Installation Instructions for Motor Operator for 3- and 4-Pole ND, NB, NC, MD, MA, MC Type 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 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

The motor operator (Fig. 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 the 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.

It is unnecessary to remove a motor operator once installed to gain access to the breaker's cable terminals, Fig. 2-3.

Fig. 1–1. Motor Operator Installed in ND Type Frame Series C Circuit Breaker

2. INSTALLATION

The motor operator is Underwriters Laboratories, Inc. listed as a recognized component suitable for field installation on N-frame circuit breakers and molded case switches under UL File E64124.

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 DEATH OR SEVERE PERSONAL INJURY.

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.

Note: 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.

To install the electrical operator perform the following steps:

2-1. Remove motor operator from packing. Inspect it for completeness (Fig. 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.

2-2. Install circuit breaker handle extension using nuts and screws supplied. (See Fig. 2-3.)

2-3. Assemble top mounting plate (spacer) with 3.75-in. flat head screws supplied (Figs. 2-1, 2-3, 4-2). Motor operator frame is to mount to this top plate using two .500-in. pan head screws.

2-4. Trip breaker to the "TRIP" position. Mount the motor operator to the circuit breaker with screws

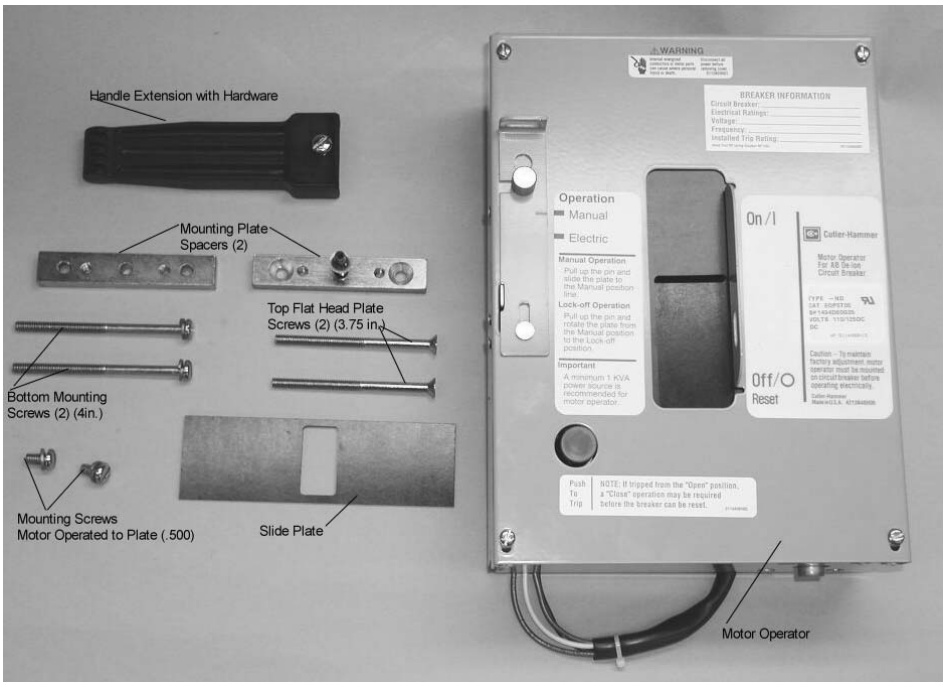


Fig. 2-1 Motor Operator Kit

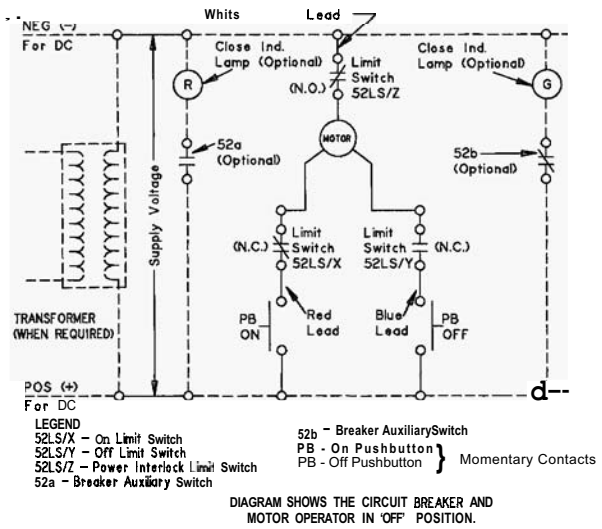


Fig. 2–2. Motor Operator Wiring Diagram

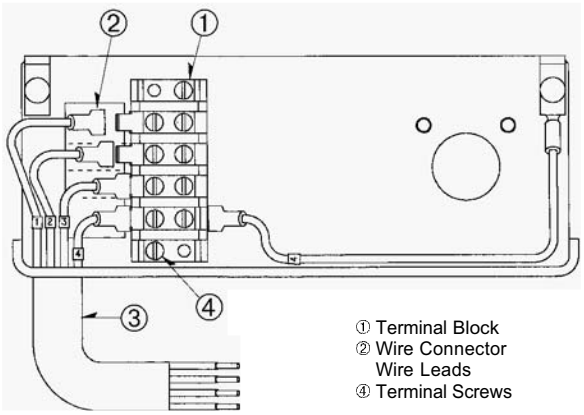


Fig. 2–4. Terminal Block and Wire Leads

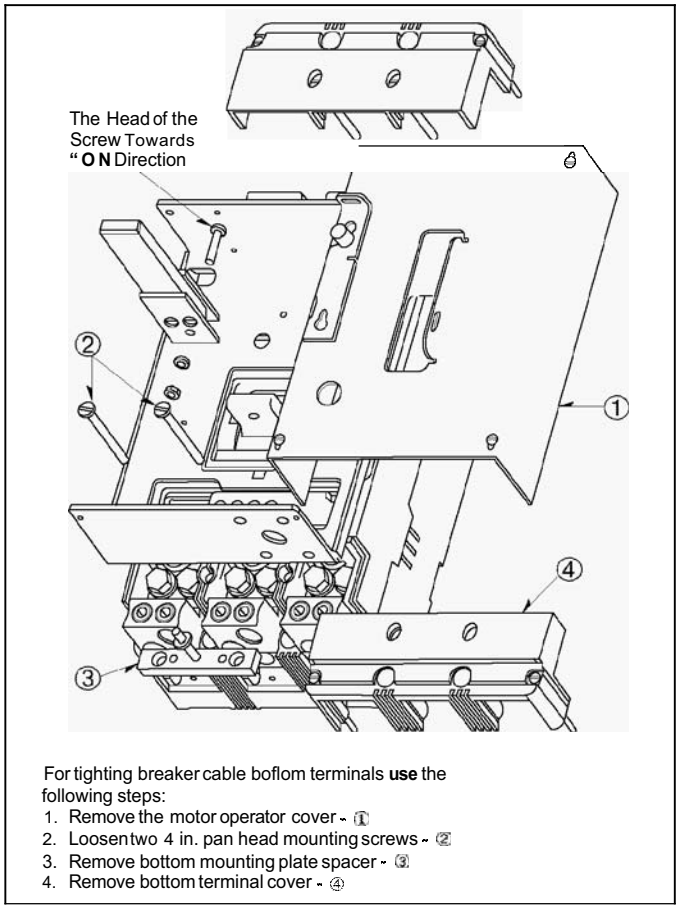


Fig. 2–3. Terminal Tightening Instructions

supplied. Put the bottom mounting plate (spacer) between the motor operator and the breaker (Figs. 2-3 (It.03)). The roll pin must be in the base slot and the push nut inside the operator. Use two 4-in. pan head screws. The handle extension must be between the rollers of the bracket assembly, and the motor towards the line end of the breaker (Figs. 2-3, 4-1).

2-5. The motor operator is equipped with a "PUSH-TO-TRIP" feature. Turn circuit breaker "ON". Press the "PUSH-TO-TRIP" button to verify that the breaker trips. Reset breaker and turn "ON" again. Replace the cover and cover screws, check the "PUSH-TO-TRIP" again.

2-6. The motor operator is equipped with a terminal block and 30-in. long wire leads. If it is desirable to change wire leads, just pull out the wire connector, and connect the new wire leads to the screws or tabs of the terminal block. (See Fig. 2-4 page 3.)

2-7. If motor operator is used for NB, NC, or MD, MA, MC type circuit breakers and molded case switches the mounting screws must be changed to .190 x 3.375, ,190 x 3.625, or .190-32 x 2.25, .190-32 x 1.75 pan head screw with lock washer.

2-8. To connect the power and control wiring, refer to Fig. 2-2, page 3.

3. OPERATION

Note: The motor operator does not permit a breaker handle to indicate its "TRIP" position. If it is desirable that the trip position be indicated, 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.

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 the setting pin and slide the locking arm (white line) to the Electrical Operation mode, (Figs. 3-1 and 3-2).

3-2. Energizing the "OFF" push button will cause the breaker to go to its "OFF" position.

3-3. Energizing the "ON" push button will cause the breaker to go to its "ON" position.

3-4. Press the "PUSH-TO-TRIP" button (see Fig. 3-1); verify that the breaker trips. Energizing the "OFF" button, motor operator will "RESET" the breaker.

Note: DO NOT use maintain type control switches.

Manual Operation

3-5. Pull up 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 (Figs. 3-1 and 3-3).

CAUTION

IF BREAKER IS TRIPPED WHEN OFF, MOTOR OPERATOR MUST BE RECYCLED TO ON, THEN RESET (OFF), AND BACK TO ON.

IF AN UNDERVOLTAGE RELEASE (UVR) IS SUPPLIED WITH BREAKER, DO NOT OPERATE THE BREAKER WITH UVR DE-ENERGIZED.

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 the setting pin and slide the locking arm (white line) to the Manual Operation mode.

3-9. Turn the locking arm 90 degrees to the "LOCK-OFF" position (Fig. 3-4) and insert up to 3 padlocks. The motor operator cannot be locked off while it is in the "ON" position.

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).

4. ADJUSTMENT

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

Note: The motor operator has been adjusted at the factory. Before attempting to adjust the motor operator, verify that a 5 kVA Power Source for 48 Vdc, 24 Vdc ratings and a 1 kVA Power Source for other ratings are being used, and that all installation instructions 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 adjustments.

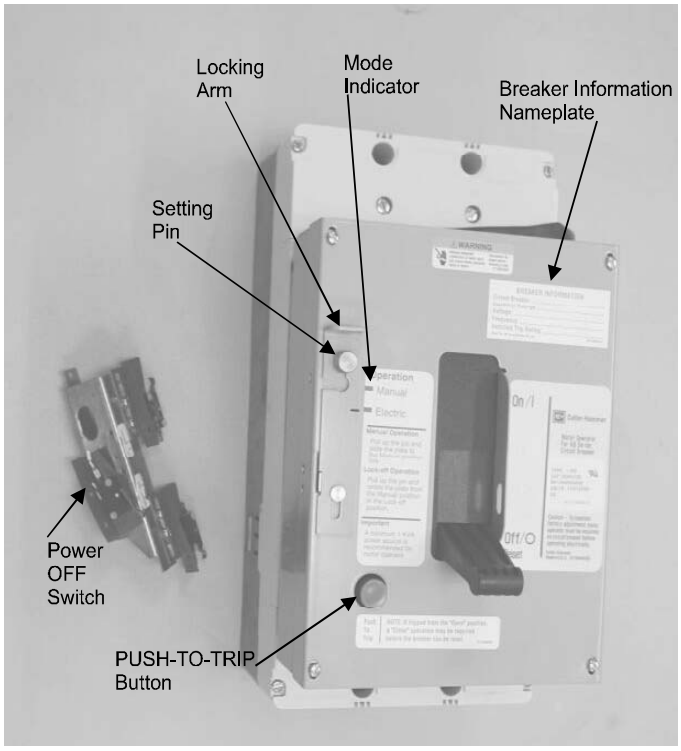


Fig. 3–1. Motor Operator Features

Fig. 3–3. Motor Operator in Manual Position

Fig. 3–2. Motor Operator in Electrical Position

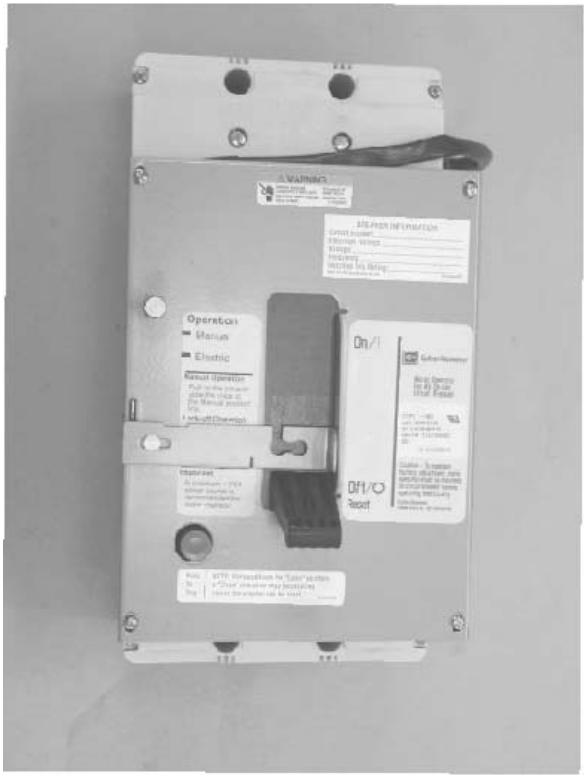


Fig. 3–4. Motor Operator in Lock-Off Position

Two limit switches control the travel of the motor operator carriage. The upper switch de-energizes the motor when the carriage has moved sufficiently to close the circuit breaker. The lower switch de-energizes the motor 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 .125-in. dia. pin (customer supplied) and insert into the .130-in. dia. hole near the "POWER-OFF" switch to hold switch "ON" (Figs. 3-1 and 4-1).

CAUTION

.125-IN. DIA. PIN 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.

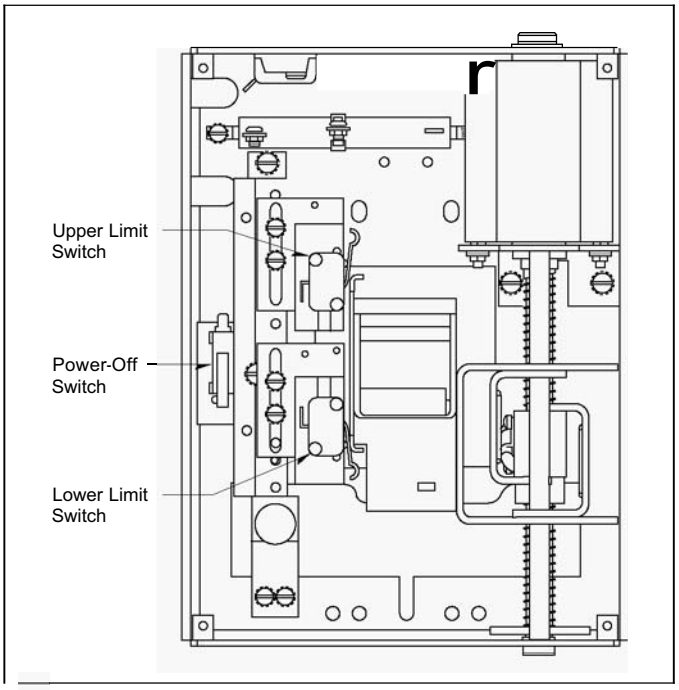


*Fig. **4–1.** Motor Operator Limit Switch Locations*

4-5. For lower limit switch adjustment, loosen the two pan head screws securing the lower 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.

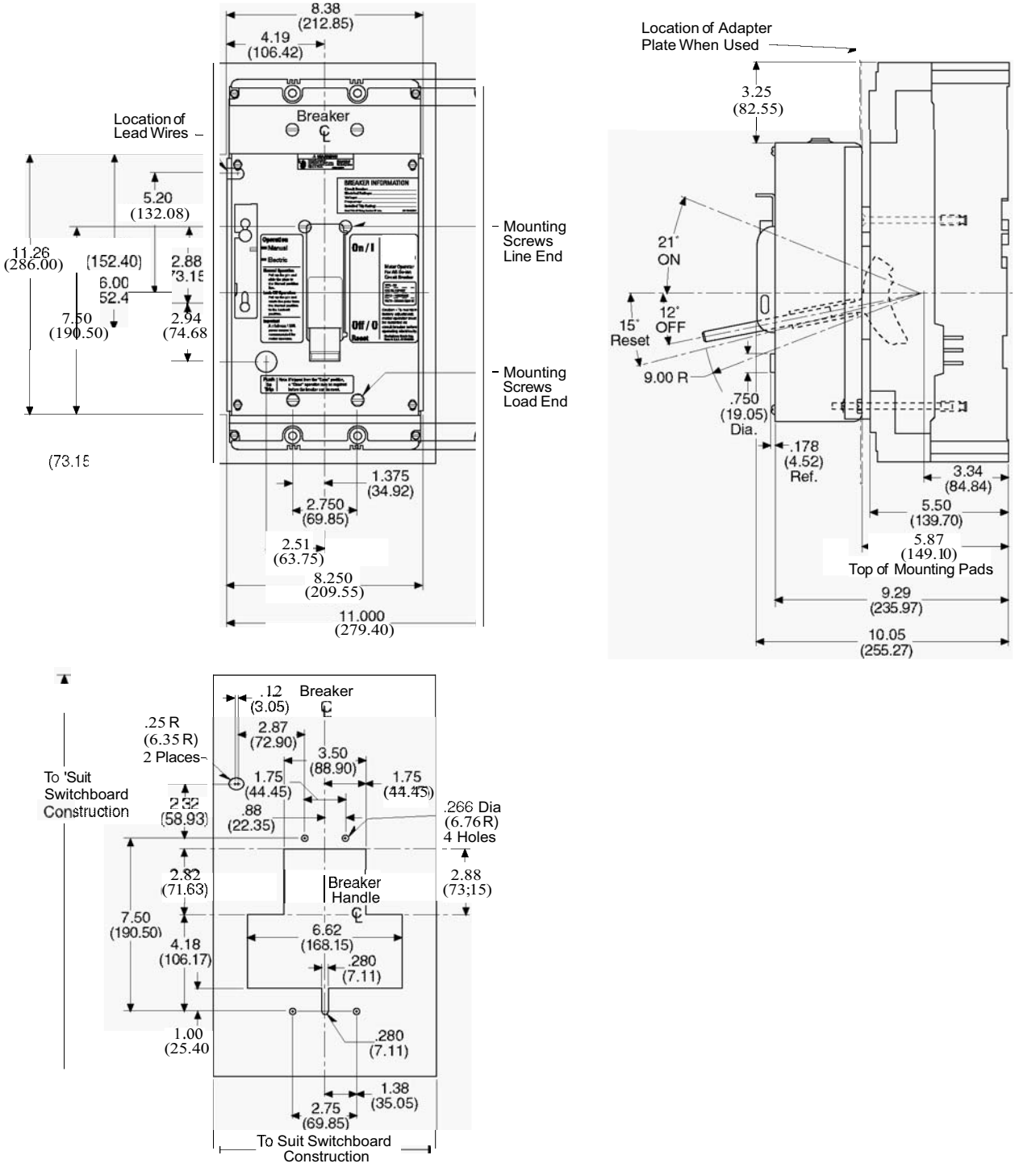
4-6. Replace the motor operator cover and cover screws.

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

Table 1–1. Available Motor Operator Ratings and Operating Conditions ①②③

Catalog Number	EOP5T07	EOP5T09	EOP5T11	EOP5T15	EOP5T26	EOP5T22	EOP5T21	
Style Number	1494D60G01	1494D60G02	1494D60G03	1494D60G04 ⑤	1494D60G05	1494D60G08	1494D60G03	
Rated Voltage(V)④	120 (110)Vac	208Vac	240 (220)Vac	480/120 Vac	125 Vdc	48 Vdc	24 Vdc	
Frequency (Hz)	50/60	50/60	50/60	50/60	Dc	Dc	Dc	
Motor-inRush Current (A) (3p/4p)	31	21	19		21	80	50	
Catalog Number								
Style Number			1494D60G31	1494D60G32	1494D60G33	1494D60G34	1494D60G35	1494D60G36
Rated Voltage (V)④			120 Vac	208 Vac	240 Vac	480 Vac	125 Vdc	24 Vdc
Frequency (Hz)			50/60	50/60	50/60	50/60	Dc	Dc
Motor-in-Rush Current (A)			31	21	19		21	50

① Operator is an intermittent duty device. The safe duty cycle (OFF to ON to OFF) should not exceed one per minute.
② 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.
③ Motor Operating temperature; Class " A temperature limits apply.
④ Applied Voltage should be no less than 85% or no more than 110% of rated voltage.
⑤ Operator applications on supply of 480 Vac utilizes a 480/115 Vac transformer.



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