

## Installation Instructions for Motor Operator for L-Frame and MDL-Frame 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 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 question arise, contact Cutler-Hammer for further information or instructions.

### 1-0 INTRODUCTION

The motor operator (Figure 1-1) allows the circuit breaker to be opened, closed, or reset remotely. It has the capability for lock-off, push-to-trip, and manual operation. Electrical power to motor is cut off when the cover is removed.

The motor operator mechanism is driven by a reversible electric motor connected to a ball screw. The ball screw drives the circuit breaker handle. Limit switches are used to control the motor.

### 2-0 INSTALLATION

The motor operator is UL listed and suitable for field installation on L & MDL-frame circuit breakers and molded case switches under UL File E64124.



*Figure 1-1 Motor Operator Installed on L-Frame Series C Circuit Breaker*

If the motor operator is to be installed on an OPTIM breaker, an OPTIM Connector Kit, Catalog Number OPEOPCK, should be ordered to allow the Optimizer to be connected on the face of the operator. The kit includes a connector socket and an extension cable to the trip unit port.

The motor operator is normally supplied as a separate item for mounting on an uninstalled circuit breaker. If a motor operator is to be mounted on an installed circuit breaker, all power must be removed from the circuit breaker before proceeding to mount the motor operator.



### WARNING

**BEFORE MOUNTING A MOTOR OPERATOR ON A CIRCUIT BREAKER INSTALLED IN AN ELECTRICAL SYSTEM, MAKE SURE THE CIRCUIT BREAKER IS SWITCHED TO THE OFF POSITION AND THAT 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 INJURY OR DEATH.**

operator is grounded). Tighten screws firmly, torque to 22-28 lb-in, but do not exceed 28 lb-in (3 Nm).



## **CAUTION**

**ENERGIZING THE MOTOR OPERATOR WHEN IT IS NOT MOUNTED TO A CIRCUIT BREAKER MAY DAMAGE IT. ENSURE THAT THE MOTOR OPERATOR IS SECURELY MOUNTED TO A CIRCUIT BREAKER BEFORE OPERATING ELECTRICALLY.**

## **NOTICE**

**A minimum 1 Kva power source is recommended for motor operator.**

**When the circuit breaker is already installed, the existing hardware must be replaced.**

**When the motor operator is mounted to the circuit breaker, the circuit breaker nameplate is not visible. Before mounting the motor operator, make sure the circuit breaker nameplate information is recorded for future reference. A blank nameplate is supplied for this purpose. The nameplate should be placed on the top side of the motor operator.**

The installation procedure consists of inspecting the motor operator for completeness and mounting the motor operator to the circuit breaker and connecting the control wires. To install the electrical operator perform the following steps:

2-1. Remove motor operator from packing. Inspect it for completeness (Figure 2-1). Check the motor operator nameplate to make sure that the rating agrees with the installation requirements; and make sure that mounting hardware is included.

The motor operator is suitable for application with 3 and 4 pole series C circuit breaker types LDB, LD, HLD, LDC, LW, HLW, MDL, LWC, plus LA circuit breaker family.

2-2. Install circuit breaker handle extension using 3 thread cutting screws supplied. Torque screws to 17-19 lb-in, (2 Nm).

2-3. The breaker must be mounted with special studs (Figure 2-1) supplied. If the circuit breaker is already installed, replace mounting hardware. (At least one of the studs must be grounded to insure that the motor

2-4 For L-Frame Mount breaker with (4) special mounting studs supplied. Assemble mounting clamp to the studs on line end of the breaker using the (2) 10-32 x 1.50" flat head screws supplied.

For MDL-Frame: Remove (4) breaker cover screws. Insert keyhole clamp into line-end, right side cover screw hole above the breaker handle.

2-5 For L-Frame turn breaker to the "Off" position. Attach the handle extension from the parts kit. Mount the motor operator to the circuit breaker using (2) 10-32 x 7/16" long screws and lock washers on the line end and using (2) 10-32 x 1.5" long screws and lock washers on the load end.

For MDL-Frame turn breaker to the "Off" position. Attach the handle extension from the parts kit. Mount the motor operator by placing the keyhole slot in the motor operator frame over the keyhole clamp and sliding it into position. Install the (3) 8-32 x 2.25" button head screws in the remaining cover holes from step 2-4.

Torque each screw to 20-22 lb-in (2.26-2.49 N-m). The handle extension must be located between the rollers of the operator bracket assembly, and the motor end of the operator is positioned towards the line end of the breaker (Figure 4-1).

2-6 The motor operator is equipped with two "PUSH-TO-TRIP" actuators for use on either solid state (left hand actuated) or thermal magnetic (right hand actuated) trip units. Mount the red "PUSH-TO-TRIP" BUTTON MOLDING TO THE CORRECT ACTUATOR USING THE (2) 4-40 X .25 LONG SEMS SCREWS SUPPLIED. Then turn on the circuit breaker, press the "PUSH-TO-START" button, to verify the breaker trips.

2-7 To connect the power and control wiring, refer to (figure 2-2).

2-8 Replace the motor operator cover and screws. If dust cover sliders become separated from the operator cover, they must be installed in a proper orientation. Viewing the cover from the rear with the "PUSH-TO-TRIP" slot on the bottom. The

smaller plate is placed on the medium plate which is placed on the longest plate, then to the inner cover surface located under the guide rails

2-9 To verify the manual operation of the motor operator, refer to paragraphs 3.5 to 3.7.

2-10 To verify the electrical operation of the motor operator, refer to paragraphs 3.1 to 3.4.

2-11 To adjust the motor operator if it fails to fully open, close or reset the circuit breaker during the electrical operation, refer to paragraphs 4.1 to 4.5.

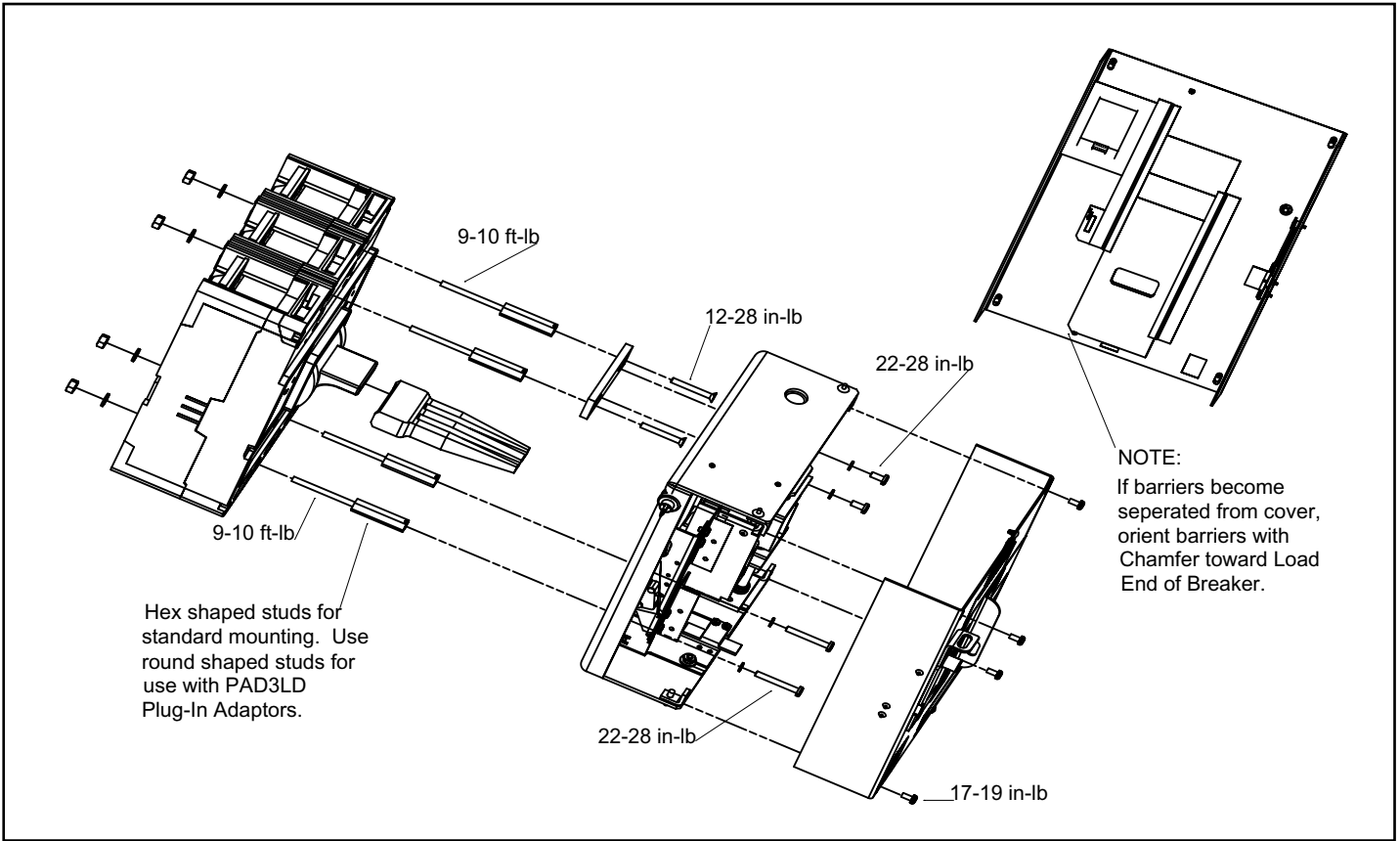


Figure 2-2a

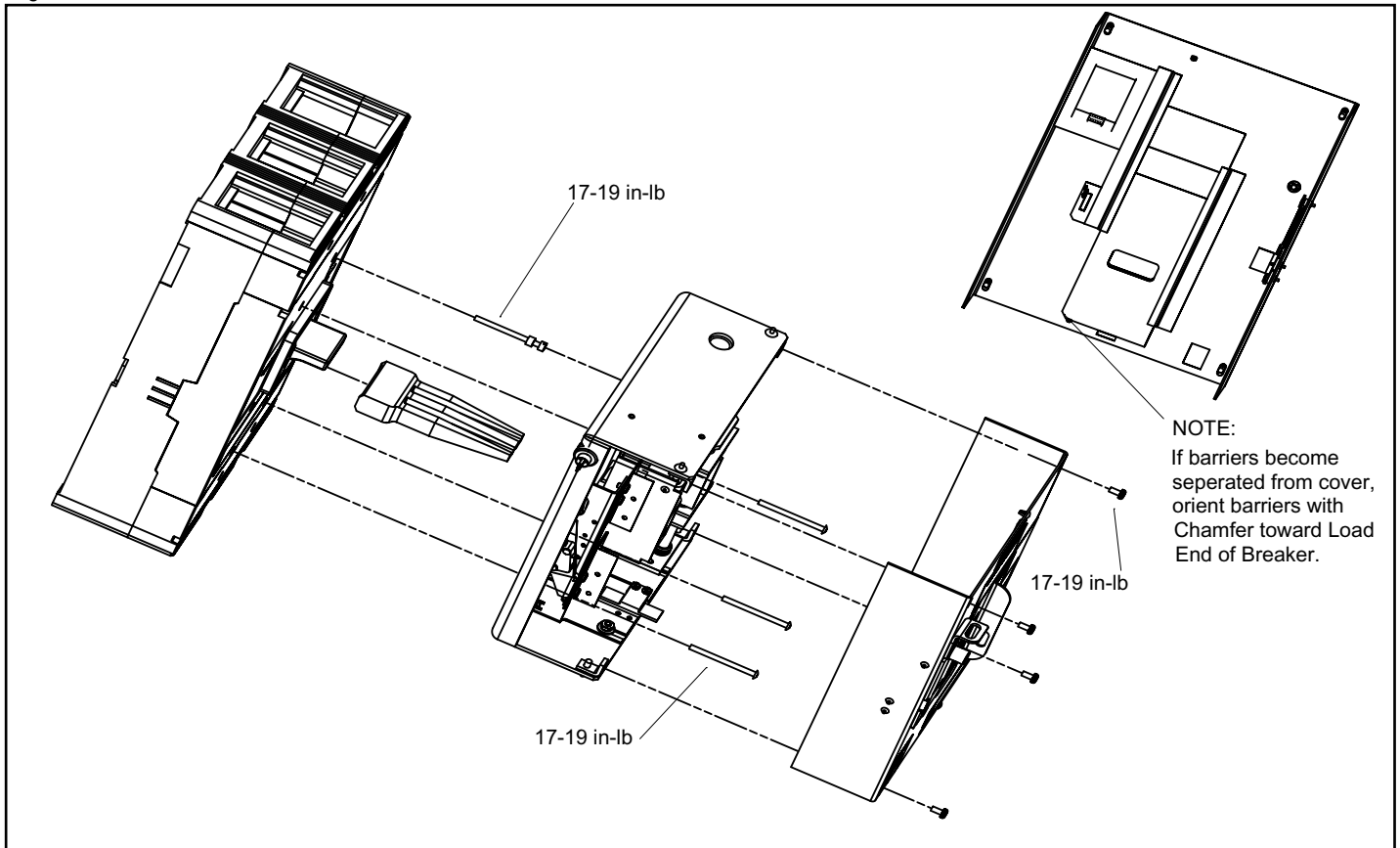


Figure 2-2b

### 3-0 OPERATION

The following procedures describe the operation of the electrical operator and addresses electrical operation, manual operation, power-off, and pad locking "OFF".

The motor operator does not permit a breaker handle to indicate its "TRIP" position. If it is desirable that the trip position be indicated either of the following two methods may be incorporated:

1. The breaker may be equipped with bell alarm contacts which "MAKE" or "BREAK" upon automatic trip operation. Contacts may be wired to an external light or other indicating device to then indicate trip.



### CAUTION

**MAKE SURE THAT ALL SENSITIVE EQUIPMENT CONNECTED TO THE LOAD SIDE OF THE CIRCUIT BREAKER IS DISCONNECTED BEFORE OPERATING THE MOTOR OPERATOR. SWITCHING OPERATIONS COULD CAUSE DAMAGE TO EQUIPMENT - ESPECIALLY EQUIPMENT REQUIRING A CONTROLLED SHUTDOWN.**

**DO NOT EXCEED THE DUTY CYCLE OF "OFF" TO "ON" TO "OFF" AT ONE PER MINUTE. EXCEEDING THE MAXIMUM OPERATING RATE CAN DAMAGE THE MOTOR OPERATOR.**

**DO NOT CONNECT THE MOTOR OPERATOR TO VOLTAGES ABOVE THE RATED VOLTAGE OF THE DEVICE. VOLTAGES THAT EXCEED THE RATED VOLTAGE CAN CAUSE DAMAGE.**

#### *Electrical Operation*

To check the electrical operation use the remote momentary "ON" and "OFF" control devices, and perform the following steps: (refer to Fig. 2-2)

- 3-1. Pull up on the setting pin and slide the locking arm (white line) to the Electrical Operation mode. (Figures 3-1 and 3-2)
- 3-2. Energizing the "OFF" pushbutton will cause the breaker to go to its "OFF" position.
- 3-3. Energizing the "ON" pushbutton will cause the breaker go to its "ON" position.
- 3-4. Press the "PUSH-TO-TRIP" button (see Figure 3-1); verify that the breaker trips. Energizing the "OFF" button, motor operator will "RESET" the breaker.

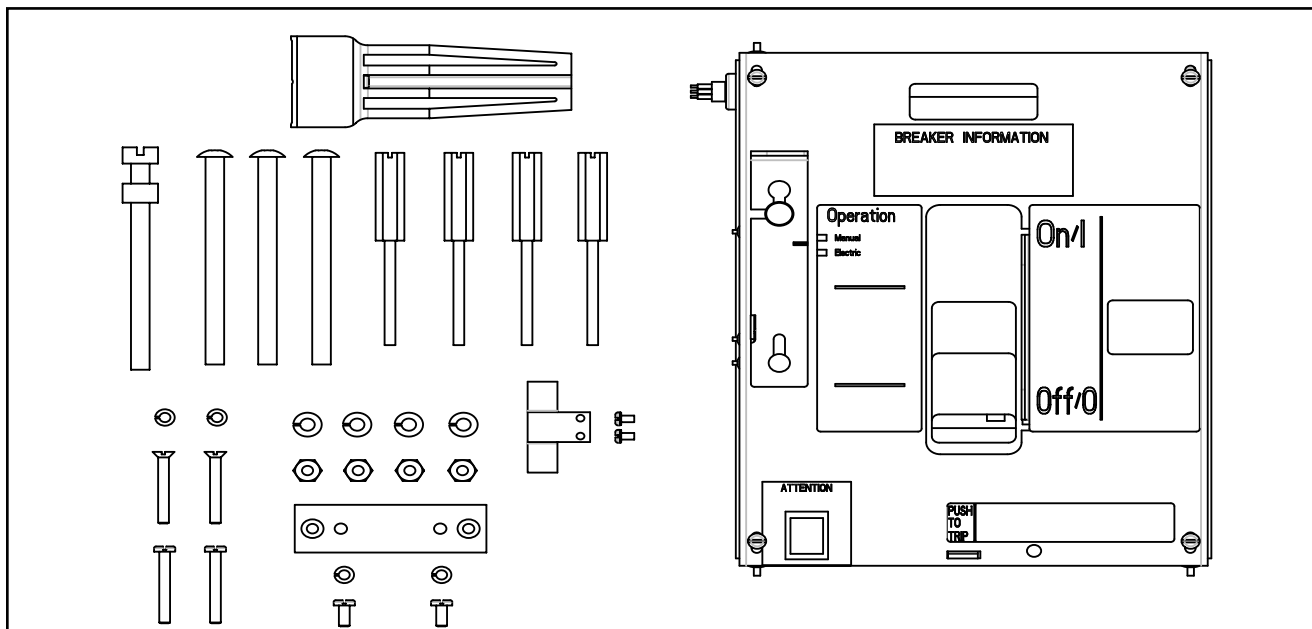


Figure 2-1 Motor Operator Kit

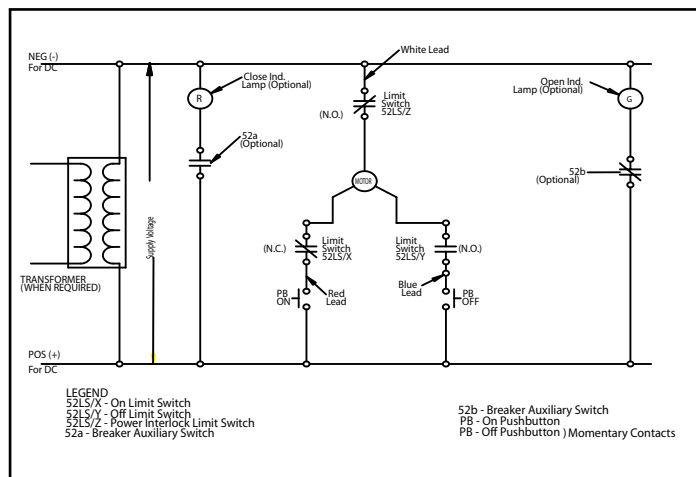


Figure 2-2 Motor Operator Wiring Diagram

## NOTICE

**Do not use maintain type control switches.**

### Manual Operation

3-5. Pull up on the setting pin and slide the locking arm (white line) to the Manual Operation mode. In this mode electrical power to the motor is cut off (Figures 3-1 and 3-3).

3-6. Using the "HANDLE EXTENSION" to operate the motor operator mechanism, throw to the "ON" and "OFF" positions.

3-7. Press the "PUSH-TO-TRIP" button to trip the circuit breaker, and verify that the breaker has tripped. Throw the "HANDLE EXTENSION" to the extreme "OFF" position. This should "RESET" the breaker.

### Lock-Off

3-8. Pull up on the setting pin and slide the locking arm (white line) to the Manual Operation mode.

3-9. Turn the breaker to "OFF" position. The motor operator cannot be locked off while it is in the "ON" position.

3-10. Turn the locking arm 90 degrees to the "LOCK-OFF" position (Figures 3-4) and insert 3 padlocks.

### Power-off

The electrical supply to the motor will be automatically cut off when the cover is removed, and also when using Manual Operation (see paragraph 3-5).

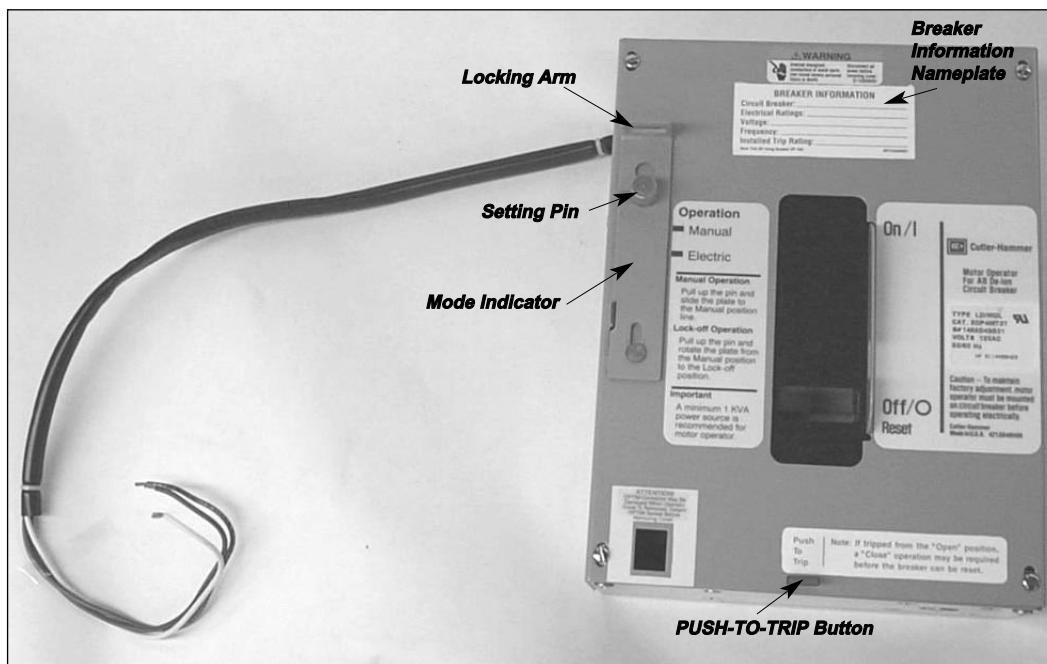


Figure 3-1 Motor Operator Features





Figure 3-2 Motor Operator in Electrical Position

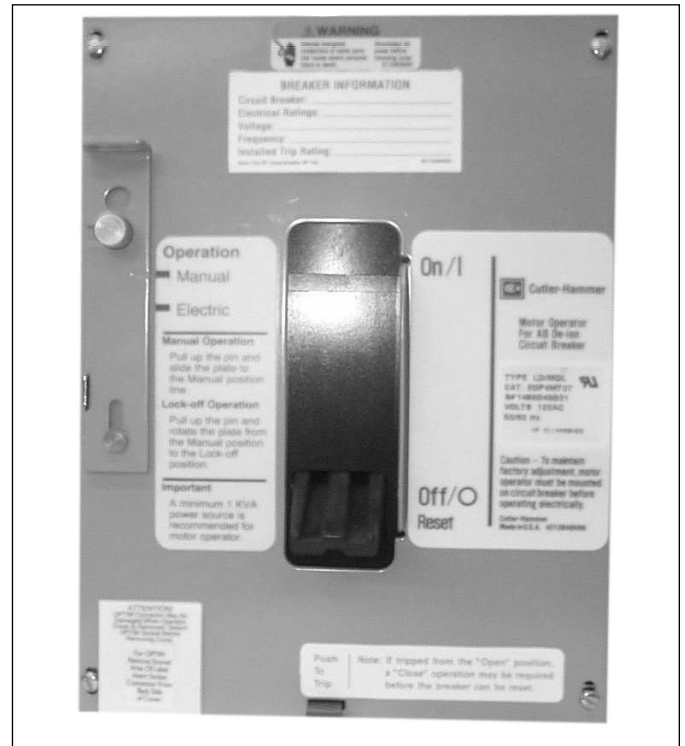


Figure 3-3 Motor Operator in Manual Position



Figure 3-4 Motor Operator in Lock-off Position

#### 4-0 ADJUSTMENT

The following procedures describe the adjustment of the motor operator limit switches if necessary:

### NOTICE

The motor operator has been adjusted at the factory. Before attempting to adjust the motor operator, verify that a 1 Kva power source is being used and that all installation instructions above have been followed. Verify that the circuit breaker can be operated without the motor operator. Under standard conditions the factory settings should not require field adjustment.

Two limit switches control the travel of the motor operator carriage. The upper switches control the travel of the motor operator carriage. The upper switch de-energizes the motor operator when the carriage has moved sufficiently to reset the circuit breaker.

4-1. Disconnect the motor operator from the supply voltage.

4-2. Remove the cover screws and the motor operator cover.

4.3. Use a small piece of tape (customer supplied) to keep the lever arm depressed on the "POWER-OFF" switch to allow testing and adjusting of limit switches.



### CAUTION

**TAPE SHOULD BE REMOVED BEFORE REINSTALLING THE COVER.**

4-4. For upper limit switch adjustment, loosen the two pan head screws securing the upper switch assembly. Move the switch up to increase the carriage travel. Move the switch down to decrease the carriage travel. After adjusting, tighten the screws.

4-5. For lower limit switch adjustment, loosen the two pan head screws securing the lower limit switch assembly. Move the switch down to increase the carriage travel. Move the switch up to decrease the carriage travel. After adjusting, tighten the screws.

4-6. Replace the motor operator cover and cover screws.

4-7. Reconnect the motor operator to the supply voltage.

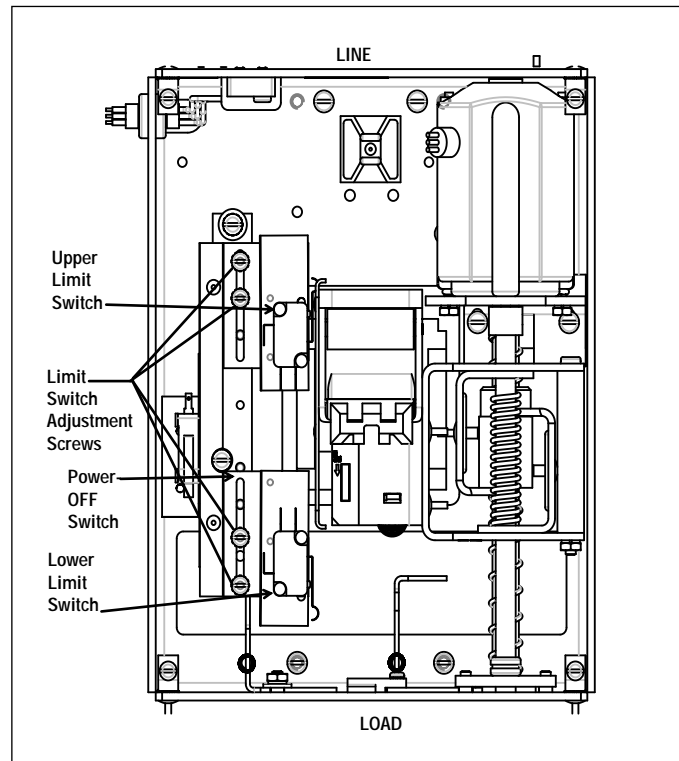


Figure 4-1 Motor Operator Limit Switch Locations



### WARNING

**BEFORE MOUNTING A MOTOR OPERATOR ON A CIRCUIT BREAKER INSTALLED IN AN ELECTRICAL SYSTEM, MAKE SURE THE CIRCUIT BREAKER IS SWITCHED TO THE OFF POSITION AND THAT 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 INJURY OR DEATH.**



### CAUTION

**REMOVE TAPE TO ALLOW SWITCH LEVER TO MOVE FREELY BEFORE REINSTALLING COVER.**

**ENERGIZING THE MOTOR OPERATOR WHEN IT IS NOT MOUNTED TO A CIRCUIT BREAKER MAY DAMAGE IT. ENSURE THAT THE MOTOR OPERATOR IS SECURELY MOUNTED TO A CIRCUIT BREAKER BEFORE OPERATING ELECTRICALLY.**



*Table 1-1 Available Motor Operator Ratings and Operating Conditions* <sup>①②③</sup>

Catalog Number	EOP4MT07	EOP4MT1	EOP4MT11A	EOP4MT1	EOP4MT2	EOP4MT21
Style Number	1483D43G07	1483D43G08	1483D43G09	1483D43G10 <sup>⑤</sup>	1483D43G11	1483D43G12
Rated Voltage (V) <sup>④</sup>	120 AC	208 AC	240 AC	480 AC	125 DC	24 DC
Frequency (Hz)	50/60	50/60	50/60	50/60	DC	DC
Motor-in-Rush	31	13	12	N/A	21	50

<sup>①</sup>Operator is an intermittent duty device. The safe duty cycle (OFF to ON to OFF) should not exceed one per minute.

<sup>②</sup>Electrical Operating times at rated voltage.

- a. To turn breaker ON - 0.2 second (12 cycles) max.
- b. To turn breaker OFF - 0.2 second (12 cycles) max.

<sup>③</sup>Motor Operating temperature; Class "A" temperature limits apply.

<sup>④</sup>Applied Voltage should be no less than 85% or no more than 110% of rated voltage.

<sup>⑤</sup>Operator application on supply of Vac utilizes a 480/115 Vac transformer.

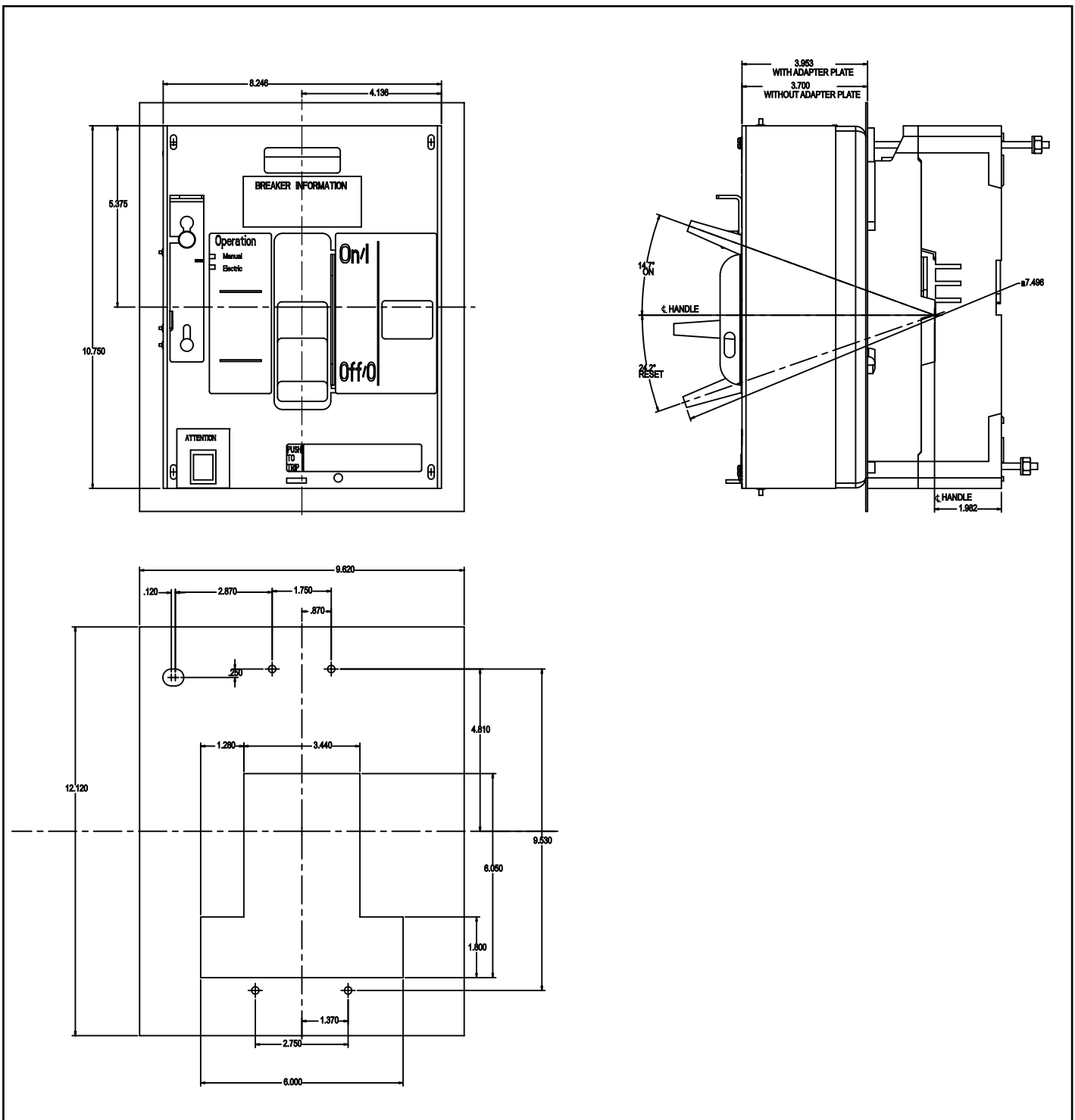


Figure 4-2

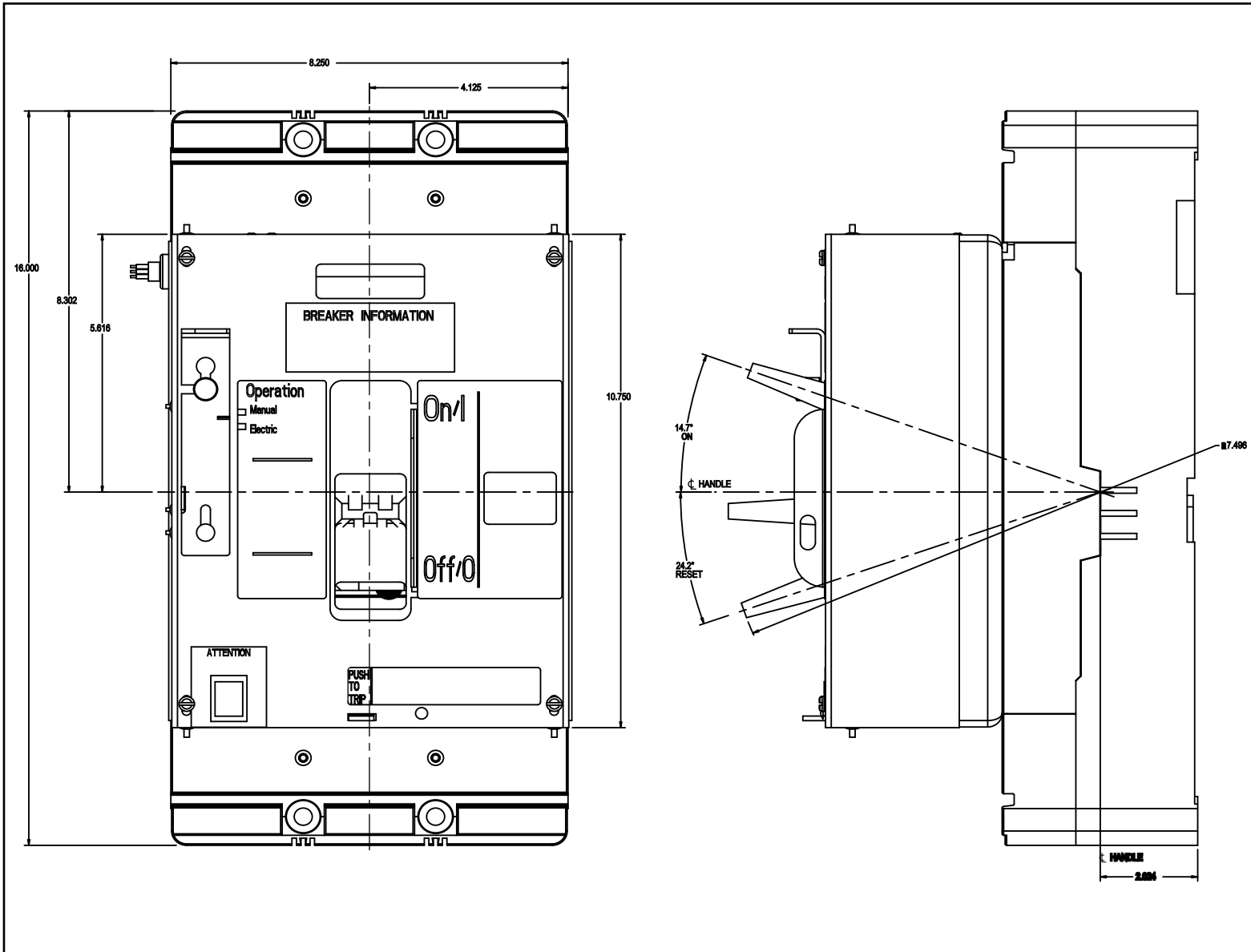


Figure 4-2b

NOTES: