2-way drawout cable interlock - NF

Instructions apply to:

UL489 : PD-NF, Series NRX NF
IEC : PD-NF, IZMX16
UL1066/ANSI : Series NRX NF

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 THE EQUIPMENT. THE SPECIFIED MAINTENANCE INTERVALS AS WELL AS THE INSTRUCTIONS FOR REPAIR AND EXCHANGE MUST BE STRICTLY ADHERED TO PREVENT INJURY TO PERSONNEL AND DAMAGE TO THE SWITCHBOARD.
Section 1: General information

The mechanical interlock holds one of the breakers tripped (prevents closure) when the other is closed. A lever assembly is mounted on each breaker and interfaces with the pole shaft and tripper bar. The lever assemblies are interconnected with cables. Cables 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 drive socket
- 11/16-inch open-end wrench
- 3/8-inch open-end wrench
- 3/8-inch drive socket
- 4 mm feeler gauge
- 2 mm Allen wrench
- Drive extension
- Adjustable wrench

Kit Parts identification

Refer to Figure 1 for visual identification of the parts listed below:

(A) M6 x 12 mm hex bolt (6)
(B) Lock washer (6)
(C) M3 x 8 mm flat-head screw (4)
(D) Drive arm (2)
(E) Interlock assembly (2)
(F) Trip pin (2)
(G) Grease tube (1)
(H) Cable bracket (4)
(I) M6 x 10 mm thread-forming screws (4)
(J) Cable assembly (2) – 5, 6, 8 and 10-foot lengths (1.5; 1.8; 2.4 and 3.0 m)
Section 2: Installation of two-way cable interlock

Proceed with the following 9 steps:

**Step 1:** Install drive arm (D) to the end of the pole shaft using an M3 x 8 mm flat-head screw (C). The drive arm should be oriented as shown. Torque to 3-5 in-lbs (0.3 - 0.6 Nm).

**Step 2:** Install trip pin (F) to the trip arm using an M3 x 8 mm flat-head screw (C). Use a wrench to hold the trip lever during installation as shown. Torque to 3-5 in-lbs (0.3 - 0.6 Nm).

**Step 3:** Fasten interlock assembly (E) to drawout cassette’s right-side sheet using three M6 x 12 mm hex bolts (A) and lock washers (B). Torque to 40 – 50 in-lbs (4.5 – 5.6 Nm).

**Step 4:** Using two M6 x 10 mm thread-forming screws (I), fasten the two cable brackets (H) to the drawout cassette’s right-side sheet just below the interlock assembly that was mounted in Step 3. Torque to 65 – 85 in-lbs (7.3 – 9.6 Nm).

**Step 5:** This step offers cable routing and installation procedures.
Make sure that cables move freely in their cable housings before installation.

**Installation recommendations:**
- 4 inch (102mm) minimum allowable cable housing bend radius
- Use plastic wire ties/clamps to attach cable housing to structure after installation and adjustment
- Do not compress cable housing
- Recheck to ensure cables move freely

**Step 6:** This step describes how to first attach the drive end (short rod) of a cable to its interlock assembly and cable bracket. See Figures 6 to 10 for details:

1. Remove small nut, compression spring, and spacer tube from end of rod.
2. Slide rubber boot toward tip of rod.
3. Unthread outer bulkhead nut and slide nut and lock washer toward tip.
4. Insert threaded end of rod into swivel fitting.
5. Slide smaller diameter portion of bulkhead fitting into cable bracket slot (see Figure 8).
6. Raise cable assembly until threaded portion of bulkhead fitting enters slotted hole in cable bracket (threads show above bracket).
7. Bring bulkhead washer and nut down to threads and hand tighten.
8. Adjust two bulkhead nuts to approximately center bulk head fitting on cable mounting bracket.
9. Hand tighten bulkhead nuts at this time.
10. Slide rubber boot back into place over end of bulkhead fitting.
11. Replace spacer tube, compression spring and small nut on end of rod.
12. Lower nuts should be shouldered against end of thread and upper nut tightened against spacer tube.
13. Hold lower nuts and torque upper nut to 30 – 40 in-lbs (3.3 – 4.5 Nm).

**Figure 6. Step 6**

**Figure 7. Step 6 - Cable Assembly**

**Figure 8. Step 6 - Mounting Cable Assembly in Cable Bracket**

**Figure 9. Step 6**
Step 7: This step describes how to attach the driven end (long rod) of a cable to its interlock assembly and cable bracket on another breaker. This is accomplished by repeating Step 6, except the driven end does not utilize a compression spring between the swivel and outer nut. Install the second cable.

Step 8: This step describes how to adjust the cables. Cable adjustments are made with the large bulkhead nuts only. Smaller nuts on the rod ends should not be moved. Adjustments are made with all breakers OPEN.

Ensure all bulkhead fittings are still approximately centered on the cable mounting bracket, allowing for adjustment room in either direction.

Repeat items 8 and 9 of Step 6 if any bulkhead fitting requires centering.

Perform initial adjustments on driven end (long rod) of cable (refer to Figure 11):

There should be 4-5 mm clearance between upper rod nut and face of swivel on which it pulls (refer to Figure 12):

Too much clearance – adjust both bulkhead nuts to retract cable housing.

No clearance – advance cable housing in a similar manner.

For additional adjustment length – bulkhead nuts on other end of cable can be used.

Torque cable bulkhead nuts on both ends to 100 -120 in-lbs (11 – 13 Nm) when proper clearance is attained on driven end.

Section 3: Functional Test of Interlock Assembly

Begin test sequence with all breakers OPEN.

Check 1: CHARGE and CLOSE Breaker A.
- Inspect driven lever on Breaker B – It should be positioned as shown in Figure 13 - Check 1
- CHARGE Breaker B and attempt to close Breaker B – It should not respond to CLOSE attempt (no noise, spring discharge or contact motion)
- If Breaker B responds to the CLOSE attempt additional adjustments may be required at cable mounting brackets (refer to Section 2, Step 8)

Check 2: OPEN Breaker A
- The interlock should release
- CLOSE Breaker B – Verify it closes with OPEN/CLOSED indicator
- Breaker A should now be held in OPEN condition
- OPEN Breaker B

Repeat checks 1 and 2 above on Breaker B
- Verify proper operation

The mechanical interlock is now properly installed and adjusted. Utilize a light amount of the supplied lubricant grease (I) if any interlock parts are sticky. This is only recommended if needed.
Figure 13. Step 9

Interlock Logic

<table>
<thead>
<tr>
<th>Breaker A</th>
<th>Breaker B</th>
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<tbody>
<tr>
<td>0</td>
<td>0</td>
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<td>1</td>
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Check 1

(Breaker A OPEN)  (Breaker B OPEN)

(Breaker A CLOSED) (Breaker B OPEN)

Check 2

(Breaker A OPEN)  (Breaker B CLOSED)

Both breakers shown OPEN (not interlocked)

Figure 14. Step 9
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