


Cutler-Hammer

Installation Instructions for Shunt Trip for Cutler-Hammer JDB, JD, HJD, JDC, JW, HJW, JWC Circuit Breakers, Molded Case Switches, and J-Frame Motor Circuit Protectors (HMCP)



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. It consists of an intermittent rated solenoid with a tripping plunger and a cutoff switch attached to a plug-in module. The plug-in module is mounted in slots in the trip unit and occupies the accessory cavity in the circuit breaker frame. When the solenoid is energized, the plunger extends and presses against an intermediate plunger, which operates the trip bar in the trip unit. As the circuit breaker trips, the molded crossbar presses against the cutoff switch operating 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.

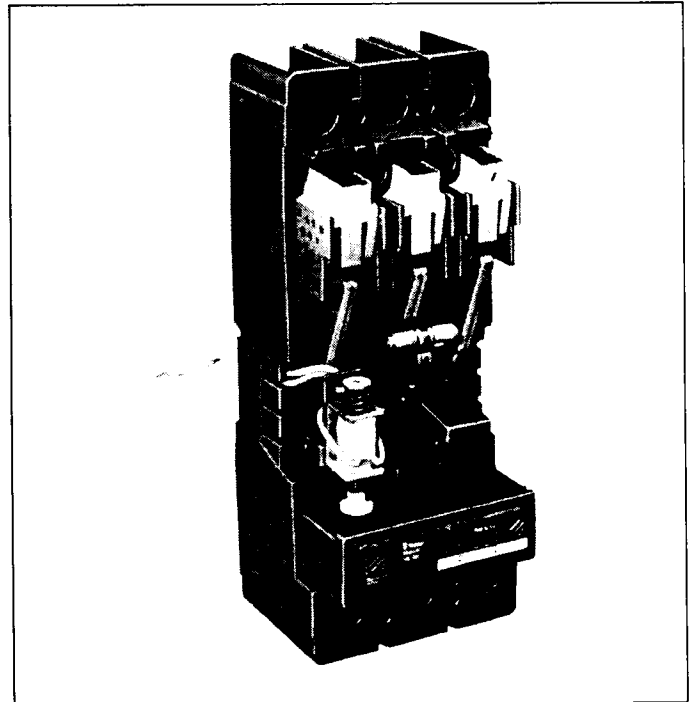


Fig. 1-1. Shunt Trip Installed in J-Frame Circuit Breaker

Depending on the model ordered, connections for the shunt trip are in one of four forms. The standard wiring configuration is pigtail leads exiting the rear of the base directly behind the shunt trip. 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 Selection Data 29-102J.

Note: When the walking beam interlock is used with the circuit breaker, the rear trough cannot be used for accessory pigtail leads.

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

2. INSTALLATION

Note: The shunt trip can be field-installed in JD, HJD, and JDC circuit breakers under UL File E64983.

The shunt trip can be field-installed in JW, HJW, and JWC circuit breakers.

For sealed circuit breakers (JDB), Underwriters Laboratories, Inc. UL489 requires that internal accessories be installed at the factory. The shunt trip is listed 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 in sealed circuit breakers. In this case, UL listing becomes invalid and the label should be removed.

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

The shunt trip, shown in kit form in Fig. 2-1, can be installed in the right or left accessory mounting cavity of a 2-, 3-, or 4-pole circuit breaker with a JT (fixed thermal) or JTA (adjustable thermal) trip unit; and, in the left pole only of a circuit breaker with a JS (electronic) trip unit. 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:



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.

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.

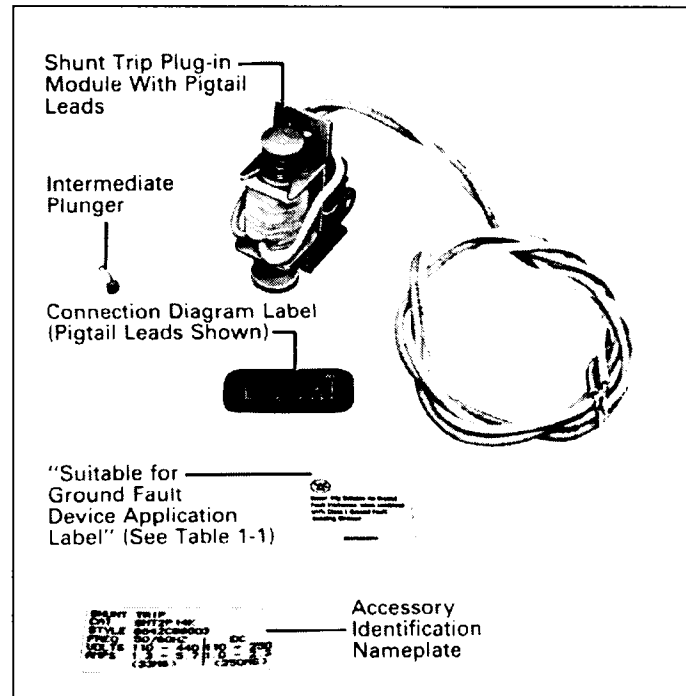


Fig. 2-1. Shunt Trip Kit

- 2-1. Switch circuit breaker to OFF position.
- 2-2. Disconnect and remove circuit breaker from installation and terminal connections.

Note: For new circuit breaker installation, the trip unit must be installed in circuit breaker before attempting to install a shunt trip. Refer to I.L. 29C600, I.L. 29C601, or I.L. 29C602 for instructions on how to install trip unit.

- 2-3. Remove cover screws and cover.

Note: For a shunt trip having rear or opposite-side exiting pigtail leads, thread leads through center trough in side of case before attempting to insert the mounting bracket. Pigtail leads exiting in this manner should be eased through trough as mounting bracket is inserted into trip unit retaining slots. Use center slot for leads exiting the side of the circuit breaker.

- 2-4. Route wiring to meet installation requirements. (See Fig. 2-2.)

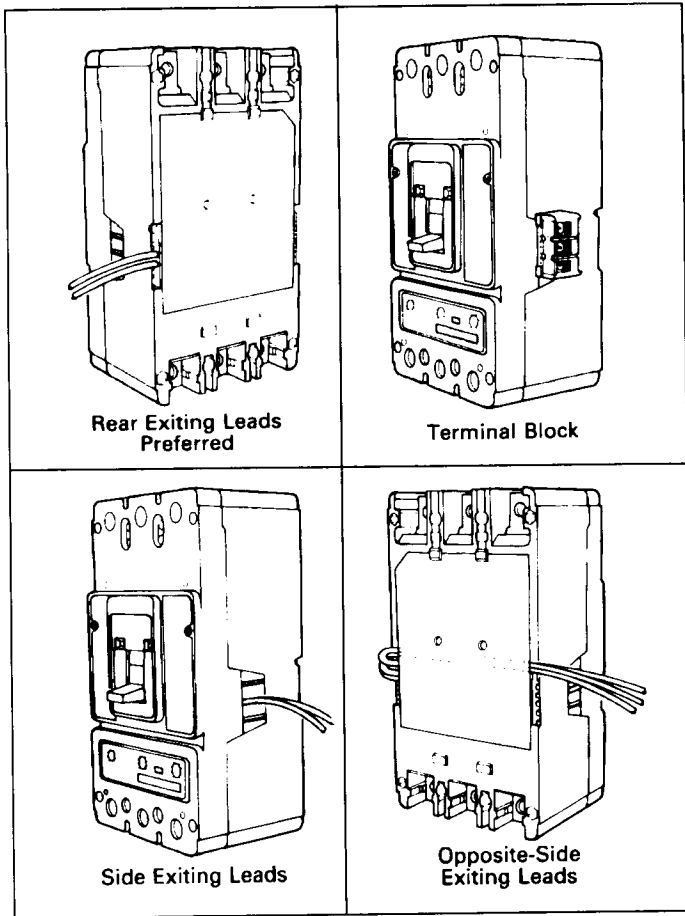


Fig. 2-2. Accessory Wiring Options



CAUTION

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

2-5. Insert shunt trip as described in following steps (Fig. 2-3):

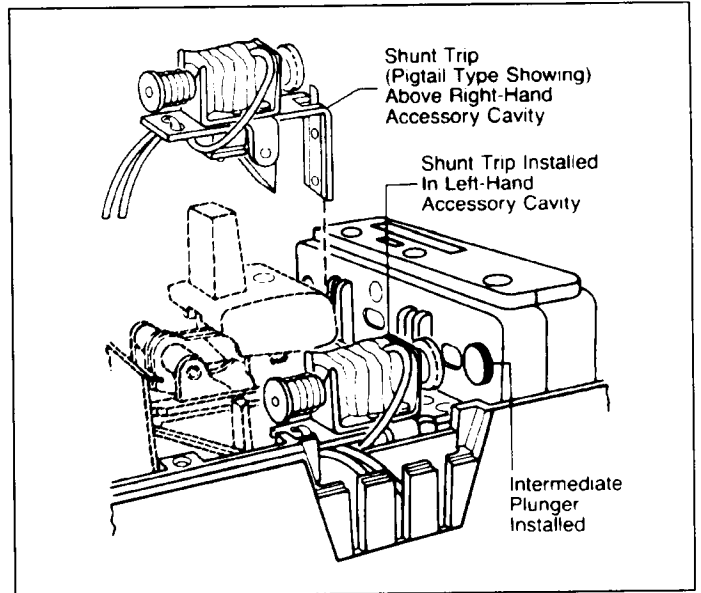


Fig. 2-3. Shunt Trip Installation Positions



WARNING

WHEN INTERMEDIATE PLUNGER IS POSITIONED IN TRIP UNIT, CIRCUIT BREAKER WILL MOVE TO TRIP POSITION. CARE SHOULD BE TAKEN TO KEEP FINGERS CLEAR OF CIRCUIT BREAKER MECHANISM PARTS AND HANDLE. FAILURE TO KEEP FINGERS AWAY FROM MOVING PARTS CAN CAUSE PERSONAL INJURY.

- a. Position intermediate plunger in trip unit. (See Fig. 2-4.)
- b. Trip circuit breaker by pressing intermediate plunger into recess in top of trip unit, and hold plunger in position.
- c. Slide shunt trip plug-in module into trip unit slots until spring-loaded retaining pin snaps into clip recess. Cutoff switch operating arm must be between the accessory operating projection on the molded cross-bar and the trip unit (Fig. 2-4.). For terminal block assemblies, slide terminal block into mounting slot on side of base as plug-in module is being positioned.
- d. If required, complete routing of leads to opposite-side through rear wiring trough.

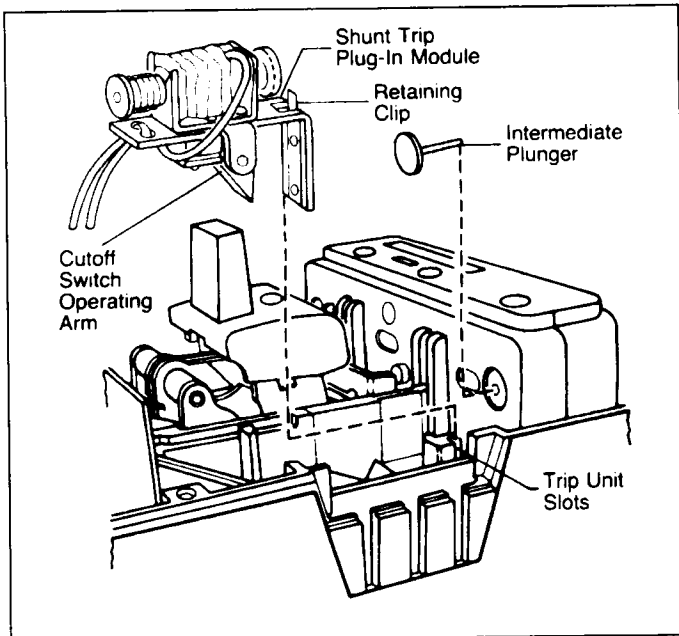


Fig. 2-4. Installing Intermediate Plunger and Shunt Trip

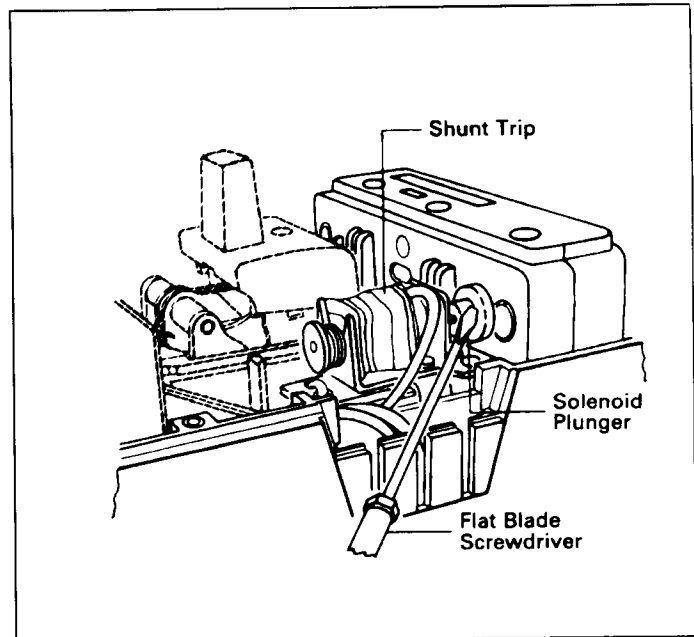


Fig. 2-5. Screwdriver Depressing Shunt Trip Solenoid Plunger



WARNING

WHEN CHECKING 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.

- 2-6. Perform mechanical check of shunt trip after installation:
- a. With the circuit breaker still electrically isolated, reset circuit breaker.
 - b. Using a small flat-blade screwdriver, depress solenoid plunger (Fig. 2-5). Circuit breaker should move to trip position.
 - c. If mechanical check does not trip circuit breaker, see if shunt trip and intermediate plunger are correctly installed. If shunt trip and intermediate plunger appear to be properly installed and problem persists, contact Cutler-Hammer.



CAUTION

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

- **SLIDING HANDLE BARRIERS ARE POSITIONED SO THAT THE HANDLE OPENING IS ALIGNED WITH HANDLE.**
- **PIGTAIL LEADS ARE CLEAR OF THE COVER.**

WHEN REMOVED AND REINSTALLED, THREAD-FORMING SCREWS WILL TRY TO REFORM THE THREADS IN THE CIRCUIT BREAKER BASE. CARE SHOULD BE TAKEN EVERY TIME A THREAD-FORMING SCREW IS USED TO ENSURE THAT THE SCREW STARTS IN THE ORIGINAL THREADS. DAMAGED THREADS CAN RESULT IN IMPROPER CIRCUIT BREAKER COVER RETENTION.

- 2-7. With circuit breaker handle in TRIP position and accessory pigtail leads (if used) routed as required, install circuit breaker cover. Secure with pan-head screws followed by thread-forming screws, as shown in Fig. 2-6.

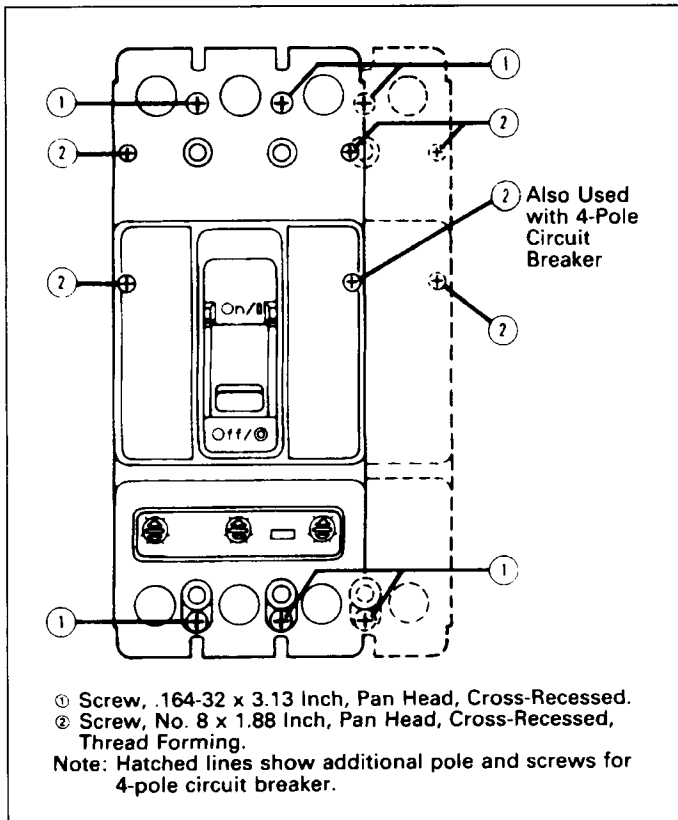


Fig. 2-6. Cover Screw Installation Positions

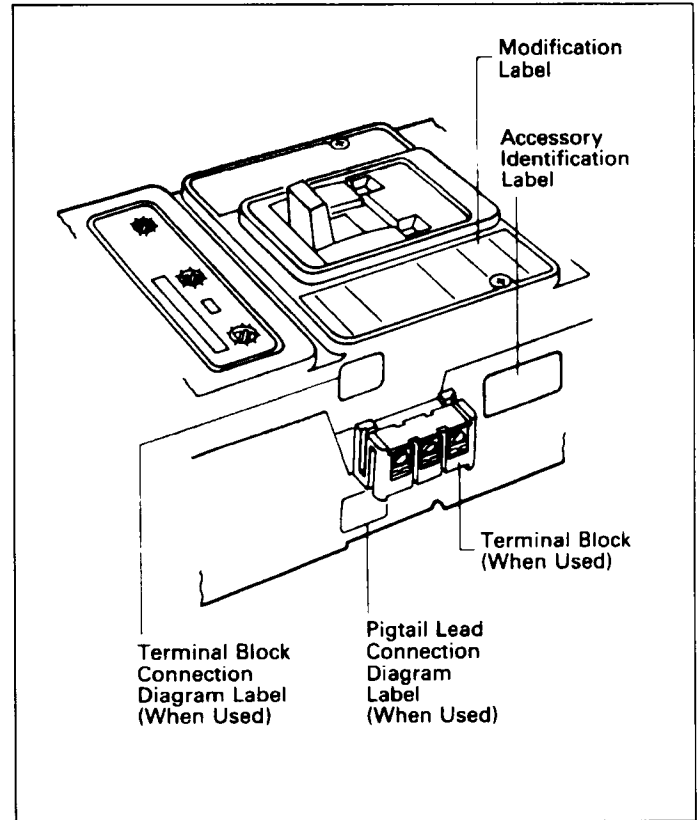


Fig. 2-7. Preferred Mounting Locations for Accessory Nameplate Labels

- 2-8. Remove and discard UL listing label on JDB circuit breakers only.
- 2-9. Place accessory labels (supplied with kit) on circuit breaker. (See Fig. 2-7.)

Note: Accessory labels show connection diagram for shunt trip. Pigtail leads are color coded white and yellow.

- 2-10. Test cutoff switch. 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.
 - c. Press PUSH-TO-TRIP button - no continuity.

- d. If cutoff switch fails test, make sure that shunt trip module is properly seated in trip unit slots. If problem persists, contact Cutler-Hammer.

2-11. Install circuit breaker.

2-12. Connect shunt trip as required. (See Fig. 2-8.)

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

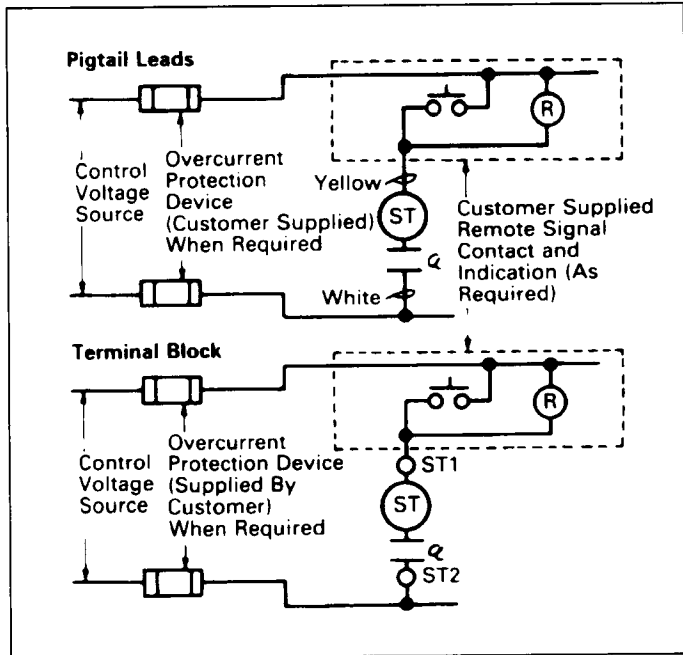


Fig. 2-8. Shunt Trip Connection Diagram



CAUTION

IF SHUNT TRIP IS REMOVED FROM CIRCUIT BREAKER, INTERMEDIATE PLUNGER MUST ALSO BE REMOVED. FAILURE TO REMOVE INTERMEDIATE PLUNGER CAN RESULT IN EQUIPMENT DAMAGE.

Table 1-1. Shunt Trip Electrical Rating Data

- Average unlatching time approximately 6 milliseconds, depending on voltage.
- Average circuit breaker contact total opening time approximately 18 milliseconds, depending on voltage.
- Endurance - 6000 electrical operations plus 2000 mechanical operations.
- Shunt trip can be operated up to a maximum of six times per minute.
- Maximum operating voltage - 110% of maximum voltage range rating.
- Terminal block is approved for use with one or two No. 18 to No. 14 AWG solid or stranded copper wire. Torque is 7 lb-in. (0.8 N.m).

Catalog Suffix		Application Ratings		Electrical Operating Ratings						
Field Mounting Kit	Factory Installed	Voltage (V)	Frequency (Hz)	Supply Voltage (V)	Minimum Operating Voltage (V)	I _p (A)	I _{rms} at 0.250s (A)	I _{rms} at 0.033s (A)	VA	One Minute Dielectric Withstand Voltage (V)
04K	04	12-24	50/60	12	9	17.7	12.6	164	1048	
				24						
		12-24	DC	12	9	7.3	87			
				24		16.9		405		
06K	06	48-60	50/60	48	36	24.4	17.3	830	1120	
				60						
		48-60	DC	48	36	14.8	710			
				60		18.4	1105			
11K ^①	11 ^①	110-240	50/60	110	60	0.9	0.6	66	1480	
				120		1.0	0.7	84		
				127		1.1	0.8	102		
				208		2.4	1.7	354		
				220		2.6	1.8	396		
				240		2.6	1.8	432		
		110-125	DC	110	60	1.0	112			
				120		1.1	138			
		125		1.2	150					
14K	14	380-440	50/60	380	285	0.34	0.33	127	1880	
				400		0.38	0.38	150		
				415		0.40	0.39	163		
				440		0.44	0.43	188		
		220-250	DC	220	165	0.18	40			
				250		0.23	58			
18K	18	480-600	50/60	480	360	0.13	0.07	34	2200	
				525		0.13	0.08	42		
				550		0.13	0.09	50		
				600		0.14	0.10	60		

Notes:

① Suitable for use with Class 1 GFP devices; marking label supplied with field mounting kit.

Cutler-Hammer

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