

## 600 A T-OP II™ terminator operation instructions



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## Safety for life



Eaton's Cooper Power series products meet or exceed all applicable industry standards relating to product safety. We actively promote safe practices in the use and maintenance of our products through our service literature, instructional training programs, and the continuous efforts of all Eaton employees involved in product design, manufacture, marketing, and service.

We strongly urge that you always follow all locally approved safety procedures and safety instructions when working around high voltage lines and equipment, and support our "Safety For Life" mission.

## Safety information

The instructions in this manual are not intended as a substitute for proper training or adequate experience in the safe operation of the equipment described. Only competent technicians who are familiar with this equipment should install, operate, and service it.

A competent technician has these qualifications:

- Is thoroughly familiar with these instructions.
- Is trained in industry-accepted high and low-voltage safe operating practices and procedures.
- Is trained and authorized to energize, de-energize, clear, and ground power distribution equipment.
- Is trained in the care and use of protective equipment such as flash clothing, safety glasses, face shield, hard hat, rubber gloves, hotstick, etc.

Following is important safety information. For safe installation and operation of this equipment, be sure to read and understand all cautions and warnings.

### Hazard Statement Definitions

This manual may contain four types of hazard statements:

#### DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

#### WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

#### CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

#### CAUTION

Indicates a hazardous situation which, if not avoided, could result in equipment damage only.

### Safety instructions

Following are general caution and warning statements that apply to this equipment. Additional statements, related to specific tasks and procedures, are located throughout the manual.

#### DANGER

**Hazardous voltage. Contact with hazardous voltage will cause death or severe personal injury. Follow all locally approved safety procedures when working around high- and low-voltage lines and equipment.**

G103.3

#### WARNING

**Before installing, operating, maintaining, or testing this equipment, carefully read and understand the contents of this manual. Improper operation, handling, or maintenance can result in death, severe personal injury, and equipment damage.**

G101.0

#### WARNING

**This equipment is not intended to protect human life. Follow all locally approved procedures and safety practices when installing or operating this equipment. Failure to comply can result in death, severe personal injury, and equipment damage.**

G102.1

#### WARNING

**Power distribution and transmission equipment must be properly selected for the intended application. It must be installed and serviced by competent personnel who have been trained and understand proper safety procedures. These instructions are written for such personnel and are not a substitute for adequate training and experience in safety procedures. Failure to properly select, install, or maintain power distribution and transmission equipment can result in death, severe personal injury, and equipment damage.**

G122.3

**CAUTION**

Eaton's Cooper Power series 600 A T-OP II™ terminator is designed to be operated in accordance with normal safe operating procedures. These instructions are not intended to supersede or replace existing safety and operating procedures. Terminators must be de-energized during operation or maintenance. Visible break and adequate grounding must be provided before cable work proceeds.

T-OP II terminators should be installed and serviced only by personnel familiar with good safety practice and the handling of high-voltage electrical equipment.

- 1 Hotstick
- Personal Protective Equipment
- Insulating Rubber Blanket
- Silicone Grease



Figure 1. 600 A T-OP II Terminator

**General**

**Equipment required**

- 1 Voltage Tester
- 3 Grounding Elbows
- 3 T-OP II insulated Standoff Bushings
- 3 T-OP II insulated Protective Caps

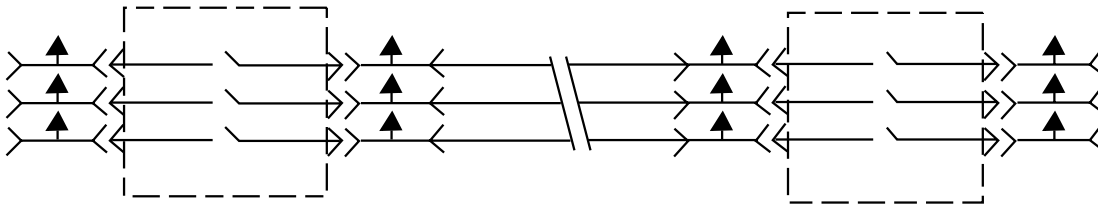


Figure 2. One-line diagram of a three-phase cable connected to a three-phase switch on either end

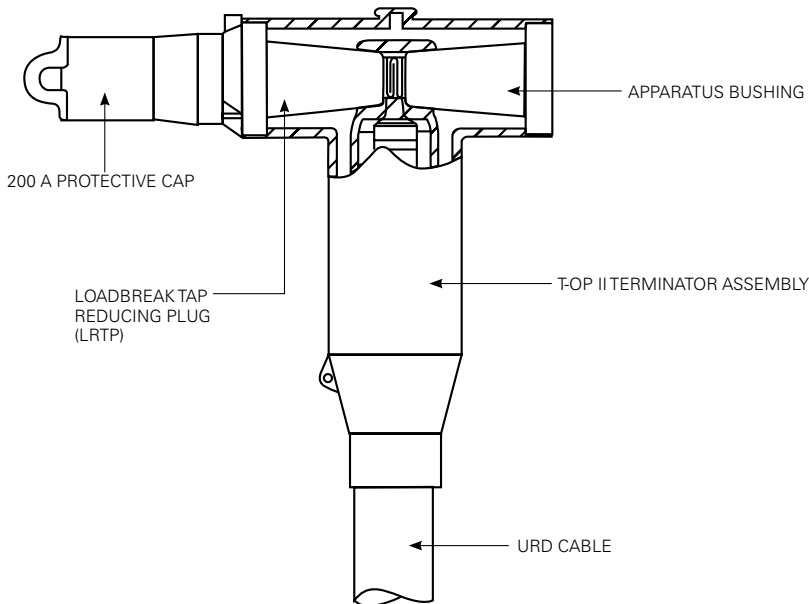


Figure 3. Line illustration of the T-OP II

## Operation

### Isolating and grounding a cable requiring repair

#### Step 1

##### **De-energize cables**

- Open switches at both ends of cable to be isolated. (Refer to Figure 4.)
- Determine that there is adequate working room around the terminators for parking the insulated standoff bushings and training cables.
- Determine that there is adequate working room for handling hotstick around apparatus cabinet.
- Place insulating rubber blanket on the ground directly in front of terminators.
- Inspect and test all operating equipment for serviceability.
- Connect grounding elbow of appropriate voltage class, to system ground.
- Connect ground leads of protective caps to system ground.

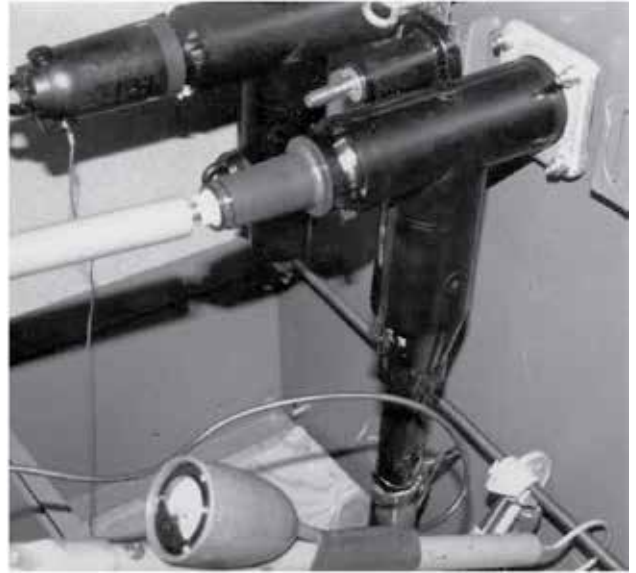


**Figure 4. De-energized cables**

#### Step 2

##### **Determine that cables are de-energized**

- Remove 200 A protective cap or arrester from T-OP II terminators using hotstick and set aside in a clean, protected area.
- Insert test probe of phasing stick on volt meter into 200 A interface. (Refer to Figure 5.)
- Determine that all cables are de-energized.



**Figure 5. Test for voltage with phasing sticks**

### **⚠ WARNING**

**Do not proceed until cables are de-energized.**

#### Step 3

##### **Provide a visible break**

- Clean and lubricate T-OP II insulated standoff bushing.
- Mount T-OP II insulated standoff bushing in the apparatus parking pocket using a hotstick. Tighten eyebolt to ensure secure mounting. Ensure that the copper stud is properly installed in the bushing before moving cable. (Refer to Figure 6.)



**Figure 6. Mount T-OP II standoff bushing**

- Clean and lubricate, mating interface of the O&T/Torque tool with an approved lubricant.
- Grasp eye of the O&T/Torque tool with a hotstick, pull eye fully into the stick.

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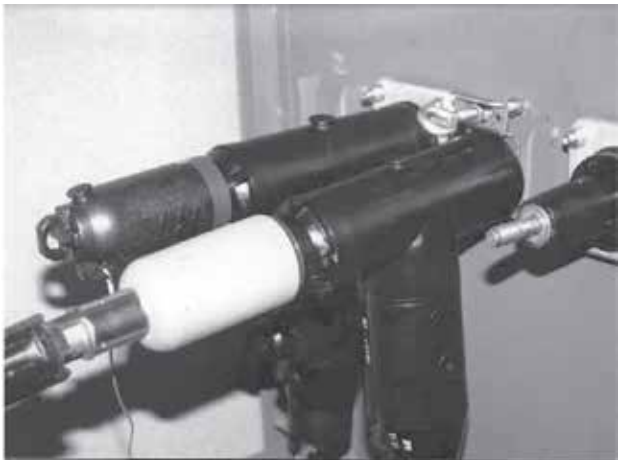
- Using the hotstick, insert the O&T/Torque tool into the throat of the 200 A bushing portion at the L RTP. Engage the rotating nut. (Refer to Figure 7.)
- Turn the O&T/Torque tool counterclockwise until both the threaded connection and the interference fit of the T-OP II is broken.



**Figure 7. Installing the O&T/Torque tool into one L RTP**

**Note:** The initial disconnect of the T-OP II may be difficult until the installation torque is overcome.

- Using the hotstick, lift the T-OP II termination off the apparatus bushing and place it on the insulated standoff bushing. (Refer to Figure 8.)
- While pushing the T-body onto the standoff bushing, turn the O&T/Torque tool clockwise to make the threaded connection, turn until tight.
- Remove O&T/Torque tool.

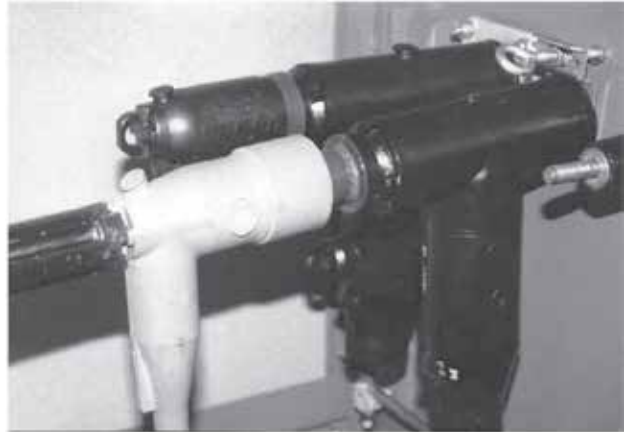


**Figure 8. Move T-OP II Terminator to insulated bushing**

### Step 4

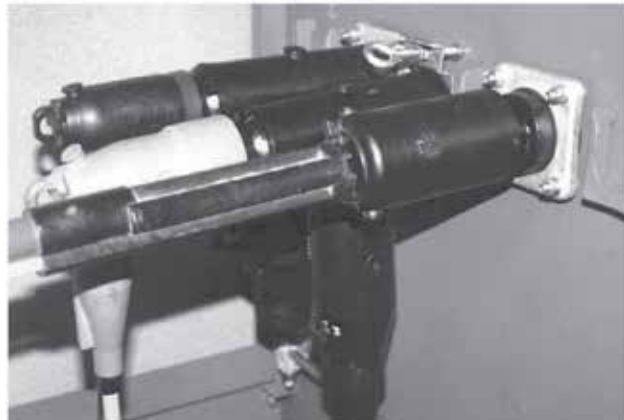
#### ***Provide a visible ground***

- After securing cable end of grounding elbow to the system ground, firmly grasp the pulling eye of the elbow with the hotstick.
- Close the grounding elbow into the 200 A bushing of the L RTP. (Refer to Figure 9.)
- Attach drain wire of 600 A T-OP II protective cap to system ground.
- Clean and lubricate mating interface of cap.



**Figure 9. Install the grounding elbow into the 200 A bushing**

- Grasp pulling eye of cap with hotstick and pull fully into the stick.
- Using the shotgun, install protective cap on to the exposed apparatus bushing by threading the cap on to the bushing stud.
- Turn until tight and remove hotstick.
- Repeat this procedure on both ends, for each cable to be grounded. (Refer to Figure 10.)



**Figure 10. Install protective cap on exposed apparatus bushing**



**Figure 11. Open switch if it is closed**

**Reconnecting cable to apparatus bushings**

**Step 1**

***Determine that bushings are de-energized***

- Check apparatus switch and see that it is open. Open switch if it is closed. (Refer to Figure 11.)
- Grasp 600 A protective cap with shotgun. Rotate counterclockwise, until threads are disengaged.
- Remove protective cap from the bushing and set aside in a clean, protected area.
- Using, a volt meter, test apparatus bushing to determine that the bushing is de-energized. (Refer to Figure 12.)

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**⚠ WARNING**

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**Do not proceed until apparatus is de-energized.**

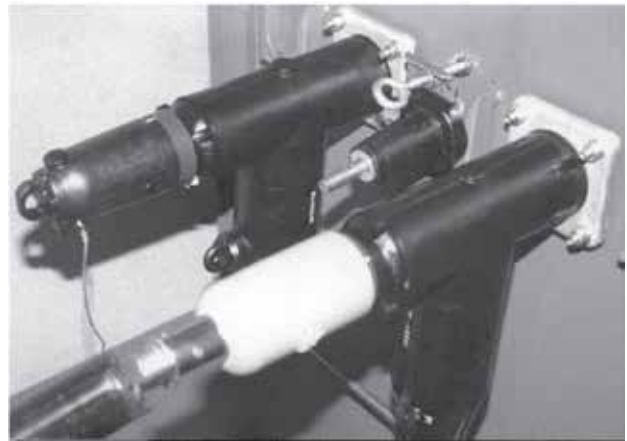


**Figure 12. Test for voltage with volt meter**

**Step 2**

***Connect cable to apparatus bushing***

- Grasp pulling eye of the grounding elbow with shotgun, pull firmly to remove elbow from the LRTP of the T-body.
- Set elbow aside in a clean area.
- Grasp O&T/Torque tool with the shotgun and pull fully into hotstick.
- Using the shotgun, insert the O&T/Torque tool into the throat at the LRTP and engage the rotating nut. Rotate tool counterclockwise until both the threaded connection and the rubber interference fit is broken.
- Lift the T-OP II termination from the insulated standoff bushing to the apparatus bushing.
- While pushing the T-body on to the apparatus bushing, turn the O&T/Torque tool clockwise to make the threaded connection. Turn until torque head rachets (20-25 ft-lbs.). An audible click will be heard. (Refer to Figure 13.)



**Figure 13. Install T-OP II termination onto apparatus bushing**

- Remove O&T/Torque tool.
- Using the hotstick, replace 200 A protective cap or elbow arrester on the 200 A interface of the LRTP. (Refer to Figure 14.)





**Figure 14. Reinstall 200 a protective cap**

- Repeat this procedure for all cables on both ends, that were previously grounded.
- Remove all tools, grounds, and personal protective equipment from work area before re-energizing equipment.

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Printed in USA  
Publication No. MN650047EN  
May 2017

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