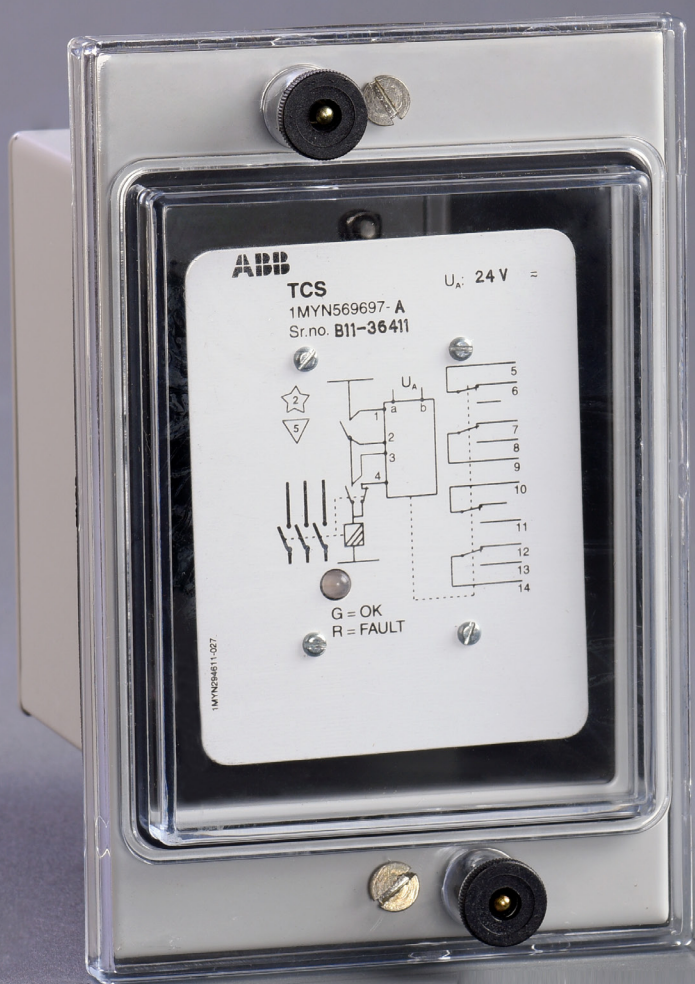


STATIC MONITORING RELAY

# Trip circuit supervision relay TCS

## Product Guide



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**The supervision relay type TCS is intended for a continuous supervision of circuit breaker trip circuit and gives an alarm for loss of auxiliary supply, faults on the trip coil or its wires independent of the breaker position.**

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# Trip circuit supervision relay

## TCS

### Features

- Continuous supervision of trip circuit independent of the circuit breaker position
- Extremely low burden on auxiliary source
- Complete range of rated AC/DC voltage
- Operation indication for trip circuit healthy and unhealthy
- Low level measuring current enables application of relay for high burden circuits
- Delayed operation to avoid spurious signals during circuit breaker operation
- Galvanic isolation between auxiliary supply and supervision circuit

### Application

In a protection system the tripping of circuit breaker is crucial. Should an interruption occur in trip circuit, possible network fault would not be disconnected and the fault would have to be cleared by another upstream protections in the power system. The supervision function is particularly important when there is only one tripping coil and CB tripping is vital or important circuit breaker in distribution networks.

The supervision relay type TCS is intended for a continuous supervision of circuit breaker trip circuit and gives an alarm for loss of auxiliary supply, faults on the trip coil or its wires independent of the breaker position.

The relay supports functions as indicated in Table 1.

### Design and principle of operation

The supervision relay TCS is designed to be used 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 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. In normal condition the indicator LED glows green and output relays are in picked up condition.

If in the event of a fault in the measuring circuit, the measuring current goes 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 auxiliary voltage (AC or DC) of rated value to be connected to the terminals.

This voltage can be the same as that of the supervised circuit or it could be a separate source with 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.

#### 1. Application and supported functions

Functionality	ANSI	IEC
Trip circuit supervision	95	TCS

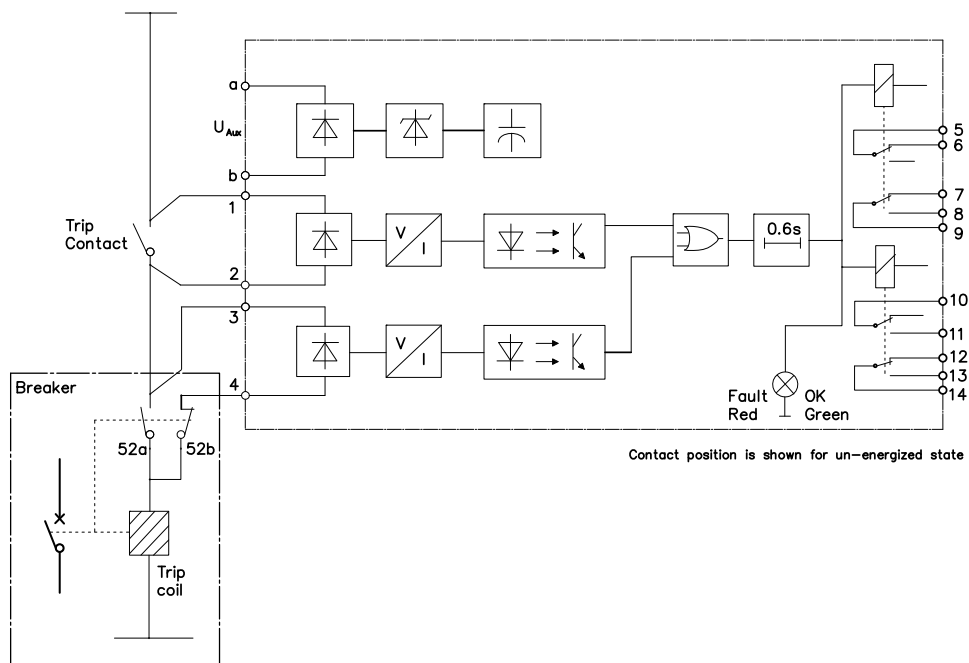


Fig 1: Block diagram of TCS Relay

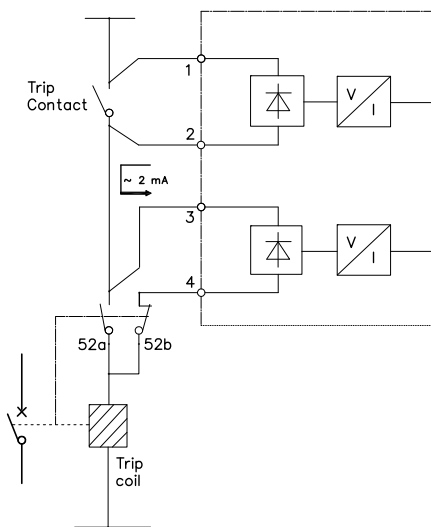


Fig 2: Supervision in pre-close condition

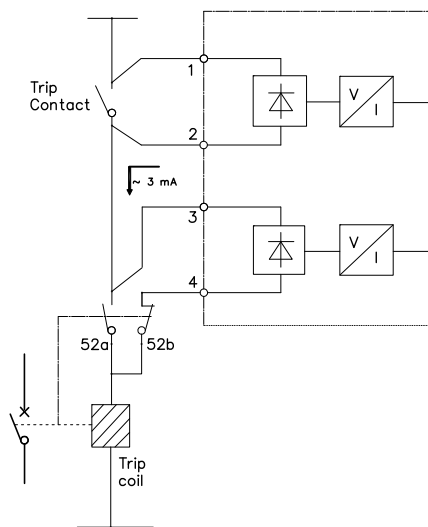


Fig 3: Supervision in post -close condition

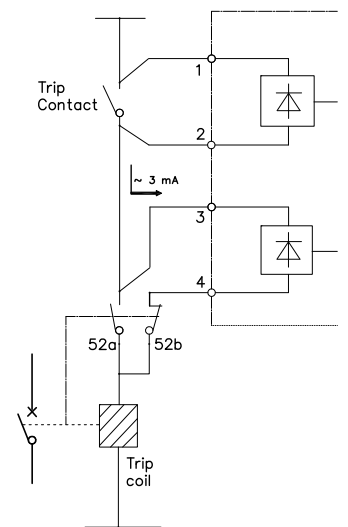


Fig 4: Supervision with latched trip relay

## Technical data

**Table 2. Dimensions**

Description		Value
Width	Frame	108.0 mm
	Case	088.0 mm
Height	Frame	164.0 mm
	Case	112.0 mm
Depth	Case	149.5.0 mm (124.5 mm + 25 mm)
Weight	Relay	1.00 kg

**Table 3. Auxiliary power supply**

Description		Value
U <sub>aux</sub> nominal		24, 30, 48, 110-125, 220-250 V DC 110-125, 220-250 V AC, 50Hz
U <sub>aux</sub> variation		80...110% of Uaux
Pick-up and Drop-off current at rated voltage Uaux and 25° C		0.3 - 0.7 mA
Operate (Drop-off) time at rated voltage Uaux and 25° C		0.6 –1 sec
Burden at rated voltage	24                      30                      48                      110-125                      220-250	
- Auxiliary voltage (W)	1.15                      1.5                      1.7                      2.9                      4.1	
- Supervision voltage (W)	0.92                      0.10                      0.18                      0.37                      0.81	
Application with AC auxiliary voltage		In case relay is supplied through UPS step-wave or square wave, interposing transformer / surge suppressor is needed to limit aux. supply peak voltage below the upper limit of the relay

**Table 4. Output contact details**

Description	Value
Rated voltage	250 V AC/DC
Continuous contact carry	5 A
Make and carry for 0.5 sec	10 A
Make and carry for 3.0 sec	8 A
Breaking capacity when the control-circuit time constant L/R < 40 ms, at 48 / 110 / 220 V DC	1.0 A / 0.25 A / 0.15 A
Electrical endurance as per IEC 60255-23	10,000 operations at 110V DC, 0.35A resistive ,360 op/hr

**Table 5. Degree of protection of relay**

Description	Value
Front side	IP 54
Rear side, connection terminals	IP 20



**Table 6. Environmental conditions**

Description	Value
Operating temperature range	-10 <sup>0</sup> ...+55°C
Relative humidity	< 93%, non-condensing
Atmospheric pressure	86...106kPa
Altitude	up to 2000 m

**Table 7. Environmental tests**

Description	Type test value	Reference
Dry heat test (humidity < 50% )		IEC 60068-2-2
• Working	16h at +55°C	
• Storing	4h at +70°C	
Dry cold test		IEC 60068-2-1
• Working	16h at - 10°C	
• Storing	4h at - 25°C	
Damp heat test, cyclic	6 cycles (12 h + 12 h) at +25°C...+55°C, 6 days Rh > 93%	IEC 60068-2-30
Storage temperature test	72h at -40°C	IEC 60068-2-1
	72h at +70°C	IEC 60068-2-2

**Table 8. Insulation tests**

Description	Type test value	Reference
Dielectric test		
• Test voltage	2 kV, 50 Hz, 1 min	IEC 60255-27
Impulse voltage test		
• Test voltage	5 kV, 1.2/50 µs, 0.5 J	IEC 60255-27
Insulation resistance test		
• Insulation resistance	> 100 M Ω at 500 V DC	IEC 60255-27

**Table 9. Mechanical tests**

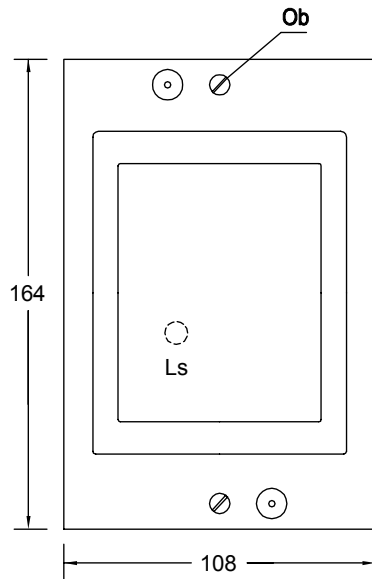
Description	Type test value	Reference
Vibration tests		IEC 60255-21-1, class I
• Response	10...150 Hz, 0.075 mm / 0.5g, 1 sweep / axis	
• Endurance / Withstand	10...150 Hz, 1.0 g, 20 sweeps / axis	
Shock tests		IEC 60255-21-2, class I
• Response	5 g, 3 pulses in each direction	
• Endurance / Withstand	15 g, 3 pulses in each direction	
Bump tests	10 g, 1000 bumps in each direction	IEC 60255-21-2, class I

## Dimensions and mounting

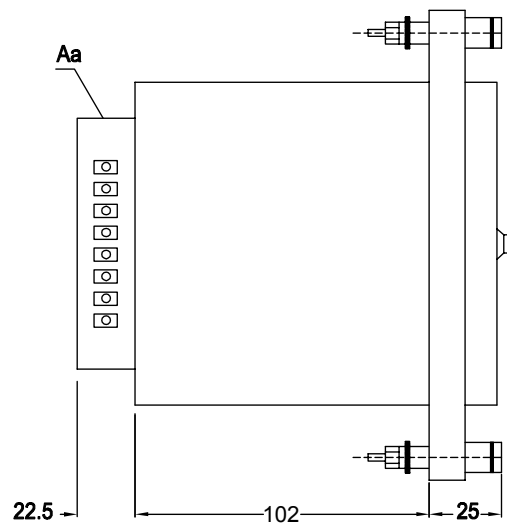
TCS relay is equipped with flush mounting arrangement.

The panel cut-out for flush mounting:

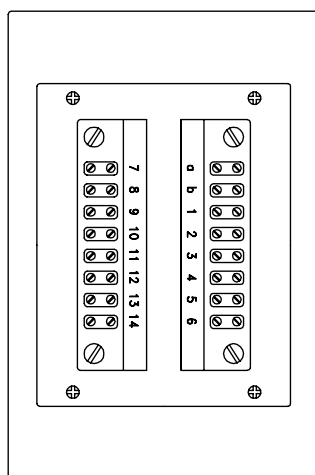
- Height :  $112.0 \pm 1.0$  mm (  $140.0 \pm 0.3$  mm between center of mounting holes)
- Width :  $88.0 \pm 1.0$  mm



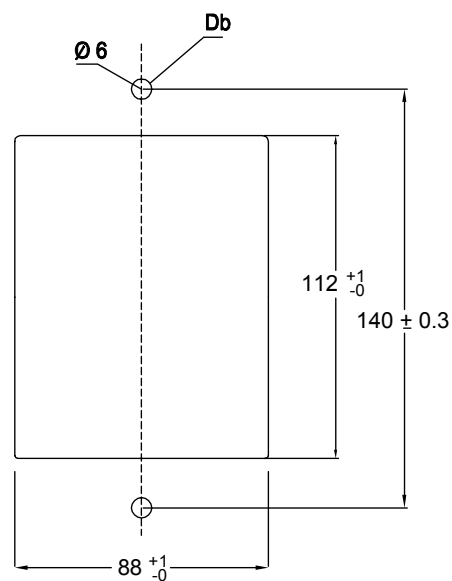
FRONT VIEW



SIDE VIEW



REAR VIEW



CUTOUT

### Legend

- Aa : Terminal Socket  
 Db : Mounting hole  
 Ob : Mounting screw  
 Ls : Operation signal

Fig 5: Dimesion and mounting



## Selection and ordering data

The relay type and serial number label identifies the relay. An order number label is placed on the side of the relay. The order number consists of a string of codes generated from auxiliary supply of the relay.

Use the ordering key information in Fig. 6 to generate the order number when ordering complete protection relay.

### Example code

#	Description	
<b>1-7</b>	<b>Product type</b>	
	Static	<b>1MYN569</b>
<b>8-10</b>	<b>Relay type</b>	
	TCS	<b>697</b>
<b>11</b>	<b>Vacant digit</b>	
	Vacant	-
<b>12</b>	<b>Auxiliary supply</b>	
	24 V DC	<b>A</b>
	30 V DC	<b>B</b>
	48 V DC	<b>C</b>
	110-125V AC/DC	<b>E</b>
	220-250V AC/DC	<b>G</b>

Example order code: 1MYN569697-E

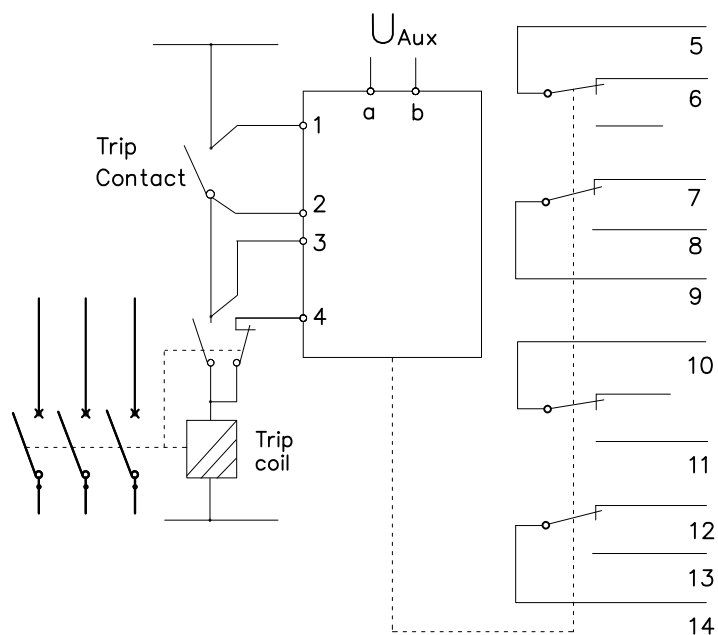
Your ordering code:

Digit (#)	1-7	8-10	11	12
Code				

Fig 6: Ordering key for relay

## Connection and terminal diagram

Connection diagram and contact configuration



Contact position is shown for un-energised state

**Fig 7: Terminal diagram of TCS relay**

### References

The <http://new.abb.com/mediumvoltage/distribution-automation> portal offers you information about the medium voltage distribution automation products and solutions.

You will find the latest relevant information on the trip circuit supervision relay on product page.

The download area contains the latest documentation such as product guide and so on. The selection tool on the web page find the document category and language.

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