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**Overhead Power Fuse Mounting and End Fittings**

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**Related/Referenced Documents**

N/A.

**Version History**

Version	Date	Revision
01	Dec. 16, 2021	Initial release.
02	Sep. 12, 2024	Format corrections, TOC update, Section 4 modified, and sections order rearranged.



### Item Version History

Warehouse Catalog #	Asset Suite	Version	Date
010-83267	83267	2	09/12/2024
010-83268	83268	2	09/12/2024



## 1. Introduction

This is a general specification that covers the minimum requirements for a power fuse mounting including end fittings, nominally rated up to 25kV, to be used in the distribution system in Puerto Rico. Further information will be provided by LUMA Energy at the time of order placement and will provide information on site specific conditions, quantity, and other requirements. This document includes the general electrical and mechanical characteristics of the equipment/material.

## 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. The hooks must be designed so a standard load buster tool can be easily attached and removed from either side when operating the cutout.
- 2.3. Certified design test reports shall be provided when requested.
- 2.4. Any changes or updates to the supplier's approved designs, procedures, quality routines and/or inspection layout shall be communicated to LUMA Energy's material specification engineer in writing.
- 2.5. In an agreed upon time frame, after receipt of purchase order, the vendor shall submit equipment outlines, complete schematic, and point-to-point wiring diagrams for LUMA Energy's approval. The vendor shall provide the required number of hardcopies of operation and maintenance manuals (O&M manuals), including diagrams in LUMA Energy's most current version of AutoCAD (dwg) format file and parts list.

### 3. Literature

- 3.1. Descriptive and technical literature must be supplied by the vendor at time of bidding. This literature must include, but is not limited to details of material, drawings, documented testing, and instructions for use and installation. **The literature must be an official document from and certified by the manufacturer.** Failure to submit documents on time and duly certified by the manufacturer will cause bidder disqualification.
- 3.2. If required by LUMA, final drawings and documentation shall be submitted by the vendor before the manufacturing and shipping process for approval.

### 4. Compatible with

For compatible manufacturers and models see Table 1. These models are examples 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.

### 5. Markings

- 5.1. Containers shall be marked outside with LUMA Energy's purchase order and item number.
- 5.2. Package(s) to be delivered at warehouse shall be clearly marked with manufacturer and item information (part number, serial number, quantity, etc.)
- 5.3. Packaging labels and tags shall be waterproof.

### 6. Packaging

- 6.1. All equipment/material shall be packaged and marked in such a way as to facilitate handling and protection from damage and that the receiving warehouse can readily identify it and send it, in one complete unit, to a field location without opening crates or boxes to sort items and/or parts.
- 6.2. Warning label shall be placed on the equipment for special handling and storage requirements.
- 6.3. Any additional materials shall be packed in weatherproof boxes and identified with weatherproof labels.
- 6.4. 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.
- 6.5. A copy of each detailed packing list must be sent to LUMA Energy's personnel in charge of the requisition, prior to the delivery.

### 7. Number Per Package (Logistics)

One unit per box or as requested by LUMA.

## 8. Acceptance Criteria

- 8.1. Test required: certified by external qualified laboratories.
- 8.2. Product shall be manufactured in accordance with the latest issue below (section 8.3). When conflicts occur between purchaser's specifications and the latest issue below, the purchaser's specification shall prevail.
- 8.3. Latest applicable codes, standards, and other regulations:
  - a. ANSI/IEEE (C37.41, C37.42) standard design tests for high-voltage (>1000 V) fuses and accessories.
  - b. IEC/TS 60815-3 selection and dimensioning of high-voltage insulators intended for use in polluted conditions – part 3: Polymer insulators for A.C. systems.
  - c. ANSI/ASTM A153 standard specification for zinc coating (hot dip) on iron and steel hardware.
  - d. ANSI Z535 sign standards for utility installations specification.
  - e. IEC 60529 IP65 certification for degree of intrusion protection against foreign bodies (tools, dirt, etc.) and moisture by mechanical casings and electrical enclosures.
  - f. IEEE 1656-2010: Guide for testing the electrical, mechanical, and durability performance of wildlife protective devices on overhead power distribution systems rated up to 38 kV.
- 8.4. The power fuse mounting must be designed such that they pass all testing requirements of IEEE Standard C37.41, including, but not limited to:
  - a. Dielectric tests.
  - b. Mechanical tests.
  - c. Environmental tests (includes accelerated UV exposure test).
  - d. Water penetration and void tests.
  - e. Interrupting tests and temperatures extremes tests.
  - f. The insulator material used for the polymer insulator shall be tested to comply with section 18 of ANSI/IEEE Specification C37.41.
- 8.5. If any other standard different from the ones indicated in this document are used, the supplier must provide information showing compatibility with the required ones.

## 9. Description

- 9.1. This equipment is used for overcurrent protection on overhead electric distribution systems from 4.16 kV to 13.2 kV LL, 60 Hz. Shall be capable of protecting transformers, lines and cables (sectionalizing), and capacitor banks.

9.2. The power fuse mounting shall be capable of operating at the rated voltage of all LUMA Energy's distribution systems, transformer connections, and customer loads, including single-phase or three-phase, grounded, non-effectively, or delta. Project information will be provided by LUMA Energy at time of order placement and will provide information on site specific conditions, quantity, and type of cutout, and electrical requirements.

9.3. Electrical Requirements:

- a. Maximum design voltage: 17.0 kV or 27 kV
- b. Nominal (System) operating voltage: 14.4 kV
- c. Creep distance minimum: 20" (50.8 cm)
- d. Minimum Basic Insulation Level (BIL): 150 KV
- e. Minimum Continuous Amperes RMS: 200A
- f. Minimum Interrupting Amp (based on the design voltage):
  - 1. Symmetrical:
    - a. 17 kV: 14,000 A
    - b. 27 kV: 12,500 A
  - 2. Asymmetrical:
    - a. 17 kV: 22,400 A
    - b. 27 kV: 20,000 A
- g. Minimum Dry Arcing Distance: 7.5" (19.05 cm)
- h. Shall operate on both three-phase and single-phase from 2.4 kV thru 15 kV.
- i. All electrical ratings shall comply with ANSI/IEEE C37.42.
- j. All power fuse mountings shall be designed to preclude any corrosion which might occur because of current flowing between dissimilar metals. Galvanized steel parts or bolts in continuous current paths shall not be allowed.
- k. All mountings shall accept a SMU-20 style fuse units of sizes from 3 to 200 amperes of various fuse curve speeds.

9.4. Physical Requirements:

- a. The mounting shall be manufactured with a polymer insulator made of a 3/4" (1.9 cm) minimum fiberglass rod. Sheds shall have alternated or offset design.
- b. An adjustable hot dip galvanized steel type-B per IEEE Standard C37.42 mounting bracket shall be furnished with each mounting.
- c. Both connection terminals shall have a parallel groove connector which can accept a conductor, size #6 AWG solid through 2/0 AWG stranded.

1. The connector material shall be compatible with either copper or aluminum conductors.
  2. The connectors are to be coated with an approved oxide inhibiting compound.
  3. The connector bolt is to be suitably staked to the mounting and shall be carriage type. Must include nut, flat washer, and lock washers. All hardware is stainless steel 304 or 316.
  4. The preferred location for the lower connection terminal is on the back side of the lower contact assembly, positioned so that the electrical connection will extend downward on a plane approximately with the mounting insulator.
- d. The current-carrying contacts shall be silver-plated or constructed of equivalent low resistance, or corrosion resistant material, subject to the approval of LUMA Energy's material specification engineer.
1. Fuse top connection contact shall be manufactured with a latch and pre-stressed loading spring mechanism that prevents the fuse unit to recoil from the latched position during closing.
  2. The lower contact pressure is to be accomplished by spring loading.
  3. Pick-up of the lower spring contact is to be accomplished before closing of the top fuse holder contacts.
  4. All contact surfaces between the stationary main body of the mounting and the operating fuse tube holder shall be coated with an electrical contact aid to prevent corrosion and to aid in maintaining low joint resistance.
- e. All non-current carrying parts shall be 304 or 316 series stainless steel.
- f. A stop shall be provided to prevent the overswing of the fuse holder beyond a 180-degree arc after the operation of the cutout. This stop shall be in either the lower contact assembly or in the fuse holder.
- g. **End Fittings**

The Power Fuse mounting shall include the fuse unit upper and lower end-fittings:

1. Material shall be high conductive alloy.
2. It must be able to accept a hookstick to install or remove the assembled fuse unit.
3. Shall be compatible with the SMD-20 power fuse mounting and accept SMU-20 fuse units, or similar, up to 200 amperes.
4. The upper fitting must have a locating pin to assure proper alignment and engagement with the fuse unit, a clamp screw to properly fix the upper end of the fuse unit, and a roller pin that secures the fuse unit to the top connection latch.
5. The lower fitting must have a locating slot that guides and supports the fuse unit in lower connection, a clamp screw to properly fix the lower end of the fuse unit.

6. The end-fittings shall be reusable and available to be acquired independently from the mounting, shall LUMA requires to do so.

#### 9.5. Environmental Requirements:

- a. Temperature & Humidity: Equipment supplied shall be adequate for an operating temperature range of 0°C to 50°C (32 to 122°F), with humidity up to 100%.
- b. Wind conditions: The equipment and all the assembly shall be designed and constructed to withstand sustained hurricane-force wind velocities up to 160 mph (257.49 km/h) with an overload factor of 1.25.
- c. Pollution: The equipment shall be designed and constructed for the corrosive environment of a distribution system in a tropical zone close to sea or exposed to strong sea winds and it shall provide reliable performance in environments with high exposure to salt, minerals, chemicals, or wind-borne particulate. The insulator contamination levels for the equipment should be adequate to prevent flashover.
- d. UV Protection: The equipment shall be constructed of UV-resistant material, and it shall have passed the accelerated UV-exposure test.

#### 9.6. Mechanical Requirements:

- a. All mountings shall be equipped with an ejector device or flipper arm which will, under all fault conditions, mechanically disengage the fuse tube from the upper mounting contacts. The device and the associated activating spring shall be made of stainless steel (304 or 316), or similar corrosive resistant metal.

### 10. Inspection

The acceptance of any equipment/material shall in no way relieve the vendor from his responsibility to meet all the requirements of this specification, and it would not prevent subsequent rejection if such equipment/materials were found later to be defective.

### 11. Warranty

- 11.1. Replacement costs associated with cutout or parts failure due to inadequate design, faulty manufacturing, or packaging are to be the responsibility of the supplier.
- 11.2. Non-conformance observed during sampling will require the supplier to bring the cutouts into compliance with the specification 14 days after receiving it from the purchaser. The units shall be shipped to the supplier at the supplier's expense.
- 11.3. In reply to purchaser's request for quotation, supplier shall include the terms and conditions of the warranty period and coverage.
- 11.4. The supplier shall warrant the product against failure while operating under normal conditions.

### 12. Proposal Information



12.1. Submitted proposals must include:

- a. Technical information, tests, and drawings.
- b. Table of Compliance completed by the bidder with reference (see Appendix 1).

**13. Table 1: Warehouse and Asset Suite Identification Number**

Material	Warehouse Item Number	Asset Suite Number	Compatible Manufacturer and Model
Power Fuse Mounting	010-83267	83267	S&C, model 92142R3-P-D, Cooper Power Systems, model S4CMUC4
Power Fuse End Fitting	010-83268	83268	S&C, model 3095 Cooper Power Systems, model CMU3095

— 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 (4350.251)		
2	Industry Standards	The Proponent complies with the industry standards established in the specification document.		
3	Amp. Capacity / Basic Insulation Level	200 Amp / 150kVBil		
4	Creeping or leakage distance	20 inches minimum		
5	Material	Fiber glass rod (3/4 inches minimum diameter) with polymer insulation. Non-carrying parts in stainless steel 304 or 316. Current carrying parts silver plated.		
6	Hardware	Carriage type bolts, nuts, flat washers, and lock washers. All in stainless-steel 304 or 316.		
7	Connection Terminals	Parallel groove connector compatible with copper and aluminum conductors from 6 AWG to 2/0AWG.		
8	Stop mechanism	A stop shall be provided to prevent the overswing of the fuse holder beyond a 180°.		

**NOTE: This table is only a check list for reference. The compliance shall be with the complete document. Marking a PASS in the table won't be accepted as a compliance without the technical information required to certify it.**










# 4350.251 Overhead Power Fuse Mounting and End Fittings (09-12-2024)

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