



ARC MONITOR ZELK-2

Protection Program

PZ-04016E

Application

When an electrical arc occurs in switchgears it can cause termical damage to equipment and injury to personnel. The damages are directly proportional to the arc burning time. Arc monitor ZELK-2 rapidly recognizes electrical arc and trips the circuit breaker in order to disconect feeding of the arc. By using optical sensor for arc detection and static output arc protection operates instantenously in less than 1ms, which is negligible in comparison with disconnection time of circuit breaker. That feature enables early arc recognition, and greatly decreases possible damages.

Arc guard system gives high contribution in protection of personell and equipment with low price and simple application. Because of that a lot of european producers of medium and low voltage switchgears with air insulation apply devices for arc protection.

Functional description

Optical arc detector OS is to be located in each optically separated compartment of switchgear panel and positioned in direction of possible arc occurance. A maximum of six arc detectors OS can be connected to one arc monitor ZELK-2.

The output stage of arc monitor is triac galvanically separated from internal electronics. Triac trips AC or DC supplied circuit breaker. In case of DC supply it is necessary to connect auxiliary contact in series with a circuit breaker's trip coil to interrupt the current through the triac.

According to selected option remote indication can be performed in three ways:

a) with one signalling relay K1 that indicates the absence of auxiliary supply voltage and tripping of the arc monitor. After tripping the signalling relay is permanently energized and it is necessary to reset it with the push button "RESET";

b) same as in a), but the signalling relay is energized in a pulse of 250ms (e.g. to energize bistable contactor);

c) with two signalling relais K1 and K2. Relay K1 indicates the absence of auxiliary supply voltage, and K2 indicates the tripping of the monitor. After tripping the signalling relay K2 is permanently energized and it is necessary to reset it with the push button "RESET";

Green LED "ON" on front panel is used for power on indiction.

Main features

- high speed tripping (in less than 1ms)
- optical arc detection, with max. 6 detectors
- functionality 250ms after auxiliary power supply failure
- AC or DC auxiliary power supply
- local and remote indication of power supply failure and tripping
- indication of fault location on digital display
- static output can be supplied with AC or DC supply
- galvanical insulation 2,5kV between all insulated circuits
- small dimensions and simple mounting on rail DIN EN 50022-35
- selective protection realized with ZELK-2, ZELK-3, IM, SM ensures maximal availability when electrical arc occurs
- ZELK-2 is optimal solution for monitoring smaller number of arc detectors in busbars, bus couplers and switchgear panel compartments



figure 1: Arc monitor ZELK-2 and optical arc detector OS

Digital display on front panel is used for local indication of tripping. It indicates and memorizes which detector has caused tripping, and thus it shows the location of the fault. After fault inspection it is necessary to reset the display with the push button "RESET".

Auxiliary power supply is galvanically insulated from internal electronics and it ensures functionality 250ms after power supply has failed.

Arc monitor ZELK-2 is used in medium voltage switchgears for arc detection in outgoing feeders (selectivity for each outgoing feeder). In combination with tripping unit IM arc monitor is also used for arc detection in busbars and bus

couplers (selectivity for section or outgoing feeder). Current sensing unit SM eliminates the possibility of tripping caused by exterior light (normal arc light in switchgear, photo flush etc.). In this way availability of switchgear is increased. According to the configuration of switchgear output from one current unit SM can be connected to series of arc monitors ZELK-2. In switchgears with multiple incoming feeders it is necessary to disconnect all circuit breakers that are feeding electric arc. For this purpose tripping unit IM is used with additional high speed outputs (five statcal galvanically insulated outputs - triacs).

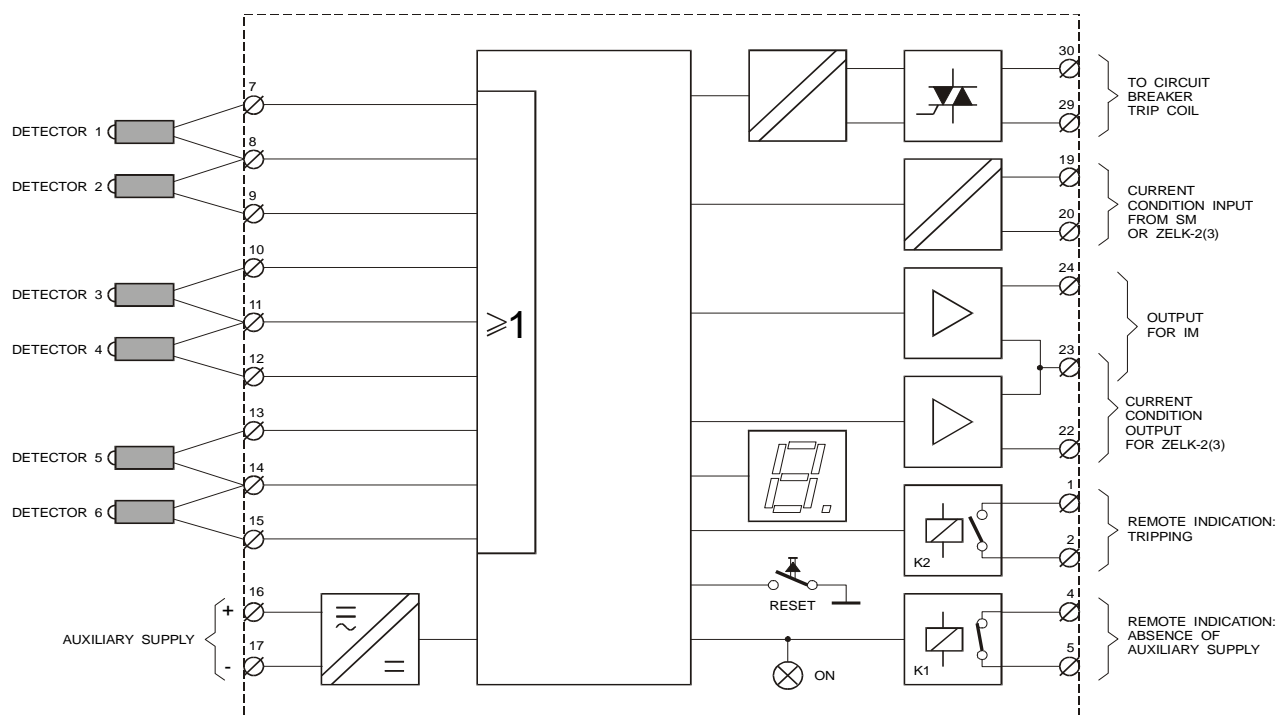


figure 2. Terminal diagram for arc monitor ZELK-2

Specifications

optical inputs:

number of detectors max 6
cable length 4,7,10m, other on request
(max. 20m)

electronical inputs and outputs:

SM input galvanically insul., 12V 20mA
IM output open collector, 12V 20mA
ZELK-2 output open collector, 12V 20mA

tripping output:

load current 10A for 300ms
holding current 5 mA
peak withstand voltage 600V
rated voltage 220V AC or DC
operating time < 1ms

indications:

remote one or two signalling relays
220V AC, 300V DC, 5A
K1 is NC, K2 is NO

local LED green (power on indication)
digital display (fault location)

auxiliary power supply:

supply voltage 24, 110 or 220V DC +45% ; -20%
or 220V AC, +10% ; -20%
power consumption stand by 3,6VA, max 5VA
galvanically insulated, functionality 250
ms after fail of auxiliary power supply

general data:

temperature range -10°C +55°C
insulation test voltage 2,5kV, 50Hz, 1min, between all
insulated circuits

mechanical data:

mounting on DIN EN 50022-35 rail or
on the wall
dimensions 100x74x120 mm

