



## Instructions for Type LT Thermal-Magnetic 2-, 3-, and 4-Pole Trip Units Installation and Operation with L-Frame Series C Circuit Breakers



### WARNING

**DO NOT ATTEMPT TO INSTALL OR PERFORM MAINTENANCE ON EQUIPMENT WHILE ITS 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

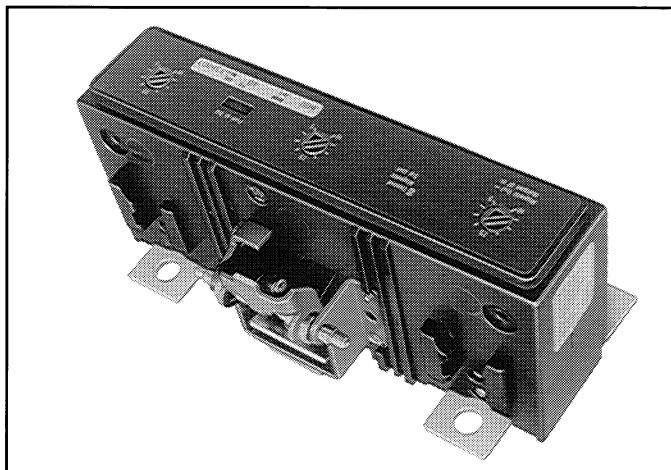


Fig. 1-1 L-Frame Series C Circuit Breaker Thermal-Magnetic Trip Unit Type LT

### General Information

Trip units for L-frame Series C circuit breakers (Fig. 1-1) are available in two types: Type LT with thermal-magnetic trip functions, described in this instruction leaflet or Type LES electronic trip functions, covered in Instruction Leaflet 29C615. 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, the trip unit continuously carries 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 enclosed overcurrent protective devices may be loaded to a maximum of 80 percent of the open air 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:** 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  $6 \times I_n$ ), the trip current times are the same for AC or DC.

**Adjustable Thermal:** Trip units having an adjustable thermal element are adjusted within the range shown in Table 1-2 with a single adjusting button (see Fig. 2-3).

**Magnetic Trip:** The magnetic trip on each pole may be adjusted by turning the adjustment button with a screwdriver (see Fig. 2-2). Trip units are shipped from the factory with the buttons set in the high position. In the magnetic trip region (above  $6 \times I_n$ ), the trip current levels can be up to approximately 40 percent higher for DC than for AC, depending on the rating.

**Note:** 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.

**Four-Pole Trip Unit:** On UL listed four-pole trip units for use in LD, HLD, and LDC Frames the far right pole of a four-pole circuit breaker is for neutral connection only. There is no overcurrent protection in this pole (see Fig. 1-2). On the four-pole trips units for use in LW, HLW and LWC Frames the far left pole is for neutral connection only. Two versions are available, one type with 60% of  $I_n$  protection and one type with no overcurrent protection. See tables 1-1 and 1-2.

**Internal Accessories:** The following types of circuit breaker internal accessories, which mount on the Type LT trip unit, are available for use. The number of the instruction leaflet covering the installation of the accessory is shown.

- Alarm (Signal)/Lockout (ASL) Switch.....I.L. 29C183
- Auxiliary Switch .....I.L. 29C123
- Shunt Trip.....I.L. 29C146
- Low Energy Shunt Trip.....I.L. 29C147
- Undervoltage Release Mechanism  
(Handle Reset) .....I.L. 29C170

For further information on the L-Frame Series C circuit breaker, refer to I.L. 29C105 and Selection Data 29-120L.

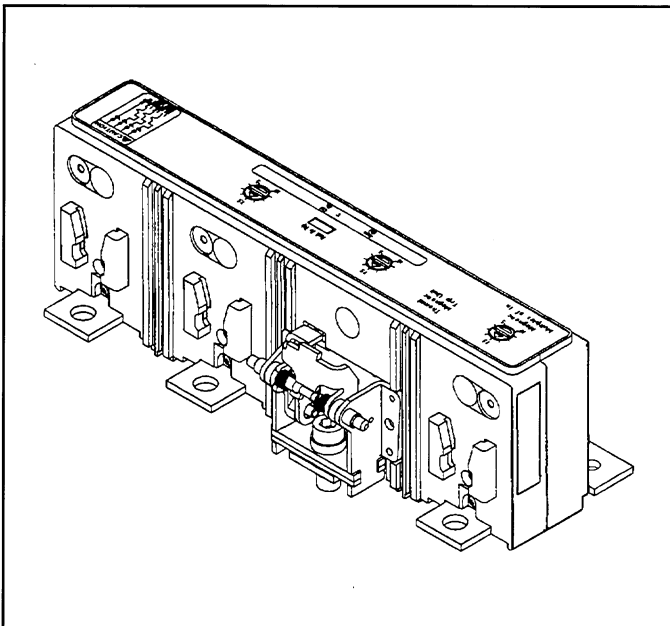


Fig. 1-2 Four-Pole LT Trip Unit with Unprotected Neutral

## 2. INSTALLATION

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

**Note: 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.

**Note: Trip unit center retaining screw is captive in the conductor; the outer screws are supplied in a plastic bag.**

- 2-2. Remove circuit breaker pan-head cover screws and covers.

**Note: The trip unit outer screws may be placed, in the trip unit conductor holes at this time. If preferred, a hexagonal-head wrench may be used to position the screws when the trip unit is in the base.**

- 2-3. Position trip unit in base. Make sure latch bracket pin is properly seated in slots in side plates (see Fig. 2-1). If necessary, push circuit breaker handle towards the closed position to help seat trip unit.



## CAUTION

**DO NOT EXCEED SPECIFIED TORQUE. EXCESSIVE TORQUING WILL SHEAR SCREWS.**

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

- 2-4. Screw in and tighten the trip unit retaining screws in each pole (mechanism pole first). Torque the screws to 10-12 lb-ft 113.56-16.27 N.m) (see Fig. 2-1).
- 2-5. Install accessory(ies), if required. For poles where accessories are not required, install protective barriers supplied with trip unit in accessory retaining slots.
- 2-6. Make sure interphase barriers are in slots in the base of the circuit breaker.
- 2-7. Make sure that opening in sliding handle barrier (captive in cover) is aligned with circuit breaker handle.

**Note: Circuit breaker cover can be installed or removed only if the circuit breaker is in the "TRIPPED" or "OFF" position.**

- 2-8. Install circuit breaker cover and line terminal cover. Secure with pan-head screws. Torque to 20-22 lb-in (2.26-2.49 N.m).
- 2-9. Reset circuit breaker by moving handle to the reset position. Move handle to the ON position. Circuit breaker should remain ON.
- 2-10. Press PUSH-TO-TRIP button with a small screwdriver to check manual tripping of the circuit breaker (see Fig. 2-2).

**Trip Unit Magnetic Adjustment**

The magnetic element of each pole of the trip unit can be 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. 2-2.

**Note: Button must be set at detents and not at intermediate positions.**

To adjust the setting, rotate each button until arrow on button points to desired setting.

- 2-11. Adjust magnetic pick-up settings as required (see Fig. 2-2).

**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. 2-3) within the ranges indicated in Table 1-2.



**CAUTION**

**TO PREVENT POSSIBLE INTERNAL DAMAGE TO THE TRIP UNIT, THE CIRCUIT BREAKER MUST BE TRIPPED PRIOR TO CHANGING THE THERMAL ADJUSTMENT.**

- 2-12. Adjust thermal setting as required (see Fig. 2-3) by rotating the thermal adjustment button until the arrow on the button points to the desired setting.

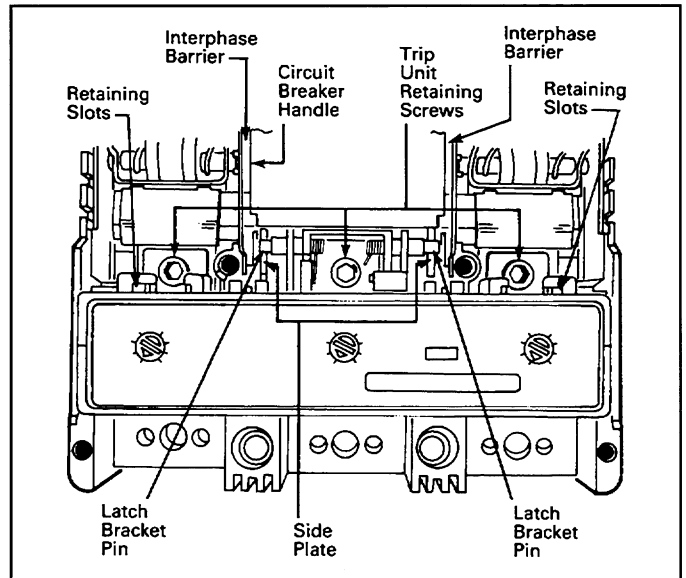


Fig. 2-1 Trip Unit Installed in Circuit Breaker

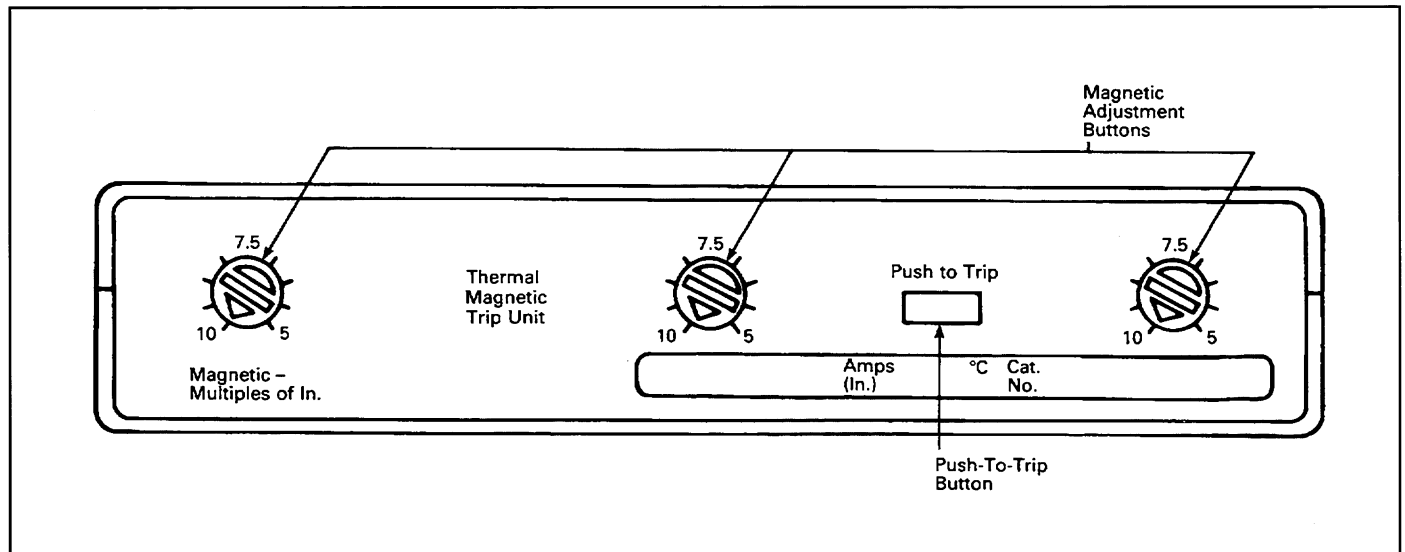


Fig. 2-2 Trip Unit Magnetic Adjustment Buttons

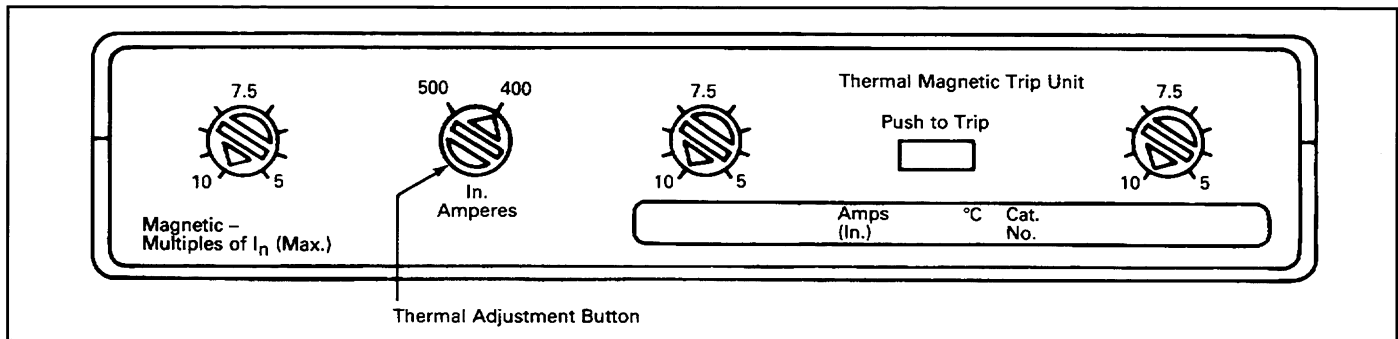


Fig. 2-3 Trip Unit Thermal Adjustment Button

Table 1-1. LD, HLD, and LDC Trip Unit Catalog Numbers and Electrical Data - Fixed Thermal

Catalog No. 2-Pole	Catalog No. 3-Pole	Catalog No. 4-Pole ② ⑥	Continuous Ampere Rating (I <sub>n</sub> ) 40°C	Magnetic Trip Range Amperes ①
LT2300T	LT3300T	LT4300T	300	1500-3000
LT2350T	LT3350T	LT4350T	350	1750-3500
LT2400T	LT3400T	LT4400T	400	2000-4000
LT2450T	LT3450T	LT4450T	450	2250-4500
LT2500T	LT3500T	LT4500T	500	2500-5000
LT2600T	LT3600T	LT4600T	600	3000-6000

① Nameplate is marked in multiples of I<sub>n</sub>, that is 5 to 10

② Neutral on the right.

**Table 1-2. LW, HLW, and LWC Trip Unit Catalog Numbers and Electrical Data ③ Fixed and Adjustable Thermal**

Catalog No. 3-Pole	Continuous Ampere Rating (I <sub>n</sub> ) 40°C	Magnetic Trip Range Amperes ④
LTF3315T	315	1575-3150
LTF3400T	400	2000-4000
LTF3500T	500	2500-5000
LTF3630T	630	3150-6300
LT3315TA	315-250	1575-3150
LT3400TA	400-315	2000-4000
LT3500TA	500-400	2500-5000
LT3630TA	630-500	3150-6300

- ③ Not UL listed
- ④ Nameplate is marked in multiples of I<sub>n</sub> (Max.), that is 5 to 10
- ⑤ Neutral on the left
- ⑥ No overcurrent protection in the neutral pole
- ⑦ 60% of I<sub>n</sub> protection in the neutral pole

**Table 1-2. LW, HLW, and LWC Trip Unit Catalog Numbers and Electrical Data ③ Fixed and Adjustable Thermal**

Catalog No. 4-Pole ⑤	Continuous Ampere Rating (I <sub>n</sub> ) 40°C	Magnetic Trip Range Amperes ④
LT4315TA ⑥	315-250	1575-3150
LT4400TA	400-315	2000-4000
LT4500TA	500-400	2500-5000
LT4630TA	630-500	3150-6300
LT4315TAE ⑦	315-250	1575-3150
LT4400TAE	400-315	2000-4000
LT4500TAE	500-400	2500-5000
LT4630TAE	630-500	3150-6300

- ③ Not UL listed
- ④ Nameplate is marked in multiples of I<sub>n</sub> (Max.), that is 5 to 10
- ⑤ Neutral on the left
- ⑥ No overcurrent protection in the neutral pole
- ⑦ 60% of I<sub>n</sub> protection in the neutral pole

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