QD5 Quik-Drive tap-changer motor replacement procedure kit 57A63675100A installation instructions

Powering Business Worldwide

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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 motor replacement kit and installation instructions gives customers the ability and guidance to replace the QD5 tap-changer motor during situations when the motor needs to be replaced.

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 Eaton representative.

Acceptance and initial inspection

Each tap-changer motor replacement 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 tap-changer motor replacement 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	2242190B01	QD8/QD5 Motor	1
2	TAA114651003	Ring terminal	3
3	0800011079Z	Wire ties	3
4	2240787B34	Motor sprocket (12-tooth)	1
5	2291647A34	Woodruff key	1
6	0800073173Z	Retaining ring	2
7	0800073190Z	Machine screw, 8-32x0.5	4
8	2240787B44	Motor sprocket (11-tooth)	1

Tools required

- Ratchet Wrench
- 9/16 inch Socket
- 3/4 inch Socket
- 7/16 inch Combination Wrench
- 1/4 inch Socket
- 3/8 inch Socket
- Phillips Head Screwdriver #2
- Standard Blade Screwdriver
- Diagonal Cutters
- Loctite® 243™ Threadlocker
- External Snap Ring Pliers
- 0-200 in-lbs (0-25 Nm) Torque Wrench
- Crimping Tool
- Pliers

Figure 1. Tap-changer motor replacement kit.

Installation procedure

1. The QD5 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 back of the motor shaft using a 3/8" socket on a ratchet until the tap-changer is in the neutral position.

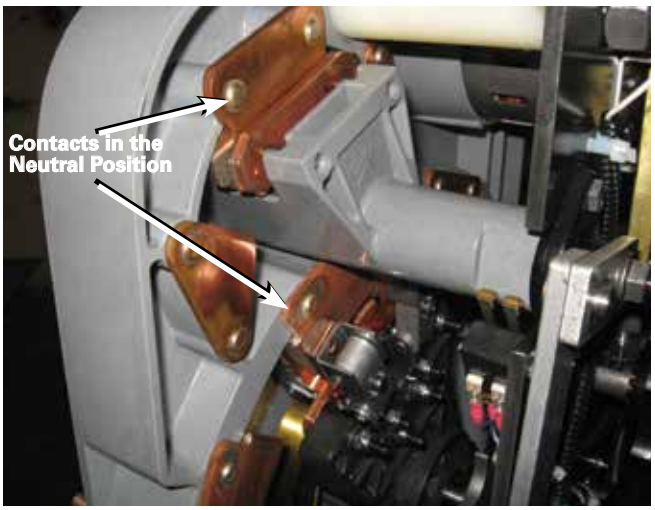

Figure 2. Neutral position.

3. Use diagonal cutters to cut the four wire ties from the motor wires. Refer to Figure 3.

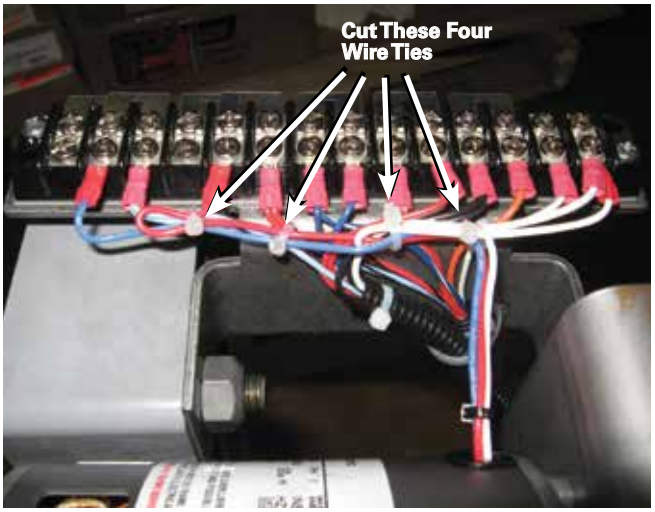

Figure 3. Removal of wire ties.

4. Use a Phillips screwdriver to disconnect the white motor wire located on terminal "G", the red motor wire located on terminal #5 and the blue motor wire located on terminal #2. Refer to Figure 4.

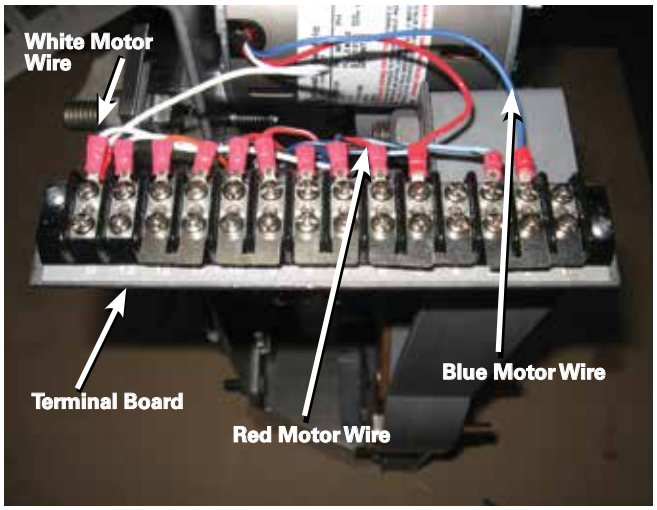

Figure 4. Disconnection of wires.

5. Loosen the jam nut on the chain tension screw with a 7/16" wrench. Loosen the chain tension screw with a screwdriver until the rubber bumper is against the motor mounting bracket. Refer to Figure 5.

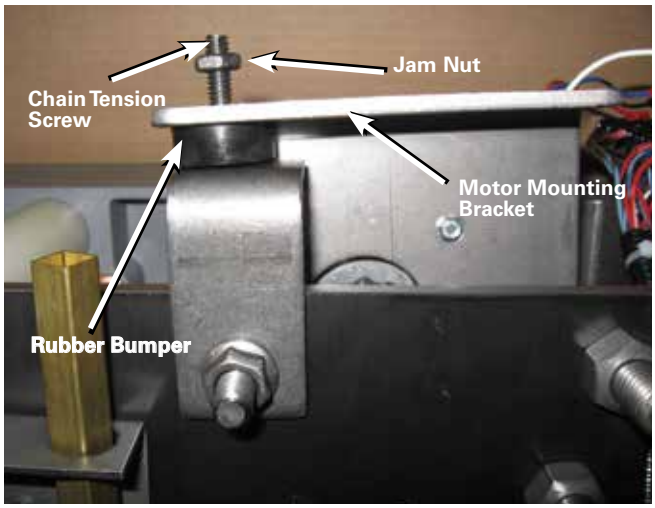

Figure 5. Loosening the chain tension.

6. If the tap-changer has a motor pivot stud design with a lock nut as shown in Figure 6, remove the motor pivot stud lock nut with a 9/16" socket on a ratchet. Pull the motor off of the motor pivot stud; make sure the Belleville washer stays on the motor pivot stud and does not fall into the tank. Set the motor in the motor relief area of the molded back panel. Refer to Figure 10.

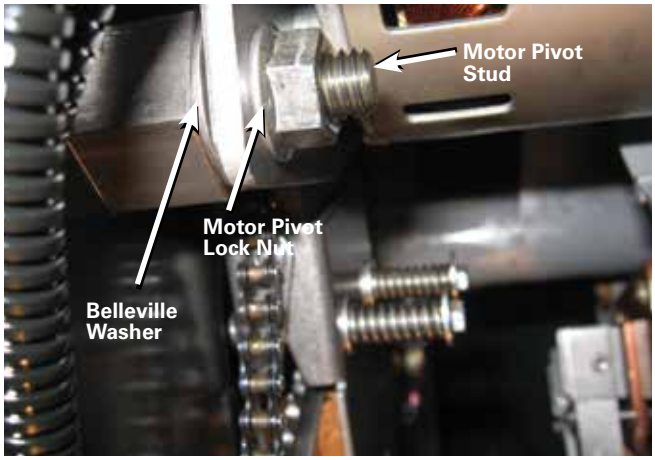

Figure 6. Motor pivot stud design.

7. If the tap-changer has a motor pivot bolt design as shown in Figure 7, remove the motor pivot bolt with a 3/4" socket on a ratchet; make sure the fiber washer does not fall off the motor pivot bolt and into the tank. Set the motor in the motor relief area of the molded back panel. Refer to Figure 8.

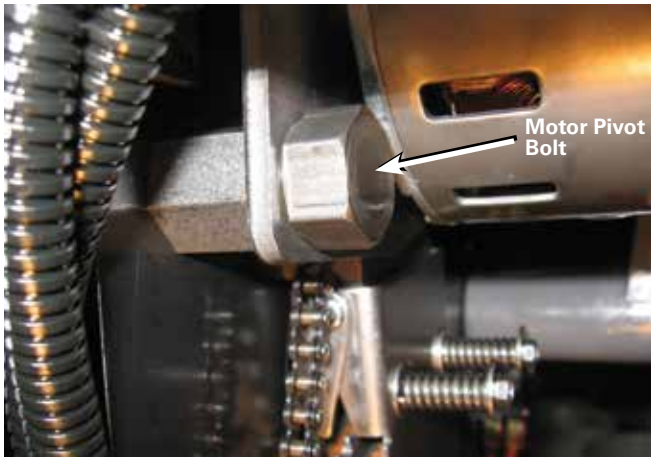

Figure 7. Motor pivot bolt design.

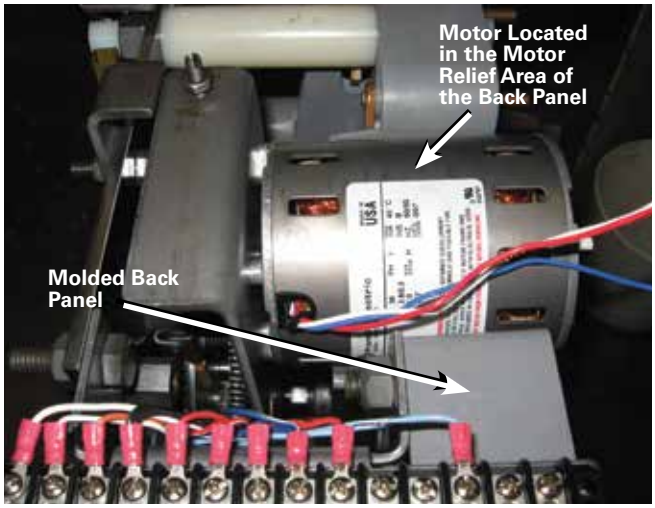

Figure 8. Removal of the motor.

8. Remove the chain from the motor sprocket and set it on the brake assembly. This will prevent the chain from falling in between the Geneva gear and sprocket. Refer to Figure 9. Remove the motor from the tap-changer assembly.

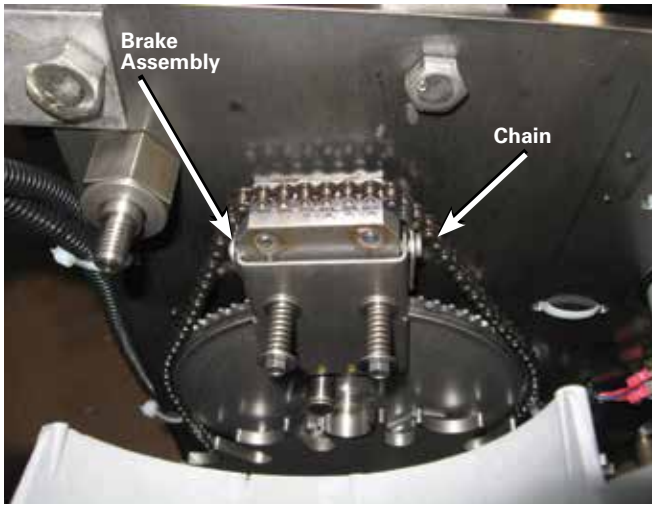

Figure 9. Removal of the chain.

9. Remove the four screws securing the motor to the motor mounting plate using a 1/4" socket on a ratchet. Remove the motor mounting plate from the old motor. Refer to Figure 10.

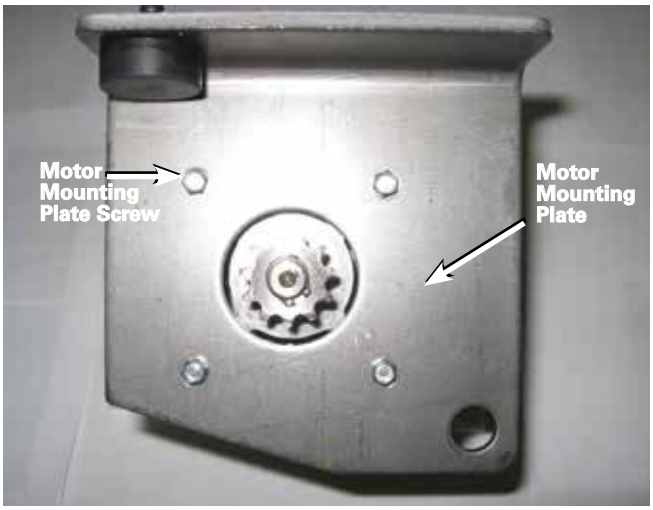

Figure 10. Removal of the motor plate.

10. The new motor kit (Part # 57A636751A100A) has a 12 tooth sprocket for the QD8 tap-changer and an 11 tooth sprocket for the QD5 tap-changer. The motor shaft has two snap ring grooves and a woodruff keyway. Install a snap ring with a snap ring pliers into the inner snap ring groove behind the woodruff keyway. Using a pliers, put the woodruff key into the keyway with the woodruff key tilted down towards the end of the motor shaft. Refer to Figure 11.

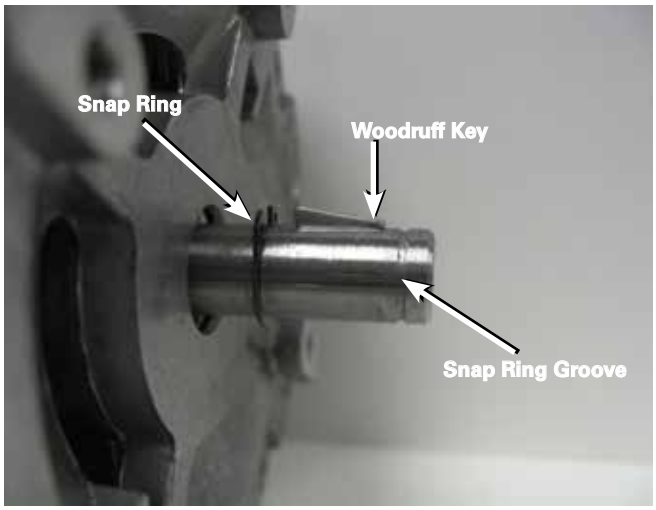

Figure 11. Woodruff key placement.

11. Align the sprocket keyway with the woodruff key on the motor shaft. Slide the sprocket onto the motor shaft with the sprocket hub end towards the motor. Install the second snap ring into the outer snap ring groove using a snap ring pliers. Refer to Figure 12.

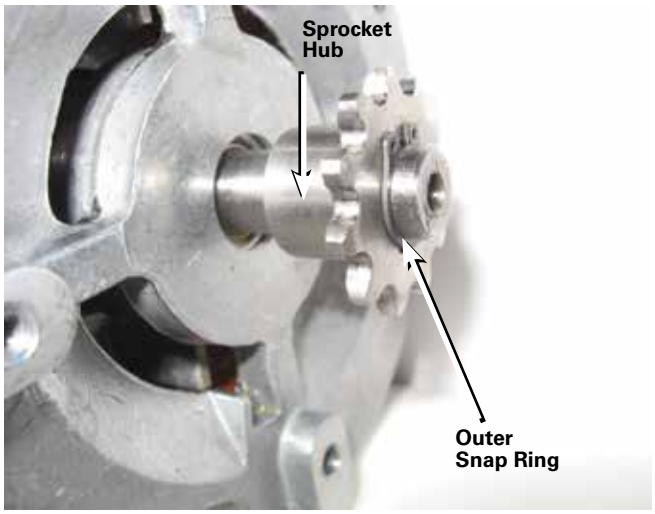

Figure 12. Placement of the sprocket.

12. Use a 1/4" socket on a ratchet to attach the motor mounting plate to the new motor using the new motor mounting plate screws provided in the motor replacement kit. Do not fully tighten. Make sure the motor wires are extending out of the top right of the motor when looking at the motor from the sprocket end. Refer to Figure 13. Using a torque wrench, now tighten the motor plate mounting screws to 18–20 lb-ins (2.0–2.2 Nm).

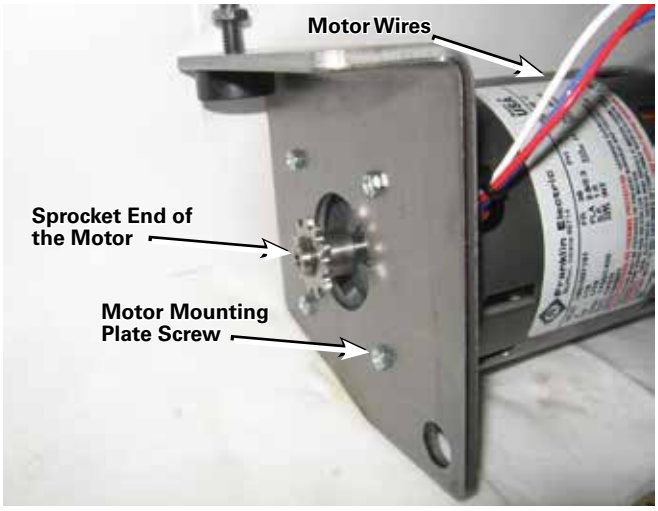

Figure 13. Motor mounting plate.

13. Place the motor into the motor relief area of the molded back panel. Put the chain on the motor sprocket engaging the sprocket teeth. Make sure the chain is fully engaged around the bottom of the drive sprocket gear. If there are any loose links around the bottom of the gear, the motor will not fit properly. Refer to Figure 14.

Note: If you have the motor pivot stud design as shown in Figure 10, follow Step 13. If you have the motor pivot bolt design as shown in Figure 11, follow Step 14.

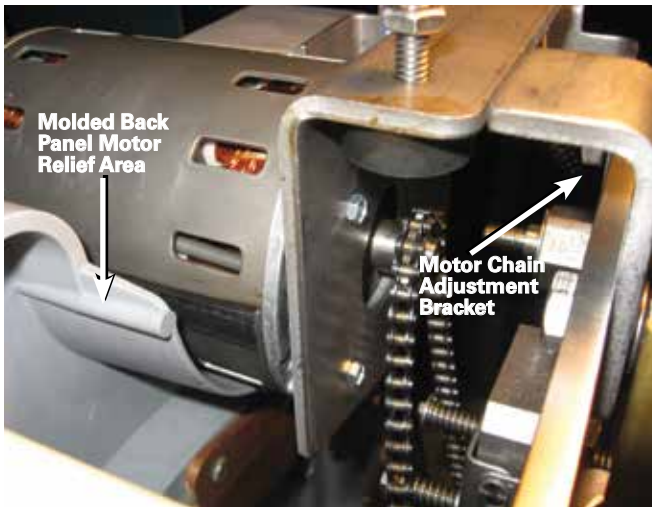

Figure 14. Locating motor.

14. Move the motor assembly into position with the motor chain adjustment screw bumper located on top of the adjustment bracket and the motor pivot stud inserted through the mounting hole in the motor mounting plate. Secure the motor mounting plate to the motor pivot stud with the locknut removed in Step 6. Refer to Figures 15 and 16. Using a torque wrench with a 9/16" socket, tighten the pivot motor stud locknut to 180–192 in-lbs (20.0–21.1 Nm). Proceed to Step 16.

IMPORTANT

Make sure that the mounting hole in the motor mounting bracket is fully seated on the shoulder of the mounting bolt. If it is not fully seated, the chain may bind and fall off.

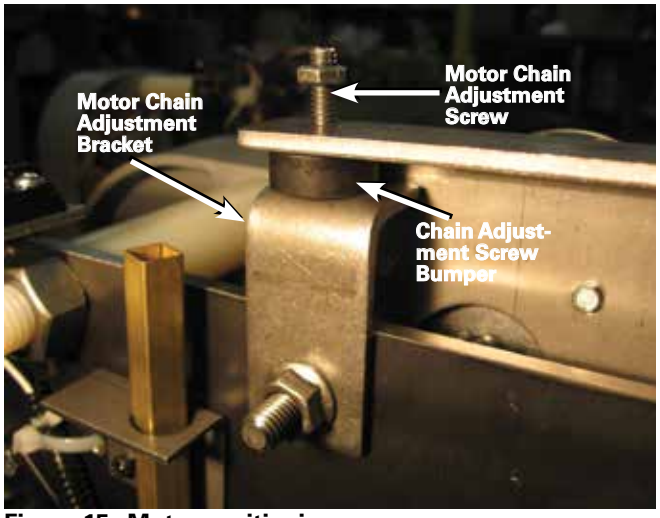

Figure 15. Motor positioning.

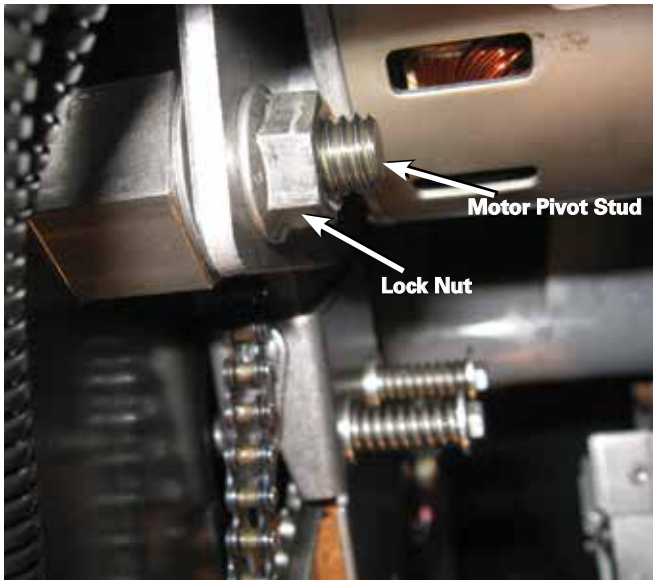

Figure 16. Motor pivot stud.

15. Apply Loctite® 243™ Threadlocker on the threads of the motor pivot bolt and verify the fiber washer is still located on the motor pivot bolt shoulder. Refer to Figure 17. Move the motor assembly into position with the motor chain adjustment screw bumper located on top of the adjustment bracket. Refer to Figure 15. Align the hole in the motor mounting plate with the hex spacer hole. Insert the motor pivot bolt through the motor mounting plate and hand tighten into the hex spacer. Refer to Figure 21. Make sure that the shoulder on the bolt is completely inserted through the hole in the motor mounting bracket. Using a torque wrench with a 3/4" socket, tighten the motor pivot bolt to 45–55 in-lbs (5.0–6.1 Nm).

IMPORTANT

Make sure that the mounting hole in the motor mounting bracket is fully seated on the shoulder of the mounting bolt. If it is not fully seated, the chain may bind and fall off.

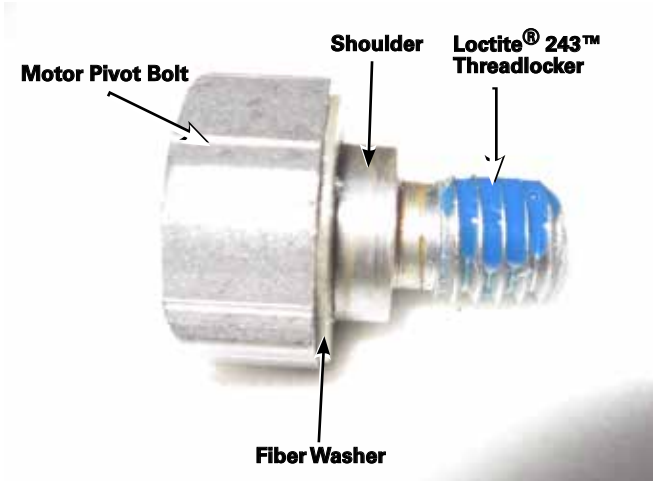

Figure 17. Motor pivot bolt.

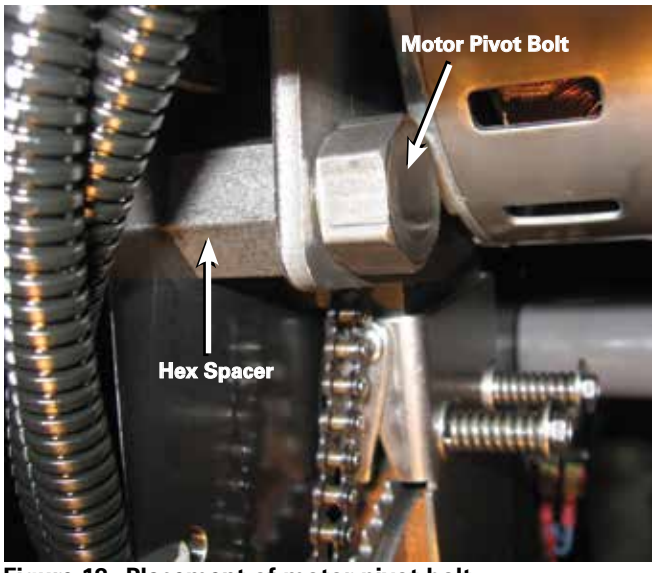

Figure 18. Placement of motor pivot bolt.

16. Adjust the chain tension by turning the motor bumper screw with a blade screw driver. Adjust the motor mount bumper screw until 1/4" deflection exists when exerting pressure on the chain. Secure the motor mount bumper screw in place with the jam nut using a 7/16" wrench. Refer to Figure 19.

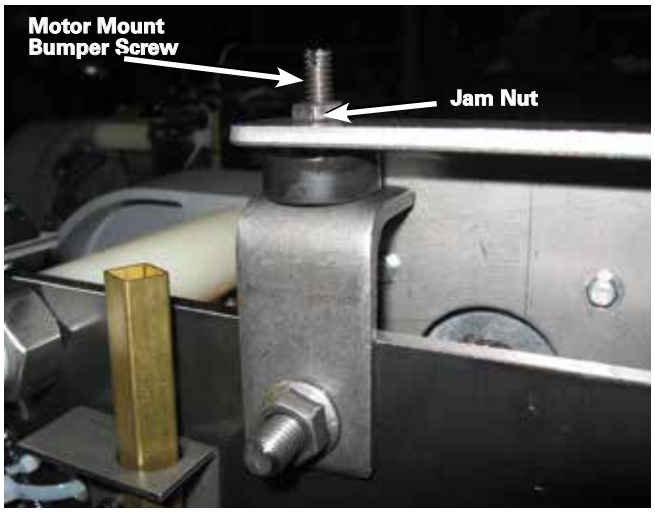

Figure 19. Chain tension.

17. The motor wire connection points are as follows: the white wire connects to terminal "G", the red wire connects to terminal #5 and the blue wire connects to terminal #2. Trim the motor wires with a diagonal cutter allowing an extra two inches of wire between the motor and the connection points. Strip 1/4" of wire insulation from the end of each wire. Crimp a supplied ring tongue connector to the end of each wire, making sure the wire is fully inserted into the ring tongue connector. The wire should not stick out of the connector by more than 1/16 (1.5 mm) of an inch. Attach the ring tongues to the motor connection points on the terminal board as described above. Refer to Figure 20.

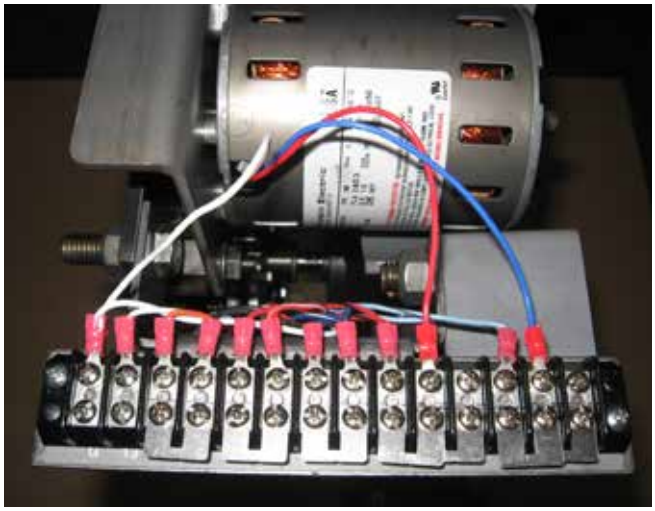

Figure 20. Wiring connections.

18. Use the wire ties provided in the motor replacement kit to bundle all the wires near the terminal board to complete the motor replacement procedure. Refer to Figure 21.

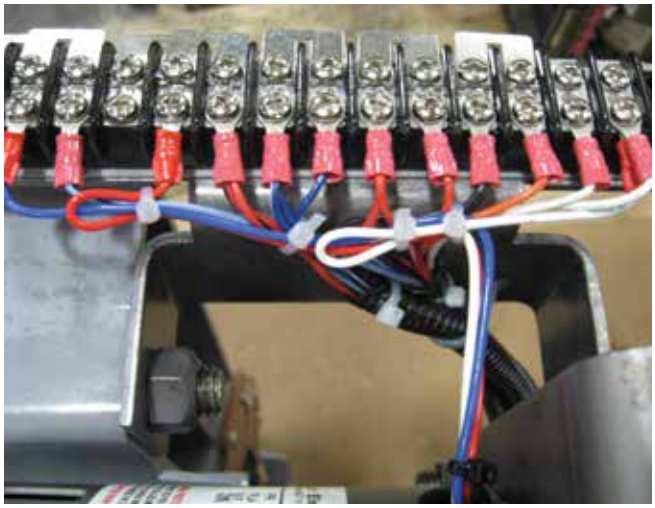

Figure 21. Wire fastening.

19. Ensure that the tap-changer is in the neutral position when the work is completed.

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 22.

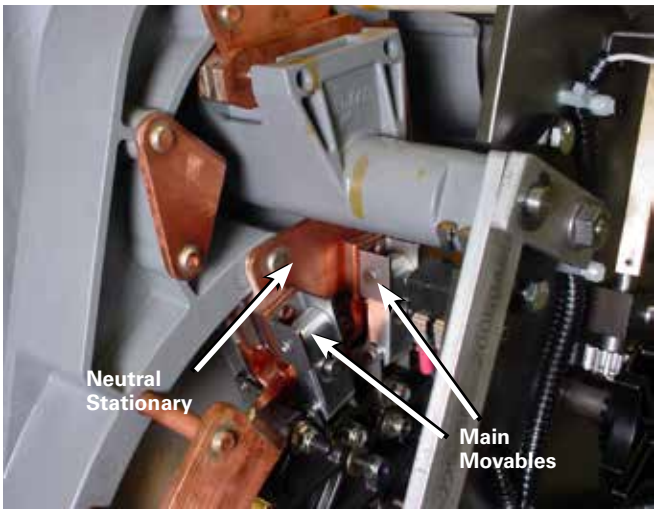

Figure 22. Neutral stationary contact.

   B. The reversing movable contact is located on the reversing neutral stationary contact. See Figure 23.

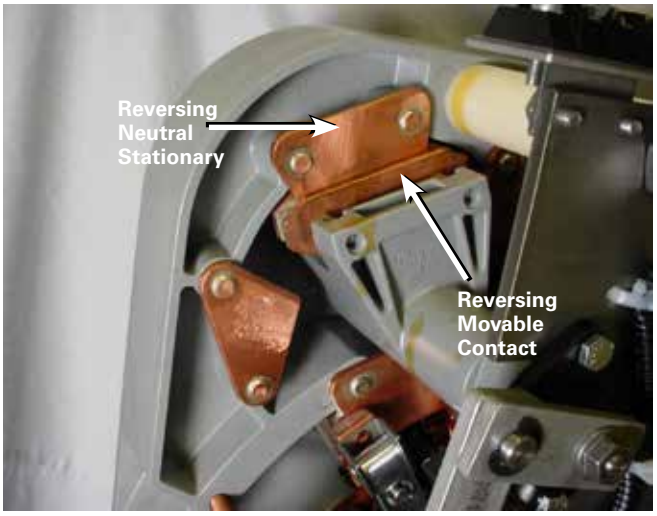

Figure 23. Neutral position for reversing movable.

C. The pinion cam is pointing to the right over the holding switch actuator. See Figure 24.

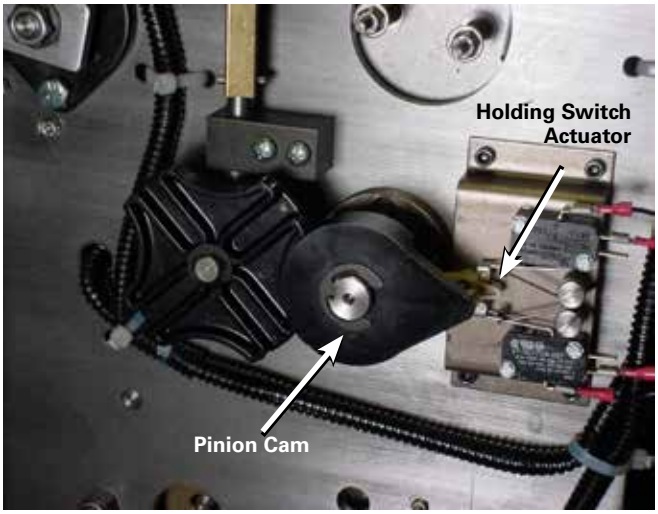

Figure 24. Neutral position for position indicator pinion cam and holding switch.

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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

Powering Business Worldwide

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For Eaton's Cooper Power series product information call 1-877-277-4636 or visit: www.eaton.com/cooperpowerseries.