

TRIP CIRCUIT SUPERVISION RELAY TSG 930 JUCKER - RELAY

The type TSG 930 relay supervises the trip circuit of the three-phase circuit breaker and it activates delayed alarm, the visual indicator and the LED of the corresponding faulty phase, in case of a trip circuit failure or a malfunction of the mechanism. The relays are available for all kinds of three-phase circuit breakers and for any combination of standard trip- and alarm voltages.

Six limiting resistors are supplied separately with the relay TSG 930 X. If the relay is accidentally short circuited, they provide current limitation which will not result in trip coil operation. These resistors are to be installed into the trip circuit, outside the relay, so that stringent safety requirements are maintained.

The six limiting resistors are installed inside the relay TSG 930 N in applications where less stringent safety is required and for 48 and 60 VDC only.

DETECTED FAILURES

After a 400 ms delay, the relay activates an alarm, the visual indicator and the LED of the corresponding faulty phase, in case of the following occurrences:

- Trip voltage failure
- Trip coil interruption
- Trip circuit wiring interruption
- Circuit breaker malfunction

Alarm and visual indicator only (without LED) at:

- Alarm voltage failure

DESIGN

The relays and the visual indicator are of rugged and proven construction, installed in a phenolic housing with screw terminals. The housing is available for rail mounting. The monitoring relays AB1, AB2, AB3 have two separate windings (dielectric strength 2,5 kV RMS) capable of attracting the relay individually, or both in series. The alarm relay C has one NO and two NC contacts for alarm functions and a release time of more than 400 ms. The visual indicator is activated in case of a failure and it can only be reset manually. Three LED's marked R, Y and B indicate the corresponding faulty circuit.

FUNCTION

The relay TSG 930 X must be connected according to wiring diagram 1 for external resistor.

The relay TSG 930 N must be connected according to wiring diagram 2 for internal resistor.

Under normal conditions and with all three circuit breakers closed, the monitoring relays AB 1, AB 2 and AB 3 are attracted via the windings 3-2 (windings 4-1 are disconnected by the NC auxiliary contacts of the three-phase circuit



breaker). Alarm relay C is attracted by the NO contacts of relays AB 1, AB 2 and AB 3 in series. Alarm voltage is applied on the visual indicator coil S by the NO part of the DPDT-contact of relay C. The visual indicator can now be reset manually.

Windings 3-2 of the monitoring relays detect every failure in the trip circuits and the failure detecting relay releases. Therefore, after 400 ms relay C releases, resulting in activation of the alarm and the visual indicator. The NC part of the DPDT-contact applies alarm voltage to the NC contacts of the relays AB 1, AB 2 and AB 3. The failure detecting relay which had released before, activates the LED of the corresponding faulty phase circuit.

Under normal conditions and with all three circuit breakers open, the monitoring relays AB1, AB 2 and AB 3 are attracted by both windings 3-2 and 4-1 in series, by means of the NC auxiliary contacts of the circuit breaker. The relays AB 1, AB 2 and AB 3 detect every trip circuit failure in the same manner as described above, with the circuit breaker closed.

The visual indicator remains in the alarm status even after the malfunction is eliminated, thus, indicating a previous, short-term failure. It has to be reset manually.

The relays AB and C are delayed in drop-off for a total of more than 400 ms to prevent a false alarm resulting from brief voltage dips. In addition, the alarm cannot be activated during a normal tripping operation, when windings 3-2 of relays AB 1, AB 2 and AB 3 are momentarily short circuited by the trip relay contacts. However, the alarm is activated if the trip relay fail to reset due to a failure of the circuit breaker tripping mechanism.

VOLTAGE RANGE

The relays TSG 930 are available for all combinations of the following trip- and alarm voltages:
 48 V= 60 V= 110 V= 125 V= 220 V=
 max. permissible line resistance 400 Ohm

LIMITING RESISTORS

Six limiting resistors are supplied separately with the relay TSG 930 X, or mounted internally with the relay TSG 930 N. They have the following values:

Tripping voltage	Limiting resistors
48 V=	750 \square
60 V=	1600 \square
110 V=	3000 \square
125 V=	3600 \square
220 V=	8900 \square

TECHNICAL SPECIFICATIONS

Trip circuit

Tripping voltage 48 - 60 - 110 - 125 - 220V \square 20 %

max. power consumption at	48 V	60 V	110 V	125 V	220 V
	2,4 Watt	3,0 Watt	7,0 Watt	8,0 Watt	13 Watt

Limited current at short circuit at	48 V	60 - 125 V	220 V
	65 mA	40 mA	25 mA

max. permissible line resistance at	48 V	60 V	110 - 220V
	48 \square	100 \square	400 \square

Alarm circuit

alarm voltage 48 - 60 - 110 - 125 - 220 V= \square 20 %

max. power	48 V	60 V	110 V	125 V	220 V
	1,8 Watt	2,3 Watt	2,6 Watt	3,3 Watt	4,9 Watt

alarm delay more than 400 ms

Visual indicators

display opto-mechanical

Failure indicators

display 3 LEDs marked R Y B

alarm Relay C

test	VDE 0453/9.72
contacts	Ag gold plated
contact load	2 x NC + 1 x NO 250V~ 3A cos \square 250V~ 1A cos \square 250V- 0,4A (0 mS) 250V- 0,2A (40 mS)

General specifications

ambient temperature range	-20° ÷ +80°C
dielectric strength	2500 V RMS 50 Hz 1 Min
isolation test about IEC60255-5 and ANSI/IEE C37.90	
weight	TSG 930 X without res. 950 gr 6 external resistors 600 gr TSG 930 N 1000 gr

Housing

housing vor Hat-rail	DIN EN 50022-35
insulation	VDE 0110-7.50 380 VE 440 VG
protection class	IP 40
terminals	2 x 1,5 mm ² with wire seal
screw terminales cover	IP 20 DIN VDE 0470
seal	dust proof

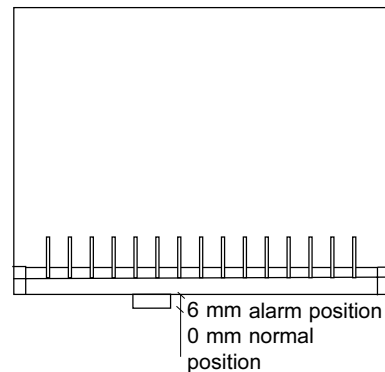
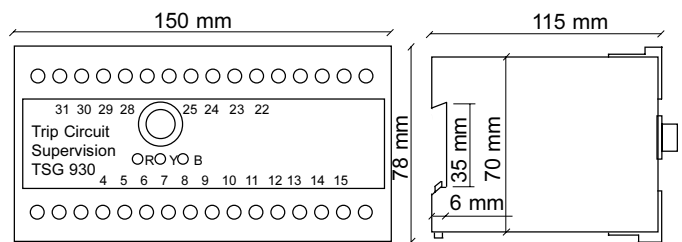
External limiting resistor

Value	see Table \square 10 %
Terminals	4 mm ² with wire seal
dielectric strength	2500 V RMS 50 Hz 1 Min.

TYPE DESIGNATION - ORDER SPECIFICATION

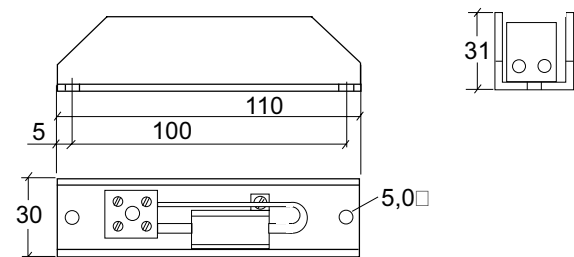
	TSG 930	X	11	A	12
Series					
Limiting resistor	external X				
for 48 and 60 V DC only	internal N				
Tripping voltage x10	48 V= 05				
	60 V= 06				
	110 V= 11				
	125 V= 12				
	220 V= 22				
Alarm voltage x10	A				
	48 V= 05				
	60 V= 06				
	110 V= 11				
	125 V= 12				
	220 V= 22				

Housing dimensions



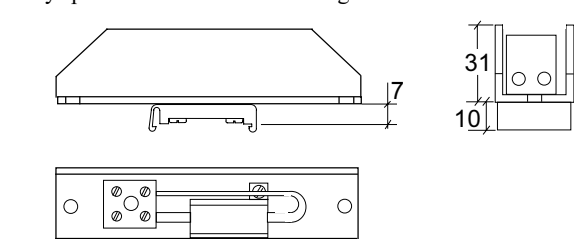
EXTERNAL LIMITING RESISTOR DIMENSIONS

Execution 'Standard'

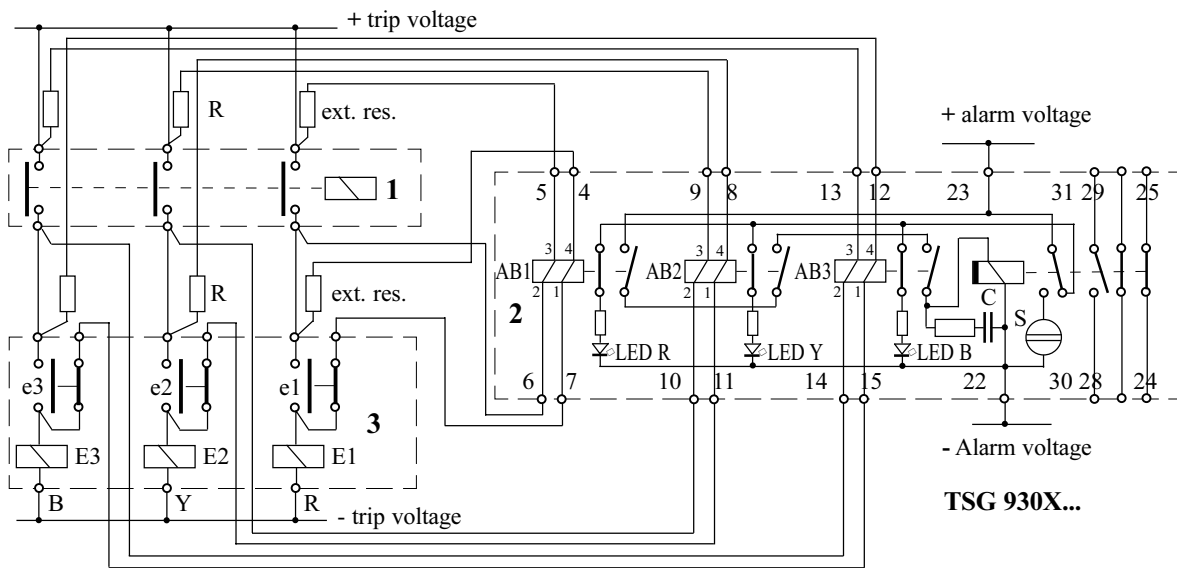


EXTERNAL LIMITING RESISTOR DIMENSIONS

Very special execution for mounting on DIN rail

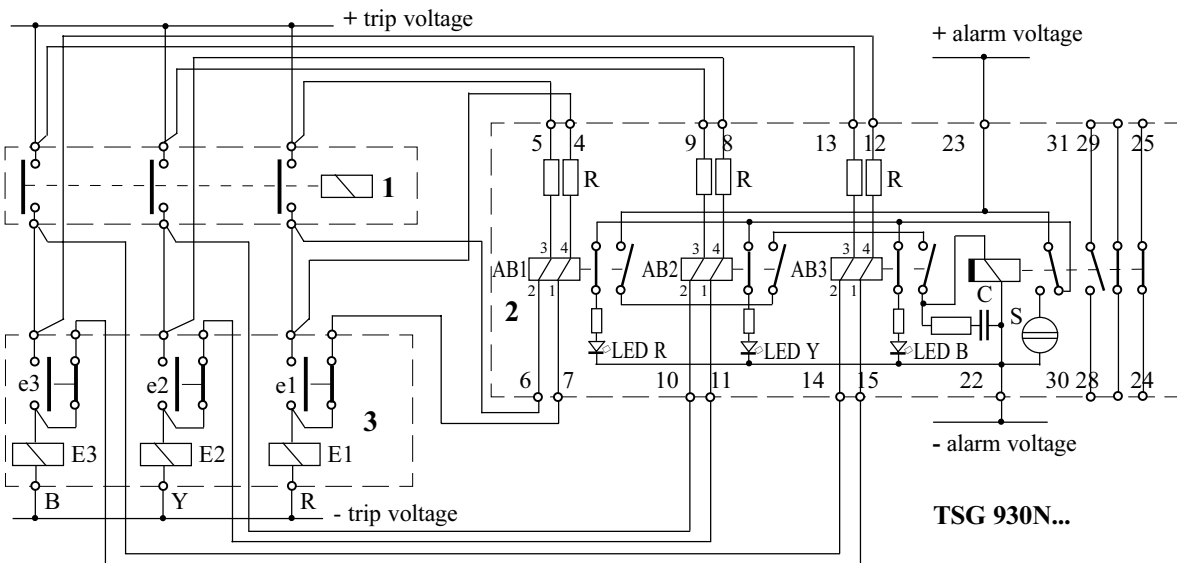


WIRING DIAGRAM 1 TSG 930 X . . . (external resistors)



- 1 TRIP RELAIS
- 2 TRIP CIRCUIT SUPERVISION
- 3 CIRCUIT BREAKER with
- E Tripping coil e auxiliary contacts
- R LIMITING RESISTOR
- S VISUAL INDICATORS

WIRING DIAGRAM 2 TSG 930 N . . . (internal resistors / for 48 and 60 V DC)



- 1 TRIP RELAIS
- 2 TRIP CIRCUIT SUPERVISION
- 3 CIRCUIT BREAKER with
- E Tripping coil e auxiliary contacts
- R LIMITING RESISTOR
- S VISUAL INDICATORS

Producer:

Schärer-Elektronik AG CH-5614 Sarmenstorf