Faulted Circuit Indicators
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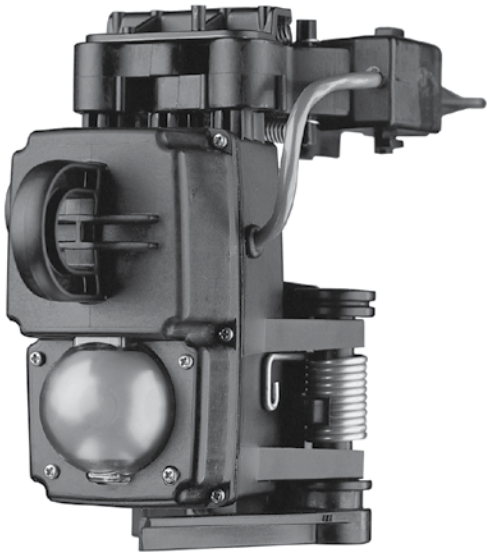
COOPER POWER SERIES

S.T.A.R.™ PATHFINDER™ variable trip current reset faulted circuit indicators



Description

Eaton designs its Cooper Power™ series S.T.A.R.™ PATHFINDER™ variable trip current reset (CR) faulted circuit indicators to quickly and easily locate faulted sections of cable systems. These faulted circuit indicators (FCI) can be installed on pad-mounted distribution transformers, sector cabinets, switchgear and overhead bare conductors. The closed core current transformer (CT) senses the fault current and provides power to operate the FCI. The unit automatically resets back to the normal position when the continuous current exceeds the 2.0 A minimum reset value. CR FCIs provide a reliable means of fault location and isolation.

The PATHFINDER variable trip current reset FCI features a trip design that senses normal load current and indicates a fault when a significant rise in current, followed by a loss of current, is detected. Hence, there is no need to specify a particular trip rating when ordering the variable trip current reset FCI. This design ensures fast, reliable and accurate operation.

Variable trip current reset FCIs provide a reliable means of fault location and isolation. They also eliminate fault chasing methods that are costly and time consuming, and stressful on system components exposed to fault currents.

Construction

S.T.A.R. variable trip current reset fault indicators consist of a sensor unit with an integral Eaton's Cooper Power series FISHEYE™ target display. The closed core CT is used for both sensing the fault current and providing power to operate the FCI. The FISHEYE display provides 180° visual indication. This unique orange reflective target designates a faulted condition and a black target designates a normal condition. The FISHEYE display also features a Lexan® cover that provides superior scratch protection for the target window. The sensor unit itself features a clamping mechanism and unique spring action CT design that allows easy snap-on connection to the live conductor with the use of a single clampstick.

The sensor housing is made of durable, corrosion resistant materials. The electronic components are completely encapsulated to prevent environmental damage.

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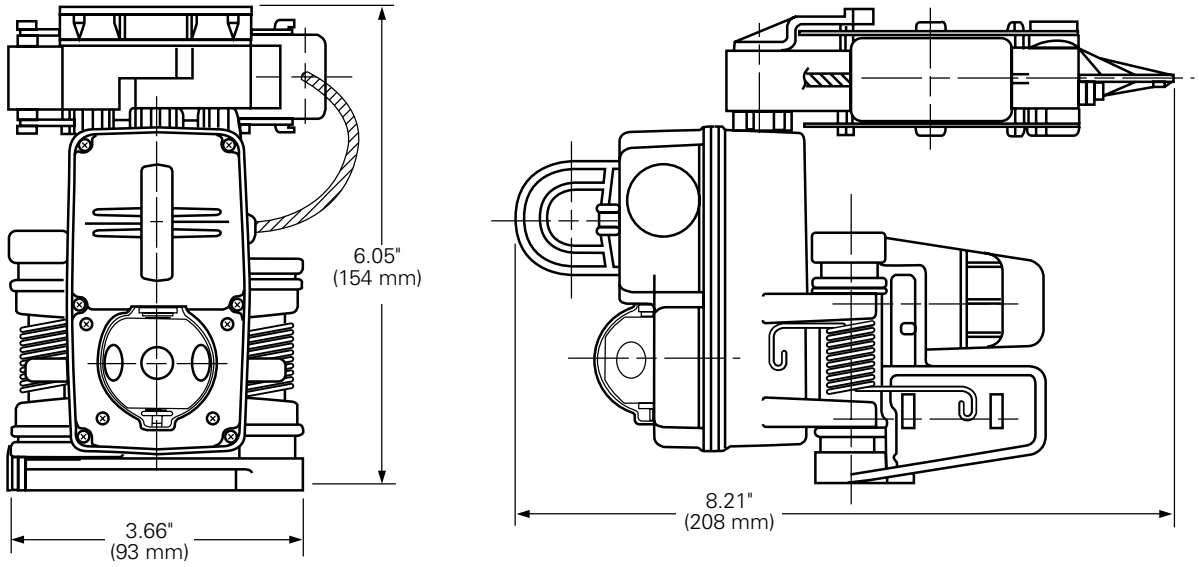

Figure 1. Features and dimensions of a variable trip CR faulted circuit indicator (shown in the "armed" position).

Trip rating

The S.T.A.R. PATHFINDER variable trip current reset FCI features a load sensing design, and trips on a current rise of a particular magnitude over time. Therefore, there is no need to specify a trip rating when ordering the variable trip FCI. The very same FCI can be used on cable diameters from 0.25" (6.4 mm) to 2.0" (51 mm). Therefore, it is not necessary to specify a cable diameter when placing an order.

Design features

The **variable trip design** eliminates the need to specify a trip rating for the FCI. The load sensing feature adjusts the FCI to normal load conditions. When a fault occurs, the unit senses the rise in system current caused by the fault, followed by the loss of system power due to operation of the protective device. Thus, the variable trip FCI provides a "one size fits all" FCI, reducing inventory and eliminating problems caused by misapplication of FCIs.

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 power loss of 1 cycle (16 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 capacitive discharges.

The quick response time of the S.T.A.R. current reset faulted circuit indicator provides easy coordination with current-limiting fuses and other protection devices (see Figure 4).

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 and meet or exceed ANSI/IEEE Std 495™-1986 standard "Guide for Testing Faulted Circuit Indicators".

100% automated production testing verifies the trip rating, the reset circuit and the inrush restraint feature.

The electronic components are completely encapsulated to prevent any environmental damage.

Table 1. Electrical Ratings and Characteristics

Description	Ratings and Characteristics
Power Requirements	Min. 2.0 A Continuous
Max. Operating Voltage	45 kV L-L
Reset Time	5 Minutes Max. at 2.0 A
Trip Current	100 A rise from load current;
Min. Pickup Level	200 A total (load plus fault current)
Trip Response Speed	Response Curve, Figure 4
Fault Withstand Capability	25 kA for 10 Cycles per ANSI/IEEE Std 495™-1986 standard
Temperature Range	-40 ˚C to +85 ˚C
Materials	Corrosion-resistant & submersible per ANSI/IEEE Std 495™-1986 standard
Weight	27.2 ounces (0.77 kg)
Conductor Size	0.25" through 2.0"

Installation

All units are shipped to the customer in the tripped condition. The status of the display cannot be changed mechanically in handling. After the unit is installed, the energized system will reset the FISHEYE target from the tripped position to the normal position.

Installation is quick and easy. No special tools are required. The patented clamping mechanism and the unique spring action CT of the sensor provides for easy installation on an energized system using a single clampstick.

Clamp arm pads are used for cable diameters from 0.25" (6.4 mm) to 1.0" (25 mm). For cable sizes from 1.0" (25 mm) to 2.0" (51 mm) the clamp arm pads are removed. Refer to *Service Information S320-77-1 S.T.A.R. PATHFINDER Variable Trip Current Reset FCI Installation Instructions* for more information.

Options

Remote FISHEYE display

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

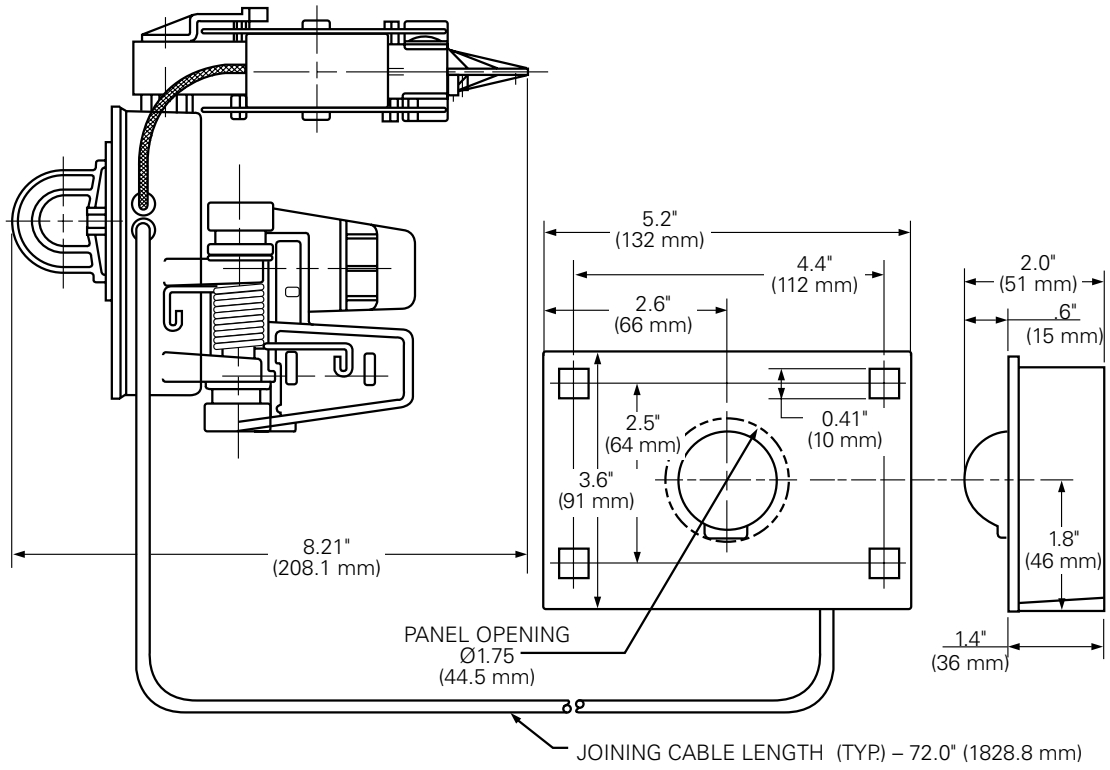

Figure 2. Features and dimensions of the variable trip CR faulted circuit indicator with remote FISHEYE display.

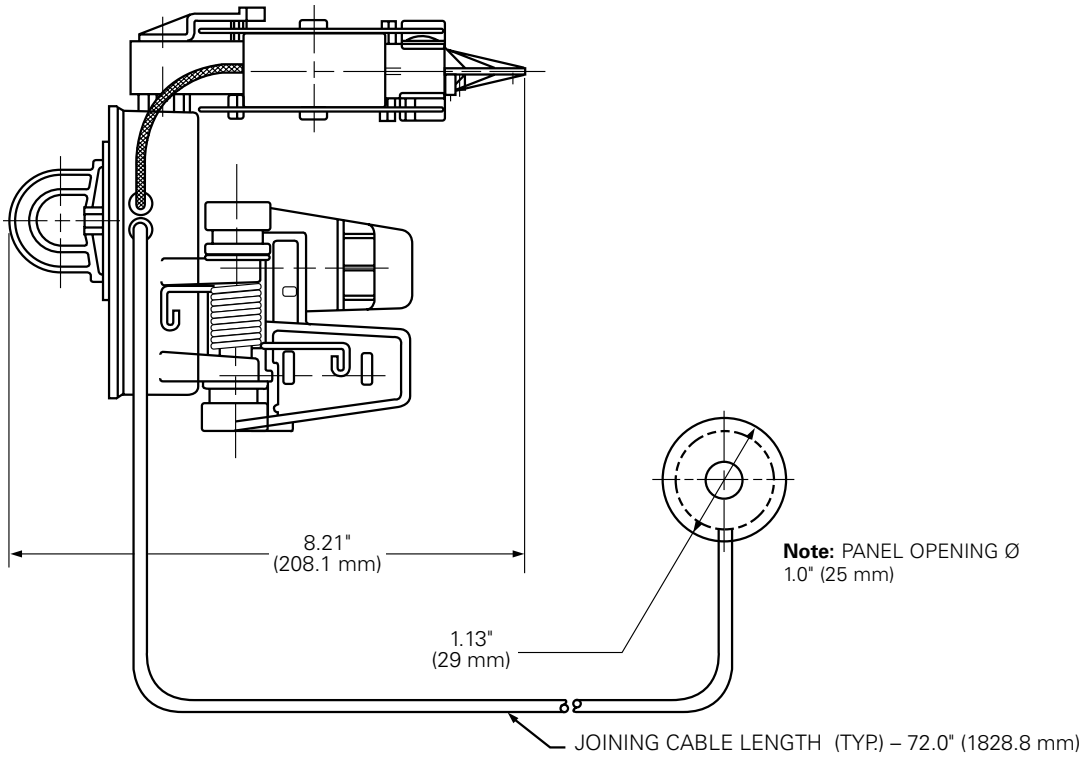

Figure 3. Features and dimensions of the variable trip CR faulted circuit indicator with small remote display.

Small remote display

The variable trip current reset faulted circuit indicator is also available with a small remote display. The remote flip target display easily retrofits to pad-mounted cabinets with a single hole installation.

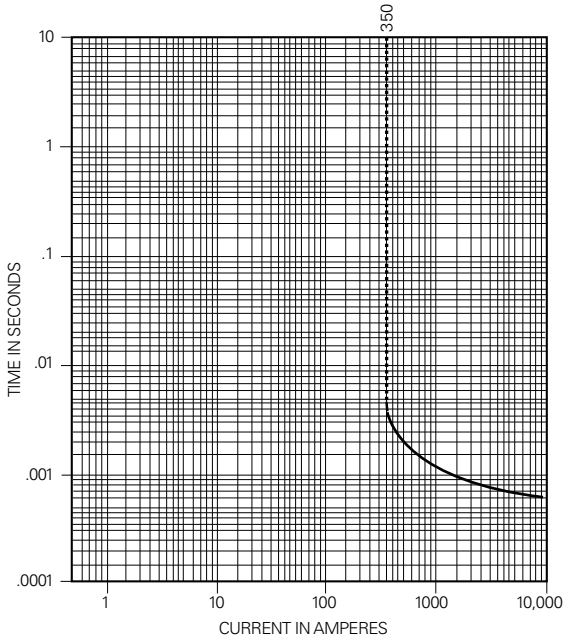

Figure 4. Pathfinder Variable Trip CR faulted circuit indicator minimum response curve.

Auxiliary Contacts

Auxiliary Contacts can be added to the standard unit and 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.

Figure 5. Remote FISHEYE display.

Figure 6. Small remote display.

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

S.T.A.R. Variable Trip Current Reset Type FCI Ordering Information

Standard → | ← Options →

Digits: 1 2 3 4 5 6

S C V T

Example: A Variable Trip Current Reset FCI would have a catalog number SCVT as shown.

S.T.A.R. FCI Line

FCI Type

Digit 2	Type
C	Current Reset

Trip Rating

Digits 3	4	Trip Rating
V	T	Variable Trip

Options

Digits 5	6	Descriptions
A		Standard Indicator with auxiliary contacts
R		*Standard Indicator with remote FISHEYE display
A	R	*Standard Indicator with auxiliary contacts and remote FISHEYE display
S		*Standard Indicator with small remote display
A	S	*Standard Indicator with auxiliary contacts and small remote display.

* Standard indicator with remote display and/or auxiliary contacts provided with 6 ft. cable lengths as standard.

Notes:

1. The S.T.A.R. FCI catalog number may vary in length from 4 digits to 6 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 design code to digits 5 and/or 6.

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