

OKPH MOK-PH2 SERIES



OKPh

OVERVIEW

- Plug-in relay for monitoring the cycle direction of three phase voltages
- 1 or 2 contacts available, according to model
- Fixed hysteresis cycle
- Monitoring of individual phase voltages
- Operation in alternating current at industrial frequency
- Solid and rugged construction for heavy or intensive duty
- Considerable long-life
- Excellent shock and vibration resistance
- Wide range of sockets
- Retaining clip for secure locking of relay on socket
- Positive mechanical keying for relay and socket

APPLICATIONS



Shipbuilding



Petroleum industry



Heavy industry



Power generation



Power distribution



Railway equipment

DESCRIPTION

Relays of the OKPh and MOK-Ph2 series are supervision devices for monitoring the directional sequence of phases or detecting the loss of one or more voltages in three phase systems. These components are used typically for detecting faults affecting either the power supply or the sequences of the individual phases. The supervision relay can identify undervoltages on one of the 3 phases, against a fixed threshold, or detect a phase break: this advantageously prevents the risk of three phase motors operating in single phase mode. In addition, monitoring of the correct R-S-T sequence enables permanent supervision of the status of power supplies to three-phase users, and the avoidance of dangerous wrong connections. These relays are connected directly to the 400Vac three-phase power line. When system under supervision is operating correctly, the relay contact remains closed. The OKPh relay detects the direction of rotation using passive electronic components (R and C) of high quality which, in combination with the superior reliability of the electromechanical section, allow these relays to cover key roles in the systems where they are installed. The MOK-PH2 relay is equipped with a completely static control circuit. The ultra high reliability and long life expectancy of these components allow their use in particularly demanding environments such as, for example, electricity generating stations, electrical transformer stations, and industries using continuous production processes, notably drilling and refining operations in the petrochemical sector.

Models	Function	Number of contacts	Rolling stock application
OKPh	Measuring relay for monitoring phase cycle direction	1 NO (Reed)	•
MOK-Ph2		2 SPDT	

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

Coil data	OKPh	MOK-Ph2
Nominal voltages Un	AC : 100 - 110 - 220 - 380 - 400Vac 50 - 60 Hz	AC : 220 - 380Vac (45 - 65 Hz)
Max. consumption at Un	≤ 4.5 VA	
Operating range	80...120% Un	85...115% Un
Type of duty	Continuous	

(1) See "Ordering scheme" table for order code.

Fixed operating thresholds	OKPh	MOK-Ph2
Pick-up threshold	V > 0.80% Un	V > 0.85% Un
Drop-out threshold	V ≤ 50% Un on 3 phases	V ≤ 30% Un on single phase
Accuracy	± 5%	

Contact data	OKPh	MOK-Ph2
Number and type	1 NO, form A (REED)	2 SPDT, form C
Current Nominal ⁽¹⁾	4 A	3 A
Breaking capacity	120W (max.3A, max 300Vac)	-
Minimum load	100mW (10V, 5mA)	
Maximum breaking voltage	300 Vac	230 Vac
Contact material	Rh	-
Operating time at Un (ms) ⁽²⁾	-	
Pick-up (NO contact closing)	8 ms (at Un)	

(1) Nominal current: on all contacts simultaneously.

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

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.) - 2.2kV (1 s)
between adjacent contacts	1 kV (1 min.) - 1.1kV (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	2 kV

Mechanical specifications	OKPh	MOK-Ph2
Mechanical life expectancy	10 ⁷ operations	
Degree of protection (with relay mounted)	IP40	
Dimensions (mm)	45x45x109 ⁽¹⁾	45x45x109 ⁽¹⁾
Weight (g)	~ 280	~ 300

(1) Output terminals excluded.

Environmental specifications	OKPh	MOK-Ph2
Operating temperature	-25 to + 55 °C	-25 to + 55 °C
Rolling stock version	-25 to + 70 °C	-
Storage and shipping temperature	-40 to + 85 °C	-40 to + 70 °C
Relative humidity	Standard: 80% RH, Tropicalized: 95% RH	
Resistance to vibrations	5g - 10 to 55 Hz - 1min.	-
Resistance to shock	20g - 11ms	-
Fire behaviour	V0 - to EN 60695-2-10	

Standards and reference values

EN 61810-1, EN 61810-2, EN 61810-7
 EN 60695-2-10
 EN 61000
 EN 60529

Electromechanical elementary relays
 Fire behaviour
 Electromagnetic compatibility
 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 96kPa and 50% humidity.

Railways, rolling stock - Standards

EN 60077 EN 50155 EN 61373 EN 45545-2 ASTM E162, E662	Electric equipment for rolling stock - General service conditions and general rules Electronic equipment used on rolling stock Shock and vibration tests, Cat 1, Class B Fire behaviour, Cat E10, Requirement R26, V0 Fire behaviour
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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 combination of the humidity with certain chemical agents, such as those present in acid atmospheres (typical of geothermal power stations) or saline atmospheres.
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OKPh - MOK-Ph2 Ordering scheme

Product code	Application ⁽¹⁾	Configuration A	Configuration B	Type of power supply	Nominal voltage (V)	Keying position ⁽²⁾
OKPh	E: Energy F: Railway Fixed Equipment R: Railway Rolling Stock	1: Standard (fixed range)	0: Standard 2: P2	A: Vac 50 Hz H: Vac 60 Hz	100 110 220 380	XXX
MOK-Ph2	E: Energy F: Railway Fixed Equipment			A: Vac (45 - 65Hz)	220 380	

Example	OKPh	R	1	2	H	220	
	OKPh-R12-H220 - OKPh relay, ROLLING STOCK series, 220 Vac 60Hz coil, with P2 tropicalization treatment						
	MOK-Ph2	E	1	0	A	380	
	MOK-Ph2E10-A380 - MOK-Ph2 relay, ENERGY series, 380Vac coil						

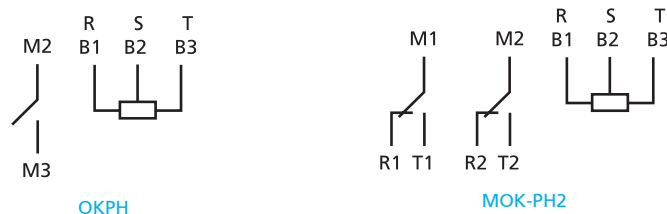
(1) ENERGY: all applications except for railway.

RAILWAYS, FIXED EQUIPMENT: application on fixed power systems and electrical railway traction. Construction according to RFI (FS Group) 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: application on board rolling stock (rail-tram-trolley vehicles). Electrical characteristics according to EN60077.

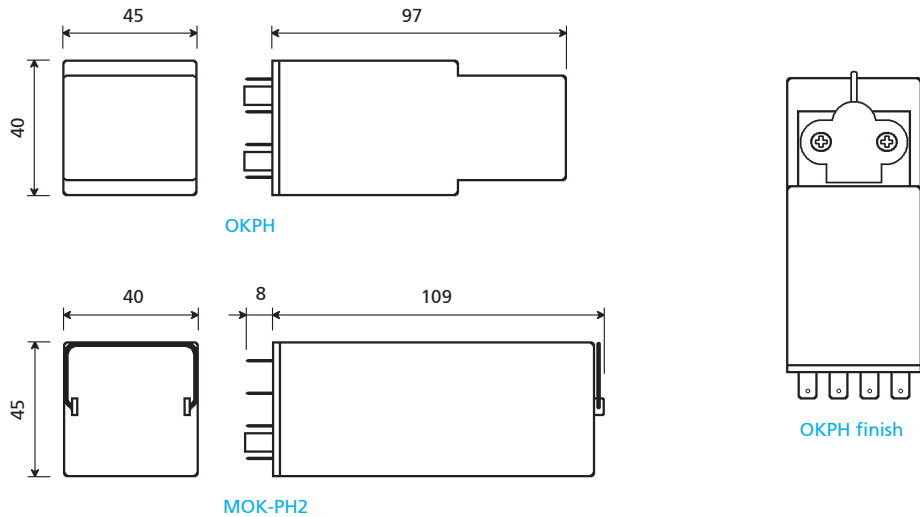
(2) Optional value. The positive mechanical keying is applied according to the manufacturer's model.

Wiring diagram



The OKTr relay requires connection of the 1B/R1 terminal with 3B/T1.

Dimensions



Sockets and retaining clips		OKPh	MOK-Ph2
Number of terminals (standard dimensions 5x0.8mm)	16	Retaining clip	Retaining clip
For wall or rail mounting			
Spring clamp, wall or DIN H35 rail mounting	PAIR160	RL48	RM48
Screw, wall or DIN H35 rail mounting	48BIP20-I DIN	RL48	RM48
Screw, wall mounting	48BL	RL48	RM48
Double faston, wall mounting	48L	RL48	RM48
For flush mounting			
Double faston (4.8 x 0.8 mm)	ADF2	RL48	RM48
Screw	43IL ⁽¹⁾	RL43	RM43
For mounting on PCB	65	RL43	RM43

(1) Insert the clip before fastening the socket on the panel.
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, especially where relays are exposed to shock and vibration. 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.