CERTIFIED
TEST REPORT

S.T.A.R.
Faulted Circuit Indicator

S.T.A.R. Test Point Variable Trip
S.T.V.T.

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Faulted Circuit Indicator

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CERTIFICATION

Statements made and data shown are, to the best of our knowledge and belief, correct and within the usual limits of commercial testing practice.

Frank J. Muench
Director of Engineering

John F. Banting
Chief Product Engineer

INTRODUCTION

A faulted circuit indicator is a device which indicates the passage of fault current and aids in the location of a cable fault.

The Variable Trip Test Point Reset S.T.A.R. Faulted Circuit Indicator (STVT-FCI) trips on fault current and resets on the capacitive voltage on an elbow of an energized system.

The STVT-FCI's are designed to mount easily on the capacitive test point of an elbow with the use of a hot stick. This test report certifies that the STVT-FCI's were successfully tested to Cooper Power Systems-Components and Protective Equipment FCI standards and ANSI/IEEE Std. 495-1986 "Guide for Testing Faulted Circuit Indicators".

QUALIFICATION TESTS

Object

To demonstrate that the Cooper Power Systems Variable Trip Test Point Reset Faulted Circuit Indicator (STVT-FCI) meets all of the necessary performance requirements.

Procedure

The following design tests were performed on units, representative of normal production, to demonstrate that the Cooper Power Systems S.T.A.R. STVT-FCI meets all of the necessary performance requirements.

Design Tests

A. ANSI/IEEE Std. 495-1986 "Guide for Testing Faulted Circuit Indicators"

Design Test		ANSI/IEEE 495-1986
A1.	Temperature Cycling Test	Section 4.4.1
A2.	Water Submersion Test	Section 4.4.2
A3.	Outdoor Weathering	Section 4.4.3
A3.	Salt Spray Test	Section 4.4.4
A2.	Immersion Corrosion Test	Section 4.4.5
N/A	Electric Cord Pull Out	Section 4.4.6
A4.	Impact Resistance Test	Section 4.4.7
A5.	Short Time Current Test	Section 4.4.8
A6.	Trip Current Test	Section 4.4.9
A7.	Reset Test	Section 4.4.10
A8.	Time Current Test	Section 4.4.11

Production Tests

B. 100% Functional testing to insure proper trip and reset per ANSI/IEEE Std. 495-1986 "Guide for Testing Faulted Circuit Indicators", section 4.2.

TEST A1

Temperature Cycling Test

Object

To insure that the S.T.A.R. STVT-FCI operates after aging.

Procedure

The S.T.A.R. STVT-FCI was subjected to a minimum of five sequential thermal cycles with exposures at -40°C, 50°C and 85°C with equilibrium achieved at each temperature. The S.T.A.R. STVT-FCI was then retested.

Results

The S.T.A.R. STVT-FCI units successfully passed all of the design tests following the temperature cycling.

TEST A2

Water Submersion Test

Object

To verify that the S.T.A.R. STVT-FCI is submersible.

Procedure

The S.T.A.R. STVT-FCI was placed under water with an equivalent pressure head of 15 feet of water. The temperature was varied from -20°C to 85°C per ANSI/IEEE Std. 495-1986. The unit was allowed to stabilize at each of the temperatures. The unit was then examined and tested for correct operation.

Results

The S.T.A.R. STVT-FCI showed no signs of moisture ingress or deterioration, and successfully passed all of the design tests.

TEST A3

Salt Spray, Weathering and Immersion Corrosion Tests

Object

To insure that the S.T.A.R. STVT-FCI performs satisfactorily when subjected to extreme environments.

Procedure

The S.T.A.R. STVT-FCI was placed in a UV chamber and salt spray chamber where it was exposed to extreme ultra violet light, moisture, temperature cycling, and salt spray. The period of exposure was meant to insure results equivalent to the products anticipated service life. The S.T.A.R. STVT-FCI was also buried under 12 inches of soil outdoors for a period of 9 months.

Results

The entire S.T.A.R. STVT-FCI housing and body parts were inspected and showed no signs of deterioration or corrosion. The S.T.A.R. STVT-FCI was tested and performed all of the design tests per the product specifications.

TEST A4

Impact Resistance Test

Object

To insure that the S.T.A.R. STVT-FCI will not change from an indication of fault to normal or from an indication of normal to fault due to normal handling in the field.

Procedure

The S.T.A.R. STVT-FCI was dropped from a minimum of 10 feet onto a concrete surface. This was performed a minimum of 10 times.

Results

The indicator remained in its prior state after impact. The S.T.A.R. STVT-FCI was successfully retested to the original product specification.

TEST A5

Short Time Current Test

Object

To verify that the S.T.A.R. STVT-FCI withstands a short time current of significant magnitude and duration.

Procedure

The S.T.A.R. STVT-FCI was subjected to short time current per ANSI/IEEE Std. 495-1986 paragraph 4.4.8, 25,000 amp class.

Results

The S.T.A.R. STVT-FCI was retested to the original product specification and performed correctly.

TEST A6

Trip Current Test

Object

To insure that the S.T.A.R. STVT-FCI indicates a fault at the specified trip current level and that it continues to indicate normal when positioned no closer than the manufacturers specified distance to a current carrying conductor.

Procedure

The S.T.A.R. STVT-FCI was tested to ANSI/IEEE Std. 495-1986 paragraph 4.4.9. Test 4.4.9(2) was performed in the 25,000 amp class per the stated requirements.

Results

When installed properly, the S.T.A.R. STVT-FCI functioned correctly to an adjacent conductor spacing of two inches. The FCI performed successfully per the original product specification.

TEST A7

Reset Test

Object

To verify that the S.T.A.R. STVT-FCI returns to an indication of normal from a faulted indication following the proper application of reset power.

Procedure

The S.T.A.R. STVT-FCI was subjected to fault current sufficient enough to cause a fault indication on the display. Normal reset power was then applied and the display monitored to insure a normal indication within 10 minutes.

Results

The S.T.A.R. STVT-FCI reset to a normal indication properly within the designed time of less than ten minutes.

TEST A8

Time Current Test

Object

To establish the operating time characteristics of the S.T.A.R. STVT-FCI.

Procedure

The S.T.A.R. STVT-FCI was subjected to selected magnitudes of fault currents at specific close angles. Both the close angles and the magnitudes were varied in order to determine the time current characteristics of the S.T.A.R. STVT-FCI. The test was run to times of less than one millisecond to insure operation with current limiting fuses.

Results

The S.T.A.R. STVT-FCI operation time current curves were established.

TEST B

100% Functional Tests

Object

To insure that every S.T.A.R. STVT-FCI manufactured operates properly prior to shipment.

Procedure

Every S.T.A.R. STVT-FCI is tested for trip, reset, and mechanical functionality at various stages during production and again just prior to packaging to insure compliance with the designed product specifications. Every S.T.A.R. STVT-FCI is tested for proper trip and reset per ANSI/IEEE 495-1986, "Guide for Testing Faulted Circuit Indicators."