



Cutler-Hammer

I.L. 29C600A

File 29-000

# Instructions for Type JT Thermal Magnetic Trip Unit Installation and Operation with J-Frame Series C 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 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.

## 1. INTRODUCTION

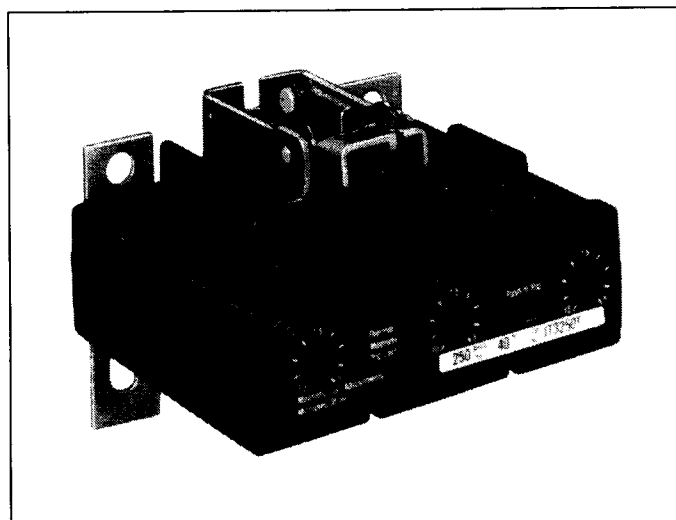


Figure 1-1 J-Frame Series C Circuit Breaker Thermal-Magnetic Trip Unit Type JT

## General Information

Trip units for J-Frame Series C circuit breakers (Fig. 1-1) are available in two types: Type JT with thermal-magnetic trip functions, described in this instruction leaflet; or Type JS electronic (Seltronic) trip functions, covered in I.L. 29C601. Trip units are listed in accordance with Underwriters Laboratories, Inc. Standard UL489 and satisfy the applicable requirements of the International Electrotechnical Commission Recommendations for molded case circuit breakers.

The trip unit includes either a fixed or an adjustable thermal element for inverse time delay on overload and an adjustable magnetic element for protection against short circuits. In open air at 40°C, a circuit breaker with the trip unit installed will carry continuously a current ( $I_n$ ) equal to the ampere rating marked on the trip unit nameplate without exceeding a 50°C rise at the terminals. The National Electrical Code (USA) requirements state that overcurrent protective devices may be loaded to a maximum of 80 percent of its rating ( $I_n$ ).

The trip unit cover is factory sealed to prevent tampering with the calibration. Tables 1-1 and 1-2 list catalog numbers and electrical data for trip units.

**Thermal Trip:** In accordance with UL standards requirements the thermal element trips the circuit breaker within 2 hours for an overload of 135 percent and trips in less time for higher overloads. For all currents in excess of the magnetic setting, the tripping action is instantaneous. In the overload trip region (up to 5 x  $I_n$ ), the trip current times are the same for AC or DC.

**Adjustable Thermal:** Trip units having an adjustable thermal element can be adjusted within the range shown in Table 1-2 using a single adjusting button. (See Fig. 2-5.)

**Magnetic Trip:** The magnetic trip on each pole may be adjusted by turning the adjustment button with a screwdriver. (See Fig. 2-4.) Trip units are shipped from the factory with the buttons set in the high position. The magnetic trip is calibrated at the factory to trip at an rms alternating current within plus or minus 10 percent of the high setting indicated on the trip unit nameplate, and within plus or minus 20 percent of the low setting. In the magnetic trip region (above 5 x  $I_n$ ), the trip current levels are approximately 40 percent higher for DC than for AC.

## NOTICE

**Trip units are calibrated at 40°C, 50/60 Hz and DC as noted. Consult Cutler-Hammer for derating at other frequencies and ambient conditions.**

**Magnetic Calibration:** The Series C magnetic calibration is performed using a controlled ramp test method that should accurately reflect run-up test methods used in most field test procedures. The calibration is conducted in a fixture essentially free of any magnetic influence. Some minor reductions (up to 10%) in the actual pick-up values could occur for circuit breakers mounted on steel surfaces.

A controlled ramp test method generally produces more consistent results than a pulse test method because of the possible variables in the pulse method.

**Internal Accessories:** The following types of circuit breaker internal accessories, which mount on the Type JT trip unit, are available for use. The number of the Instruction Leaflet covering the installation of each accessory is also shown.

- Alarm (Signal)/Lockout (ASL) Switch I.L. 29C181
- Auxiliary Switch I.L. 29C121
- Shunt Trip I.L. 29C142
- Low Energy Shunt Trip I.L. 29C143
- Undervoltage Release Mechanism (Handle Reset) I.L. 29C163
- Undervoltage Release Mechanism (Manual Reset) I.L. 29C164
- Undervoltage Release Mechanism (Automatic Reset) I.L. 29C165

For further information on the J-frame Series C circuit breaker, refer to I.L. 29C103 and Frame Book 29-102.

## 2. INSTALLATION

The installation procedure consists of inspecting and installing the trip unit. To install the trip unit, perform the following steps.

## NOTICE

**If required, internal accessory installation should be done before the circuit breaker is mounted and connected. Refer to individual accessory instruction leaflets.**

2-1. Make sure that the trip unit is suitable for the intended installation by comparing nameplate data with existing equipment ratings and system requirements.

Inspect the trip unit for completeness, and check for damage before installing it in the circuit breaker frame.

## NOTICE

**Trip unit center retaining screw is captive in the conductor; the two outer screws are installed in the circuit breaker frame.**

2-2. Remove circuit breaker cover screws and cover.

2-3. Remove two screws from outer shunt plate inserts. (See Fig. 2-1.)

## NOTICE

**The two trip unit outer screws may be placed in the trip unit conductor holes at this time. If preferred, a magnetic screwdriver may be used to position the screws when the trip unit is in the base.**

**Make sure shunt plates are centered over shunt plate inserts. (See Fig. 2-1.)**

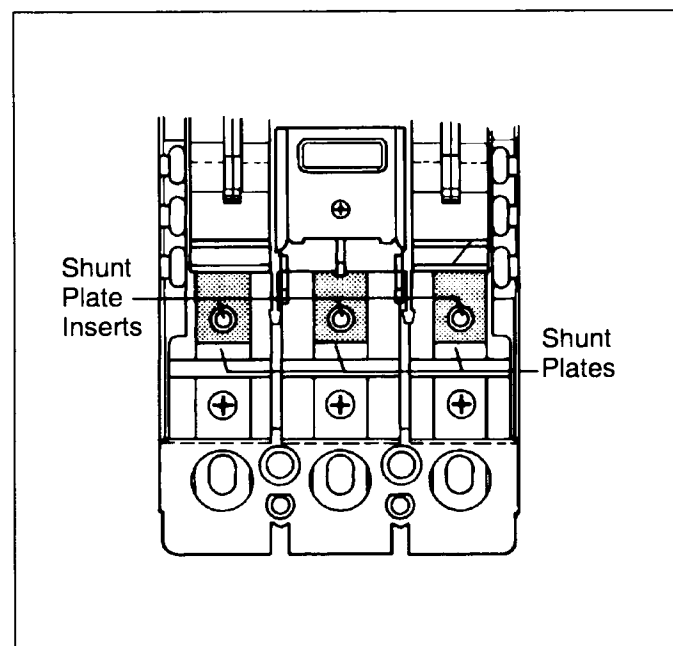


Figure 2-1 Shunt Plates Centered Over Shunt Plate Inserts

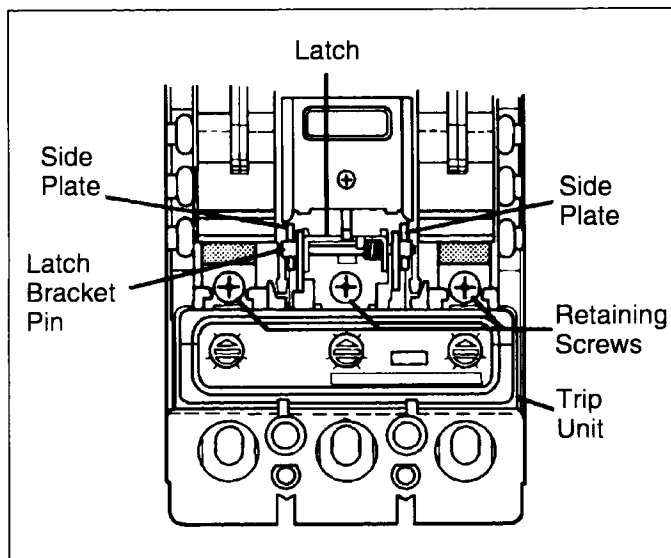


Figure 2-2 Trip Unit Installed in Circuit Breaker

2-4. Position trip unit in base. Make sure latch bracket pin is properly seated in slots in side plates. (See Fig. 2-2.) If necessary, pull latch towards load end of circuit breaker to help seat trip unit.



### CAUTION

**DO NOT EXCEED A TORQUE OF 6 TO 8 LB-FT (8 TO 10 N.M.). EXCESSIVE TORQUING WILL SHEAR SCREWS.**

**FAILURE TO APPLY THE REQUIRED TORQUE MAY LEAD TO EXCESSIVE HEATING AND CAUSE NUISANCE TRIPPING OF THE CIRCUIT BREAKER.**

2-5. Screw in and tighten three trip unit retaining screws (center first). Torque the screws to 6 to 8 lb-ft (8 to 10 N.m.). (See Fig. 2-2.)

2-6. Install accessory(ies), if required.



### CAUTION

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

### NOTICE

**When the trip unit is installed in a new circuit breaker frame, the remaining cover mounting hardware is supplied in a plastic bag with the frame.**

2-7. Install circuit breaker cover, and secure with pan-head screws followed by thread-forming screws as shown in Fig. 2-3.

2-8. Reset circuit breaker by moving handle to the reset position. Move handle to the ON position. Circuit breaker should remain ON.

2-9. Press PUSH-TO-TRIP button with a small screwdriver to check manual tripping of the circuit breaker. (See Fig. 2-4.)

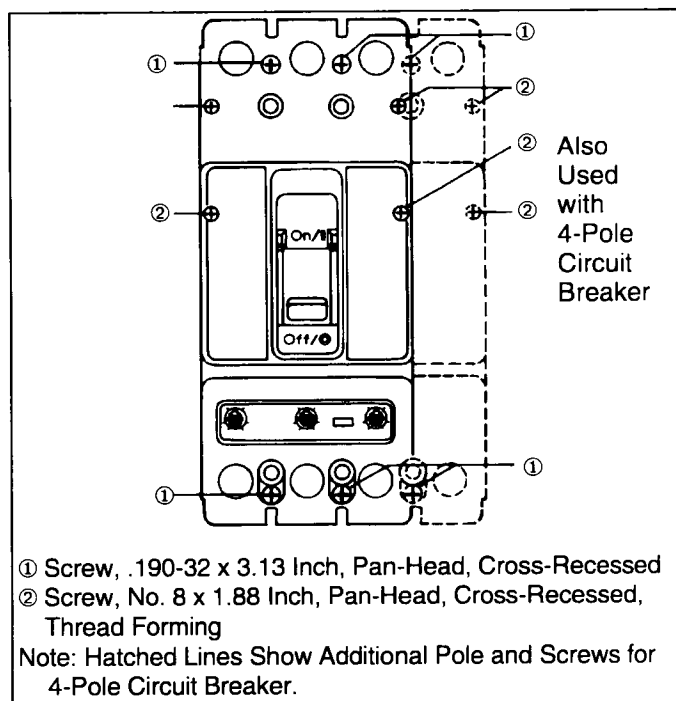


Figure 2-3 Cover Screw Installation Positions

### Trip Unit Magnetic Adjustment

The magnetic element of each pole of the trip unit can be JT2225T adjusted by rotating the adjustment buttons on the front face of the trip unit with a screwdriver. The buttons have several settings as indicated on the nameplate with values in multiples of the trip unit ampere rating ( $I_n$ ) as shown in Fig. 2-5. To adjust the setting, rotate each button clockwise until arrow on button points to desired setting.

2-10. Adjust magnetic pick-up settings as required. (See Fig. 2-4.)

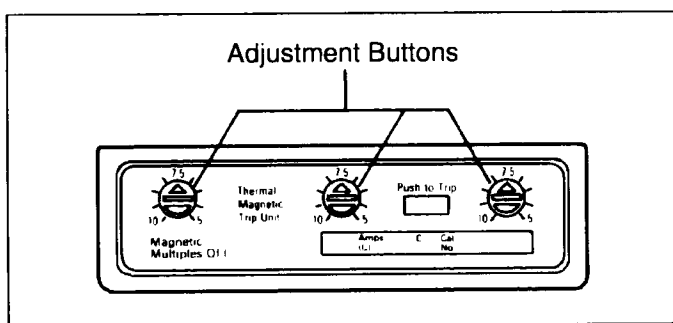


Figure 2-4 Trip Unit Magnetic Adjustment Buttons

### Trip Unit Thermal Adjustment

In some trip unit types, the thermal rating ( $I_n$ ) of the trip unit can be adjusted by a single button (See Fig. 2-5) within the ranges indicated in Table 1-2. To adjust the setting, rotate the thermal adjustment button until the arrow on the button points to desired setting.

2-11. Adjust thermal setting as required. (See Fig. 2-5.)

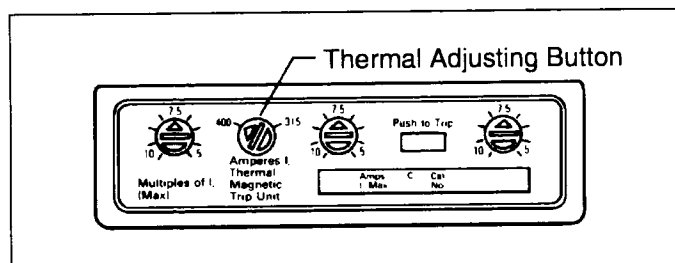


Fig. 2-5. Typical Trip Unit With Adjustable Thermal

Table 1-1. Trip Unit Catalog Numbers and Electrical Data - Fixed Thermal

| Catalog No.<br>2-Pole | Catalog No.<br>3-Pole <sup>①</sup> | Continuous<br>Ampere Rating<br>( $I_n$ ) 40°C <sup>③</sup> | Magnetic<br>Trip Range<br>Ampere <sup>②</sup> |
|-----------------------|------------------------------------|------------------------------------------------------------|-----------------------------------------------|
| JT2070T               | JT3070T                            | 70                                                         | 350 - 700                                     |
| JT2090T               | JT3090T                            | 90                                                         | 450 - 900                                     |
| JT2100T               | JT3100T                            | 100                                                        | 500 - 1000                                    |
| JT2125T               | JT3125T                            | 125                                                        | 625 - 1250                                    |
| JT2150T               | JT3150T                            | 150                                                        | 750 - 1500                                    |
| JT2175T               | JT3175T                            | 175                                                        | 875 - 1750                                    |
| JT2200T               | JT3200T                            | 200                                                        | 1000 - 2000                                   |
| JT2225T               | JT3225T                            | 225                                                        | 1125 - 2250                                   |
| JT2250T               | JT3250T                            | 250                                                        | 1250 - 2500                                   |

- ① Also used with 4-pole circuit breaker. Load end adapter for neutral pole included in 4-pole frame (overcurrent protection for fourth pole not provided).
- ② Nameplate is marked in multiples of ( $I_n$ ), (that is, 5 to 10 times).
- ③ Trip unit calibration complies with IEC requirements at 30°C.

Table 1-2. Trip Unit Catalog Numbers and Electrical Data - Adjustable Thermal<sup>①</sup>

| Catalog No.<br>2-Pole <sup>②</sup> | Catalog No.<br>3-Pole <sup>②③</sup> | Continuous<br>Ampere Rating<br>( $I_n$ ) 30°C | Magnetic<br>Trip Range<br>Ampere <sup>③</sup> |
|------------------------------------|-------------------------------------|-----------------------------------------------|-----------------------------------------------|
| JT2125TA                           | JT3125TA                            | 125                                           | 625 - 1250                                    |
| JT2160TA                           | JT3160TA                            | 160                                           | 800 - 1600                                    |
| JT2200TA                           | JT3200TA                            | 200                                           | 1000 - 2000                                   |
| JT2250TA                           | JT3250TA                            | 250                                           | 1250 - 2500                                   |

- ① Not UL listed.
- ② Also used with 4-pole circuit breaker. Load end adapter for neutral pole included in 4-pole frame (overcurrent protection for fourth pole not provided).
- ③ Nameplate is marked in multiples of ( $I_n$ ), (that is, 5 to 10 times).

③ Changed since previous issue.

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