

Trip circuit supervision relay

Type TCS



ABB – a global technology leader

ABB is a global leader in Power and Automation technologies that enable utility and industry customers to improve performance while lowering environmental impact. The ABB Group of companies operates in around 100 countries and employs over 1,03,000 people.

In India, ABB serves customers with the complete range of power and automation technologies. The company has a vast installed base, extensive manufacturing facilities and a countrywide marketing and service presence.

As a part of its Power Technologies offering, ABB serves electric, gas and water utilities as well as industrial and commercial customers with a wide range of products, systems and services for power generation, transmission and distribution. ABB's system offering ranges from Electrical Balance of Plant (EBOP) for power plants, bulk power transmission, turnkey substations and complete electrification to utility automation and power distribution.

The product offering covers a wide spectrum of technologies across the entire voltage range including indoor and outdoor circuit breakers, air and gas insulated switchgear, disconnectors, capacitor banks, reactive power compensators, power transformers, distribution transformers, instrument transformers, Compact Secondary Substations (CSS) and Ring Main Units (RMU).

Advantage ABB

- ✓ 120 years of technology and innovation
- ✓ Unparalleled domain competence
- ✓ Global experience
- ✓ Complete solution capabilities
- ✓ Large installed base
- ✓ Environment-friendly technologies



Trip circuit supervision relay type TCS

Features

- Continuous supervision of complete trip circuit independent of the circuit breaker position
- Detects faults in the supervised circuits, such as loss of voltage, circuit breakage, contact degeneration in connections and resistance increase in wires, contacts and coils
- Low-level measuring current enables application in sensitive or high resistance circuits
- Operation delay to avoid spurious signals, for instance, on circuit breaker operations
- Operation indication by a single dual - colour LED
- Complete range of rated voltages either AC or DC
- Galvanic isolation is possible between auxiliary source and supervised circuit
- Very low burden on the auxiliary source

Description

The supervision relay TCS is designed for the supervision of trip circuits and other important control and monitoring circuits. Block diagram of the relay is shown in Fig. 1. The supervision function is based on a low-level (~ 3 mA) current injection principle. The injected current is sensed by two opto-couplers. The supervision function in three steady states of circuit breaker-trip circuit can be seen from fig.2, 3 and 4 (page 5). In normal condition, the indicator LED glows green and output relays are in 'picked-up' condition. In the event of a fault, if the measuring current drops below the operating value of the relay (0.3 - 0.7 mA) or completely stops flowing. The supervision relay operates (drops-off) after a delay of 0.6 sec and the indicator LED turns red. The supervision relay, for its functioning requires an auxiliary voltage (AC or DC) of rated value to be connected to the terminals 'a' and 'b'. This voltage can be the same as that of the supervised circuit or it could be a separate source with the same magnitude (AC or DC). Should a fault occur in the auxiliary voltage supply, the LED does not glow and the output relay drops off. Relays with differing rated voltage for supervision circuit and auxiliary supply can be supplied as a special execution.

Application

In a protection system the trip circuit of the circuit breaker is crucial. If an interruption occurs in the trip circuit a possible network fault will not be disconnected and would have to be cleared by another protection upstream in the power system. The supervision function is particularly important when there is only one tripping coil and CB tripping is vital. For instance, for generator circuit breakers or any other important circuit breaker in distribution networks. The supervision relay type TCS is intended for a continuous supervision of circuit breaker trip circuit and to give an alarm for loss of auxiliary supply, faults on the trip-coil or its wires independent of the breaker position, faults on the breaker auxiliary contacts and faults in the supervision relay itself.

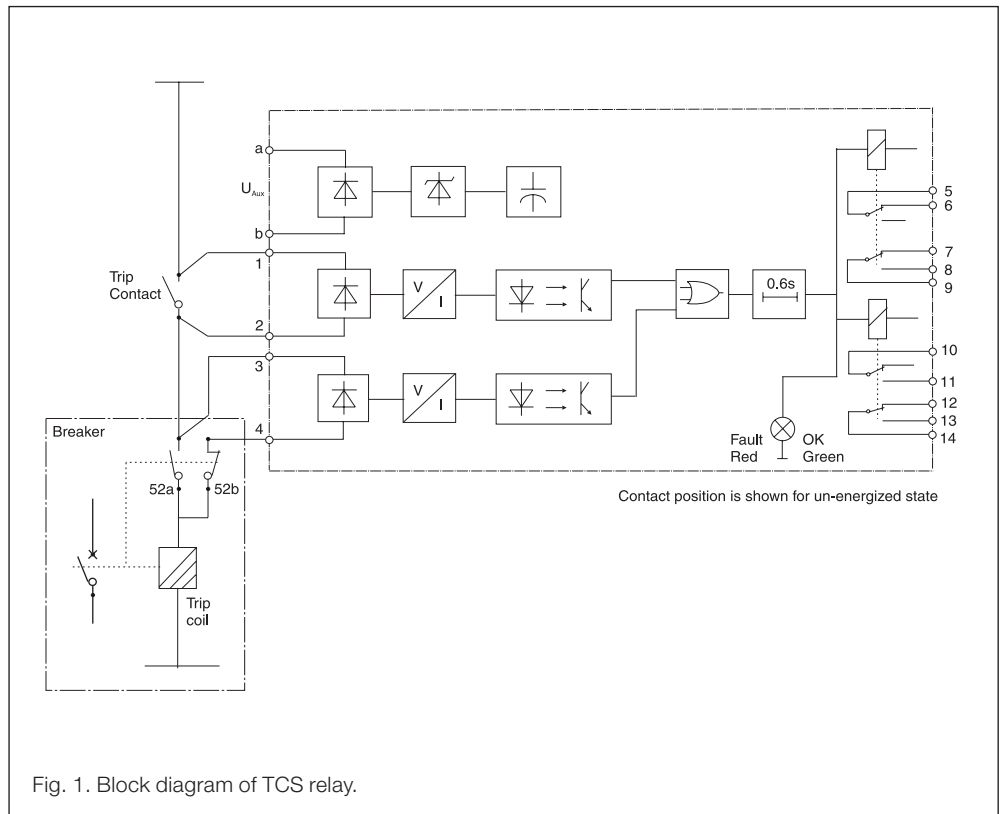
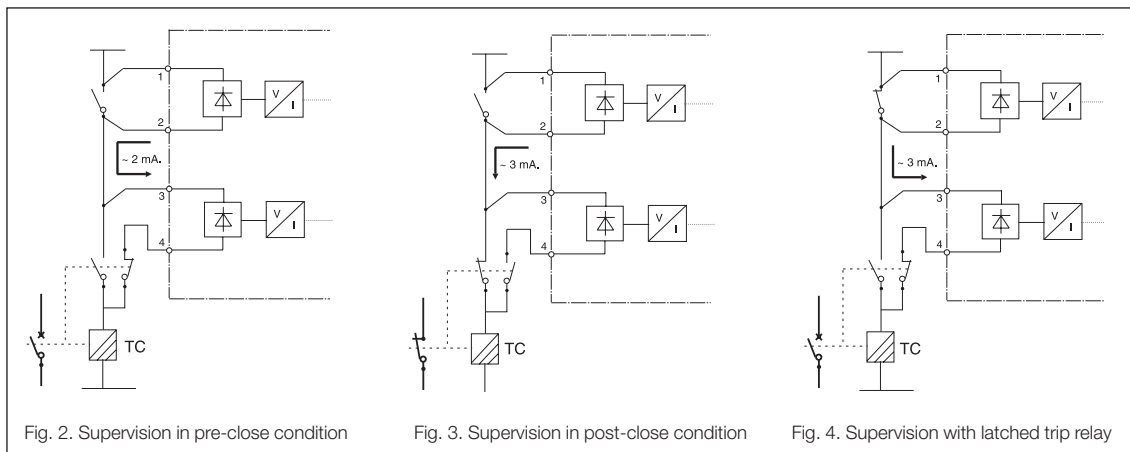


Fig. 1. Block diagram of TCS relay.

Technical data



Energizing quantities, rated values and limits

Rated voltage of supervised and auxiliary circuit U_{Aux}	24,30, 48,110-125, 220-250,V AC or DC
Operative voltage range	80-110% of rated U_{Aux}
Permitted ambient temperature range	0 ⁰ C to +55 ⁰ C
Pick-up & Drop-off current at rated voltage U_{Aux} & 25 ⁰ C	0.3 - 0.7 mA
Operate (Drop-off) time at rated voltage U_{Aux} & 25 ⁰ C	0.6 - 0.7 sec.
Burden at rated voltage	
– Auxiliary circuit (W)	24 30 48 110 125 220 250
– Supervision circuit (W)	1 1.3 1.4 2 2.5 2.7 3.5
	0.08 0.08 0.15 0.25 0.32 0.54 0.7
Mechanical durability	1 Million switching operations
Terminals	Suitable for 2 x 2.5 mm ² wires
Weight	1 Kg

Contact data

Contact configuration (self reset)	1 N/O +1 N/C + 2C/O
Max voltage within a contact system	250 V DC / AC
Rated current	5 A
Make and carry for 0.5 s	10 A
Make and carry for 3.0 s	8 A
Breaking capacity for DC with circuit time-constant L/R ≤ 40 ms, at 48/110/220 VDC	1A/0.25A/0.15A
Electrical endurance Tested according to IEC 255-23	10,000 operations, at 110 V DC, 0.35A resistive, 360 op/hr

Electrical tests

Temperature-rise; tested acc. to IEC 255-6	Enclosure, pcb relays, heat dissipating components
Insulation resistance; tested acc. to IEC 255-5	>100 M Ohm at 500 V DC
Dielectric; Tested acc. to IEC 255-5	2.0 kV, 50 Hz, 1 min
Impulse; Tested acc. to IEC 255-5	5 kV, 1.2/50µs, 0.5J
1 MHz burst disturbance test acc. to IEC 255-22-1 – common mode – differential mode	Class III 2.5 kV, 1 MHz, 400 pls/s 1 kV, 1 MHz, 400 pls/s
Electro-static discharge test acc. to IEC 255-22-2 – contact discharge – air discharge	Class III 6 kV, 150 pF/330 ohm 8 kV, 150 pF/330 ohm
Fast transient disturbance test acc. to IEC 255-22-4 – common mode	Class IV 4 kV, 5/50 ns, 5kHz, Rs = 50 ohm
Surge immunity test acc. to IEC 255-22-5 – common mode – differential mode	Class III 2 kV, 1.2/50 µs, Rs = 10 ohm 1 kV, 1.2/50 µs, Rs = 2 ohm

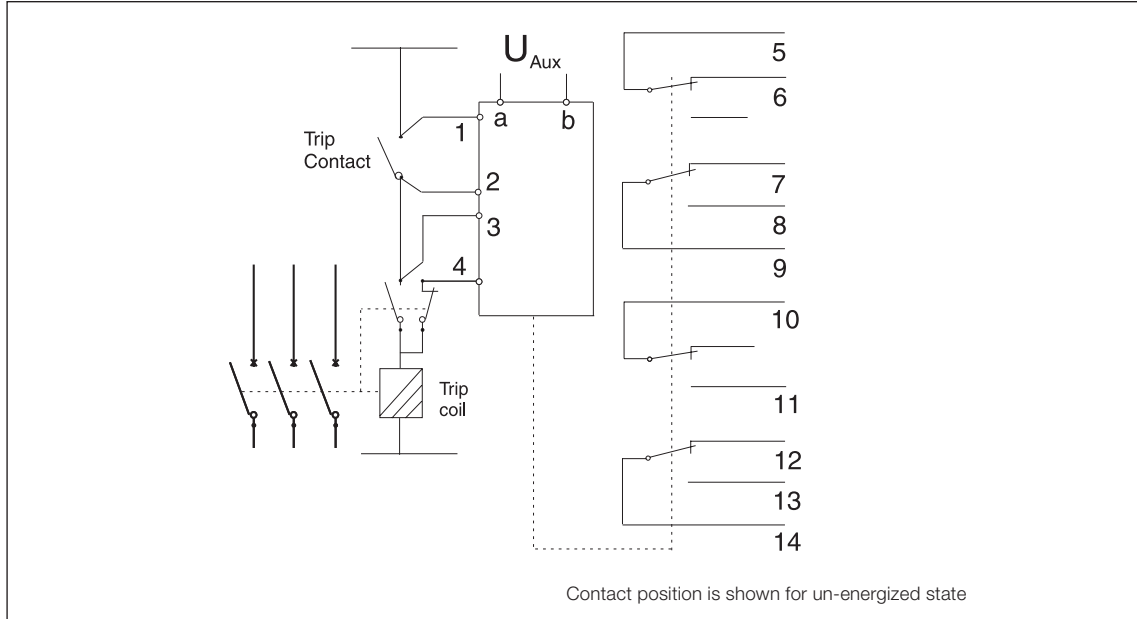
Environmental tests

Vibration response and endurance Tested acc. to IEC 255-21-1	Class I, 10.....150Hz
Shock response and endurance Tested acc. to IEC 255-21-2	Class I, 11 ms
Dry heat; test acc. to IEC 68-22-2	+55° C / +70° C
Dry cold; test acc. to IEC 68-2-1	-10° C / -25° C
Damp heat (cyclic - 12+12 Hr) Test acc. to IEC 68-2-30	12 Hr/55° C + 12 Hr/25° C x 6 days at 95% RH

Ordering details

Relay type	Contact	Rated voltage (AC/DC)	Article no
TCS	1N/O+1N/C+2C/O	24	1MYN569697-A
		30	1MYN569697-B
		48	1MYN569697-C
		110-125	1MYN569697-E
		220-250	1MYN569697-G

Connection diagram and Contact configuration



Dimensions

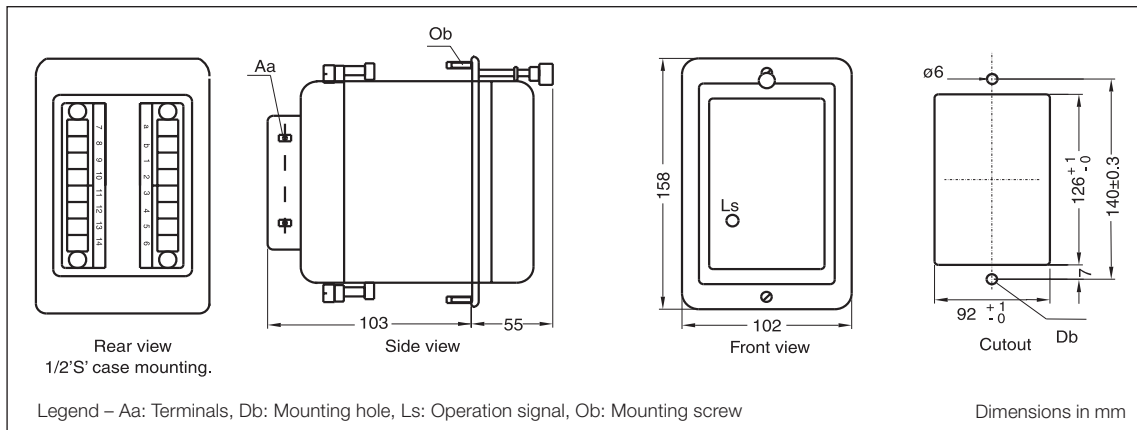


ABB Limited
Distribution Automation
Maneja,
Vadodara 390 013, India.
Tel: +91 265 2604384/5/6
+91 265 2604397
Fax: +91 265 2638922
E-mail: aicds@in.abb.com

Regional Marketing Offices:

North

NBCC Tower
4th Floor
No. 15, Bhikaji Cama Place
New Delhi 110 066
Tel: +91 11 26186000
Fax: +91 11 26197592/84035

West

ABB House
Dr. S B Path
Ballard Estate
Mumbai 400 038
Tel: +91 22 56318231 – 39
Fax: +91 22 56318276/77

South

Embassy Star, 1st Floor
No. 8, Palace Road
Vasanth Nagar
Bangalore 560 052
Tel: +91 80 22949779
Fax: +91 80 22949808

East

4th Floor
No. 9
Elgin Road
Kolkata 700 020
Tel: +91 33 22832906/8
Fax: +91 33 22832990

Central

Vandana House
1st Floor
G E Road, Ramkund
Raipur 492 001
Tel: +91 771 5060816-8
Fax: +91 771 5053391

Century Plaza
No. 3C, 3D & 3F, 3rd Floor
561 / 562, Anna Salai
Teynampet (Mount Road)
Chennai 600 018
Tel: +91 44 24340201
Fax: +91 44 24340282

www.abb.co.in