INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

AUTOMATIC RECLOSER, TYPE 100-GR

Single Pole, 25 to 100 Amperes, 2400 to 14400 Volts
Max. Interrupting Capacity 2500 Amperes

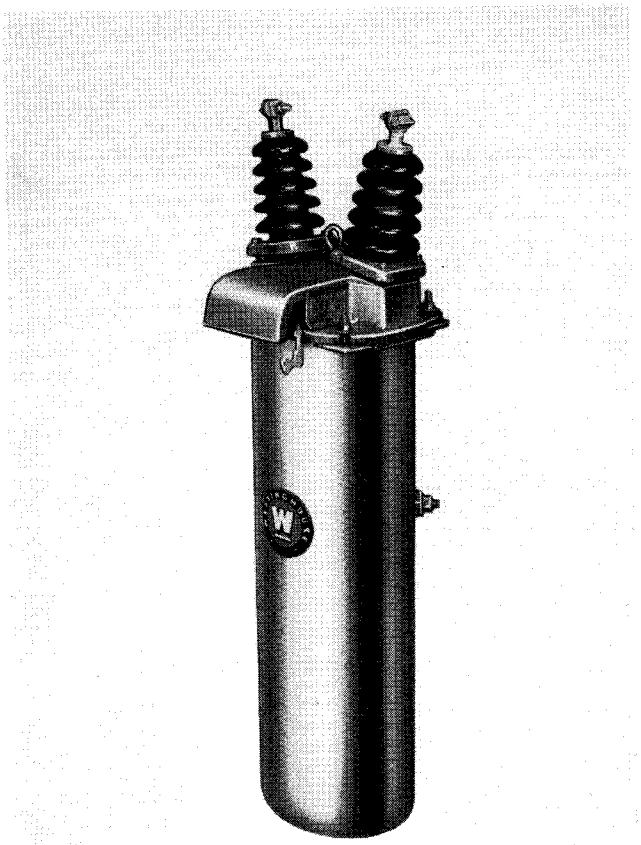


FIG. 1. Type 100 GR Automatic Recloser

TYPE 100-GR RECLOSER is a single pole, self-contained, automatically reclosing oil circuit breaker. The 100-GR Recloser is designed for use on 60 cycle alternating current power distribution circuits. A companion to the line of 50-GR Reclosers, it is designed for circuits having higher load currents and higher fault currents. The 100-GR Recloser provides fault current protection by automatically opening and then reclosing to clear temporary faults, or by opening and reclosing until it locks open to clear permanent faults. The recloser should be applied only on circuits where the maximum fault current does not exceed the maximum interrupting rating of the recloser.

STORING

The recloser is filled before shipping with the correct amount and type of oil. Therefore, if it is to be stored before ultimate use, it should be placed in a vertical position, preferably in a clean, dry location.

INSTALLATION

Mounting. The recloser is contained in a steel tank on which two mounting lugs are welded. By use of proper mounting brackets the recloser may be mounted to the crossarm, extended from pole or direct to pole as shown in Fig. 4. The recloser may be positioned in the tank so that the hood will face in any desired position.

To mount the recloser, attach the mounting brackets to the crossarm (or pole). Loosen the two captive carriage bolts and push the heads away from the bracket so that the tank can be slipped down into position, (see Figure 2) then retighten captive bolts.

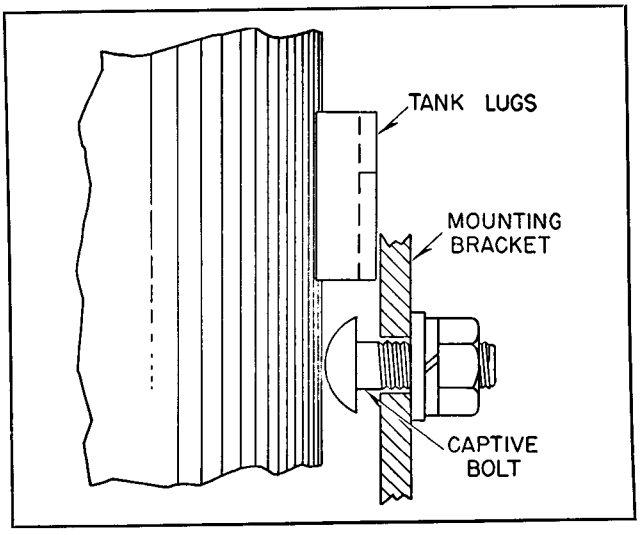
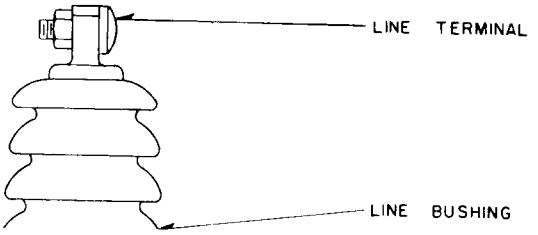


FIG. 2. Mounting Bolt Details



100-GR RECLOSER

After it is in place, the recloser should be operated manually approximately four times to expel any air that may be trapped in the time delay dashpot.

Electrical Connections. The recloser is connected in series with the line. Clamp-type terminals are supplied on the bushings for use with #8 to #00 leads. Depending on operating practice, a ground lead may be attached to the stud which is welded to the tank adjacent to the lower tank lug.

Lightning Protection. Although equipped with a by-pass gap to protect the coil from surge, maximum recloser protection is obtained by installing lightning arresters on both load and source terminals of the recloser. If only one lightning arrester is used, it should be connected to the source terminal, except when the recloser is at the substation, the arrester should be connected to the load terminal.

OPERATION

Manual. The 100-GR Recloser may be operated manually by means of the operating lever located under the hood (Fig. 3). When the handle is up the contacts are closed. When the handle is down the contacts are open.

Automatic. If an overcurrent should flow through the series coil, the armature will be drawn upward into the timing dashpot, compressing the operating spring. The armature, by means of the thrust tube, will drive the contacts apart and the compressed operating spring will snap the moving contact to the open position. The armature speed varies with the magnitude of the overcurrent.

The series coil is de-energized as soon as the circuit is opened and the armature and contact then drop slowly. When the moving contact is a predetermined distance from the stationary contact, it snaps closed to prevent arcing. The reclosing time is constant, independent of the magnitude of the overcurrent.

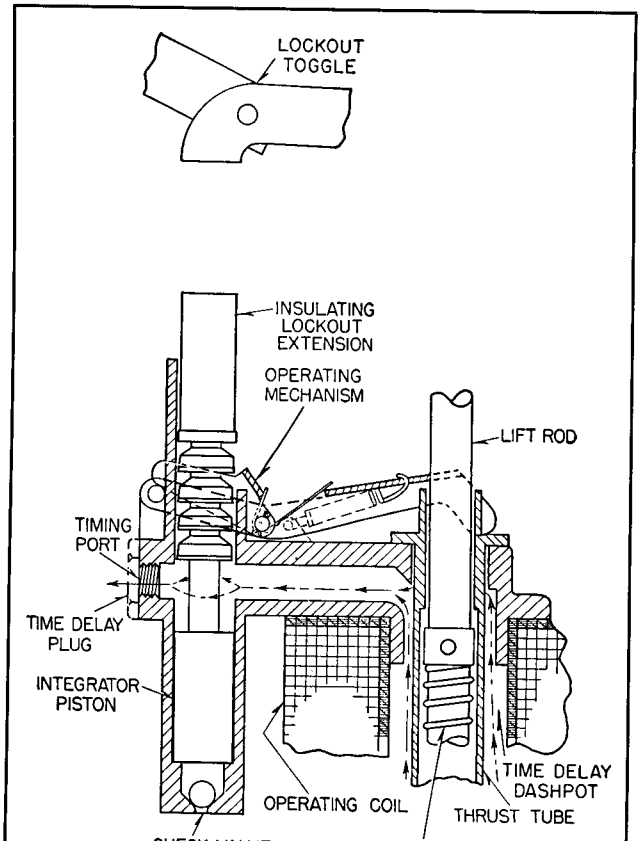
Lockout Integrator. Each opening of the recloser advances the lockout integrator piston one step (see Figure 5).

The integrating mechanism resets to its original position after a period of time if the recloser remains closed after the first, second, or third opening, thus providing the same sequence of operation for subReclosing and resetting of integrator mechanism is thus prevented until the operating handle is reset to the closed position. This ensures that when the line is re-energized after an extended outage, the recloser timing is on the time delay setting, therefore the recloser will not trip open on the short time inrush which occurs.

TIMING CHARACTERISTICS

Timing Sequence. The 100-GR Recloser may be changed in the field to give one instantaneous operation followed by time delay operations by removing the time delay plug (shown in Fig. 5).

Removal of the plug opens a port which allows oil to flow freely out of the timing dashpot. After the first operation, however, the integrator piston, acting as a slide valve, closes the port. Subsequent operations are then time-delayed, just as though the plug were still in place. Reclosing time remains constant whether or not the plug is in place.



new extension should be adjusted so that on the operation before lockout the extension will clear the lockout toggle by approximately 1/8 inch.

Coil Protector. The "De-ion" coil protector is of the low voltage type mounted under oil on the coil plate and connected directly across trip coil. This gives the coil the best possible protection. The gap is of the expulsion type and is so constructed that a 1/4 inch air gap will be automatically maintained in the gap electrode due to the "diving bell" effect.

IMPORTANT: It is necessary to have some air in the coil protector before putting the recloser in service. To insure this condition, merely lift the recloser out of the tank until this intake of air is accomplished and then replace. This should be done immediately before mounting the recloser on the pole.

TESTING

No testing of the recloser should be required other than the manual operation of the operating lever. When this lever is pushed upward the contact should close with an audible snap after a short time interval.

Low Voltage Testing. The 100-GR Recloser is a high voltage (2400-14,400 volts) circuit interrupter and is designed to operate in this voltage range. If the device is operated on low voltage circuits it will not operate properly.

If it is desired to determine the minimum trip current of the recloser on a low-voltage circuit, the recloser should be connected with the contacts out of the tripping circuit as shown in Fig. 6.

IMPORTANT: The recloser should never be operated unless the tank is filled with oil.

Connections. The low voltage leads are connected to the coil terminals by attaching one lead to the bushing on the coil side and the other lead to the lower coil terminal.

A test lamp may be connected across the contacts to indicate the time at which they open.

Increasing The Current. If a resistor is used to control the current in the circuit and an ammeter is used to measure the current, the current may be slowly increased until such time as the ammeter indicates a decrease in the current. This decrease is caused by the increase in circuit reactance as the armature is drawn upward into the series coil.

Therefore, the maximum current indicated on the ammeter before the current begins to decrease is the minimum trip current of the recloser.

Because the circuit current will decrease as the armature rises, the recloser may not be able to open the contacts unless the resistance controlling the circuit current is reset to maintain the current constant as the armature moves upward. On a typical 110 volt test circuit with a 25-ampere recloser the armature will pick up at a value of 50 amperes, ±10%. As the armature moves upwards, the current will drop off to a value of approximately 30 amperes. This current is not sufficient to cause the armature to complete its stroke and separate the contacts, therefore, the circuit current must be readjusted to the original value of pickup current (50 amperes). The armature should then force the contacts open. If the circuit current is then turned off by external means, the armature will reset.

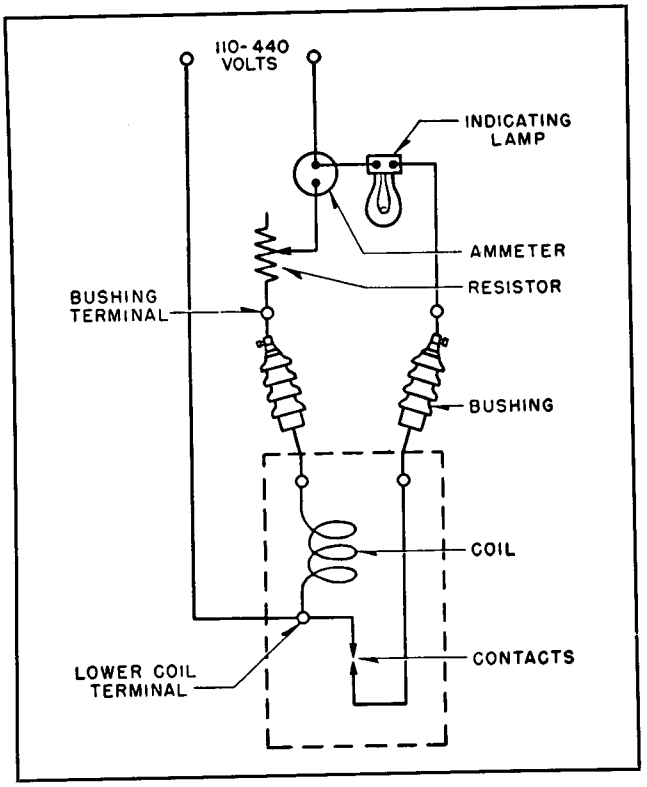


FIG. 6. Low Voltage Test Circuit

NOTE: This effect of reduced current, due to increase of reactance in the coil, is not factor on a 2400 volt circuit as the coil reactance is a very small portion of the total reactance of the circuit.

INSPECTION AND MAINTENANCE

Yearly Inspection. At least one inspection per year is recommended at which time the recloser should be removed from the tank and the tank drained of oil. The recloser is removed from the tank by loosening the four captive carriage bolts and then moving the four clamps away from the flange of the tank.

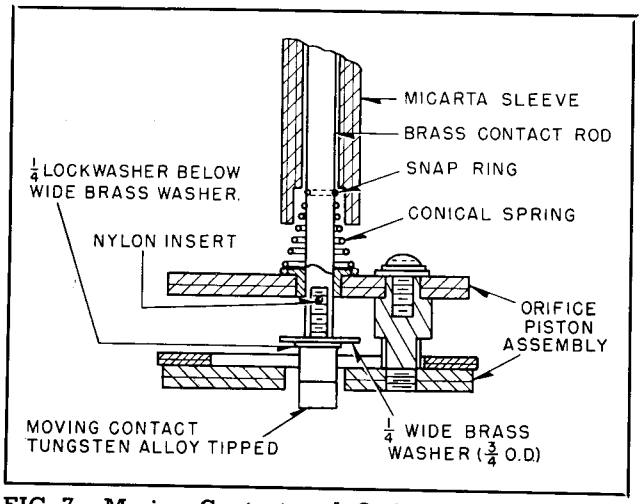


FIG. 7. Moving Contact and Orifice Piston Assembly

Oil should be changed once a year or about every 100 operations, whichever is sooner.

Check the condition of the contacts. These contacts should have an average life of 100 to 1000 operations depending on the magnitude of the short circuits interrupted. The contacts, which are faced with 3/16-inch-thick arc resisting tungsten alloy, are suitable for further operation as long as the remaining portion of this material is 1/32 inch thick.

NOTE: It is not necessary to dress the contacts even though they may appear mottled and uneven as they will carry their full rated current within the rated temperature rise as long as this arc resisting alloy is present.

The moving contact may be removed by unscrewing it from the operating rod, being careful to save the accompanying washers. Care should be taken to reassemble as shown in Fig. 7. The nylon insert is essential to prevent loosening under vibration.

The orifice piston assembly is designed to have about the same life as the contacts. Ordinarily, it should be replaced whenever contacts are replaced. A complete maintenance kit, including contacts, orifice piston assembly, and necessary hardware, is available from the factory.

Contact Adjustment. The fixed contact should be moved up or down until the groove on the Micarta operating rod extension is level with the top of the thrust tube cap. (See Fig. 8). This adjusts the recloser for correct position and contact pressure.

Maintenance Procedure. Before remounting the recloser in the tank the following procedure should be followed:

1. Wipe the inside of the tank clean with lint-free cloth. Do not use waste.

2. Wipe the bushings clean.

3. Check the electrical connections for tightness.

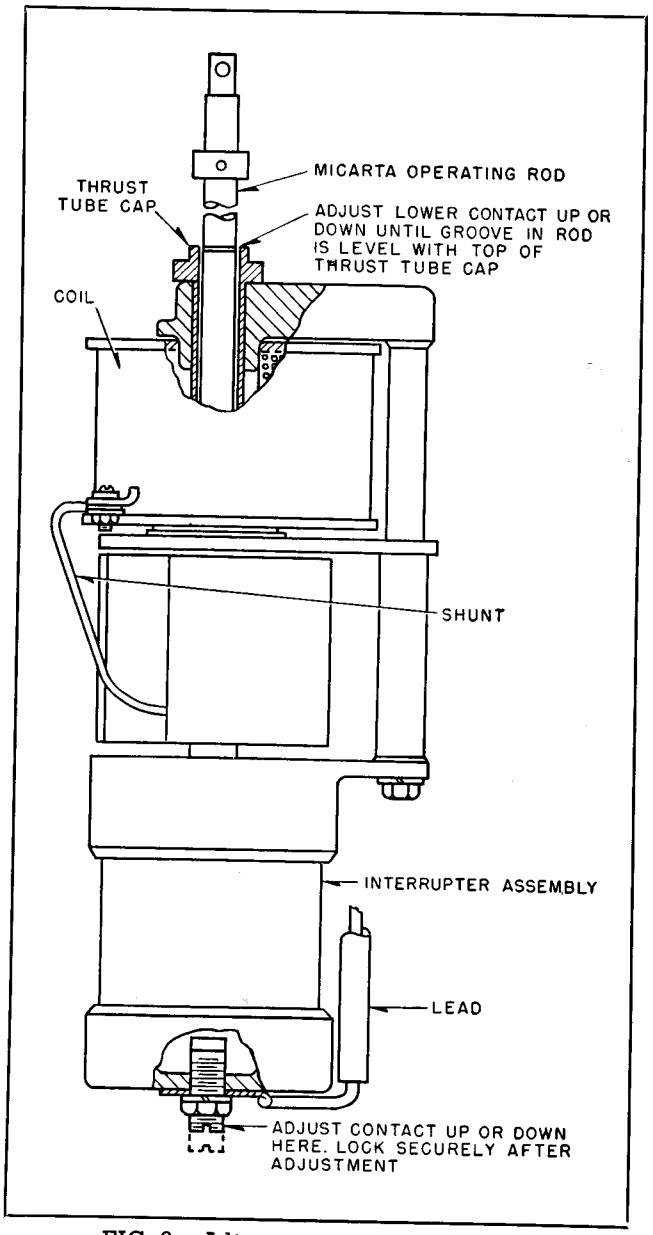


FIG. 8. Adjustment of Fixed Contact

4. Check to see that the stationary contact leads are tight.

5. Refill the tank with clean oil.

6. Operate the recloser manually before remounting in the tank to make certain all parts of the mechanism are free.

The aluminum top casting and the galvanized tank require no maintenance except to check for breaks due to abrasion. These may be retouched with aluminum paint or red lead.

TO CHANGE RATING

In order to change the rating of the recloser, merely replace the trip coil with one having the desired rating. Refer to the Table on page 7 to de-

termine the style number for the particular coil. To remove the trip coil, proceed as follows (See Fig. 9).

1. Disconnect both leads at the coil terminals. Disconnect main lead from fixed contact at bottom of interrupter. Disconnect flexible shunt from operating rod.

2. Remove lower interrupter casting. Disconnect moving contact and orifice piston assembly.

3. Remove interrupter tube and upper casting as one unit by unscrewing the three bolts which enter the supporting studs.

4. Remove shunt connector from operating rod.

5. Remove as one unit the coil plate, coil protector tube and gas baffle by unscrewing the three supporting studs that fasten the coil plate to the coil frame studs.

6. Remove armature guide from coil. Now the coil may be removed and the new one substituted.

7. Position the coil so that the upper coil terminal will be directly above the coil protector tube when reassembled.

8. Replace parts previously removed in the reverse order as described.

9. *IMPORTANT: Micarta check valve in interrupter must be free to move up and down.*

10. Reconnect all leads in their original positions. Maintain a minimum clearance of 3/8 inch between the upper coil lead and the coil casting.

11. Adjust the position of the fixed contact as described in Fig. 8.

12. Operate the mechanism manually to insure that all moving parts are free.

13. Mark nameplate to record change.

INSULATING OIL

The care of the insulating oil used in this circuit recloser is of the utmost importance to its successful operation. Contamination by dirt, moisture, metallic particles, lint and other types of foreign particles, reduces the dielectric strength of the oil upon which the operation and current interrupting ability of the recloser depends. Consequently, careful attention should be given to keeping the oil clean, not only in filling the tank, but in storage.

Only the highest grade of insulating oil such as Wemco "C" should be used. The oil should be new or at least thoroughly reconditioned by means of filter press or centrifuge.

If the recloser has been allowed to stand with no oil in the tank, the tank should be thoroughly cleaned and flushed out with insulating oil before filling. The same treatment should be given the recloser mechanism itself. Care should be used during inspection and maintenance which should preferably be done only under favorable weather conditions.

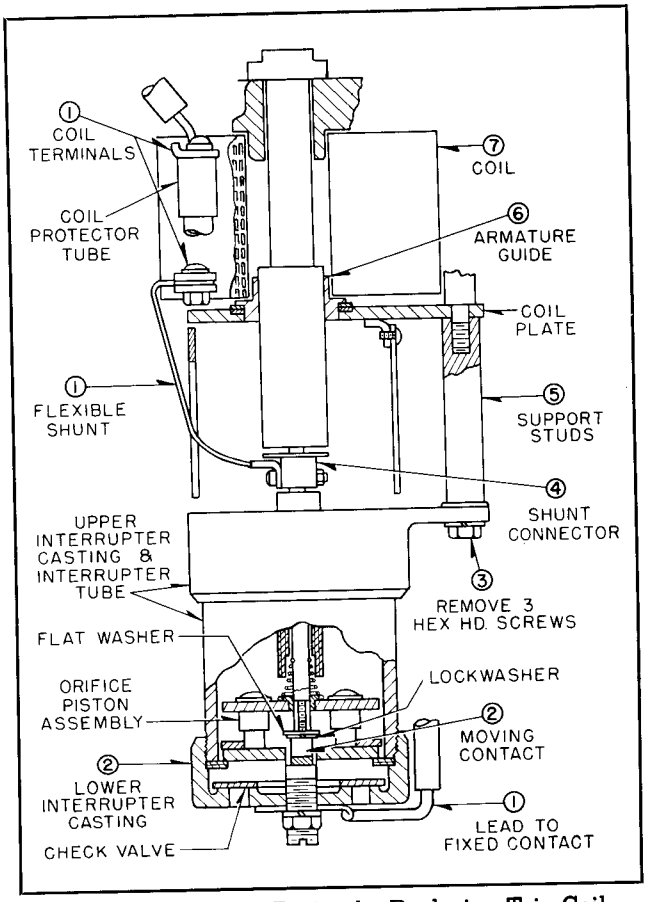


FIG. 9. Changing Rating by Replacing Trip Coil

TABLE OF RATINGS

LOAD CURRENT AMPERES	MIN. TRIP CURRENT AMPS (±10%)	INTERRUPTING RATING AMPERES		RECLOSER STYLE NO.	COIL STYLE NO.
		2.4–4.8 KV	14.4 KV		
25	50	1000	1000	505D214A02	1534 618
35	70	1500	1500	505D214A03	1534 619
50	100	2500	2000	505D214A04	1534 620
70	140	2500	2000	505D214A05	1534 621
100	200	2500	2000	505D214A06	1534 622

Oil capactiy—4½ gallons
Net weight with oil, less bracket—120 pounds
Crossarm Mounting Bracket—Style No. 1446 066
Direct-to-Pole Mounting Bracket—Style No. 1446 067
Extended Pole Mounting Bracket—Style No. 1446 068

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