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**Transmission Line In-Line Switch 38, 115 & 230 kV**

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**Version History**

Version	Date	Description
00	Jun 30, 2023	First issue.



## Transmission Line In-Line Switch 38, 115 & 230 kV

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Document No.: 4752.327  
Originating Dept: Transmission Eng.

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### **1. General**

- 1.1. This specification describes the minimum requirements for the design, manufacturing, testing, and delivery of an In-Line Switch to be used in LUMA Energy 38, 115 & 230 kV transmission lines in Puerto Rico.
- 1.2. Further information will be provided by LUMA Energy at the time of order placement and will provide information on site conditions, quantity, and other requirements.

### **2. Specific Name**

3. Transmission Line In-Line Switch.

### **4. Basic Use**

- 4.1. To be used as temporary switches to isolate and sectionalize line for bypass construction or tying two circuits together, installed at overhead line spans between transmission line structures.

### **5. Special Requirements**

- 5.1. Samples shall be furnished if requested by LUMA.
- 5.2. LUMA may require One (1) unit properly labeled for testing and analysis.
- 5.3. Descriptive and technical literature, installation instructions and outline drawings showing physical dimensions and switch mounting shall be supplied if requested by LUMA.
- 5.4. They shall be required to show evidence of LUMA's approval of the equipment if requested.

### **6. Marking and Packaging**

- 6.1. Containers shall be marked outside with LUMA's purchase order number and code number.
- 6.2. Vendors shall prepare material and equipment for shipment in such a way that facilitate handling and protect it from damage.
- 6.3. Switches and accessories shall be adequately packaged and crated for outdoor storage for a period of at least one (1) year.
- 6.4. All material shall be packaged and marked in such a way that the receiving warehouse can readily identify and send in one (1) complete unit (one set of switches) to field location without opening crates to sort items and/or parts.



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**7. Equal or approved equal to:**

7.1. Cleveland/Price, Inc. – see table below for specific catalog number.

Catalog No.	Transmission System Voltage	LUMA Warehouse No.
C02B007G01	38 kV	032-84865
C02B007G03	115 kV	032-84866
C02B008G02	230 kV	032-84867

**8. Quantity per package:**

8.1. As requested by LUMA.

**9. Acceptance Criteria**

- 9.1. Each disconnect switch shall be designed and built following the latest applicable ANSI/IEEE, NEMA and ASTM standards and the herein included requirements.
- 9.2. The following standards shall form part of this specification unless otherwise stated:
  - 9.2.1. ANSI C84.1 Electric Power Systems and Equipment - Voltage Ratings (60 Hz)
  - 9.2.2. IEEE C37.30.1 Requirements for AC High-Voltage Air Switches Rated Above 1000V.
  - 9.2.3. ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

**10. Description**

10.1. The Transmission Line In-Line Switch 38, 115 & 230 kV shall comply with the following minimum ratings:

Parameters	Transmission System Voltage		
	38 kV	115 kV	230 kV
Normal Operating Voltage, kV rms	38	115	230
Nominal Rated Voltage, kV rms	46	-	-
Maximum Rated Voltage, kV rms	48.3	121	242
Rated Continuous Current, A rms	2,000	2,000	2,000
Short Circuit Current, A rms	62.5	62.5	62.5
Duration of Short Circuit, sec	3	3	3
Momentary Short Circuit Current Withstand, kA peak	100	100	100
Peak Short Circuit Current Withstand, kA peak	164	164	164
Rated Full Wave Impulse Withstand Voltage, BIL kV peak	250	550	900
Positive Critical Flashover Value, kV	350	813	1300
Maximum Strength Working Load, lbs.	25,000	25,000	40,000



## Transmission Line In-Line Switch 38, 115 & 230 kV

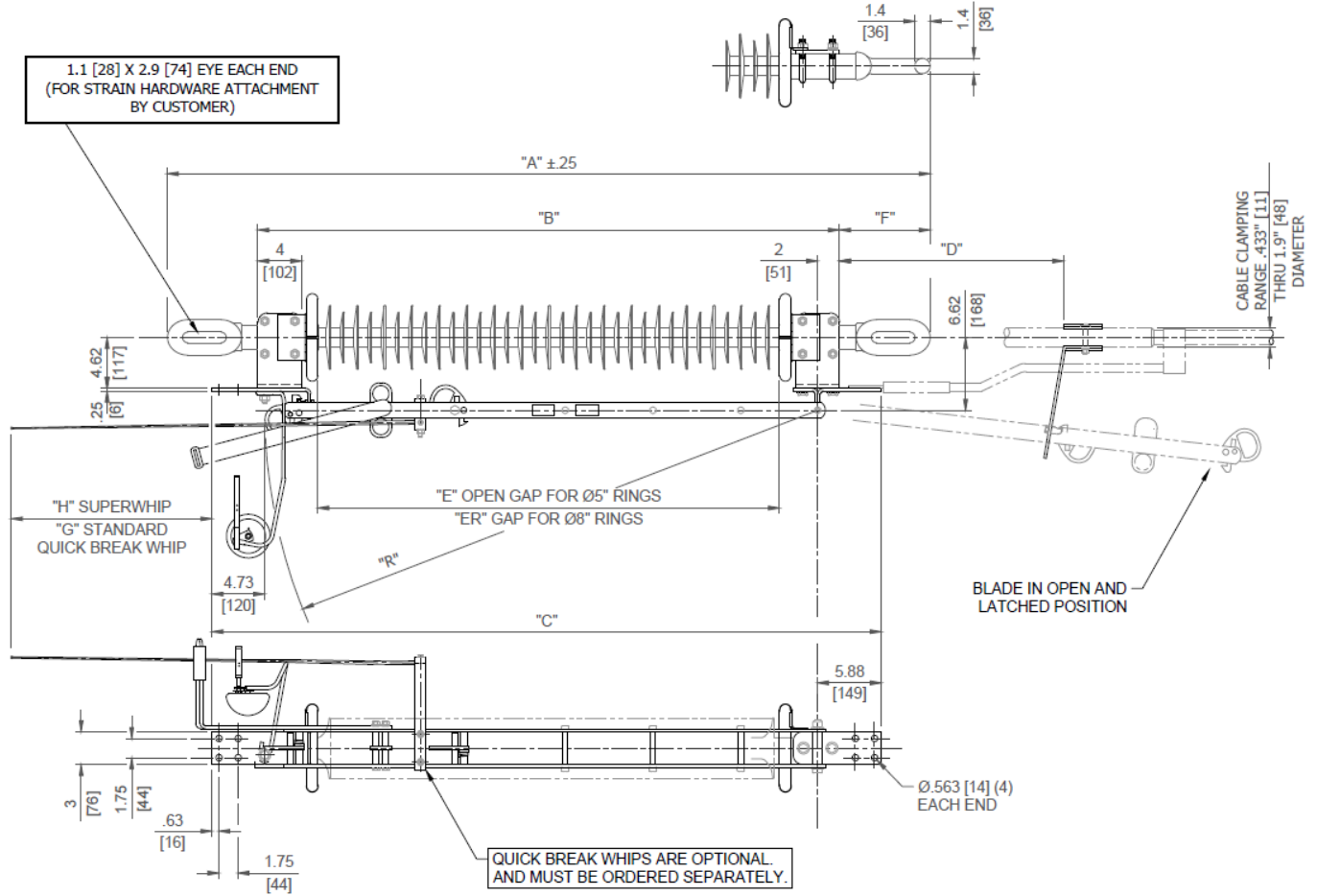
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- 10.2. Transmission Line In-Line Switch should be suitable to be operated from an insulated bucket truck with a hot stick tool.
- 10.3. Transmission Line In-Line Switch shall be equipped with the Superwhip™ interrupter used for interrupting the capacitive line charging current of transmission lines.
- 10.4. Corona rings are required on insulation and hardware for 230 kV In-Line Switches.
- 10.5. The live parts of the switch are made from hard-drawn, high-conductivity copper, suitable for tropical and corrosive environments.
- 10.6. The switch contacts are high-pressure line type. Wear of contacts shall not result in diminished contact performance due to a reduction of contact pressure.
- 10.7. The disconnect switch, in its fully open and fully closed positions shall be designed and constructed to withstand sustained hurricane-force wind velocities up to 160 mph (257 km/h), with an overload factor of 1.1.
- 10.8. Contact springs shall be stainless steel.
- 10.9. Contact surfaces shall be silver-to-silver.
- 10.10. Each disconnect switch shall be designed with an Allowable Continuous Current Class (ACCC) of D06 to meet the Heat Rise limitations per IEEE C37.30.1, Annex C.
- 10.11. The disconnect switches shall be provided with a standard 4-hole NEMA, tin-plated terminal pads.
- 10.12. The switch is supplied with a polymer strain insulator having a chain-eye end fitting, suitable for strain hardware attachment.
- 10.13. The insulator shall have a high tensile strength rating.
- 10.14. The apparatus associated hardware intended to be installed directly to the cable shall comply with a clamping range of 0.433 in. to 1.9 in. diameter, for ACSR overhead cable.
- 10.15. No braided conductor shall be used in the current path.
- 10.16. Non-ferrous construction shall be used from switch lever to switch contacts.
- 10.17. The switch apparatus associated hardware shall have a hot-dip galvanized steel in accordance with applicable ANSI/IEEE standards and galvanizing as per ASTM A153. All bolts, cap screws, socket set screw lock washers or equivalent, etc.

## 11. Drawing

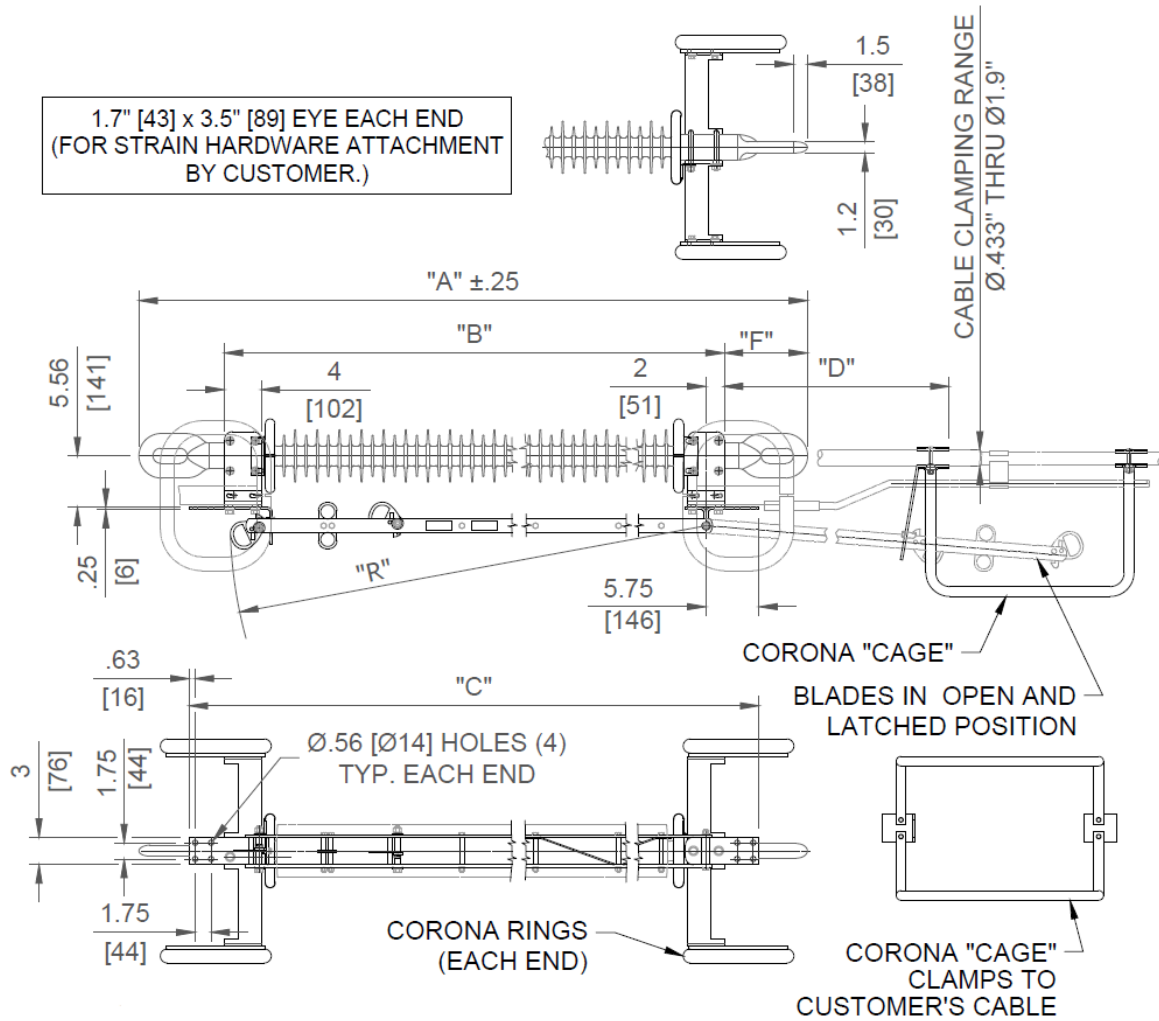
### 11.1. Typical Drawing and Dimensions for Catalog No. C02B007G01 & C02B007G03:



Catalog No.	A	B	C	D	E	ER	F	H	R	Weight by Switch Pole
C02B007G01	50.4"	37.6"	45.25"	17"	27.25"	25.66"	6.4"	23.13"	34.75"	54 lbs.
C02B007G03	75.2"	62.2"	69.83"	39.31"	51.62"	50.30"	6.5"	31.63"	59.5"	70 lbs.

Note: "G" dimension does not apply.

11.2. Typical Drawing and Dimensions for Catalog No. C02B008G02:



Catalog No.	A	B	C	D	F	R	Weight by Switch Pole
C02B008G02	113.6"	95.81"	103.63"	72"	9"	92.65"	138 lbs.

— End of Specification —











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Final Audit Report

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