200 A 35 kV class three-phase (purple cuff) loadbreak elbow connector

General

Eaton's Cooper Power™ series, 200 A, 35 kV three-phase rated (21.1/36.6 kV) loadbreak elbow connector meets the full requirements of IEEE Std 386™–2006 standard 200 A loadbreak interface No.1A, 21.1/36.6 kV (large 35 kV interface). Elbow connectors are used in pad-mounted cabinets, underground vaults and other installations to provide three-phase rated, shielded, insulated deadfront connections. They are used to terminate underground cables on 35 kV class electrical equipment. When mated with comparably rated products (bushings, junctions or standoff bushings), the loadbreak elbow connector provides a fully shielded, submersible, separable connection for loadbreak operation.

The 200 A three-phase rated loadbreak elbow is designed for use with 35 kV class 21.1/36.6 kV Large Interface No. 1A loadbreak bushings and accessories meeting the requirements of IEEE Std 386™-2006 standard.

The 21.1/36.6 kV three-phase rated elbow connector should not be used with 21.1 kV single-phase rated bushings and accessories. For quick identification, 21.1/36.6 kV three-phase rated elbow connectors are color coded with purple cuffs. Single-phase rated products are color coded with tan nose pieces and tan cuffs.

All loadbreak elbows are molded of high quality peroxide-cured EPDM insulation and have a molded on peroxide-cured semi-conducting shield. They feature a 2.88" long coppertop friction welded compression connector, a tin-plated copper probe with an ablative arc follower tip. Elbows can be ordered with a capacitive test point for determining if the circuit is energized. The test point also provides a means for mounting Eaton's Cooper Power series test point voltage fault circuit indicator. (See Section CA320004EN). Elbows can be ordered with a concentric neutral jacket seal included in the kit.

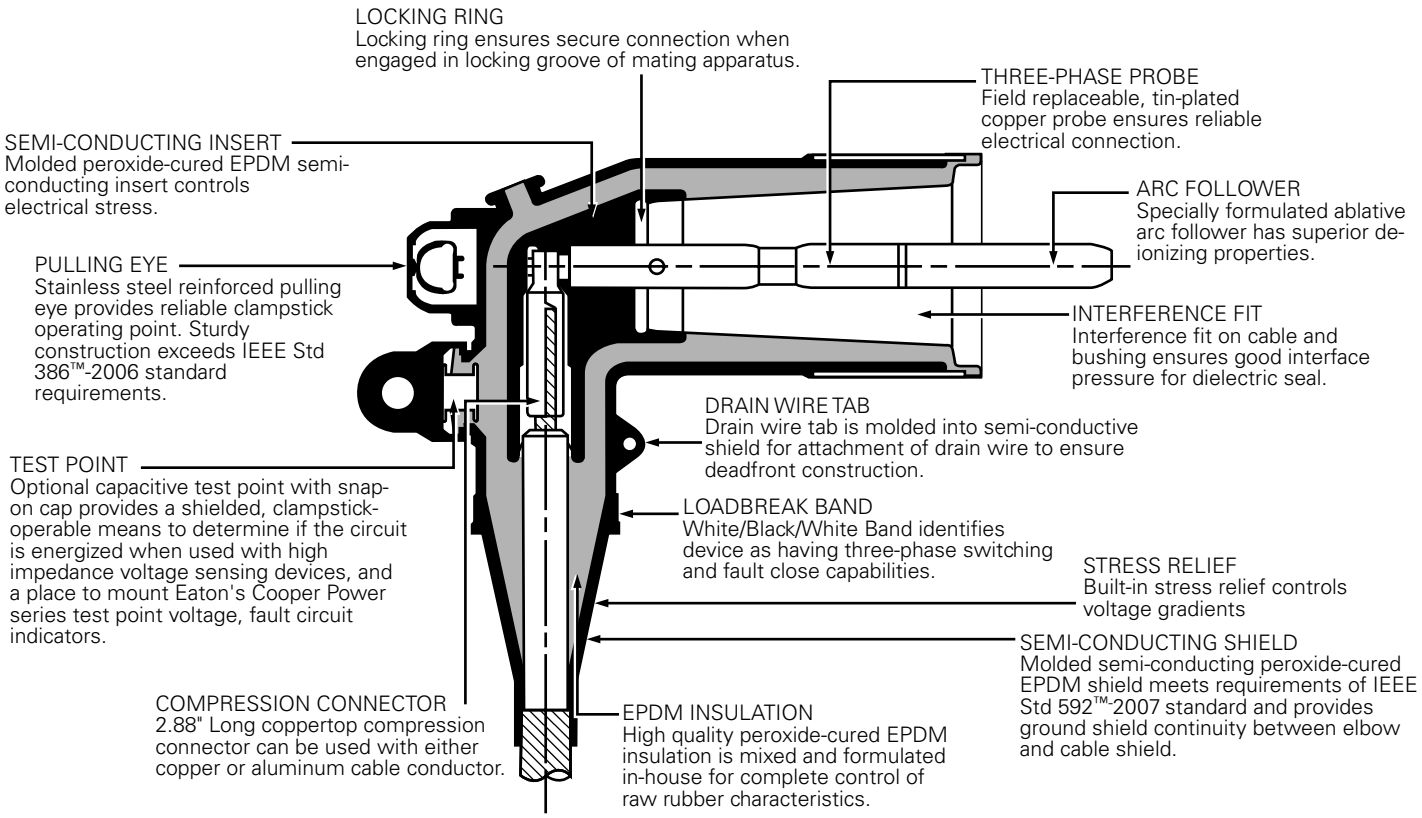


Figure 1. Cutaway drawing shows design detail.

Table 1. Voltage ratings and characteristics

Description	kV
Standard voltage class	35
Maximum rating phase-to-phase	36.6
Maximum rating phase-to-ground	21.1
AC 60 Hz 1 Minute withstand	50
DC 15 Minute withstand	103
BIL and Full wave crest	150
Minimum corona voltage level	26

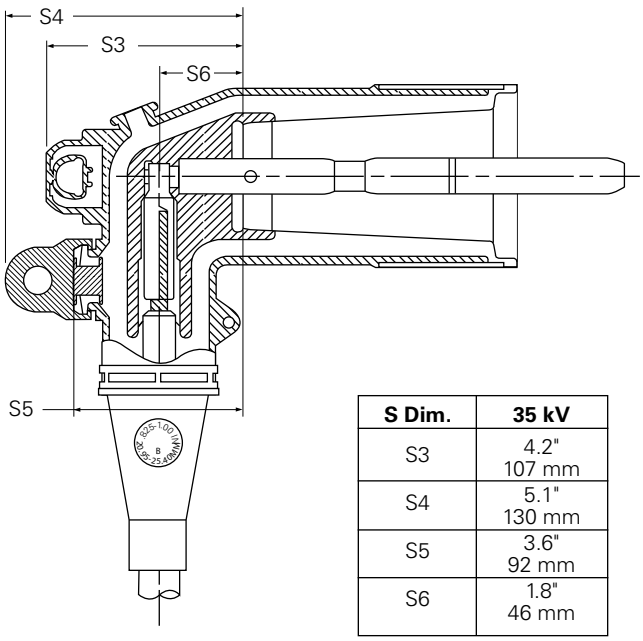
Voltage ratings and characteristics are in accordance with IEEE Std 386™-2006 standard.

Table 2. Current ratings and characteristics

Description	Amperes
Continuous	200 A rms
Switching	10 operations at 200 A rms at 36.6 kV*
Fault closure	10,000 A rms symmetrical at 36.6 kV for 0.17 s after 10 switching operations*
Short time	10,000 A rms symmetrical for 0.17 s 3,500 A rms symmetrical for 3.0 s

Current ratings and characteristics are in accordance with IEEE Std 386™-2006 standard.

* When mated with similar rated 21.1/36.6 kV three-phase products with purple nose pieces.



S Dim.	35 kV
S3	4.2" 107 mm
S4	5.1" 130 mm
S5	3.6" 92 mm
S6	1.8" 46 mm

Figure 2. 35 kV loadbreak elbow profile and stacking dimensions.

Note: Note: Dimensions given are for reference only.

Installation

No special tools are required. The de-energized and grounded cable is prepared according to the installation instructions. The coppertop compression connector is crimped on the cable conductor. The cable is inserted into the elbow housing and the male probe is screwed into the threaded conductor contact. A clampstick tool is used to mate the elbow to the bushing interface. Refer to Installation Instruction Sheet MN650010EN for details.

Production tests

Tests conducted in accordance with IEEE Std 386™-2006 standard:

- AC 60 Hz 1 Minute withstand
  - 50 kV
- Minimum corona voltage level
  - 26 kV
- Test point voltage test

Tests conducted in accordance with Eaton requirements:

- Physical inspection
- Periodic dissection
- Periodic X-ray Analysis

Ordering information

The standard elbow kit is packaged in a heavy duty polyethylene bag. There are 10 bagged kits to a carton. Individual boxed kits are also available by special part number. To order a 35 kV Class loadbreak elbow kit, for cable meeting all applicable industry cable standards, follow the easy steps below.

Each kit contains:

- Elbow body
- Coppertop compression
- Connector
- Loadbreak probe
- Probe installation tool
- Silicone lubricant
- Installation instruction sheet

STEP 1: Determine the cable's diameter over the insulation as shown in Figure 3 (including tolerances) from the cable manufacturer. Then identify a cable range from Table 3 that brackets the minimum and maximum insulation diameters. Select the CABLE RANGE CODE from the far right column.

STEP 2: Identify the conductor size and type in Table 4 and select the CONDUCTOR CODE from the far right column.

For an elbow kit without a compression connector, use "00" for the conductor code.

STEP 3: For an elbow kit without a capacitive test point order:

LE235	CABLE RANGE CODE	CONDUCTOR CODE

For an elbow kit with a capacitive test point order:

LE235	CABLE range code	CONDUCTOR CODE	T

STEP 4: (Optional)
To add a premolded jacket seal for concentric neutral cable to the elbow kit, consult Table 5 and add the suffix that corresponds to the diameter over the cable's outer jacket.

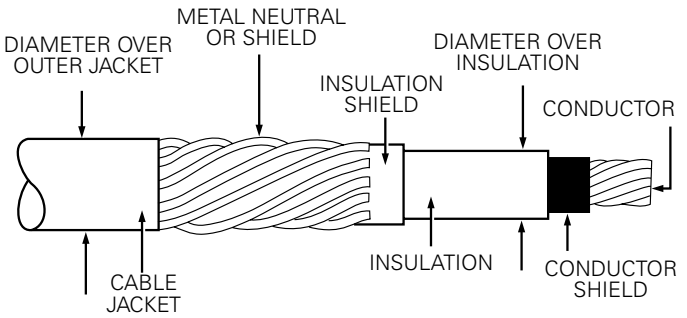


Figure 3. Illustration showing typical construction of high voltage underground cable.

Table 3. Cable insulation diameter range

Diameter over cable insulation		Cable range code
Inches	**Millimeters**	
0.825-1.000	20.96-25.40	**B**
0.995-1.180	25.27-29.97	**D**
1.180-1.340	29.97-34.04	**F**

Table 4. Conductor size and type

Class B Stranded or Compressed		Compact or Solid		Conductor code
AWG	**mm²**	**AWG**	**mm²**	
No Connector				**00**
#6	16	#4	–	**01**
#4	–	#3	25	**02**
#3	25	#2	35	**03**
#2	35	#1	–	**04**
#1	–	1/0	50	**05**
1/0	50	2/0	70	**06**
2/0	70	3/0	–	**07**
3/0	–	4/0	95	**08**
4/0	95	250	120	**09**
250*	120	300	–	**10**

* Compressed stranding only.

STEP 5: (Optional)
To add a cold shrinkable metallic shield adapter to the elbow kit, consult Table 6 and add the suffix that corresponds to the diameter over the cable's outer jacket.

Step 6: (Optional)
For an elbow kit individually packaged in a corrugated cardboard box, insert an "X" as the last character in the part number.

Table 5. Jacket seal for concentric neutral

Diameter over outer jacket		
Inches	**Millimeters**	**Suffix**
0.866-1.140	22.0-29.0	**GCB**
1.020-1.420	25.9-36.1	**GCD**
1.220-1.730	31.0-43.9	**GCF**

Table 6. Metallic shield adapter kit

Diameter over outer jacket		
Inches	**Millimeters**	**Suffix**
0.590-1.050	15.0-26.7	**–SA1**
0.830-1.640	21.1-41.7	**–SA2**
1.270-2.170	32.3-55.1	**–SA3**
1.700-2.600	43.2-66.0	**–SA4**

EXAMPLE: Select an elbow kit with a capacitive test point for use on a 1/0 concentric neutral class B stranded cable with a minimum insulation diameter of 1.095" and maximum diameter 1.155". Jacket seal included in the kit.

STEP 1: From Table 3, identify the cable range 0.995"–1.180" and select the "D" CABLE RANGE CODE.

STEP 2: The conductor size is a 1/0 and the type is class B stranded.

From Table 4, under the column "Class B Stranded or Compressed" identify 1/0 and select the "06" conductor code.

STEP 3: Capacitive test point required, add a "T" after the conductor code

STEP 4: Concentric neutral jacket seal required. The diameter of the cable over the outer jacket given by the cable manufacturer is 1.43". Add jacket seal code "GCF" from Table 5.

STEP 5: Not required – concentric neutral cable.

STEP 6: Not required – elbows will be bulk packed.

STEP 7: Order catalog number

LE235D06TGCF

Table 7. Replacement 2.88" Long Coppertop Connectors

Conductor size				
Concentric or Compressed		Compact or Solid		
AWG	mm^2	AWG	mm^2	Catalog Number
#6	16	#4	–	CC2C01T
#4	–	#3	25	CC2C02T
#3	25	#2	35	CC2C03T
#2	35	#1	–	CC2C04T
#1	–	1/0	50	CC2C05T
1/0	50	2/0	70	CC2C06T
2/0	70	3/0	–	CC2C07T
3/0	–	4/0	95	CC2C08T
4/0	96	250	120	CC2C09T
250*	120	300	–	CC2C10T

Note:
Coppertop compression connector may be used on both aluminum and copper cable conductors.
* Compressed Stranding Only

Table 8. Replacement parts

Description	Catalog number
Loadbreak probe installation tool	2606785A01
Probe Kit (includes Probe, Installation Tool, Silicone Lubricant, Installation Instruction Sheet)	PK235
Silicone Grease 0.175 oz tube (5 grams) 5.3 oz tube (150 grams)	 2603393A03 2605670A02M
Test point cap	2639992A01

Accessories

Figure 4. Cold shrinkable metallic shield adapter.

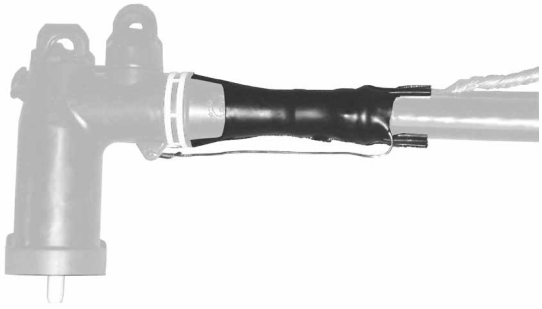


Figure 5. Concentric neutral jacket seal (see catalog section CA650067EN).

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