



P.U.P. Softin Sp. z o.o.  
 ul. Piękna 74  
 50-506 Wrocław  
 Poland  
 tel./fax. +48 71 372 81 37  
 e-mail: softin@softin.com.pl  
 web: www.softin.com.pl



# SZK-40. Earth-fault and phase-to-phase fault indicating system

The SZK-40 is recommended for use in:



transformer stations,



cable connectors,



THO-24 load switches on poles.



THO-24 load switch with the PR-0.72 transformer



CSO25 current sensor



CRR1-50 Rogowski coil

### Applications of the SZK-40 indicator

The SZK-40 indicator is dedicated to detection of earth faults and phase-to-phase faults and identification of fault location in medium-voltage networks. The device has signalling, measuring and controlling functions and communicates data about the monitored line with remote control systems through a system of outputs. The wide range of settings makes it possible to use the indicator in medium-voltage networks of voltage up to 36kV:

- resonant earthed systems, with a unit forcing the active zero-sequence current component,
- with a neutral point, grounded with a resistor,
- with a neutral point, insulated temporarily or permanently.

### Operation of the SZK-40 indicator in networks with high capacity currents share

In networks with low capacity currents share the device serves as a level comparator. In networks with high capacity currents share, resonant earthed systems with a unit forcing the active zero-sequence current component, the device may operate according to the directional algorithm – selective detection of earth faults in the normal system and in the emergency system (changing the distribution of capacity currents).

### Description

The SZK-40 indicating system is totally autonomous and constitutes a complete monitoring unit. Parameter settings for earth faults and phase-to-phase faults are selected by the user through a keypad and screened on an OLED display unit with a high contrast and a wide viewing angle. The indicating system consists of the SZK-40 monitoring unit and three current transformers for cable or overhead medium-voltage networks.

Optionally, the indicating system can be equipped with an external alarm and signaling LED light.

### Current transformers

The SZK-40 indicator can be used with the supplied current transformers or with current transformers manufactured by other producers.

To allow for operation at different ratios, the device is equipped with an internal module adjusting the device to work with current transformers with a particular ratio specified by the customer (e.g. PR-0.72 300/1A, CSO25 300/1A, KOKU 072 G4 400/1A or other types\*) or Rogowski coils with 1mV/A sensitivity (e.g. CRR1-50 \*).

The earth-fault and phase-to-phase fault indicating system is a microprocessor device measuring current signals received from the transformers. The device constantly measures phase currents and analyses current signal in the event of an earth or phase-to-phase fault. An incident of exceeding the set limits in a set time TPD – in the event of an earth fault ( $I_0 >$ ), TPZ1 – in the event of a phase-to-phase fault ( $I >$ ) or TPZ2 - in the event of a phase-to-phase fault ( $I >>$ ) activates alarm and signaling circuits for the signaling time TS, until remotely or manually reset. The indicator's activation can also be reset upon restoration of the current in the monitored line and its flow over a set time.

The indicator makes it possible to detect transient and permanent faults or only permanent faults, disabling the medium-voltage lines.

## Inputs/outputs

## RS-485/Modbus

## Testing/Resetting

## External optic signallisation

## Optional equipment



3x1 current transformers  
 $\Phi=100\text{mm}$



1 Ferranti transformer  
 $\Phi=150\text{mm}$  + 2 current  
transformers  $\Phi=100\text{mm}$



A damage-proof light



A LED light

## Warranty

## Ordering

The device can operate with remote control systems thanks to two optoelectronically isolated inputs and two transmitter outputs. Input and output settings can be adjusted. The indicator is equipped with an RS-485 interface with Modbus-RTU protocol. This allows for full remote monitoring of the device, that is data and configuration parameters readings as well as change of settings.

The device can be tested for operation with the Test and Kas keys. The result is indicated by the lights mounted on the indicator's front panel.

**The external alarm and signalling light** is an impulse-operated LED.

The bi-colour external light, in a protective casing against third-party damage, is mounted on a building's wall or on a pole of overhead power lines. The indicator's activation is signalled by local LED lights mounted on the indicator's front panel.

## Specifications

- Currents measured I1, I2, I3 [A]:  $-0 \div 1200; \pm 8\%$ ,
- Selection of the mode of operation:
  - threshold operation mode,
  - directional algorithm operation mode (in resonant earthed systems with a unit forcing the active zero-sequence current component).
- Earth fault threshold (I0>) Ir [A]:  $-5 \div 500; \pm 8\%$ ,
- Phase-to-phase fault threshold (I>) Iz1 [A]:  $-100 \div 1200; \pm 8\%$ ,
- Phase-to-phase fault threshold (I>>) Iz2 [A]:  $-100 \div 1200; \pm 8\%$ ,
- Delay for I0> - TPD [ms]:  $-50 \div 1000; \pm 5\%$ ,
- Delay for I> - TPZ1 [ms]:  $-0 \div 1000; \pm 5\%$ ,
- Delay for I>> - TPZ2 [ms]:  $-0 \div 1000; \pm 5\%$ ,
- The indicator's response time (permanent faults) TO[s]:  $-1 \div 60$ ,
- Directional algorithm time settings  $\Delta T$ [ms]:  $-1500 \div 5000$ ,
- Directional algorithm sensitivity settings  $\Delta I$ [A]:  $-1 \div 9$ ,
- Indication period TS[h]:  $-1 \div 10$ ,
- Earth fault counter:  $-0 \div 999$ ,
- Phase-to-phase fault counter:  $-0 \div 999$ ,
- Digital inputs:  $-2$  optoisolated, 24VDC,
- Digital outputs:  $-2$  for remote control systems: (relays 5A/250VAC, 5A/30VDC),
- Customised output :
  - for the LED light,
- Communication interface:  $-$  isolated RS-485 / Modbus-RTU,
- Indicator testing:
  - manual – through the keypad,
  - remote – with 24VDC voltage.
- Indicator resetting:
  - automatic – after signaling time TS,
  - manual – through the keypad,
  - automatic – after TK[s]:  $1 \div 90$  s,
  - remote – with 24VDC voltage,
- Power supply / consumption:  $-24\text{VDC} / 150\text{mA}$ ,
- The indicator's casing:
  - dimensions (HxWxD): 108x90x114.5mm,
- Mounting:
  - TS-35 strip,
- Casing protection:
  - indicator - IP 20,
  - transformers - IP 40,
  - alarm indicator (LED light) - IP 65,
- Operating temperature range:  $-40^\circ\text{C} \div +70^\circ\text{C}$ .

**Full service and warranty.** SOFTIN offers a two-year warranty for the devices it produces and provides a post-warranty service of its products.

In your order please specify the required version of the SZK-40 indicator. If the indicator should be connected to a transformer manufactured by another company, please specify its ratio (e.g. for the PR-0.72 300/1A transformer please select SZK-40/300, for the Rogowski coil SZK-40/CRR1-50.)

*\*) Photographs of products manufactured by other companies are presented for illustrative purposes only.*