



Installation Instructions for Undervoltage Release Mechanism (Handle Reset) for EHD, FDB, FD, HFD, FDC, FW, HFW, FWC Circuit Breakers and Molded Case Switches



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.

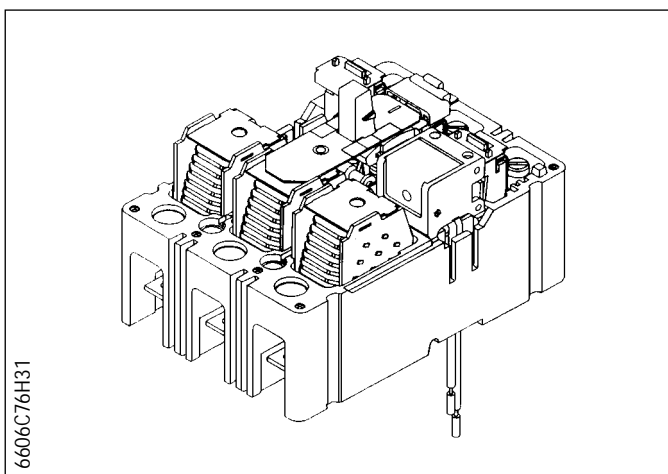


Figure 1-1 Undervoltage Release Mechanism (Handle Reset) Installed in F-Frame Circuit Breaker

1-0 INTRODUCTION

General Information

The undervoltage release mechanism (UVR) (Figure 1-1) monitors a voltage (typically a line voltage) and trips the circuit breaker when the voltage falls to between 70 and 35 percent of the solenoid coil rating. The UVR consists of a continuous rated solenoid with a plunger and tripping lever mounted in a plug-in module. The tab on the tripping lever resets the UVR when normal voltage is restored and the circuit breaker handle is moved to the reset (OFF) position. With no voltage applied to the UVR, the circuit breaker contacts will not touch when a closing operation is attempted.

The UVR is available with several voltage ratings for most AC and DC requirements. Table 1.1 lists application and electrical operating rating data for the UVR.

Depending on the model ordered, connections for the UVR are in one of four forms. The standard wiring configuration is pigtail leads exiting the rear of the base directly behind the UVR. Optional configurations include a terminal block mounted on the same side of the base as the accessory, leads exiting the side of the base where the accessory is mounted, and leads exiting the rear of the base on the side opposite the accessory. The 18-inch long pigtail leads are color coded for identification; identification labels are provided for pigtail leads and terminal block points. For allowable locations of all accessories, refer to Frame Book 29-101.

NOTICE

No more than three pigtail leads can be routed through the rear trough in the circuit breaker base. When the walking beam interlock is used with the circuit breaker, the rear trough cannot be used for accessory pigtail leads.

This instruction leaflet gives detailed procedures to install the UVR.

Table 1.1 Undervoltage Release Mechanism (Handle Reset) Ratings ①②③

Catalog Suffix	Application Ratings		Electrical Operating Ratings					Dielectric ④ Withstand Voltage (V)
	Voltage (V)	Freq. (Hz)	Supply Voltage (V)	Dropout Voltage (V)		Pickup Voltage (V)	VA	
				Min.	Max.	Max.		
02	9-12	50-60	9	4.2	6.3	7.6	1.3	1024
03	24	50-60	12				2.5	
22	48	50-60	24	8.4	16.8	20.4	1.4	1048
24	60	50-60	48	16.8	33.6	40.8	1.2	1096
08	110-127	50-60	60	21	42	51	1.9	1120
			110	44.5	77	93.5	1.3	1254
			120				1.5	
			127				1.7	
11	208-240	50-60	208	85	145.6	176.8	2.2	1480
			220				2.4	
			240				2.9	
15	380-480	50-60	380	168	266	323	2.9	1960
			415				3.5	
			440				3.9	
			480				4.6	
18	525-600	50-60	525	210	367	446	4.3	2200
			550				4.8	
			600				5.8	
20	12	DC	12	4.2	8.4	10.2	2.8	1024
21	24	DC	24	8.4	16.8	20.4	1.6	1048
22	48	DC	48	16.8	33.6	40.8	1.3	1096
24	60	DC	60	21	42	51	2.0	1120
26	110-125	DC	110	44.5	77	93.5	1.5	1250
			120				1.7	
			125				1.9	
28	220-250	DC	220	87.5	154	187	2.6	1500
			250				3.4	

① Terminal block is approved for use with one or two No. 18 to No. 14 AWG solid or stranded copper wire. Torque is 7 pound-inches (0.8 N.m.).

③ Initiation of HMCP contact separation begins 8 to 38 ms after voltage drop. Maximum HMCP contact opening occurs within 10 ms after initial separation.

② Endurance - 6000 electrical operations plus 4000 mechanical operations.

④ For 1 minute.

2-0 INSTALLATION

NOTICE

For sealed circuit breakers, Underwriters Laboratories, Inc. UL489 requires that internal accessories be installed at the factory. The UVR is listed only for factory installation under UL file E7819.

Where local codes and standards permit and UL listing is not required, internal accessories can be field installed.

Before attempting to install the UVR, check that the catalog number is correct and the rating of the accessory satisfies job requirements.

The UVR is shown in kit form in Figure 2-1 and can be supplied as either a right or left-hand assembly. Depending on the catalog number ordered, the UVR can be installed in the right accessory mounting cavity of a 2-pole circuit breaker, in the left or right cavity of a 3-pole circuit breaker, or in the left cavity only of a 4-pole circuit breaker. A UVR must be installed in the circuit breaker before the circuit breaker is mounted in an electrical system. To install the UVR, perform the following procedures:

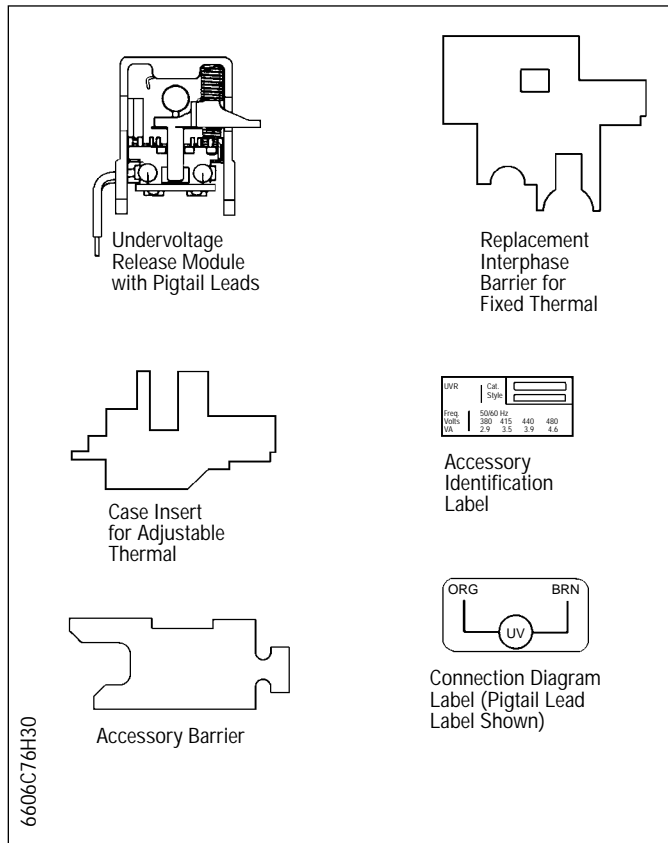


Figure 2-1 Undervoltage Release Mechanism (Handle Reset) Kit

NOTICE

A circuit breaker that is mounted in an electrical system must be removed to install the accessory. To ensure correct accessory installation, the circuit breaker must be placed on a horizontal surface.

WARNING

BEFORE REMOVING A CIRCUIT BREAKER INSTALLED IN AN ELECTRICAL SYSTEM, MAKE SURE THE CIRCUIT BREAKER IS SWITCHED TO THE OFF POSITION AND THERE IS NO VOLTAGE PRESENT WHERE WORK IS TO BE PERFORMED. SPECIAL ATTENTION SHOULD BE PAID TO REVERSE FEED APPLICATIONS. THE VOLTAGES IN ENERGIZED EQUIPMENT CAN CAUSE DEATH OR SEVERE PERSONAL INJURY.

- 2-1. Switch circuit breaker to the OFF position.
- 2-2. Disconnect and remove circuit breaker from installation and terminal connections.
- 2-3. Remove cover screws and cover. The handle must be in the OFF position if the circuit breaker has a cover interlock.

CAUTION

DURING INSTALLATION AND FUNCTIONAL CHECKS OF THE UVR, DO NOT TOUCH THE CIRCUIT BREAKER CALIBRATED TRIP MECHANISM. CONTACT WITH THE CALIBRATED TRIP MECHANISM COULD CHANGE TRIP CHARACTERISTICS.

- 2-4. To install the UVR, the circuit breaker operating mechanism must be in the tripped position. Press PUSH-TO-TRIP button below escutcheon to trip the operating mechanism.

NOTICE

For a UVR having rear or opposite-side exiting pigtail leads, thread leads through trough in side of base before attempting to install the accessory. Pigtail leads exiting in this manner must be eased through trough as UVR is inserted into mounting cavity.

- 2-5. Route wiring to meet installation requirements (see Figure 2-2).

FD or FW Fixed Thermal Breaker

- 2-6.1. Insert UVR as described in the following steps (see Figure 2-3):
 - a. Remove interphase barrier between accessory mounting cavity and operating mechanism as shown in Figure 2-4.

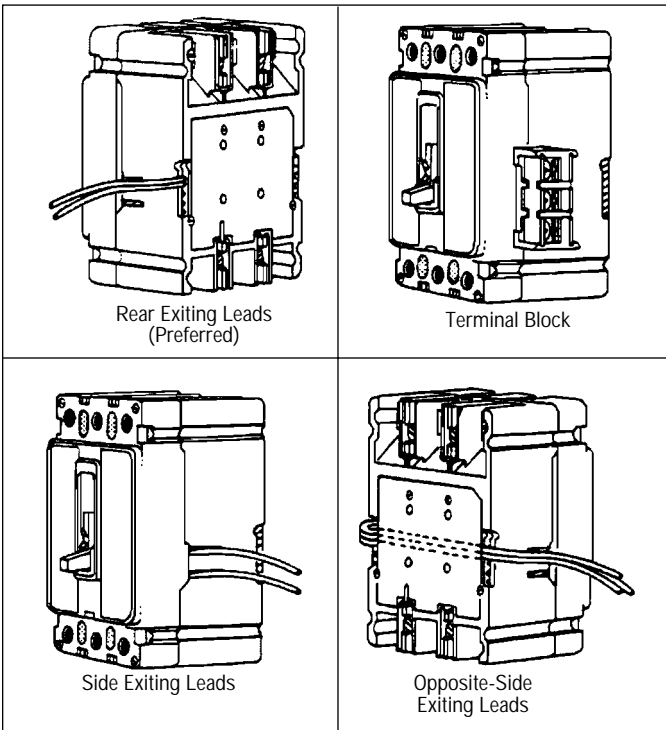


Figure 2-2 Accessory Wiring Options

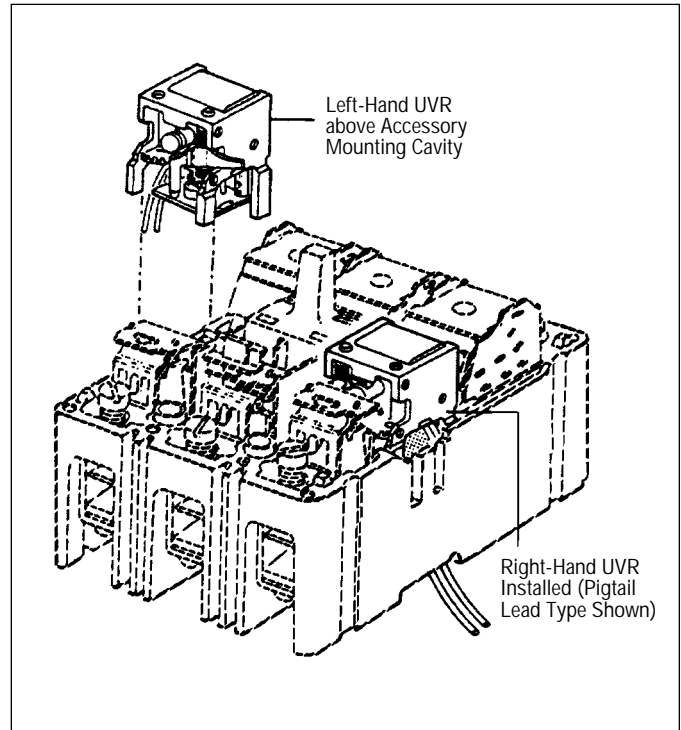


Figure 2-3 UVR Installation Positions

- b. Lift out arc extinguisher on the same side of the circuit breaker as the accessory installation.
- c. Slide accessory barrier into position between molded crossbar and trip bar. Long leg of barrier must go into slot in base. Bend barrier over and put T-shaped end into moving contact slot in base (see Figure 2-5).
- d. Install arc extinguisher.
- e. Put tip of UVR reset tab through square opening in replacement interphase barrier. (See Figure 2-6.)

IMPORTANT

- f. **Slide UVR plug-in module and interphase barrier slowly into mounting slots in base. Gentle pressure on circuit breaker handle towards arc extinguishers will assist UVR reset tab past handle. For terminal block assemblies, slide terminal block into mounting slot in side of base as plug-in module is being positioned.**

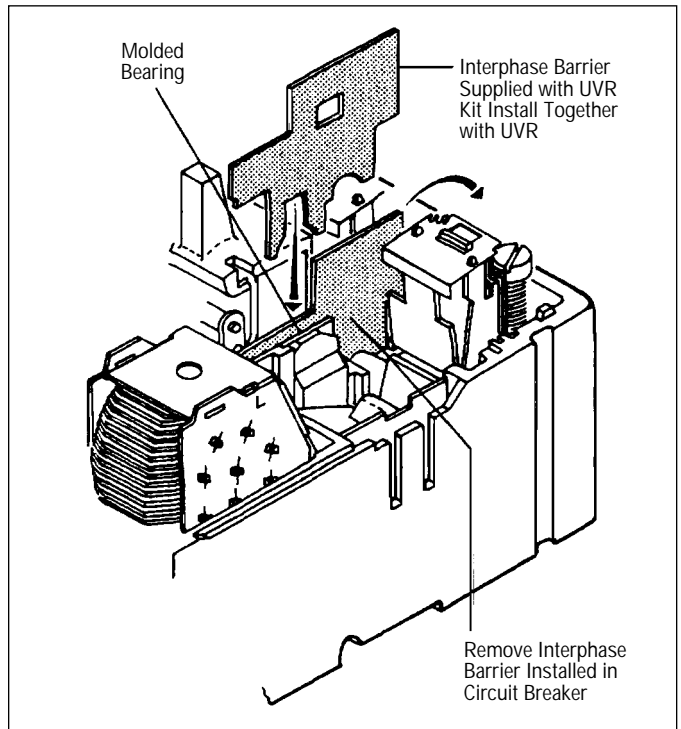


Figure 2-4 Position of Interphase Barrier and Molded Bearing

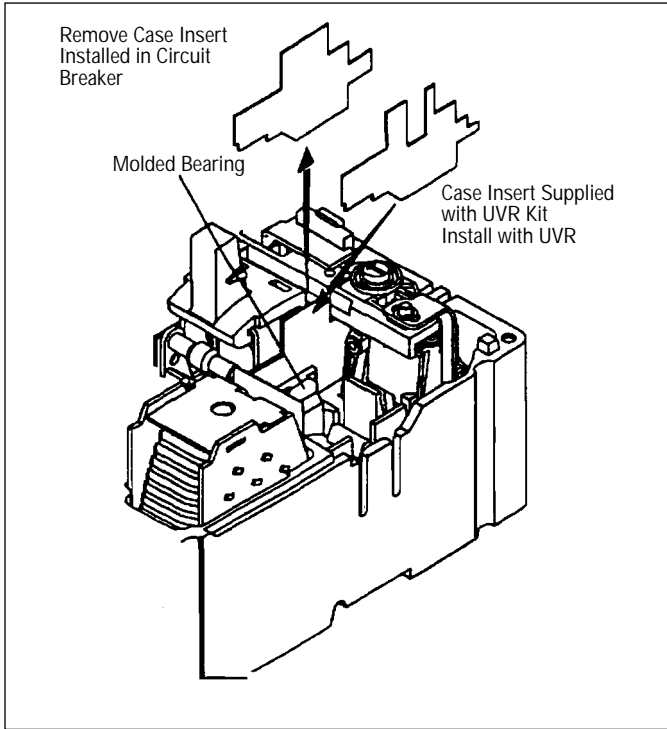


Figure 2-4a Position of Interphase Barrier and Molded Bearing

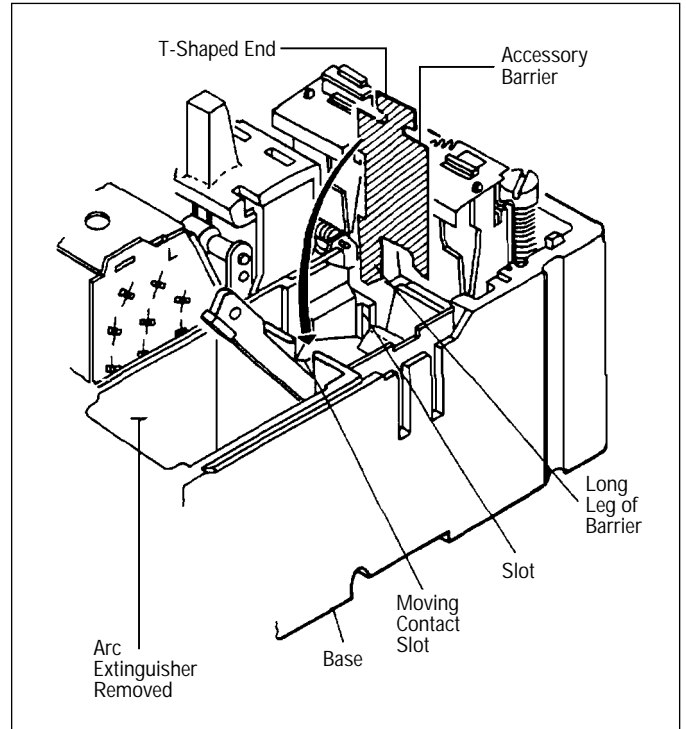


Figure 2-5 Accessory Barrier Installation Position

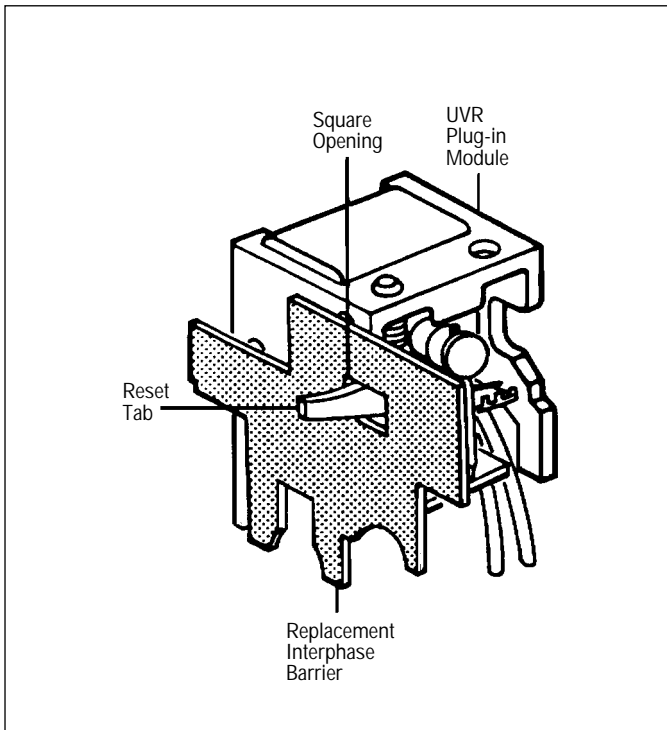


Figure 2-6 UVR Interphase Barrier Installation

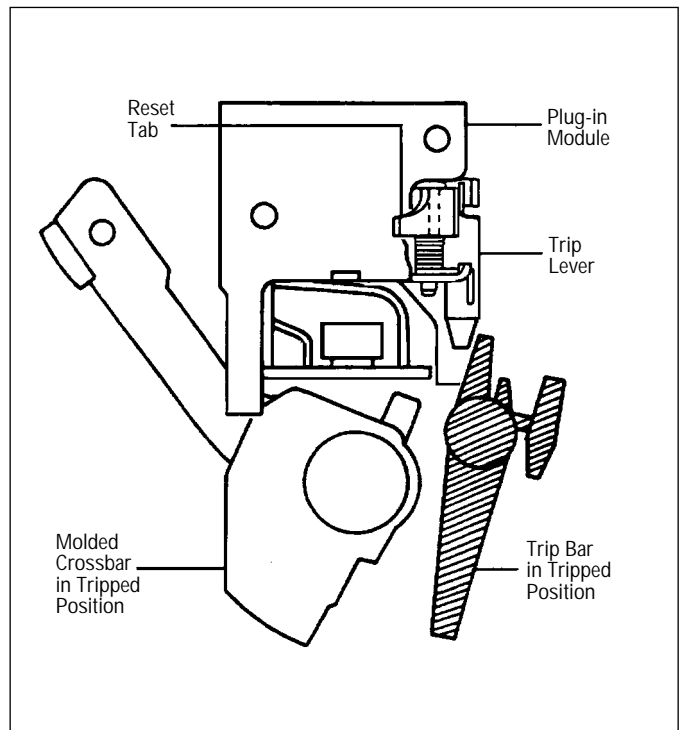


Figure 2-7 Correct Position for Trip Lever and Trip Bar

- g. **Before plug-in module seats fully in mounting slots, reset the circuit breaker and put the handle in the OFF position. Then seat the UVR. Make sure UVR trip lever touches the flat surface of trip bar (see Figure 2-7) and reset tab is operated by the handle arm (see Figure 1-1).**
- h. If required, complete routing of opposite-side exiting leads.

FW Adjustable Thermal Breaker

2-6.2. Insert UVR as described in the following steps (see Figure 2-3):

- a. Remove case insert between accessory mounting cavity and operating mechanism shown in Figure 2-4a.
- b. Lift out arc extinguisher on the same side of the circuit breaker as the accessory installation.
- c. Slide accessory barrier into position between molded cross bar and trip bar. The long leg of barrier must go into slot in base. Bend barrier over and put T-shaped end into moving contact slot in base (see Figure 2-5).
- d. Install arc extinguisher.
- e. Slide thin replacement case insert into position between thick interphase barrier and molded bearing (see Figure 2-4a).

IMPORTANT

- f. **Slide UVR plug-in module slowly into mounting slots in base. Gentle pressure on circuit breaker handle towards the arc extinguisher will assist UVR reset tab past handle.** For terminal block assemblies, slide terminal block into mounting slot in side of base as plug-in module is being positioned.
- g. **Before plug-in module seats fully in mounting slots, reset the circuit breaker and put the handle in the OFF position. Then seat the UVR. Make sure UVR trip lever touches the flat surface of the trip bar (see Figure 2-7) and reset tab is operated by the handle arm (see Figure 1-1).**
- h. If required, complete routing of opposite-side exiting leads.



WARNING

WHEN CHECKING THE ACCESSORY, DO NOT PUT FINGERS NEAR MOVING PARTS INSIDE THE CIRCUIT BREAKER CASE. SPRINGS CAUSE INTERNAL PARTS TO MOVE QUICKLY AND WITH FORCE. CONTACT WITH MOVING PARTS CAN CAUSE INJURY.

- 2-7. Perform an installation and mechanical check of the UVR after installation.
 - a. Installation check. Hold accessory in base. Reset circuit breaker. Check that UVR tripping lever pushes plunger into solenoid. Circuit breaker must trip when handle is moved towards the ON position.
 - b. Mechanical check. Hold UVR plug-in module firmly in position in the base. Using a small flat-blade screwdriver as shown in Figure 2-8, push in and hold solenoid plunger. Reset and switch circuit breaker to ON. Release solenoid plunger and check that circuit breaker trips.
 - c. Reset circuit breaker handle and check that handle arm moves UVR reset tab and tripping lever to reset position.
 - d. If mechanical check does not trip the circuit breaker, confirm if UVR is correctly installed.

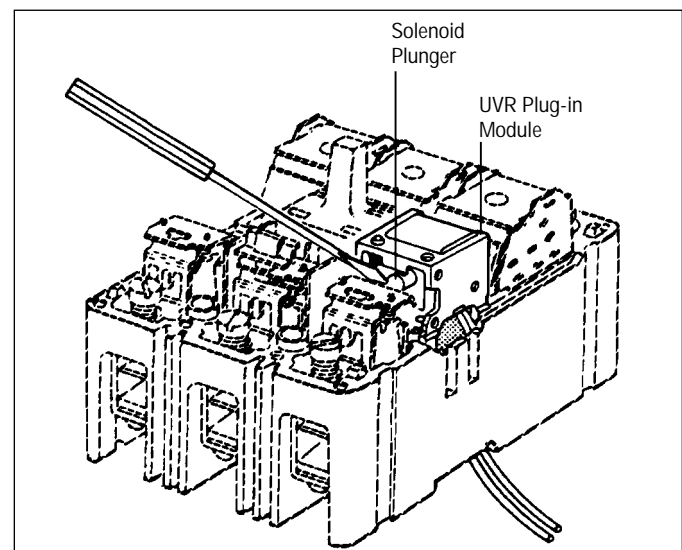


Figure 2-8 Screwdriver Depressing Undervoltage Release Mechanism Solenoid Plunger

If UVR appears to be correctly installed and problem persists, contact Cutler-Hammer.



CAUTION

WHEN INSTALLING THE CIRCUIT BREAKER COVER, MAKE SURE THAT ALL INTERNAL PARTS ARE IN PLACE:

- Arc extinguishers are in each arc extinguisher cavity.
 - Interphase barrier or case insert is fully inserted into base.
 - Sliding handle barrier is correctly installed with O on barrier over arc extinguisher.
 - PUSH-TO-TRIP button should be guided through hole in cover using small screwdriver.
 - Cover baffle(s) in place in cover.
 - Pigtail leads are clear of the cover.
- 2-8. With circuit breaker handle in the OFF position and pigtail leads routed as required, install cover and cover screws. Torque cover screws to 12-15 lb-in.
- 2-9. When UVR is installed at a non-UL-approved location, remove and discard UL listing label.
- 2-10. Place labels supplied with kit on circuit breaker (see Figure 2-9).

NOTICE

When installing UVR in 2 pole circuit breakers or circuit breakers with cover mounted accessories, alternate label mounting positions on side of circuit breaker should be selected.

2-11. Where practical and after taking all necessary safety precautions, apply UVR rated voltage to the UVR. Reset and close circuit breaker. Confirm circuit breaker trips when voltage is removed.

2-12. Install circuit breaker.

NOTICE

Labels on circuit breaker show connection diagram for UVR contacts. Pigtail leads are color coded orange and brown.

No external resistors are required.

2-13. Connect UVR to power source to be monitored (see Figure 2-10).

Cutler-Hammer assumes no responsibility for malfunctioning accessories installed by the customer.

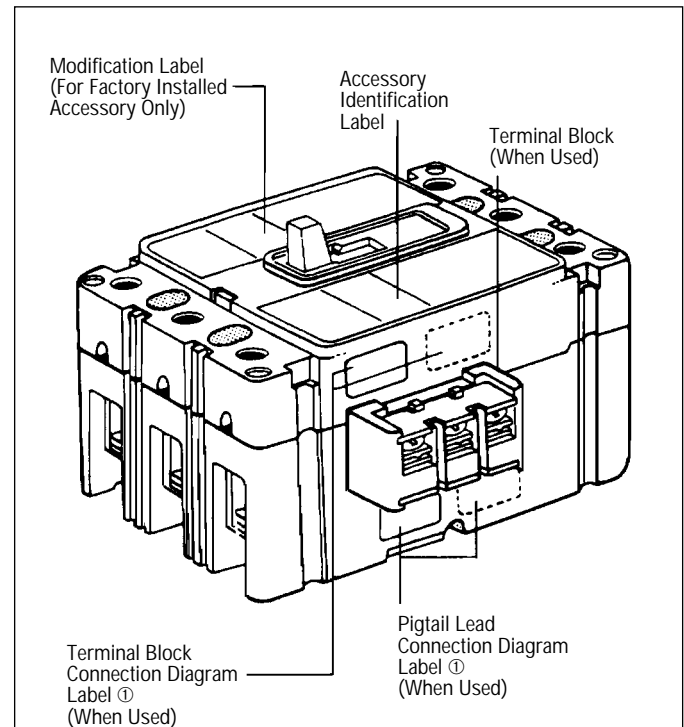


Figure 2-9 Preferred Mounting Locations for Accessory Nameplate Labels

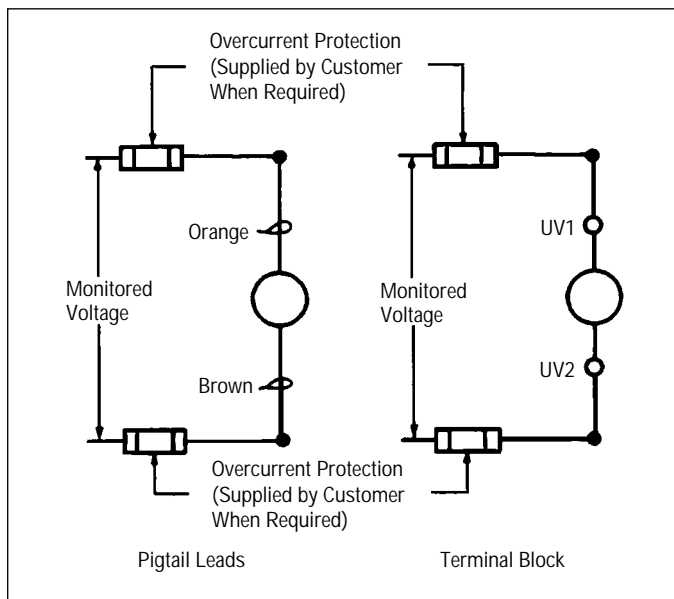


Figure 2-10 Undervoltage Release Mechanism (Handle Reset) Connection Diagram

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