

## Directional overcurrent relays for ground fault protection in ungrounded systems.



# TCCV

## Directional Overcurrent Relay

### Application

- Three phase ungrounded systems

### Protection and Control

- Ground sensitive
- Directional overcurrent

### Features

- Front panel settings
- LED trip indicator
- 1/3 standard 19", 4 unit, rack case
- High sensitivity (5 mA)

## DESCRIPTION

The relays type TCCV perform a directional protection against ground faults in ungrounded systems. These are solid state modular relays supplied in 1/3 of a 19" rack case.

## APPLICATION

These relays have a very wide application field in ungrounded systems protection. They provide a selective protection due to the incorporation of a directional unit.

The election of values which determine the operation curve characteristic for the overcurrent unit is made from the relay frontal nameplate and depends on the characteristics or needs of the system in which the relay is going to be applied.

The possibility of delaying the trip up to a maximum of 3 sec is included, being such election made from the front of the relay .

Its negligible over-travel, fast reset (<75 ms.), high trip/reset ratio (<95%) characteristics, together with an adjustable time delay (0 to 3 sec), high response time (minimum of 21 ms) and the 32 selectable calibrated taps, provide the right requirements for a perfect coordination, making fast reclosings without loss of selectivity available.

## OPERATION

The relay will trip whenever the overcurrent and directional units issue a trip permission simultaneously, being the first trip time delayed (definite time from 0 to 3 sec) and the next instantaneous during the associated reclosing cycle, minimizing in this way the damages caused by a close over fault. The relay continues operating in instantaneous trip mode for 10 sec, after the first time delayed trip. After these 10 sec the relay automatically goes back to the time delay mode.

### Overcurrent Unit

In the frontal nameplate of the relay there is a group of 5 microswitches used for the selection of the current taps, according to the following formulas:

$$I_L = 1.2 [5 + ( )] \text{ mA} \quad I_H = 4.5 [5 + ( )] \text{ mA}$$

The minimum current  $I_L$  can take 32 values from 6 to 80.4 mA. These values, together with  $V_H = 45 \text{ V}$  and  $V_L = 2 \text{ V}$  determine the operation characteristic curve, so that it will give trip permission when the voltage and the current fall into the trip region.

The relay has the possibility of delaying the first trip. The setting is made through a block of 4 microswitches and a scale switch placed in the front nameplate .

### Directional Unit

- rated polarization voltage  $110/\sqrt{3} \text{ V}$ , 50 Hz or  $120/\sqrt{3} \text{ V}$ , 60 Hz
- continuous thermal capacity: 3.6 Vn
- characteristic angle:  $90^\circ$  I lagging V
- directional stability: it doesn't operate for currents in the opposite direction till 30 times the rated current with polarization voltages between 0 and 3 Vn



## OPERATION

- directional sensibility: the minimum polarization current is 2 mA and the minimum polarization voltage is 0.5 V
- operating time: 21 ms for  $I > 7 I_L$  and  $V > 10 V$  and an angle of  $90^\circ$

### Construction

- accuracy, reliability and low power consumption
- fixed rack cases; led indicator with trip memory and reset push-button
- shock proof, non-flammable and fire-resisting sealed plastic cover, which permits exterior reset of indicator
- output unit of high seismic value

## TECHNICAL SPECIFICATIONS

POWER SUPPLY	
<b>DC AUXILIARY CIRCUIT</b>	
<b>Power Consumption 125 V:</b>	
Typical:	75 mA
Operated:	120 mA
<b>Power Supply Voltage:</b>	
Nominal Voltage:	48 or 125 VCC
Operation Range:	39-57, 85-150 VCC (according to nominal voltage)

TYPE TESTS	
<b>TYPE TESTS</b>	
The TCCV type relays include type tests recommended by IEC255-5 standard, about Impulse Test And High Frequency Transients.	

OUTPUTS		
<b>CONTACT CHARACTERISTICS</b>		
The TCCV series relays include one telephone-type relay with 3 normally open contacts with the following characteristics:		
Make and Carry Capacity	Breaking Capacity	Rated Capacity
3.000 W resistive during 0.2 sec with 30 A and 300 VCC max	50 W resistive with 2 A and 300 VCC max	5 A with 300 VCC max

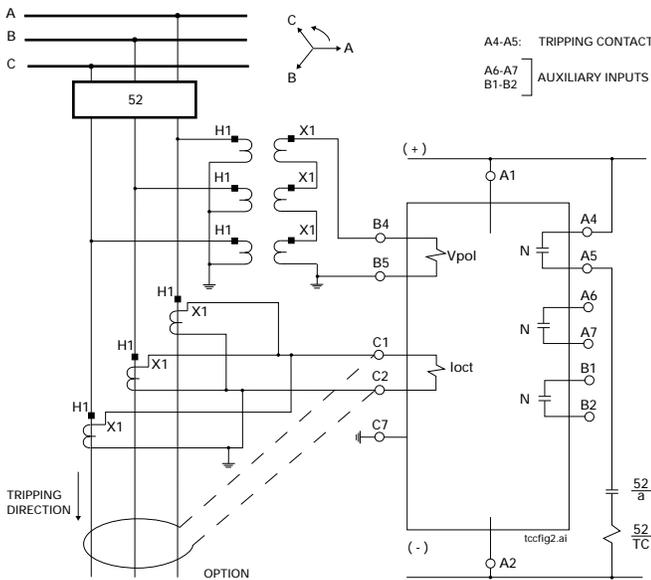
INPUTS	
<b>VOLTAGE CIRCUIT BURDENS</b>	
<b>Power:</b>	<0.05 VA

CURRENT CIRCUIT BURDENS								
Range (mA)	Frequency (Hz)	Minimum Operation Current (mA)	Max Burden (mΩ) for Multiples of Minimum Operation Current					
			Once			2 times Z	10 times Z	20 times Z
			R	X	Z			
6-80.4	50	6	109	11	110	110	110	110

Specifications subject to change without notice.

## CONNECTION DIAGRAM

Fig. 1. External connections



## ORDERING

To order select the basic model and the desired features from the Selection Guide below.

TCCV	*	5DA	*	00	*	00	
TCCV							Directional overcurrent ground relay
0							No test block
1							Test block
		1					50 Hz 110/√3 VAC
		2					60 Hz 120/√3 VAC
				A			48 VCC auxiliary voltage
				C			125 VCC auxiliary voltage

**Example:** TCCV modular relay without test blocks, 60 Hz, 125 VDC, control voltage Model TCCV 05DA200C00