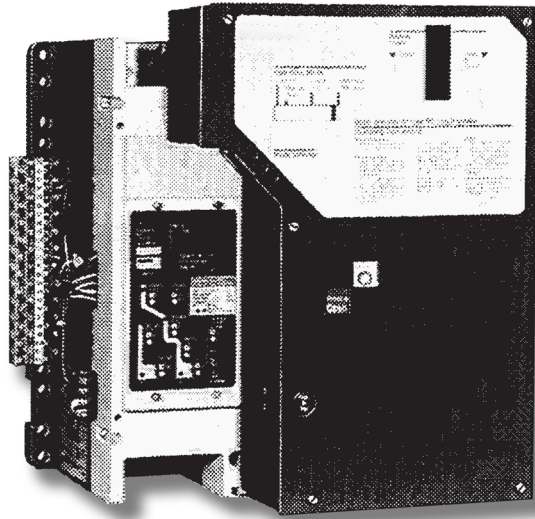


Installation Instructions for Motor Operator for Eaton R-Frame Circuit Breakers and Molded Case Switches



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Powering Business Worldwide



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.

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The recommendations and information contained herein are based on Eaton 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 Eaton for further information or instructions.

1.0 INTRODUCTION

The motor operator (Fig. 1-1) allows the circuit breaker to be opened, closed, or reset remotely. It also has a lock-off capability and provisions for manual operation.

The motor operator contains a reversible motor connected to a ball screw. The ball screw drives the circuit breaker handle. Limit switches and relays are used to control the motor.

Since the motor operator is equipped with control relays, only a momentary control signal is required to close or open the circuit breaker. Once an operation is initiated, the control relays seal-in and the motor operator completes its operation. The relays carry the motor current. The control momentary switches only provide the signal.

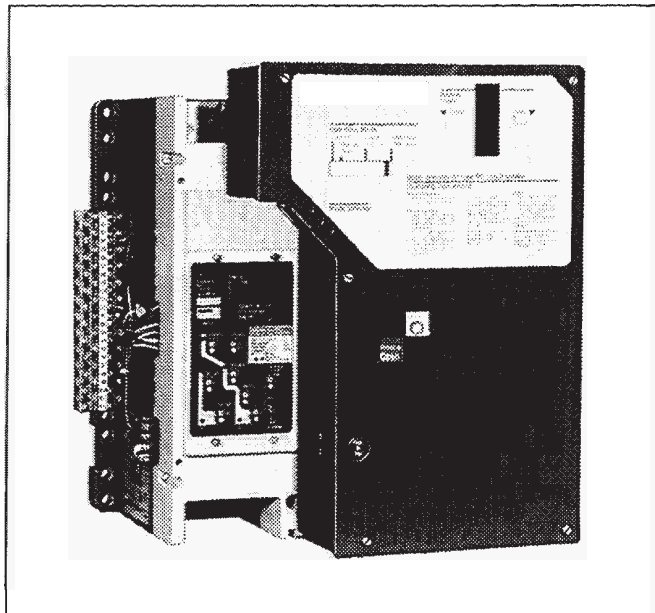


Fig. 1-1. Motor Operator Installed on an R-Frame Circuit Breaker

2.0 INSTALLATION

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



WARNING

THE VOLTAGES IN ENERGIZED EQUIPMENT CAN CAUSE DEATH OR SEVERE PERSONAL INJURY. SPECIAL ATTENTION SHOULD BE PAID TO REVERSE FEED APPLICATIONS TO ENSURE NO VOLTAGE IS PRESENT. BEFORE MOUNTING THE MOTOR OPERATOR ON 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.

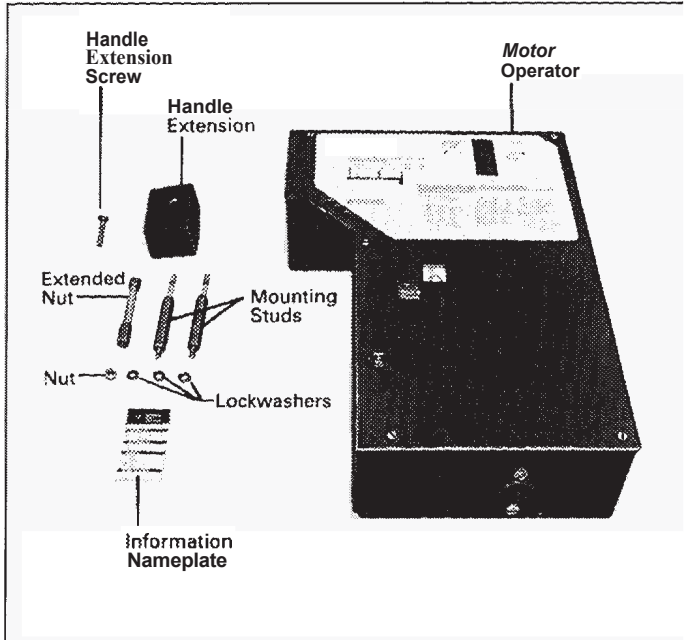


Fig. 2-1. Motor Operator Kit

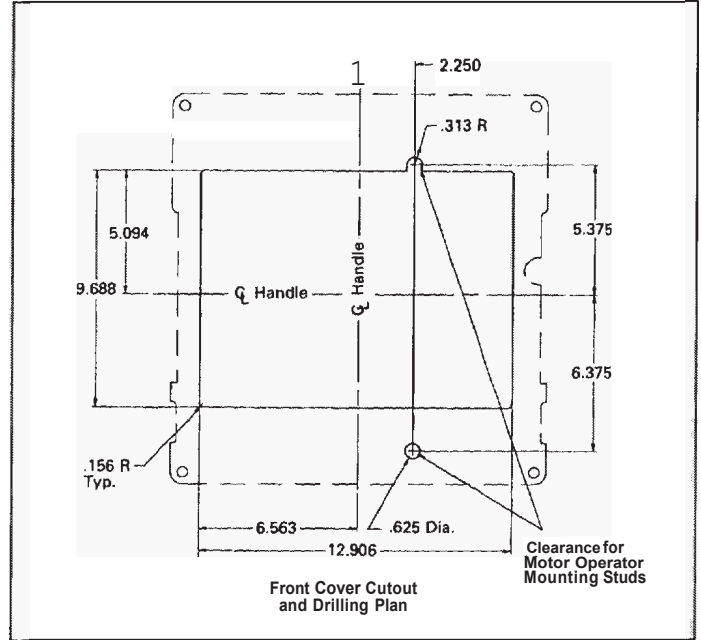


Fig. 2-2. Motor Operator Mounting Stud Locations



WARNING

MOVING PARTS MAY CAUSE PERSONAL INJURY. ENSURE THAT THE MOTOR OPERATOR IS INSTALLED ON A CIRCUIT BREAKER AND THAT THE COVER IS IN PLACE BEFORE ENERGIZING THE MOTOR OPERATOR.



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.

The motor operator may be installed on a circuit breaker that is mounted behind a dead front panel. The arrangement must be such that the handle, trip unit and nameplate of the circuit breaker protrude through the dead front panel. The thickness of the panel must not exceed .125 in.

Note: A minimum 1 KVA power source is recommended for motor operator.

Note: Install all circuit breaker internal accessories before installing the motor operator.

Note: The motor operator must be installed when the circuit breaker handle is in the tripped position.

- 2.1. Trip the circuit breaker by pushing the "PUSH-TO-TRIP BUTTON".
- 2.2. When installed, the motor operator covers the circuit breaker nameplate. Record the circuit breaker nameplate information on the information nameplate supplied. Affix the information nameplate to the front or side of the motor operator.
- 2.3. Replace the two circuit breaker cover screws indicated in Fig. 2-2 with the two motor operator mounting studs and lockwashers shown in Fig. 2-1, torque to 84 in-lbs.
- 2.4. If a dead front panel is to be used, add hole and notch to the panel as clearance for the two motor operator mounting studs (see Fig. 2-2).
- 2.5. Install the dead front panel.

Note: The motor operator must be mounted when in the "INSTALL" position.

- 2.6. Install the handle extension on the circuit breaker handle. The head of the screw should be installed from the top (line end) of the circuit breaker.
- 2.7. The motor operator is shipped in the INSTALL position. If the word INSTALL is not centered in the window of the motor operator cover, follow the instructions for manual operation and position the word INSTALL in the center of the window (see paragraphs 3.1 through 3.6).
- 2.8. Remove the 5 motor operator cover retaining screws and the motor operator cover.
- 2.9. Place motor operator on front of circuit breaker while aligning the mounting studs and cover escutcheon with mating holes in motor operator.
- 2.10. Secure the motor operator with the 1/4-20 nut and extended nut provided, torque to 120 in-lbs. The extended nut is used on the upper (line end) mounting post. A lockwasher is supplied for use with the standard nut.



CAUTION

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

Note: Depending upon the application, power and control wiring to the motor operator may need to be protected from physical damage. The grommet in the 7/8 in. diameter wire access hole may be removed to permit the use of standard connectors (see Fig. 4-1).

- 2.11. Slide the mode selector lever to the left to expose the terminal block. Connect the power and control wiring per Fig. 2-3. Ensure that wiring is clear of moving parts and cover mounting screws.
- 2.12. Replace the motor operator cover and the five cover screws. Do not substitute hardware longer than 1/2 in.
- 2.13. Verify the manual operation of the motor operator (see paragraphs 3.1-3.6).
- 2.14. Verify the electrical operation of the motor operator (see paragraph 3.7.).

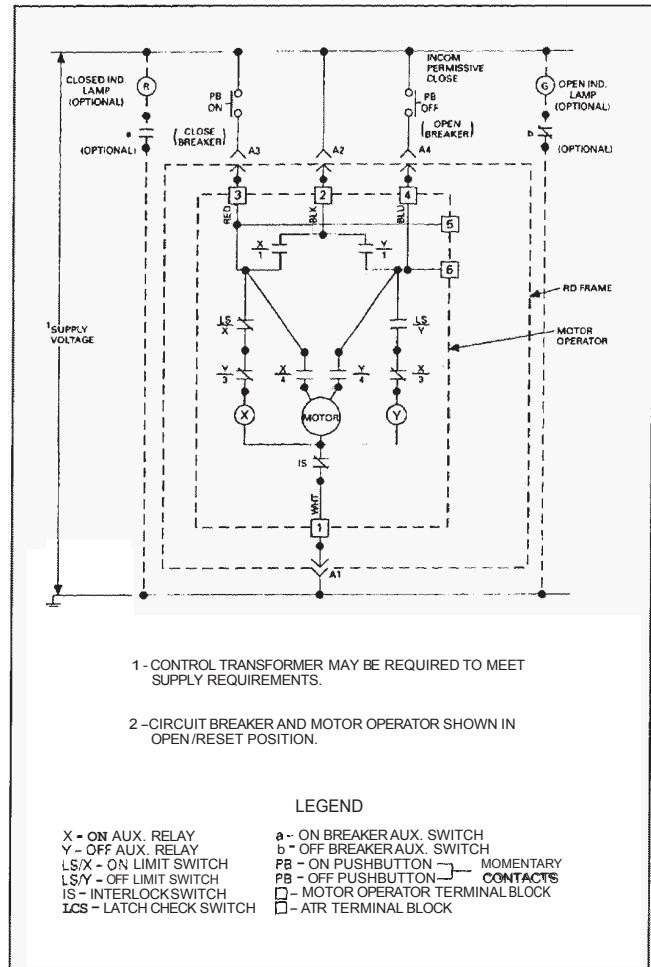


Fig. 2-3. Motor Operator Wiring Diagram

- 2.15. Adjust per paragraph 4-1. and 4-2. If the motor operator fails to fully open, close or reset the circuit breaker.

3.0 OPERATION

The following procedures describe the operation of the electrical operator. They address manual operation, electrical operation, and locking the motor operator in the OFF position.

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 LOADSIDE OF THE CIRCUIT BREAKER IS DISCONNECTED BEFORE OPERATING THE ELECTRICAL OPERATOR. SWITCHING OPERATIONS COULD CAUSE DAMAGE TO EQUIPMENT, ESPECIALLY EQUIPMENT REQUIRING A CONTROLLED SHUTDOWN.

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

Manuel Operation

- 3.1. Move the MODE SELECTOR to align the indicator with the CRANK IN/OUT marking on the cover. The crank will spring through the window in the cover.
- 3.2. Pull the white crank handle straight out until it is fully extended.
- 3.3. Move the MODE SELECTOR to the MANUAL mode.
- 3.4. Rotate the crank to operate the circuit breaker.

To close the circuit breaker crank counter clockwise.

To open the circuit breaker crank clockwise. "Breaker is Reset" must be centered in the window to reset the circuit breaker.

- 3.5. Move the MODE SELECTOR to the CRANK mode and align the handle with the window in the cover.



WARNING

MOVING THE MODE SELECTOR WHILE A FINGER IS IN THE CRANK WINDOW CAN CAUSE THE FINGER TO BE PINCHED. USE A TOOL TO DEPRESS THE CRANK.

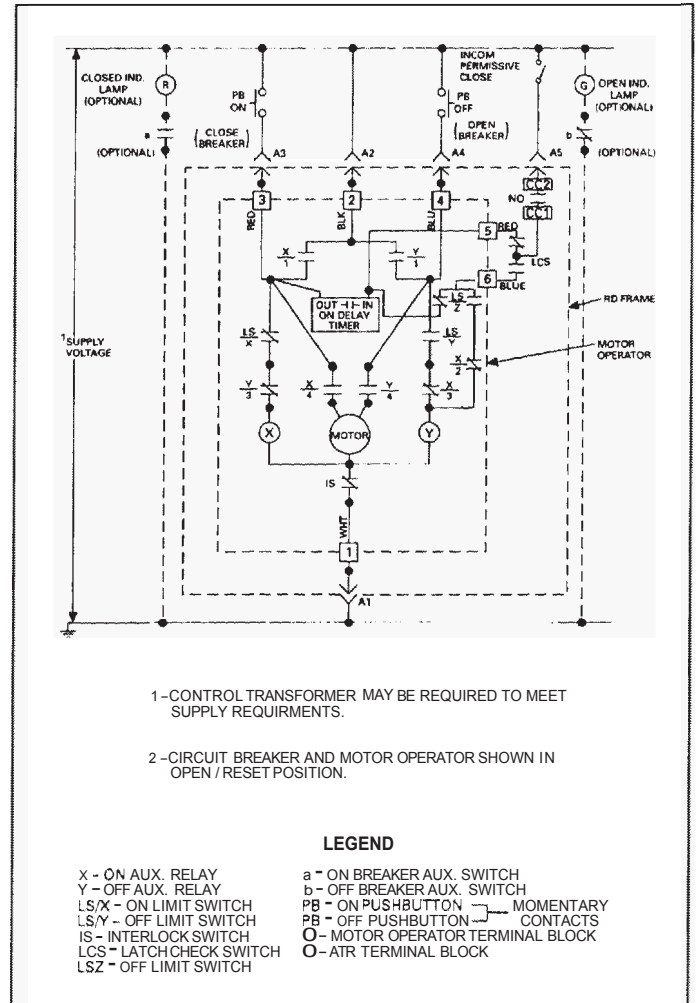


Fig. 2-4. INCOM Compatible Motor Operator Wiring Diagram

- 3.6. Depress the crank into the cover. Move the MODE SELECTOR to retain the crank.

Electrical Operation

- 3.7. Move the MODE SELECTOR (see Fig. 3-1) to select the ELECTRICAL OPERATION mode.

Momentary closure of the customer supplied "OW" or "OFF" momentary contacts will cause the motor operator to respond.

Should the breaker "TRIP, energizing the "OFF" circuit will "RESET" the breaker.

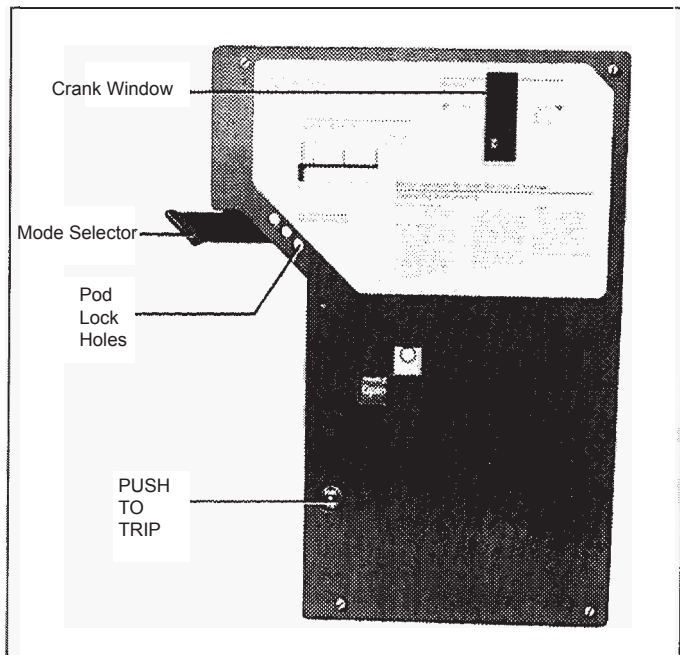


Fig. 3-1. Motor Operator Features

Note: If the breaker is tripped from the "OFF" position, the breaker must be reset- first by energizing the "ON" circuit, then by energizing the "OFF" circuit.

Lock-off

Note: The motor operator cannot be locked off while it is in the ON position.

Note: The motor operator cannot be operated electrically or manually while in the LOCK-OFF mode.

- 3.8. To lock the motor operator place it in the OFF position.



WARNING

MOVING THE MODE SELECTOR WHILE A FINGER IS IN THE CRANK WINDOW CAN CAUSE THE FINGER TO BE PINCHED. USE A TOOL TO DEPRESS THE CRANK.

- 3.9. Move the MODE SELECTOR to the LOCK-OFF mode. Depress the crank into the cover if passing through the CRANK position.

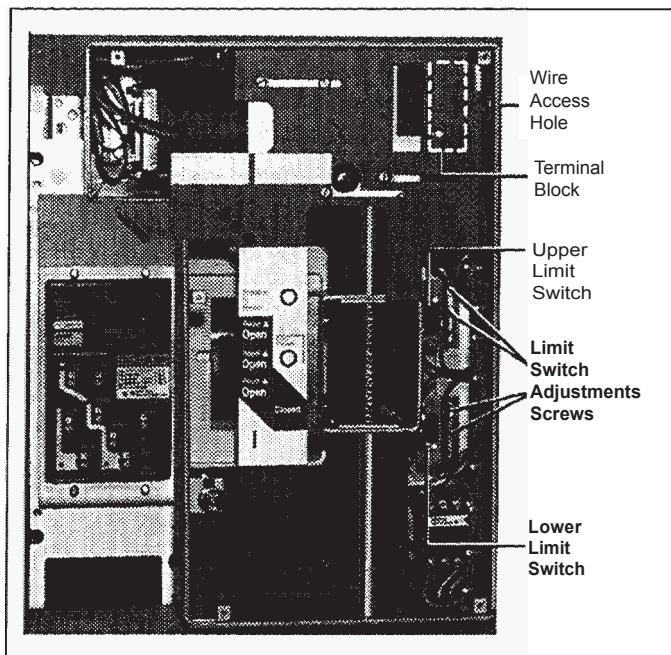


Fig. 4-1. Motor Operator Limit Switch Locations

- 3.10. Use customer supplied pad locks to secure as needed.

4.0 ADJUSTMENT

The following procedures describe the adjustment of the motor operator limit switches.

Note: 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 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 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 motor operator from supply voltage.
- 4.2. Remove the five cover screws and the motor operator cover.

- 4.3. 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. Retighten the screws.
- 4.4. 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. Retighten the screws.
- 4.5. Replace the motor operator cover and five cover screws. DO NOT SUBSTITUTE hardware longer than 1/2 in.
- 4.6. Reconnect the motor operator to the supply voltage.

5.0 DIGITRIP RMS TRIP UNIT OPERATION OF THE MOTOR OPERATOR

The Digitrip RMS trip unit is a microprocessor based trip unit that may be ordered as an option in the RD circuit breaker. The 700 and 800 series of Digitrip RMS trip units provide communications and control features via INCOM. INCOM is an acronym for INtegrated COMmuni-

cations. It utilizes a communications chip developed by Eaton for combining microprocessor based and other electrical distribution and control products with personal computers into a comprehensive communications and control network. The motor operator may be connected to the Digitrip RMS trip unit to allow remote operation of the RD circuit breaker by a personal computer via the INCOM network.

When the Digitrip RMS receives a signal from the INCOM network to open the circuit breaker, it trips the circuit breaker via the normal tripping mechanism. When the Digitrip RMS receives a signal to close the circuit breaker it sends a signal to the motor operator via the latch check switch. If the circuit breaker is tripped the latch check switch signals the motor operator to reset the circuit breaker, then it signals the motor operator to close the motor operator. If the circuit breaker is already reset, the latch check switch signals the motor operator to close the circuit breaker.

If the breaker was tripped from the OFF position the motor operator will move toward the CLOSE position, then back to the RESET position and then finally will close the breaker. This is required to properly reset the breaker.

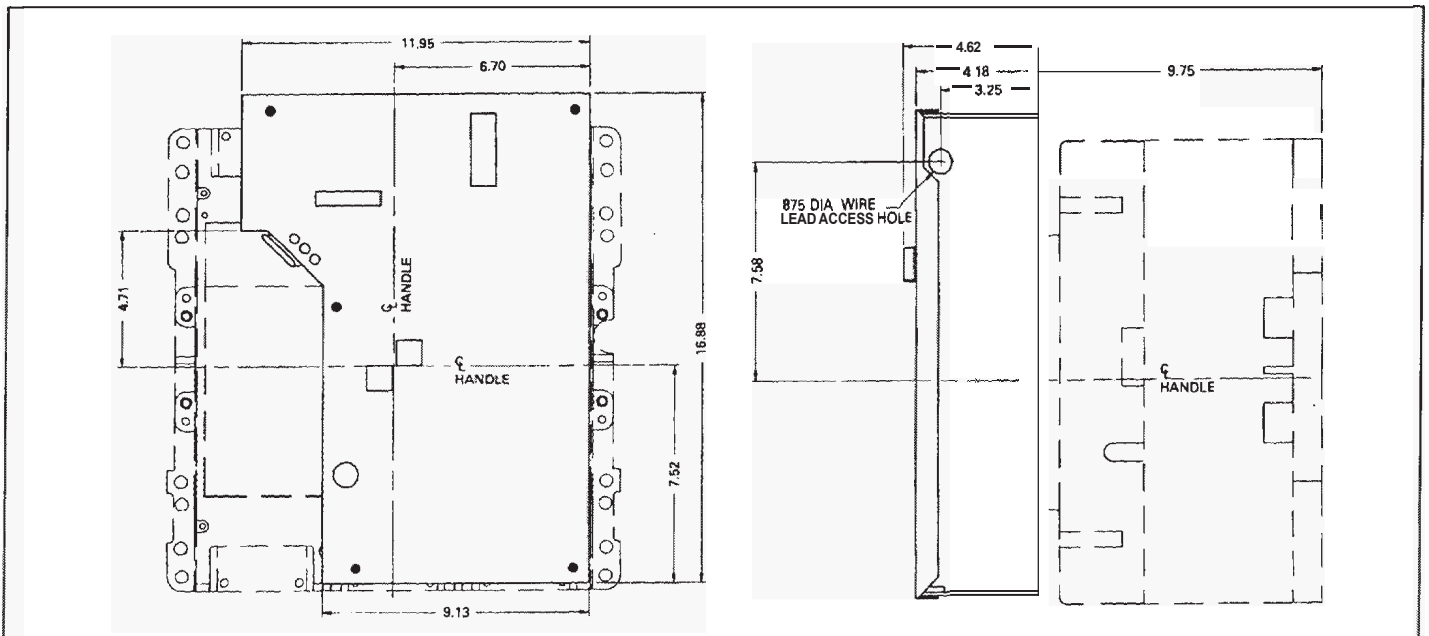


Fig. 4-2. Motor Operator Outline Dimensions

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

Catalog Number	Rated Voltage (V) ④	Frequency	Motor In-Rush Current (A)	Dielectric Withstand Voltage (V)
EOP6T08 K	120	50/60 Hz	40	1000 VAC
EOP6T11 K	240	50/60 Hz	27	1000 VAC
EOP6T21 K	48	DC	53	1000 VAC
EOP6T08C K ⑤	120	50/60 Hz	40	1000 VAC
EOP6T19 K	24	DC	58	1000 VAC

- ① Operator is an intermittent duty device. The safe duty cycle (OFF to ON to OFF) should not exceed one per minute.
- ② Electric Operating time at rated voltage;
 - (a) To turn breaker ON – 1/2 second max.
 - (b) To turn breaker OFF – 1/2 second 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.
- ⑤ INCOM compatible version.

Notes:

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