Technical Data **TD650026EN**

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# 600 A 35 kV class BT-TAP™ deadbreak connector

## General

Eaton's Cooper Power Systems 600 A 35 kV Class BT-TAP™ deadbreak connector is used to terminate high-voltage underground cable to transformers, switches, switchgear and other apparatus. It is designed for use with unthreaded connectors to easily retrofit existing 600 A BOL-T™ installations, or in new installations where a 200 A interface is required and where the system will not need to be frequently operated. If the system will be frequently operated to sectionalize, or to achieve a visible break or ground, Eaton's Cooper Power Systems recommends the use of the T-OP™ II Connector System. (See catalog section 600-52.) The BT-TAP deadbreak connector is fully shielded, submersible and meets the requirements of IEEE Std 386™-2006 standard – Separable Insulated Connector Systems.

The 200 A, single-phase rated loadbreak interface provides a means for obtaining a direct conductor test, visible ground and provides a convenient location for an Eaton's Cooper Power Systems M.O.V.E. arrester or grounding elbow.

Eaton's Cooper Power Systems offers an optional capacitive test point similar to test points on our 200 A elbow connectors. This allows use of Eaton's Cooper Power Systems Type "TPR" series fault indicators, and provides a hotstick operable means of determining circuit condition when used with high impedance voltage sensing devices designed for test points.

BT-TAP connectors are designed for use on solid dielectric cable (XLPE or EPR) with extruded semiconductive shields and concentric neutral, with or without a jacket.

Installation on jacketed concentric neutral cable may require additional sealing material. Cold shrinkable adapters are available for tape shield, linear corrugated, UniShield™ cable, and drain wire cables for use with deadbreak connectors.

**Cooper Power Systems**
by EATON

## 900 AMP rating

The BT-TAP connector is rated for 900 A continuous when used with a coppertop compression connector and copper bushing or junction.

## 200 kV BIL rating

The BT-TAP connector is available with an optional 200 kV BIL rating, allowing you to match the BIL rating of the system and the equipment to which it will be connected. If 200 kV BIL rating is required, specify "38" in digits 5 and 6 in the part number. See page 4.

## Interchangeability

All Eaton's Cooper Power Systems 600 A deadbreak connectors conform to the electrical, mechanical and dimensional requirements of IEEE Std 386™-2006 standard. The connectors can be used on any comparably rated bushing interface that also meets the requirements of this standard. In addition, all T-bodies, cable adapters, insulating plugs and compression connectors are designed to be interchangeable with those currently available from other major manufacturers that also certify their components to IEEE Std 386™-2006 standard.

## Installation

The T-body is assembled onto prepared cable with an unthreaded compression or shear bolt connector. The short end of a special copper alloy stud, provided with the kit, is torqued onto a de-energized 600 A bushing. Using a T-WRENCH, the loadbreak reducing tap plug is threaded onto the stud drawing the entire assembly tight to the apparatus bushing. The assembly is then torqued to the apparatus bushing using a torque wrench. Refer to *Service Information S600-55-1 600 A 35 kV Class BT-TAP Connector System Installation Instructions* for details.

## Production tests

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

- ac 60 Hz 1 Minute Withstand
  - 50 kV/70 kV
- Minimum Partial Discharge Extinction Voltage
  - 26 kV

Tests conducted in accordance with Eaton's Cooper Power Systems requirements:

- Physical Inspection
- Periodic Dissection
- Periodic X-ray Analysis

**Table 1. Voltage Ratings and Characteristics**

| Description | kV |
|---|---|
| Standard Voltage Class | 35 |
| Maximum Rating Phase-to-Phase (loadbreak reducing tap plug only) | 36.6 |
| Maximum Rating Phase-to-Ground | 21.1 |
| AC 60 Hz 1 Minute Withstand<br>150 kV BIL Class BT-TAP<br>200 kV BIL Class BT-TAP | <br>50<br>70 |
| DC 15 Minute Withstand | 103 |
| BIL and Full Wave Crest | 150/200 |
| Minimum Partial Discharge Extinction Voltage | 26 |

Voltage ratings and characteristics meet or exceed IEEE Std 386™-2006 standard.

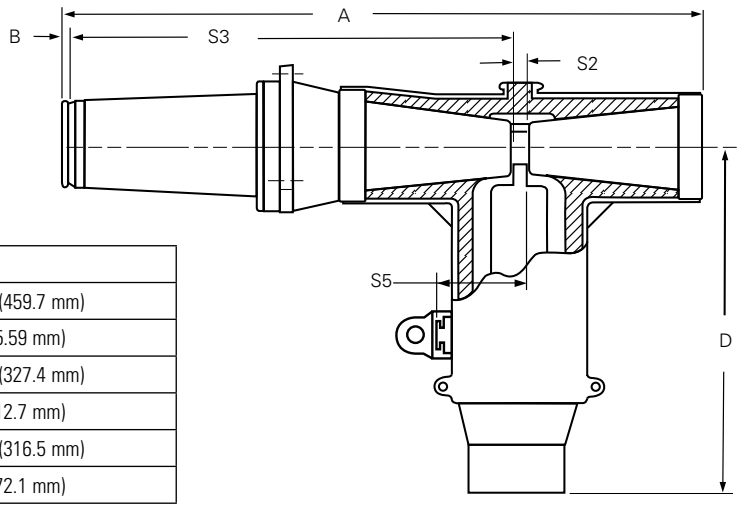
**Table 2. Current Ratings and Characteristics**

| Description | Amperes | |
|---|---|---|
| Continuous | 600 A rms (Aluminum) | 900 A rms (Copper) |
| 4 Hour Overload | 900 A rms (Aluminum) | 1,200 A rms (Copper) |
| Short Time | 25,000/40,000 A rms sym metrical for 0.17 s | |
| | 10,000 A rms symmetrical for 3.0 s | |
| **200 A Interface*** | | |
| Continuous | 200 A rms | |
| Switching** | 10 operations at 200 rms at 21.1 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 meet or exceed IEEE Std 386™-2006 standard.

* System design and protection must recognize the ratings of 200 A interface.

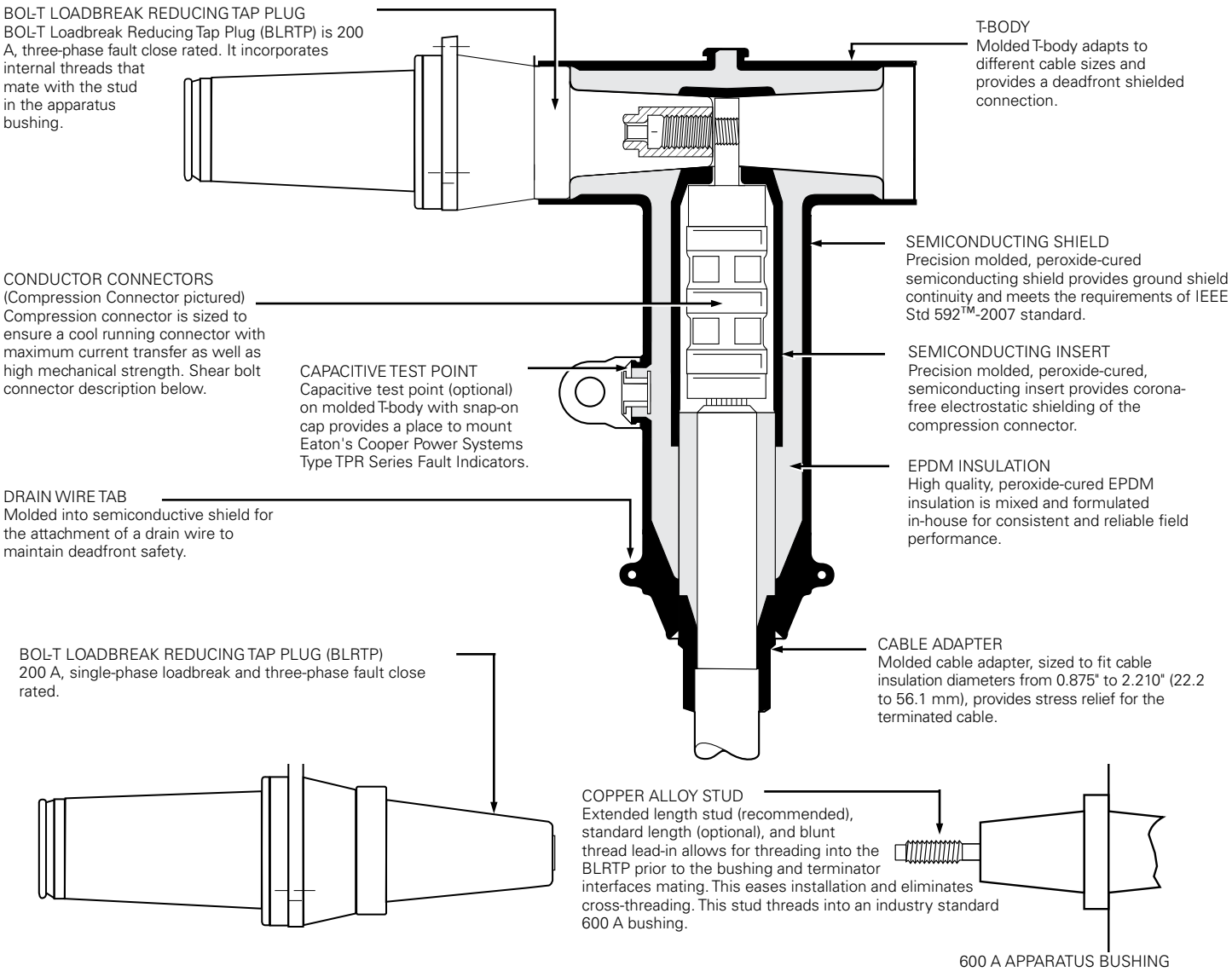
** Switching rating limited to single-phase 21.1 kV




| Dim. | 35 kV |
|---|---|
| A | 18.10" (459.7 mm) |
| B | 0.22" (5.59 mm) |
| D | 12.89" (327.4 mm) |
| S2 | 0.50" (12.7 mm) |
| S3 | 12.46" (316.5 mm) |
| S5 | 2.84" (72.1 mm) |

**Figure 1. BT-TAP profile and stacking dimensions from Figure 11A of IEEE Std 386™ -2006 standard.**

**Note:** Dimensions given are for reference only.




### Shear bolt connector

Bolted cable lug is fitted with stepless bolts, which shear off when optimum contact force has been reached. Provides electrical continuity for copper and aluminum conductors while eliminating need for dies and compression tools.

**Figure 2. Cutaway drawing illustrates design features.**

## BT-TAP connector kit – catalog numbering system

Build the 12 digit catalog number for a 35 kV BT-TAP Kit by following the steps given below. The first 4 digits are always "BTP6", only digits 5 through 12 need to be selected.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| B | T | P | 6 | | | | | | | | |

**Catalog number digits:**

1, 2 & 3 = "BTP," BT-TAP Connector System

4 = "6", 600 A System

**Step 1.** Select Digits 5 and 6 Bushing Interface

5 & 6 = "35", 35 kV Class Bushing Interface, 150 kV BIL

"38", 35 kV Class Bushing Interface, 200 kV BIL

**Step 2.** Select Digit 7 Cable Adapter Range Code

Determine the cable's diameter over the electrical insulation as shown in Figure 4 (including tolerances).

Then identify a cable range from Table 3 that covers the minimum and maximum insulation diameters.

Select the correct CABLE RANGE CODE from Table 3.

**Table 3. Cable Diameter Range**

**Cable Diameter Range**

| Inches | mm | Cable Range Code | Inches | mm | Cable Range Code |
|---|---|---|---|---|---|
| 0.875-0.985 | 22.2-25.0 | **D** | 1.355-1.520 | 34.4-38.6 | **M** |
| 0.930-1.040 | 23.6-26.4 | **E** | 1.485-1.595 | 37.7-40.5 | **N** |
| 0.980-1.115 | 24.9-28.3 | **F** | 1.530-1.640 | 38.9-41.7 | **P** |
| 1.040-1.175 | 26.4-29.8 | **G** | 1.575-1.685 | 40.0-42.8 | **Q** |
| 1.095-1.240 | 27.8-31.5 | **H** | 1.665-1.785 | 42.3-45.3 | **R** |
| 1.160-1.305 | 29.5-33.1 | **J** | 1.755-1.875 | 44.6-47.9 | **S** |
| 1.220-1.375 | 31.0-34.9 | **K** | 1.845-1.965 | 46.9-49.9 | **T** |
| 1.285-1.395 | 32.5-35.4 | **L** | 1.960-2.210 | 49.8-56.1 | **U** |

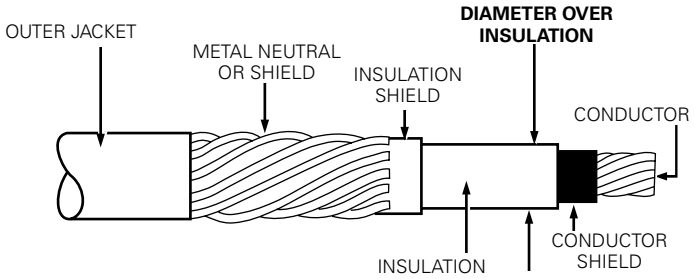



**Figure 3. Illustration showing typical construction of medium voltage underground cable.**

**Step 3.** Select Digits 8 and 9 Conductor Code

Identify the conductor size and type in Table 4 and select the Conductor Code from the appropriate (compression or shear bolt) column.

**Step 4.** Select Digit 10

Determine whether 600 A or 900 A rating is required. The shear bolt connector is only available as a 600 A aluminum connector.

"A" = 600 A rating (Aluminum Compression or Shear Bolt Connector)

"C" = 900 A rating (Coppertop Compression Connector)*

**Step 5.** Select Digit 11 (optional)

Determine if the T-body should have a test point.

T = Test Point on T-body

If no test point is required, do not include an 11th digit.

**Step 6.** Select Digit 12 (optional)

Determine whether a 35 kV, 200 A protective cap is required in the kit.

C = Protective Cap

If no cap is required, do not include a 12th digit.

* Apparatus bushing and stud must also be copper to achieve a 900 A rating.

**Table 4. Conductor Size and Type**

| Compression Connector | | | | | Shear Bolt Connector | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Concentric or Compressed | | Compact or Solid | | Compression Conductor Code | AWG or Kcmil | | | $mm^2$ Stranded & Compressed | | Shear Bolt Conductor Code | Catalog Number |
| AWG or kcmil | $mm^2$ | AWG or kcmil | $mm^2$ | | Concentric | Compressed | Compact | min | max | | |
| No Connector | | | | **0** | 3/0 | 3/0 | 3/0 | 95 | 150 | **S1** | CDT630SB150 |
| #2 | 35 | 1 | - | **11** | 4/0 | 4/0 | 4/0 | | | | |
| #1 | - | 1/0 | 50 | **12** | 250 | 250 | 250 | | | | |
| 1/0 | 50 | 2/0 | 70 | **13** | - | - | 350 | | | | |
| 2/0 | 70 | 3/0 | - | **14** | 350 | 350 | - | 185 | 300 | **S3** | CDT630SB300 |
| 3/0 | - | 4/0 | 95 | **15** | 500 | 500 | 500 | | | | |
| 4/0 | 95 | 250 | 120 | **16** | 600 | 600 | 600 | | | | |
| 250 | 120 | 300 | - | **17** | - | - | 700 | | | | |
| 300 | - | 350 | - | **18** | 700 | 700 | - | 400 | | **S4** | CDT630SB400 |
| 350 | - | 400 | 185 | **19** | 750 | 750 | 750 | | | | |
| 400 | 185 | 450 | - | **20** | - | 800 | 800 | | | | |
| 450 | - | 500 | 240 | **21** | - | - | 900 | | | | |
| 500 | 240 | 600 | 300 | **22** | 800 | - | - | 500 | 630 | **S6** | CDT1250SB630 |
| 600 | 300 | 700 | - | **23** | 900 | 900 | - | | | | |
| 650 | - | 750 | - | **24** | 1000 | 1000 | 1000 | | | | |
| 750 | - | 900 | - | **25** | 1100 | 1100 | - | | | | |
| 900 | - | 1000 | 500 | **26** | 1200 | 1200 | - | | | | |
| 1000 | 500 | - | - | **27** | 1250 | 1250 | - | | | | |
| 1250 | 630 | - | - | **28** | 1300 | 1300 | - | 800 | | **S8** | CDT1250SB800 |
| - | - | - | - | - | 1400 | 1400 | - | | | | |
| - | - | - | - | - | 1500 | 1500 | - | | | | |

## Optional features

### Protective cap

200 A insulated protective cap fits over loadbreak reducing tap plug for deadfront shielding.

### Capacitive test point

Capacitive test point on molded T-body, with snap-on cap, provides a place to mount Eaton's Cooper Power Systems Type TPR series fault indicators. To order replacement compression connectors and cable adapters for a BT-TAP connector system, see catalog section 600-66 "Deadbreak Accessories, Tools and Replacement Parts."

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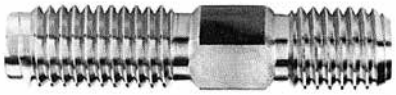

**Figure 4. Catalog Number STUDAL or STUDCL**

The stud with its extended length allows for threading into the connector prior to mating the bushing and terminator interfaces. Blunt start threads on the stud help eliminate cross-threading. Stud threads into an industry standard 600 A bushing.

**Figure 5. Catalog Number TQHD635**

The torque tool is required to check the torque of a 35 kV Class T-OP II and BT-TAP deadbreak connector or bushing adapter when it is installed on a 600 A bushing interface. It is precision calibrated and hotstick operable.

**Table 5. Replacement Parts and Tools**

| | Catalog Number | |
|---|---|---|
| **Description** | **150 kV BIL** | **200 kV BIL** |
| T-body without Test Point | DT635 | DT638 |
| T-body with Test Point | DT635T | DT638T |
| BOL-T Loadbreak Reducing Tap Plug (BLRTP) (includes stud) | BLRTP635 | BLRTP638 |
| 5/16" Hex Shaft with 3/8" Socket Drive Tool | HD635 | HD635 |
| 200 A, 35 kV Class Insulated Protective Cap | LPC235 | LPC238 |
| Extended Length Aluminum Stud | STUDAL | STUDAL |
| Extended Length Copper Alloy Stud | STUDCL | STUDCL |

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