**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 selection 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:

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

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/\(\sqrt{3}\) V, 50 Hz or 120/\(\sqrt{3}\) V, 60 Hz
- Continuous thermal capacity: 3.6 Vn
- Characteristic angle: 90° 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
**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 IL and V > 10 V and an angle of 90°.

**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-resistant sealed plastic cover, which permits exterior reset of indicator.
- Output unit of high seismic value.

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**Technical Specifications**

<table>
<thead>
<tr>
<th>POWER SUPPLY</th>
<th>DC AUXILIARY CIRCUIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Consumption 125 V:</td>
<td>75 mA (Typical)</td>
</tr>
<tr>
<td></td>
<td>120 mA (Operated)</td>
</tr>
<tr>
<td>Power Supply Voltage:</td>
<td>48 or 125 VCC Nominal Voltage:</td>
</tr>
<tr>
<td></td>
<td>39.5-78.5 VCC Operation Range: (according to nominal voltage)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OUTPUTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTACT CHARACTERISTICS</td>
</tr>
<tr>
<td>The TCCV series relays include one telephone-type relay with 3 normally open contacts with the following characteristics:</td>
</tr>
<tr>
<td>Make and Carry Capacity</td>
</tr>
<tr>
<td>50 W resistive with 2 A and 300 VCC max</td>
</tr>
</tbody>
</table>

**Inputs**

**Voltage Circuit Burdens**
- Power: <0.05 VA

**Table: Input Current Circuit Burdens**

<table>
<thead>
<tr>
<th>Range (mA)</th>
<th>Frequency (Hz)</th>
<th>Minimum Operation Current (mA)</th>
<th>Max Burden (mΩ) for Multiples of Minimum Operation Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-80.4</td>
<td>50</td>
<td>6</td>
<td>109, 110, 110, 110, 110, 110, 110, 110, 110, 110</td>
</tr>
</tbody>
</table>

**Outputs**

**Contact Characteristics**
- The TCCV series relays include one telephone-type relay with 3 normally open contacts with the following characteristics:

<table>
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<tr>
<th>Make and Carry Capacity</th>
<th>Breaking Capacity</th>
<th>Rated Capacity</th>
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<td>50 W resistive with 2 A and 300 VCC max</td>
<td>5 A with 300 VCC max</td>
<td></td>
</tr>
</tbody>
</table>

**Connections Diagram**

[Diagram showing external connections]

**Ordering**

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

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