/R = 10 ms : 10^5 operations
- 110Vac - 5 A - $\cos\phi = 0.7$: 5×10^5 operations
- 220Vac - 3 A - $\cos\phi = 0.7$: 5×10^5 operations
- 440Vac - 0.2 A - Resistive : 5×10^5 operations

Sockets	POK - POKS	BIPOK - BIPOKS	TRIPOK - TRIPOKS	QUADRIPOKS	ESAPOKS
Number of terminals	8	16	24	32	48
For wall or rail mounting					
Spring clamp, wall or DIN H35 rail mounting	PAIR080	PAIR160	PAIR240	PAIR320	PAIR480
Screw, wall or DIN H35 rail mounting	50IP20-I DIN	48BIP20-I DIN	78BIP20-I DIN	96IP20-I DIN	156IP20-I DIN
Screw, wall mounting	50L	48BL	78BL	96BL	156BL
Double faston, wall mounting	51L	48L	78L	-	-
For flush mounting					
Double faston (4.8 x 0.8 mm)	ADF1	ADF2	ADF3	ADF4	ADF6
Screw	53IL	43IL	73IL	-	-
For mounting on PCB					
	65 ⁽¹⁾	65	-	-	-

(1) Suitable for mounting 2 relays side by side.

Retaining clips – correspondence with sockets	POK - POKS	BIPOK - BIPOKS	TRIPOK - TRIPOKS	QUADRIPOKS	ESAPOKS
Number of clips per relay	1	1 ⁽¹⁾	2	2	2
SOCKET MODEL	CLIP MODEL				
For wall or rail mounting					
PAIR080, PAIR160, PAIR240, PAIR320, PAIR480	RPB48	RPB48	RPB48	RQ48	RPB48
50IP20-I DIN, 48BIP20-I DIN, 78BIP20-I DIN, 96IP20-I DIN, 156IP20-I DIN	RPB48	RPB48	RPB48	RQ48	RPB48
50L, 48BL, 78BL, 96BL, 156BL	RPB48	RPB48	RPB48	RQ48	RPB48
51L, 48L, 78L	RPB48	RPB48	RPB48	-	-
For flush mounting					
ADF1, ADF2, ADF3, ADF4, ADF6	RPB48	RPB48	RPB48	RQ48	RPB48
ADF, 53IL, 43IL, 73IL ⁽²⁾	RPB43	RPB43	RPB43	-	-
For mounting on PCB					
65	RPB43	RPB43	-	-	-

(1) Assume two clips for use on rolling stock.

(2) Insert the clip before fastening the socket on the panel.

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.