Instructions for Type PRC and PRCB Capacitor Switches

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Distribution Apparatus Division, Bloomington, Indiana 47401

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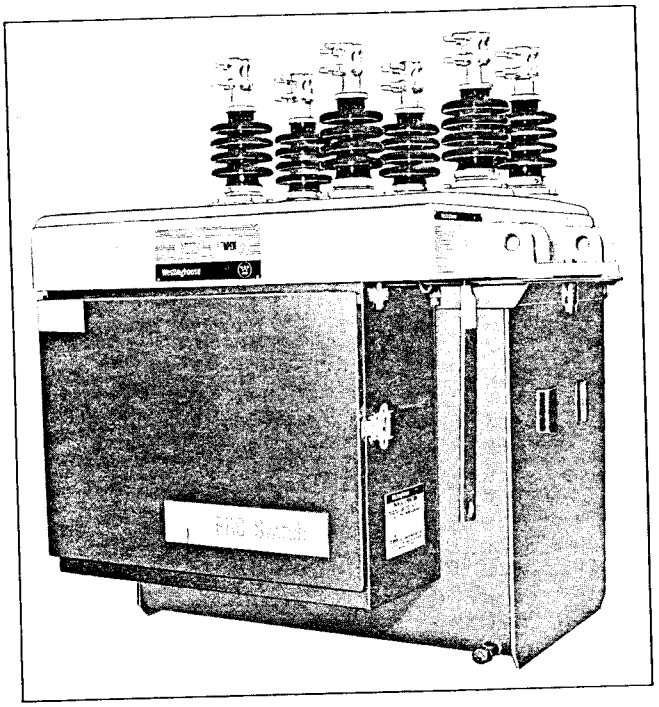


Fig. 1. PRC Capacitor Switch

INTRODUCTION

The Westinghouse type PRC and PRCB three phase oil switches, (Figure 1) are reliable, low cost units for the automatic switching of parallel or isolated capacitor banks as changes in load conditions dictate. The unit may be operated electrically from a remote position or manually by hand or hook stick. A counter in the switch provides a convenient record for service and maintenance purposes.

The PRC and PRCB oil switches should be installed within the design limitations described on the nameplate and in this instruction book.

Satisfactory performance of the switch is contingent upon the correct installation and adequate maintenance and servicing. The following instructions have therefore been prepared to help the user obtain the best and most economical usage from the device.

The type PRC and PRCB capacitor switch ratings are shown in Table 1.

DESCRIPTION

General

The capacitor switches are comprised of two systems, (1) an oil filled tank and (2) a top casting which supports the interrupters and operating mechanism which is housed in a weatherproof cabinet outside the oil tank.

Specific

OIL FILLED TANK

The oil filled tank (Figure 2, Items) (capacity 46 gallons of Wemco "C" oil) is attached to the top casting and sealed with a cork-neoprene gasket. It houses the interrupters. Each interrupter is in a separate compartment (Figure 2, Item 1) made from an arc resistant, moisture resistant, high dielectric strength material, which confines the interrupting gases to a single phase. Each compartment in the PRCB includes a surge cushion to minimize shock duty to the control components and accessories

TABLE 1

Description	400 PRC	600 PRC	PRCB-4000	PRCB-8000
Voltage:				
Nominal Operating Voltage	2.3 to 14.4 KV	2.3 to 14.4 KV	2.3 to 14.4 KV	2.3 to 14.4 KV
Nominal Rated Volt	14.4 KV	14.4 KV	14.4 KV	14.4 KV
Max. Design Volt	15.5 KV	15.5 KV	15.5 KV	15.5 KV
Basic Impulse Insulation Level (BIL)				
1.5 x 40 Microseconds Impulse Withstand	110 KV	110 KV	110 KV	110 KV
60 Cycle, One Minute Withstand, Dry	50 KV RMS	50 KV RMS	50 KV RMS	50 KV RMS
60 Cycle, Ten Second Withstand, Wet	45 KV RMS	45 KV RMS	45 KV RMS	45 KV RMS
Current:				
Continuous Current	400 A	600 A	600 A	600 A
Capacitor Rated Current	300 A	450 A	450 A	450 A
Momentary Current	20000 A RMS Asym	24000 A RMS Asym	24000 A RMS Asym	24000 A RMS Asym
One Second Rating	12000 A RMS Sym	16000 A RMS Sym	16000 A RMS Sym	16000 A RMS Sym
Fault Interrupting Capacity (Non-Reclosing)	- - -	- - -	4000 A RMS Sym	8000 A RMS Sym

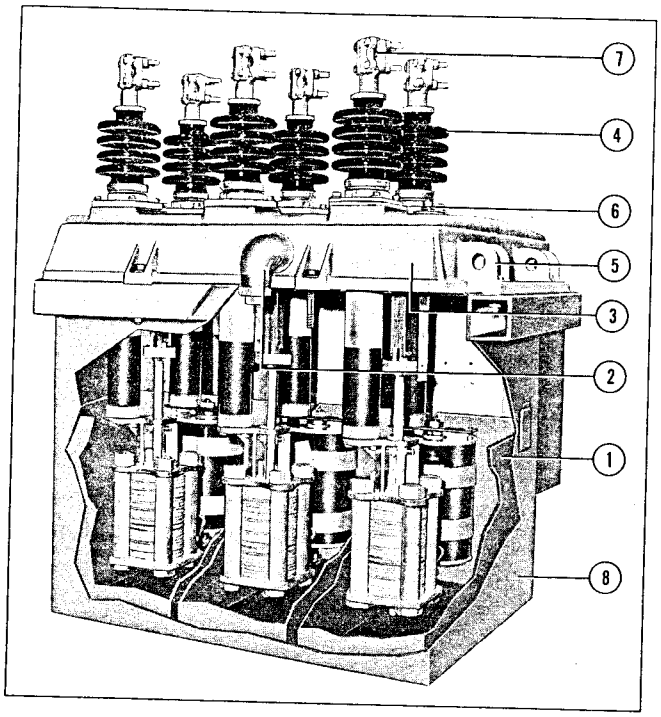


Fig. 2. PRC Capacitor Switch--Rear View

during fault current interruption. Relief vents (Figure 2, Item 2) permit arc extinction gases to escape from the high voltage compartments.

a. Mounting

(1) PRCB 8000

To remove high current interruption shock strain from the top casting, the oil tank supports the switch in the mounting frame. The mounting brackets (Figure 3, Item 3) are attached to the oil tank channel (4) and mounting frame (5).

(2) PRC and PRCB 4000

To support the switch, 4 bolts hold the top casting to the mounting frame.

b. Tank Removal

(1) PRCB 8000

When it is necessary to lower the tank, first remove the bolts from the top casting. Then, carefully unscrew the frame bolts (1) to release the brackets from their mounting and provide lowering clearance. Remove the tank bolts (2) and lower the enclosure with the windlass. As the crank is turned, the top casting will drop 1/8" to a rest on the mounting frame. The tank may then be lowered until the interrupters are exposed.

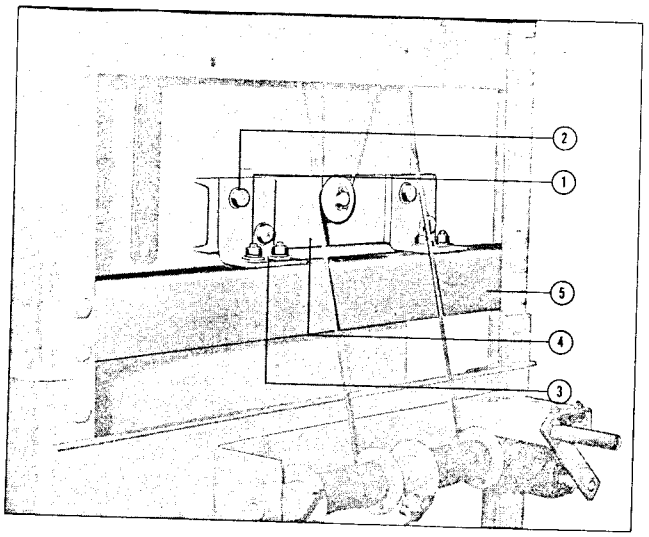


Fig. 3. PRCB 8000 Oil Tank Mounting

(2) PRC and PRCB 4000

When it is necessary to lower the tank, remove the bolts from the top casting. With the windlass, lower the enclosure until the interrupters are exposed. Access to the front bolts is gained with the nut extension rods (Figure 4, Item 1) protruding beneath the mechanism cabinet.

To reposition the tank, reverse the procedure being positive to securely tighten all bolts.

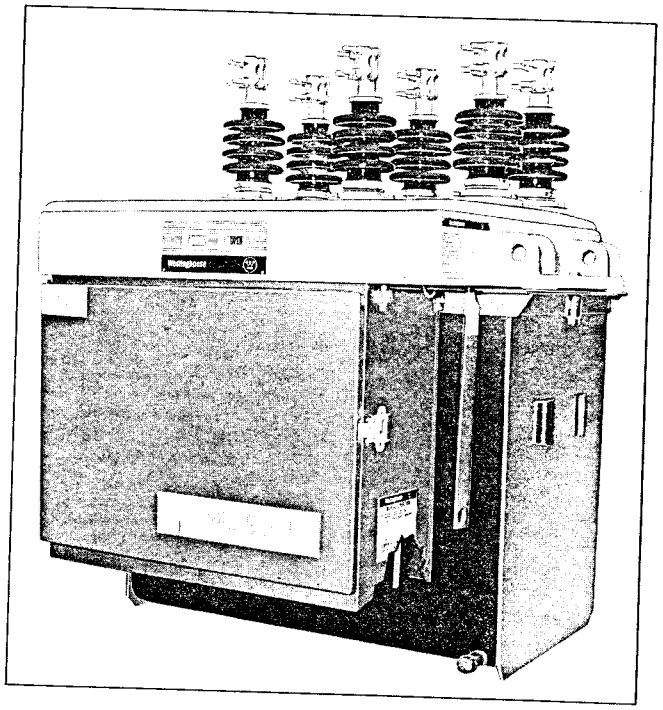


Fig. 4. PRC and PRCB 4000 Tank Removal

TOP CASTING

The top casting (Figure 2, Item 3) supports the interrupters and the operating mechanism. The interrupters are located in the oil tank, while the operating mechanism is housed in an independent weatherproof cabinet.

a. Bushing Description

(1) PRCB 8000

Condenser type, 15kv, insulated interchangeable bushings, (Figure 2, Item 4) are flange and stud mounted to the top casting with cork neoprene gaskets. A wide selection of terminals (Figure 2, Item 7) permit horizontal or vertical connection with #2 to 800 MCM conductor.

(2) PRC and PRCB 4000

Alumina, 15kv, insulated interchangeable bushings, insure equal distribution of voltage between the bushing conductor and ground. The bushings have a high mechanical strength to withstand large values of current. A wide selection of terminals permit horizontal or vertical connection with #2 to 800 MCM conductor.

b. Lifting Flanges

There are four flanges (Figure 2, Item 5) for attachment to a hoist for lifting purposes.

CAUTION

Lift only by the flanges at the side of the top casting. *Do not lift by the bushings or terminal connectors.*

c. Oil Level Indicator

Oil level may be checked by using the dip stick (Figure 2, Item 6) provided or by an optional visual oil indicator mounted in the tank wall. The oil may be removed by means of a plug at the bottom of the tank wall or by an optional 1/2" globe type drain and sampling valve.

d. Bushing Current Transformers (Optional)

A total of six multi-ratio bushing current transformers (one for each phase) may be supplied with the switch. Housed in the oil tank and supported by the top casting, the secondary leads are brought through a sealed opening to the mechanism compartment and connected to the terminal strip with shorting devices. See wiring diagram for tap and ratio information. The thermal rating is 90 times rated current for one second, and the mechanical, momentary rating is 180 times rated current.

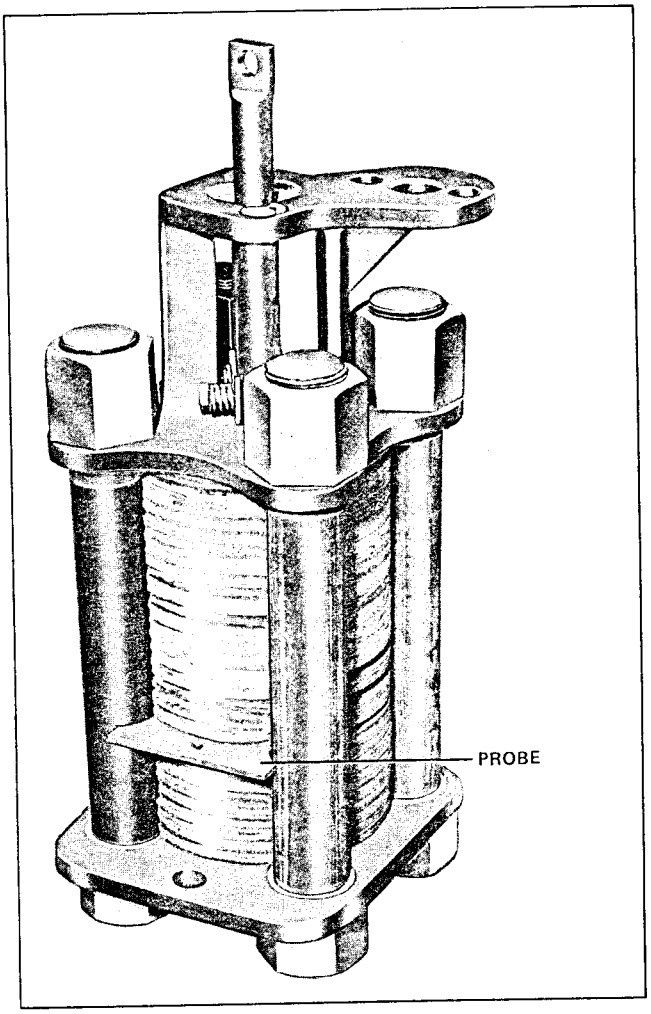


Fig. 5. Current Interrupter

e. Current Interrupter

The capacitor switch has 3 heavy, grid plate interrupters using the basic Westinghouse De-ion design. Each interrupter (Figure 5) contains a series of insulated, vulcanized fibre plates (Figures 6 & 7, Item 4). Heavy brass castings and steel plates serve as the top and bottom respectively. A resistor probe (5) is added to make connection with the moving contact rod (2) as it moves past. A silver tungsten collar is brazed to the inside perimeter of the probe disc to provide the auxiliary contact with good arc resistance. Special high strength laminated rods completes the interrupter's compact assembly. Silver tungsten tips on the moving and stationary contacts, provide high conductivity and long life.

The stationary contact (Figures 6 and 7, Item 1) in each pole is a self-aligning nest of spring-biased tulip contacts. Current is carried along the moving contact rod and

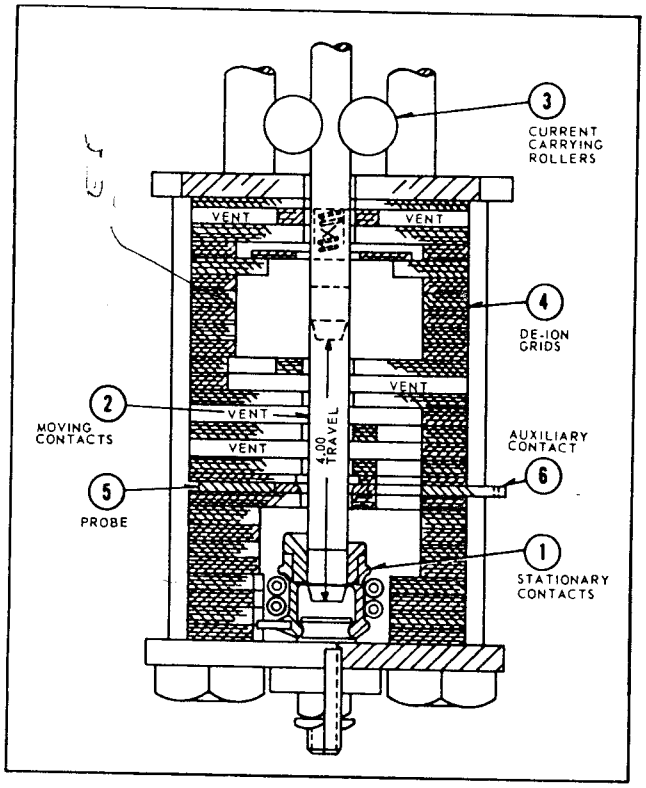


Fig. 6. PRC and PRCB 4000 Current Interrupter

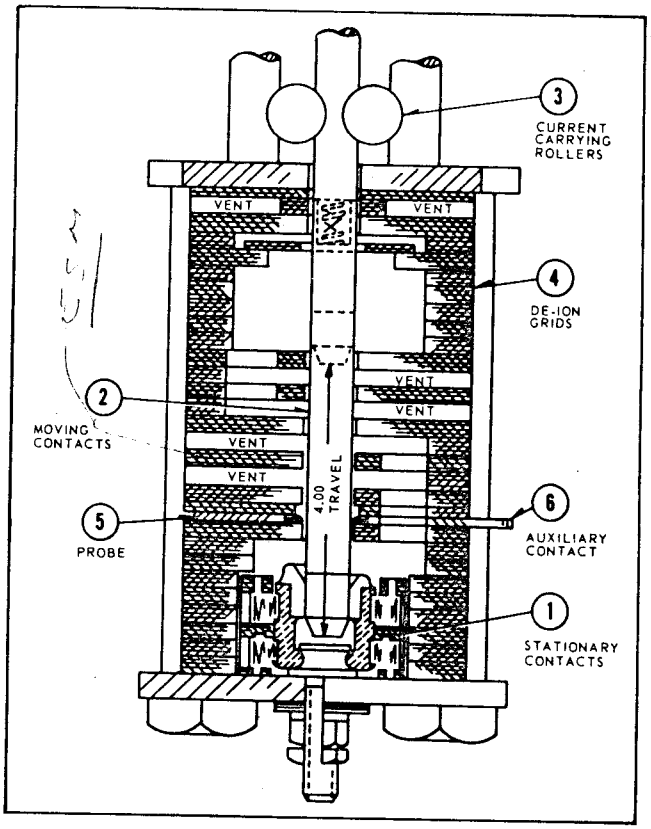


Fig. 7. PRCB 8000 Current Interrupter

through the spring-biased current carrying rollers (3) to the other bushing of that phase in the switch.

The resistor probe places a resistor (Figure 8A) in series with the circuit in such a manner that it is "made" only during the closing or opening operation. Figure 8 shows the interruptter and resistor assembly.

f. Manual Operating Handles

(1) Trip Handle:

The "green" trip handle (Figure 9, Item 1) is linked to the operating mechanism and protected by the top casting. A downward pull trips the switch. This handle cannot be used for closing.

(2) Close Handle:

The "red" closing handle (Figure 9, Item 2) engages with the operating shaft. An upward push closes the main contacts. This handle cannot be used for tripping and may be removed if safety requirements dictate.

CAUTION

The manual close handle is to be used only for test purposes . . not for switching operations since "Teasing" of the contacts would allow overcurrents to damage the shunting resistors.

These handles may be operated either by hand or hookstick. The nameplate indicates the direction of close and trip.

g. Nameplates

Nameplates (Figure 9, Item 3) located on the top casting give rating data with style and shop order numbers.

h. Operating Counter and Position Indicator

The red and green target of the position indicator (Figure 9, Item 4) is marked "CLOSE" and "OPEN" to show contact position.

Upon tripping, the operating counter (Figure 9, Item 5) advances 1/2 of a full turn, then the final 1/2 turn during reclosing . . . thus one count equals one complete tripping and reclosing operation. The 1/2 position also serves as an additional indication the contacts are open.

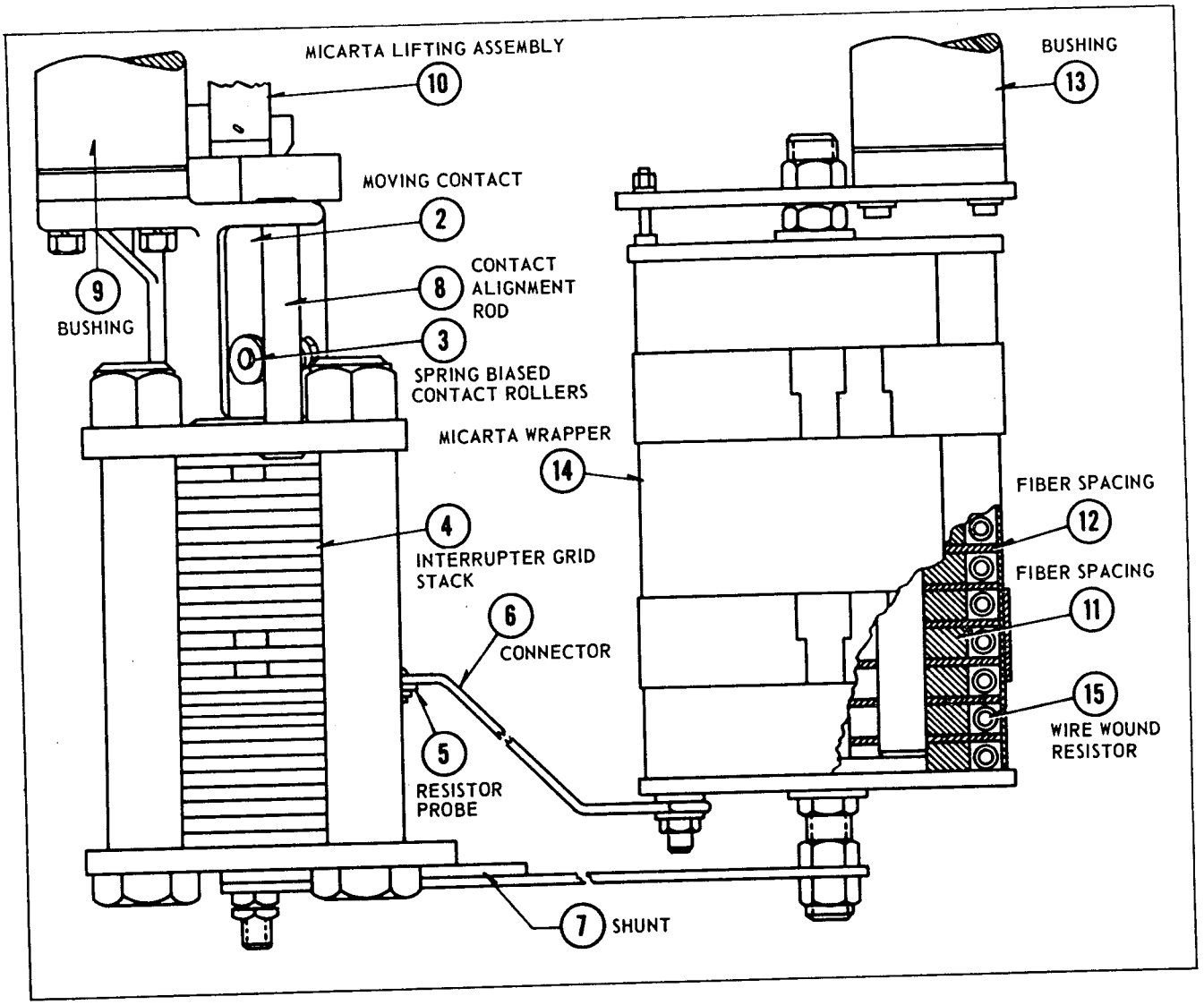


Fig. 8. PRC and PRCB Interrupter and Resistor Assembly

i. Weatherproof Control Compartment

All control components are located in the low voltage mechanism cabinet with an access door that is hand removable. The door and mechanism compartment are gasketed for complete weather protection.

(1) Operating Mechanism

Bolted to the top casting, the operating mechanism (Figure 10, Item 1) consists of a motor, worm gearing and toggle linkage. This unit closes the switch contacts and stores energy in the trip spring.

(2) Closing Motor

The closing motor (Figure 10, Item 2) is a vertical shaft, single phase commutation type, with ball bearings sealed with lubricant for the life of the motor. A single reduction of speed between the motor and the mechanism crank is accomplished by a worm gear mounted directly on the upper end of the motor shaft.

The closing motor may be activated, for test purposes, a maximum of 25 consecutive times before overheating may damage the apparatus.

During the closing operation, the motor also compresses the trip spring for the next operation.

(3) Trip Coil

The trip coil (Figure 10, Item 3) moves a plunger upward to operate the tripping lever when it receives an external signal.

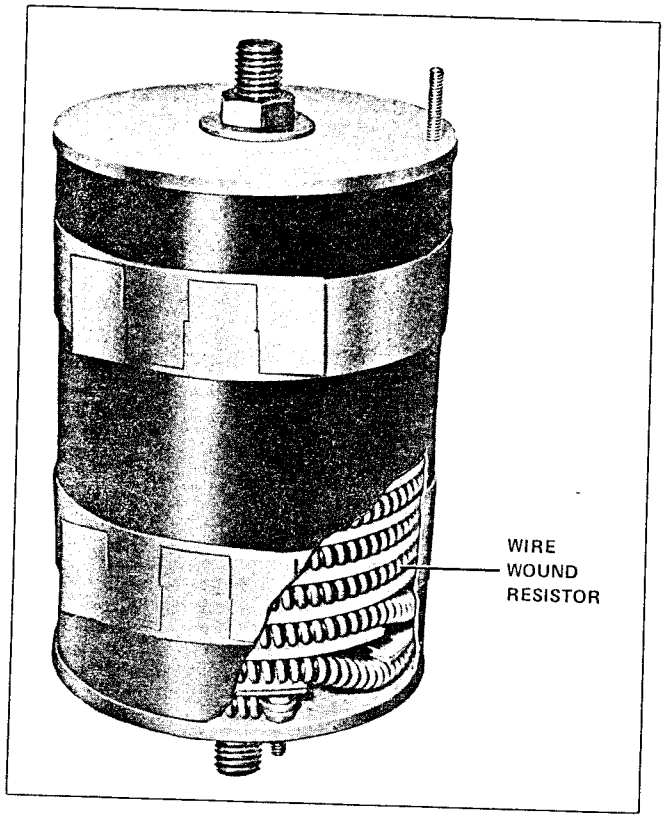


Fig. 8A. Damping Resistor

(4) Heater

The heater (Figure 10, Item 4) is energized continuously to prevent moisture from forming inside the mechanism compartment.

(5) Terminal Strip

The twelve pointed terminal strip (Figure 10, Item 7) functions as a connector between the control panel and auxiliary controls or signaling devices.

NOTE

Points X_1 and Y_1 are used for pre-installation testing of the apparatus.

(6) Auxiliary Switch

The auxiliary switch (Figure 10, Item 5) is mounted to the left of the operating mechanism. It is a mechanically driven, rotary type switch, with four sets of contacts (Figure 11). Normally, two of the contacts are open (a) and the other (b) are closed. Two contacts, one (a) and one (b) are used in the standard operation of the switch. An additional four point switch may be furnished and adjusted for any combination of normally opened or normally closed contacts. The contacts may be set in the factory per special instructions, or may be adjusted in the field. The contacts will carry 15 amperes continuously or 250 amperes for three seconds.

RECEIVING, HANDLING AND STORAGE

Each switch is completely assembled and tested at the factory previous to being prepared for shipment. It is important that it be promptly inspected to be certain that the correct material has been received and that a claim may be made for any shipping damage. If the device is not to be placed in service immediately, it is essential that proper care be exercised in the handling and storage to insure good operating condition in the future.

Inspection

Check all parts against the shipping list as they are unpacked. Instructions and literature packed with the switch should be kept with the unit. A pocket inside the door of the low voltage compartment provides a convenient place to keep this book, a copy of the schematic diagram, and the card carrying the service record. Additional copies may be obtained upon request from the nearest Sales Office of the Westinghouse Electric Corporation.

Remove the oil tank and the mechanism cabinet to allow inspection of the switch mechanism and interrupters. (Refer to tank removal, Page 2).

Remove the shipping supports and check the mechanism for loose screws or nuts and broken parts. Any claim for damage should be filed *at once* with the carrier and the local Westinghouse Sales Office notified.

This equipment was packed and shipped in perfect condition. If damaged this is carrier liability. Call the carrier at once for inspection and request an inspection report. File formal claim with the carrier supported with your paid freight bill, inspection report and invoice.

Handling

CAUTION

Lift only by the flanges at the side of the top casting. *Do not lift by the bushings or terminal connectors.*

Storage

Unless otherwise specified, the switch is shipped with oil and may be stored as received in an indoor or outdoor

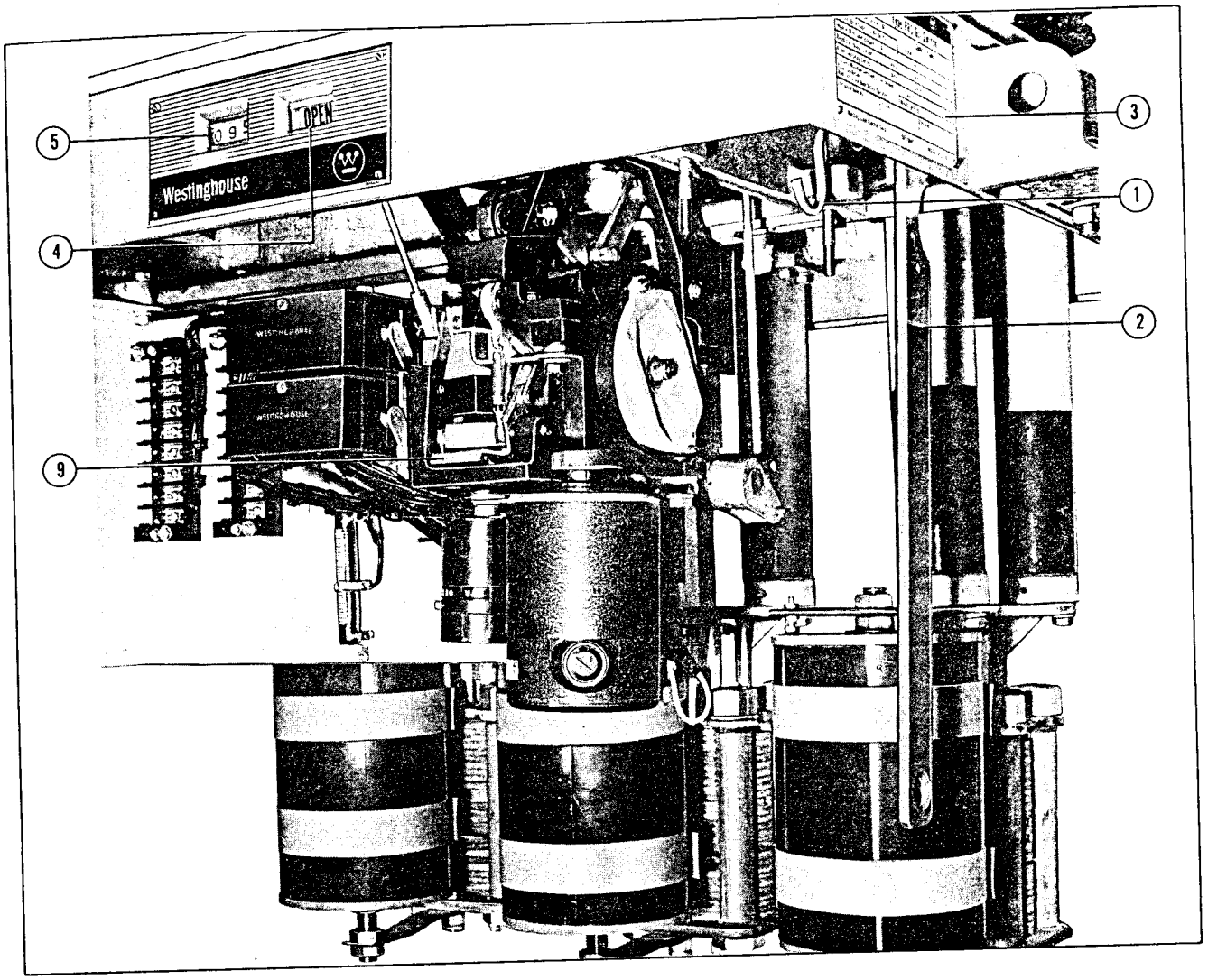


Fig. 9. Mechanism Cabinet--Right Side View

location. If stored outdoors or in humid atmosphere, the vent plugs should be kept in place and an inspection of the gasket seals should be made to insure that moisture does not enter the oil and insulating members of the switch.

OPERATIONAL CHECK

The switch should be test operated for mechanical and electrical operation before delivery to the installation site. Remove the door or mechanism cabinet so as to observe the mechanical operations. This is easily accomplished by releasing the double door latch or loosening the four bolts that hold the cabinet to the top casting. Lower the cabinet carefully to avoid damaging the control mechanism.

Manual Operation

With the manual operating handle, close . . . then trip the switch. To close, pull forward and upward on the long "red" closing lever at the right side of the switch. To trip, pull down lightly on the small "green" tripping lever. The unit may also be tripped by pressing lightly on the manual tripping lever extension (Figure 9, Item 9) just above and in front of the operating motor. Each operation should advance the counter and operate the position indicator.

Electrical Test

In the mechanism cabinet, connects a 60 Hertz, single phase power source to the X_1 and Y_1 terminals (Figure 10, Item 6) on the terminal strip. If an auxiliary control panel is to be used, connect it to the switch and make the necessary power connections.

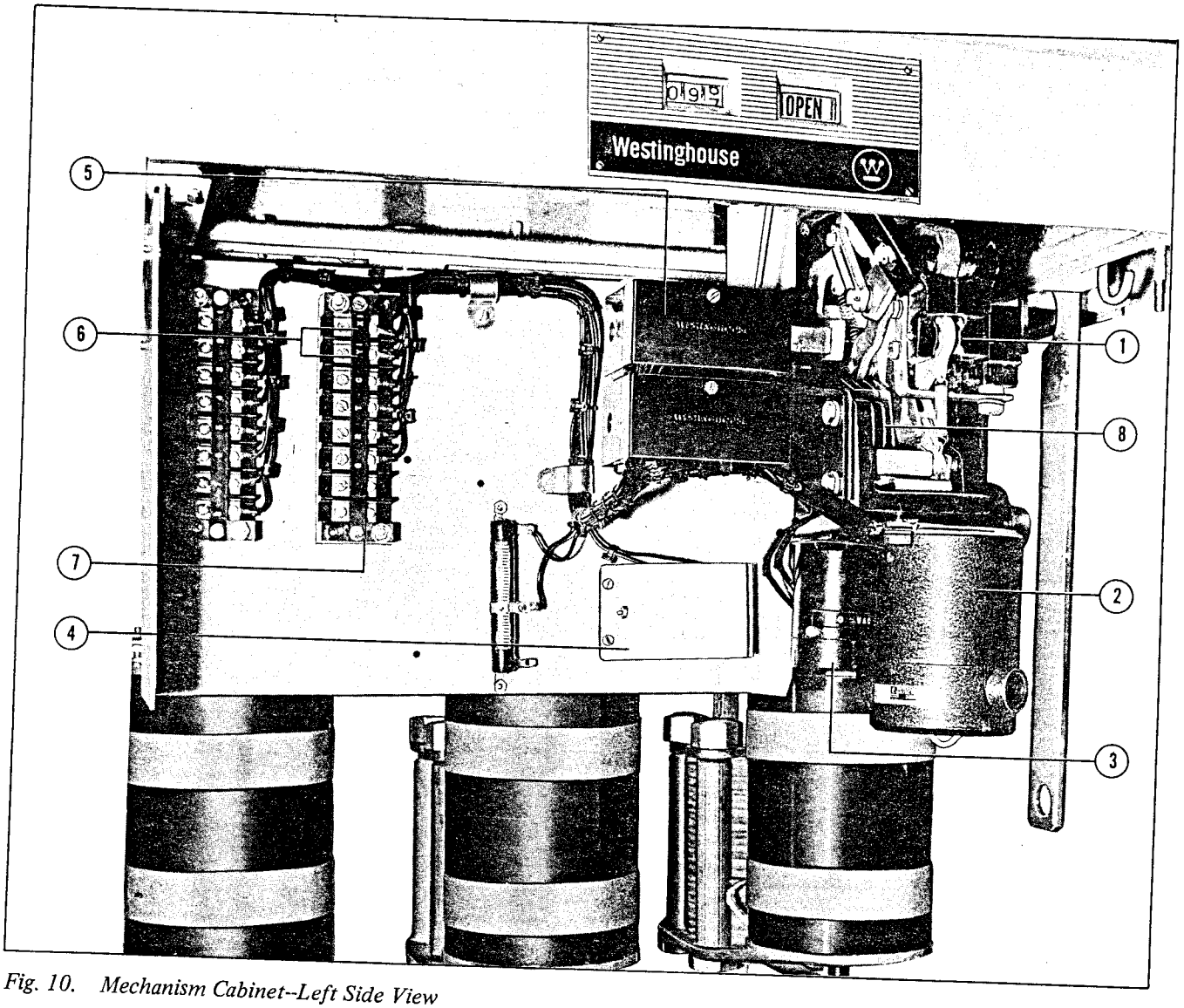


Fig. 10. Mechanism Cabinet--Left Side View

All electrical connections to the control circuit should be made in accordance with the diagram supplied for the specific unit.

NOTE

Consult nameplate for proper voltage

PERMANENT INSTALLATION

The switch should be located so that it is readily accessible for manual operation and inspection. All overhead construction work should be completed before the unit is installed. Care should be taken when the unit is installed that the lifting devices do not come in contact with the bushings.

Switch Mounting

Capacitor switches may be installed in a variety of mountings. They may be set in substation frames, mounted from pole supported crossarms or be hung on existing steel frameworks.

The substation frame is adjustable in height to meet various electrical codes and provide flexibility of installation.

Suitable mounting fixtures for all installations, with optional windlasses for lowering the oil tank, are available upon request.

The switch . . . no matter how it is mounted . . . must be level and firmly secured for satisfactory performance.

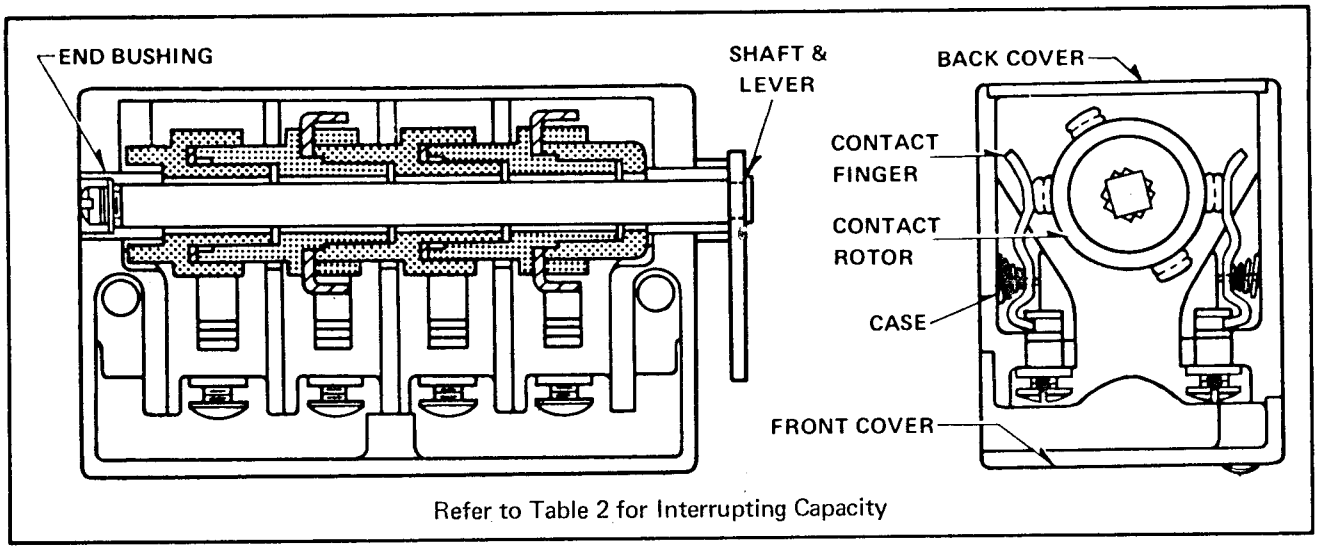


Fig. 11. Auxiliary Switch

Table 2 Interrupting Capacity

VOLTS	INTERRUPTING CAPACITY IN AMPERES	
	Non-Inductive Circuit	Inductive Circuit
125 V. D-C	11	6.25
250 V. D-C	2	1.75
115 V. A-C	75	15
450 V. A-C	25	5

Line Connection

The unit is connected in series with the capacitors facing either direction, as there is no distinction between the line and load terminals. Power to operate the switch mechanism, must be taken from a secondary circuit on the line side for proper operation. *Precautions must be taken to insure that all wires to be connected to the unit are not energized.*

A grounding terminal pad is welded to the base of the mounting frame and will accept #2 to #8 solid or #4 stranded conductor.

A small amount of slack should be allowed in the conductor attached to the terminals as to eliminate undue strain on the bushing assemblies.

Terminals

1. PRC 400

Clamp type terminals that will accomodate conductor from 2/0 to 350 MCM.

2. PRC 600

Single bolt, clamp type terminals that will accomodate conductor from 1/0 to 500 MCM.

3. PRCB 4000 and 8000

Four bolt, clamp type terminals that will accomodate conductor from 1/0 to 500 MCM.

Control Connections and Wiring

A 60 Hertz, single phase source is required for switch operation and may be obtained from a secondary circuit on the line side of the switch or from an independent source. The source should be capable of supplying 12 amperes with no more than a 20% voltage drop.

NOTE

Consult nameplate for proper voltage.

All electrical connections to the control circuit should be made in accordance with the diagrams supplied for the specific unit. Figure 12 presents a General Schematic and Connection Diagram.

Final Inspection

When the capacitor switch has been installed and all mechanical and electrical connections completed, EXCEPT

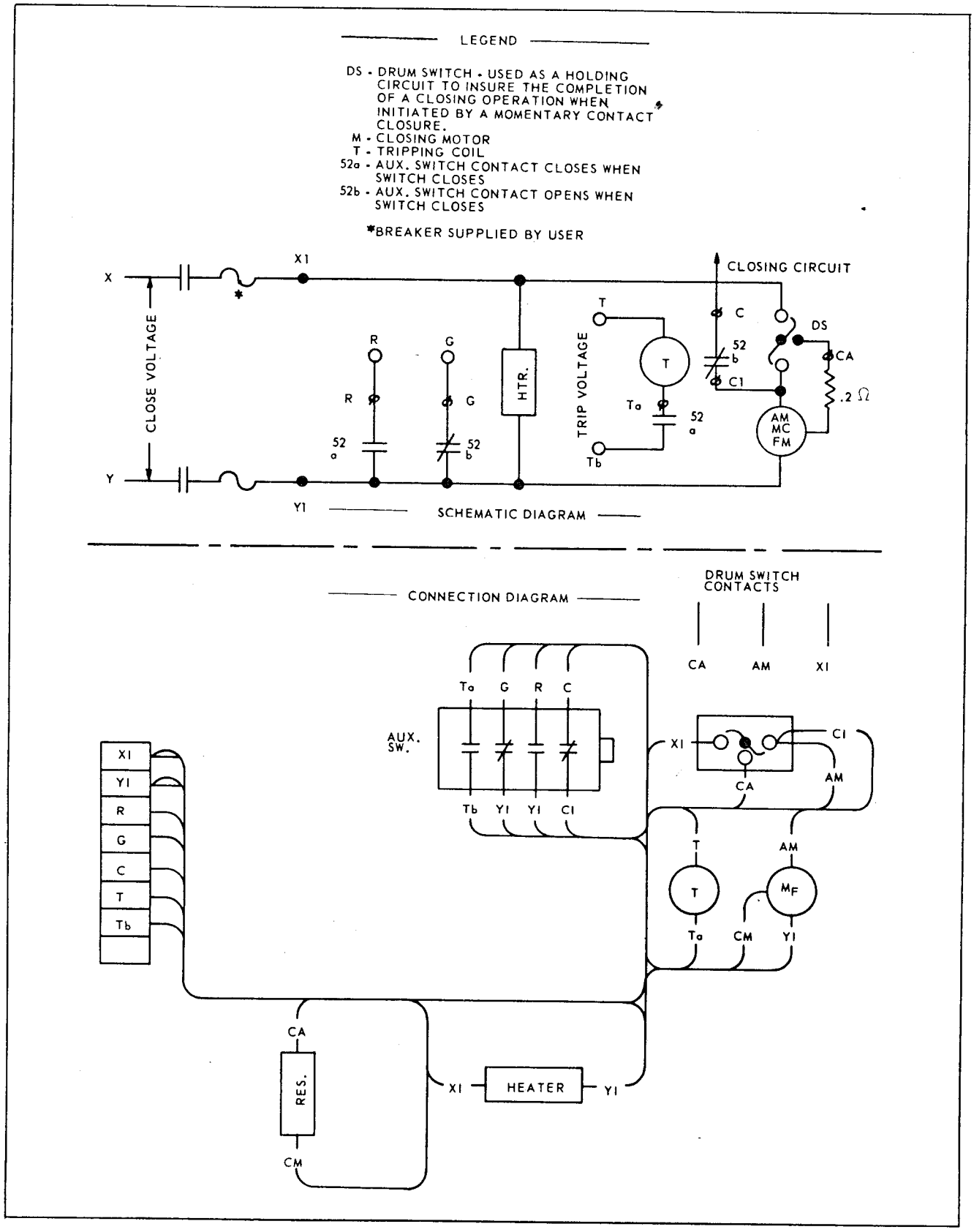


Fig. 12. Connection and Schematic Diagrams

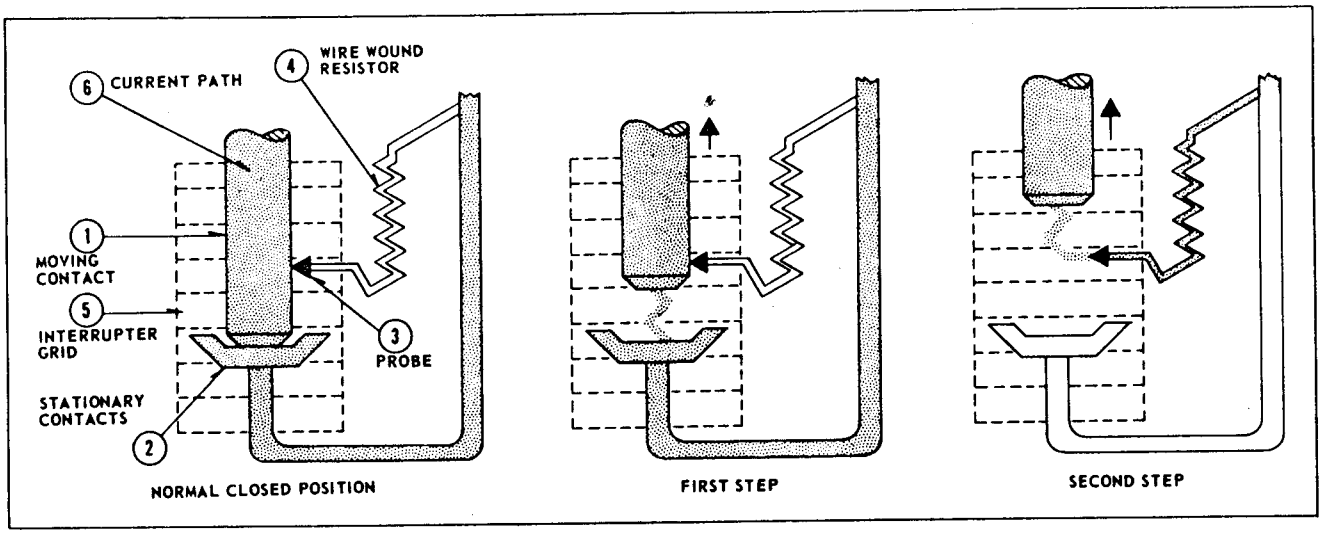


Fig. 13. Resistance Step Switching

ENERGIZING THE POWER LINE, the following points of inspection are recommended.

1. See that the inside of the tank and all insulating parts are clean and dry and that the tank liners are in position. Do not use cotton waste if any wiping is necessary.

2. Be sure that the bearings and operating mechanism are free of packing or foreign matter. Lubrication should not be required, and should be used sparingly . . . if at all.

3. See that the unit and frame is properly leveled and secured.

4. Make a final check for tightness of hardware on the interrupters, shunts, lifting mechanism, etc.

5. See that the tank gaskets are in place and undamaged.

6. See that the screws on the bushing flanges are evenly tightened, and that the terminal connections are tight.

7. Check the pipe fittings for tightness.

8. Check the control wiring insulation and see that the connections are properly made.

Insulating Oil

Unless otherwise specified, the capacitor switch is shipped with oil. Before energizing check to be sure the proper amount of oil is in the tank. If the switch has been stored for a period of time, a dielectric strength test should be made with a sample from the bottom of the tank.

In refilling the switch, either inhibited or non-inhibited Wemco "C" oil should be used. If possible, the preparation and filling of outdoor apparatus should be done on a clear, dry day. In all cases, protection must be provided against moisture and dirt. To avoid condensing moisture . . . the oil and tank should be approximately the same temperature.

OPERATION

Principles

CURRENT INTERRUPTERS

To reduce the transient currents during a capacitor switching operation, a damping resistor is connected between the stationary contact (Figure 13, Item 2) and a probe (3) placed in the interrupter assembly of the switch. The resistor is of the cylindrical wire-wound type (4) and is so arranged as to be in the circuit only during the opening and closing operation. The switching operation is accomplished in two steps and hence is termed "resistance step switching."

In the normal closed position, the resistor is by-passed by the junction of the stationary and moving contacts. When the moving contact (1) pulls away during the first step, as arc is drawn and quickly extinguished within the interrupter. It is highly unlikely that a restrike will occur during the first step since the current path transfers to the

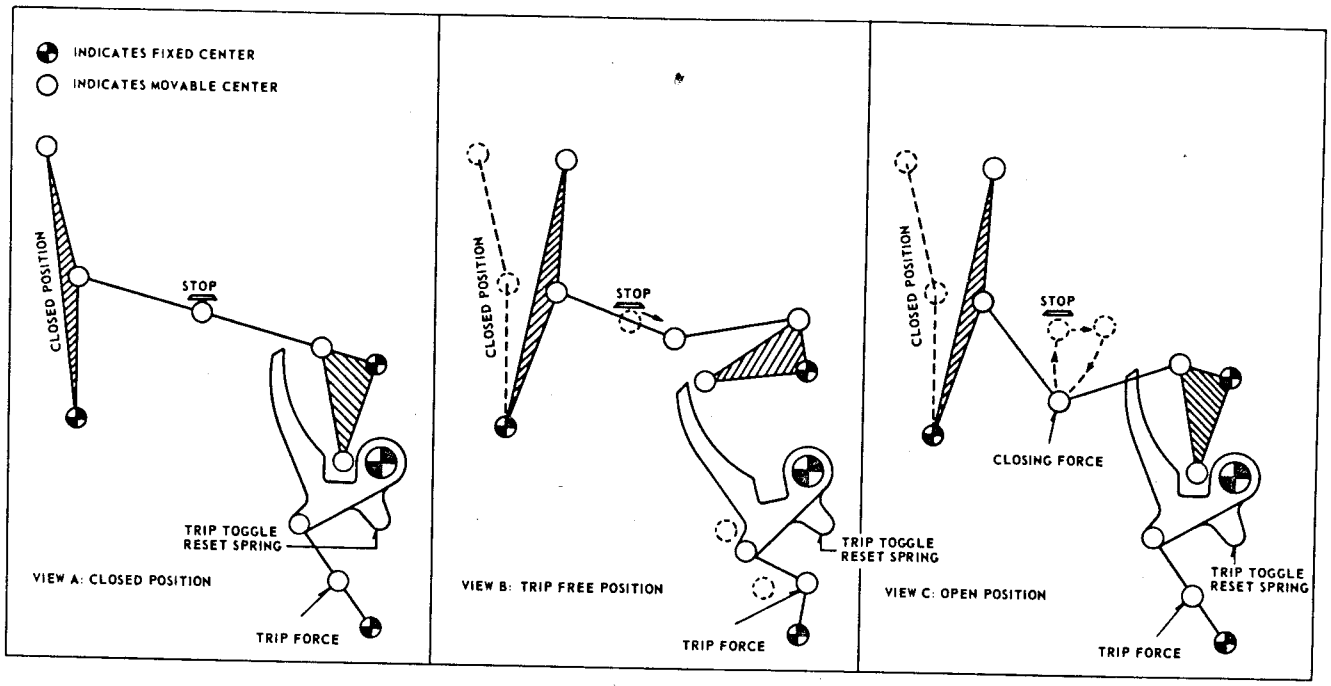


Fig. 14. Simplified Diagram of Operating Mechanism

resistor, now in parallel with the separated contacts. As the moving contact continues upward beyond the probe, a second arc is drawn and extinguished. At this point, a restrike may occasionally take place, but the transient voltages and currents, and their associated high frequencies, are limited to near normal values by the damping resistor, now in series with the restriking arc. The value of the resistor to accomplish this purpose is not extremely critical. For the 500 and 600 ampere switches, used on capacitor banks up to 1800 kvar, a resistor of approximately 4 ohms is adequate.

During the closing operation, an arc is drawn first between the moving contact and the resistor probe. As in Step 2 of the opening cycle, the transient surges resulting are damped by the resistor in series with the stationary contact. When the moving contact continues its downward thrust and meets the resistor probe, the transient current arc is extinguished. Another small arc of extremely short duration may then be created when the moving contact approaches the stationary contact, but the voltage and current are so small that no dangerous surges result.

OPERATING MECHANISM

The capacitor switch is operated by a motor driven operating mechanism. The toggle of the device (Figure 14, View A-B-C) has been reduced to the simplest possible arrangement by employing a single toggle for tripping and a single closing toggle.

a. Mechanism Tripping Action

1. Automatic Tripping

The operating mechanism has a sufficiently light "break" load to permit the trip coil to easily activate the assembly. For a diagram on the following procedure, See Figure 15.

The tripping force, applied by the upward motion of the trip coil (1) plunger striking the trip lever (2), is transferred to the over center trip toggle linkage (3). This linkage buckles and causes the latch (4) to rotate downward about its fixed center. The resulting action, releases the latch roller (5), which in turn allows the latch roller link (6) to rotate upward due to the pressure of the trip spring (10). The movement of the latch roller link permits the closing link (7) to "break" and the switch to open.

The movement of the apparatus caused by the buckling action of the closing link, immediately returns the latch roller link to its original position . . . ready for the next tripping operation. However, if the tripping force is still applied to the trip toggle linkage, the latch roller link will be free to move and the mechanism will be trip free. When the tripping force is removed, the trip toggle reset spring (13) returns the trip toggle linkage to their over center position. The latch is thereby forced to hold the latch

roller until the next closing operation. A mechanism of this design does not require special springs to return the closing toggle to its original position, nor does it require primary and secondary toggles . . . the operation of which is dependent upon a critical distance the contacts must travel.

2. Manual Tripping

A tripping force may be applied to the trip toggle linkage by two manual tripping devices, causing the mechanism to open.

(a) Trip Handle

The "green" trip handle (Figure 9, Item 1) is linked to the operating mechanism by a mechanical trip and close transverse shaft (20) running behind the motor. Connected to this rod are the manual closing operating handle roller assembly (17), the manual tripping bar (18).

When the "green" trip handle is pulled, the manual tripping bar is raised. This action engages the trip lever and "breaks" the trip linkage . . . setting the mechanism in motion.

(b) Manual Tripping Lever Extension

Located above and just left of the closing motor is the manual tripping lever extension (21). Fabricated as an integral part of the trip lever (2), the extension will operate the mechanism in the same manner as the trip coil.

b. Mechanism Closing Action

The closing link (7) is not directly connected to either the switch or the closing motor. The front end of the closing link is supported by the latch roller link and the latch roller. These are held in place by the latch and the trip toggle linkage assembly. The rear end is connected to the toggle link (33) which is pinned to the H frame (8) attached to the mechanism casting and the operating rod (9). The switch is closed by applying force to the closing link in such a manner as to raise it upward and just over center. This forces the H frame to push the operating rod "in" and thus close the contacts of the interrupter assembly. The pressure of the trip spring (10) against the reclosing mechanism, holds the closing link in the closed position by forcing it against the mechanism frame casting until the switch is tripped.

1. Electrical Closing

The sequence of operations to close the apparatus is to energize the motor circuit. The motor drives a worm which engages a worm gear. Mounted on the shaft of the worm gear is the closing crank and the moving contacts (14) of the drum type motor cutoff switch. As the shaft rotates, the stationary contacts (15) of the drum type motor cutoff switch seals in the motor circuit so the closing operation will be completed. The crank engages with the automatic closing link (11) which closes the switch and resets the operating mechanism by pushing the toggle up and over center.

The motor continues to drive the worm gear shaft until the motor cutoff switch opens the circuit. At the same time, a third contact on the drum switch "makes" to electrically brake the motor.

Because the closing crank of the automatic closing link rotates 360 degrees on the worm gear shaft, it is impossible to foul the mechanism by tripping the apparatus during the closing operation. Regardless of the position in which the closing crank may be stopped, or the position in which the automatic closing link may be held . . . on the next operation, the closing crank will rotate until it engages the automatic link and closes the switch.

2. Manual Closing

The switch may be closed and the mechanism reset manually for test purposes only.

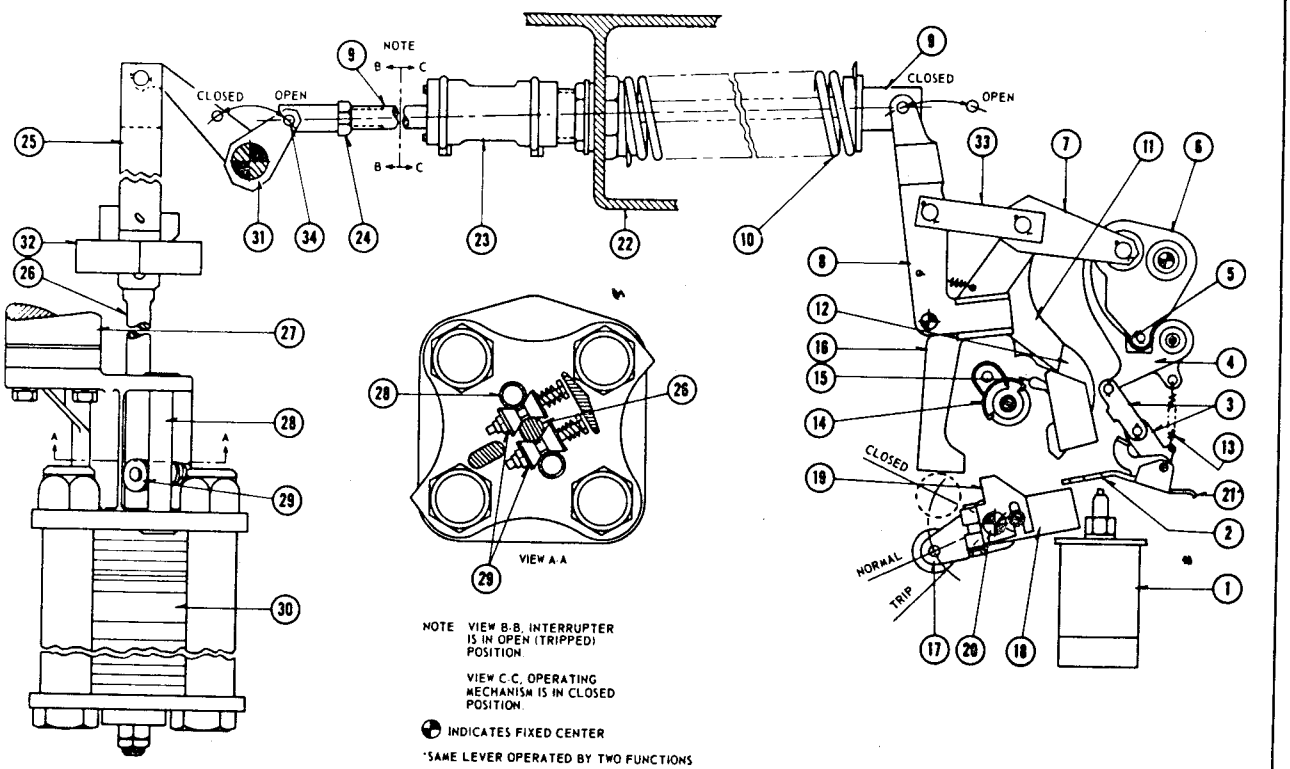
CAUTION

Do not manually close on an energized line. Slow closing speed will damage the shunting resistors.

This is accomplished by pulling upward on the "red" closing handle (Figure 9, Item 2). The manual closing handle is linked to the operating mechanism by the manual trip and close transverse shaft (20) running behind the motor. As the closing handle is moved, the manual closing operating handle roller assembly (17) is raised to come in contact with the manual closing link (16). Raising this link, elevates the closing link (7) to its closed position.

c. Operating Mechanism Switches

The moving contacts of the drum type motor cutoff switch and a dynamic brake switch are mounted on the worm gear shaft. They are designed to insure that the mechanism is completely closed before the motor circuit is opened. To provide reclosure of the motor circuit for the next operation, the drum switch (Figure 10, Item 8) is wired in parallel with a contact of the auxiliary switch that closes when the capacitor switch opens and opens before the drum switch. These switches are not critical and therefore no adjustment is necessary or provided.



1. Trip Coil
2. Trip Lever
3. Trip Linkage
4. Latch
5. Latch Roller
6. Latch Roller Link
7. Closing Link
8. H-Frame
9. Operating Rod
10. Trip Spring
11. Automatic Closing Link
12. Automatic Closing Link Guide
13. Trip Toggle Reset Spring
14. Moving Contact of Drum Switch
15. Stationary Contact of Drum Switch
16. Manual Closing Link
17. Manual Closing Operating Handle Roller Assembly
18. Manual Tripping Bar
19. LSM Trip Linkage Lug
20. Manual Tripping and Close Transverse Shaft
21. Manual Tripping Lever Extension
22. Top Casting
23. Rubber Seal
24. Operating Rod Lock Nut
25. Micarta Lifting Assembly
26. Moving Contact
27. Bushing
28. Contact Alignment Rod
29. Spring Biased Contact Rollers
30. Interrupter Grid Stack
31. Operating Shaft
32. Mechanism Damper
33. Toggle Link
34. Connection Pin

Fig. 15. Operating Mechanism and Interrupter Assembly

INSPECTION, MAINTENANCE AND ADJUSTMENT

Periodic Inspection

The safety and successful functioning of any apparatus or system connected with the switch, depends to a large extent on the proper and reliable operation of this unit. To this end, it must have systematic inspection on regular time intervals. Operating experience, based on the number of operations, magnitude of current and any unusual operation which occasionally occur, will soon establish a maintenance schedule which will assure proper switching reliability. The following check list is a minimum inspection guide.

1. Inspect the bushings carefully for hairline cracks. Clean if there is any evidence of contamination.

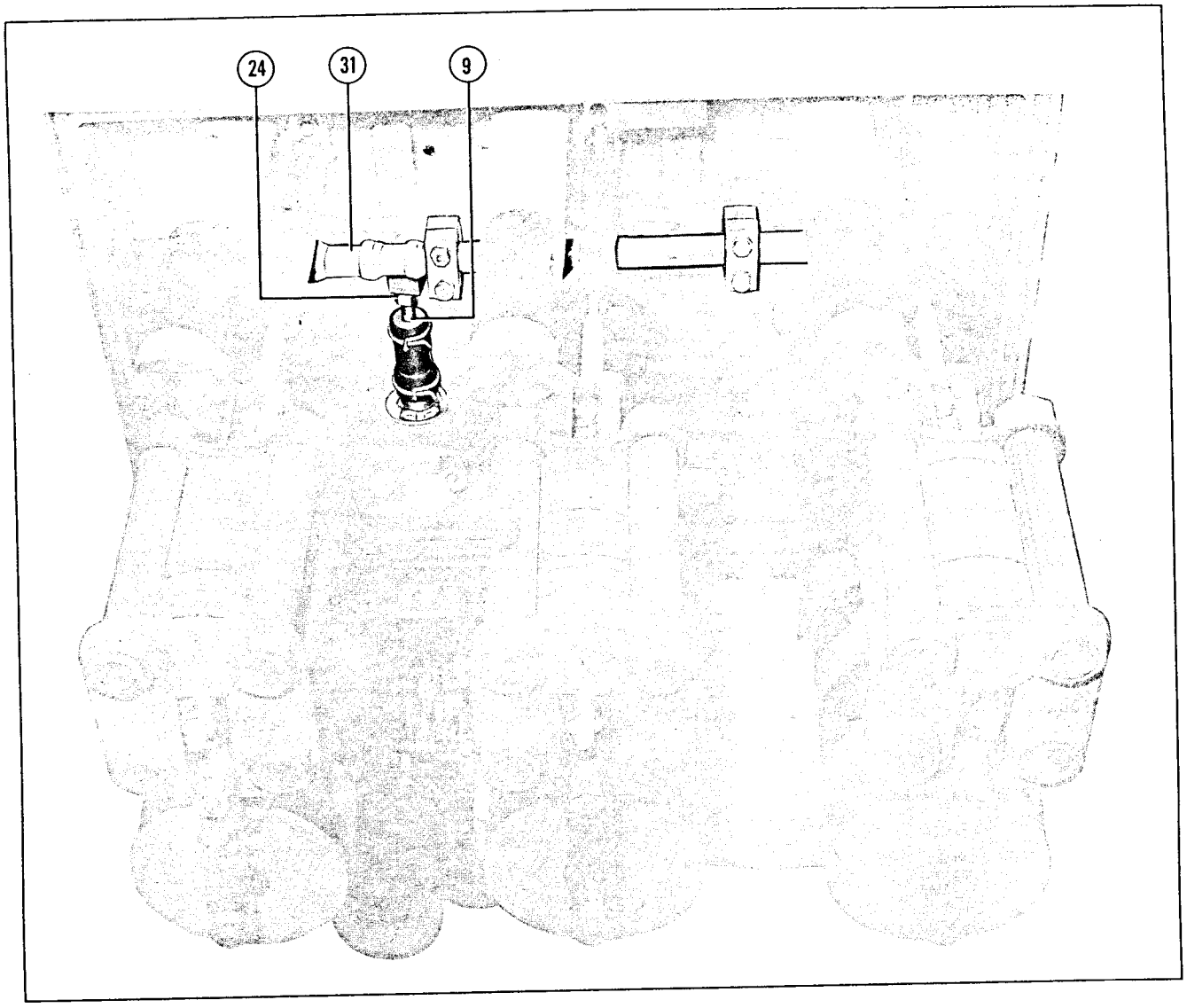


Fig. 16. Interrupter Adjustment

2. Check the oil tank and mechanism cabinet for rust and corrosion. If any is found, use a good grade of touch-up paint.

3. Open the mechanism cabinet door and inspect the control panel for loose connections.

4. The oil tank should be removed and if the switch has only operated a few times, the oil need not be replaced. Otherwise, it should be filtered or new oil used.

5. Check the condition of the moving contacts by removing them for inspection. They may be removed by releasing the dowel pin from the Micarta® rod and lifting the contact from the interrupter.

If the moving contact is badly worn it is necessary to remove the bottom casting of the interrupter for inspection of the stationary contacts. However if the moving contact is in good condition, it is safe to assume the same for the stationary ones.

The contacts on the switch interrupter may be adjusted, if the necessity arises. To adjust . . . refer to Figure 15 and 16.

a. Remove the pin (34) connecting the operating shaft to the operating rod.

b. Push the moving contact (26) into the interrupter assembly until it bottoms, then pull out 1/8 inch.

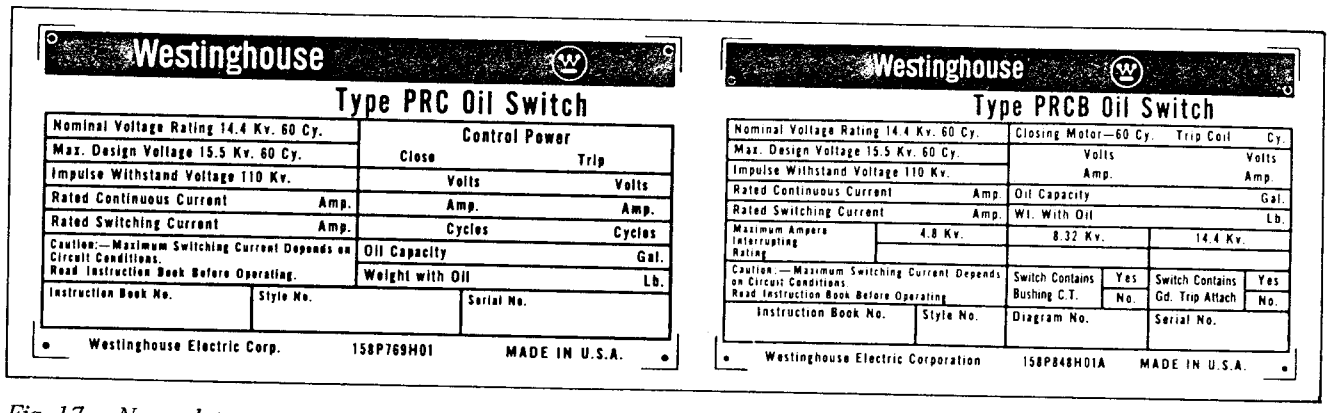


Fig. 17. Nameplate

c. Close the operating mechanism by hand and adjust the length of the operating rod (9) to match the position of the operating shaft (31). Reinsert the pin connecting the operating rod and operating shaft, and retighten locknut (24).

CAUTION

It is possible to dress the contacts, but do not file away any good contact material unless deep pitting is evident. The contacts will carry their full rating even though somewhat mottled and uneven in appearance.

6. Check the interrupter grid plates externally for erosion of the parts. If the contacts were changed, it will usually be necessary to replace several grid plates.

7. The tank liners should be checked carefully for breaks and cracks. If any are found, the liners should be replaced.

8. The trip linkage should operate freely, without interference from the trip lever. Normally, adjustment of the trip toggle linkage is unnecessary; if such an adjustment is made, the toggle should be 1/32 to 3/64 of an inch over center. If this dimension is exceeded, the force required of the solenoid may be too great for reliable operation. A screw and self-locking nut on the solenoid support provide for the adjustment of the trip toggle linkage.

9. The operating mechanism and motor should be inspected for tightness and alignment.

10. The capacitor switch has been designed to minimize lubrication requirements. The motor and gear box are sealed and the linkages normally require no additional lubrication. A THIN coat of light mineral oil may be used on the working surfaces under extreme cases.

NOTE

For placing the unit back in service after inspection, follow the general procedure outlined in this instruction manual.

Standard Operating Duty

The PRC and PRCB capacitor switches operating duty is determined by the maximum interrupting current rating corresponding to the frame rating.

When a switch has completed an interrupting duty equivalent to the above, it should be removed from service at the earliest opportunity and overhauled. It is expected that this may require replacement of contacts, oil and worn grid plates.

In order to insure that the apparatus receives the proper service, a record of operations should be maintained. Special note should be made of those interruptions at, or near, the maximum service time as contact wear is in direct proportion to the current interrupted.

Renewal Parts

A list of renewal parts associated with and maintained in stock will be furnished upon request. When ordering renewal parts . . . specify the name of the part, identify the switch by including the type, amperes, volts and shop order (S.O.) number as indicated on the nameplate.

Standard hardware items, such as bolts, nuts and washers should be purchased locally. For replacement parts prices, contact the nearest Sales Office of the Westinghouse Electric Corporation.