Two-way cable interlock kit for
Magnum drawout 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. DRAWOUT CIRCUIT BREAKERS SHOULD BE LEVERED (RACKED) OUT TO THE DISCONNECT POSITION.
4. ALL CIRCUIT BREAKERS SHOULD BE SWITCHED TO THE OFF POSITION AND MECHANISM SPRINGS DISCHARGED.

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

⚠️ WARNING

THE INSTRUCTIONS CONTAINED IN THIS IL AND ON PRODUCT LABELS HAVE TO BE FOLLOWED. OBSERVE THE FIVE SAFETY RULES:
- DISCONNECTING
- ENSURE THAT DEVICES CANNOT BE ACCIDENTALLY RESTARTED
- VERIFY ISOLATION FROM THE SUPPLY
- EARTHING AND SHORT-CIRCUITING
- COVERING OR PROVIDING BARRIERS TO ADJACENT LIVE PARTS

DISCONNECT THE EQUIPMENT FROM THE SUPPLY. USE ONLY AUTHORIZED SPARE PARTS IN THE REPAIR OF EQUIPMENT. THE SPECIFIED MAINTENANCE INTERVALS AS WELL AS THE INSTRUCTIONS FOR REPAIR AND EXCHANGE MUST BE STRICTLY ADHERED TO IN ORDER TO PREVENT INJURY TO PERSONNEL AND DAMAGE TO THE SWITCHBOARD.

Section 1: General information

These instructions deal with the installation of the Magnum two-way mechanical interlock. The two-way mechanical interlock cable holds one circuit breaker in the open position and disables its closing mechanism when the other breaker is 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. Cable can be used for any orientation of the breakers and are available in 5, 6, 8, and 10-foot lengths (1.5; 1.8; 2.4; and 3.0 m). Individual cable kits are ordered separately.

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 (2)
- 0.5 mm feeler gauge
- 4 mm Allen wrench
- Drive extension
- Pliers

Kit parts identification

Refer to Figure 1 and Figure 2 for visual identification of the parts listed below.

Kit 1 (2A11857G01, as shown in Figure 1):
Interlock Assembly Kit.
(A) M6 x 12 mm hex bolt (six)
(B) M6 x 25 mm flat-head screw (two)
(C) M6 lock washer (six)
(D) M6 x 20 mm hex bolt (four)
(E) Drive arm (two)
(F) Interlock assembly (two)
(G) Grease tube (one)

Kit 2 (2A11858G01-G04, as shown in Figure 2):
Interconnecting Kit (includes cables)
(H) Cable bracket (two)
(I) M6 x 10 mm thread-forming screws (four)
(J) Cable assembly (two) – in 5-, 6-, 8-, or 10-foot lengths (1.5; 1.8; 2.4; or 3.0 m)

Note: Parts (D) are not used for this installation
Section 2: Installation of two-way cable interlock

Proceed with the following 12 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.

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

**Step 3**: Install the drive arm (E) to the right end of the pole shaft using an M6 x 25 mm flat-head screw (B) and 4 mm Allen wrench. The drive arm should be oriented as shown. Torque to 65-85 in-lbs (7.3-9.6 Nm).
Step 4: Reinstall front cover (removed in Step 1). Perform Steps 1 to 4 for each breaker.

Step 5: Fasten the interlock assembly (F) to the drawout cassette’s right-side sheet as shown using three M6 x 12 mm hex bolts (A) and lock washers (C). Torque to 40–50 in-lbs (4,5–5,6 Nm).

Figure 6. Step 5

Step 6: Fasten the cable bracket (H) to the drawout cassette’s right-side sheet (below the interlock assembly mounted in Step 5) as shown, using two M6 x 10 mm thread-forming screws (I). Torque to 65–85 in-lbs (7,3–9,6 Nm). Perform Steps 5 and 6 for each breaker.

Figure 7. Step 6

Step 7: Perform the three tasks below to prep the cables before they are attached to the interlock assemblies. Check to be sure that all cables move freely in their cable housing. Each cable should have a long rod end and a short rod end. To perform the cable prep:

1. Remove the upper lock nut and spacer tube from both rod ends.
2. Remove the compression spring from the short rod.
3. Two loose nuts should be positioned on the threads of each rod. Shoulder the lower nut against the end of the rod's threads until the nut stops. Using two 3/8 in. wrenches, tighten the upper nut against the lower nut (See Figure 9).

Repeat the above process on any given cable. When prep is complete, install the breakers into their cassettes in the CONNECTED position.

Step 8: This step describes how to route and install the cables. Ensure that the breakers are in the OPEN and DISCHARGED positions and adhere to the following recommendations during cable installation:

- 4 inch (102 mm) minimum allowable cable housing bend radius and minimal number of total bends
- Use plastic wire ties/clamps to attach cable housing to the structure after installation and adjustment
- Do not compress cable housing
- Recheck to ensure cables move freely
Figure 10. Step 8

**Step 9:** This step describes how to attach the cables to the interlock assemblies. Each breaker needs one long rod and one short rod attached. The long (driven) rod will be attached first. To do so:

1. Slide the rubber boot toward the tip of the rod.
2. Unthread the outer bulkhead nut and slide the nut and lock washer upwards.
3. Slide the smaller diameter portion of bulkhead fitting in to the slot on the cable bracket (See Figure 11).
4. Raise cable assembly until threads of the bulkhead fitting show above the slotted hole in the bracket (See Figure 11).
5. Insert threaded end of rod into its swivel fitting.
6. Bring the bulkhead washer and nut down to the threads and hand-tighten.
7. Adjust the two bulkhead nuts to approximately center the fitting on the slot and hand-tighten.
8. Replace the rubber boot over end of fitting.
9. Replace spacer tube on rod end.
10. Replace lock nut on rod end. Hold the lower nuts that were tightened in Step 7 with pliers and use a 3/8-inch socket or a 3/8-inch open-ended wrench to tighten the lock nut until it touches the spacer tube. Torque to 30-40 in-lbs (3.3-4.5 Nm)

Next, the short (drive) rod will be attached. The short rod is attached in the same way as the long rod except that it requires a compression spring (see Figure 13). Replace the compression spring after replacing the spacer tube on the rod tip. Manually compress the spring and replace the lock nut on rod end. Release the spring. Hold the lower nuts that were tightened in Step 7 and use a 3/8-inch socket or a 3/8-inch open-ended wrench to tighten the lock nut until it touches the spacer tube. Torque to 30 – 40 in-lbs (3.3 – 4.5 Nm).

At the end of cable installation, the breakers should still be in the OPEN position.

**Figure 11. Step 9.**

**Figure 12. Step 9 - Long Rod Assembly**

**Figure 13. Step 9 - Short Rod Assembly**

**Step 10:** This step describes how to adjust the cables. Adjustment should be performed with the large bulkhead nuts ONLY and with all breakers OPEN. Ensure bulkhead fittings are still approximately centered on their slot and secure cables by snugly tightening bulkhead nuts with an 11/16-inch wrench.
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Perform initial adjustments on the driven (long rod) end of cable. There should be a small (0.0 – 0.5 mm) clearance between the rod lock nut and the face of the swivel on which it pulls.

**Too much clearance:** adjust both bulkhead nuts to retract cable housing

**No clearance:** advance cable housing in a similar manner

**For additional adjustment length:** use bulkhead nuts on other end of cable

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).

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Section 3: Functional Tests of Interlock Assembly

**Step 1:** Perform the “Checks” below to test functionality of the lever assembly.

**Check 1:**
- With the breaker OPEN and CONNECTED, observe the position of the drive (lower) lever. The gap between the lower right-hand corner of the drive lever and the interlock assembly flange should be 0 – 4 mm (see Figure 15 Breaker OPEN).
- Now CHARGE and CLOSE the breaker, and the drive lever should rotate approximately 60 degrees counterclockwise. The gap between the lower left-hand corner of the lever and the interlock assembly flange should be 1 – 7 mm (see Figure 15 Breaker CLOSED).
- If either of these gaps is out of specification, **DO NOT CONTINUE THE INSTALLATION.** Consult Eaton for additional instructions. To reach an EatonCare representative, call (877) 386-2273.
- Perform this check for each breaker.

**Check 2:**
- Now check the function of the driven (upper) lever and inner trip arm. With the breaker OPEN, the upper left-hand corner of the driven lever should be held in contact with the interlock assembly flange by the return spring, and the inner trip arm that operates the tripper bar should protrude a few millimeters beyond the right edge of the interlock assembly.

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- With the breaker CLOSED, grasp and slowly rotate the driven lever counterclockwise. After about 30 degrees of rotation (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 interlock assembly flange (see Figure 15 Breaker TRIPPED), the driven lever and/or inner trip arm are out of specification. **DO NOT CONTINUE THE INSTALLATION.** Consult Eaton for additional instructions. To reach an EatonCare representative, call (877) 386-2273.
- Perform this check for each breaker.
Step 2: The final step is to test the interlock.

1. CHARGE and CLOSE Breaker A. Breaker B should be held in the open condition. Inspect the driven lever on Breaker B. There should be less than a 5 millimeter gap between the upper right-hand corner of the driven lever and its stop (the interlock assembly flange). CHARGE and attempt to CLOSE Breaker B. 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 6 through 10. Additional adjustment may be required at the cable bracket.

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. Inspect the driven lever on Breaker A. There should be less than a 5 millimeter gap between the upper right hand corner of the driven lever and its stop (the interlock assembly flange). CHARGE and attempt to CLOSE Breaker A. 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 6 through 10. Additional adjustment may be required at the cable bracket.

Figure 16. Step 2

The mechanical interlock is now properly installed and adjusted.

- If some interlock parts are sticky, use a light amount of the lubricant grease (G) to reduce the friction. This is ONLY recommended if needed.
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