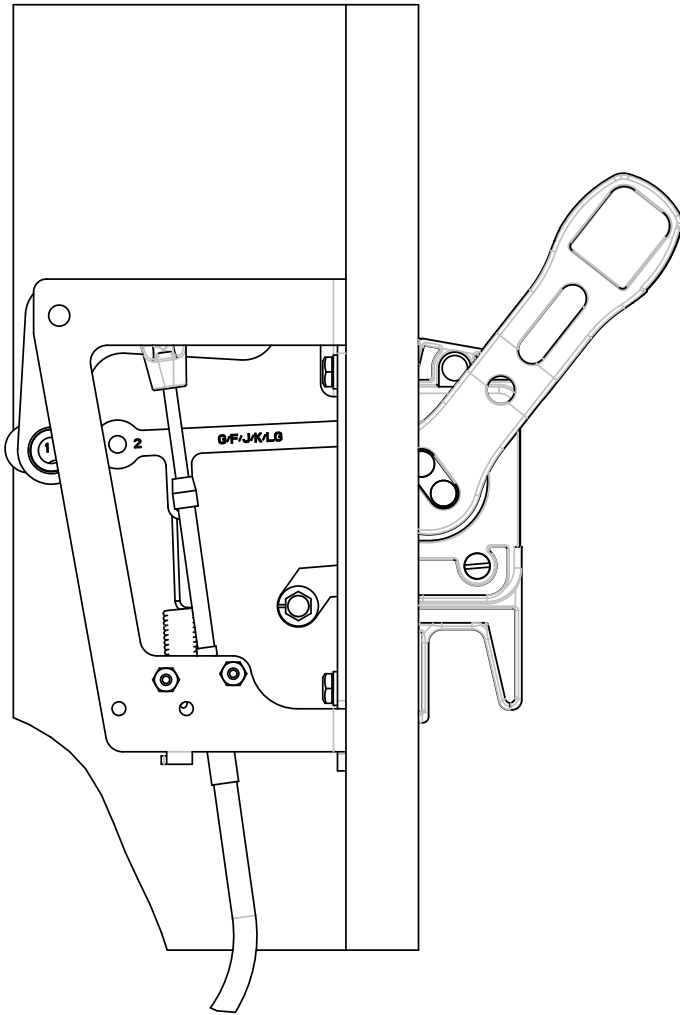


Instructions for drilling and assembling high performance Flex Shaft™ handle mechanism for PDG1 circuit breakers, molded case switches, and HMCPs



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WARNING

DO NOT ATTEMPT TO INSTALL OR PERFORM MAINTENANCE ON EQUIPMENT WHILE IT IS ENERGIZED. DEATH, SEVERE PERSONAL INJURY, OR SUBSTANTIAL PROPERTY DAMAGE CAN RESULT FROM CONTACT WITH ENERGIZED EQUIPMENT. ALWAYS VERIFY THAT NO VOLTAGE IS PRESENT BEFORE PROCEEDING WITH THE TASK, AND ALWAYS FOLLOW GENERALLY ACCEPTED SAFETY PROCEDURES. EATON IS NOT LIABLE FOR THE MISAPPLICATION OR MISINSTALLATION OF ITS PRODUCTS.

The user is cautioned to observe all recommendations, warnings, and cautions relating to the safety of personnel and equipment as well as all general and local health and safety laws, codes, and procedures.

The recommendations and information contained herein are based on Eaton experience and judgment, but should not be considered to be all-inclusive or covering every application or circumstance which may arise. If any questions arise, contact Eaton for further information or instructions.

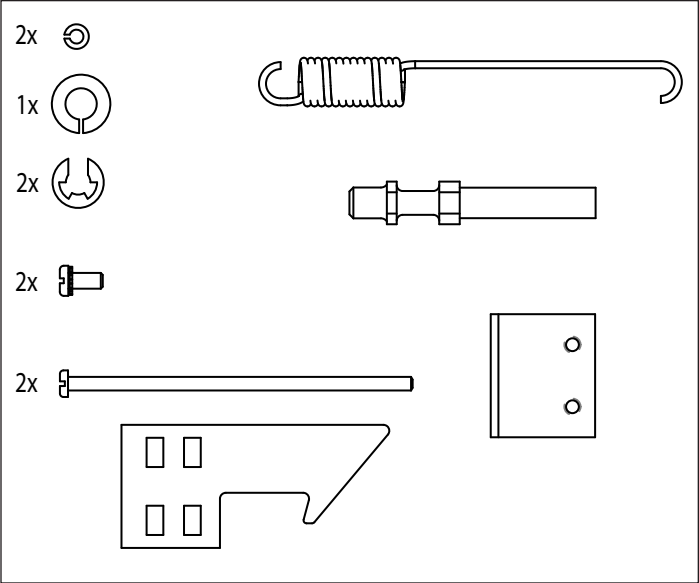



Figure 1. Hardware contents.

1. General information

The high performance Flex Shaft handle mechanism provides a means of externally operating the circuit breaker and can be applied to enclosures of varying heights and depths. The handle can be used with NEMA 1, 3R, 12, and 4/4X enclosure applications, depending on the accessory components selected. An operating handle, flexible shaft, and mechanism are required for standard application. Nine lengths of shafts are available for use with the wide range of depths of various enclosures (2 through 10 ft [0.61 through 3.05 m]). When selecting the length of the flexible shaft, ensure minimum bending radius of 4 in. (101.60 mm) is maintained to operate properly. The standard method of shipment includes the mechanism preset at the factory. If minor field adjustments are required, see Figure 5. For this publication, the term circuit breaker shall also include the molded case switch and motor circuit protector (HMCP).



WARNING

WHEN INSTALLING A NEW HANDLE MECHANISM, OR A NEW CIRCUIT BREAKER AND HANDLE MECHANISM IN AN EXISTING ELECTRICAL SYSTEM, MAKE SURE THERE IS NO VOLTAGE PRESENT WHERE WORK IS TO BE PERFORMED. SPECIAL ATTENTION SHOULD BE PAID TO REVERSE FEED APPLICATIONS TO ENSURE NO VOLTAGE IS PRESENT. THE VOLTAGE IN ENERGIZED, EQUIPMENT CAN CAUSE DEATH OR SEVERE PERSONAL INJURY.

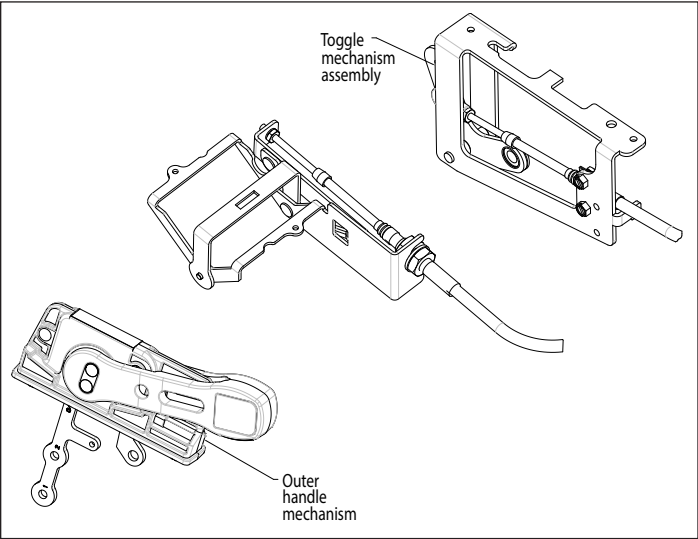


Figure 2. Assembly contents.

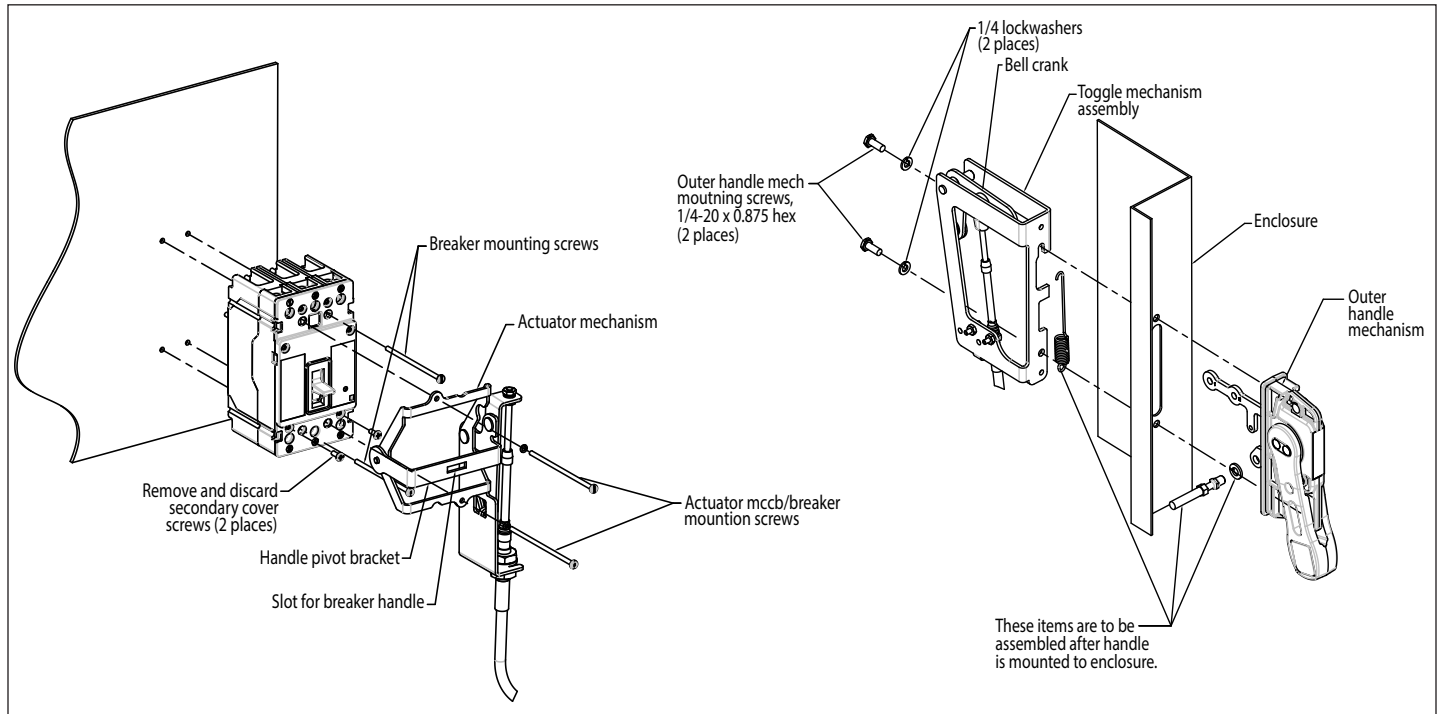


Figure 3. Securing the actuator mechanism to the breaker, toggle mechanism, and handle to enclosure.

2. Installation

For assembly steps, refer to Figure 3, unless otherwise noted.

1. Mount the breaker with two of the breaker mounting screws. Install the screws in the diagonal fashion as shown, opposite of the actuator mechanism. Tighten to 10 lb-in (1.1 N·m).
2. Install the handle to the enclosure by removing the two screws and lock washers from the outer handle mechanism. Place the outer handle mechanism with attached gasket over the enclosure cutout. (For cut-out dimensions, refer to Figure 8.) Insert the top 0.250"-20 outer handle mechanism mounting screw and lock washer through the enclosure and thread into the outer handle mechanism for a few turns, but not all the way.
3. Slide the toggle mechanism assembly over the top of the handle mounting screw. Insert the bottom outer handle mechanism mounting screw and lock washer through the toggle mechanism bracket, through the enclosure, into the handle. Tighten both mounting screws 23 - 37 lb-in (2.6 - 4.1 N·m) max.
4. Remove and discard the two secondary cover screws shown in Figure 3. Verify that the breaker is in the "Trip" position. Put the outer handle mechanism in the "Trip" position for ease of mounting the actuator mechanism.
5. Place the actuator mechanism around the front of the breaker (see Figure 3). Orient the handle pivot bracket so that the slot captures the breaker handle. Fasten securely with the two M4 x 80 mm actuator mechanism/breaker mounting screws and lock washers, as shown. Tighten 10 lb-in (1.1 N·m).
6. Connect the long end of the spring through hole in handle actuator link. Hook the shorter end of the spring into the tab on the lower portion of the toggle mechanism (see Figure 6).
7. Rotate the bell crank towards the handle and rotate the outer handle to the "On" position. Align the actuator link, hole that is marked "1", and attach it to the bell crank and secure it using an E-Ring (see Figure 7).

8. Mount the door interlock pin and lock washer to handle. Tighten to 23 - 37 lb-in (2.6 - 4.1 N·m).
9. Operate the handle mechanism to ensure functionality. To operate, either close the door or defeat the door interlock lever.
10. If minor adjustments are necessary, refer to Adjustment procedure in Section 3.
11. Install the appropriate door hardware (supplied) (see Figure 8).

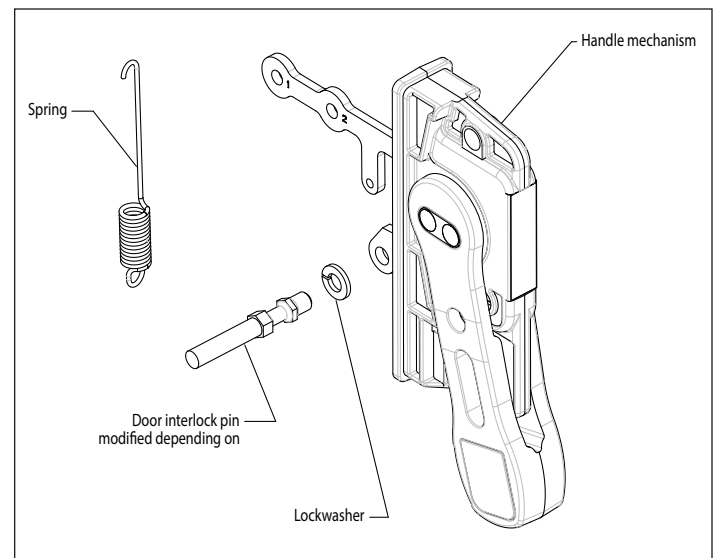


Figure 4. Outer handle mechanism assembly.

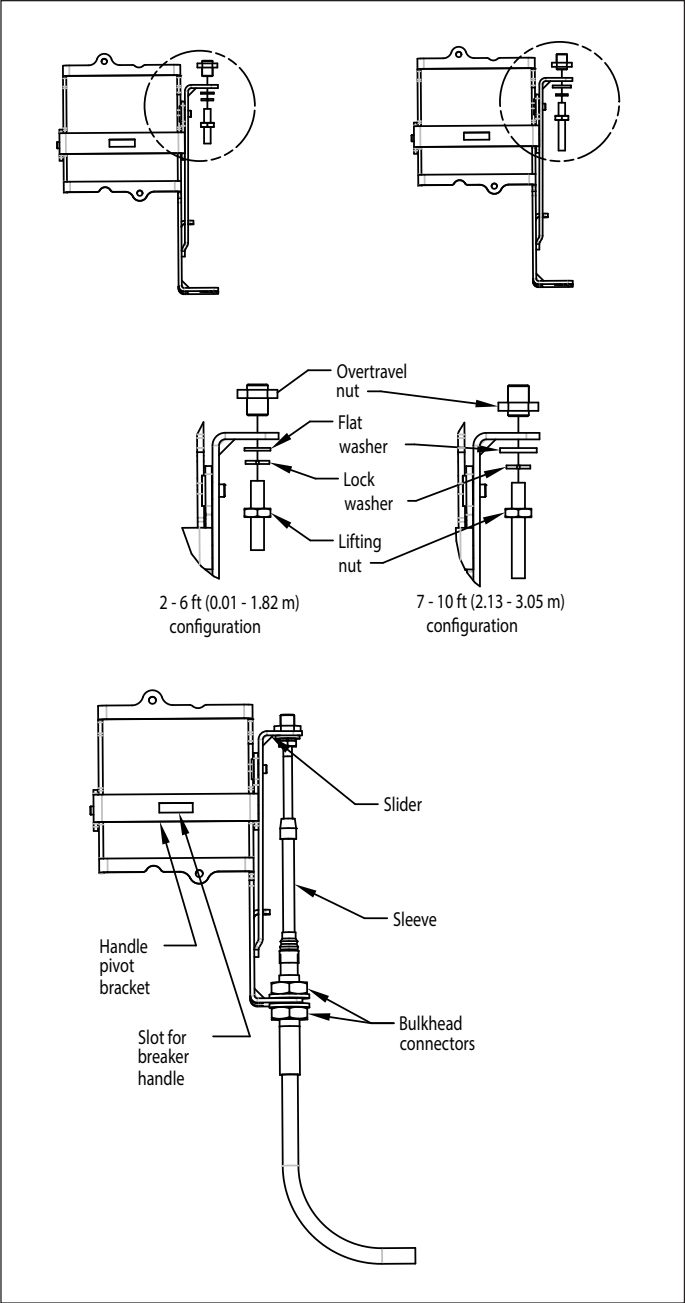


Figure 5. PDG1 actuator mechanism.

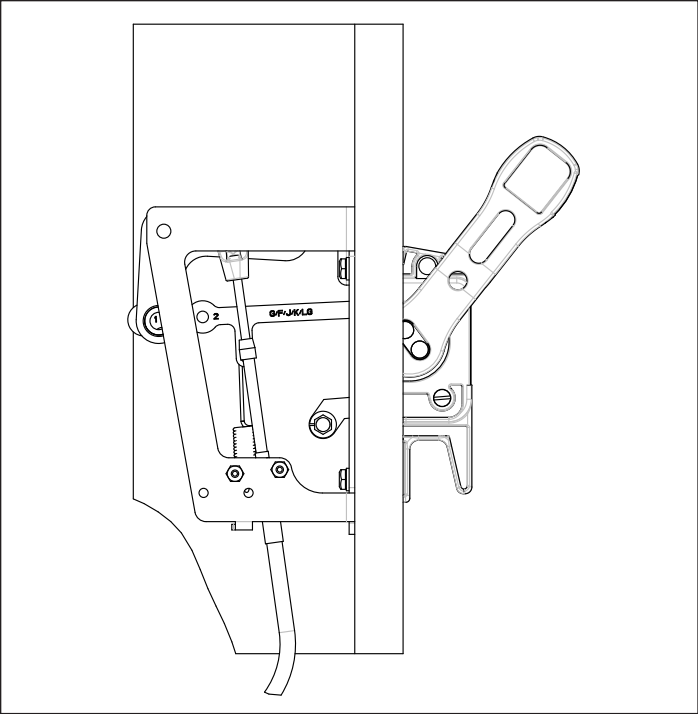


Figure 6. Assembly of spring to toggle mechanism.

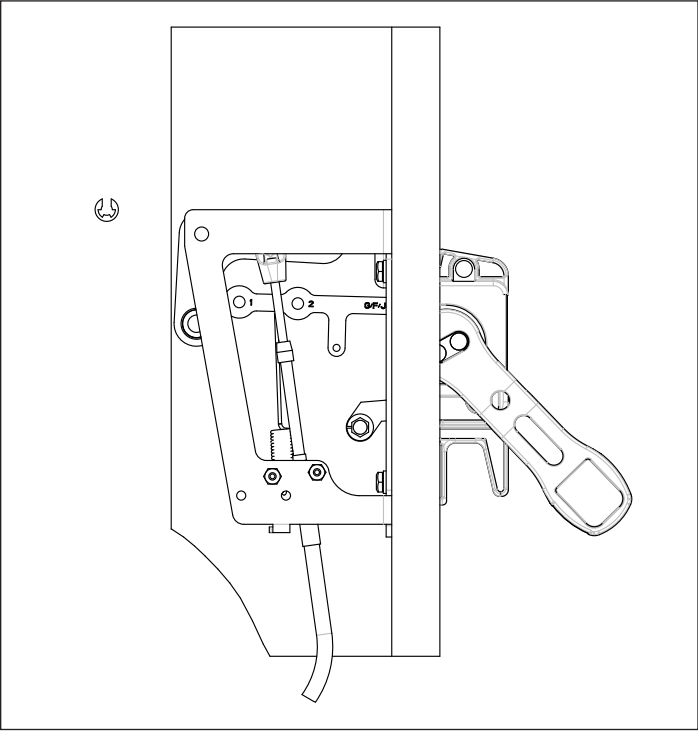


Figure 7. Assembly of adapter link to bell crank.

3. Alternate installation

WARNING

BEFORE ANY INSTALLATION OR MAINTENANCE IS PERFORMED, MAKE SURE THAT THE BREAKER IS NOT ENERGIZED.

In the event a customer must disassemble the pre-assembled Flex Shaft handle mechanism, the procedure listed below must be followed before continuing with the "Installation" instructions (see Figure 5).

1. Remove the flat washer, lock washer, and nut assembly.
2. Loosen the bulkhead connectors and remove Flex Shaft from the actuator mechanism. The shaft may not be routed as required.
3. Place circuit breaker in the "ON" position.
4. Place the operating handle in the full "ON" position.
5. Replace the Flex Shaft through the actuator mechanism. Center the bulkhead connectors on the threaded portion and tighten to approximately 70 in-lb (7.91 N·m).
6. Place the slot in handle pivot bracket over the breaker handle while still in the "ON" position. Turn the lifting washer/nut until it is flush against the slider plate.
7. Replace the flat washer, lock washer, and nut assembly for the flexible shaft assembly. Tighten both nuts to approximately 45 in-lb (5.08 N·m).
8. Check the operation of mechanism for "ON", "OFF", and "Reset". Check the reset position of the actuator mechanism, that the lifting nut and sleeve of shaft do not come in contact with each other (see Figure 5). If they do, move the bulkhead connectors accordingly. If the mechanism functions incorrectly, repeat the procedure or go to adjustment checklist.

Adjustment checklist

Situation:

Breaker turns "ON" and "OFF", but will not reset when tripped.

Adjustment:

Loosen the lifting washer/nut while tightening the washer/lock washer/nut. Two or three turns should be sufficient (see Figure 5).

Note: Check the reset position of the actuator mechanism, that the lifting nut and sleeve of shaft do not come into contact with each other (see Figure 5). If they do, move the bulkhead connectors accordingly.

Situation:

The breaker resets after tripping, but does not turn "ON".

Adjustment:

Loosen the washer/lock washer/nut on the end of the shaft while tightening the lifting washer/nut until the breaker turns on with positive action. Tighten both nuts and recheck for "ON", "OFF", and "Reset" positions (see Figure 5).

Note: After adjustment, be certain to have a minimum of one thread past the washer/lock washer/nut assembly (see Figure 5).

If any other adjustment problems should arise, contact your local Eaton representative.

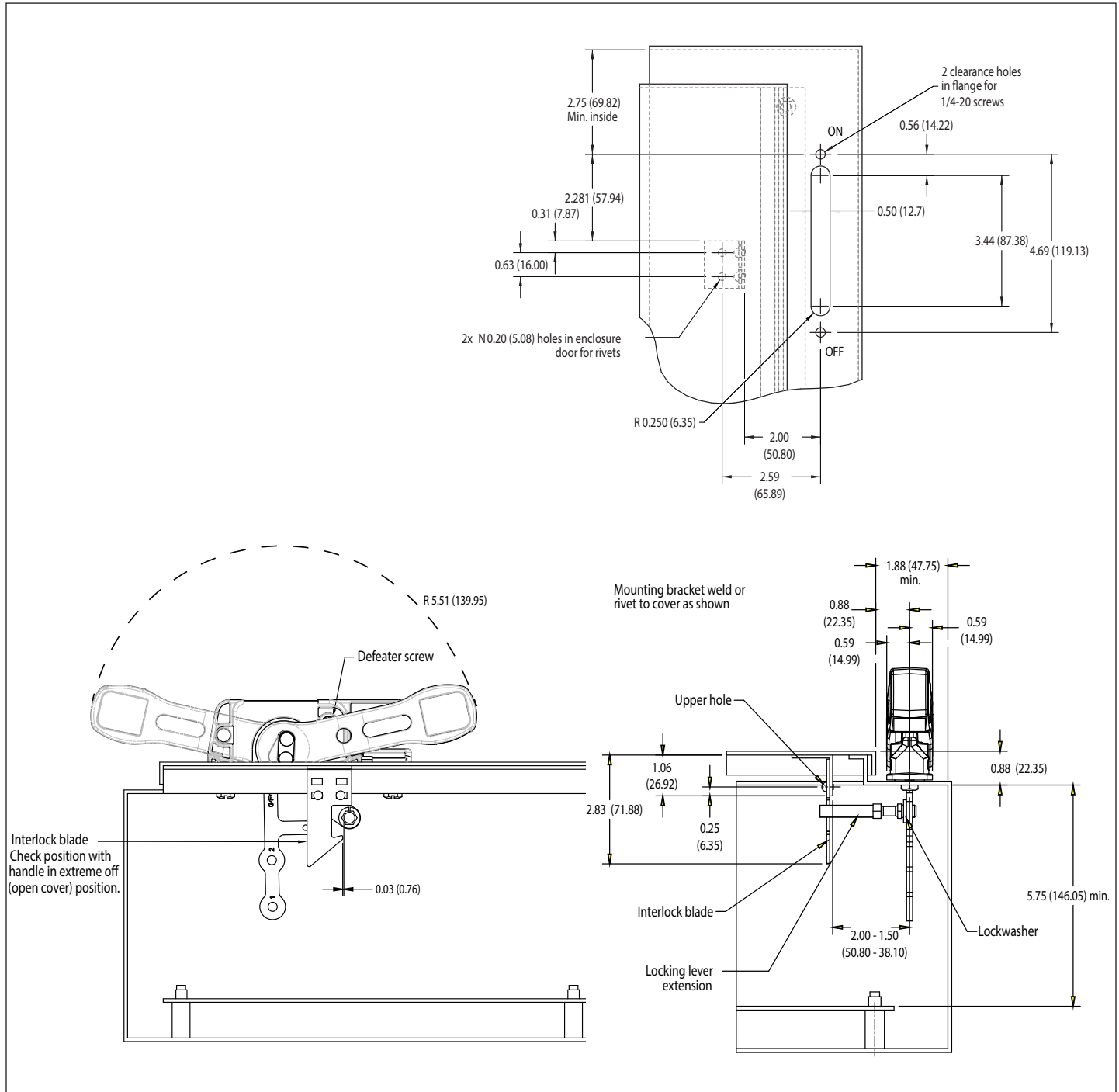


Figure 8. Flange drilling plans for handle and interlock blade mounting dimensions.

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Instruction Leaflet IL012160EN

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Notes:

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