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02-6/2018 Rev.: 0



COS-2

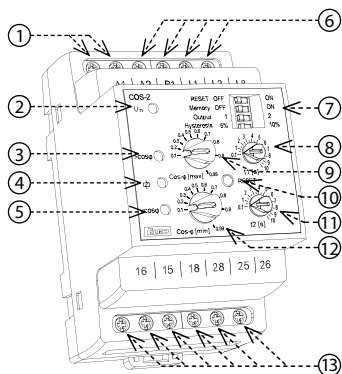
Power factor monitoring relay



Characteristics

- Relay monitors phase shift between current and voltage in 3-phase or 1-phase networks - evaluates COS φ (replacement COS-1)
- The relay is designed to monitor overload / relieve the motors
- Relay is designed for 3 x 400 / 230V circuits
- Galvanically isolated power supply AC 230V, AC 110V, AC 400V or AC / DC 24V
- Adjustable upper and lower level COS φ
- Possibility to extend the current range using a current transformer
- Adjustable MEMORY function
- Two output relays (for each level independent)
- Adjustable delay eliminating engine start-up
- Output contact 2x changeover 16A / 250V AC1
- 3-MODULE design, mounting onto DIN rail.

Description



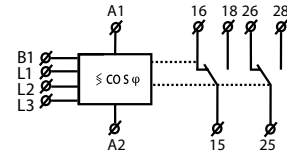
- Supply voltage terminals
- Supply voltage
- Upper level COS φ max / timing t2
- OK / timing status t1
- COS Lower Level C φ min / timing t2
- Terminals monitor voltage and current
- DIP
- Time delay t1
- COS top level setting φ max
- RESET button
- Time delay t2
- Setting COS lower level φ min
- Output contact

Description of DIP switches

RESET OFF	<input type="checkbox"/>	ON	←-14
Memory OFF	<input type="checkbox"/>	ON	←-15
Output 1	<input type="checkbox"/>	2	←-16
Hysteresis 5%	<input type="checkbox"/>	10%	←-17

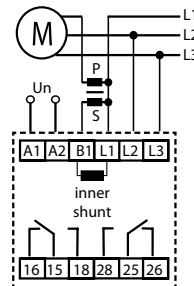
- Enable reset by button
- Memory error state
- Relay function setting
- Hysteresis setting

Symbol

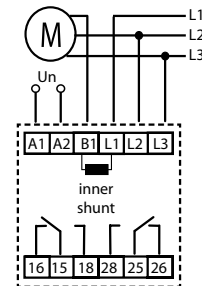


Connection

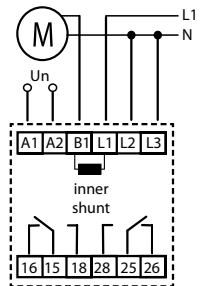
connection with current transformer



3-phase connection



1-phase connection



Type of load	 cos $\varphi \geq 0.95$	AC2	AC3	AC5a uncompensated	AC5a compensated	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

COS-2

Supply	
Supply terminals:	A1 - A2
Voltage range:	AC 230 V, AC 110 V, AC 400 V or AC/DC 24 V (AC / 50 - 60 Hz)
Burden max.:	2.5 W / 5 VA (AC 110 V, AC 230 V, AC 400 V), 1.4 W / 2 VA (AC/DC 24 V)
Max. dissipated power (Un + terminals):	4 W
Operating range:	-15 %; +10 %

Measuring	
Voltage set:	3x 400 V / 230 V / 50 - 60 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 0.1 - 10 s
Time delay t2:	adjustable 0.1 - 10 s

Accuracy	
Accuracy setting (mechanical):	5 %
Accuracy of repetition:	< 1 %
Temperature dependance:	< 0.1 % / °C (°F)
Limit values tolerance:	5 %

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

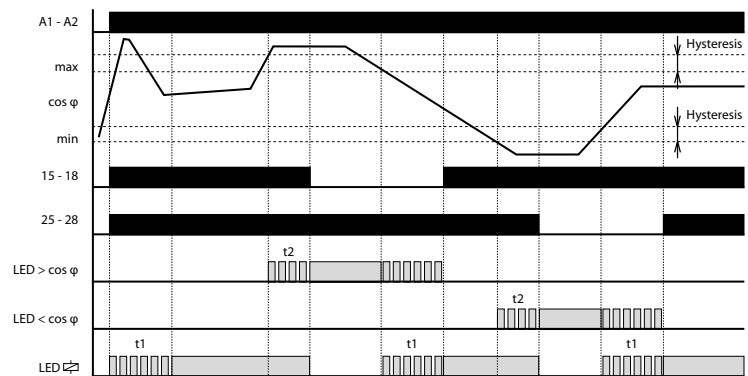
Other information	
Operating temperature:	-20 °C to 55 °C (-4 °F to 131 °F)
Storage temperature:	-30 °C to 70 °C (-22 °F to 158 °F)
Electrical strength:	4 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP40 from front panel / IP20 terminals
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm ²):	max. 1x 2.5, max. 2x1.5 / with sleeve max. 1x 1.5 (AWG 12)
Dimensions:	90 x 52 x 65 mm (3.5 x 2 x 2.6")
Weight:	8.6 oz (243 g) (230 V, 110 V, 400 V); 5 oz (141 g) (24 V)
Standards:	EN 60255-1, EN 60255-26, EN 6255-27

Warning

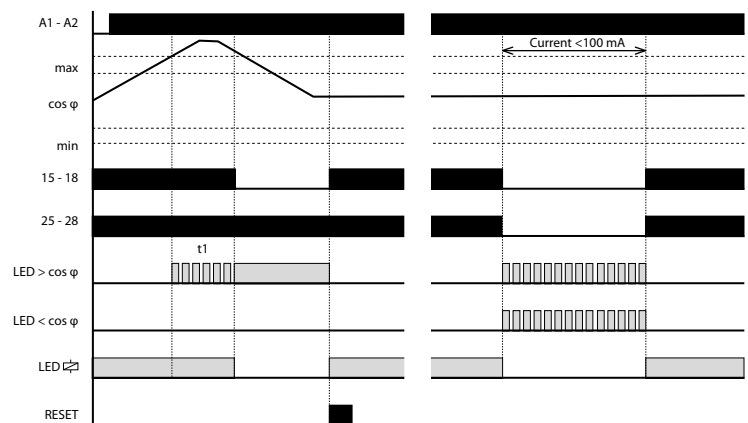
The device is constructed to be connected into 3-phase main and must be installed in accordance with regulations and norms applicable in a particular country. Installation, connection and setting can be done only by a person with an adequate electro-technical qualification which has read and understood this instruction manual and product functions. The device contains protections against over-voltage peaks and disturbing elements in the supply main. To 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.

DECLARATION OF CONFORMITY
ELKO EP declares that the COS-2 type of equipment complies with Directives 2014/30/EU, 2011/65/EU, 2015/863/EU and 2014/35/EU. The full EU Declaration of Conformity is available at:
www.elkoep.com/power-factor-relay---cos-2

Status after switching on power, two relay mode



Memory on, two relay mode



After powering on, the device sets the delay time t1 and yellow LED flashes. Both relays are switched on. The delay serves to eliminate a faulty state when starting the motor. After the time delay t1 begins monitoring COS φ only.

If the COS φ is in the band between the upper and lower limits set, both relays are switched on and the yellow LED is on.

If the COS φ is outside the set limits (> COS φ max or <COS φ min), an error condition occurs - the time t2 is delayed while the red LED corresponding to the COS φ blinks at the same time. After the time delay t2 red LED lights and the corresponding relay remains off.

When the COS φ returns to set limits, the time t1 is delayed and the yellow LED flashes at the same time as the corresponding red LED. After the time delay stops blinking yellow LED, the corresponding red LED turns off and the relay switches on.

At low wattage (<100mA) or with a power failure, an error is reported by the simultaneous blinking of both red LEDs. After resuming the voltage or the current being watched, the relay returns to the normal state where the COS φ value is monitored.

When the memory is turned off (DIP switch 2 OFF) and the allowable reset (DIP switch 1 ON), the pressing state is reached after the power is turned on, i.e. flashing yellow LED, both relays are switched on, with time delay t1. When the memory (DIP switch 2 ON) is in an error state (high or low value for cos φ) it should be reset (by pressing the RESET button).