



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-30. Earth-fault and phase-to-phase fault indicating system in cable networks

Applications of the SZK-30 indicator

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The SZK-30 indicator can be installed in medium-voltage networks to monitor cable runs, identifying the section damaged as a result of an earth fault or a phase-to-phase fault.

With mains electricity, the device can be mounted in transformer stations with a low-voltage supply. For load switches there is a version of the SZK-30 indicator dedicated to a guaranteed 24VDC voltage supply. Sites without their own power supply (e.g. medium-voltage cable connectors) require the battery-powered model of the indicator. 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 in networks with high capacity currents share

Operation of the SZK-30 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

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The SZK-30 indicating system is totally autonomous and constitutes a complete monitoring unit.

Parameter settings for earth faults and phase-to-phase faults are chosen through controllers by the user. The indicating system consists of:

- three transformers for the medium-voltage network,
- a fault indicator,
- an external alarm and signaling LED light (optionally).

Current transformers

Current transformers:

In cable networks three transformers with a 100mm window diameter – for earth faults and phase-to-phase faults. The transformers' outputs are protected against opening.

The earth-fault and phase-to-phase fault indicating system

The earth-fault and phase-to-phase fault indicating system is a microprocessor device measuring current signals received from the transformers mounted on phase cables in a medium-voltage network. The device analyses current signals in the event of an earth fault or a phase-to-phase fault.

A lasting incident of exceeding the set limits in a set time (TPD – in the event of an earth fault, TPZ – in the event of a phase-to-phase fault) activates alarm and signaling circuits for the signaling time t_{TS} , until remotely or manually reset.

There is an option to reset the indicator with the medium-voltage or low-voltage supply lines operating for a period of 12s.

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

The device can communicate with remote control systems through relay contacts, separately for earth faults and phase-to-phase faults.

The indicator has a wide range of settings that are easy to choose. The settings can be seen through the transparent lid of the casing. Once set, the device can be tested for operation with a switch.

Testing/Resetting. In the TEST mode the indicator also checks the battery level.

Operation, battery level and external power supply level (low voltage or 24VDC) are signaled by lights mounted on the front panel of the device.

The indicator can have the settings reprogrammed upon request.

External optic signallisation

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 station's wall or on a pole of medium-voltage power lines. The indicator's activation is signalled by local LED lights mounted on the indicator's front panel.

Specifications

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- 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).
- Detection of earth faults in the 5 ÷ 500A range.
- Threshold for the earth-fault-current level comparator I_r [A]:
5÷40 every 5A; 50÷80 every 10A; 100÷160 every 20 A; settings error ±8%.
- Detection of phase-to-phase faults exceeding 100A.
- Threshold for the level comparator of phase-to-phase fault current I_z [A]:
100÷450A every 50A; 500÷1200 A, every 100A; settings error: ±8%;
- TPD delay [ms]: 100, 200, 300, 400ms; settings error: ±5%.
- TPZ delay [ms]: 100, 200, 500, 1000ms; settings error: ±5%.
- The indicator's response time (permanent faults): $T_O = 10 \div 90$ s, every 10s
- Directional algorithm time settings ΔT : (2000÷5150) ms, every 50ms
- Directional algorithm sensitivity settings ΔI : (1÷9) A, every 1A
- Indication period T_S : – 1h, 2h, 3h, 4h
- Outputs: for the LED light; for remote control systems: (transmitter switches with the 1A/125VDC parameters)
- Indicator testing:
 - manual – with a switch;
 - remote – with 24VDC voltage.
- Indicator resetting:
 - automatic – after signaling time T_S ,
 - manual – with a switch,
 - automatic – after 12s of medium-voltage or low-voltage supply,
 - remote – with 24VDC voltage.
- Power supply / consumption:
 - the SZK-30/01 version:
lithium battery 3.6V; 17Ah (R20) / 450µA,
battery working time: ca 5 years,
 - the SZK-30/02 version: 24VDC / 50mA,
 - the SZK-30/03 version: 230VAC, 50Hz,
backup – lithium battery 3.6V; 2.25Ah,
 - the SZK-30/04 version: 24VDC / 50mA separated.
lithium battery life – up to 15 years.
- The indicator's casing: dimensions (HxWxD): 150x180x50mm
- Casing protection:
Indicator - IP 65,
Transformer - IP 40
Alarm indicator (LED light) - IP 65
- Operating temperature range: -40°C ÷ +70 °C

Warranty

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

Ordering

In your order please specify the required version of the SZK-30 indicator (e.g. SZK-30/02).