



## Instructions for Drilling and Assembling Series C Rotary Handle Mechanism for F-Frame Series C Circuit Breakers, Molded Case Switches, and HMCPs



### 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.**

**CUTLER-HAMMER 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 Cutler-Hammer 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 Cutler-Hammer for further information or instructions.

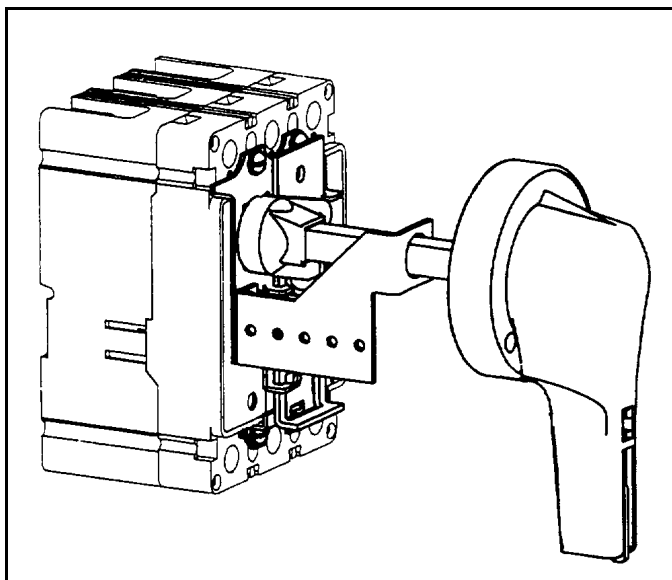


Fig. 1-1 F Rotary Handle Mechanism Assembly

### DESCRIPTION

The Cutler-Hammer general purpose Rotary handle mechanism is suitable for use with NEMA 1, 3R, 12, 4, and 4X fabricated enclosures. It is designed for use with Series C - F-Frame Circuit Breakers, Molded Case Switches, and Motor Circuit Protectors (HMCP) up to 150 amps.

Required for a standard application are the operating handle, shaft, and mechanism.

The operating handle has been designed to meet NFPA 79 requirements. It may be mounted in either the horizontal or vertical direction. The handle was ergonomically designed with extra clearance for a "gloved hand" to operate. It may be padlocked in the Off position utilizing 3 padlocks (.312 Max).

The standard label on the operating handle indicates ON/Tripped/OFF/Reset. To fulfill international requirements, an alternate handle may be ordered which indicates (I)/Tripped/(O)/Reset.

To meet the various enclosure depths, four variable depth shafts are offered (6", 12", 16", and 24"). Each shaft includes a support brace to ensure proper alignment. In addition, the 16" and 24" extra long shafts include an adjustable support bracket.

The standard mechanism located on the breaker does include means for internally locking the breaker in the "Off" position with up to 3 padlocks each with a maximum diameter of .312".

As an option, an auxiliary switch is offered so that the control panel builder may electrically indicate the status of the breaker. This accessory would be mounted on the mechanism and comes with 24" pigtail leads.

### INSTALLATION INSTRUCTIONS:

The installation procedure consists of: drilling and modifying customer enclosure; installing the circuit breaker and operating assembly; assembling the shaft to the operating assembly, and handle assembly to the enclosure cover; testing function of installed handle mechanism. To install the handle mechanism, perform the following steps.

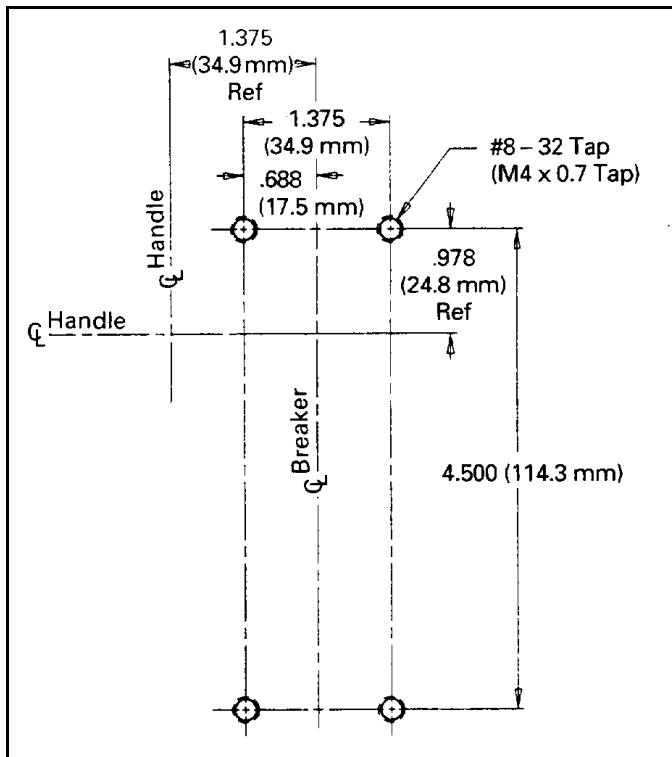


Fig. 2-1 Drill & Tapping Plan for F-Frame Breaker



**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 VOLTAGES IN ENERGIZED EQUIPMENT CAN CAUSE DEATH OR SEVERE PERSONAL INJURY.

**Installation of Circuit Breaker and Operating Assembly**

1. Determine position for circuit breaker in enclosure. Drill and tap circuit breaker mounting holes in enclosure mounting surface as shown in Figure 2-1.
2. Mount circuit breaker to enclosure using the two shorter screws in the hardware kit. Insert screws and lockwashers into two diagonally opposed circuit breaker mounting holes and tighten securely into tapped holes from step 1. (Fig. 2-2)

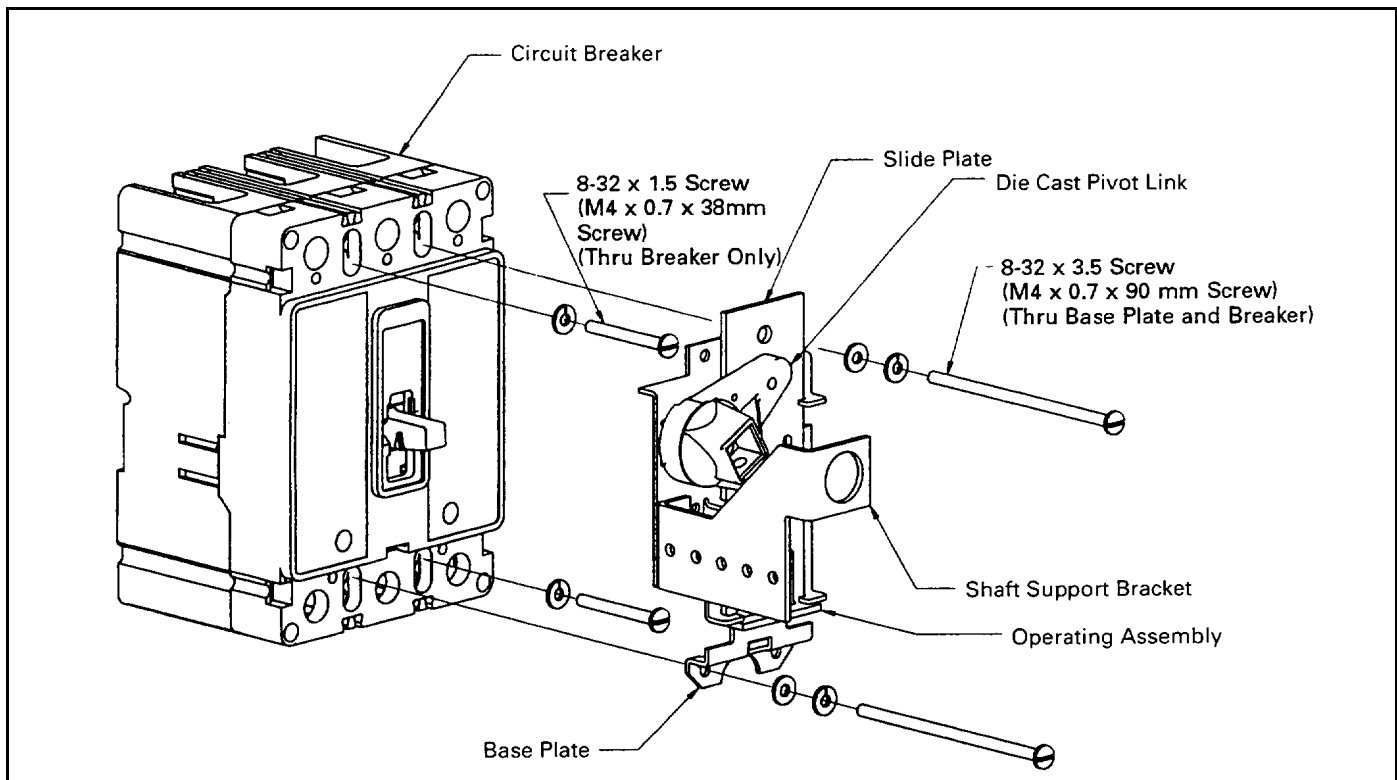


Fig. 2-2 F-Frame Breaker/Mechanism Assembly

3. Turn circuit breaker to "OFF" position.
4. Measure panel depth "D" per Figure 3-1. If "D" is less than 7" (179 mm), remove shaft support bracket from operating assembly and discard.
5. Mount mechanism onto circuit breaker, ensuring slide plate is engaged with the circuit breaker handle. Insert the two longer screws, washers, and lockwashers from the hardware kit into the remaining circuit breaker mounting holes. (Fig. 2-2)

**Installation of Shaft to Operating Assembly**

1. Using panel depth "D" from step 4, determine shaft length by subtracting 3.00" (76.2 mm) from this dimension.

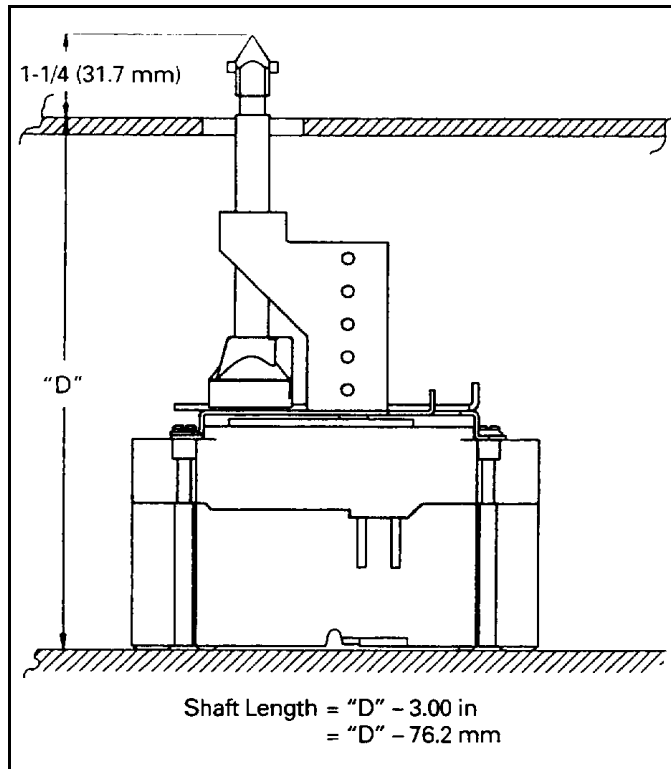


Fig. 3-1 Cutting Shaft to Length

2. Mark shaft, measuring length beginning at the pointed end and cut to correct length. (Fig. 3-1)
3. If adjustable support extension is being used (designed for 16" and 24" shaft lengths), install loosely at this time. Remove screws from extension and use to attach to shaft support bracket.
4. Place square end of shaft into square opening of die cast pivot link on the operating mechanism attached to the circuit breaker. Ensure pin is in shaft correctly oriented with respect to anticipated handle position

(vertical or horizontal handle placement, see Fig. 3-2). Insert set screw from hardware kit into pivot link and torque to 50 lb.-in.

5. If adjustable support extension is being used, tighten securely at this time.

**Installation of Handle Assembly onto Enclosure Cover**

1. To determine where to drill the enclosure door cover, close the cover with moderate force in order to cause the point of the shaft to scratch/mark the paint on the inside of the door.
2. Prior to drilling the 1.50" (38 mm) Dia. hole in the cover door, use correction factor per Table 4.1. Correction should be made from mark on door (step 1) towards the hinge. Drill 1.50" (38 mm) Dia. hole.

Distance From Hinge	Correction	
	Flat Hinge	Offset Hinge
4	3/16" (4.8 mm)	9/16" (9.5 mm)
5	5/32" (4.0 mm)	7/16" (11.1 mm)
6	1/8" (3.2 mm)	11/32" (8.7 mm)
7	3/32" (2.4 mm)	9/32" (7.1 mm)
8	3/32" (2.4 mm)	1/4" (6.4 mm)
9	3/32" (2.4 mm)	7/32" (5.6 mm)
10	1/16" (1.6 mm)	3/16" (4.8 mm)
11	1/16" (1.6 mm)	3/16" (4.8 mm)
12	1/16" (1.6 mm)	5/32" (4.0 mm)

Table 4.1 Correction Factor Table

3. After hole is drilled, close enclosure cover allowing the shaft to stick through the opening. Check this dimension per Figure 3-1. If dimension is not correct, loosen the set screw holding the shaft in the die cast pivot link and adjust such that the dimension is within the required limits, and retighten set screw.
4. Close enclosure door. Cut out the dotted line of the shaft on the template provided in the hardware kit or in Figure 4-1. Do not cut out the handle mounting screw holes. Place the template over the shaft ensuring the proper side is facing out. Align the template with the shaft and mark the handle mounting holes for the "F" frame breaker (dashed lines). Drill (4) .281" (7.0 mm) diameter holes.
5. Place gasket, supplied in hardware kit, between handle assembly and door. Loosely drive the four

1/4-20 x 0.5 screws through both the door and gasket from the inside of the enclosure door cover and into the handle assembly. Tighten evenly. For International handle styles, the handle mounting hardware is similar to the M6 x 1 x 12 mm screw if misplaced.

- j. Align handle assembly with shaft and close enclosure door.
- k. Switch handle mechanism to OPEN COVER (RESET) position. Check to ensure breaker resets.

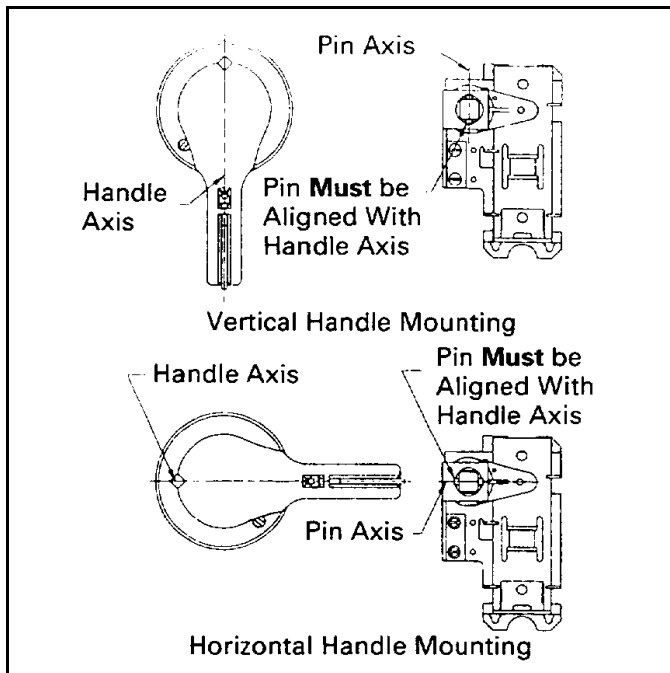


Fig. 3-2 Handle Orientation

6. With power isolated from the circuit breaker, test function of installed handle mechanism in the following manner:
  - a. Close enclosure door. Switch handle mechanism to ON.
  - b. Check that handle mechanism switches circuit breaker to ON position and that enclosure door cannot be opened.
  - c. Switch handle mechanism to OFF position.
  - d. Check that handle mechanism switches circuit breaker to OFF position and that enclosure door cannot be opened.
  - e. Turn handle to OPEN COVER position and ensure door opens.
  - f. Close enclosure door. Switch handle mechanism/circuit breaker to ON.
  - g. Turn interlock defeater counter clockwise with a flat-blade screwdriver.
  - h. Open enclosure door.
  - i. Press Push-To-Trip button in the circuit breaker trip unit with a small flat-blade screwdriver to trip circuit breaker.

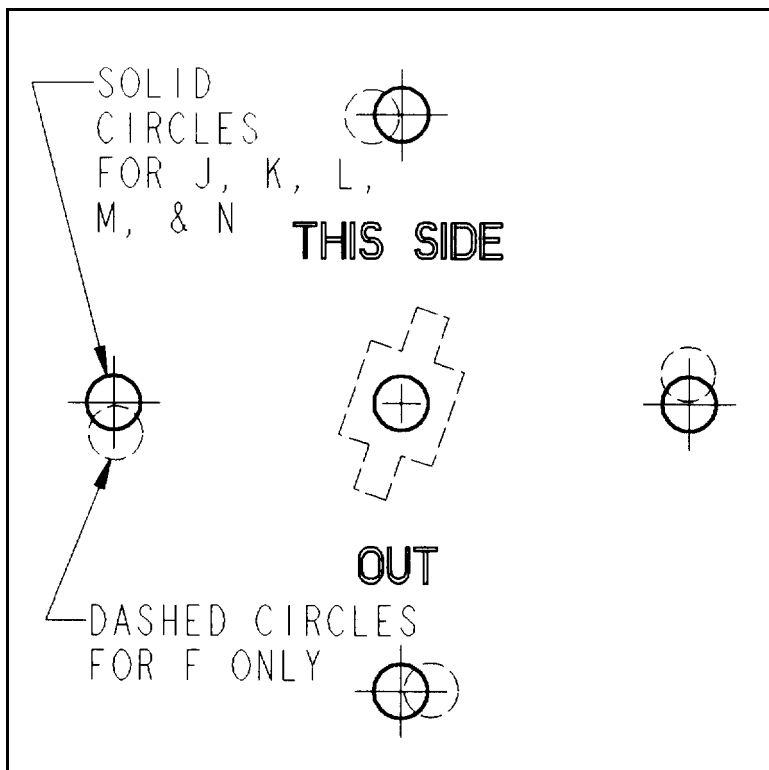


Fig. 4-1 Full Size Drill Template

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**Cutler-Hammer**

Pittsburgh, Pennsylvania U.S.A.

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