S.T.A.R.™ test point reset faulted circuit indicators

**Description**
Eaton designs its Cooper Power™ series S.T.A.R.™ test point reset (TPR) faulted circuit indicators to quickly and easily locate faulted sections of underground cable systems. These faulted circuit indicators (FCIs) can be used on both 200 A separable connectors and 600 A terminators with a voltage test point. The removable sleeve allows for use on major manufacturers' loadbreak elbows. S.T.A.R. TPR FCIs feature a stored energy design that utilizes the capacitively coupled voltage present at the elbow test point. This design ensures fast, reliable and accurate operation. All FCI units are shipped to the customer in the tripped position. The magnetically latched target will not change status as a result of mechanical shock or vibration. After the unit is installed, the energized system will reset the flag from the tripped position to the normal position.

**Construction**
The test point reset indicator is a one-piece housing that can be easily installed with a clampstick using the pulling-eye. The sensor is designed to minimize proximity effect described as the sensitivity of FCIs to fault currents on other phases of a three-phase installation. The TPR FCI indicates the passage of fault current by showing a “fault” flag in the window of the display. The standard display consists of a highly visible orange fluorescent flag to designate a fault and a black flag to designate a normal condition. The polycarbonate display is made of Lexan® giving the exposed flag window tamperproof and scratch-resistant protection. When the system is re-energized, the indicator resets automatically.

**Trip rating**
The S.T.A.R. FCI is available with either a low trip rating or a high trip rating. A low trip rating will trip at approximately 400 A rms and a high trip rating will trip at approximately 800 A rms. The trip rating varies slightly with different kV class elbows and different elbow manufacturers.
Figure 1. Features and dimensions of a TPR faulted circuit indicator with optional auxiliary contacts cable.

- **S.T.A.R.**
- **TEST POINT RESET**
- **FAULTED CIRCUIT INDICATOR**
- **FLUORESCENT FLAG**
  - Provides a highly visible orange fluorescent flag designating a fault and a black flag designating a normal condition.
- **PULLING EYE**
  - Provides for quick installation using a single clampstick.
- **CABLE**
  - Length 72" (1829 mm)
- **OPTIONAL AUXILIARY CONTACTS cable**
  - Provides additional data collection points when used on circuits connected to a SCADA system.

Figure 2. Features and dimensions of a TPR faulted circuit indicator with remote FISHEYE™ display and auxiliary contacts.

- **S.T.A.R.**
- **TEST POINT RESET**
- **FAULTED CIRCUIT INDICATOR**
- **CABLE**
  - Length 72" (1829 mm)
- **FISHEYE™ DISPLAY**
  - Provides 180° visual indication of FCI operation. Features a highly visible orange reflective target designating a fault and a black target designating a normal condition.
- **REMOTE DISPLAY**
  - Designed for mounting in the cabinet wall so that it is visible from the outside at a glance.
- **TAMPERPROOF LEXAN® HOUSING**
  - Provides a tamperproof and scratch-resistant protection to the exposed target window.
- **OPTIONAL AUXILIARY CONTACTS CABLE**
  - Provides additional data collection points when used on circuits connected to a SCADA system.
- **6 FOOT (1.8 m) REMOTE DISPLAY CABLE**
  - Connects the sensor to the display.
Design features

An inrush restraint feature eliminates false tripping and is standard on all units. The S.T.A.R. faulted circuit indicator will ignore inrush currents caused by reclosing operations of protective devices on the system. A dead time of 200 rms will activate the inrush restraint feature.

A low pass filter, also a standard feature, will prevent the S.T.A.R. faulted circuit indicator from tripping on high frequency transients like those caused by cable capacitive discharges.

In addition, the S.T.A.R. faulted circuit indicator is equipped with temperature compensation circuitry to assure accurate reliable performance over the entire specified temperature range.

The quick response time of the S.T.A.R. test point reset faulted circuit indicator allows easy coordination with current-limiting fuses (see Figure 3). This unique combination of standard features makes the S.T.A.R. faulted circuit indicator extremely reliable.

Testing

S.T.A.R. faulted circuit indicators are made of corrosion resistant materials, meeting or exceeding ANSI/IEEE Std 495™-1986 standard “Guide for Testing Faulted Circuit Indicators.” 100% automated production testing verifies the trip rating, the reset voltage, and the inrush restraint feature.

The electronic components are completely encapsulated to prevent environmental damage.

Installation

Installation is quick and easy using a single clampstick. No special tools are required. The TPR FCI easily adapts to most manufacturers’ separable connector products. An additional adapter kit may be needed for some manufacturers’ older style test points. Please refer to Service Information S320-40-1 S.T.A.R. Type TPR Faulted Circuit Indicator Installation Instructions for installation details.
Options

Auxiliary contacts

Auxiliary contacts can be added to the standard unit and would provide an additional data collection point when used on circuits connected to a SCADA system. The magnetic latching circuit that operates the auxiliary contact ensures a reliable indication.

Remote FISHEYE™ display

Eaton provides 180° visual indication of FCI operation in its Cooper Power series remote FISHEYE™ display. This unique orange reflective target fits a standard remote indicator window that exists in many pad-mounted transformer specifications.

Figure 5. Remote FISHEYE display.

Small remote display

Eaton’s TPR FCI is also available with a small remote flip-target display. This display can be easily retrofitted for pad-mounted cabinets with a single-hole installation. Refer to Service Information S320-40-1 S.T.A.R. Type TPR Faulted Circuit Indicator Installation Instructions for installation details.

Figure 6. TPR faulted circuit indicator with small remote display.
**Ordering information**

To order an Eaton’s Cooper Power series S.T.A.R. Test Point Reset Type faulted circuit indicator specify the catalog number from Table 2 by selecting the appropriate codes.

Contact your Eaton representative for additional information.

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**Table 1. Electrical Ratings and Characteristics**

<table>
<thead>
<tr>
<th>Description</th>
<th>Ratings and Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Requirements</td>
<td>Min. 5 kV L-G</td>
</tr>
<tr>
<td>Reset Time</td>
<td>Max. 3 min. at 5 kV</td>
</tr>
<tr>
<td>Trip Current</td>
<td>Factory Preset (High and Low)</td>
</tr>
<tr>
<td>Trip Accuracy</td>
<td>+/- 10%</td>
</tr>
<tr>
<td>Trip Response Speed</td>
<td>Response Curve, Figure 4</td>
</tr>
<tr>
<td>Fault Withstand Capability</td>
<td>25 kA for 10 cycles per ANSI/IEEE Std 495™-1986 standard</td>
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<tr>
<td>Temperature Range</td>
<td>-40 °C to +85 °C</td>
</tr>
<tr>
<td>Materials (Conductive EPDM Rubber)</td>
<td>Corrosion resistant &amp; submersible per ANSI/IEEE Std 495™-1986 standard</td>
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<tr>
<td>Weight</td>
<td>8.56 ounces (0.24 Kg)</td>
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<tr>
<td>Elbow Rating (All Manufacturers)</td>
<td>200 &amp; 600 A and 15, 25 &amp; 35 kV Class</td>
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<tr>
<td>Auxiliary Contact Ratings</td>
<td>1 A 30 Vdc</td>
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<tr>
<td></td>
<td>0.5 A 125 Vac</td>
</tr>
<tr>
<td></td>
<td>0.3 A 110 Vac</td>
</tr>
</tbody>
</table>

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**Table 2. S.T.A.R. Faulted Circuit Indicator Ordering Information**

**Catalog Number**

Example: A Test Point Reset FCI with a high trip rating and standard 6 ft. auxiliary contacts would have a catalog number STHIA (as shown below).

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     Standard   Options
Digits: 1 2 3 4 5 6 7

S.T.A.R. FCI Line

FCI Type

Digit 2 Type
T Test Point Reset

Trip Rating

Digits 3 4 Trip Rating
L O Low
H I High

Options

Notes:
1. The S.T.A.R. FCI catalog number may vary in length from 4 digits to 7 digits.
2. The standard S.T.A.R. FCI catalog number may be truncated after entering digits 1-4. Options may be selected by adding the appropriate code to digits 5, 6, and/or 7.
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