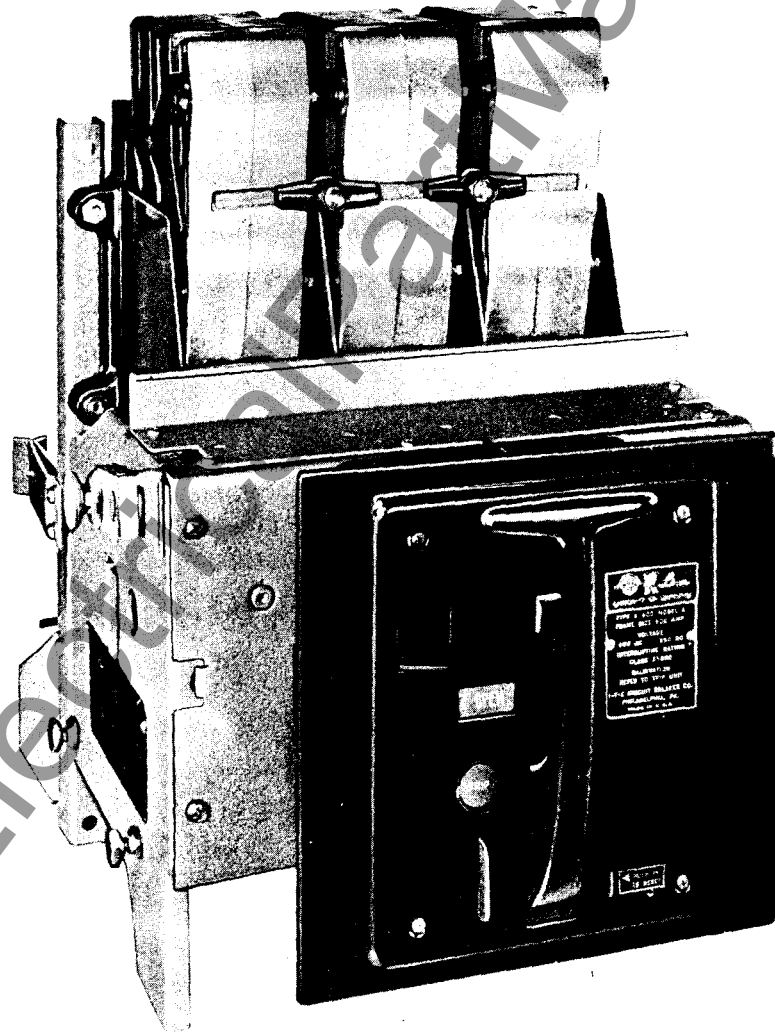




IB-5721

# LOW VOLTAGE POWER SWITCHGEAR INSTRUCTIONS

TYPE K-225, K-600 AND K-1600  
CIRCUIT BREAKERS  
(DRAWOUT MOUNTED)

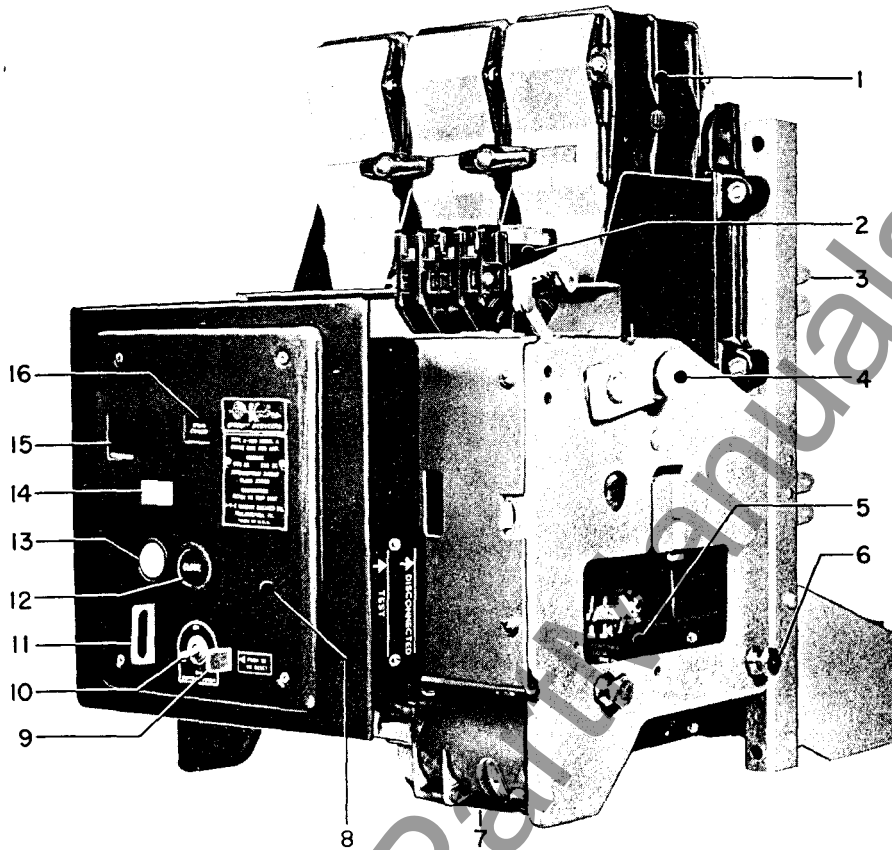


I-T-E CIRCUIT BREAKER COMPANY



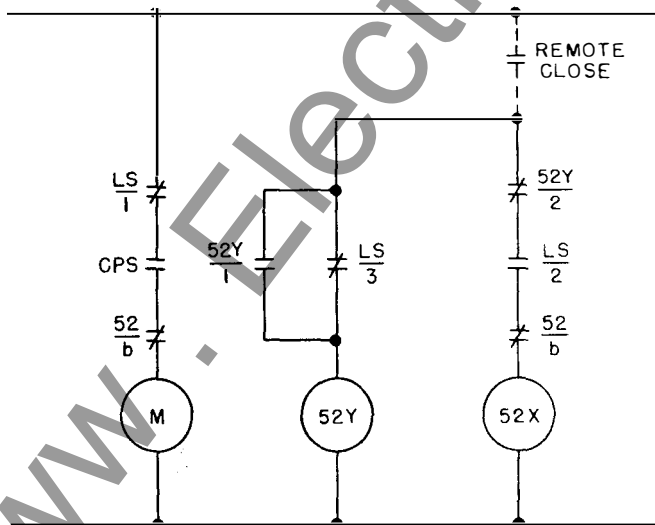
PHILADELPHIA 30, PENNSYLVANIA

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- |                             |                            |
|-----------------------------|----------------------------|
| 1 Arc Chute                 | 9 Automatic Trip Indicator |
| 2 Auxiliary Switch          | 10 Charging Power Switch   |
| 3 Primary Separable Contact | 11 Locking Hasp            |
| 4 Racking Cam Assembly      | 12 Electric Close Button   |
| 5 Overcurrent Trip Device   | 13 Manual Trip Button      |
| 6 Positioning Pin           | 14 Visual Indicator        |
| 7 Motor                     | 15 Racking Shutter         |
| 8 Escutcheon Assembly       | 16 Spring Charge Indicator |

Fig. 1—Type K-600 Electrically Operated Circuit Breaker



- LEGEND**
- M—Charging Motor
  - CPS—Charging Power Switch
  - LS/1, LS/3—Limit Switch Contacts Closed When Springs are Discharged, Open When Springs are Charged.
  - LS/2—Limit Switch Contact Open When Springs are Discharged, Closed When Springs are Charged.
  - 52/b—Contact Open When Breaker is Closed
  - 52X—Latch Release Coil
  - 52Y—Control Coil
  - 52Y/1—Lockout Relay Contact, Normally Open
  - 52Y/2—Lockout Relay Contact, Normally Closed

Fig. 2—Schematic Diagram of Closing Circuit

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## INSTRUCTIONS FOR TYPE K-225, K-600 AND K-1600 CIRCUIT BREAKERS (DRAWOUT MOUNTED)

### INTRODUCTION

These instructions apply to the type K-225, K-600, and K-1600 circuit breakers (K-Line). These circuit breakers can be furnished as a two-pole or three-pole circuit breaker having either a manually or electrically operated mechanism. A three-pole manually operated circuit breaker is shown on the cover, and an electrically operated circuit breaker is shown in Fig. 1. Two-pole construction is similar except that the center pole is omitted.

### TRANSPORTATION DAMAGE

If damage or loss is evident, file a claim at once with the carrier and promptly notify the I-T-E Circuit Breaker Company.

### STORAGE

It is recommended that the circuit breakers be installed in their permanent location even though they may not be placed in service for some time.

The circuit breaker may be stored and locked in the "DISCONNECTED" position in its compartment with the door closed. Both the primary and control separable contacts are disconnected in this position.

If the circuit breakers cannot be installed in their permanent location, they can be stored in their shipping cartons as protection against dust, dirt, and damage.

### GENERAL INFORMATION

The following sections are pertinent to the basic operation of the circuit breaker.

### OPERATING MECHANISM

Two types of operating mechanism are available; either the manually operated mechanism as shown on the circuit breaker in the cover photo or the electrically operated mechanism as shown on the circuit breaker in Fig. 1. The manually and electrically operated mechanism are interchangeable on circuit breakers having the same "type" designation.

### CONTROL DEVICE

The control device (7, Fig. 6) is furnished on electrically operated circuit breakers. The device is mounted below and to the left of the mechanism.

The control device contains three electrical components, the limit switch (LS), the lockout relay (52Y), and the latch release relay (52X). The schematic diagram of the closing circuit (Fig. 2) clearly illustrates the function of this device. In addition to its electrical functions, the base of the device provides a terminal block for the circuit breaker wiring.

### RACKING MECHANISM

The racking mechanism may be used to move the circuit breaker to any one of its three positions ("CONNECTED," "TEST" or "DISCONNECTED"). All of these positions are attainable with the cubicle door closed. The racking shutter (15, Fig. 1), which must be lifted to gain access to the racking mechanism, is interlocked with the circuit breaker so that the circuit breaker contacts must be open before the shutter may be lifted to rack the circuit breaker to another position. The circuit breaker can not be closed when the shutter is open. The circuit breaker may be padlocked open by means of the locking hasp. This automatically locks the racking mechanism. With the "TRIP" button (13, Fig. 1) depressed, the locking hasp (11, Fig. 1) may be pulled outward, accommodating from one to three padlocks, when the shutter is closed and the circuit breaker is tripped. The shutter can not be lifted and the breaker contacts can not be closed when the locking hasp is restrained by one or more padlocks.

### AUTOMATIC TRIP INDICATOR

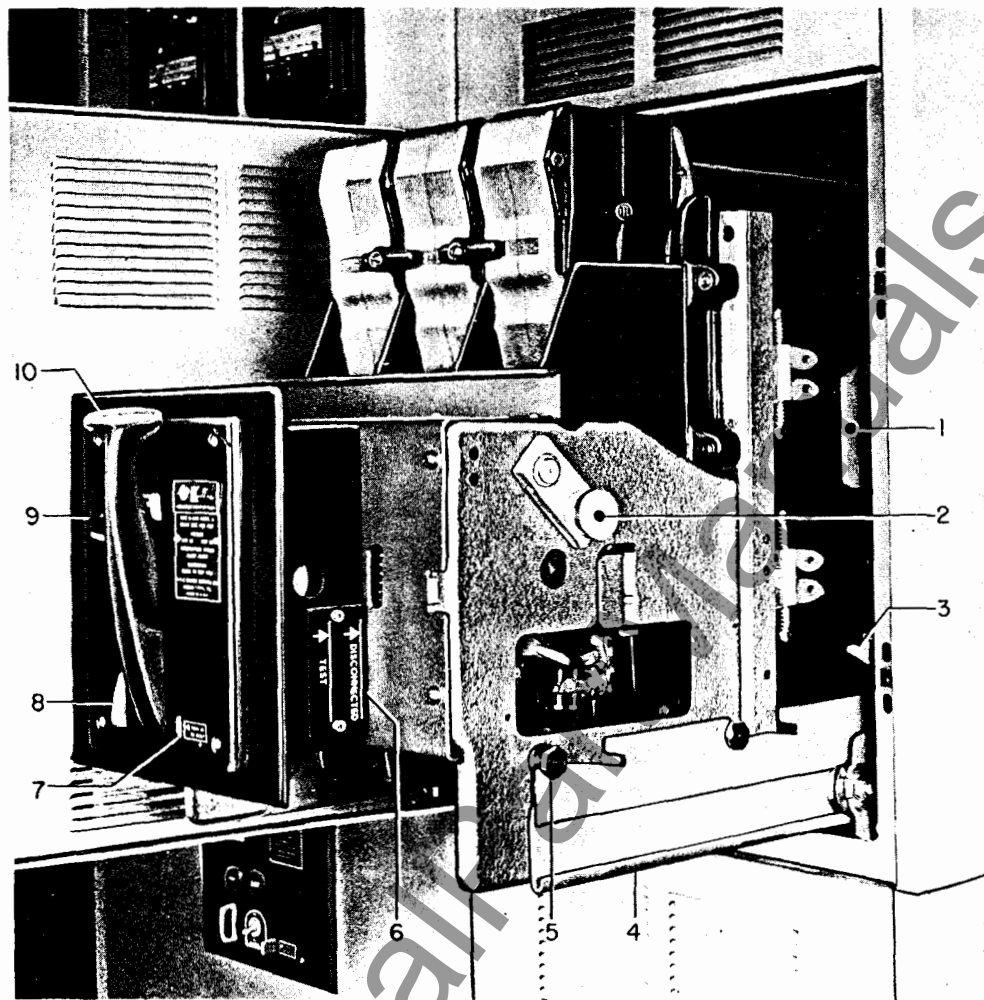
#### (Alarm and Lockout)

The automatic trip indicator (9, Fig. 1) extends through the escutcheon and provides a positive indication when overcurrent or undervoltage tripping has occurred. The indicator should be manually reset after each indication by pushing the indicator to its normal position. The alarm contacts and/or lockout attachment, if provided, are manually reset by this indicator. Reset is mandatory if these features are provided.

### PADLOCKING DEVICE

The padlocking device (11, Fig. 1), when withdrawn and padlocked, prevents unauthorized closing of the circuit breaker. To withdraw the locking hasp, the manual trip button (13, Fig. 1) must be depressed. The locking hasp will accommodate from one to three padlocks.

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- |                        |                            |
|------------------------|----------------------------|
| 1 Cradle Assembly      | 6 Position Indicator       |
| 2 Racking Cam Assembly | 7 Automatic Trip Indicator |
| 3 Latch                | 8 Locking Hasp             |
| 4 Track                | 9 Racking Shutter          |
| 5 Positioning Pin      | 10 Manual Closing Handle   |

Fig. 3—Type K-600 Circuit Breaker on Tracks Ready to be Placed in Compartment

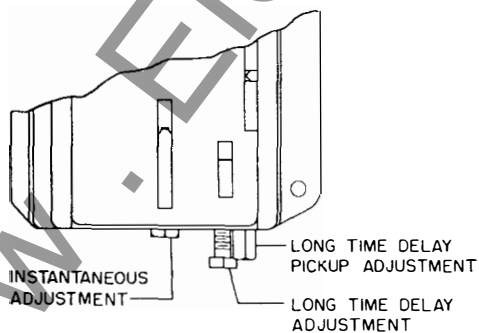


Fig. 4—Type OD-3 Overcurrent Trip Device, Partial View Showing Adjustable Features

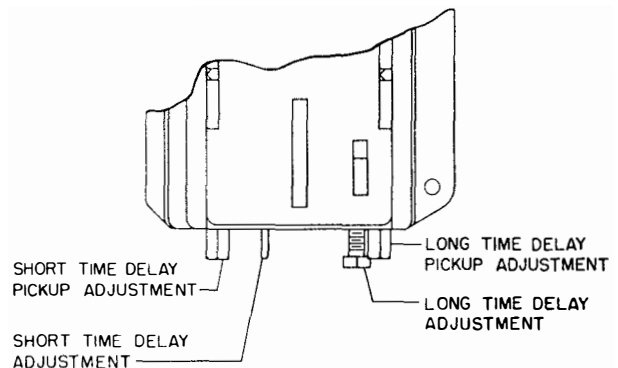


Fig. 5—Type OD-4 Overcurrent Trip Device, Partial View Showing Adjustable Features

Photo. 28293-RA

Dwg. S-14388  
Dwg. S-14389

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## OVERCURRENT TRIP DEVICES

### Type OD-3 Dual Overcurrent Trip Device

The type OD-3 overcurrent trip device, for general purpose applications, provides long-time delay tripping on moderate overcurrents which are above the long-time pickup setting; and instantaneous tripping on fault currents above the instantaneous trip setting. This device must be properly set to provide adequate protection for an electrical system. Three adjustment screws (See Fig. 4) on the bottom of the device provide independent control of the long-time pickup, instantaneous pickup, and amount of time delay. The nameplate of this device shows the settings of these adjustments and the range of settings which are available. For information on the time-current characteristics of this device, request a copy of TD-5523.

### Type OD-4 Dual Selective Overcurrent Trip Device

The type OD-4 overcurrent trip device, for selective tripping applications, provides long-time delay and short-time delay tripping. Independent adjustment (See Fig. 5) of both pickup and time delay is provided for both types of tripping. The nameplate of this device shows the settings which are available. For information on the time-current characteristics of this device, request a copy of TD-5524-A, B, or C for the minimum, intermediate, and maximum long-time bands, respectively.

## INSTALLATION

**CAUTION: FOR INITIAL INSTALLATION, DE-ENERGIZE THE PRIMARY AND CONTROL CIRCUITS BEFORE INSERTING THE CIRCUIT BREAKER INTO THE COMPARTMENT.**

### INSERTING CIRCUIT BREAKER

To insert the circuit breaker into its compartment, proceed as described below:

1. The circuit breaker must be in the "OPEN" position, the racking crank turned in the counter-clockwise direction fully against its stop, and the charging power switch (10, Fig. 1) (electrically operated circuit breakers only) in the "OFF" position.
2. Open the compartment door and pull out the right-hand and left-hand tracks (4, Fig. 3) to the fully extended and latched position.
3. Using a lifting yoke, lower the circuit breaker so that the positioning pins (5, Fig. 3) (two each side of circuit breaker) rest in the cut-out sections of each track (4, Fig. 3).
4. Remove the lifting yoke and push the circuit breaker toward the compartment. The circuit breaker will slide in the cut-out sections of the tracks until the positioning pins reach the end of the cutouts. An additional positive push

will automatically release the two latches (3, Fig. 3). This allows the circuit breaker to move toward the compartment until the racking cams (2, Fig. 3) stop against their guides on the cradle (1, Fig. 3).

5. Lift shutter (9, Fig. 3) covering the racking opening, insert racking crank, and turn crank clockwise, pass through the "DISCONNECTED" position, until the position indicator on the cradle shows "TEST" position.
6. Perform all steps in TABLE I, A or B.

TABLE I—Pre-Operational Inspection

A—Electrically Operated Breakers
<ol style="list-style-type: none"> <li>a. Manually reset automatic trip indicator (7, Fig. 3), if required.</li> <li>b. Charge closing power springs by means of removable maintenance handle (2, Fig. 6). (See NOTE under section OPERATION). Close circuit breaker by operating lever (3, Fig. 6) on control device. Trip by pushing manual "TRIP" button on escutcheon.</li> <li>c. Refer to instruction card on type OD overcurrent trip device.</li> <li>d. Megger out all circuits.</li> <li>e. Energize the control circuit, turn charging power switch (10, Fig. 1) to "ON", and electrically close and manually trip the circuit breaker from the push buttons on the escutcheon.</li> <li>f. Close and trip the circuit breaker from the remote mounted control switch, and check each auxiliary device, such as under-voltage trip, for proper operation.</li> </ol>

B—Manually Operated Breakers
<ol style="list-style-type: none"> <li>a. Manually reset automatic trip indicator (7, Fig. 3), if required.</li> <li>b. Close circuit breaker by means of manual closing handle (10, Fig. 3). Trip by pushing manual "TRIP" button on escutcheon.</li> <li>c. Refer to instruction card on type OD overcurrent trip device.</li> <li>d. Megger out all circuits.</li> <li>e. If the circuit breaker has a shunt trip device, energize the control circuit and manually close and electrically trip the circuit breaker from the remote mounted "TRIP" switch.</li> </ol>

7. With the circuit breaker in the "OPEN" position and the charging power switch (10, Fig. 1) in the "OFF" position, insert the racking crank and turn clockwise until the position indicator on the cradle shows "CONNECTED" position.

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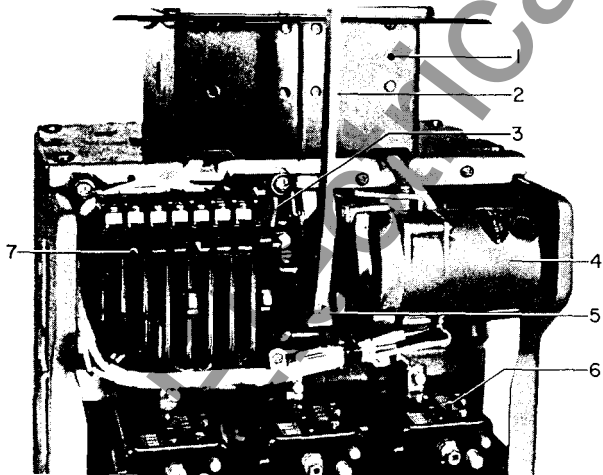


- Remove racking crank, place charging power switch (electrically operated circuit breakers only) in the "ON" position, energize the primary circuit, and the circuit breaker is ready for service.

## REMOVING THE CIRCUIT BREAKER

To move the circuit breaker to the "TEST" position or to remove it from the compartment, proceed as follows:

- With the compartment door closed, trip the circuit breaker by means of the remote mounted control switch or manual "TRIP" button (4, Fig. 7) on the escutcheon.
- Lift racking shutter (2, Fig. 7), insert racking crank and turn counter-clockwise until position indicator (6, Fig. 3) on the right-hand side of the escutcheon shows "TEST" position. (NOTE: The circuit breaker may be tested in this position—primary contacts are disconnected and the control contacts are connected.)
- Continue turning the racking crank counter-clockwise until the position indicator (6, Fig. 3) on the right-hand side of the escutcheon shows "DISCONNECTED" position.
- Open compartment door and discharge closing springs (electrically operated breakers only) by lifting the emergency close lever (3, Fig. 6) on the control device and then pushing the manual trip button on the escutcheon. Place charging power switch (9, Fig. 8) in the "OFF" position.



- |                                |                           |
|--------------------------------|---------------------------|
| 1 Escutcheon Assembly          | 5 Carrier                 |
| 2 Removable Maintenance Handle | 6 Overcurrent Trip Device |
| 3 Emergency Close Lever        | 7 Control Device          |
| 4 Motor                        |                           |

Fig. 6—Partial Bottom View of Electrically Operated Circuit Breaker, Showing Removable Maintenance Handle Positioned for Closing

- Insert racking handle and crank clockwise as far as the stops will allow.
- Pull circuit breaker forward until tracks (4, Fig. 3) are in the fully extended and latched position.
- Using a lifting yoke, just pick up the circuit breaker weight.
- With a positive pull, release positioning pins from cut-out sections of the tracks.
- Remove circuit breaker from tracks by means of lifting yoke.
- Release latch (3, Fig. 3) on each track, push tracks into the compartment, and close compartment door.

## OPERATION

The circuit breakers are designed for either manual or electrical operation. Electrically operated circuit breakers may be closed manually for maintenance purposes by using the maintenance handle (2, Fig. 6) to manually charge the closing springs, and the emergency close lever (3, Fig. 6) to close the circuit breaker.

NOTE: The maintenance handle will not function to manually charge the closing springs if the motor stops with its crank and roller on dead center with the carrier. The crank and roller can be moved off dead center as follows:

Refer to Fig. 6 and,

- Remove the maintenance handle (2).
- Insert the blade of a screwdriver through the slot in the carrier (5).
- Push the operating crank and roller, on the motor (4), away from the carrier (5) as far as possible.

The circuit breakers are mechanically and electrically trip free. That is, the circuit breaker mechanism will be tripped in any part of its closing stroke by operation of any tripping device with which it is equipped. As soon as the contacts touch under short circuit or severe overload conditions, the circuit breaker will immediately trip to the "OPEN" position.

Refer to TABLE II for the possible means of charging, closing, and tripping the circuit breaker in the various compartment positions.

## MAINTENANCE

It is recommended that a maintenance program be established for inspecting the circuit breaker at least once every six months and, as soon as possible, after a short circuit or severe overload interruption.

**WARNING: KEEP HANDS CLEAR OF ALL OPERATING PARTS. THE CLOSING SPRINGS ON ELECTRICALLY OPERATED CIRCUIT BREAKERS ARE CHARGED WHEN THE CIRCUIT BREAKER IS IN THE "OPEN" POSITION.**

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TABLE II—Methods of Operation

Electrically Operated Breakers			Manually Operated Breakers				
Position			Operation and Method	Position			Operation and Method
Connected	Test	Disconnected		Connected	Test	Disconnected	
x	x		<b>CHARGING:</b> 1. Electrical— <sup>ⓐ</sup> Motor 2. Manual— <sup>ⓑ</sup> Removable maintenance handle  <b>CLOSING:</b> 1. Electrical— a. Remote "CLOSE" switch b. Local "CLOSE" button 2. Manual— <sup>ⓒ</sup> Lever on control device  <b>TRIPPING:</b> 1. Electrical—Remote "TRIP" switch 2. Manual—Manual "TRIP" button	x	x	x	<b>CHARGING AND CLOSING:</b> 1. Manual Closing Handle  <b>TRIPPING:</b> 1. Electrical (If shunt trip or under-voltage trip is provided)—Remote "TRIP" switch. 2. Manual—Manual "TRIP" button
ⓧ	x	x		x	x		
x	x			x	x	x	
ⓧ	x	x		x	x	x	
x	x						
x	x	x					

- ⓧ Operation requires compartment door to be open and therefore is not recommended when the circuit breaker is energized.
- ⓐ The charging power switch (9, Fig. 8) must be in the "ON" position.
- ⓑ Place maintenance handle as shown in Fig. 6, and operate with a ratchet type motion.
- ⓒ Lift lever (3, Fig. 6), at front-right of control device, to manually release latch and close circuit breaker.

Refer to section Discharging Closing Springs under MAINTENANCE OPERATION for procedure to discharge the closing springs.

For maintenance instructions, request copies of IB-5724 from the nearest Sales Office of the I-T-E Circuit Breaker Company.

### MAINTENANCE OPERATION

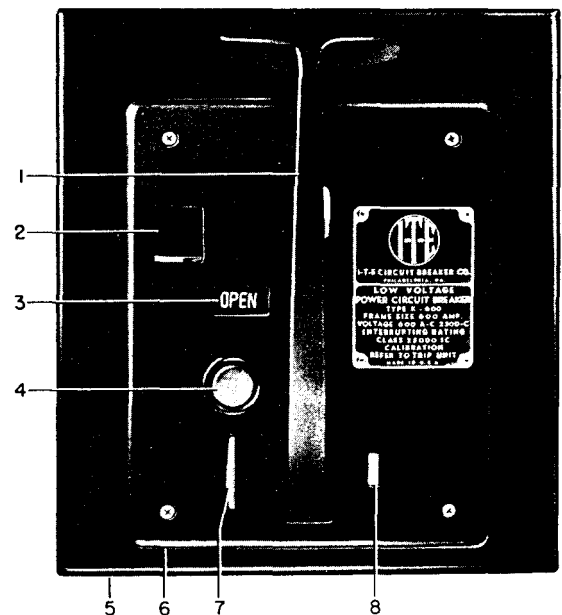
Refer to TABLE II for possible means of charging, closing, and tripping the circuit breaker. The circuit breaker should be in either the "TEST" or "DISCONNECTED" position, or withdrawn from the compartment.

### Discharging Closing Springs

The closing springs of manually operated circuit breakers are discharged by each closing operation.

The closing springs of electrically operated circuit breakers are charged whenever the contacts are open, the charging power switch is "ON", and control power is available. Two methods of discharging the closing springs are necessary; one, for the circuit breaker when it is in the "TEST" position; and the second, when it is in the "DISCONNECTED" position or withdrawn from the compartment.

With the circuit breaker in the "TEST" position, discharge the closing springs as follows:



- |                         |                            |
|-------------------------|----------------------------|
| 1 Manual Closing Handle | 5 Dust Plate               |
| 2 Racking Shutter       | 6 Escutcheon               |
| 3 Visual Indicator      | 7 Locking Hasp             |
| 4 Manual Trip Button    | 8 Automatic Trip Indicator |

Fig. 7—Front View of Escutcheon Assembly for Manually Operated Circuit Breaker

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1. Close the circuit breaker with the local "CLOSE" button (4, Fig. 8).
2. Place charging power switch (9, Fig. 8) in the "OFF" position.
3. Open the circuit breaker by means of the manual "TRIP" button (5, Fig. 8).
4. The closing springs are now discharged.

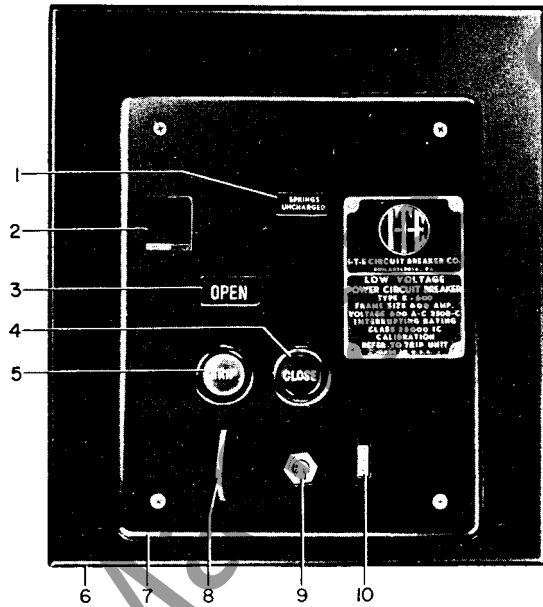
If the circuit breaker is in the "DISCONNECTED" position or withdrawn from the compartment, discharge the closing springs as follows:

1. Lift lever (3, Fig. 6) on the control device to manually release latch and close the circuit breaker.
2. Open the circuit breaker by means of the manual "TRIP" button (5, Fig. 8).
3. The closing springs are now discharged.
4. Place charging power switch (9, Fig. 8) in the "OFF" position.

#### RENEWAL PARTS

To order renewal parts, address the nearest Sales Office of the I-T-E Circuit Breaker Company. Specify the complete nameplate data, description of parts, and quantity required.

To facilitate the ordering of renewal parts, a copy of RP-5801 will be furnished on request.



- |                           |                             |
|---------------------------|-----------------------------|
| 1 Spring Charge Indicator | 6 Dust Plate                |
| 2 Racking Shutter         | 7 Escutcheon                |
| 3 Visual Indicator        | 8 Locking Hasp              |
| 4 Electric Close Button   | 9 Charging Power Switch     |
| 5 Manual Trip Button      | 10 Automatic Trip Indicator |

Fig. 8—Front View of Escutcheon Assembly for Electrically Operated Circuit Breaker

*These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation, or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the I-T-E Circuit Breaker Company.*



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