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Disconnect Air-Break Switch, 27kV, 600A & 900A, 150kVBIL

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Related/Referenced Documents

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Version History

Version	Date	Revision Comments
1	Nov. 29, 2021	PREPA to LUMA Format for Item 032-02785. (Ver. 9)
2	Mar. 18, 2022	General Format and Description Section modified. Item 032-82825 created. (Ver. 1/10)
3	Apr. 20, 2022	Table of Compliance (TOC) added. (Ver. 1/10)
4	Jan. 25, 2023	Cover Page added; General Format and TOC modified. (Ver. 2/11)
5	Nov. 08, 2023	General format and TOC modifications, including backstrap description. (Ver. 3/12)



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Department: Distribution

Item Version History

Warehouse Catalog #	Asset Suite #	Version	Date
032-82825	82825	3	11/08/2023
032-02785	55417	12	11/08/2023



1. Introduction

This is a general specification that covers the minimum requirements for a disconnect air-break switch to be used in the 15 kV, 60 Hz 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 (O11) at Palo Seco, Puerto Rico. Shipping will include transportation and unloading at the indicated warehouse.
- 2.2. The product shall be furnished as described here in this specification or as amended by the purchase order. 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 for a new approval before shipping.
- 2.3. Upon inspection of incoming equipment/material, the purchaser reserves the right to refuse product shipments and to determine the acceptability or rejection of the product received. The supplier shall be liable for all costs incurred for a product that is refused/rejected.

3. Literature

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. Evidence of LUMA Energy's approval of the equipment/material shall be supplied by the vendor if requested by LUMA Energy.

4. Markings

- 4.1. Containers shall be marked outside with LUMA Energy's purchase order and item number.
- 4.2. Packaging labels and tags shall be waterproof.

5. Compatible with

- 5.1. For compatible manufacturers and models see Table 1.
- 5.2. 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.

6. Packaging

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.

7. Number Per Package (Logistics)

Standard Package: One unit per box or as requested by LUMA.

8. Acceptance Criteria

- 8.1. Test required: certified by external qualified laboratories indicating the device was built and tested to the limits set in ANSI/IEEE C37.30, including specific alloy, tensile strength, plating, and/or insulation requirements.
- 8.2. Latest applicable codes, standards, and other regulations:
 - a. ANSI/IEEE C37.30: For all high voltage enclosed indoor or outdoor, and non-enclosed indoor or outdoor, switches rated in excess of 1,000 V.
 - b. ANSI/IEEE C37.32: For schedules of preferred ratings and construction specifications for high voltage disconnect, interrupter, fault initiating, and grounding switches rated above 1000 volts.
 - c. ANSI/IEEE C37.34: Design test requirements for all high voltage enclosed indoor and outdoor and non-enclosed indoor and outdoor air switches rated above 1000 V are specified.
 - d. ANSI/IEEE C37.37: To determine the allowable continuous current class (ACCC), the continuous load current capabilities of air switches under various conditions of ambient temperature, and the emergency load current capabilities of air switches under various conditions of ambient temperature.
 - e. ANSI/ASTM A153: For zinc coating (hot dip) on iron and steel hardware.
 - f. IEC 265: High-voltage switches for rated voltages above 1 kV and less than 52 kV.

9. Description

- 9.1. The disconnect air break switch is used for distribution switching on phase-to-phase systems operations. The 900 A one is used for sub-stations and the 600 A one is used for branches.
- 9.2. Shall be single-phase, single-thrown, double member, with hard-drawn blades suitable for operations with both hook-stick and load-break tool.
- 9.3. Shall have a stainless steel and corrosion-resistant nameplate fastened to the device showing all electrical characteristics.
- 9.4. Electrical Requirements:
- a. Maximum design voltage: 27.0 kV
 - b. Nominal operating voltage: 13.2 kV, 8.32 kV, 7.2 kV, and 4.16 kV
 - c. Open switch withstand, 1 minute, 60 Hz: 120 kV
 - d. Continuous amperage rating: as per Table 1.
 - e. Momentary asymmetrical RMS amperage: 40,000 A
 - f. Basic insulating level: 150 kVBIL
 - g. Leakage minimum distance: 26" (66.0 cm)
- 9.5. Physical Requirements:
- a. Minimum mechanical tensile load: 5,000 lbf (2.22 kN)
 - b. Minimum torsion strength: 350 lbf (1.56 kN)
 - c. Minimum cantilever load: 800 lbf (3.59 kN)
 - d. Shall be manufactured with a polymer insulator, 11" (27.9 cm) approximate length, and 2.25" (5.72 cm) bolt circle.
 - e. Must be designed for pole, single or double crossarm mounting in horizontal inverted or vertical position.
 - f. Shall have a back strap with four 3/8" (0.95 cm) captive bolts, four square nuts, and four flat washers. All of this on hot dip galvanized steel as per ASTM A153. The bolts length shall be not less than 8" (20.32 cm) and not more than 10" (25.40 cm).
 - g. The switch shall be provided with an appropriate removable stop pin to adjust maximum blade travel and open position to 90°. Luma shall evaluate other similar mechanisms.
 - h. Blade and Channel approximate length:
 - 1. 600A: Blade = 11" (40.6 cm); Channel = 25" (76.2 cm).

2. 900A: Blade = 16" (40.6 cm); Channel = 30" (76.2 cm).
 - i. The current-carrying contacts shall be silver-plated copper.
 - j. NEMA two-hole terminal pads shall be included on both ends. Shall be silver-plated copper or tin-plated copper.
 - k. Two 1/2" (1.27 cm) captive bolts shall be included for each terminal pad. Each bolt must include a nut, flat washer, and lock washer. Bolts length shall be 1-3/4" (4.44 cm) approximate. All hardware on stainless steel 304 or 316. Nut could be accepted on bronze.
 - l. All non-current carrying parts, excluding the back strap and its bolts, shall be 304 or 316 series stainless steel.
- 9.6. 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: All mounting equipment shall be designed and constructed to withstand sustained hurricane-force wind velocities complying with the applicable construction codes, standards or LUMA Energy's design criteria for PR.
 - 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.

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/material were found later to be defective.

11. Warranty

- 11.1. All equipment/material shall be warranted for a period of one year from date of installation or 18 months from the date of shipment or whichever comes first, against equipment/material defects and workmanship.
- 11.2. The warranty shall include parts and labor to repair the defective component at the supplier's facility.
- 11.3. The supplier also warrants that all equipment/material supplied there under are new with an expected service life of 40 years minimum on the electrical distribution system.



12. Proposal Information

12.1. Submitted proposals must include:

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

13. Table 1: Warehouse and Asset Suite Identification Number

Item	Warehouse Catalog #	Asset Suite #	Compatible Manufacturer & Model
1 – 600 A	032-82825	82825	EATON (D73P36SOCE) Hubbell (M3D68AC)
2 – 900 A	032-02785	55417	EATON (D73P39SOCE) Hubbell (M3D98AC)

— 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 (4350.071).		
2	Industry Standards	The Proponent complies with the industry standards established in the specification document (ANSI/ASTM, ANSI/IEEE, IEC).		
3	Material	<ul style="list-style-type: none"> • Current carrying parts silver plated copper. • Non-Current carrying parts in Stainless-Steel 304 or 316. • Blade: Copper • Insulator: Polymer with fiberglass rod. • Base & Backstrap: hot dip galvanized as per ASTM A153 • Hardware: Stainless Steel 		
4	Product Requirements	Backstrap included with 4 3/8" captive bolts, 4 square nuts, and 4 flat washers. Bolts length between 8" and 10".		
5	Electrical Requirements	<ul style="list-style-type: none"> • Voltage: 27 kV • Insulating Level: 150 kVBIL • Rating Current: <ul style="list-style-type: none"> • 032-82825: 600A • 032-02785: 900A • Momentary Current: 40,000 A • Leakage Distance: 26.0" minimum 		
6	Physical Requirements	<ul style="list-style-type: none"> • Tensile Load: 5,000 lbf • Torsion Strength: 350 lbf • Cantilever Load: 800 lbf 		
7	Approximate Dimensions	<ul style="list-style-type: none"> • Blade: <ul style="list-style-type: none"> • 032-82825: 11" long • 032-02785: 16" long • Channel: <ul style="list-style-type: none"> • 032-82825: 25" long • 032-02785: 30" long • Insulator: 11" long, 2.25" bolt circle 		
7	Terminal Pads	One NEMA Two-Hole at each end with two 1-3/4" x 1/2" captive bolts each.		
8	Blade Stop	At 90° with pin		
9	Name Plate	As per section 9.3.		











4350.071 Air Break Switch 27kV, 150kVBIL, 600A & 900A (11-8-23)

Final Audit Report

2023-11-08

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