

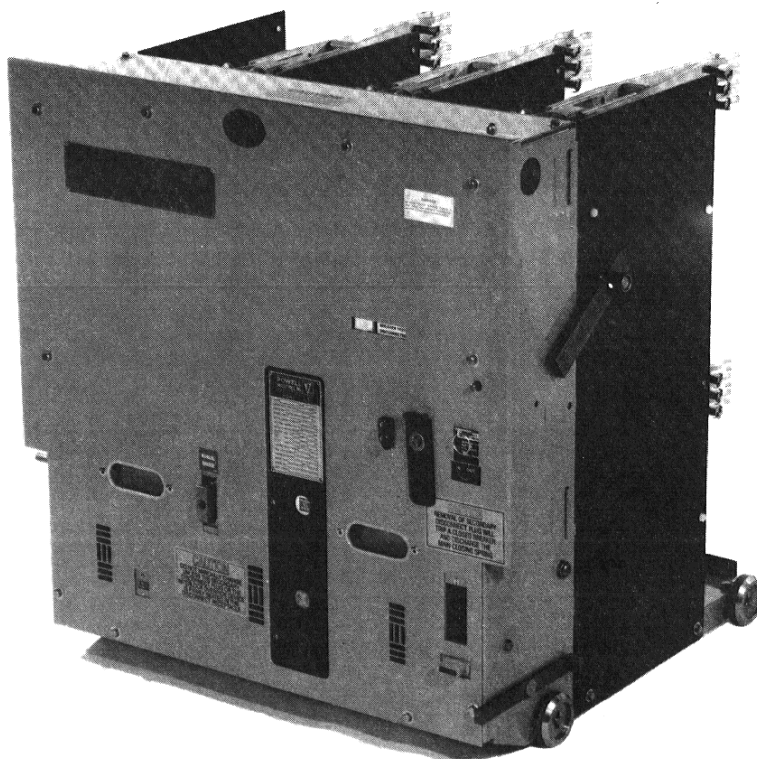


## Series P-60000 POWL-VAC® VACUUM CIRCUIT BREAKERS

Models 05PV0250-3 & -4, 15PV050H-3 & -4 and  
15PV0500-3 & -4, 1200 A and 2000 A

### CAUTION

THIS INSTRUCTION BOOK IS INCOMPLETE BY ITSELF. IT IS A SUPPLEMENT TO IB-60010 AND MUST BE USED TOGETHER WITH IB-60010. THIS INSTRUCTION BOOK CONTAINS ONLY INFORMATION THAT IS SPECIFIC TO POWL-VAC® CIRCUIT BREAKERS EQUIPPED WITH GENERAL ELECTRIC VACUUM INTERRUPTERS TYPE 50C AND 52C.



**MAINTENANCE &  
RENEWAL PARTS**



POWELL ELECTRICAL MANUFACTURING COMPANY  
8550 MOSLEY DRIVE • HOUSTON, TEXAS 77075 USA  
PHONE (713) 944-6900 • FAX (713) 947-4453



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**CAUTION**

**Before any adjustment, servicing, parts replacement, or any other act is performed requiring physical contact with the electrical working components or wiring of this equipment, the POWER SUPPLY MUST BE DISCONNECTED AND THE CIRCUIT BREAKER CLOSING SPRING MUST BE DISCHARGED.**

## I. MAINTENANCE

(See Section V of IB-60010)

**CAUTION:**

**These breakers utilize stored energy spring charged mechanisms. These mechanisms must be serviced only by skilled and knowledgeable personnel capable of releasing each spring load in a controlled manner. EXTREME CARE MUST BE EXERCISED TO KEEP ALL PERSONNEL, TOOLS, AND OTHER OBJECTS CLEAR OF MECHANISMS WHICH ARE TO BE OPERATED OR RELEASED. Detailed information regarding these mechanisms is found in IB-60010.**

### A. INTERRUPTER AND CONTACT AREA

#### (1) Vacuum Interrupter Contact Erosion

At each inspection, the vacuum interrupters should be checked for contact erosion. The breaker must be closed for this check. Each new vacuum interrupter is set with a gap of about 0.500 inch between the contact loading spring yoke and the nut on the pushrod. Because the factory setting of the overtravel gap varies slightly for each interrupter, a label is provided on the lower part of each interrupter. The original factory setting of the overtravel gap and the end-of-life measurement of this gap are recorded on the label. When the overtravel gap measurement reaches the end-of-life value given on this label the interrupter should be replaced. See Figure 1.

#### (2) Mechanical Adjustment of Interrupters

There are several factory adjustments in the interrupter area which are described below. No adjustment of these settings is required for routine maintenance. The dimensions given below are for NEW interrupters, and all of them will change during the life of the interrupter. Adjustment of these settings will be required only after interrupter replacement. **DO NOT ADJUST THESE SETTINGS UNNECESSARILY AS DAMAGE TO THE CIRCUIT BREAKER MAY RESULT.**

If major disassembly of the mechanism or the vacuum interrupters becomes necessary for any reason, all of the factory set dimensions described below must be measured and recorded

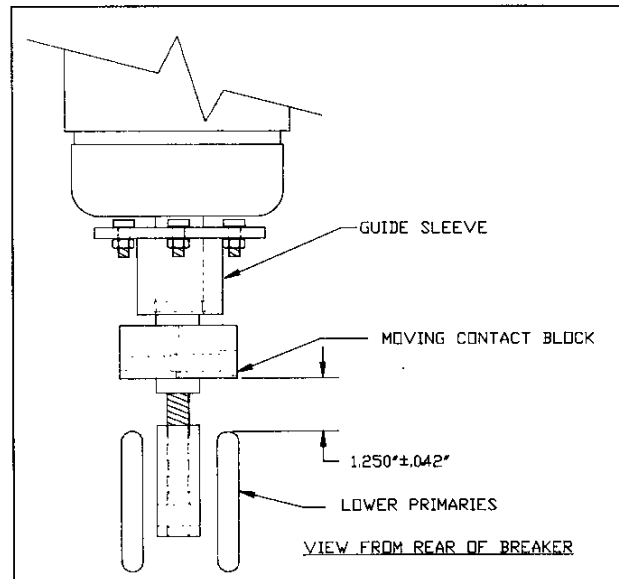


Figure 1. Moving Contact Block Measurements

prior to disassembly if interrupter replacement is not required. These dimensions must be restored to the "as-found" dimensions upon reassembly to insure proper timing and operation of the circuit breaker.

**NOTE: THE FOLLOWING DIMENSIONS ARE FOR NEW AND UNUSED INTERRUPTERS ONLY. THESE INITIAL SETTINGS WILL CHANGE DURING NO-LOAD BREAK-IN OPERATION OF THE INTERRUPTERS AND SUBSEQUENTLY WITH NORMAL CONTACT EROSION. NO ATTEMPT SHOULD BE MADE TO RESTORE THESE DIMENSIONS TO USED INTERRUPTERS AS DAMAGE TO THE CIRCUIT BREAKER MAY RESULT.**

- With closed contacts on a new vacuum interrupter, the bottom of the moving contact block should be 1.250" plus or minus 0.042" above the top of the lower main primary disconnect bars. See Figure 1.
- With closed contacts on a new vacuum interrupter, the bottom of the pin which connects the bell cranks to the

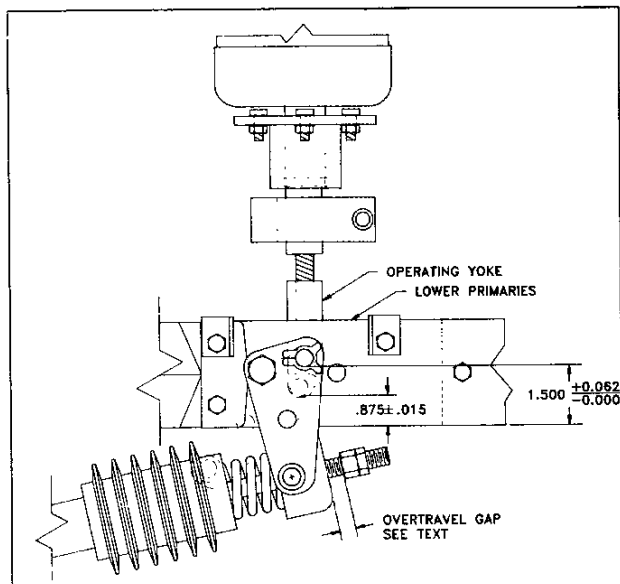


Figure 2. Operating Yoke Adjustments

operating yoke should be 1.500" + 0.06" - 0.000" above the bottom of the lower main primary disconnect bars. See Figure 2.

- c. With the breaker open, the dimension described in (b) should be .875" ± 0.015".
- d. As explained in the description of the mechanism operation, when the breaker is closed a gap will exist between the contact loading spring yoke and the nut on the push rod stud, Figure 2. With a new vacuum interrupter, this gap will be about 1/2 inch. As the contacts erode, the gap will reduce to about 1/8 inch.

### (3) Primary Resistance Values

Whenever maintenance procedures require that any portion of the primary current path be disassembled, the resistance of the primary current path should be checked upon reassembly. See Section V of IB-60010.

The micro-ohm values of resistance must not exceed the following limits:

TYPE	RATED AMPS	RESISTANCE
05PV0250-31, -41	1200	90
05PV0250-32, -42	2000	40
15PV0500-31, -41	1200	90
15PV0500-32, -42	2000	50
15PV050H-31, -41	1200	90
15PV050H-32, -42	2000	50

## II. RECOMMENDED RENEWAL PARTS AND REPAIR PROCEDURES

(See Section VI. of IB-60010)

### A. ORDERING INSTRUCTIONS

- (1) Order Renewal Parts from Powell Apparatus Service Division (PASD).
- (2) Always specify complete nameplate information, including:
  - a. Type
  - b. Serial Number
  - c. Rated Voltage
  - d. Rated Amps
  - e. Impulse Withstand
  - f. Control Voltage (for control devices and coils)
- (3) Specify the quantity and description of the part, and IB-60010 and IB-60011. If the part is in the tables of recommended renewal parts, give its catalog number. If the part is not in the tables, the description should be accompanied by a marked illustration from IB-60010, this bulletin, a photo or a sketch showing the part needed.
- (4) Standard hardware, such as screws, bolts, nuts, washers, etc., should be purchased locally. Hardware used in bolted joints of conductors must be SAE Grade 5 or better in order to insure proper clamping torque and prevent overheating of the joints. Hardware should be plated to deter corrosion.

### B. RECOMMENDED RENEWAL PARTS

It is recommended that sufficient renewal parts be carried in stock to enable the prompt replacement of any worn, broken or damaged part. A stock of such parts minimizes service interruptions caused by breakdowns and saves time and expense. When continuous operation is a primary consideration, more renewal parts should be carried, the amount depending on the severity of the service and the time required to secure replacements.

Spare or replacement parts which are furnished may not be identical to the original parts, since improvements are made from time to time. The parts which are furnished, however, will be interchangeable. Tables I, II and III list the recommended spare parts to be carried in stock by the user. The recommended quantity is not specified. This must be determined by the user based on the application. As a minimum, it is recommended that one set of parts be stocked per ten breakers or fraction thereof.



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**Table I. Interrupter and Sliding Contact Finger Assemblies**

Breaker Type	Rated kV	Rated Continuous Current	Rated Momentary kA	Interrupter Assembly (3 per Bkr.)	Sliding Contact Finger Assembly (6 per Breaker)
5PV0250-3	4.76	1200A	58	60149-G1	50952-G1
5PV0250-3	4.76	2000A	58	60149-G1	50952-G1
15PV0500-3	15.0	1200A	37	60149-G2	50951-G1
15PV0500-3	15.0	2000A	37	60149-G2	50952-G1
15PV050H-3	15.0	1200A	58	60149-G2	50952-G1
15PV050H-3	15.0	2000A	58	60149-G2	50952-G1

**Table II. Control Devices (1)**

Control Voltage	Closing Coil	Shunt Trip Left(2)	Shunt Trip Right(3)	Under-voltage Device(4)	Charging Motor	Anti-Pump Relay
24VDC	N/A	50041-G5	50042-G6	50028-G4	N/A	N/A
48VDC	50026-G1	50041-G1	50042-G1	50028-G3	50960-G6	PVKUP11055-48
125VDC	50026-G3	50041-G2	50042-G3	50028-G1	50960-G4	PVKUP11055-110
250VDC	50026-G4	50041-G3	50042-G4	50028-G2	50960-G5	PVKUP11055-110(5)
120VAC	50026-G1	50041-G1	50042-G1	N/A	50960-G4	PVKUP11A55-120
240VAC	50026-G2	50041-G6	50042-G2	N/A	50960-G5	PVKUP11A55-240
Capacitor Trip (6)	N/A	50041-G4	50042-G5	N/A	N/A	N/A

## NOTES FOR TABLE II

- One each required per breaker if breaker was originally equipped with this item. All breakers have closing coil, left shunt trip, charging motor, and anti-pump relay. Right shunt trip and undervoltage device are optional. See notes 2-4.
- Standard shunt trip.
- Secondary shunt trip, where furnished. Cannot be present with undervoltage device.
- Where furnished. Cannot be present with right-hand shunt trip.
- For 250VDC applications, a dropping resistor, 50747-G2, is required in series with this relay's coil.
- For use with capacitor trip units with 240VAC input. Consult factory for other ratings.

**Table III. Miscellaneous Parts**

Qty/Bkr	Description	Catalog No.
18	Primary Contact Spring Assembly	50740-G1
1	Latch Check Switch	PVBA-2RV2-A2
1	Motor Cutoff Switch Assembly	50756-G1
	Ground Shoe Finger Assembly	
2	5PV0250-3, 1200A & 2000A	50952-G3
2	15PV0500-3, 1200A & 2000A	50951-G2
2	15PV050H-3, 1200A & 2000A	50952-G3
1	Auxiliary Switch Assembly	102108LN

## C. REPLACEMENT PROCEDURES

This section includes instructions for replacing all the parts recommended as renewal parts. Before attempting any repair work, take note of safety practices outlined in Section II of IB-60010.

MAKE CERTAIN THAT THE CONTROL CIRCUITS ARE DE-ENERGIZED AND THE BREAKER IS RESTING SECURELY OUTSIDE THE SWITCHGEAR HOUSING. DO NOT START TO WORK ON A CLOSED BREAKER OR A BREAKER WITH THE CLOSING SPRINGS CHARGED. WHEN ANY MAINTENANCE PROCEDURE REQUIRES OPENING OR CLOSING OF THE CIRCUIT BREAKER OR CHARGING OF ANY OF THE MECHANISM SPRINGS, EXERCISE EXTREME CARE TO MAKE SURE THAT ALL PERSONNEL, TOOLS AND OTHER OBJECTS ARE KEPT WELL CLEAR OF THE MOVING PARTS OR THE CHARGED SPRINGS.

### (1) Vacuum Interrupter

- Open circuit breaker and discharge closing spring.
- Remove the front cover of the circuit breaker.
- Remove interphase barrier assembly.
- Measure and record the height of the opening springs (b, Figure 3, IB-60010).
- Relieve the tension on the opening springs by removing the locknuts and hex nuts found on top of the opening springs. During this operation, hold the breaker open by inserting a large screwdriver or similar tool under the pin connecting the opening spring rod to the jack shaft levers and over the spacer that contacts the open-position stop bolt, then applying pressure upward. The jack shaft will rotate to the interrupter "contact touch" position when the tension is relieved from the opening springs and the pressure on the tool holding the breaker open is relaxed, due to the vacuum present in the interrupters.
- Loosen the set screw holding the operating yoke to the operating pin. Remove X-washer from one end of the vacuum interrupter operating pin and pull the pin (d, Figure 9, IB-60010). The X-washer can be opened by squeezing the two projecting tabs with pliers.
- Remove the four socket-head screws, two on each side (f, Figure 9, IB-60010), holding the sliding contact assemblies, and pivot the sliding contact assemblies down.
- Unscrew and remove the operating yoke at the lower end of the vacuum interrupter (Figure 2).
- Loosen, but do not remove, the two bolts through the upper contact block (k, Figure 9, IB-60010).
- Loosen, but do not remove, the four bolts connecting the vertical bars above the vacuum interrupter to the upper main horizontal primary disconnect bars.
- While supporting the vacuum interrupter, remove the two bolts connecting the upper contact block to the vertical bars.
- Remove the vacuum interrupter.
- Unscrew the upper contact block from the vacuum interrupter.
- Check the contents of the replacement vacuum interrupter kit. It should contain the following:
  - A vacuum interrupter of the proper rating, with the lower contact block attached. **DO NOT DISTURB THE ATTACHMENT OF THE CONTACT BLOCK TO THE INTERRUPTER.** This critical assembly has



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been made at the factory. Attempting to modify it may result in damage to the vacuum interrupter stem, making the interrupter unusable.

2. Two X-washers.
3. Two containers of lubricant, one tacky high pressure grease Anderol 757, and one contact grease Mobilgrease 28.
- p. Screw the upper contact block onto the upper stem of the vacuum interrupter so that 3 to 5 threads of the interrupter stem protrude from the top of the contact block. This adjustment is not critical at this point, as it will be gauged later.
- q. Install the new interrupter in the breaker by reversing steps m through f above.
- r. Set the height of the interrupter in the breaker by rotating the interrupter. Be careful to turn the interrupter by its ceramic body. Do not attempt to turn it by the lower contact block or the movable stem, as this might result in damage to the interrupter's bellows and loss of vacuum. Rotate the interrupter until the lower surface of the lower contact block is 1.125" above the upper edge of the lower primaries. See Figure 1. Then rotate the interrupter downward as necessary to position the long edges of the block parallel and in line with the lower primaries. Recheck the dimension between the lower surface of the contact block and the upper surface of the lower primaries. This dimension should be 1.125" plus or minus 0.042".
- s. Remove the nut from the bell crank mounting bolt and remove the bell cranks.
- t. Insert the pin through the operating yoke and the lower primaries.
- u. Set the height of the operating yoke so that the bottom of the pin is  $1.438" + 0.062" - 0.000"$  above the bottom edge of the lower primaries. See Figure 1.
- v. Remove the pin and reassemble the bell cranks.
- w. Lubricate the pin with a liberal coat of the tacky high pressure grease, Anderol 757, insert the pin through both bell cranks and the operating yoke, and place a new X-washer in the groove of the pin. Tighten the X-washer by squeezing the two open ends together with pliers. Tighten the set screw in the bottom of the operating yoke.
- x. Tighten all bolts in the upper contact structure to 45 lb-feet.
- y. Apply a light coat of Mobilgrease 28 contact lubricant to the left and right sides of the lower contact block and reassemble the sliding contact fingers.
- z. Fully open the breaker by reversing step e. Reset the opening springs to the dimension recorded in step d.
- aa. Close and open the circuit breaker about 50 times to properly seat the vacuum interrupter contact surface.
- bb. Measure the stroke of the vacuum interrupter contacts. This can be accomplished by measuring the distance from the top of the moving contact block to the lower flange of the interrupter with the breaker open and again with the breaker closed. The difference of these two measurements is the stroke of the interrupter contacts. The stroke for these ratings is 0.562" to 0.625". If the

stroke is found to be outside these limits, it will be necessary to adjust the operating yoke by turning it upward or downward. Turning it downward decreases the stroke, while turning it upwards increases the stroke. Each half-turn of the operating yoke will change the stroke by 0.050".

**CAUTION: IF ADJUSTMENT OF THE OPERATING YOKE IS REQUIRED, MAKE CERTAIN THE BREAKER IS OPEN AND THE MAIN SPRING IS DISCHARGED PRIOR TO ADJUSTING THE OPERATING YOKE.**

This adjustment can be accomplished by the following procedure:

1. Loosen the set screw in the operating yoke.
  2. Remove the "X" washer from one side of the pin.
  3. While applying a downward force to the moving contact block just sufficient to overcome the force of the vacuum, slid the pin out of one bellcrank and the operating yoke.
- CAUTION: DO NOT FORCE THE MOVING CONTACT BLOCK DOWN FARTHER THAN REQUIRED TO ALIGN THE PIN, BELL CRANKS AND OPERATING YOKE AS DAMAGE TO THE VACUUM INTERRUPTER BELLOW AND LOSS OF VACUUM MAY RESULT.**
4. Rotate the operating yoke as required.
  5. Install the pin through the operating yoke and bell crank. Install the "X" washer and tighten the set screw in the operating yoke.
  6. Repeat the above steps as required to obtain the specified stroke.
  - cc. With the breaker closed, measure the gap between the contact loading spring yoke and the nut on the pushrod stud. Record this value in the space of the label on the vacuum interrupter marked "new". Deduct .38" from this dimension and record the result in the space marked "end-of-life".
  - dd. Replace interphase barrier assembly.

#### (2) Sliding Contact Finger Assembly

Instructions are given in the maintenance section of IB-60010 for removing and inverting the sliding contact finger assembly. Follow these instructions, but install the new finger assembly instead of re-installing the old one.

#### (3) Closing Coil Assembly

The closing coil is located in the lower front center of the circuit breaker. See Figure 3, Page 4 of IB-60010. To replace it:

- a. Remove front cover of the breaker.
- b. Elevate the breaker so that there is at least 6 inches of clear space below the bottom pan of the breaker.



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- c. Unplug the closing coil from the wire harness.
- d. Remove two bolts holding closing coil assembly to base pan and drop the closing coil out of the bottom of the breaker.
- e. Insert new closing coil assembly into the breaker from below, bolt it in place and plug it into the wiring harness. No adjustment is required.
- f. Close breaker several times electrically to insure that coil is functioning properly.
- g. Replace front cover.

#### (4) Shunt Trip Coil Assembly, Left

This assembly is located in the center part of the mechanism area, just to the left of the main closing spring. See Figure 3, Page 4 of IB60010. To replace it:

- a. Remove front cover of breaker.
- b. Unplug the trip coil from the wiring harness.
- c. Remove the two bolts holding the trip coil assembly to the breaker frame and remove the assembly.
- d. Bolt new assembly in place and plug it into the wiring harness.
- e. Trip the breaker electrically several times at nominal control voltage to insure that coil is functioning properly.
- f. Check the time interval from energization of the trip coil (at nominal control voltage) to the parting of the main contacts of the circuit breaker. This time must be within 40 to 55 milliseconds. If necessary, bend the trip lever slightly to achieve this setting. See Figure 3.
- g. Trip the breaker electrically at minimum control voltage.
- h. Replace front cover.

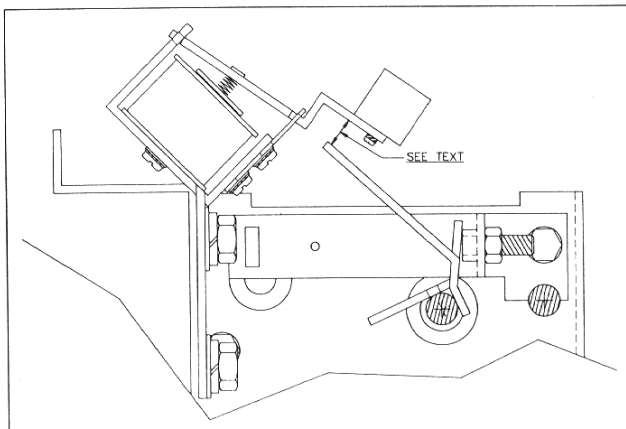


Figure 3. Trip Lever Gap Adjustment

#### (5) Shunt Trip Coil Assembly, Right

This assembly is located in the center part of the mechanism area, just to the right of the main closing spring. See Figure 12, Page 8 of IB60010. To replace it:

- a. Remove front cover of breaker.
- b. Unplug the trip coil from the wiring harness.
- c. Remove the two bolts holding the trip coil assembly to the breaker frame and remove the assembly.

**NOTE:** It will be easier to remove the trip coil assembly if the right hand main operating spring connecting rod is removed. See section headed "Closing Spring Removal and Slow Closing of Mechanism" under Maintenance in IB-60010 for procedures for removing this connecting rod.

- d. Bolt new assembly in place and plug it into the wiring harness. No adjustment is required.
- e. Re-assemble spring connecting rod and main spring, if previously removed.
- f. Trip the breaker electrically several times to insure that the coil is functioning properly.
- g. Replace front cover.

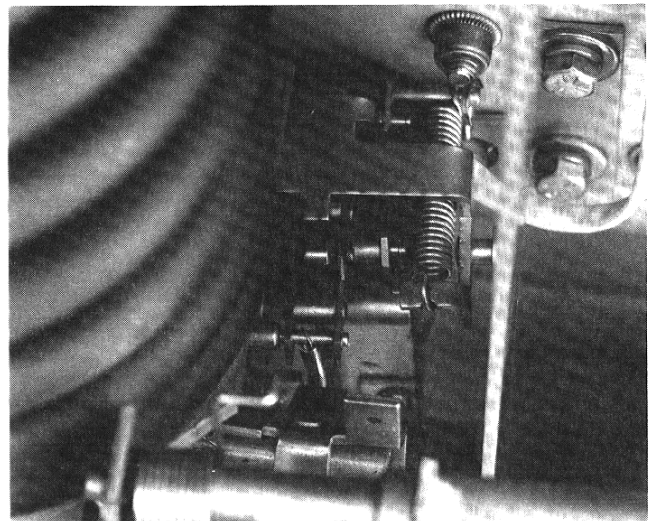


Figure 4. Undervoltage Device Mounted on Circuit Breaker

#### (6) Undervoltage Device Assembly

This assembly is located in the center part of the mechanism area, just to the right of the main closing spring. See Figure 4. To replace it:

- a. Remove front cover of breaker.
- b. Remove right hand main operating spring connecting rod. See section headed "Closing Spring Removal and Slow Closing of Mechanism" under Maintenance in IB60010 for procedures for removing this rod.
- c. Unplug the undervoltage device from the wiring harness.
- d. Remove the two bolts holding the undervoltage device assembly to the breaker frame and remove the assembly.
- e. Bolt new assembly in place.
- f. Re-assemble the main operating spring connecting rod.



- g. While the undervoltage device has been tested at the factory, it is necessary to check and possibly adjust its settings once it has been assembled to the circuit breaker. This will require a variable voltage DC source capable of output of from 40% to 100% of the DC rating of the undervoltage device. Connect this source to the terminals of the undervoltage device coil.

Apply a DC voltage of 80% of the undervoltage coil rating. The undervoltage device should pick up and allow the breaker to close. Close and trip the breaker several times, using manual or shunt trip, to be sure that the vibration of breaker operation does not cause the undervoltage device to drop out improperly. If the device does drop out during this test, rotate the screw at the bottom of the device to the right in 1/8 turn steps until the proper operation is obtained. This adjustment may be fine tuned by bending the tab at the base of the beam spring up in 1/16 inch steps. See Figure 5.

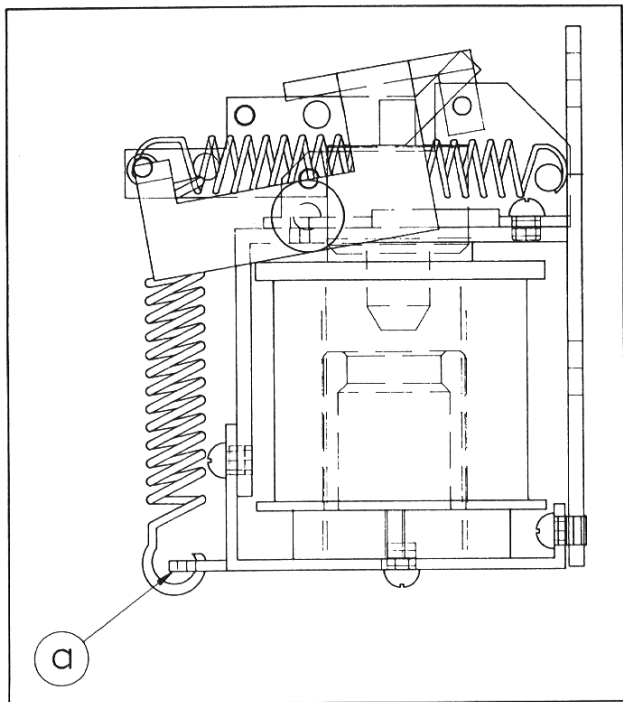


Figure 5. Undervoltage Device  
a. Beam Spring Tab

Check dropout of undervoltage device by reducing test voltage to 52-56%. The undervoltage device should drop out and cause the breaker to trip in this voltage range. If dropout voltage is too low, bend the tab at the base of the beam spring down slightly to raise the voltage.

- h. Disconnect the test source and plug the undervoltage device into the wiring harness.  
i. Replace front cover.

### (7) Charging Motor Assembly

The charging motor assembly is located at the lower right-hand side of the mechanism (See Figure 4, Page 4 of IB-60010). To replace it:

- Remove front cover of the breaker.
- Unplug the motor from the wiring harness.
- Remove the two bolts holding the motor mounting bracket to the base pan and slide the motor to the right, disconnecting the motor shaft from the mechanism, and lift the motor out.
- Lubricate the end of the shaft of the new motor liberally with Anderol 757 grease.
- Position the new motor assembly in the circuit breaker, being sure that the pin on the end of the drive shaft engages the slot in the mechanism shaft.
- Bolt the motor to the base pan and plug it into the wiring harness.
- Operate the circuit breaker several times to insure that the motor operates smoothly.
- Replace front cover.

### (8) Anti-Pump Relay

This relay is located near the top of the mechanism, to the left of the main operating spring. See Figure 6. To replace it:

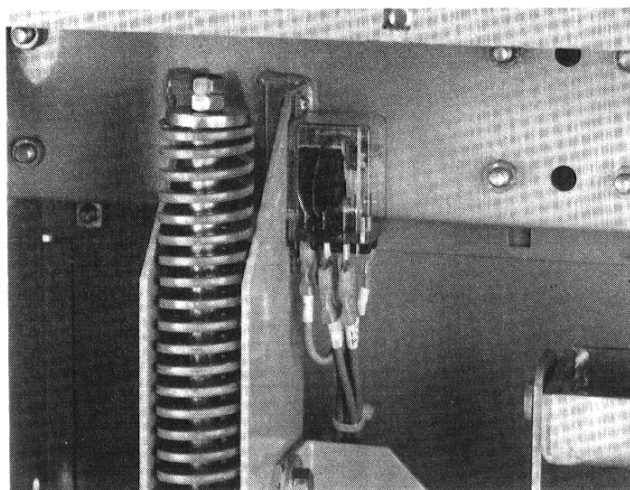


Figure 6. Anti-Pump Relay

- Remove front cover of breaker.
- Disconnect leads from anti-pump relay, being careful to note which wires go to which terminal.
- Loosen lower mounting screw of relay.
- Remove upper mounting screw and lift relay off lower screw.
- Place new relay over lower screw, reinstall upper screw, and tighten both screws.



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- f. Reconnect all wires to the proper terminals of the relay.
- g. Relays in 250VDC closing circuits are provided with dropping resistors to apply the proper voltage to the relay coil. The resistor is mounted adjacent to the relay. It may be replaced by unplugging it from the relay and unscrewing the mounting feet from the breaker frame, replacing the resistor and reassembling.
- h. Operate the breaker several times to insure that the relay functions properly.
- i. Replace front cover.

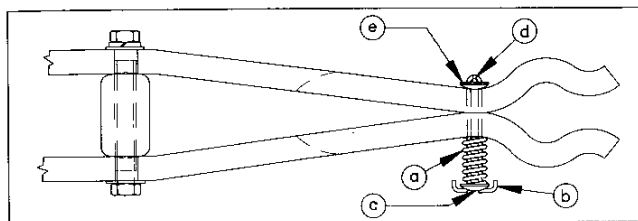


Figure 7. Primary Disconnect Finger Spring Assembly

- a. Spring
- b. Support
- c. Cap
- d. Keeper
- e. Secondary Cap (1200A Models Only)

#### (9) Primary Contact Spring Assembly

These springs are located at the outer end of the primary contact bars. See Figure 7. To replace them:

- a. Depress spring support sufficiently to allow keeper to be removed. For 1200 ampere breakers, remove the secondary cap.
- b. Remove cap, spring support and spring.
- c. Slide new spring onto spring support and place spring support in slot between fingers.
- d. Depress head of spring support and install secondary cap (if required) and keeper in slot in end of spring support.
- e. Release spring slowly, allowing keeper to seat properly.

**NOTE:** Springs are to be installed in every other slot in fingers; top, center and bottom. The second and fourth slots are empty.

#### (10) Latch Check Switch

The latch check switch is located on the left-hand side of the main mechanism frame, near the bottom of the main closing spring. See Figure 5, Page 4 of IB-60010. To replace it:

- a. Remove the front cover of breaker.
- b. Remove two screws holding switch to mechanism. Do not lose nut plate into which these screws are threaded.

- c. Disconnect wires from switch.
- d. Connect wires to new switch and fasten switch in place with screws and nut plate previously removed.
- e. Adjust switch per instructions in section headed "Adjustment of Primary and Secondary Trip Latches and Latch Check Switch" under MAINTENANCE in IB-60010.
- f. Operate breaker electrically several times to insure that it is working.
- g. Replace front cover.

#### (11) Motor Cutoff Switch Assembly

The motor cutoff switch assembly is located on the floor pan of the mechanism area, just to the right of the main mechanism. See Figure 4, Page 4 of IB-60010. To replace it:

- a. Remove the front cover of breaker.
- b. Disconnect wires from switch, being careful to identify each wire by the terminal number from which it was removed.
- c. Remove the two bolts holding the assembly to the breaker floor pan and remove the assembly.
- d. Install new cutoff switch assembly, bolt it to the floor pan. Reconnect the wiring. No adjustment is needed.
- e. Operate breaker electrically several times to insure that it is working.
- f. Replace front cover.

#### (12) Ground Shoe Finger Assembly

The ground shoe assembly is located at the rear edge of the breaker floor pan between the center and right poles of the breaker. See Figure 8. To replace it:

- a. Elevate the breaker so that there is at least 6 inches of clear space below the bottom pan of the breaker.
- b. Remove the bolt holding the retaining clip to the ground shoe mounting bracket, and remove the retaining clip.
- c. Slide the finger assembly slightly forward, so that the ends of the mounting rods on each side of the assembly are clear of the holes in the ground shoe mounting bracket. Press down on finger assembly and remove it from bottom of breaker.
- d. Remove from socket-head screws holding two side finger assemblies to two red spacer tubes.
- e. Assemble new side finger assemblies to red spacer tubes.
- f. Wipe old lubricant off the ground shoe mounting bracket on breaker and apply a thin coat of contact lubricant Mobilgrease 28 to mounting bracket.
- g. Insert new finger assembly from below the breaker floor pan and press up and slide back until the mounting rods can be inserted into the holes in the ground shoe mounting bracket.
- h. Reinstall the retaining clip.

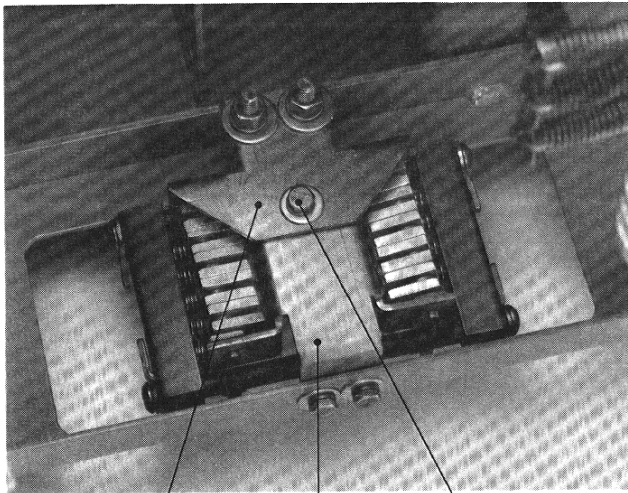


Figure 8. Ground Shoe

- a. Mounting Bracket
- b. Retaining Clip
- c. Holding Bolt

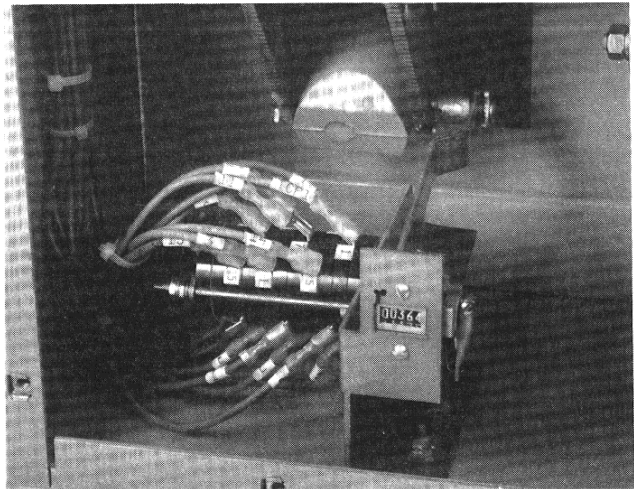


Figure 9. Auxiliary Switch

### (13) Auxiliary Switch

The auxiliary switch is located in the lower left front of the mechanism area. See Figure 9. To replace an auxiliary switch:

- a. Remove the front cover of breaker.
- b. Disconnect wires from switch, being careful to identify each wire by the terminal number from which it was removed.
- c. Remove the "E" ring securing the switch operating arm to the operations counter linkage.
- d. Remove the two screws holding the auxiliary switch to its mounting bracket, and remove the switch.
- e. Insert the new switch and attach it to the mounting bracket with the two screws removed in step d. Make sure the terminal marked "15" on the deck farthest from the operating shaft is facing the front of the breaker.
- f. Insert the operating arm of the switch into the hole in the end of the operations counter linkage and secure with the "E" ring removed in step c.
- g. Reconnect the wiring. Be sure wires are connected to the same terminals from which they were removed.
- h. Operate breaker electrically several times to insure that it is working.
- i. Replace front cover.



POWELL ELECTRICAL MANUFACTURING COMPANY  
8550 MOSLEY DRIVE • HOUSTON, TEXAS 77075 USA  
PHONE (713) 944-6900 • FAX (713) 947-4453

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