



# Installation Instructions for Shunt Trip for GB/GHB, GC/GHC Circuit Breakers



## 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 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 shunt trip (Fig. 1-1) provides remote controlled electrical tripping for the circuit breaker and consists of an intermittent rated solenoid with a tripping plunger and a cutoff switch mounted in a plug-in module. Shunt trip modules are mounted so that when the solenoid is energized, the plunger presses against the trip bar and trips the circuit breaker. As the circuit breaker trips, the accessory operating projection on the molded crossbar presses against the cutoff switch actuator arm to open the cutoff switch, disconnecting power to the solenoid and preventing coil burn out.

Table 1-1 lists application and electrical operating rating data for the shunt trip.

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

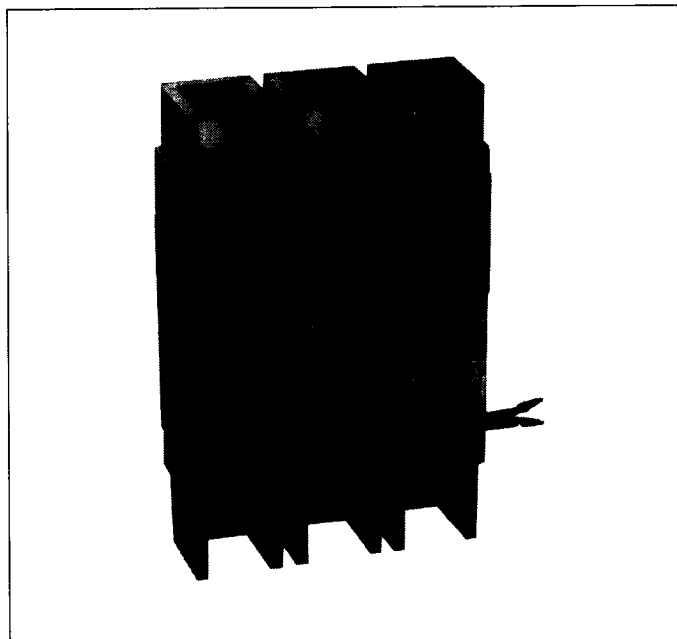


Fig. 1-1 Shunt Trip Installed in GHC Circuit Breaker

## 2. INSTALLATION

**Note: For sealed circuit breakers, Underwriters Laboratories, Inc. UL489 requires that internal accessories be installed at the factory. The shunt trip 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 shunt trip, check that the style number is correct and the rating of the accessory satisfies job requirements.**

The shunt trip, shown in kit form in Fig. 2-1, can be installed in the left-hand accessory mounting cavity in the cover of a 3-pole circuit breaker. A shunt trip must be installed in the circuit breaker before the circuit breaker is mounted in an electrical system. To install the shunt trip, perform the following procedures:

**Note: 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.**

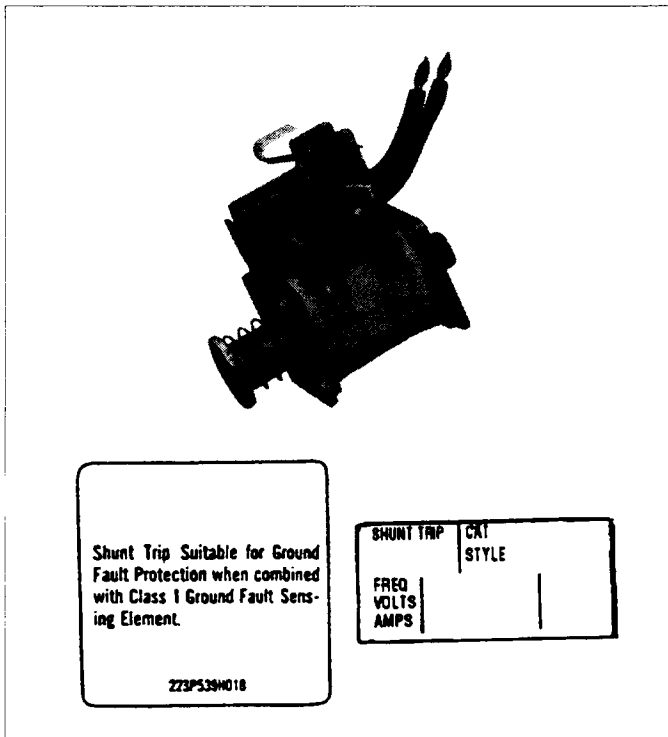


Fig. 2-1 Shunt Trip Kit



**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 TO ENSURE NO VOLTAGE IS PRESENT. 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.



**CAUTION**

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

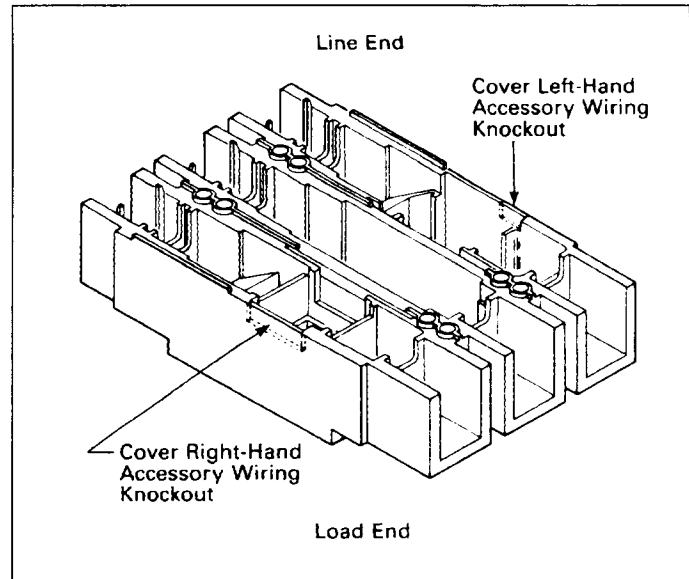


Fig. 2-2 Location of Accessory Wiring Knockout in Cover

- 2-4. Locate knockout (Fig. 2-2) provided in left side of cover for accessory wiring. Remove knockout and file rough edges smooth.
- 2-5. With cover in inverted position (Fig. 2-3), position shunt trip plug-in module as shown and slide into mounting cavity in circuit breaker cover.

**Note: Left-hand mounting cavity will be on the right when inside of cover is facing upwards.**

Make sure that leads are properly nested and fit into notch provided in cover.



**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.**



**CAUTION**

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

- **ARC EXTINGUISHERS ARE IN THE ARC EXTINGUISHER CAVITIES.**
- **INTERPHASE BARRIERS ARE FULLY INSERTED IN BASE.**
- **PIGTAIL LEADS ARE NOT PINCHED BY THE COVER.**

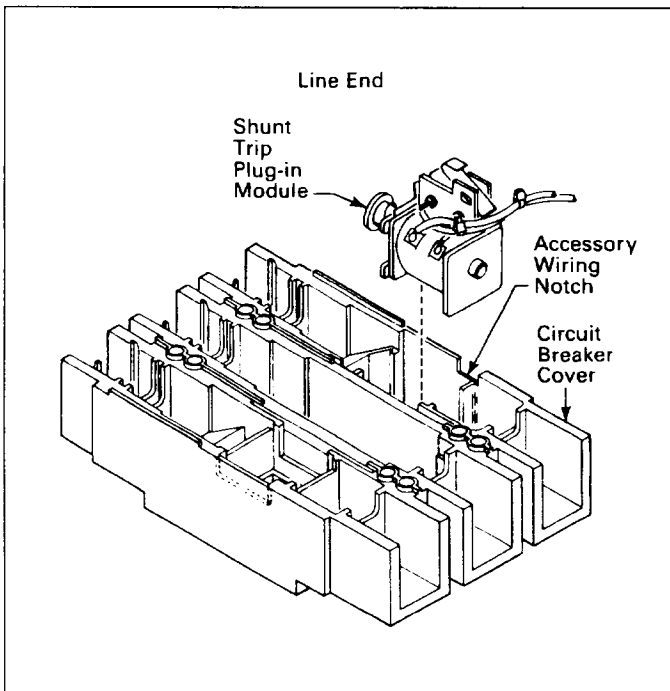


Fig. 2-3 Shunt Trip Installation

- 2-6. With the circuit breaker handle in the OFF position and pigtail leads routed as required, install cover and cover screws.
- 2-7. When shunt trip is installed at a non-UL approved location, remove and discard UL listing label.
- 2-8. Place labels supplied with kit on circuit breaker. (See Fig. 2-4.)
- 2-9. Test shunt trip. Connect ohmmeter across pigtail leads or terminal block connections. Check continuity as follows:
  - a. Circuit breaker handle OFF - no continuity.
  - b. Circuit breaker handle ON - less than 9000 ohms.

2-10. Where practical and after taking all necessary precautions, apply shunt trip rated voltage to shunt trip. Test operation of shunt trip as follows:

- a. With circuit breaker closed, push shunt trip test button. Circuit breaker must trip. Shunt trip must not buzz.
- b. With circuit breaker open, push shunt trip test button. Shunt trip must not operate.

2-11. Install circuit breaker.

2-12. Connect shunt trip as required (see Fig. 2-5).

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

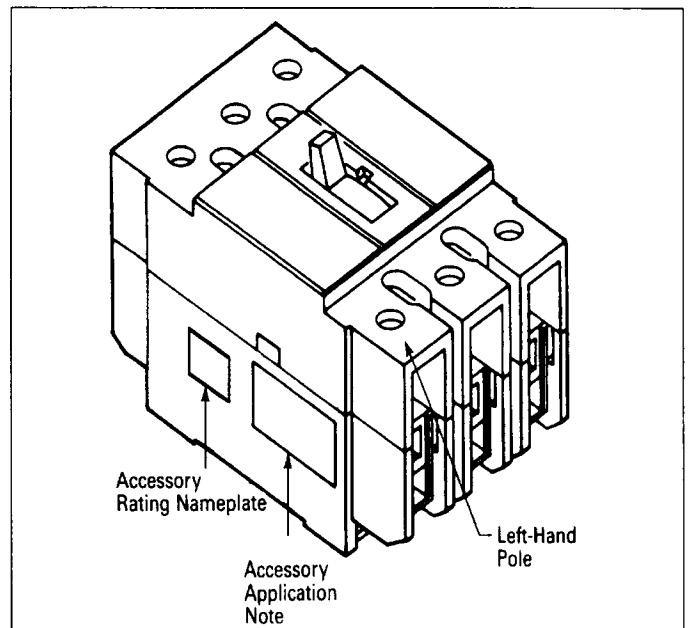


Fig. 2-4 Preferred Mounting Locations for Accessory Nameplate Labels

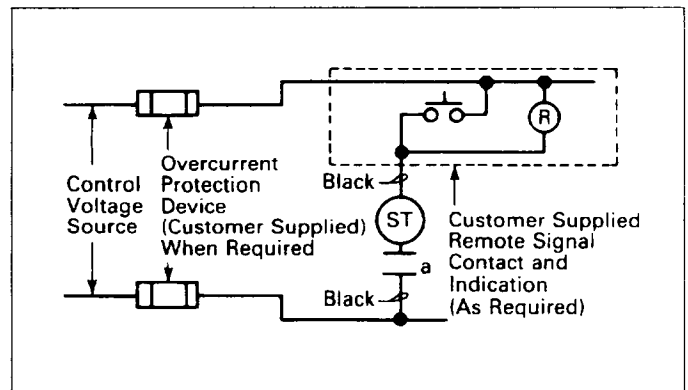


Fig. 2-5 Shunt Trip Connection Diagram

**Table 1-1. Shunt Trip Electrical Rating Data**<sup>②③④⑤⑥</sup>

| Application Ratings  |                | Electrical Operating Ratings |                               |                              |                              |                                |           |   |
|----------------------|----------------|------------------------------|-------------------------------|------------------------------|------------------------------|--------------------------------|-----------|---|
| Voltage (V)          | Frequency (Hz) | Supply Voltage (V)           | Minimum Operating Voltage (V) | I <sub>p</sub> at 0.017s (A) | I <sub>Dc</sub> at 0.25s (A) | I <sub>rms</sub> at 0.033s (A) | VA        | One Minute Dielectric Withstand Voltage (V) |
| 120-240 <sup>①</sup> | 50/60          | 120                          | 66                            | 1.6                          |                              | 1.1                            | 135       | 1500  |
|                      |                | 240                          | 66                            | 3.0                          |                              | 2.1                            | 500       |   |
| 12-24                | DC             | 12<br>24                     | 9<br>9                        |                              | 2.8<br>5.7                   |                                | 40<br>140 | 1500  |
| 24                   | 50/60          | 24                           | 18                            | 12.5A                        |                              | 8.1                            | 195       | 1500  |

**Notes:**

- ① Shunt trip is suitable for ground fault protection when combined with Class 1 ground fault sensing element.
- ② Average unlatching time approximately 6 milliseconds.
- ③ Average circuit breaker contact total opening time approximately 18 milliseconds.
- ④ Endurance - 600 electrical operations of the shunt trip plus 9400 mechanical operations of the circuit breaker.
- ⑤ Shunt trip can be operated up to a maximum of six times per minute.
- ⑥ Maximum operating voltage 110% of maximum voltage range rating.

**Cutler-Hammer**

Pittsburgh, Pennsylvania U.S.A.

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