



Document Title:  
**38kV – 46kV Three Phase Bypass Disconnect Switch System**

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**Related/Referenced Documents**

Include the applicable document, section, or reference "[add link here](#)".

**Version History**

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01	24/05/06	First Issue

## Table of Contents

<b>1. General .....</b>	<b>3</b>
<b>1.1. Purpose .....</b>	<b>3</b>
<b>1.2. Overview .....</b>	<b>3</b>
<b>1.3. Applicable Guidelines, Codes and Standards .....</b>	<b>3</b>
<b>2. Materials .....</b>	<b>3</b>
<b>2.1. Specific Requirements .....</b>	<b>3</b>
<b>2.2. Basic Use .....</b>	<b>5</b>
<b>2.3. Description .....</b>	<b>5</b>
<b>3. Asset Identification .....</b>	<b>6</b>
<b>4. Acceptance Criteria .....</b>	<b>6</b>
<b>5. Reference Documents .....</b>	<b>7</b>
<b>6. Inspection .....</b>	<b>7</b>
<b>7. Drawings .....</b>	<b>7</b>

## 1. General

This specification covers the electrical requirements for a non-loadbreak manually hootstick operated three-phase (3 $\emptyset$ ) Bypass Disconnect Switch for overhead lines on electrical system up to 46kV.

### 1.1. Purpose

The purpose of this document is to outline the minimum electrical, mechanical, material furnished and fabrication requirements for the purchase of the three-phase (3 $\emptyset$ ) 38kV Bypass Disconnect Switch.

### 1.2. Overview

The requirements covered by this specification pertain to a 38 KV 3-phase bypass switch. The bypass switch is designed to safely bypass and isolate the recloser and regulators from the electrical system, enabling continuous service to LUMA customers during repairs or maintenance routines on reclosers and regulators without causing a disruption. The bypass switch will be manually operated using a hook stick.

### 1.3. Applicable Guidelines, Codes and Standards

The Bypass Switch material, fabrication and operation shall comply with latest revisions of applicable industry standards, including the following:

ANSI/IEEE C37.30, C37.32, C37.34, & C37.37

IEEE C37.60/ IEC 62271-111

IEC 62271-1

IEC 62271-200

ASTM A153

ISO 9001, 14001, 45001 and 50001 certified

## 2. Materials

All material and equipment shall be packaged and marked in such a way as to facilitate handling and protection during its transportation and from damage that the receiving warehouse can readily identify, in one complete unit, to a field location without opening crates or boxes to sort items and/or parts. The Bypass disconnect switch shall be kitted (packed) as a single system including the three (3) single by-pass switches and a 10 feet cross-arm, and all associated hardware ready for field installation. All materials fabrication shall comply but not limited to the standards listed on section 1.3.

### 2.1. Specific Requirements

2.1.1 Samples shall be furnished as requested by LUMA Energy. Vendors that have supplied this material to LUMA on previous orders, will not have to furnish samples at bid opening. The 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.

2.1.2 The connection terminals shall have a 4-hole nema pad connector which can accommodate copper or aluminum conductors, for conductor sizes 556.5 and 1192.5 kcmil ACSR with 4 holes terminal pad mounting hardware.

- a. The connector material shall be compatible with either copper or aluminum conductors.
- b. The connectors are to be coated with an approved oxide inhibiting compound.
- c. The connector bolt is to be suitably staked to the switch insulator assembly and shall be carriage type.
- d. Must include nut, flat washer, and lock washers as minimum. All of them on stainless steel 304 or 316.

2.1.3 The switch shall have the following features and characteristics:

- a. Copper current carrying parts shall be silver plated at hinge, contact, and blades.
- b. Shall have polymer station post insulators.
- c. Load-buster hooks which will not deform from load-buster tool operation.
- d. The combined mechanical and electrical (M&E) tension strength shall be 15,000 lbs. (6,803.88 kg).
- e. Blade Stop: 180 degrees.

2.1.4 Electrical Requirements:

Ratings	Type I	Type II
Maximum Design Voltage (kV)	46	46
Nominal operating Voltage (kV)	38	38
Impulse Level (BIL) Voltage, kV – Phase-to-Phase and Phase-to-Ground	200	200
Impulse Level (BIL) Voltage, kV – Across the By-pass	170	170
Continuous Load Current	900	1200
Momentary current (Amps)	40,000	40,000
Minimum Leakage Distance (in)	43	43

- 2.1.5 Shall have a stainless-steel and corrosion resistant name plate fastened to the device showing all electrical characteristics and engraved on plate.
- 2.1.6 The switch shall have a positive blade lock to prevent opening under high momentary current.
- 2.1.7 Pole mounting bracket shall be provisioned with grounding connector.
- 2.1.8 The single-phase model shall include the necessary hardware for installation in a crossarm. For the single disconnect switch, please refer to specification 4752.336, 38kV – 46kV Single Phase Bypass Disconnect Switch for more details.
- 2.1.9 The three-phase model shall include a fiberglass cross arm to hold the three bypass switches and shall comply with the electrical requirements on section 4.0.
- 2.1.10 The base for the crossarm to be installed in our poles shall comply with the following:
  - a. Shall be hot dip galvanized as per ASTM (A153).
  - b. The base is to be mounted on a concrete or steel pole with holes at 8” apart on one face, center to center and 12” apart on the other face, center to center in a vertical way. To comply with this statement, the base must have three holes/slots of 11/16” diameter.
  - c. Shall be C-Type with a thickness of 1/4” as minimum. No sharp edges allowed.
  - d. The specified diameter of the holes and slots shall be measured at the end of the protection process (final product).

- 2.1.11 Hardware shall be hot dip galvanized steel as per ANSI / ASTM A153.
- 2.1.12 All non-current carrying parts shall be 304 or 316 series stainless-steel.
- 2.1.13 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.

**2.2. Basic Use**

The Bypass Disconnect Switch is a single-phase hookstick operated switch. It is for manual switching of overhead lines on electrical distribution systems up to 46kV, rated for 900 / 1200 Amps continuous operation, 40,000 amps momentary and 25,000 amps sym. 2-seconds short-time withstand to be installed on a single fiberglass cross-arm.

- 2.2.1 The basic operation of the By-Pass Disconnect Switch equipment is to safely bypass and isolate the recloser or regulator from the distribution system for repairs or maintenance routine enabling continuous services to LUMA’s customer without power outages and services disruption.

In normal operation, the bypass blade is open and the two disconnect blades are closed (Fig. 1), allowing the recloser its normal operation. When isolation of the recloser is required, the by-pass blade is closed to provide a parallel current and the disconnect blades are open isolating the Recloser (Fig. 2).

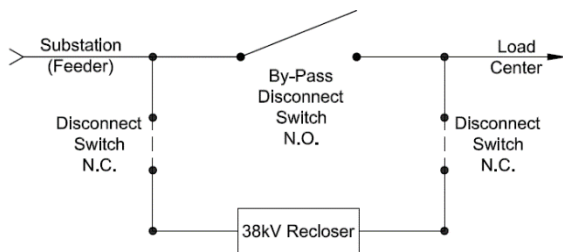


Fig. 1  
Normal Operation  
Position

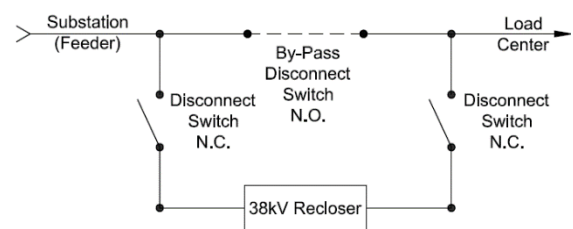


Fig. 2  
By-Pass Operation  
Position

**2.3. Description**

This is a Hookstick Disconnect Switches Up to 46kV 900 Amp 40kA Momentary, to be used to bypass and isolate reclosers and regulators for repair or routine maintenance without service interruption. This switch type has blades that are parallel to each other and have vertical insulators and a base parallel to the blades.

### 3. Asset Identification

LUMA Spec	Warehouse #	Description
4752.335	032- 85720	38KV – By-pass 3-phase switch 900 Amps
4752.335	032- 85721	38KV – By-pass 3-phase switch 1200 Amps

### 4. Acceptance Criteria

Test required: certified by external qualified laboratories indicating the device was built and tested to the limits set in ANSI/IEEE C37.30.

The following table shall be completed by the switch manufacturer.

Compliance Table:

Line	Criteria	Description	Pass/Fail (P / F)	Comments
1	Specification	The Proponent complies with the corresponding specification document (4752.335)		
2	Industry Standards	The Proponent complies with the industry standards established in the specification document. (ANSI/ASTM, ANSI/IEEE, UL)		
3	Electrical Requirements	<ul style="list-style-type: none"> <li>• Design Voltage: 46 kV</li> <li>• Nominal Voltage: 38 kV</li> <li>• Continuous Current: 900/1200 A</li> <li>• Basic Insulation Level: 200 kV BIL</li> <li>• Momentary Current: 40,000 A</li> <li>• Min. Leakage Distance: 43"</li> <li>• 60Hz Withstand-Wet: 100kV.</li> <li>• Impulse Flashover-Positive: 280kV</li> </ul>		
4	Mechanical Requirements	<ul style="list-style-type: none"> <li>• Base Dia. 4 Holes @ 5" B.C. or 4 Holes @ 3" B.C.</li> <li>• Mech &amp; Elec Tension Strength: 15,000 lbf combined</li> </ul>		
5	Material	<ul style="list-style-type: none"> <li>• Non-Carrying Parts: Stainless Steel 304 or 316</li> <li>• Current Carrying Parts: Silver Plated</li> <li>• Insulators Type: Post Polymer</li> <li>• Switch base: Hot Dip Galvanized as per ASTM A153</li> <li>• Hardware: Hot Dip Galvanized as per ASTM A153</li> <li>• Cross Arm (3Ø model): 12' Overall Length, Fiberglass</li> </ul>		
6	Connection Terminals	<ul style="list-style-type: none"> <li>• 4 Holes Nema connector compatible with copper and aluminum conductors from 556.5 to 1192.5 KCMIL ACSR.</li> </ul>		

Line	Criteria	Description	Pass/Fail (P / F)	Comments
		<ul style="list-style-type: none"> <li>Must include carriage type bolts with nut, flat washer, and lock washer as minimum, all of them on stainless steel 304 or 316.</li> </ul>		
7	Blade Stop & Blade Lock	<ul style="list-style-type: none"> <li>A stop shall be provided to prevent the overswing of the blade holder beyond a 180°.</li> <li>A positive blade lock shall be provided to prevent opening under high momentary current.</li> </ul>		
8	Base Holes	<ul style="list-style-type: none"> <li>Three holes (11/16" diameter) along the base. The top one is a keyhole. The other two are 1.5" slots.</li> <li>Distance from keyhole to the second hole/slot is 12". Distance from keyhole to the bottom slot is 16".</li> </ul>		
9	Name Plate	Stainless-steel fastened and engraved to the device showing all electrical characteristics.		

**5. Reference Documents**

38kv - 40.5kV Three Phase Line Recloser System, Specification 4752.334

38kV – 46kV Single Phase Bypass Disconnect Switch System, Specification 4752.336

**6. Inspection**

The acceptance of any material or equipment 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 materials were found later to be defective.

**7. Drawing**

7.1. Vendor must submit a technical drawing in PDF and CAD file.

— End of Specification —










# 4752.335 38kV 46kV Three Phase Bypass Disconnect Switch

Final Audit Report

2024-05-06

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