Fault Indicators

S.T.A.R.™ Type TPR Faulted Circuit Indicator
Installation Instructions

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CAUTION: The Cooper Power Systems
S.T.A.R.™ Type TPR Faulted Circuit Indicator
is designed to be operated in accordance with normal
safe operating procedures. These instructions are not
intended to supersede or replace existing safety and
operating procedures. Read all the instructions before
installing the faulted circuit indicator.

Faulted circuit indicators should be installed and
serviced only by personnel familiar with good safety
practice and the handling of high-voltage electrical
equipment. Improper operation, handling, or
maintenance can result in death, severe personal
injury, and equipment damage.

PRODUCT INFORMATION

The Cooper Power Systems S.T.A.R. Test Point Reset
(TPR) Faulted Circuit Indicators (FCIs) are used on both
200 A separable connectors and 600 A terminators with
voltage test points. They are easily installed with a shot-
gun stick using the pulling eye. The FCI indicates the
passage of fault current by showing a “fault” flag in the
window of the display. When the system is re-energized,
the indicator resets automatically.

The FCI is weatherproof, submersible and meets or
exceeds ANSI®/IEEE 495-1986™ Testing Guide. The
flag will not change status as a result of mechanical
shock or vibration.

The FCI is available with either a low or 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.
Trip rating varies slightly with different kV class elbows
and different elbow manufacturers.

NOTE: At least 5 kV line-to-ground must be present to
provide sufficient stored energy to both trip and reset
the device.

INSTALLATION PROCEDURES

The TPR Faulted Circuit Indicator can be installed on
most manufacturers’ elbows. Instructions are included
herein for RTE, Elastimold, Blackburn, Joslyn and
GE-Chardon elbows. Where an adapter is required, a
kit must be ordered separately.

For Cooper Power Systems RTE 15, 25, and 35 kV Loadbreak Elbows and
GE-Chardon 15 and 35 kV Elbows

1. The FCI can be installed on live elbows. As an
alternative, de-energize the circuit and elbow
terminator and ground the terminator according to
approved procedures.
2. Remove the cap from the elbow test point using a
hotstick.
3. Be sure the test point area is clean and dry.
4. Discard the internal sleeve.
5. Lightly lubricate the inside of the indicator boot
using a silicone lubricant.

These instructions do not claim to cover all details or variations in the equipment, procedure, or process described, nor to provide
directions for meeting every contingency during installation, operation, or maintenance. When additional information is desired to
satisfy a problem not covered sufficiently for the user’s purpose, please contact your Cooper Power Systems sales engineer.

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The instructions in this manual are not intended as a substitute for proper training or adequate experience in the safe operation of the equipment described. Only competent technicians, who are familiar with this equipment should install, operate and service it. A competent technician has these qualifications:

- Is thoroughly familiar with these instructions.
- Is trained in industry-accepted high- and low-voltage safe operating practices and procedures.
- Is trained and authorized to energize, de-energize, clear, and ground power distribution equipment.
- Is trained in the care and use of protective equipment such as flash clothing, safety glasses, face shield, hard hat, rubber gloves, hotstick, etc.

Following is important safety information. For safe installation and operation of this equipment, be sure to read and understand all cautions and warnings.

Hazard Statement Definitions

This manual may contain four types of hazard statements:

- **DANGER**: Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
- **WARNING**: Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
- **CAUTION**: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
- **CAUTION**: Indicates a potentially hazardous situation which, if not avoided, may result in equipment damage only.

**Safety Instructions**

Following are general caution and warning statements that apply to this equipment. Additional statements, related to specific tasks and procedures, are located throughout the manual.

- **DANGER**: Hazardous voltage. Contact with high voltage will cause death or severe personal injury. Follow all locally approved safety procedures when working around high- and low-voltage lines and equipment.

- **WARNING**: Before installing, operating, maintaining, or testing this equipment, carefully read and understand the contents of this manual. Improper operation, handling or maintenance can result in death, severe personal injury, and equipment damage.

- **WARNING**: This equipment is not intended to protect human life. Follow all locally approved procedures and safety practices when installing or operating this equipment. Failure to comply may result in death, severe personal injury and equipment damage.

- **WARNING**: Power distribution equipment must be selected for the intended application. It must be installed and serviced by competent personnel who have been trained and understand proper safety procedures. These instructions are written for such personnel and are not a substitute for adequate training and experience in safety procedures. Failure to properly select, install or maintain this equipment can result in death, severe personal injury, and equipment damage.
6. Attach the pulling eye of the indicator to the hotstick.
7. Using steady pressure, push the boot over the test point while rotating the boot.
8. Align the pulling eye on the indicator with the elbow pulling eye. (See Figures 3 and 4.)

For all Cooper Power Systems 200 A, 250 A and 400 A Deadbreak Elbows, Elastimold 15, 25 and 35 kV (PCE) Elbows and New Design* Blackburn 15 kV Elbows

1. The FCI can be installed on live Elastimold (PCE) or new design Blackburn elbows. As an alternative, de-energize the circuit and elbow terminator and ground the terminator according to approved procedures.
2. Remove the cap from the elbow test point using a hotstick.
3. Be sure the test point area is clean and dry.
4. Insert the internal sleeve into the indicator boot. (See Figure 2.)
5. Lightly lubricate the inside of the internal sleeve using a silicone lubricant.
6. Attach the pulling eye of the indicator to the hotstick.
7. Using steady pressure, push the boot over the test point while rotating the boot.
8. Align the pulling eye on the indicator with the elbow pulling eye. (See Figures 3 and 4.)

For Old Design* 15 and 25 kV Blackburn Elbows, Elastimold 15, 25 and 35 kV (not PCE) Elbows, Joslyn 15 kV Elbows and GE-Chardon 25 kV Elbows

1. A separate adapter (Catalog # STAK) is required for the old design 15 and 25 kV Blackburn, Elastimold 15, 25 and 35 kV (not PCE), Joslyn 15 kV and GE-Chardon 25 kV elbows. It is not included with the FCI and must be ordered separately. Because an adapter is needed, a slotted screwdriver and hex head driver mounted on a hotstick with tool holder is also required.
2. De-energize the circuit and elbow terminator and ground the terminator according to approved procedures.
3. Remove the cap from the elbow test point.
4. Remove and discard the screw and steel washer from the center of the test point.
5. Select the proper adapter screw and thread size from the adapter kit, according to the elbow being used, as outlined in Table 1.

TABLE 1
Adapter Screw and Thread Sizes**

<table>
<thead>
<tr>
<th>Elbow Manufacturer</th>
<th>Screw &amp; Thread Size</th>
<th>Plastic Washer Side Facing Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 and 25 kV Blackburn – Old Design</td>
<td>3/8 in. 24</td>
<td>A</td>
</tr>
<tr>
<td>15 kV Joslyn, Elastimold 15, 25 and 35 kV (not PCE)</td>
<td>5/16 in. 24</td>
<td>B</td>
</tr>
<tr>
<td>25 kV GE-Chardon</td>
<td>1/4 in. 20</td>
<td>B</td>
</tr>
</tbody>
</table>

**Consult your Cooper Power Systems sales engineer for other available screw sizes.

6. Select the proper side of the plastic washer to face out from the test point, according to the elbow being used, as outlined in Table 1. This will ensure the best fit for the screw and plastic washer, within the test point.
7. Be sure the test point is clean and dry.
8. Using the 7/64 inch hex wrench provided, screw the adapter and plastic washer into the test point using the hotstick with tool holder.
9. Discard the internal sleeve.
10. Lightly lubricate the inside of the indicator boot using a silicone lubricant.
11. Attach the pulling eye of the indicator to the hotstick.
12. Using steady pressure, push the boot over the test point while rotating the boot.
13. Align the pulling eye on the indicator with the elbow pulling eye. (See Figures 3 and 4.)
Installation Instructions for Remote FISHEYE™ Display

1. Punch or drill four 0.5” (13 mm) and one 1.75” (45 mm) holes as shown in Figure 5. Hole rims may need to be treated for corrosion resistance. Consult enclosure manufacturer for recommendation.

2. Position the FISHEYE display against the back side of the enclosure aligning the four 0.5” (13 mm) holes with the corresponding holes on the FISHEYE display. The indicator ball of the FISHEYE display should protrude thought the 1.75” (45 mm) hole and be visible from the outside of the enclosure.

3. Install the four 3/8-16 UNC carriage bolts through the four 0.5” holes with the heads on the outside of the enclosure and the bolts extending through the four holes on the FISHEYE display.

4. Install the four 3/8” flat washers, lock washers, and hex nuts onto the carriage bolts and hand tighten.

5. Adjust the display to the desired alignment and tighten the hex nuts to flatten the lock washers. DO NOT OVERTIGHTEN THE HEX NUTS.

WARNING: The Cooper Power Systems S.T.A.R. Type TPR Faulted Circuit Indicator with remote display and/or auxiliary contact outputs are designed for installation at Ground Potential Only. Remote indicators and auxiliary contacts are not insulated for high voltage application. If high voltage is applied across the fault indicator, flashover may occur, possibly resulting in death, severe personal injury, and equipment damage.

Figure 3. Correct methods of aligning Loadbreak elbow with fault indicator.

Figure 4. Incorrect methods of aligning Loadbreak elbow with fault indicator.

Figure 5. Remote FISHEYE™ display installation diagram.
Installation Instructions for Small Remote Display

1. **Punch or drill** one 1\" diameter hole as shown in Figure 6. Hole rim may need to be treated for corrosion resistance. Consult enclosure manufacturer for recommendation.

2. **Insert the outer fitting** through the 1\" diameter hole with the threads extending through the hole in the enclosure.

3. **Insert the end of the FCI display** into the outer display fitting. Note that the lens of the FCI display is keyed to fit the slot on the outer fitting.

4. **Thread the bushing** at the end of the remote display, onto the outer fitting.

5. **Adjust the display** to the desired alignment and tighten the bushing to pull the outer fitting against the front of the enclosure. Tighten sufficiently to prevent removal of the outer fitting from outside the cabinet, but do not overtighten the bushing.

**WARNING:** The Cooper Power Systems S.T.A.R. Type TPR Faulted Circuit Indicator with remote display and/or auxiliary contact outputs are designed for installation at **Ground Potential Only**. Remote indicators and auxiliary contacts are not insulated for high voltage application. If high voltage is applied across the fault indicator, flashover may occur, possibly resulting in death, severe personal injury, and equipment damage.

**OPERATION**

The indicator is shipped in the fault indicating position. The trip target rotates out of view a few minutes after the circuit is energized with a system voltage of at least 5 kV. The indicator is then ready for use.

When the auxiliary contact option is included with the FCI the following applies: the auxiliary contacts provide a relay closure when the FCI is in the faulted position. The contacts are normally open, and the FCI comes supplied with a pair of 6 foot conductor leads. The contacts will open when the FCI is reset with the appropriate system voltage of at least 5 kV. The auxiliary contacts are rated as follows:

- 1 A 30 VDC
- 0.5 A 125 VAC
- 0.3 A 110 VAC

**Installation Instructions for Auxiliary Contacts**

**WARNING:** The Auxiliary Contact option is intended solely for use with faulted circuit indicators being installed on dead-front design equipment. **DO NOT USE** the auxiliary contact feature on fault indicators being applied to overhead conductors or live-front equipment. Exposed ends of the auxiliary contact cable may contact bare conductors or other energized equipment, and may result in electrocution hazard. The faulted circuit indicators should be installed and serviced only by personnel familiar with good safety practice and the handling of high-voltage electrical equipment.

Cooper Power Systems S.T.A.R. Test Point Reset FCIs are available with auxiliary contacts as an option. The contact provides a means to monitor the status of the FCI remotely. The contact mirrors the status of the faulted circuit indicator. If the FCI is in the faulted position, the dry contacts will latch closed. If the FCI is in the reset position, the dry contacts will latch in the open position. A simple control diagram of the contacts is shown in Figure 7.

**Figure 6.**
Small remote display installation diagram.

**Figure 7.**
Control drawing of auxiliary contacts.