INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

TYPE GRS SECTIONALIZER

Single Pole, 5 to 140 Amperes, 15,000 Volts

Maximum Interrupting Capacity—220 Amperes

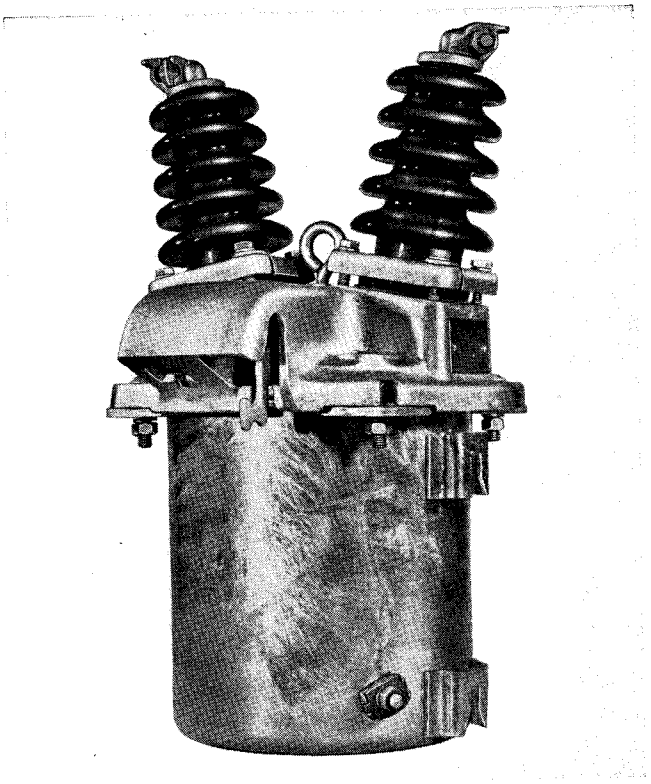


FIG. 1. Type GRS Line Sectionalizer

TYPE GRS SECTIONALIZER is a single pole, self-contained, automatic sectionalizing device, designed to operate in conjunction with a reclosing breaker. It may be applied on rural or urban circuits.

Storing. The sectionalizer is filled before shipping with the correct amount and type of oil. Therefore, it may be stored either indoors or out, but it must be placed in a vertical position. No particular care need be taken of the sectionalizer while in storage because it is designed for use outdoors and may be stored anywhere.

The sectionalizer, like any other piece of oil insulated apparatus, should never be placed in storage unless its tank is filled with the proper type and amount of oil.

INSTALLATION

Mounting. The sectionalizer is contained in a seamless drawn steel tank to which two mounting lugs are welded. It can be mounted to the crossarm, or on the pole mounting brackets as shown in Fig. 6 on page 6. In either case, the sectionalizer can be positioned in the tank so that the hood will face in any desired position. This is accomplished by merely loosening the clamping bolts, rotating to the desired position, and retightening the bolts.

To mount the sectionalizer, 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 lugs can be slipped down into position, (See Fig. 2) then retighten captive bolts.

Electrical Connections. The sectionalizer is connected in series with the line. Clamp-type terminals are supplied on the bushings. A ground lead may be attached to the stud which is welded to the tank adjacent to the lower tank lug.

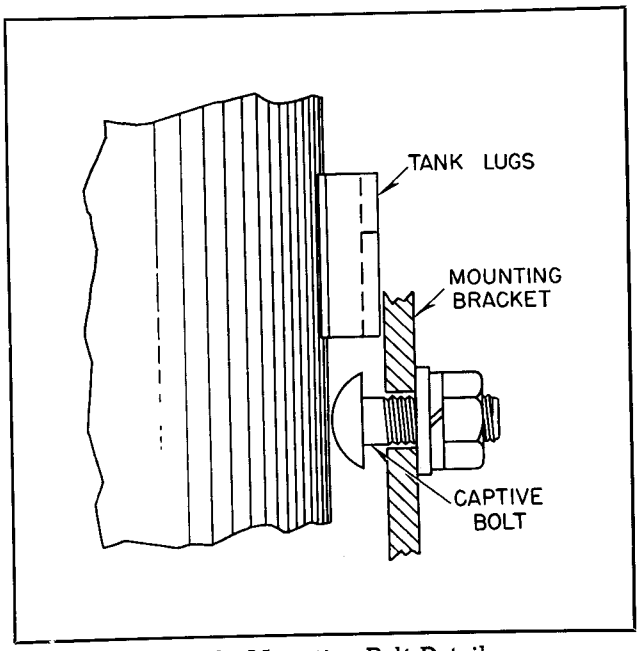
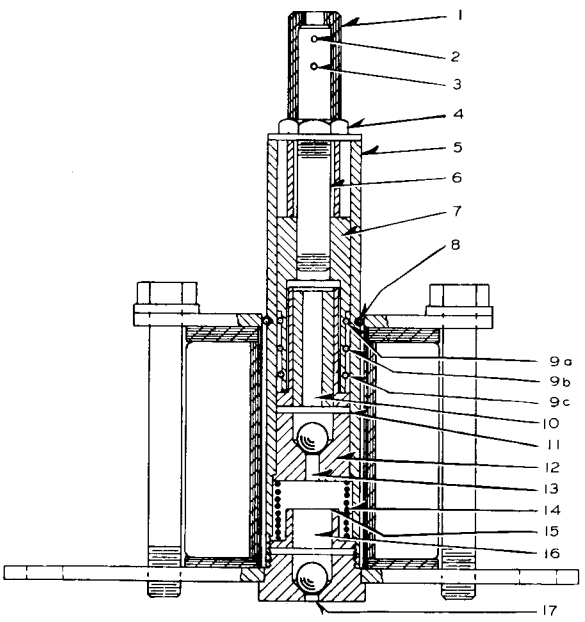


FIG. 2. Mounting Bolt Details



LEGEND

1 MICARTA TIP
2 } HOLES FOR ADJUSTING
3 } NUMBER OF OPERATIONS
4 ADJUSTING NUT
5 GUIDE TUBE
6 TRIP PIN (MICARTA)
7 TRIP PISTON (BRASS)
8 GUIDE TUBE SNAP RING
9 (a) (b) (c) INTEGRATOR RINGS
10 OIL CHAMBER
11 CHECK PIN
12 ARMATURE
13 CHECK VALVE
14 COMPRESSION SPRING
15 POLE FACE
16 OIL CHAMBER
17 CHECK VALVE

FIG. 3. Integrator Mechanism for Type GRS Sectionalizer in Normal Current Carrying Position

Placing in Service. The Type GRS Sectionalizer is initially closed by an upward push with a hook stick on the combination operating handle and position indicator (See Fig. 4). This closes the contacts and places the sectionalizer in service.

OPERATION

Caution: Do not operate the sectionalizer electrically unless it is filled with oil.

Operating Principle. The operation of the Type GRS Sectionalizer is dependent upon an integrator that counts overcurrent and subsequent openings of an associated reclosing breaker. This counting is accomplished by means of a magnetically compensated oil pump (See Fig. 3, and also Fig. 5 on page 5).

When an overcurrent flows in the series coil, the armature (12) is pulled down to the bottom of the guide tube. This compresses the spring (14) while allowing oil to flow through check valve (13) into space (10). When the associated recloser opens and the series coil is de-energized, the spring moves the armature up, and because no oil can flow down through check valve (13) the trip piston (7) is pushed up along with the armature. The upward movement of the armature pulls oil into space (15) through check valve (17).

If the fault or overload is not temporary, the afore-mentioned process will be repeated. If the sectionalizer is set to trip after three operations, the third step trips the release mechanism, causing the sectionalizer contacts to drop open and the indicating handle to drop down. As the associated reclosing breaker has four operations to lockout, the GRS Sectionalizer opens the faulted line while the recloser still has one operation to lockout. The breaker starts resetting immediately so that within a few minutes it is once again prepared to go through four operations to lockout. Of course, if the fault is temporary and is cleared before the sectionalizer locks out, the sectionalizer will start resetting immediately.

The iron rings (9) on the piston are spaced so that the distance between them is equal to the upward travel of the armature when the coil is de-energized during fault conditions. Under normal conditions the ring (9a) is in line with the flux that flows from ring (8) on the guide tube to the armature (12). Therefore, when a fault condition appears causing the associated recloser to operate, the ring (9b) will be moved into the line of flux after the first operation of the recloser.

The second operation of the recloser will cause ring (9c) to be moved into the line of flux. The line of flux from the guide ring to the armature exerts a force on the rings (9). This magnetic force tends to keep the ring nearest the line of flux in line with the flux and thus compensates for any deviation in the amount of travel of the trip piston. However, at all currents below the minimum

trip current of the coil the magnetic force is not strong enough to prevent the trip piston from resetting to its normal position.

The Micarta tip (1) can be adjusted in relation to the trip pin (6) so that the sectionalizer will lock out on the thrid, second or first operation of the associated reclosing device. Cotter pin holes (2) and (3) and two similar holes in the tip (1) are provided so that the tip may have any one of three positions in relation to the trip pin (6). With the tip (1) in its lowest position, the sectionalizer will trip in three operations. Raising the tip will cause

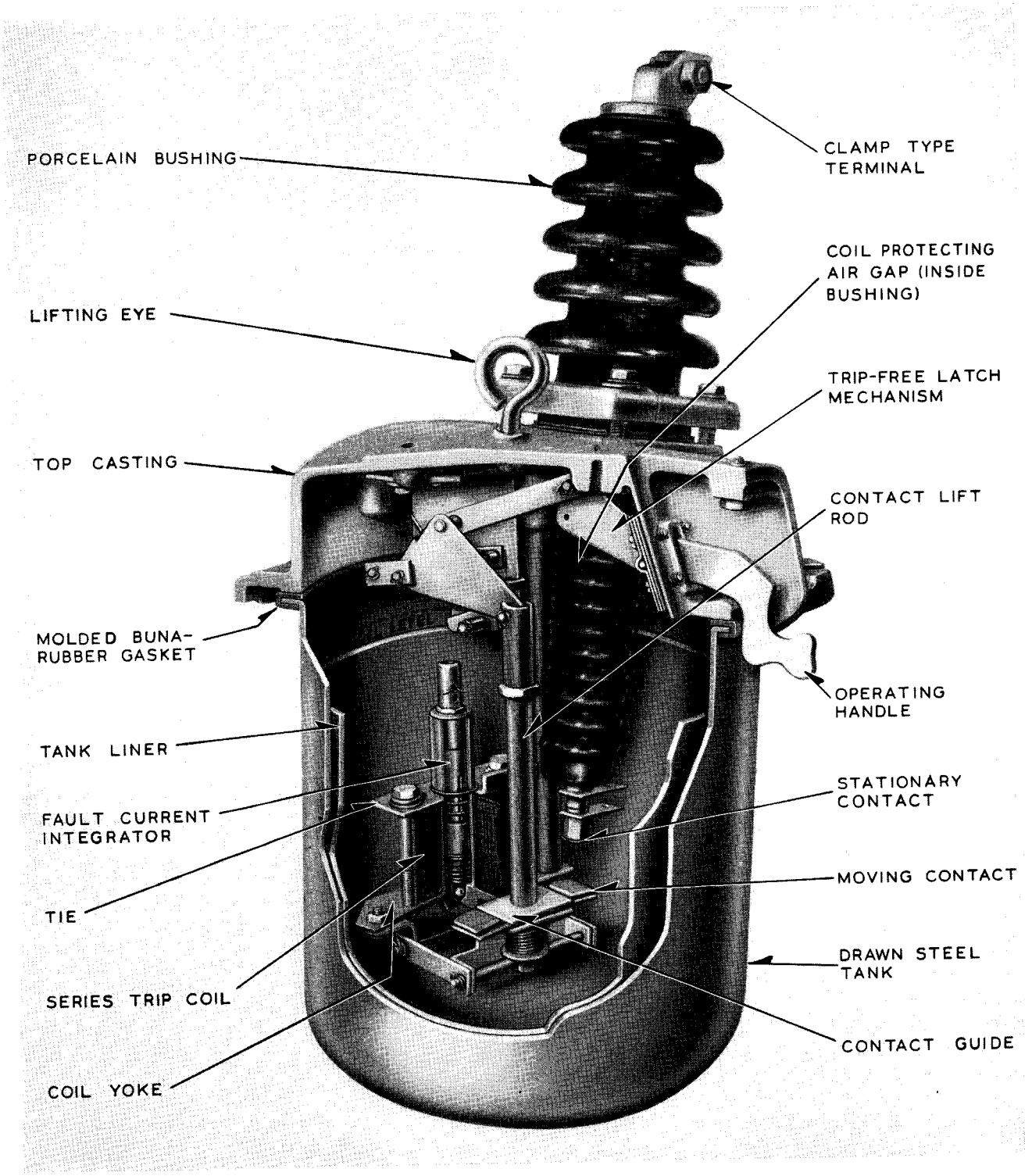


FIG. 4. Cutaway View of the GRS Sectionalizer

the sectionalizer to trip out in one or two operations, as may be required.

The correct distances between the top of the tip (1) and the lockout trip latch for one, two or three operations are 1/32, 9/32, and 17/32 inch respectively.

Whenever the contacts are open the indicating handle will be down. A manual operation is necessary to place the sectionalizer back in service.

Note: Successive fluctuations of current between 160% and 40% of rated trip current will cause the integrator to operate. This may result in false operations in circuit breaker applications when the breaker trip settings are considerably higher than the sectionalizer trip current ratings.

Coil Protector. The coil protector consists of a voltage limiting air gap in parallel with the coil. This gap is located inside the bushing to which the coil connections are made. It is above the oil level of the tank so as to prevent the possibility of it being rendered inoperative by oil submersion. The gap needs no maintenance or inspection. It is merely a by-pass gap to protect the coil from surges and affords no line to ground protection to the sectionalizer.

TESTING

No testing of the sectionalizer should be required other than the manual operation of the operating handle. When this handle is pushed upward the contacts should close. The operating lever will indicate the opening of the sectionalizer contacts.

Low Voltage Testing. In the event low voltage (110-440 volts) laboratory tests are desired, the sectionalizer will operate in its proper fashion if the coil is energized and de-energized to simulate recloser operation.

If it is desired to determine the minimum trip current of the sectionalizer on a low voltage circuit, the sectionalizer should be connected in its normal fashion.

Important: The sectionalizer should never be operated unless the tank is filled with oil.

Determining the Trip 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 needle indicates a decrease in the current. A well damped ammeter must be used to make the decrease perceptible. This decrease is caused by the increase in circuit reactance as the armature is drawn downward 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 sectionalizer.

On a typical 110-volt test circuit with a 5-ampere sectionalizer (S# 1535202), the armature will pick up at a value of 8 amperes, ±10%.

INSPECTION AND MAINTENANCE

Routine Inspection. At least one inspection every two years is recommended, at which time the sectionalizer should be removed from the tank and the tank drained of oil. The sectionalizer is removed from the tank by loosening the four captive carriage bolts and then removing the four clamps from the flange of the tank.

Oil should be changed once every two years or after about every 500 operations if the device is used to open load current as a sectionalizing switch.

Check the condition of the contacts. These contacts should have an average life of 500 to 5000 operations depending on the magnitude of the load currents interrupted and the frequency with which the sectionalizer is used to interrupt load current. These contacts have an infinite life if the sectionalizer operations are for fault conditions as the sectionalizer does not interrupt current when operating due to a fault. The contacts, which are faced with arc resisting tungsten alloy, are suitable for further operation as long as any of this material is present.

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.

Maintenance Procedure. Before remounting the sectionalizer 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 electrical connections for tightness.

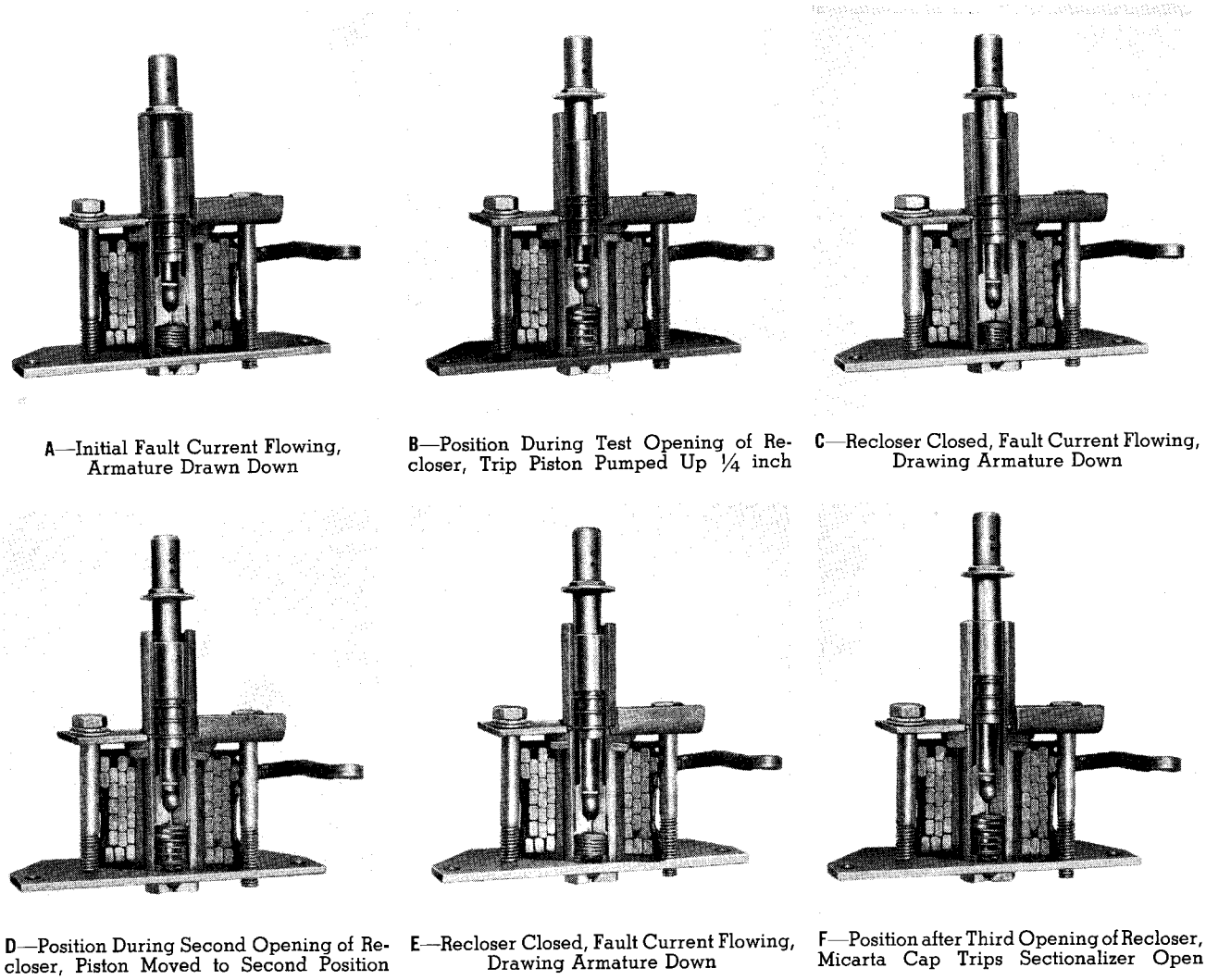
4. Check the stationary contacts for tightness.

5. Check tank liner and replace if damaged.

6. Refill the tank with clean oil.

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

8. Lower the sectionalizer into the tank until the top of the guide tube is under the surface of the oil



A—Initial Fault Current Flowing, Armature Drawn Down

B—Position During Test Opening of Recloser, Trip Piston Pumped Up ¼ inch

C—Recloser Closed, Fault Current Flowing, Drawing Armature Down

D—Position During Second Opening of Recloser, Piston Moved to Second Position

E—Recloser Closed, Fault Current Flowing, Drawing Armature Down

F—Position after Third Opening of Recloser, Micarta Cap Trips Sectionalizer Open

FIG. 5. Operating Sequence of the Integrator Mechanism

and pump the trip piston four or five times. This removes all the air from the check valves in the integrator assembly.

The top casting and tank require no maintenance other than touching-up of areas damaged by abrasion.

INSULATING OIL

The care of the insulating oil used in this sectionalizer 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 sectionalizer depends. Consequently, careful attention should be given to keeping the oil clean, not only when filling the tank, but during 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 sectionalizer 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 sectionalizer mechanism itself. Care should be used during inspection and maintenance which should preferably be done only under favorable weather conditions.

TO CHANGE RATING

The rating of the sectionalizer can be changed by merely replacing the trip coil with one having the desired rating. Refer to the Table on page 6 to determine the style number for the particular coil desired. To change coils proceed as follows:

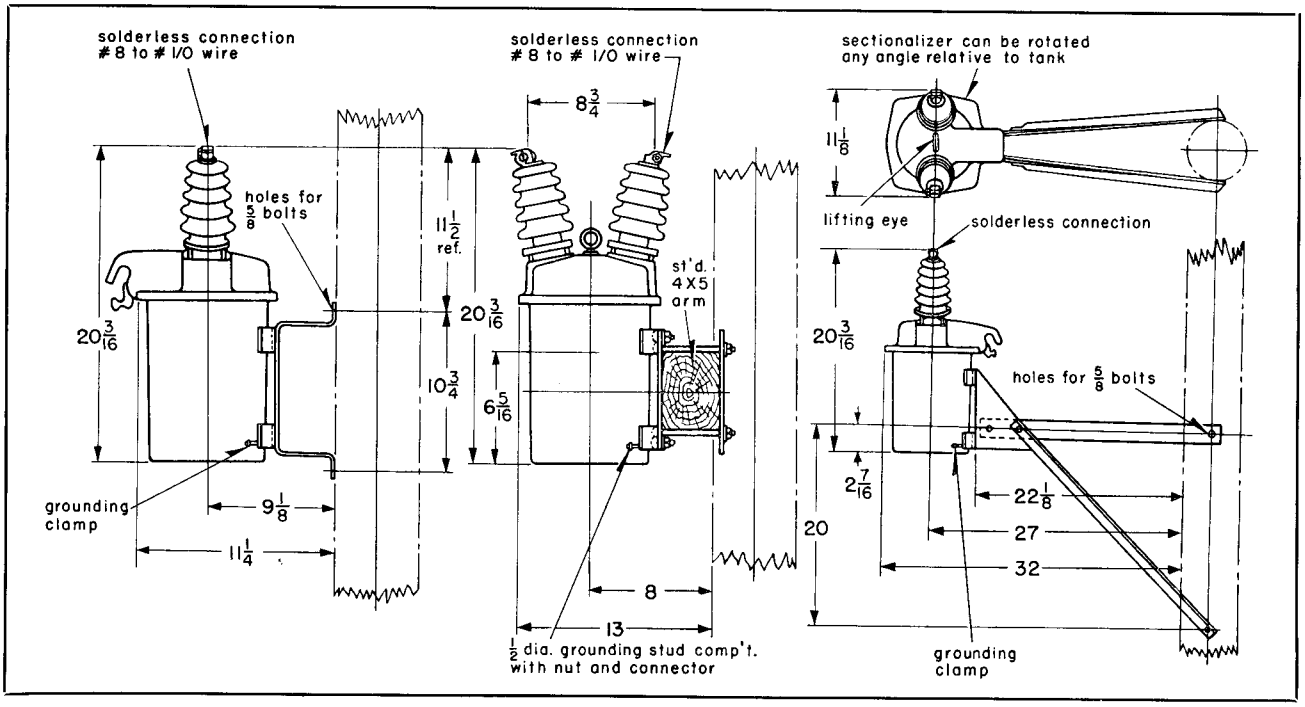


FIG. 6. Crossarm and Pole Mounting Details

1. Disconnect the coil terminals from the protective gap terminals.

2. Remove the two bolts holding the coil yoke to the Micarta supports.

3. Remove the two bolts connecting the tie with the yoke. The coil can now be removed and the new coil placed in position and the unit reassembled.

4. The snap ring (Item 8, Fig. 3) placed in the groove of the guide tube is an important part of the magnetic circuit and must not be lost.

Important: Do not let the coil leads pass between the Micarta supports and the tank. The leads should pass between the coil and the Micarta supports.

5. The nameplate supplied with the coil should then be attached to the top casting.

TO REPLACE BUSHINGS

In the event that a bushing is damaged and must be replaced, proceed as follows:

TABLE OF RATINGS

TYPE	CONTINUOUS CURRENT **	MINIMUM COUNTING & TRIPPING CURRENT AMPERES	MOMENTARY RATING RMS ASYMMETRICAL AMPERES	STYLE NUMBERS		
				COMPLETE SECTIONALIZERS		COIL REPLACEMENT KIT
				3 COUNTS TO LOCKOUT*	2 COUNTS TO LOCKOUT*	INCLUDES NAMEPLATE
GRS-5	5	8	960	1585 543	1634 611	1585 330
GRS-10	10	16	1920	1585 544	1634 612	1585 331
GRS-15	15	24	2880	1585 545	1634 613	1585 332
GRS-25	25	40	4800	1585 546	1634 614	1585 333
GRS-35	35	56	6500	1585 547	1634 615	1585 334
GRS-50	50	80	6500	1585 548	1634 616	1585 335
GRS-70	70	112	6500	1585 549	1634 617	1585 336
GRS-100	100	160	6500	1585 550	1634 618	1585 337
GRS-140	140	220	6500	1733 693	1733 694	1743 438

* All sectionalizers may be field adjusted to trip in 1, 2, or 3 counts.
** All sectionalizers have a safe manual load breaker rating of 220 amperes.

Oil capacity—8 quarts
Net weight with oil—54 pounds
Shipping weight with oil—64 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

1. Remove the sectionalizer from the tank and inspect to make sure only the bushing is damaged.

2. If the damaged bushing contains the protective gap assembly the coil terminals must be disconnected from the protective gap terminals. If the other bushing is damaged no internal connections have to be loosened.

3. Remove the four bolts holding the removable bushing flange and lift the damaged bushing from the top casting.

4. Unscrew clamp-type terminal from bushing and tube assembly or contact stud and remove from bushing. Be careful not to lose the pin and washer (See Fig. 7).

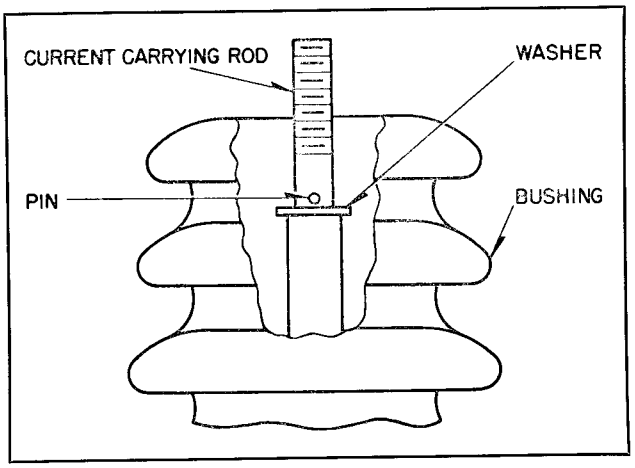


FIG. 7. Correct Positioning of Pin and Washer in Bushing Assembly

5. With the pin and washer in place (See Fig. 7) slide the assembly in the new bushing, and with a new gasket in position under the clamp-type terminal, replace the terminal and tighten it. This gasket should be cemented to the bushing with any good gasket cement. A bit of vaseline on the top of the gasket will prevent it sticking to the terminal while the terminal is tightened.

6. A new gasket should then be cemented to the top casting and the new bushing placed into position. The flange gasket and flange are then placed in position and the bolts tightened.

7. If any internal connections were disconnected they should now be connected.

8. Before placing the sectionalizer back in service check the stationary contacts to make sure that they are approximately on the same horizontal plane. Any misalignment can be corrected by adjusting of the stationary contacts.

SPARE PARTS

Tank Liner, complete—Style No. 1576 472.

Bushing Replacement Kit, complete—Style No. 1585 442.

Note: Renewal parts for this sectionalizer can be found in Renewal Parts Data 38-760A1.

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