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Management Approval (If apply)

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Related/Referenced Documents

N/A

Version History

Version	Date	Revision Comments
01	Oct. 11, 2022	Initial Release. Converted 038-01545 to LUMA format.
02	Dec. 12, 2022	Added item 038-83874.
03	May 31, 2024	General format revision. Section 9 modified.

Item Version History

Warehouse Catalog #	Asset Suite #	Version	Date
038-01545	56917	4	05/31/2024
038-83874	83874	2	05/31/2024

1. Introduction

This specification covers underground automatic reset faulted circuit indicators (FCI) for use on the 60 Hertz WYE connected multi-grounded in range of 4.16 to 13.2 kV (phase to phase) in Puerto Rico. Further information will be provided by LUMA Energy at time of order placement and will provide information on site specific conditions, quantity, FCI type, and electrical requirements.

2. Special Requirements

2.1. Samples shall be furnished as requested by LUMA Energy. Vendors that have supplied this equipment/material to LUMA on previous orders will not have to furnish samples at bid opening. The equipment/material will be received at the LUMA's general warehouse (011) at Palo Seco, Puerto Rico. Shipping will include transportation and unloading at the indicated warehouse.

2.2. Any changes or update to the supplier's approved designs, procedures, quality routines and/or inspection layout shall be communicated to the LUMA Distribution Materials Section in writing.

2.3. The purchaser reserves the right to refuse shipment and to determine the acceptability and rejectability of FCIs received. The supplier shall be liable for all costs incurred for shipments that are refused, rejected, or replaced.

3. Literature

3.1. Descriptive and technical literature must be supplied by the vendor at time of bidding. This literature may include, but is not limited to details of material, drawings, documented testing, and instructions for use and installation. Failure to submit documents on time will cause bidder disqualification.

3.2. In an agreed upon time frame, after receipt of purchase order, the vendor shall submit any special procedures, techniques, or precautions that must be followed during installation. The vendor shall provide digital and hard copies of Operation and Maintenance manuals (O&M Manuals).

4. Markings, Packing, Shipping and Storage

4.1. Each FCI must be permanently identified with the supplier's catalog number, trip current value, minimum reset value, and date code.

4.2. FCIs must be individually boxed with the outside of each box marked with the LUMA warehouse item number, the supplier's name, and the supplier's catalog number.

4.3. If FCIs are stored outdoors open to the elements, packaging shall prevent equipment from being damaged by rain, snow, ice, wind, etc.

4.4. The supplier must include installation instructions agreed upon by the purchaser. Warning Label shall be placed on the equipment for special handling and storage requirements.

4.5. All materials, elements, parts, and hardware crates shall be shipped on flatbed trailers and stored in such a way so that they can be unloaded by finger lifts. Deliveries in containers or closed platforms where finger lifts cannot be used will not be accepted.

4.6. A copy of each detailed packing list must be sent to LUMA Energy personnel in charge of the requisition, prior to the delivery.

5. Compatible with

Schweitzer Engineering Laboratories, model SEL-ARU.

This model is an example of the equipment/material described in this document and do not represent a preference. LUMA will evaluate equally any model not listed here during any acquisition event.

6. Acceptance Criteria

6.1. Each FCI shall be built following the latest applicable ANSI/IEEE, NEMA, NEC, IEC, and ASTM Standard and the herein included requirements. When conflict occurs between ANSI/IEEE and purchaser's specifications, the purchaser's specification shall prevail.

6.2. The following standards shall form a part of this specification unless otherwise stated:

a. ANSI/IEEE Std 495-2007 Guide for Testing Faulted Circuit Indicators

b. IEC 60529: IP 68

6.3. Certified design test reports shall be provided.

7. Description

7.1. Material and Make-Up

a. Materials for the FCI shall withstand the environmental and operating conditions as defined in ANSI/IEEE Std. 495-2007. Shall be furnished in a sealed and waterproof protective case, in compliance with IP 68 standard. Must withstand continuous water submersion of at least 15 feet.

b. The FCI device must withstand a temperature range of -40° to 85° C (-40° to 185° F)

c. FCIs shall be compatible with cable insulation shields and elbow connectors (200 A and 600 A type).

7.2. Current Sensor

a. The current sensor portion of the FCI shall be capable of being installed on an energized cable or wire. All FCIs shall have provisions for installation with a hook stick.

b. LUMA prefers that FCI be self-powered without the need of external power supplies or photocells. Batteries are acceptable but must have a minimum operating life of 10 years.

c. The FCI unit must be able to automatically select the current trip value based on sampled load current or load tracking method. The trip thresholds shall range from 50 to 1,200 A.

d. The FCI shall automatically reset at a minimum current reset value of 3 A continuous. The FCI must also be able to be manually reset with a tool supplied by the Supplier. The tool must be compatible with a standard hook stick.

e. The FCI must have capability for inrush restraint to eliminate false tripping of the unit.

7.3. The FCI device must provide one of the following indication methods, as requested by LUMA Energy (see Table #1), with the following characteristics:

a. **Remote indication**

1. The LED remote indication must connect to the current sensor portion of the FCI via a fiber optic cable.
2. The LED remote indication must be designed for installation in a 5/16-inch hole and retained on the inside of the Purchaser's equipment enclosure. A moisture sealing washer must be included for installation under the bolt head.
3. The indication shall have provisions for mounting on framing channel.
4. The standard face of the LED must be visible from 100 feet when the fault indicator is installed.
5. The LED remote indication shall display a red color when in a fault condition. Other colors must be submitted to the Distribution Materials Section for evaluation and approval.
6. The fiber optic cable must be at least 20 feet long.
7. The device shall provide a local indication independently of the remote indication. This will serve as an alternate indication method in the case that the remote indication is damaged or not installed, per the user decision. The local indication shall comply with Section 7.3.b.

b. **Local indication**

1. The device must be manufactured with a mechanical flag or LED indication that turns red when a fault is present.
2. The indication must be part of the device and not require any external equipment to operate.

8. Qualification and Testing Requirements

8.1. At the time of request for quotation, the supplier shall submit a certified report of the design tests performed demonstrating full compliance to ANSI/IEEE 495-2007 (or latest). The test report shall include description, details, results, and pertinent data of samples tested. Retesting is required for a change in any product.

8.2. At the time of request for quotation, the supplier shall submit a copy of their Quality Control Manual to show how the supplier has incorporated the measures to produce a quality product in their operation. The quotation shall include SPC data in graph form containing routine test results for the last 1000 fault indicators produced.

8.3. Suppliers will be required to submit product samples for inspection by LUMA's Material Specifications Section. This inspection will verify that the Supplier's product meets the requirements of applicable specifications.

9. Nameplate Information

Each FCI shall be permanently identified with the appropriate catalog number, supplier's catalog number, trip current value, minimum reset value, and date code.

10. Guarantee

10.1. In reply to the purchaser's request for quotation, suppliers shall respond to the terms and conditions for the FCIs being proposed to include warranty period and coverage. Replacement costs associated with premature fault indicator failure due to inadequate design or faulty manufacturing shall be the responsibility of the supplier.

10.2. Replacement costs associated with FCI failure due to inadequate design, faulty manufacturing, or software errors are to be the responsibility of the supplier.

10.3. Non-conformance observed during sampling will require the supplier to bring the FCIs into compliance with the specification 14 days after notification. The units to be brought into compliance with the specification shall be shipped to the supplier at the supplier's expense.

11. Proposal Information

11.1. Submitted proposals shall include:

a. Technical information

b. Any exceptions taken to this specification.

c. Copies of sample nameplates

d. Lists of special and standard maintenance tools

e. List of recommended spare parts

12. Warehouse and Asset Suite Identification Information

TABLE 1: Underground Faulted Circuit Indicators

Item	Warehouse Number	Asset Suite Catalog	Minimum Conductor Range (in.)	Indication Type/Length (Section 7.3)
1	038-01545	56917	0.75 – 2.00	Fiber Optic / 20 ft.
2	038-83874	83874	0.75 – 2.00	Local indication

— End of Specification —

Appendix

Appendix 1: Table of Compliance

Line	Criteria	Description	Pass/Fail (P / F)	Comments
1	Specification	The Proponent complies with the corresponding specification document (4350.039).		
2	Industry Standards	The Proponent complies with the industry standards established in the specification document. (ANSI/ASTM, ANSI/IEEE)		
3	Material	• Shall be furnished in a sealed and waterproof protective case. Must withstand continuous water submersion of at least 15 feet. • Withstand a temperature range of -40° to 85° C (-40° to 185° F) • FCIs shall be compatible with cable insulation shields and elbow connectors.		
4	Current Sensor	• The current sensor portion of the FCI shall be capable of being installed on an energized cable or wire. All FCIs shall have provisions for installation with a hook stick. • Self-powered without the need of external power supplies or photocells. Batteries are acceptable but must have a minimum operating life of 10 years. • The FCI unit must be able to automatically select the current trip value based on sampled load current or load tracking method. The trip thresholds shall range from 50 to 1,200 A. • The FCI shall automatically reset at a minimum current reset value of 3 A continuous. The FCI must also be able to be manually reset with a tool supplied by the Supplier. • The FCI must have capability for inrush restraint to eliminate false tripping of the unit.		
5	Indication	• Remote indication: Complies with Section 7.3.a • Local indication: Complies with Section 7.3.b		

4350.006 Underground FCI Intelligent and Automatic Reset Type (05-31-2024)

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