Installation Instructions for Low Energy Shunt Trip for R-Frame Series C Circuit Breakers and Molded Case Switches

**WARNING**

CONTACT WITH ENERGIZED EQUIPMENT CAN RESULT IN DEATH, SEVERE PERSONAL INJURY, OR SUBSTANTIAL PROPERTY DAMAGE. DO NOT ATTEMPT TO INSTALL OR PERFORM MAINTENANCE ON EQUIPMENT WHILE IT IS ENERGIZED. 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 judgement, 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.

1. INTRODUCTION

General Information

The low energy shunt trip (LEST) (Fig. 1-1) is designed to interface with a customer ground fault detection circuit. The LEST consists of an intermittent-rated solenoid and a plunger assembled to a plug-in module. The plug-in module is mounted in slots in the accessory mounting deck in the right pole of the circuit breaker. When the solenoid is energized, the plunger extends and presses against the trip bar, tripping the circuit breaker. The trip bar resets the LEST when the trip signal is removed and the circuit breaker handle is moved to the reset (extreme OFF) position.

The LEST is designed to trip the circuit breaker when a 100 microfarad capacitor charged to 28 Vdc is discharged through the solenoid.

The standard wiring configuration for the LEST is pigtail leads exiting the right side of the cover. An optional terminal block (Cat No. TBRD) may be mounted to the base on the right side of the circuit breaker to terminate attachment leads. The 18-inch long pigtail leads are color coded for identification.

A maximum of one LEST may be installed in each circuit breaker.

This instruction leaflet (IL) gives detailed procedures for installing the shunt trip.

![Fig. 1-1 Low Energy Shunt Trip Installed in R-Frame Circuit Breaker](image)

2. INSTALLATION

Note: The LEST can be field-installed in RD and RDC circuit breakers under UL File E64983.

The LEST can be field-installed in RW and RWC circuit breakers.

The LEST is listed for factory installation under UL File E7819.

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

The LEST, shown in kit form in Fig. 2-1, is installed in the right pole of a 3- or 4-pole circuit breaker. To install the shunt trip, perform the following procedures:

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**WARNING**

THE VOLTAGES IN ENERGIZED EQUIPMENT CAN CAUSE DEATH OR SEVERE PERSONAL INJURY. SPECIAL ATTENTION SHOULD BE PAID TO REVERSE FEED APPLICATIONS TO ENSURE NO VOLTAGE IS PRESENT. BEFORE MOUNTING THE SHUNT TRIP IN 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.

Note: Internal accessories are most easily installed in a circuit breaker before it is mounted in an electrical system. Although it is recommended that a circuit breaker mounted in an electrical system be removed to install accessories, it is possible to perform this task in a mounted circuit breaker provided no voltage is present and proper safety precautions are followed.

2-1. Switch circuit breaker to OFF position.

Note: To install accessory, circuit breaker must be in tripped position.

2-2. Press Push-to-Trip button to trip operating mechanism.

Note: The cover holds the handle in position. Attention should be paid to the orientation of the handle on the handle arm when the cover is removed. The handle must be re-installed in the same position.

2-3. Remove cover screws, cover, and handle.

2-4. Install shunt trip as described in following steps:

Note: For ease of installation, auxiliary switch accessories (if used) should be installed in the accessory mounting deck before the LEST or other accessories.

- a. Select position for the LEST on accessory mounting deck (see Fig. 2-2).
- b. Place legs of the LEST mounting bracket into slots in accessory mounting deck.
- c. Slide the LEST toward the line end of the circuit breaker until the retaining clip snaps into recess in deck (see Fig. 2-3).

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**CAUTION**

PIGTAIL LEADS COULD BE DAMAGED IF IN CONTACT WITH MOVING PARTS. PIGTAIL LEADS SHOULD BE FORMED; AND ROUTED TO CLEAR ALL MOVING PARTS WHEN ACCESSORY IS PROPERLY INSTALLED.

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Fig. 2-1 Low Energy Shunt Trip Kit

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Fig. 2-2 Accessory Location Diagram
2-5. Attach cable tie mounting pad to side of circuit breaker (See Fig. 2-4 for location). Route leads to mounting pad. Ensure leads line up with slot in cover and are clear of all moving parts. Secure leads to mounting pad with cable tie. Leads from multiple accessories may be secured by a single cable tie and mounting pad (see Fig. 2-3).

2-6. Remove barrier indicated in Fig. 2-4 from cover accessory lead lot.

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**CAUTION**

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

- HANDLE MUST BE HELD IN PLACE ON HANDLE ARM AS COVER IS BEING INSTALLED. LOCATE HANDLE SO THAT THE GREEN TABS ARE CLOSEST TO THE LINE-END OF THE CIRCUIT BREAKER.
- PIGTAIL LEADS MUST BE CLEAR OF THE COVER.

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**CAUTION**

SOLENOID IS RATED FOR INTERMITTENT DUTY. CONTINUOUS APPLICATION OF 24 VDC WILL DAMAGE THE SOLENOID.

2-9. Electrical check. Where practical and after taking all necessary safety precautions, connect yellow LEST lead to positive terminal of a DC power supply and white lead to ground. Reset and close circuit breaker. Confirm that circuit breaker trips when 24 Vdc (maximum pulse of one second) is applied to leads.

2-10. Install circuit breaker.
2-11. Connect LEST to ground fault detection circuit to be monitored (see Fig. 2-5). Yellow lead is positive.

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

Fig. 2-5  Low Energy Shunt Trip Connection Diagram