LOGIC RELAYS: FLASHERS & ONE-SHOT

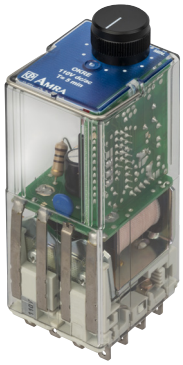
TOK-L | OKRE-L | TOK-FP | OKRE-FP CLE SERIES

USER SECTORS

- Power generation
- Nuclear
- Power transmission
- Rolling Stock
- Fixed railway installations
- Shipbuilding
- Petroleum industry
- Heavy industry

TOK Series

OKRe Series,
flat head slotted screw
setting control



OKRe Series,
knob setting control

PRODUCT ADVANTAGES

- "L": flasher function with symmetrical output pulse, adjustable or fixed
- "FP": one-shot function, adjustable
- Wide range of time settings available
- Solid and rugged construction for heavy or intensive duty
- Long life expectancy
- Patent operating mechanism, designed to ensure high contact pressure (TOK)
- Independent and self-cleaning contacts
- Magnetic arc blow-out standard
- Excellent shock and vibration resistance
- 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

DESCRIPTION

5 models of **"FLASHER"** or **"ONE SHOT"** logic relays are available, derived from the TOK and OKR series. The **TOK-L, OKRe-L and CLE models** are flasher type relays, whereas the **TOK-FP** and **OKRe-FP** models are one-shot relays. The relays in the TOK series provide higher breaking capacity and longer mechanical life expectancy than those in the OKR / CLE series.

Flasher relays: when the component is energized, the coil of the relay is piloted by an electronic circuit, delivering voltage pulses in a continuous symmetrical ON/OFF cycle. Accordingly, the contacts change status cyclically, for as long as the control voltage is applied to the circuit. These relays can be specified with an adjustable or fixed intermittence frequency; in the case of an adjustable frequency, the setting is made by way of a potentiometer having a knob type or flat head slotted screw type control.

One-shot relay: Lorsque le relais est alimenté, la bobine when the component is energized, the coil of the relay is piloted by an electronic circuit, delivering voltage pulses. Accordingly, the contacts change status instantaneously and return to the break conditions after a predetermined interval of time, even with the control voltage applied to the circuit. Relays can be provided with a pulse of adjustable duration or a pulse of fixed duration. In the case of an adjustable pulse, the setting is made by way of a potentiometer having a knob type or a flat head slotted screw type control.
Excellent electrical and mechanical performance levels allow the product to be used in the most demanding of sectors such as, for example, in electricity generating stations, electrical transformer stations, rail transport or in industries using continuous production processes (chemical and petrochemical, rolling mills, cement factories, etc.). In particular, with their notable shock and vibration resistance, they are ideal for use on rolling stock.

Models	Logic Function	Number of contacts	Range of contacts	Output	Setting control		Rolling stock application
					Knob	Flat head slotted screw	
OKRe-L	Flasher	4	5A	50%ON / 50%OFF adjustable up to 1h	•	•	•
TOK-L		4	10A	50%ON / 50%OFF adjustable up to 1h		•	•
CLE		4	5A	50%ON / 50%OFF, fixed 55 – 90 pulse/min	-	-	
OKRe-FP	One-shot	4	5A	Adjustable up to 1h	•	•	•
TOK-FP		4	10A	Adjustable up to 1h		•	•

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

Coil specifications

Nominal voltages Un (1)	**DC:** 24-36-48-72-110-125-132-144-220 **AC:** 24-48-110-125-220-230
Max. consumption at Un (DC/AC)	4 W / 4 VA
Operating range (1) Rolling stock version (2)	80…115 % Un DC : 70…125 % Un
Type of duty	Continuous

(1) Other values on request.
(2) See "Ordering scheme" table for order code.

Contact specifications		CLE OKRe-L OKRe-FP	TOK-L TOK-FP
Number and type		4 CO, form C	
Current	Nominal (1)	5 A	10 A
	Maximum peak (1s) (2)	10 A	20 A
	Maximum pulse (10ms) (2)	100 A	150 A
Example of electrical life expectancy (3)		0.2 A – 110 Vdc – L/R 0 ms : 10^5 operations - 1,800 operations / hour	0.5 A – 110 Vdc – L/R 40 ms : 10^5 - 1,800 operations / hour
Minimum load	Standard contacts	500 mW (20V, 20 mA)	
	Gold-plated contacts **P4GEO** (4)	100 mW (10V, 5 mA)	200mW (20 V, 5 mA)
	Gold-plated contacts **P8** (4)	50 mW (5V, 5 mA)	-
Maximum breaking voltage		250 Vdc / 350 Vac	350 Vdc / 440 Vac
Contact material		AgCu	

(1) Nominal current: 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 gold-plated contacts on new relay
a) Plating material: **P4 GEO:** 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.

Insulation	CLE OKRe-L OKRe-FP	TOK-L TOK-FP
Insulation resistance (at 500Vdc) between electrically independent circuits and between these circuits and ground between open contact parts	> 1,000 MΩ > 1,000 MΩ	
Withstand voltage at industrial frequency between electrically independent circuits and between these circuits and ground between open contact partss	2 kV (1 min) - 2.2 kV (1 s) 1 kV (1 min) - 1.1 kV (1 s)	2 kV (1 min) - 2.2 kV (1 s) 2 kV (1 min) - 2.1 kV (1 s)
Impulse withstand voltage (1.2/50µs - 0.5J) between electrically independent circuits and between these circuits and ground between open contact parts	5 kV 3 kV	5 kV 5 kV

Mechanical specifications	CLE OKRe-L OKRe-FP	TOK-L TOK-FP
Mechanical life expectancy	$20x10^6$ operations	$100x10^6$ operations
Degree of protection (with relay mounted)	IP40	
Dimensions (mm) (1)	40x45x97	45x45x109
Weight (g)	~ 220	~ 300

(1) Excluding output terminals and adjuster knob, if specified.

Environmental specifications	CLE OKRe-L OKRe-FP	TOK-L TOK-FP
Operating temperature	-25 to + 55 °C	
Rolling stock version	-25 to + 70 °C	
Storage and transport temperature	-25 to + 85 °C	
Relative humidity	Standard: 75% RH, Tropicalized: 95% RH	
Resistance to vibrations	5 g - 10 to 55 Hz - 1min.	5 g - 5 to 60 Hz - 1 min.
Resistance to shock	20 g - 11 ms	30 g - 11 ms
Fire behavior	V0	

Standards and reference values

EN 61810-1, EN 61810-2, EN 61810-7	Electromechanical elementary relays
EN 61812-1	Timer relays
EN 60695-2-10	Fire behavior
EN 61000	Electromagnetic compatibility
EN 60529	Degree of protection provided by enclosures

Unless otherwise specified, products are designed and manufactured to the requirements of the European and International standards indicated above.
In accordance with EN 61810-1, all items of technical data are referred to ambient temperature 23 °C, atmospheric pressure 96kPa and 50% humidity.
Tolerance for coil resistance, nominal electrical input and nominal power is ±7%.

Railways, rolling stock - Standards

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 behavior, Cat E10, Requirement R26, V0
ASTM E162, E662	Fire behavior

Configurations - Options

P2	Tropicalization of coil with epoxy resin for use with 95% RH (@ T 50 °C). This treatment also protects the coil against corrosion which could occur by the combination of 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 ≥ 6µ. 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** type gold-plating, but applied to contacts, contact terminals and output terminals + P2 coil tropicalization.
P6GEO	Gold-plating of contacts, contact terminals and output terminals + **P2** coil tropicalization.
P7	Silver cadmium oxide contacts.
P8	Gold plating of contacts with gold-cobalt alloy, thickness ≥ 5µ, knurled fixed contact. This finish allows further improvement of the performance provided by the gold-plated contact, compared to treatment **P4GEO**.
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.
TRANSIL	Non-polarized component connected in parallel with the coil. Behavior is similar to that of a varistor, with faster operating times.

CLE Ordering scheme

Function	Product code	Application (1)	Configuration A	Configuration B	Label	Type of power supply	Nominal voltage (V) (2)	Keying position (3)
Flasher	CLE	**E:** Energy Railway Fixed Equipment	1: Standard	0: Standard 2: P2 4: P4 GEO 5: P5 GEO 6: P6 GEO 7: P7 8: P8	F	C: Vdc A: Vac 50 Hz H: Vac 60 Hz	024 - 048 - 110 125 - 230	XXX

Example

CLE	E	1	0	F	H	125	
CLEE10F-H125: CLE relay, ENERGY series, standard coil, nominal voltage 125Vac 60Hz							

OKRE-L / OKRE-FP Ordering scheme

Function	Product code	Application (1)	Configuration A	Configuration B	Label	Type of power supply	Nominal voltage (V) (2)	Setting control (3)	Full scale times (3)	Keying position (3)
Flasher	OKReL	**E:** Energy Railway Fixed Equipment **R:** Railway Rolling Stock	1: Standard 2: Diode // 3: Varistor 4: Led 5: Diode // + Led 6: Varistor + Led 7: Transil 8: Transil + Led	0: Standard 2: P2 4: P4 GEO 5: P5 GEO 6: P6 GEO 7: P7 8: P8	F	T: Vdc+ac C: Vdc (4)	024 - 036 - 048 072 - 110 - 125 132 - 144 - 220 230	M = Knob C = Flat head slotted screw	01S: 1 s 05S: 5 s 10S: 10 s 15S: 15 s 30S: 30 s 01M: 1 min 02M: 2 min 05M: 5 min 10M: 10 min 15M: 15 min 30M: 30 min 60M: 60 min	xxx
One-shot	OKReFP									

Example

OKReL	R	1	2	F	C	072	M	01S	
OKReLR12F-C072-M01S: OKRe-L relay, rolling stock series, P2 coil tropicalization, nominal voltage 72Vdc, full scale 1 second, knob setting control									
OKReFP	**E**	**4**	**8**	**F**	**T**	**110**	**C**	**05M**	
OKReFPE48F-C110-C05M: OKRe-FP relay, energy series, nominal voltage 110Vdc/ac, full scale 5 minutes, slotted screw setting control, with led, P8 finish (gold-plated contacts)									

TOK-L / TOK-FP Ordering scheme

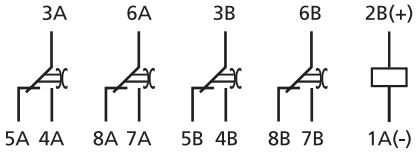
Function	Product code	Application (1)	Configuration A	Configuration B	Label	Type of power supply	Nominal voltage (V) (2)	Full scale times (3)	Keying position (3)
Flasher	TOK-L	**E:** Énergy / Railway Fixed Equipment	4: Led (fixed range)	0: Standard 2: P2 4: P4 GEO 5: P5 GEO 6: P6 GEO	F	C: Vdc (4) A: Vac 50 Hz H : Vac 60 Hz	024 - 036 - 048 072 - 110 - 125 132 - 144 - 220 230	01S: 1 s 02S: 2 s 04S: 4 s 08S: 8 s 16S: 16 s 32S: 32 s 01M: 1 min 02M: 2 min 04M: 4 min 08M: 8 min 16M: 16 min 32M: 32 min 64M: 64 min	xxx
One-shot	TOK-FP	**R:** Railway Rolling Stock							

Example

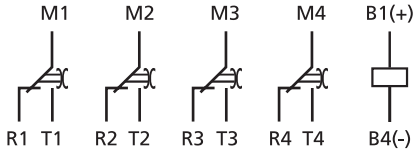
TOK-L	R	4	0	F	C	072	64M	
TOKLR40F-C072-64M: TOK-L relay, railways series, rolling stock, nominal voltage 72Vdc, full scale 64 minutes								
TOK-FP	**E**	**4**	**2**	**F**	**A**	**220**	**04S**	
TOKFPE42F-A220-04S: TOK-FP relay, energy series, P2 coil tropicalization, nominal voltage 220Vac, full scale 4 seconds								

(1) **E = ENERGY**: all applications, except for railways rolling stock.
Suitable on energy production, transport and distribution plants, railways fixed equipment, petrolchemical and heavy industry.
R = RAILWAYS, ROLLING STOCK: Application on board rolling stock (rail-tram-trolley vehicles). Electrical characteristics according to EN60077.
Availables also the product series:
RAILWAYS, FIXED EQUIPMENT: Approved and conforming relays and products to RFI (FS Group) specification no. RFI DPRIM STF IFS TE 143 A
For the list of RFI approved and conforming products, consult dedicated catalogue "RAILWAY SERIES – RFI APPROVED".
STATIONS: ENEL approved material meeting LV15/LV16 specifications.
For the list of ENEL approved and conforming products, consult the dedicated catalog "STATIONS SERIES – LV15-LV16-LV20".**CLE**: also available is the Stations series, with ENEL approved material meeting LV15/LV16 specifications. Consult the dedicated catalog for more information.
(2) Other values on request.
(3) Optional value. The positive mechanical keying is applied according to the manufacturer's model.
(4) Rolling Stock version, Vdc only available.

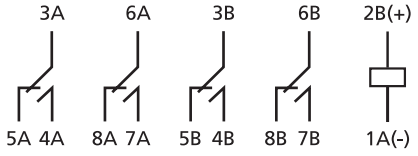
Wiring diagram



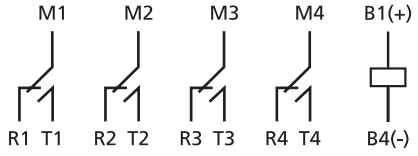
CLE , OKRE-L



TOK-L

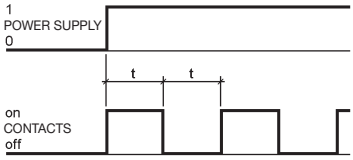
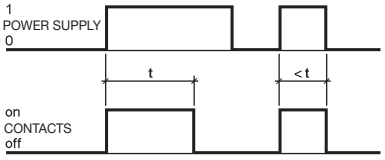


OKRE-FP



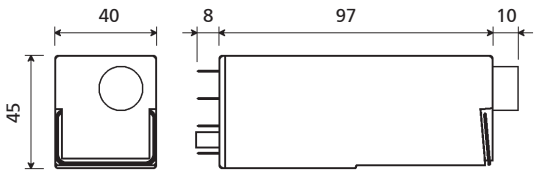
TOK-FP

Functional diagram

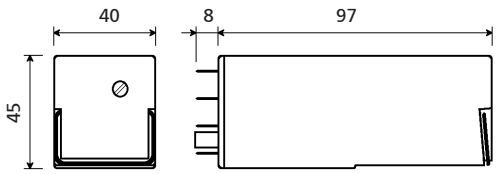
CLE, OKRE-L, TOK-L	OKRE-FP, TOK-FP
	

Time delay Switching time setting	OKRE-L OKRE-FP	TOK-L TOK-FP	CLE
Time setting	By way of potentiometer, with knob or flat head slotted screw control	By way of potentiometer, with flat head slotted screw control	No time setting 55 ... 90 pulse/min symmetrical
Full scale times available	10 ÷ 100 % of full scale	20 ÷ 100 % of full scale	
Time setting rangee	± 10 % of time delay	± 5 % of time delay	
Accuracy, setting (0.8...1,1 Un, t=20°C)	DC : 0.5 % / AC : ± 0.5 % + 20 ms	± 5% of time delay	
Accuracy, repeatability	DC: 0.5 % / AC : ± 0.5 % + 20 ms		
Reset	< 100ms, in time-delay phase < 1s		

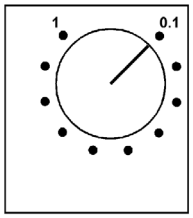
Dimensions



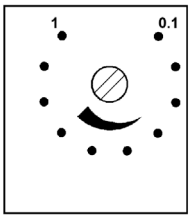
OKRE-L / OKRE-FP with knob setting control



OKRE-L / OKRE-FP with flat head slotted screw setting control

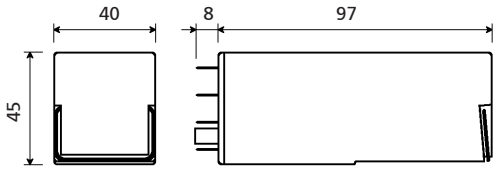


Knob setting control

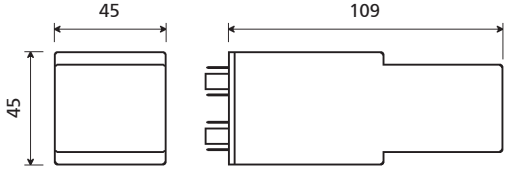


Flat head slotted screw setting control

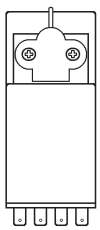
The scale shown on the relay (0.1-1) is approximate



CLE



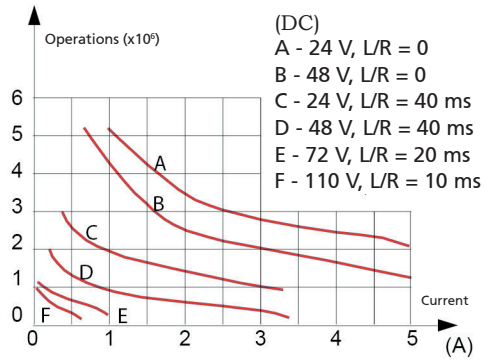
TOK-L / TOK-FP

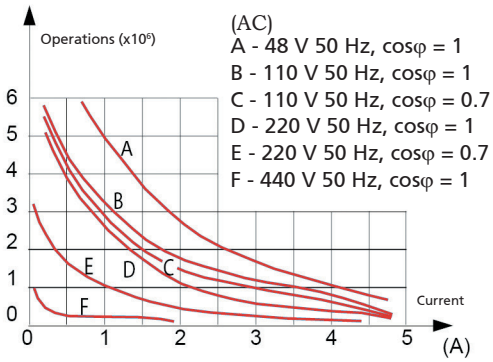


TOK-L / TOK-FP finish for ROLLING STOCK version

Electrical life expectancy

CLE OKRE-L OKRE-FP

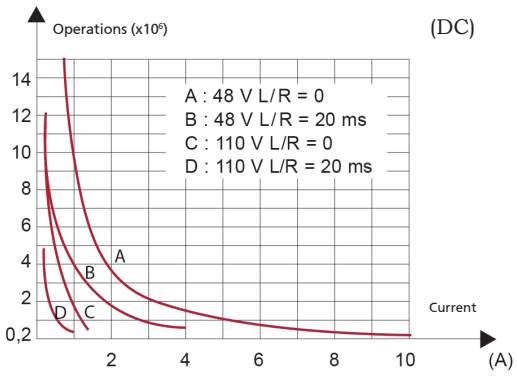


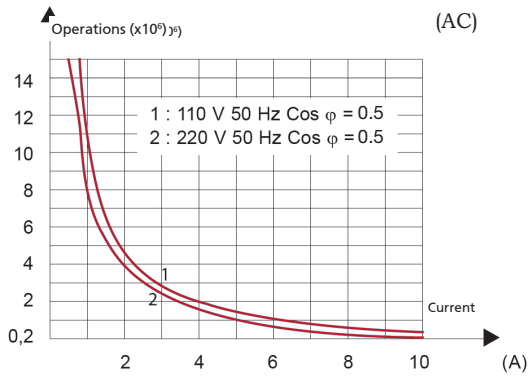


Some examples of electrical life expectancy
48Vdc - 5 A – L/R = 10 ms: 5 x 10^5 operations
80Vdc - 5 A – Resistive: 5 x 10^5 operations
110Vdc - 0.5 A – L/R = 10 ms: 5 x 10^5 operations

220Vdc - 0.2 A – L/R = 10 ms: 10^5 operations
110Vac - 5 A – Cosφ = 0.7: 5 x 10^5 operations
220Vac - 3 A – Cosφ = 0.7: 5 x 10^5 operations
440Vac - 0.2 A – Resistive: 5 x 10^5 operations

TOK-L TOK-FP





Other examples of electrical life expectancy available on the technical data sheet of the OK series relay (OKSFC model)

Sockets and retaining clips		CLE OKRe-L OKRe-FP	TOK-L TOK-FP
Number of terminals (standard dimensions 5x0.8mm)	16	Retaining clip (2)	
For wall or rail mounting			
Spring clamp, wall or DIN H35 rail mounting	PAIR160	RC48	RL48
Screw, wall or DIN H35 rail mounting	48BIP20-I DIN	RC48	RL48
Screw, wall mounting	48BL	RC48	RL48
Double faston, wall mounting	48L	RC48	RL48
For flush mounting			
Double faston (4.8 x 0.8 mm)	ADF2	RC48	RL48
Screw	43IL (1)	RC43	RL43
For mounting on PCB	65	RC43	RL43

(1) Insert the clip before fastening the socket on the panel.
(2) Assume two clips for use on rolling stock.
For more details, see specifications of mounting accessories.

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.