Two-way cable interlock kit for Magnum fixed circuit breakers

⚠️ WARNING

(1) ONLY QUALIFIED ELECTRICAL PERSONNEL SHOULD BE PERMITTED TO WORK ON THE EQUIPMENT.
(2) ALWAYS DE-ENERGIZE PRIMARY AND SECONDARY CIRCUITS IF A CIRCUIT BREAKER CANNOT BE REMOVED TO A SAFE WORK LOCATION.
(3) ALL CIRCUIT BREAKERS SHOULD BE SWITCHED TO THE OFF POSITION AND MECHANISM SPRING DISCHARGED.

FAILURE TO FOLLOW THESE STEPS FOR ALL PROCEDURES DESCRIBED IN THIS INSTRUCTION LEAFLET COULD RESULT IN DEATH, BODILY INJURY, OR PROPERTY DAMAGE.

Section 1: General information

A family of mechanical interlocks are available to interlock the closing of two or three Magnum™ circuit breakers. The mechanical interlock holds one or more circuit breakers tripped (prevents closure) when others are closed. A lever assembly is mounted on each breaker that interfaces with the pole shaft and the tripper bar. The lever assemblies are interconnected with cables. Cables can be used for any orientation of the breakers. For all Magnum breakers, Kit 1 and Kit 2 required.

Required tools
- 10 mm socket and 1/4-inch drive socket
- 10 mm open end wrench
- 11/16-inch open end wrench
- 3/8-inch open end wrench
- 0.5 mm feeler gauge
- 4 mm Allen wrench
- Drive extension

Kit parts identification

Refer to Figure 1 and Figure 2 for visual identification of the parts listed below for the different kits:

Kit 1 (shown in Figure 1): Interlock kit parts to mount to breaker, does not include the cable.
(A) M6 x 12 mm hex bolt (eight)
(B) M6 x 25 mm flat head screw (two)
(C) M6 lock washer (12)
(D) M6 x 20 mm hex bolt (four)
(E) Drive arm (two)
(F) M6 square nut (six)
(G) Interlock assembly (two)
(H) Grease tube (one)
(I) M6 x 0.75 O.D. spacer washer (four)
(J) Mounting plate (two)

Figure 1. Contents of Kit 1
**Kit 2** (shown in Figure 2): Interconnecting kit, includes cable.  
(K) Cable bracket (two)  
(L) M6 lock washer (four)  
(M) M6 x 10 mm thread-forming screws (four)  
(N) Cable assembly (two)—(in 5-, 6-, 8-, and 10-foot lengths)

**Figure 2. Contents of Kit 2**

### Section 2: Installation of two-way cable interlock

Proceed with the following 11 steps:

**Step 1:** Remove the front cover by unscrewing the hex head captive bolts (four for three-pole, six for four-pole) that join the cover to the breaker housing using a 10 mm 1/4-inch drive socket. Then hold the charge handle down approximately 45 degrees to pull off the cover.

**Figure 3. Step 1**

**Step 2:** Remove the knockout from the right side of the front cover using pliers to break out the U-shaped tab. Carefully file any excess material from broken edge.

**Figure 4. Step 2**

**Step 3:** Install the drive arm (E) to the right end of the pole shaft with the drive arm lever extending downward as shown. Use an M6 x 25 mm flat head screw (B) to make the connection and torque to 65–85 in-lbs (7.3–9.6 Nm).

**Figure 5. Step 3**

**Step 4:** Attach the interlock assemblies (G) and cable brackets (K) to the mounting plates (J). The interlock assembly is attached to the mounting plate using three M6 x 12 hex bolts (A) and lock washers (C). Torque to 40–50 in-lbs (4.5–5.6 Nm). Fasten the cable brackets to the mounting plates using two M6 x 10 thread-forming screws (M) and lock washers (L). Torque to 65–85 in-lbs (7–9 Nm).

**Figure 6. Step 4**
Step 5: Attach the interlock assemblies from Step 4 to the right side of the breakers. Start by removing the M6 hex bolt, nut, lock washer and grounding (earthing) wire installed in the lower front corner of the mounting foot. This bolt assembly will be re-installed through the adapter plate near the end of this step. Slide an M6 square nut (F) into the slot in the upper rear part of the case with the flat face toward the outside. The nut may have to be tapped to fully seat it into the slot. Install an M6 x 20 hex bolt (D), lock washer (C), and flat spacer washer (I) into the square nut a few turns. Locate another captive square nut in a slot in the upper part of the case, forward of the square nut just installed. Install another M6 x 20 hex bolt, lock washer, and spacer washer combination in this square nut. Slide the spacer washers fully against the case and the lock washers fully against the heads of the bolts. This creates a space into which the open slots in the top of the mounting plate will slide.

Now insert the mounting bracket slots onto the upper bolts and rotate the bracket down against the side of the breaker. Make sure that the drive paddle slides in behind the wireform tripper bar, and the follower slides in behind the drive arm pin. Re-install the lower front bolt assembly (removed earlier), making sure to re-connect the ground (earth) wire. Tighten the upper bolts to stabilize the plates. Now insert an M6 x 12 hex bolt and M6 lock washer through the rear plate and mounting foot, retaining it with square nut on the inside of the mounting foot. Torque to 65–85 in-lbs (7–9 Nm).

Step 6: Reinstall front cover removed in Step 1. Step 7: This step describes how to route the cables. Before installing the cable, however, check to be sure that all cables move freely in their cable sheath. Route the cables from one breaker to the other in such a fashion that there are no sharp bends in the cable sheath and the total number of bends are minimized. The minimum allowable cable housing bend radius is 4 inches (102 mm). After completing the installation and adjustment of the cables, attach the cable sheath to the structure at a suitable number of points along the cable run, being careful not to compress the cable sheath. The use of plastic wire clamps or wire ties will minimize the likelihood of binding the cables. After the cables are installed, recheck to be sure the cables still move freely.
Step 8: This step describes how to attach the cables to the interlock assembly. The attachment of the driven (long rod) end of the cable is illustrated. Remove nut and spacer tube from the end of the rod. Slide the rubber boot toward the tip of the rod. Unthread the outer bulkhead nut and slide the nut and lock washer toward the tip. Insert the threaded end of the rod into the swivel fitting while simultaneously sliding the smaller diameter portion of the bulkhead fitting into the slot in the mounting plate. Raise the cable assembly until the threaded portion of the bulkhead fitting enters the slotted hole and fasten the bulkhead washer and nut finger tight. Adjust the two bulkhead nuts so that the fitting is approximately centered on the cable mounting bracket and hand tighten the nuts. Slide the rubber boot back into place over the end of the bulkhead fitting. Replace the tube spacer and upper nut on the rod end. The lower nuts should be shouldered against the end of the thread and the upper nut tightened against the spacer tube. While holding the lower nuts, torque to 30–40 in-lbs (3.3–4.5 Nm). Repeat the above process in this step to attach the other end of the cables to the other breaker interlock assembly. Each breaker needs to have one long end and one short end attached.

The only difference is that the drive (short) rod uses a compression spring. Locate compression spring for Position A below the swivel fitting. The compression spring for Position C must be located above the swivel fitting (see Figure 9). The spring for Position C must therefore be removed before installation and replaced as shown before installation of the upper rod nut.

Note: Hold the the cable rod with pliers while removing and installing the nuts to prevent the cable from rotating.

Step 9: This step describes how to adjust the cables. Adjustment of the cable is done with the bulkhead mounting nuts. The two nuts on the rod ends should not be moved. The adjustment is performed with both breakers OPEN. Begin by adjusting all cable bulkhead mounting nuts (both ends) so that the mounting bracket is approximately in the center of the threaded section of the bulkhead fitting. This allows room for adjustment in either direction. Finger tighten all bulkhead nuts in this position. Perform initial adjustments on the drive (long rod) end of the cable. There should be a small (0.0–0.5 mm) clearance between the outer rod nut and the face of the swivel on which it pulls. If there is too much clearance, adjust both bulkhead nuts to retract the cable sheath. If there is no clearance, advance the cable sheath in the same way. If additional adjustment length is required, the bulkhead nuts on the other end of the cable can also be used. When the proper clearance is attained on the driven end, tighten the cable bulkhead nuts on both ends to a torque of 100–120 in-lbs (11–13 Nm).

---

**Figure 9. Step 8**

**Figure 10. Step 9**
Step 10: At this point in the process, check the functioning of the lever assemblies by performing the two following checks in conjunction with provided graphics:

Check 1: With the breaker OPEN, check the adjustment of the lower drive lever. The gap between the lower right-hand corner of the drive lever and the mounting bracket flange should be from 0–2 mm (see Figure 1). Now CLOSE the breaker. The drive lever should rotate approximately 60 degrees counterclockwise. There should be a minimum gap of 1 mm and a maximum gap of 4 mm between the lower left-hand corner of the lever and the mounting bracket flange (see Figure 2). If either of these gaps are out of specification, the installation should not continue. Consult Eaton for additional instructions.

Check 2: Now check the function of the upper driven lever and tripper bar. With the breaker OPEN, the upper left-hand corner of the driven lever should be held in contact with the mounting bracket flange by the return spring, and the inner arm that operates the tripper bar should protrude a few millimeters beyond the right edge of the mounting bracket. With the breaker CLOSED, grasp and slowly rotate the driven (upper) lever counterclockwise. At approximately 30 degrees of rotation (with the lever approximately horizontal), the breaker should trip. If the breaker does not trip before the upper right-hand corner of the driven lever is within 3 mm of the mounting bracket flange (see Figure 3), the driven lever and/or trip lever are out of specification. Do not continue the installation. Consult Eaton for additional instructions. Perform these tests for each breaker.

Step 11: The final step is to test the interlock assembly.

1. CHARGE and CLOSE Breaker A. Inspect the driven lever on Breaker B. It should be rotated against its stop (the mounting bracket). CHARGE Breaker B and attempt to CLOSE it. It should not respond to the CLOSE attempt (no noise, no spring discharge, no contact motion). If the breaker does not respond as described, review Steps 7 through 10. Additional adjustment may be required at the cable mounting brackets.

2. OPEN Breaker A. The interlock should release. CLOSE Breaker B. Verify that it closes with the OPEN/CLOSED indicator. Breaker A should now be held in the OPEN condition. Repeat the above checks on Breaker B (lever position, attempt to CLOSE).

The mechanical interlock is now properly installed and adjusted. If some interlock parts are sticky, use a light amount of the lubricant grease (H) supplied to reduce the friction.
Two-way cable interlock kit for Magnum fixed circuit breakers
Disclaimer of warranties and limitation of liability

The information, recommendations, descriptions, and safety notations in this document are based on Eaton Corporation’s (“Eaton”) experience and judgment, and may not cover all contingencies. If further information is required, an Eaton sales office should be consulted.

Sale of the product shown in this literature is subject to the terms and conditions outlined in appropriate Eaton selling policies or other contractual agreement between Eaton and the purchaser.

THERE ARE NO UNDERSTANDINGS, AGREEMENTS, WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, OTHER THAN THOSE SPECIFICALLY SET OUT IN ANY EXISTING CONTRACT BETWEEN THE PARTIES. ANY SUCH CONTRACT STATES THE ENTIRE OBLIGATION OF EATON.

THE CONTENTS OF THIS DOCUMENT SHALL NOT BECOME PART OF OR MODIFY ANY CONTRACT BETWEEN THE PARTIES.

In no event will Eaton be responsible to the purchaser or user in contract, in tort (including negligence), strict liability, or otherwise for any special, indirect, incidental, or consequential damage or loss whatsoever, including but not limited to damage or loss of use of equipment, plant or power system, cost of capital, loss of power, additional expenses in the use of existing power facilities, or claims against the purchaser or user by its customers resulting from the use of the information, recommendations, and descriptions contained herein.

The information contained in this manual is subject to change without notice.