ELKO EP, s.r.o.
Palackého 493
769 01 Holešov, Všetuly
Czech Republic
Tel.: +420 573 514 211
e-mail: elko@elkoep.com
www.elkoep.com

02-86/2016 Rev.: 0

EN

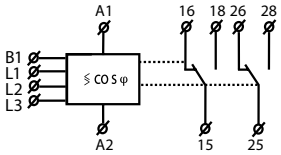
COS-1

Power factor monitoring relay

Characteristics

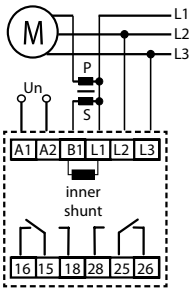
- relay monitors phase shift between current and voltage - cos-φ in 3-phase and also 1-phase mains for monitoring overload / unloading of motors
- supply set 3x 400 V
- function "MEMORY" - manual reset - button on front pannel
- it is possible to connect current transformer in front of the device. This enables increase of current range
- 2 output relays, independent for each level
- adjustable delay to eliminate short peak overloading
- adjustable range and bottom level cos-φ, of power factor between 0.1- 0.99
- adjustable delay to eliminate starting of motor
- selectable hysteresis 5 or 10 %
- galvanically separated supply AC 230 V, AC 110 V, AC 400 V or AC/DC 24 V
- output contact: 2x changeover 16 A / 250 V AC1
- 3-MODULE, DIN rail mounting

Symbol

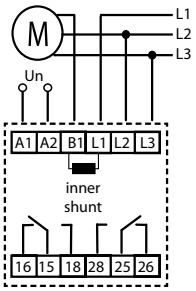


Connection

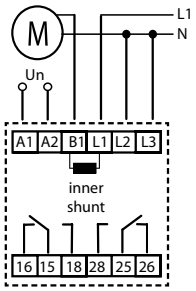
connection with current transformer



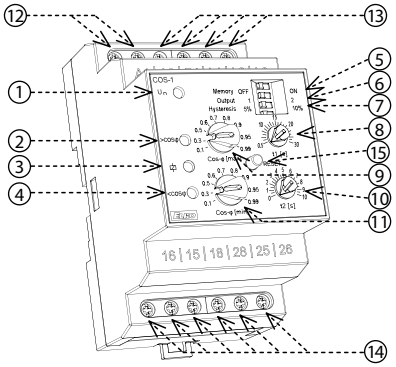
3-phase connection



1-phase connection



Description



1. Supply voltage
2. Upper level - max exceeded
3. Output indication - indicates state, when cos-φ is within limints. In case of yellow LED flashing ne caps lockem
4. Indication of exceded lower level - min
5. MEMORY function - funkction Memory is activated in ON position
6. Choise of output function - in position 1 both relays work together, in position 2 separately for cos-φ - max and cos-φ - min.
7. Hysteresis from faulty to OK normal state
8. t1 - time delay for motor starting (0.5 - 30 s)
9. Setting of cos-φ - max. If exceeded, it is indicated by red LED as fault > cos-φ and by output relay switching off
10. t2 - time delay for peak elimination (0 - 10 s)
11. Setting of cos-φ - min. If it is reached, it is indicated as fault by red LED < cos-φ and by output relay opens
12. Supply voltage terminals
13. Terminals monitor voltage and current
14. Output contact
15. RESET button

Type of load	cos φ ≥ 0.95 AC1	AC2	AC3	AC5a uncompensated	AC5a compensated	HAL.230V AC5b	AC6a	AC7b	AC12
Mat. contacts AgNi, contact 16A	250V / 16A	250V / 5A	250V / 3A	230V / 3A (690VA)	x	800W	x	250V / 3A	250V / 10A
Type of load	AC13	AC14	AC15	DC1	DC3	DC5	DC12	DC13	DC14
Mat. contacts AgNi, contact 16A	250V / 6A	250V / 6A	250V / 6A	24V / 16A	24V / 6A	24V / 4A	24V / 16A	24V / 2A	24V / 2A

Technical parameters

COS-1

Supply terminals:	A1 - A2
Supply voltage:	AC 230 V, AC 110 V, AC 400 V or AC/DC 24 V (AC 50-60 Hz)
Consumption:	max. 4.5 VA
Supply voltage tolerance:	-15 %; +10 %

Measuring circuit

Set of voltage:	3x 400 V / 50 Hz
Terminals:	L1, L2, L3, B1
Upper level cos-φ:	adjustable 0.1 - 0.99
Bottom level cos-φ:	adjustable 0.1 - 0.99
Max. permanent voltage:	(input L1, L2, L3) AC 3x 460 V
Current range:	0.1 - 16 A
Current overloading:	20 A (< 3 sec.)
Hysteresis:	adjustable 5 % or 10 %
Time delay t1:	adjustable 0.5 - 30 s
Time delay t2:	adjustable 0 - 10 s

Accuracy

Setting accuracy (mech.):	5 %
Accuracy of repetition:	< 1 %
Temperature dependance:	< 0.1 % / °C
Limit values tolerance:	5 %

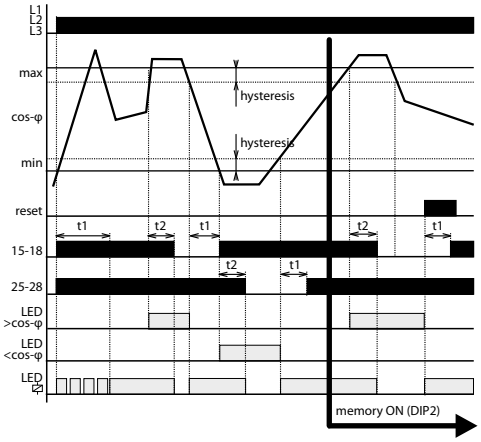
Output

Number of contacts:	2x changeover / DPDT (AgNi / Silver Alloy)
Rated current:	16 A / AC1
Breaking capacity	4000 VA / AC1, 384 W / DC
Inrush current:	20 A / < 3 s
Switching voltage:	250 V AC1 / 24 V DC
Output indication:	yellow LED
Mechanical life:	$3x10^7$
Electrical life (AC1):	$0.7x10^5$

Other information

Operating temperature:	-20 °C to +55 °C (-4 °F to 131 °F)
Storing temperature:	-30 °C to +70 °C (-22 °F to 158 °F)
Electrical strength:	4 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP40 from front panel / IP20 terminals
Overvoltage cathegory:	III.
Pollution degree:	2
Max. cable size (mm^2):	max. 1x 2.5, max. 2x 1.5 / with sleeve max. 1x 1.5 (AWG 12)
Dimensions:	90 x 52 x 65 mm (3.5˝ x 2˝ x 2.6˝)
Weight:	240 g (8 oz.)
Standards:	EN 60255-6, EN 61010-1

Function



After the device is switched on, the yellow LED flashes for time t and both relays are switched (state OK). This delay serves to eliminate a faulty state e.g. motor start-up.

If the upper limit is exceeded (cos-φ - max) red LED shines > cos-φ. After a time delay t2 the output relay opens (15-18).

Equally, if it falls under bottom limit (cos-φ - min) red LED shines < cos-φ and after a time delay t2 the output relay opens (25-28).

In case the load is disconnected (no current), red LED shines > cos-φ (cos-φ = 1).

Warning

The device is constructed to be connected into 3-phase main and must be installed in accordance with regulations and norms applicable in a particular country. Installation, connection and setting can be done only by a person with an adequate electro-technical qualification which has read and understood this instruction manual and product functions. The device contains protections against over-voltage peaks and disturbing elements in the supply main. Too ensure correct function of these protection elements it is necessary to front-end other protective elements of higher degree (A,B,C) and screening of disturbances of switched devices (contactors, motors, inductive load etc.) as it is stated in a standard. Before you start with installation, make sure that the device is not energized and that the main switch is OFF. Do not install the device to the sources of excessive electromagnetic disturbances. By correct installation, ensure good air circulation so the maximal allowed operational temperature is not exceeded in case of permanent operation and higher ambient temperature. While installing the device use screwdriver width approx. 2 mm. Keep in mind that this device is fully electronic while installing. Correct function of the device is also depended on transportation, storing and handling. In case you notice any signs of damage, deformation, malfunction or missing piece, do not install this device and claim it at the seller. After operational life treat the product as electronic waste.