

QD5 Quik-Drive tap-changer main movable contact replacement kit 5740785B33 installation instructions



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Safety for life



Eaton meets or exceeds all applicable industry standards relating to product safety in its Cooper Power™ series products. 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 arc flash clothing, safety glasses, face shield, hard hat, rubber gloves, clampstick, 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 an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

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

CAUTION

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

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may 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

Product information

Introduction

Eaton's Cooper Power™ series QD5 Quik-Drive tap-changer main movable contact replacement kit and installation instructions gives customers the ability and guidance to replace the QD5 main movable contact during maintenance cycles when contact erosion has occurred to the point of needing replacement.

Refer to *Service Information MN225003EN CL-7 Series Control Installation, Operation, and Maintenance Instructions* for information on the CL-6 voltage regulator control. Refer to *Service Information MN225016EN CL-6 Series Control Installation, Operation, and Maintenance Instructions* for information on the CL-6 voltage regulator control. Refer to *Service Information MN225008EN VR-32 Voltage Regulator with Quik-Drive Tap-Changer Installation, Operation, and Maintenance Instructions* for information on Eaton's voltage regulator with Quik-Drive tap-changer.

Read this manual first

Read and understand the contents of this manual and follow all locally approved procedures and safety practices before installing or operating this equipment.

Additional information

These instructions cannot cover all details or variations in the equipment, procedures, or process described nor provide directions for meeting every possible contingency during installation, operation, or maintenance. For additional information, contact your representative.

Acceptance and initial inspection

Each kit is in good condition when accepted by the carrier for shipment. Upon receipt, inspect the shipping container for signs of damage. Unpack the kit and inspect it thoroughly for damage incurred during shipment. If damaged is discovered, file a claim with the carrier immediately.

Handling and storage

Be careful during handling and storage of the kit to minimize the possibility of damage. If the kit is to be stored for any length of time prior to installation, provide a clean, dry storage area.

Standards

ISO 9001 Certified Quality Management System

Parts supplied

Item	Part Number	Description	Qty
1	5740785B33	Main Movable Contact Replacement Kit	1

Tools required

- Ratchet Wrench
- 3/4 inch Socket
- 3/8 inch Socket
- 7/16 inch Deep-well Socket
- 9/16 inch Deep-well Socket
- 5/8 inch open end Wrench
- Torque Wrench 0-300 in-lbs
- Small-bladed Screwdrivers (2)
- Bladed Screwdriver
- 5/32 inch hex Wrench
- Lineman's Pliers
- Loctite® 243™ Threadlocker



Figure 1. Main movable contact replacement kit.

Installation procedure

1. The tap-changer should be secured to a bench before starting the replacement procedure if the tap-changer has been removed from the unit.
2. The tap-changer should be in the neutral position before starting the replacement procedure. Refer to Figure 2. If the tap-changer is not in the neutral position, turn the shaft on the back of the motor shaft using a 3/8" socket on a ratchet until the QD5 tap-changer is in the neutral position.

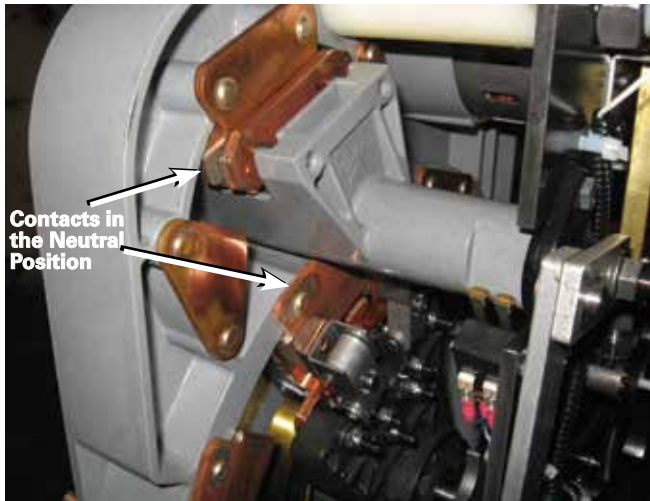


Figure 2. Neutral position.

3. Remove the number 1 stationary contact from the molded panel using a 9/16" deep well socket wrench. Refer to Figure 3.

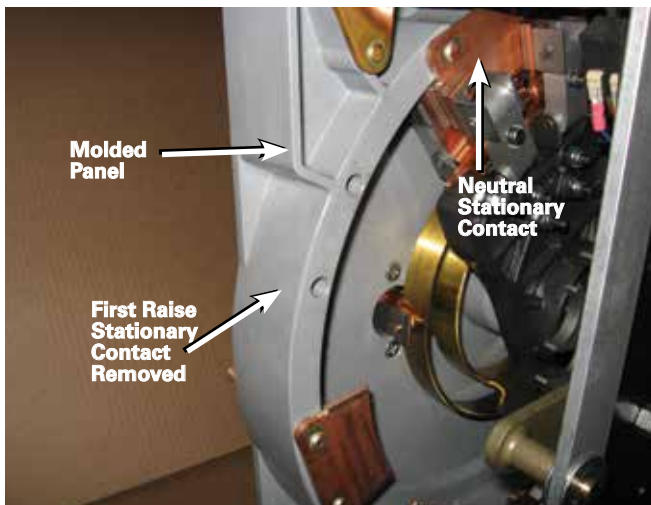


Figure 3. Stationary contact.

4. Using a 3/8" socket on a ratchet, rotate the shaft on the back of the motor to move the movable contacts into the space opened up when the number 1 stationary contact was removed.



Figure 4. Main movable contacts in number 1 stationary position.

5. Remove the two bolts that mount the actuator finger with a 7/16" socket wrench. Remove the actuator finger. Refer to Figure 5.

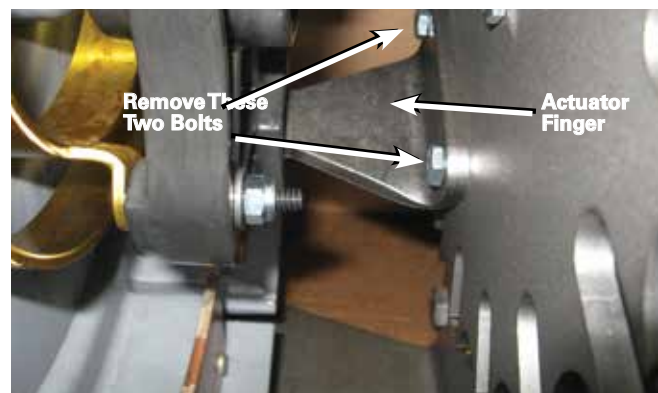


Figure 5. Actuator finger.

- Remove the nut on the end of the main shaft using a 3/4" socket wrench. Use a 5/8" open end wrench positioned on the flats of the main shaft to hold the shaft in place during this procedure. Refer to Figures 6 and 7.

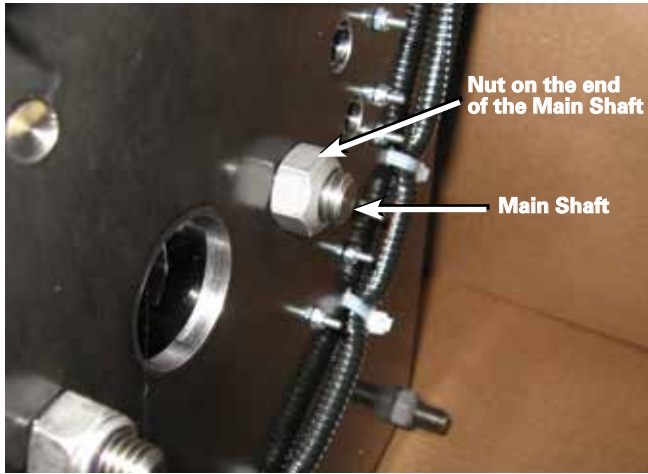


Figure 6. Fastening nut for main shaft.

- Push the main shaft from the threaded end partially through the steel front plate of the tap-changer so that the retaining ring on the main shaft is centered between the movable contact panel and the washer/Geneva gear hub. Refer to Figure 8.

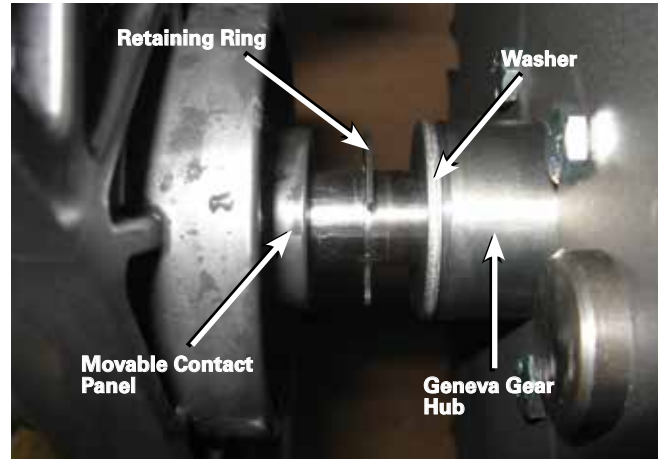


Figure 8. Shaft positioning.

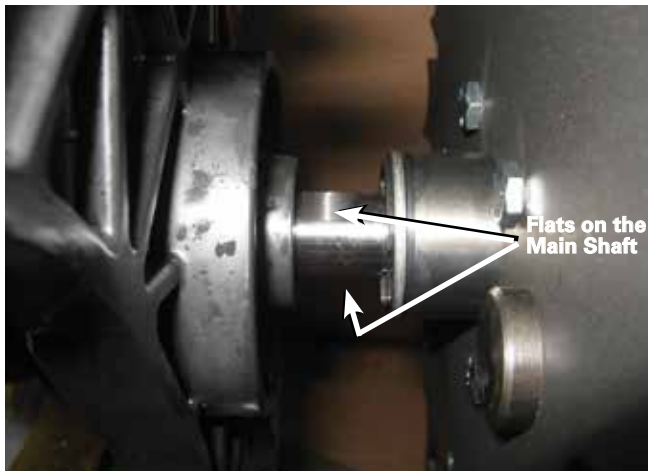


Figure 7. Main shaft.

- Use a pair of lineman's pliers to remove the retaining ring. Slide the washer up against the movable contact panel. Refer to Figure 9.

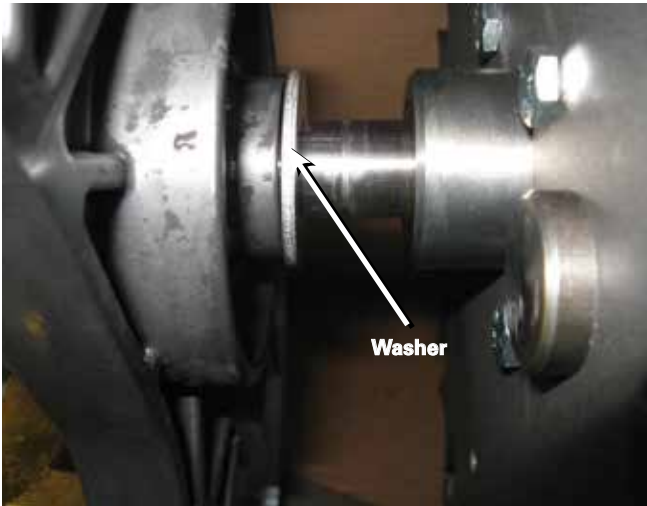


Figure 9. Washer.

- Push the threaded end of the main shaft through the steel panel toward the molded panel. Support the Geneva gear with one hand and pull the main shaft out from the back of the molded panel until the main shaft is out of the Geneva gear hub. Make sure the washer remains on the shaft and does not fall into the tank. Remove the Geneva gear and slide the washer off the shaft. Refer to Figure 10.

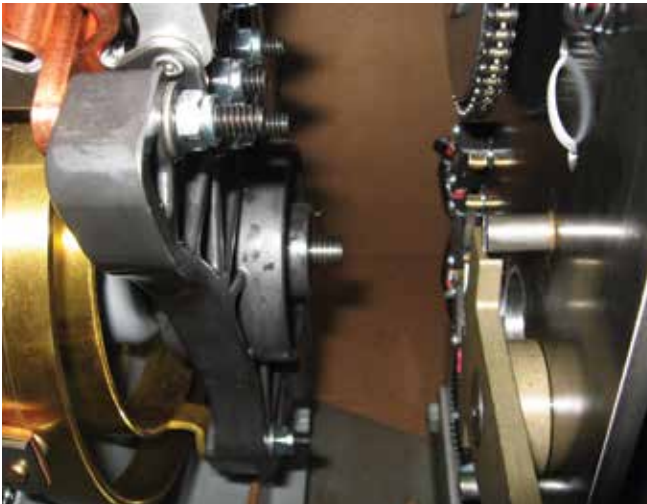


Figure 10. Removal of shaft.

- Pull the main shaft completely out of the back of the molded panel. Pull the contact rings out of the button contacts and remove the movable contact panel assembly. Refer to Figure 11.

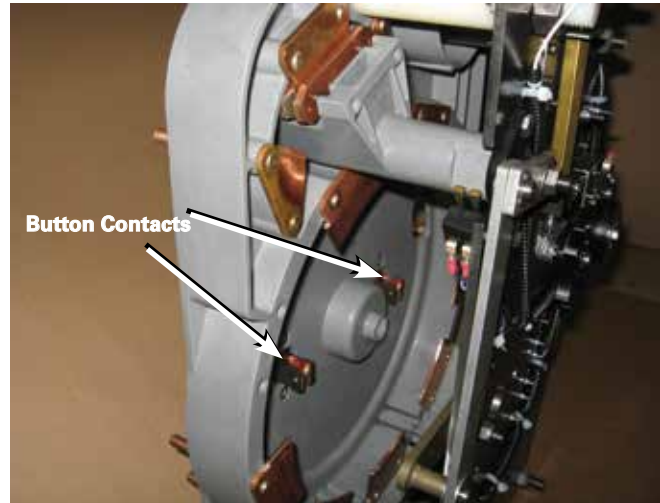


Figure 11. Removal of main contacts.

- Remove the three button head screws, nuts and washers that secure each contact to the movable contact panel using a 5/32" hex wrench and a 7/16" deep well socket wrench. Refer to Figures 12 and 13.

Note: The center button head screw on each movable contact assembly has a flat washer and a Belleville washer under the nut.

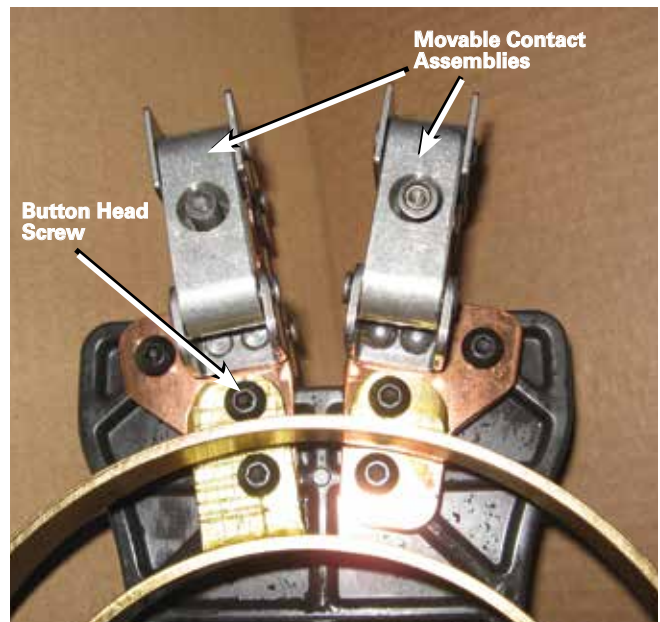


Figure 12. Movable contact removal from insulating arm and rings.

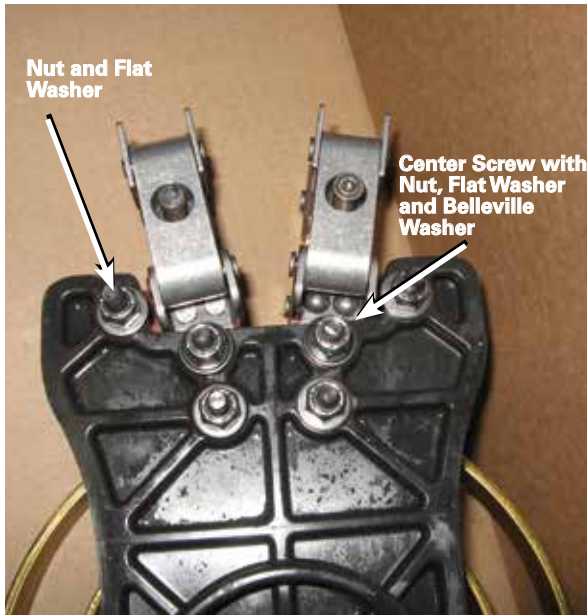


Figure 13. Removal of contacts.

12. The two replacement movable contact assemblies are identical; therefore, they can be installed in either position on the movable contact panel. Position one of the replacement movable contact assemblies between the contact ring and the movable contact panel and align the holes. Insert the three button head screws from the contact ring side of the assembly so the screw heads secure the contact ring in place. On the side opposite the contact ring, place a flat washer on all three screws. Place a Belleville washer on the center screw and thread a Nylok® nut onto all three screws. Tighten the Nylok® nuts to 65 to 75 in-lbs (7.3–8.5 Nm) using a 7/16" deep well socket wrench while holding the screw in place with a 5/32" hex wrench. Refer to Figures 13 and 14. Repeat this procedure for the other movable contact assembly.

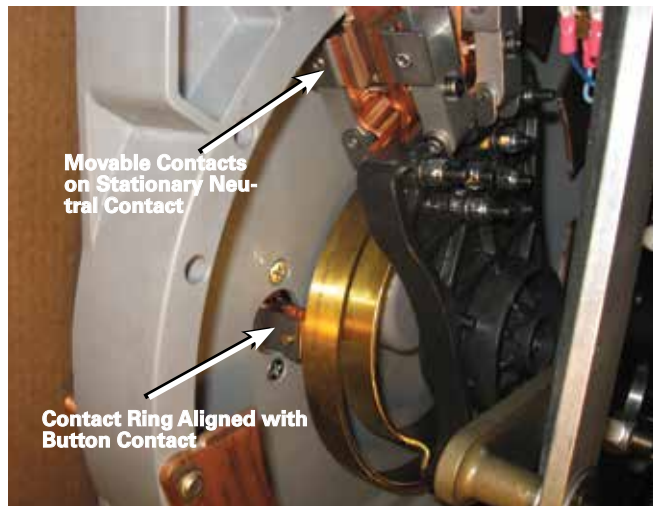


Figure 14. Installation of movable contacts and of rings.

13. Position and center the movable contact panel assembly in the molded panel cavity with the contact rings facing the molded panel. Locate the movable contacts in the area of the removed stationary contact. Rotate the movable contact panel and slide the movable contacts onto the neutral stationary contact. Align the contact rings with the button contacts. Refer to Figure 16.
14. For the outer contact ring, spread the button contacts using a bladed screwdriver and insert the contact ring between the contact buttons. See Figure 15.



Figure 15. Inserting the outer contact ring between the button contacts.

15. For the inner contact ring, from the back of the molded panel, insert a small blade screwdriver between the button contact spring and the button contact shunt on each side of the contact. Refer to Figure 16.

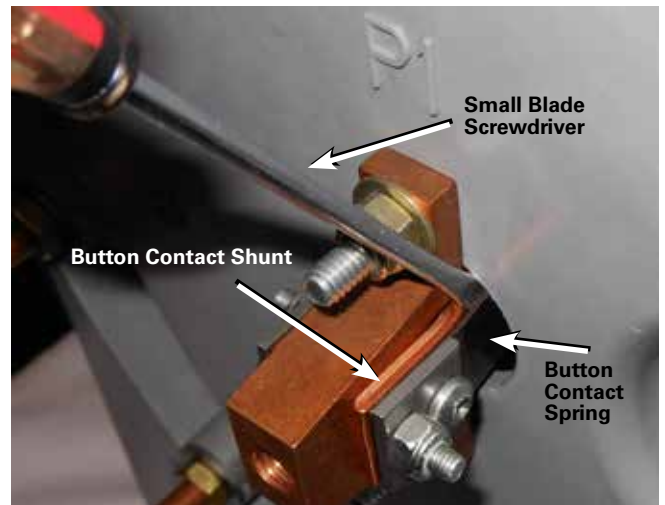


Figure 16. Installing rings into P1 and P2.

16. Squeeze the handles of the small screwdrivers together to spread apart the button contacts. Push the aligned ring contact in between the button contact so the buttons are fully engaged with the contact ring. Refer to Figures 17 and 18.



Figure 17. Installing ring into P1 contact.

17. Insert the threaded end of the main shaft through the back of the molded panel, then through the movable contact panel until the threads of the shaft are just protruding out of the movable contact panel. Slide the washer onto the main shaft and position it against the movable contact panel. Refer to Figure 19.



Figure 19. Installing main shaft.

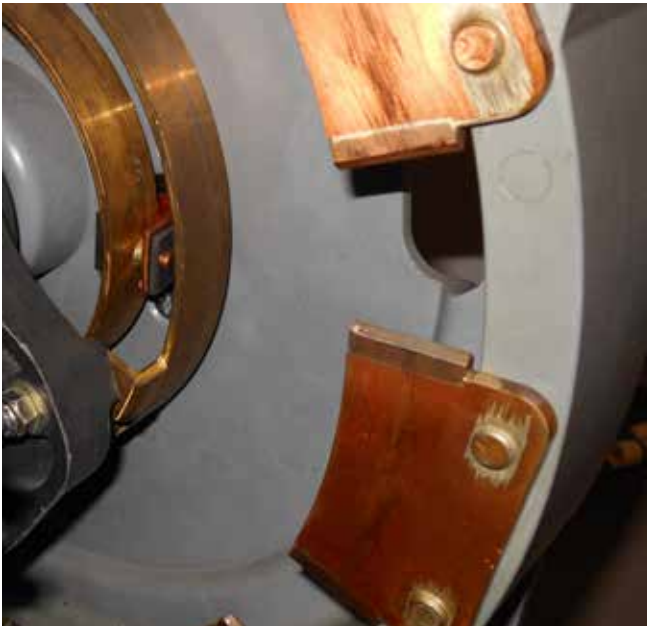


Figure 18. Ring and P1 contacts.

18. Line up the main shaft with the hole in the Geneva gear. Push the shaft through Geneva gear until the threaded end of the shaft reaches the steel front plate. Lift on Geneva gear to assist in lining up the shaft with the hole in the front plate. Insert the shaft tip just slightly into the hole. The Geneva gear should be rotating freely on the shaft. See Figures 20 and 20.



Figure 20. Geneva gear rotating freely on main shaft.

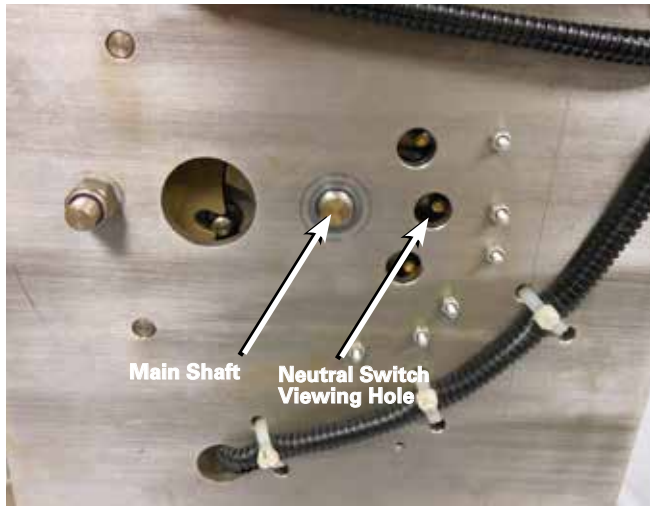


Figure 21. Aligning Geneva gear.

19. Rotate the Geneva gear so the pin on the back of the Geneva gear lines up with the slot in the reversing actuator.
20. Gently push the Geneva gear toward the steel plate. If there is resistance and the Geneva gear cannot be pushed all the way forward into place, the neutral switch actuator is hitting the neutral switch arm.

Note: Do not force it into place or damage to the neutral switch will result. Instead, insert small screwdriver through the small hole in the steel plate and depress the neutral switch while fully seating the Geneva gear. See Figure 21.

21. Push the washer against the Geneva gear and use a lineman's pliers to install the e-clip into the e-clip groove on the main shaft. See Figure 22.



Figure 22. Locating of e-clip.

22. Push the shaft the remainder of the way through the hole in the steel plate. Secure the steel shaft to the steel panel using the 1/2" -13 lock nut. Use a 5/8" open end wrench to hold the steel shaft while securing the nut on the threaded end of the shaft with a 3/4" socket wrench. Tighten the nut to a torque of 180 to 400 in-lbs (20.3–45.2 Nm). Refer to Figure 150.



Figure 21. Main shaft with nut installed.

23. Rotate the movable contact insulator arm so the only one of the movable contacts is engaging the neutral stationary contact as shown in Figure 24. This should line the arm up with the Geneva gear so that the actuator finger pocket in the arm is across from the bolt holes used to attach the finger to the Geneva gear.

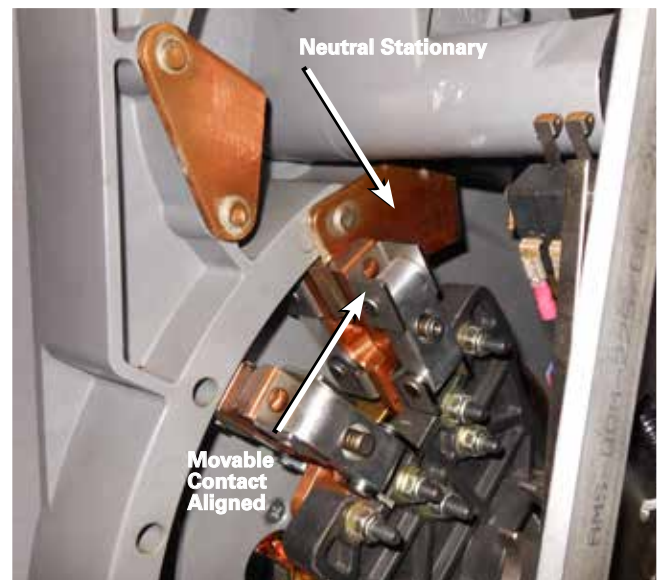


Figure 24. Main movable contact aligned with neutral stationary for installation of the actuator finger.

24. If none is present, apply Loctite® 243 Threadlocker to the two actuator finger bolts and then install the actuator finger. It may be necessary to reposition the movable contact insulator arm if the holes do not quite line up. See Figure 25.



Figure 25. Installing the actuator finger.

25. Place the tap-changer into the neutral position. See the next section for instruction on how to confirm that the tap-changer is in the neutral position.
26. Reinstall the number 1 stationary contact and tighten the nuts to a torque of 80–90 in-lbs (9.0–10.2 Nm).

Placing tap-changer into neutral

1. Place a 3/8" socket and ratchet on the output shaft of the motor; rotate the motor so that the contacts and other components are aligned in the neutral position
2. Confirm that the regulator is in the neutral position.
 - A. Main movable contacts are located on the neutral stationary contact, which is located at the 11 o'clock position and under the reversing switch movable contact assembly. See Figure 26.

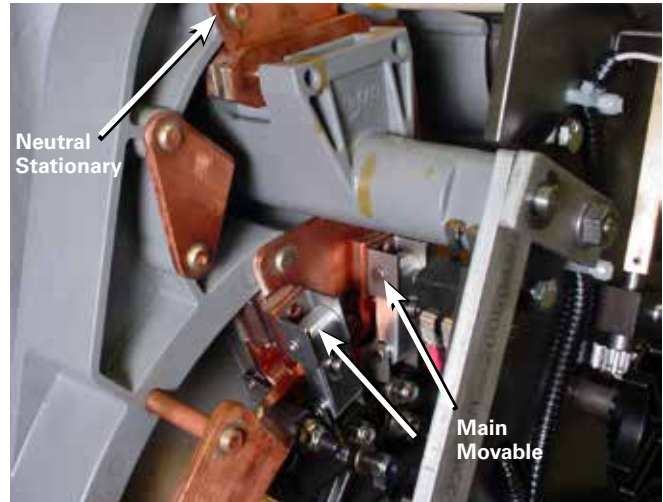


Figure 26. Neutral stationary contact.

- B. The reversing movable contact is located on the reversing neutral stationary contact. See Figure 27.

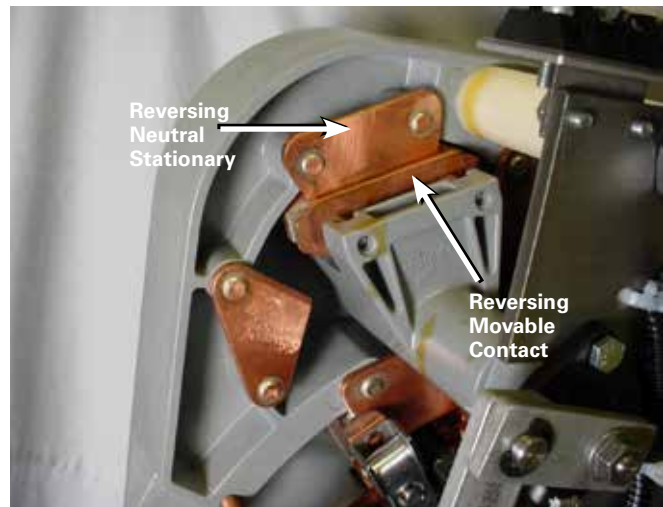


Figure 27. Neutral position for reversing movable.

- C. The pinion cam is pointing to the right over the holding switch actuator. See Figure 28.

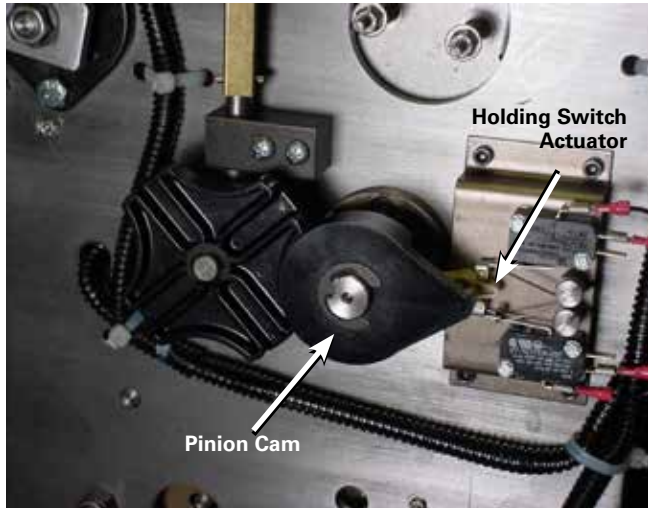


Figure 28. Neutral position for position indicator pinion cam and holding switch.

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Eaton
1000 Eaton Boulevard
Cleveland, OH 44122
United States
Eaton.com

**Eaton's Cooper Power Systems
Division**
2300 Badger Drive
Waukesha, WI 53188
United States
Eaton.com/cooperpowerseries

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