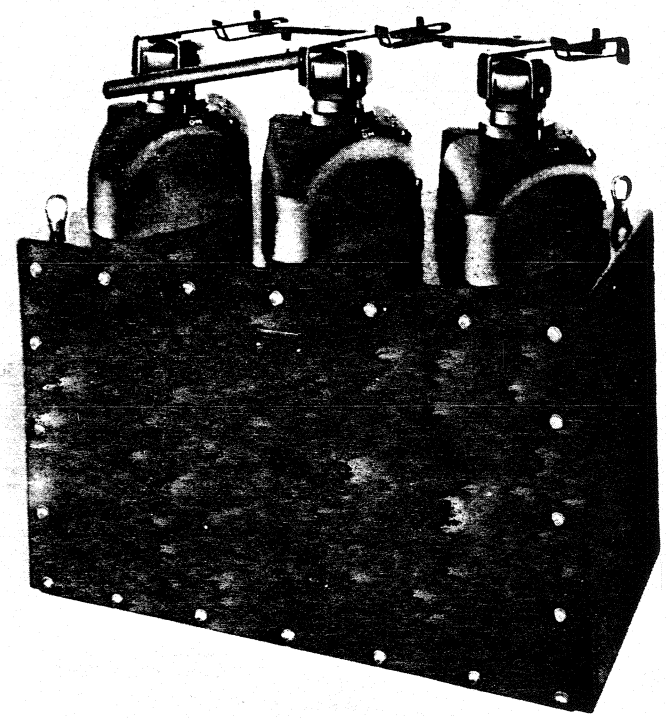
OIL CUTOUTS

METAL-ENCLOSED ASSEMBLIES
RACK-MOUNTED ASSEMBLIES
FUSED OIL INTERRUPTER SWITCH



RATED

5.2 KV—100 AMPERES
—200 AMPERES
—300 AMPERES

7.8 KV—100 AMPERES
—200 AMPERES

15 KV—100 AMPERES
—200 AMPERES

CAUTION: These G-E oil cutouts are designed and tested on the basis of using standard 10C* oil. Substitution of other oil, particularly 10-CA inhibited oil, may result in reduced interrupting ability after repeated fuse blowing. No substitutes for standard 10C oil should be used in these cutouts without approval of G-E distribution cutout engineers.

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GENERAL ELECTRIC

APPLICATION

CAUTION: *THE EQUIPMENT COVERED BY THESE INSTRUCTIONS SHOULD BE INSTALLED AND SERVICED ONLY BY COMPETENT PERSONNEL FAMILIAR WITH GOOD SAFETY PRACTICES. THIS INSTRUCTION IS WRITTEN FOR SUCH PERSONNEL AND IS NOT INTENDED AS A SUBSTITUTE FOR ADEQUATE TRAINING AND EXPERIENCE IN SAFE PROCEDURES FOR THIS TYPE OF EQUIPMENT.*

These cutouts may be used on circuits where the voltage across the cutout does not exceed the rated maximum design voltage as shown on the nameplate or given in the following tabulations. They may be used with a fuse link or a nonfusible copper disconnecting blade by installing a fuse link or a blade on the fuse carrier at the option of the purchaser. Refer to Table I. The user should determine whether a fuse or a blade is used since it determines the proper usage of the cutout. When a disconnecting blade is used, install overcurrent protection on the "source" side and interlock the cutout with the secondary switchgear to prevent the possibility of switching under short-circuit conditions. Do not use oil cutouts with disconnecting blades where the available short-circuit current or its duration will exceed the short-time ratings. Refer to Table II for interrupting capability, load-break ratings and short-time ratings.

TABLE I
FUSE LINKS, CO-ORDINATING FUSE LINKS AND DISCONNECT BLADE
For Present Listed Designs of G-E Oil Cutouts

Capacity in Amperes 100% Rating	Fuse Link Model No.	Co-ordinating Fuse Link Model No.	Disconnecting Blade Model No.
6	9F57CAA006	.....	.....
10	9F57CAA010	.....	.....
15	9F57CAA015	.....	.....
20	9F57CAA020	.....	.....
25	9F57CAA025	.....	.....
30	9F57CAA030	.....	.....
40	9F57CAA040	.....	.....
50	9F57CAA050	.....	.....
65	9F57CAA065	.....	.....
75	9F57CAA075	.....	.....
100	9F57CAA100	.....	.....
125	9F57CAA125	.....	.....
140	9F57CAA140	.....	..... *
150	9F57CAA150	.....	9F57CAB150
200	9F57CAA200	.....	9F57CAB200*
201	.....	9F57CAA201	.....
202	.....	9F57CAA202	.....
250	9F57BAA250	.....	9F57BAB250
300	9F57BAA300	.....	.....
301	.....	9F57BAA301	.....
350	.....	.....	9F57BAB350

* For 7800 and 15,000 volts.

TABLE II
LOAD-BREAK AND SHORT-TIME RATINGS

Cutout Voltage Rating kV	Continuous Current Ratings Rms Amps		Load-break Ratings* (Rms Amps)			Short-time Ratings With Disconnect Blade (Rms Amps)	
	With Fuse Link	With Disconnect Blade	Nominal Circuit Voltage and Load Connection	Normal Switching 100 Operations @ 0.8 PF	Maximum Switching 5 Operations @ 0.8 PF	Momentary (10 Cycles)	Four Seconds
5.2	100	150	2400 Delta or 2400/4160 grounded wye	150	...	4500	2500
			4160 and 4800 Delta or ungrounded wye	150	...		
5.2	200	250	2400 Delta or 2400/4160 grounded wye	450	650	9000	4000
			4160 and 4800 Delta or ungrounded wye	200	300		
5.2	300	350	2400 Delta or 2400/4160 grounded wye	350	...	9000	5000
			4160 and 4800 Delta or ungrounded wye	200	...		
7.8	100	150	7200 Delta or wye	150	300	9000	4000
	200	200	7200 Delta or wye	200	300		
15	100	150	14,400 Delta or wye	150	200	16000	4000
	200	200	14,400 Delta or wye	200	900		

* When a disconnecting blade is used, install over-current protection on the "source" side and interlock the cutout with the secondary switchgear to prevent the possibility of switching under short-circuit conditions.

TABLE III
OIL FUSE CUTOUTS

Type	Rating		Type of System	Max. System Voltage Line-to-line kV	Single Phase Interrupting Rating, Amps Asymmetrical (Note 1 and 5)	Max. 3 Phase Interrupting Capability kVA Rms, Asymmetrical (Note 2)	Max. Permissible Calculated Symmetrical Fault kVA for Systems Having X/R Constants	
	kV	Amps					X/R Less Than 4 (Note 3)	X/R More Than 4 (Note 4)
Vented or Sealed	5.2	100	3 Phase Wye or Delta	2.6	6,000	27,000	22,500	16,900
Vented or Sealed	5.2	200	3 Phase Wye or Delta	2.6	11,000	49,000	41,000	30,600
Sealed 9F32H Series	5.2	200	3 Phase Wye or Delta	2.6	15,000	67,500	56,000	42,000
Vented or Sealed	5.2	300	3 Phase Wye or Delta	2.6	11,000	49,000	41,000	30,600
Vented or Sealed	5.2	100	3 Phase Wye or Delta	5.2	5,000	45,000	37,500	28,000
Vented or Sealed	5.2	200	3 Phase Wye or Delta	5.2	10,000	90,000	75,000	56,000
Sealed 9F32H Series	5.2	200	3 Phase Wye or Delta	5.2	14,000	126,000	105,000	79,000
Vented or Sealed	5.2	300	3 Phase Wye or Delta	5.2	10,200	92,000	77,000	57,800
Vented or Sealed	7.8	100	3 Phase Wye or Delta	7.8	5,000	67,500	56,000	42,000
Vented or Sealed	7.8	200	3 Phase Wye or Delta	7.8	5,000	67,500	56,000	42,000
Vented or Sealed	15	100	3 Phase Wye or Delta	15	4,000	104,000	90,000	67,500
Vented or Sealed	15	200	3 Phase Wye or Delta	15	7,000	182,000	151,000	115,000

(NOTE 1)—The interrupting ratings shown apply to vented oil cutouts or sealed oil cutouts with expansion chambers. Maximum interrupting current is the total rms value of the current including the d-c component with maximum system voltage applied directly across the cutout.

(NOTE 2)—Maximum asymmetrical 3 phase interrupting capability is based on (maximum design voltage) × (maximum interrupting current) × (1.73). This corresponds to a symmetrical rating on a system having X/R=0.

(NOTE 3)—To find maximum permissible SYMMETRICAL fault current on systems with X/R= less than 4 (generally applies to overhead utility distribution circuits) divide maximum asymmetrical 3 phase kva by (1.2).

(NOTE 4)—To find maximum permissible SYMMETRICAL fault current on systems with X/R= more than 4 divide maximum asymmetrical 3 phase kva by (1.6). Generally applies on industrial applications at large plants fed by their own generators where there is a large concentration of power on short feeders with large conductors.

(NOTE 5)—Cutout with fuse links can be switched closed on short circuits up to their published interrupting rating.

INSTALLATION

GENERAL—APPLIES TO ALL OIL CUTOUTS

1. Follow these general instructions when installing the vented (Fig. 1 or 2) or the sealed-type cutouts (Fig. 3).

2. Be sure that all parts are dry, clean, and in good mechanical condition. To check the interior, remove the fuse carrier.

3. Mount the cutout on the pole, wall, or apparatus with the carrier end upward so that it hangs vertically; otherwise, siphoning may result. The insulation on the Flamenol* cutout cable leads is not sufficient for continuous full-line voltage to ground and is intended only for protection against momentary or accidental contact. The leads should not be run in conduit or allowed to rest against grounded surfaces without additional insulation being added. When installed out-of-doors and connected to overhead lines, a drip loop should be made and the joint waterproofed with tape and compound so that water will not run down the strands of the cable inside of the insulation. Before mounting 100-, and 200-ampere sealed cutouts, see Step 10, page 6, under the heading "Cable Connections to Oil Cutouts." Individual cutouts of the oil cutout metal-enclosed assemblies, Fig. 26, are mounted as a unit on the junction box at the factory. Specific instructions on metal-enclosed oil cutout assemblies will be found on page 12; gang-operating mechanisms will be found on page 9; and pole-base switching mechanisms will be found in Instructions GEI-88836.

4. Connect the lead-sheath cable to sealed cutout wiping sleeve terminals according to the instructions on pages 5, 6 and 7. Connect the rubber-covered cable (without lead sheath) according to instructions on pages 8 and 9.

5. Fill with 10C oil exactly to the level indicated by the nameplate and pipe plug on the front of the cutout, or to the oil-level mark on the fuse carrier plug. Too much oil may cause siphoning or leakage at the bushings or into entrance terminals. Too little oil can cause improper fuse operation, heating, or even failure of the cutout. The cutout may be filled with oil with the fuse carrier and oil level plug removed, and filling until oil runs out of the oil level hole. It may also be filled through the top with the fuse carrier removed, by the following procedure: Pour in oil until the contacts are barely covered; insert fuse carrier and remove it, noting the height to which the oil has wet the carrier plug in relation to the mark indicating the proper oil level; add oil in small amounts and repeat procedure until the oil wets the fuse carrier exactly to the proper oil-level mark on the fuse carrier plug.

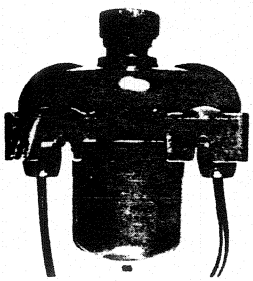

Fig. 1. Vented cutout, 100, 200 and 300 amperes, 5.2 kv; 200 amperes, 7.8 kv and 15 kv

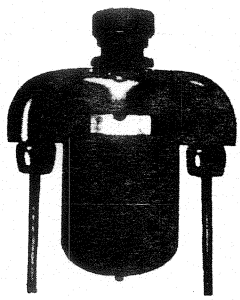

Fig. 2. Metal-enclosed assembly type, 100, 200 and 300 amperes, 5.2 kv; 200 amperes 7.8 kv and 15 kv

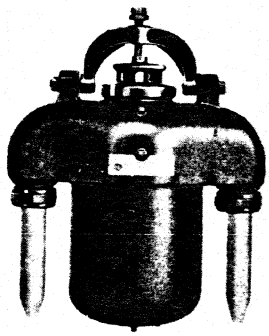

Fig. 3. Sealed cutout, 100 and 200 amperes, 5.2 kv

6. Clamp the ends of the fuse link tightly under the thumb nuts back of the contacts on the fuse carrier.

7. Sealed cutouts require an expansion chamber which is threaded into an outlet provided at the back of the cover. Use the Cat. 9F32FBW008 unit with cutouts rated 5.2 kv except for the 300-ampere size. Use Cat. 9F32FBW040 with 300-ampere cutouts and with cutouts rated 7.8 or 15 kv. Standard pipe fittings may

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be used instead if comprising a minimum air volume of 150 cu. in. and 300 cu. in. respectively, if arranged so the oil will drain back into the cutout, and water will not back up into the cutout.

Make all joints in the venting system airtight. In doing this, do not use red or white lead or any other material that is soluble in oil. G-E Compound D50P53 is recommended for making up all of the threaded joints.

8. To close the circuit, insert the fuse carrier and rotate it clockwise one-quarter turn in one quick motion, in order to bring it up against the stop and thus establish good contact. The pointer on the cap indicates when the fuse carrier is in the ON and OFF positions.

CAUTION: *DO NOT INSERT THE FUSE CARRIER INTO THE CUTOUT IF THE FUSE IS BLOWN OR DAMAGED.*

Before closing the circuit on sealed cutouts, swing the yoke into position and turn the clamping screw down by hand. After rotating the carrier to the ON position so that the carrier is against the stop, tighten the clamping screw enough to seal the joint, tapping down on the cap if necessary. Then set up the locknut.

NOTE: Always open or close the energized cutouts with one complete rapid motion.

9. Maintain the cutout as directed on page 11.

TESTING FOR LEAKAGE IN SEALED CUTOUTS

It is important that all joints in the cutout and expansion system be pressure-tight, especially where

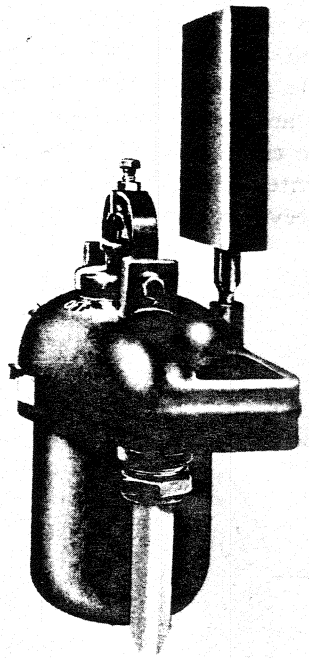


Fig. 4. Sealed cutout with expansion chamber

installations are in manholes that are damp or ... be filled with water. A simple method of testing for leaks is to attach a pump and pressure gage to the ⅜-in. pipe outlet provided at the front of the cover, and raise the pressure to six pounds. If the pressure is not maintained without pumping, the leaks can be located by applying soapy water to the joints.

CABLE CONNECTIONS TO OIL CUTOUTS

FOR LEAD-SHEATH CABLE TO DETACHABLE WIPING SLEEVES

1. Disassemble the terminal, Fig. 5, removing the nut (3), the wiping sleeve (5), gasket (4), insulating sleeve (7), and the plug contact (8), leaving the terminal as shown in Fig. 6. To remove the sleeve (7), pull with a steady twisting motion.

2. Remove cable insulation and lead covering accurately, using the gage (Fig. 7) furnished with the cutout. Compare the ampere rating on the gage with that on the cutout, to be sure they agree and that the correct gage is being used.

With rubber-covered leaded cable, follow carefully the instructions in the "NOTE" following, making certain that the rubber is completely covered.

3. Sweat the plug contact (8), *onto the cable,* Fig. 8, being careful not to damage the cable insulation.

NOTE: At this point, in order to prevent migration of the petrolatum (which is to be applied later), especially with paper-insulated cable, or in order to seal over rubber-covered lead-sheath cable, or varnish-cambric lead-sheath cable, apply two layers of varnish-cambric tape as follows: Apply G-E Material A15B20B (formerly No. 1153) or shellac and then a tightly wrapped layer of varnish-cambric tape on the conductor (10), Fig. 8, the insulation (11), and ½ in. of the lead sheathing (12), so as to cover the end of the insulation and the joints.

Apply another coating of A15B20B or shellac over the first wrapping, and then wrap on another layer of varnish-cambric tape.

4. Cut off enough of the end of wiping sleeve to pass over cable. Pass the wiping sleeve (5) *and its nut* (3) *over the cable* keeping the union nut in the position shown in Fig. 9, since the wipe joint may prevent its being moved to this position later.

5. Push the plug contact (8) into assembly fixture as far as possible, Fig. 10, and turn the union nut up tightly by hand. Be sure to omit gasket (4) Fig. 5. Mark the cable at the end of the wipe sleeve and remove fixture and sleeve. Roll additional tape (10), Fig. 10, on the cable until it fits snugly in the wipe sleeve. This centers the cable and prevents lead from flowing into sleeve. Reassemble as in Fig. 10.

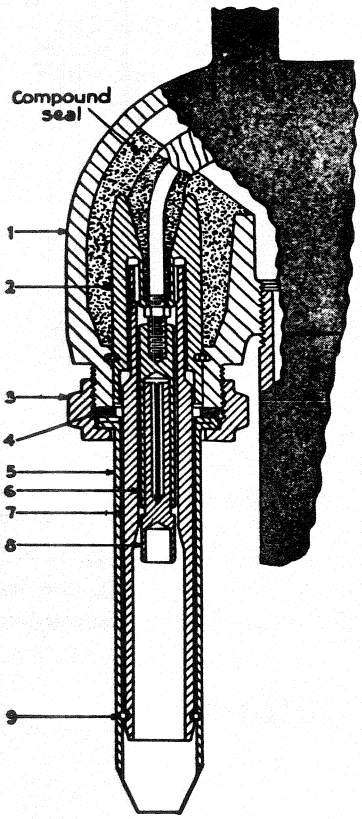


Fig. 5. Assembled view of terminal

If an assembly fixture is not available for this purpose use the cutout being sure to omit gasket.

6. Wipe the joint between cable and sleeve, Fig. 11.

7. Uncouple union.

8. Turn cover upside down.

9. Melt petrolatum. Do not overheat. (The petrolatum furnished with the cutout has a high dielectric strength and a melting point of approximately 135 F.)

10. Fill the molded insulation members in the cover with melted petrolatum, Fig. 12. The petrolatum should be poured up to the inside shoulder of the molded insulation members. Proceed immediately with Steps, 11, 12 and 13 below while petrolatum in cutout is cooling. Allow petrolatum to cool only sufficiently so that the cutout may be righted.

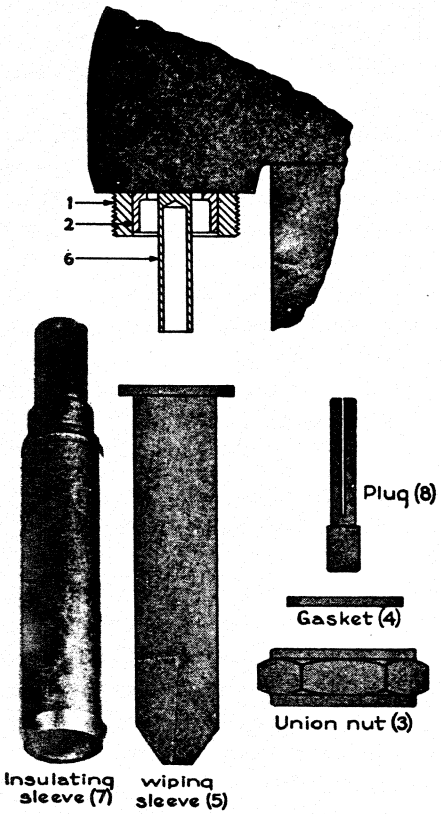


Fig. 6. Disassembled view of terminal

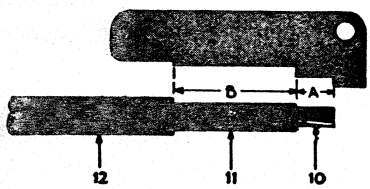
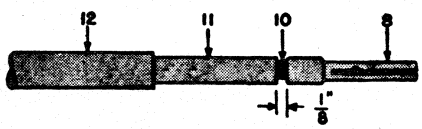


Fig. 7



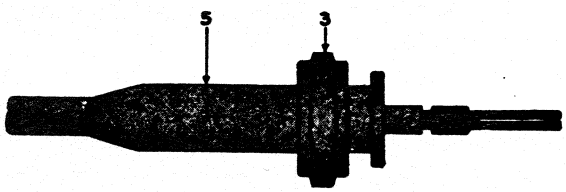


Fig. 9

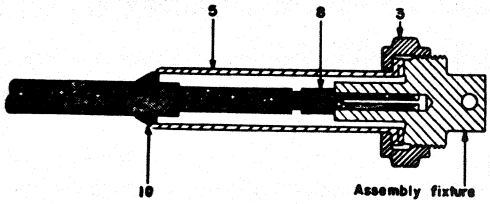


Fig. 10

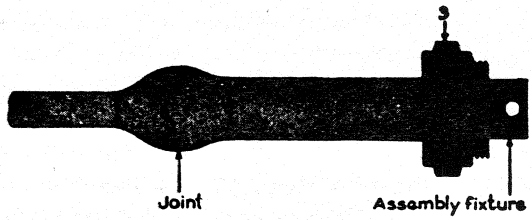


Fig. 11

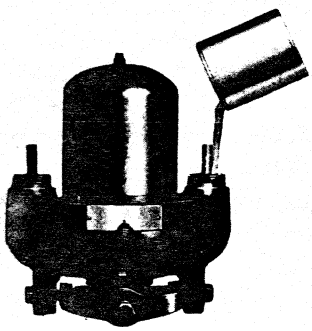


Fig. 12

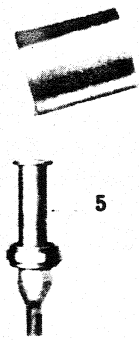


Fig. 13

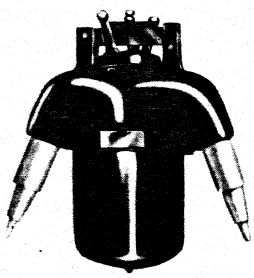


Fig. 14. Sealed cutout, 200 amperes, 7.8 kv; or 300 amperes, 5.2 kv

11. Heat wiping sleeve (5), Fig. 13, to about melting point of petrolatum.

12. Fill wiping sleeve (5), Fig. 13, with melted petrolatum up to base of plug (8), Fig. 5.

13. Push the insulating sleeve (7), Fig. 15, *slowly but promptly, into the wiping sleeve* until the ring (9), Fig. 5, snaps into the groove on the end of insulating sleeve (7). Do this while the petrolatum is warm and with a flat member closing the end of the sleeve (7).

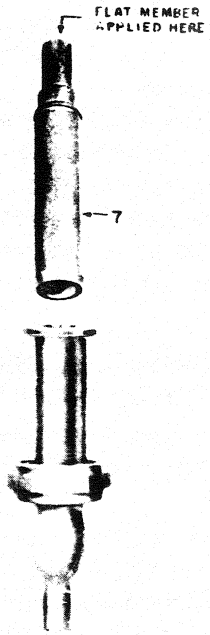


Fig. 15

14. Replace the gasket (4), Fig. 16, *and push the assembled terminal back into position* until the union nut (3) catches onto the threads of the cover (1), allowing the excess petrolatum to squeeze out through the gasket joint. Tighten the union nut (3) sufficiently to seal the joint.

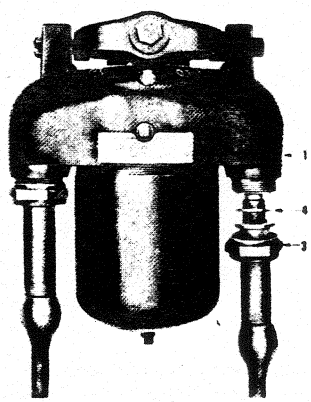


Fig. 16

FOR LEAD-SHEATH CABLE TO NON-DETACHABLE WIPING SLEEVES (See Fig. 14)

When ready, make up the joint with the lead-sheath cable as if two cables were being spliced, using standard splicing material.

Screw the connector on to the threaded stud projecting from the bushing. Crimp the connector to cable with a pressure tool. After the joint has been properly taped, raise the lead sleeve, wipe one end of it to the brass wiping sleeve on the cutout and the other end to the lead sheathing on the cable. Then fill as usual with compound. G-E Joint Compound D5D4A is recommended.

To connect lead-sheath, rubber-insulated cable to cutouts with non-detachable wiping sleeves, fasten cable to the end of the terminal as if two cables were being spliced, using standard splicing materials and procedures. If shielded cable is used, extend shielding over joint and connect to sleeve.

FOR RUBBER-COVERED CABLE, SHIELDED OR NON-SHIELDED

For cutouts with Entrance Terminal for Rubber-covered Cable (ETRC) used with (B), Fig. 17, proceed as follows:

1. Fasten rubber-covered cable to the stud at the end of the terminal (B) as if two cables were being spliced, using standard splicing materials and procedures. If shielded cable is used, extend shielding over joint and connect to sleeve of terminal.

2. Fill the terminal with petrolatum as described under Steps 10 and 12, pages 6 and 7, except that in this case the insulating sleeve (7), Fig. 15, is a unit part of the bushing and so cannot be removed; but the petrolatum should be poured into the center space around the plug connector.

3. Reassemble the terminal in the same manner shown under Step No. 14, page 7.

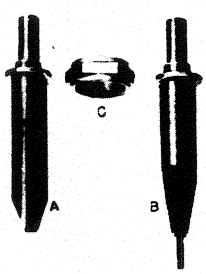


Fig. 17. Standard wiping sleeve for sealed cutout (A), special entrance terminal for rubber-covered cable (B), and union nut (C), usable with either. These terminals are interchangeable.

FOR CUTOUTS WITH FLEXIBLE LEADS

Train cable and cutout leads to final position and cut to proper length. The joint should be at least 12 in. from the cutout bushing to provide sufficient creepage distance over the Flamenol cutout leads. Space cables so that the Flamenol insulated cutout leads are held away from any grounded surfaces: at least 1 in. for 5-kv and 2 in. for 15-kv cutouts. The lead insulation is intended for protection against accidental or momentary contact but should not be regarded as insulation for continuous full-line voltage. When installed out-of-doors and connected to overhead lines, a drip loop should be made and the joint waterproofed with tape and compound so that water will not run down the strands of the cable inside of the insulation jacket.

Bare enough of the conductor to enter the copper connector used, plus about ¾ in. on each side of the connector if a solder-type connector is used. (See Fig. 18.) Attach connector to the cable ends. If solder is used, heat the joint with hot solder until it adheres. Protect the insulation temporarily. When cool, remove burrs or needle points.

Pencil back the cable insulation to 4 times its thickness; bare the insulation for 20 times its thickness by removing jacket, shield, and semi-conducting tape. If shielded cable is used, allow for tying and soldering of the shielding braid. Pencil jacket to 4 times its thickness. Pencil the Flamenol cutout lead approximately 6 times the insulation thickness.

Use dimensions shown in Fig. 18 for Vulkene* composition insulated cable.

CLEAN SURFACES

Remove thoroughly any exposed ends or strands of semi-conducting tape or other tape under the insulation and shielding. Roughen the surface of the Flamenol insulation with sandpaper or a rasp to the taped distance beyond the shoulder of the taper. Clean the surfaces of insulation to be taped with a safety approved volatile solvent making sure that no conducting particles remain.

Apply a thin coat of G-E No. A50P68 rubber cement to the surfaces to be taped and allow to dry until quite tacky. Apply G-E No. 8380 Super Coronol* splicing tape, stretching to ⅔ width and building up to 1½ times the insulation thickness over connector. In addition, for shielded cable, build tape to the recommended lengths and form a stress cone. Cover with one layer of No. 33 Scotch electrical tape, ½ lap.

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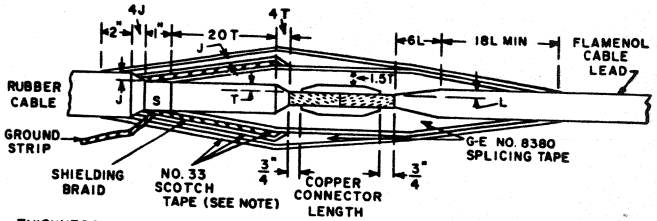


L = THICKNESS OF FLAMENOL INSULATION
T = THICKNESS OF CABLE INSULATION
J = THICKNESS OF JACKET
S = SHIELD OF CABLE

NOTE: IF OUTDOORS, USE SCOTCH NO. 70 SILICONE TAPE FOR OUTER COVERING.
* 35T AND 3T RESPECTIVELY FOR VULKENE COMPOSITION INSULATED CABLE.

Fig. 18. Cable joint

SHIELDED CABLE

When shielded cable is used, apply shielding braid from the shield to the top of the stress cone, $\frac{1}{16}$ in. lap, and terminate with a smooth edge. Solder the ground strip along the braid, extending it out the cable end for ground connection. Cover the braid with one layer of No. 33 Scotch electrical tape. Wrap tightly around the protruding ground strip.

Coat penciled jacket and the shield of the shielded cable with G-E No. A50P68 cement and apply G-E No. 8380 tape, building up to the jacket thickness. Cover the entire joint with two layers of No. 33 Scotch electrical tape, ½ lap, wrapping tightly around the ground strip. Obtain a smooth wrapping but do not stretch tape more than necessary. If outdoors, use Scotch No. 70 silicone tape for outer covering.

GROUNDING

Ground strips from single-conductor cables in three-phase installations may be joined together and connected to a single ground point. If no special provision is made for a ground connection, the installing contractor will usually make such a connection at a convenient point.

If a "T" connection is made to a loop feeder, the shielding may be terminated, as above, at the top of a stress cone on each side of the joint and joined together by external connection of the ground strips. In this case additional spacing must be provided between the stress cones and shielding so that the creepage surface over the joint from the shielding to the tap or to the cutout lead will be adequate for the circuit voltage. An alternative to the above construction would be to build a stress cone on the tap or cutout lead, in which case the shielding may be made continuous over the joint and to the top of the stress cone, and only one ground strip brought out at a suitable point.

FOR LEAD-SHEATH OR RUBBER-INSULATED CABLE TO 15-KV OIL CUTOUTS WITH COMPOUND-FILLED TERMINAL SLEEVES

1. Remove terminal sleeve and gasket (Fig. 33). Cut cable to proper length allowing enough to enter connector. Pass terminal sleeve and gasket over cable. With rubber-insulated cable, a stuffing box is attached to lower end of terminal sleeve. Pass the nut, metal washers, rubber washers, casing and gasket of stuffing box over the cable in the proper order.

2. Screw connector to threaded stud projecting from tapered porcelain bushing. Bare enough of conductor to enter connector and crimp. Remove lead sheath and shielding from 9½ inches of cable, clean all conducting particles from surface of insulation. Pencil end of insulation or step it in accordance with instructions of cable manufacturer or in accordance with procedures given in EEI underground systems reference book. Cover bare metal of connection with one layer of conducting or semi-conducting tape, making connection with semi-conducting tape on conductor. Do not run this tape on insulation.

3. Tape up joint and build a stress cone 2½ inches long. Avoid making air pockets. Run tape over porcelain bushing for ⅔ of its length. Build joint to 2 inches in diameter to leave room for compound filling of sleeve.

4. Raise terminal sleeve, being sure that gasket is in proper position and bolt to cutout. With lead cable, wipe joint to terminal sleeve. With rubber cable, raise stuffing box and connect ground strap from stress cone then bolt to terminal sleeve. Tighten ring nut to clamp rubber washers to cable.

5. Remove vent plug from cutout casting and clear hole by running a small wire into it. Attach stand pipe and funnel to filling hole opposite the smaller diameter of joint. Heat sleeve to prevent premature solidification of compound. Fill sleeve with G-E No. D5D4A or A15B10 compound or their equivalent until compound starts to come out of vent hole. Close vent hole. Keep standpipe warm until sleeve is completely filled and solidified then seal filling hole.

TABLE IV
RECOMMENDED CRIMP TOOLS AND DIES FOR ALUMINUM CABLE CONNECTORS
15 kV Cutouts

Connector Diameter	Manufacturer	Tool	Die	Number of Crimps
5/8"	Anderson	VC-5	.....	3
5/8"	Anderson	VC-6	.....	2
5/8"	Burndy	MD-6	W-BG	2
5/8"	Burndy	MD-6	W-243	2
5/8"	Burndy	Y35 and Y35L	U-BG	2
5/8"	Burndy	Y35 and Y35L	U-243	1
5/8"	Kearney	O	635	3
5/8"	Kearney	H	635	2
5/8"	Kearney	H	5/8	4
5/8"	Somerset (T and B)	UT5	TWTY and TU	3

INSTALLATION OF OIL CUTOUTS WITH RACK AND GANG-OPERATING MECHANISMS

Single and Three Phase

GENERAL—APPLIES TO ALL RACKS

1. All the instructions for the installation of vented and sealed cutouts as given on pages 4 to 9 should be followed when mounting these cutouts on single- and three-phase racks.

2. Mount the rack on the pole or wall, using the bolt holes provided in the angles at the back. Through bolts or transformer hanger irons may be used for pole mounting.

VENTED CUTOUTS ON RACK WITH GANG-OPERATING MECHANISMS

1. Mount the vented cutouts on the rack as shown in Fig. 19.

2. Select the cutout to which the operating arm will be attached later. Sandwich the ON and OFF indicator between this cutout and the rack channel. The operating arm can be placed on any of the cutouts; but the center one, of a three-phase installation, is usually selected unless the peculiarities of a certain location prove the selection of an end cutout more advantageous.

3. Insert the mounting bolt through the slot in the indicator when bolting the selected cutout to the rack channel.

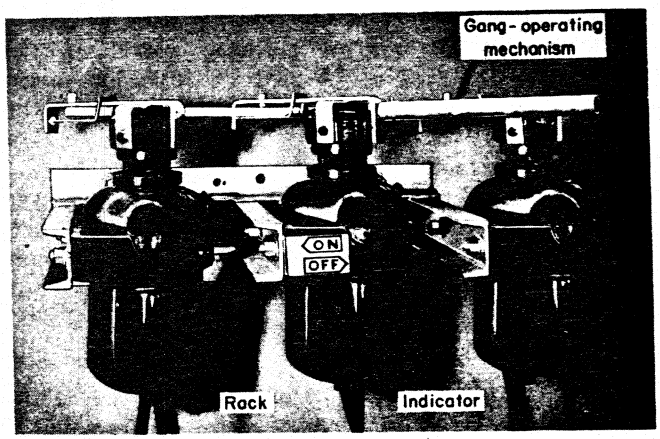


Fig. 19. Rack and gang-operating mechanisms for vented cutouts

4. Push the indicator snugly against the contour of the cutout bracket, Fig. 19.

5. Align the cutouts using a straight edge across the ends of the cutouts.

6. Tighten the mounting bolts.

7. Fasten the lever arms on the caps of the fuse carriers, as shown in Fig. 20. The lever arm, having the protruding rod, is for the operating arm.

8. Insert the fuse carriers in the cutouts, and make any necessary readjustment for proper alignment.

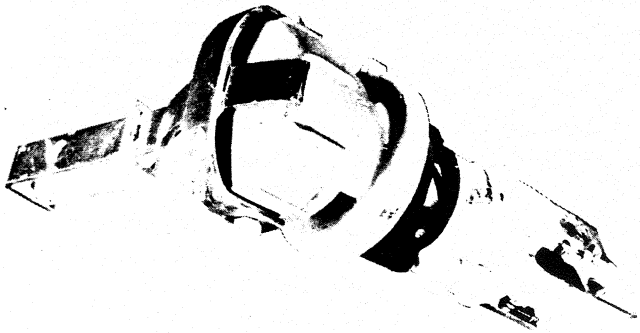


Fig. 20. Lever arm fastened to caps of fuse carriers, vented cutout

The cutouts can be shifted on the rack channels because of the slotted mounting bolt holes in the rack channels. The unrestricted operation obtained by this readjustment should be as follows:

(a) As the fuse carriers are inserted in the cutouts and are, therefore, in the full OFF position, the holes in the lever arms, Fig. 19, should slide freely over the pins on the sliding bar of the mechanism when it is parallel to the rack mounting base.

9. To close all cutouts simultaneously, rotate operating arm clockwise until reaching the stop.

SEALED CUTOUTS ON RACK WITH GANG-OPERATING MECHANISMS

RATED 5.2 KV, 100 AND 200 AMPERES, MOUNTED LONG WAY

1. Mount the sealed cutouts on the rack, with expansion chambers as shown in Fig. 21.

2. Insert the fuse carriers into the cutouts.

3. Insert the lever arms A, Fig. 22, into the tapered openings in the top of the caps B of the fuse carriers. The wedge-shaped end of the lever arm should be pushed until it is wedged into the tapered opening.

4. Fasten the lever arms in this position by adjusting the slideable locking strips C, Fig. 22, and tightening the individual cap screws D.

5. Swing yokes into upright position and tighten the clamping screws by hand while the fuse carriers are still in the full OFF position.

6. To close all cutouts simultaneously:

(a) Grasp the hand grip on the operating bar and push, quickly and firmly, to the left until reaching the stop.

(b) Check the indicator on each cutout to determine that all cutouts are in the ON position.

7. Tighten clamping screw to seal gasket.

MOUNTED SHORT WAY

Mount cutouts with expansion chamber on rack as for vented cutouts. Then, follow same instructions above as for sealed cutouts.

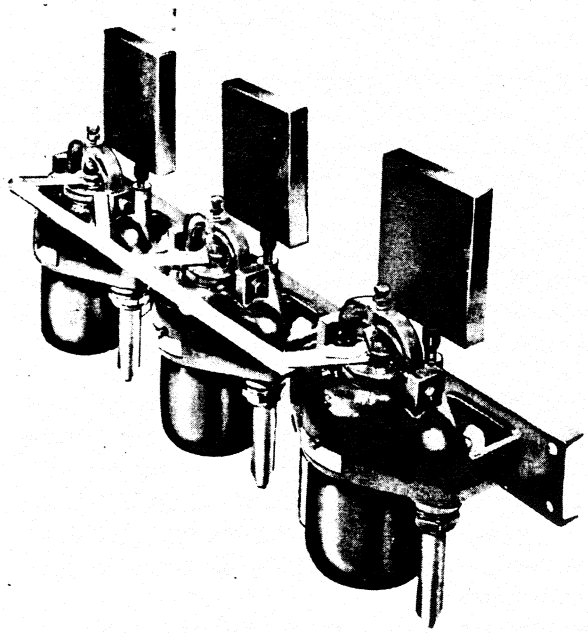
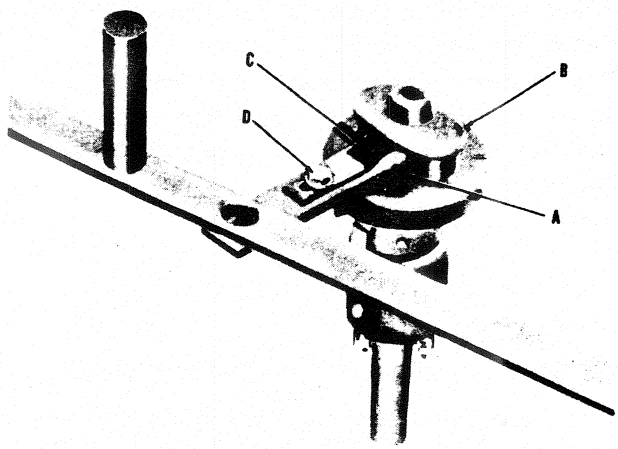


Fig. 21



A—Lever arm
B—Cap
C—Locking strip
D—Cap Screw

Fig. 22

RATED 5.2 KV, 300 AMPERES, 7.8 KV, AND 15 KV, MOUNTED SHORT WAY

1. Mount the cutouts and expansion chambers on the rack as shown in Fig. 23. It is necessary to temporarily remove the fuse carrier to assemble the expansion chamber.

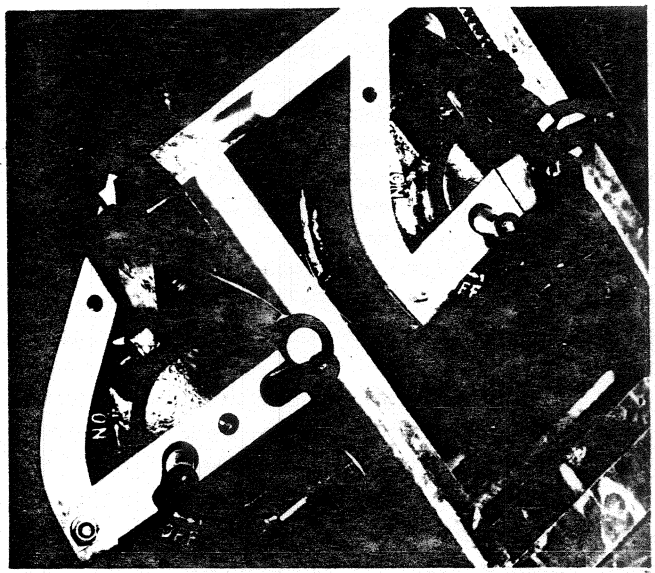


Fig. 23

2. Replace carriers in the OFF position.

3. Slide the lever arms over the horns on the fuse carriers, Fig. 23.

4. Swing yokes in position over fuse carriers. Make clamping screws finger tight.

5. Assemble extension arms and drive bar.

6. Pull operating handle to the left to stop and check to determine that all cutouts are in the ON position.

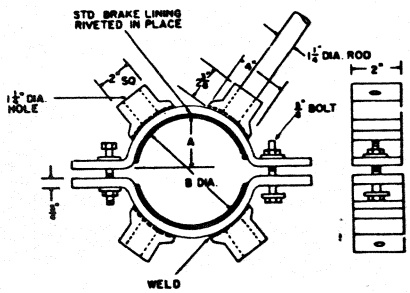
7. Tighten clamping screw to seal gaskets.

MAINTENANCE

GENERAL—APPLIES TO ALL OIL CUTOUTS

Inspect the cutout and check the condition of the oil periodically. Maintain the correct level, checking by means of the pipe-plug oil gage at the front of the cover. Failure of operation may occur if the oil level gets too low. When the oil becomes dark in color from frequent blowing of the fuse links or switching of loads, it should be replaced with new oil, after carefully flushing out the cutout with clean oil. No more than fifty blown fuse link tubes should be permitted to accumulate in the bottom of the cutout tank. The contacts should be kept in good operating condition.

If necessary to remove the threaded tank, attach (as close as possible to the bottom to prevent distortion), either a special wrench of the type shown in Fig. 24 or a standard chain pipe wrench. Use a steady pressure when applying it. If this does not loosen the tank, heat the joint with a torch and then rap with a hammer while applying pressure.



CUTOUT	A	B
100-amp	2¾ in.	6¼ in.
200-amp	3¾ in.	8¼ in.
300-amp	4¾ in.	10¼ in.

Fig. 24. Special wrench for removal and replacement of threaded tank in cutout

To replace the tanks, thoroughly clean both cover and tank threads, apply G-E Compound D50P53 sparingly to the first two or three cover threads and to all tank threads, attach the wrench and make the joint air- and oil-tight.

Damaged or worn gaskets in the caps of the fuse carriers should be replaced after thoroughly cleaning the groove. On vented cutouts, fasten the cork gaskets in place with G-E Material A15B8B1. On sealed cutouts, Fig. 3, fasten the copper-clad gaskets with G-E Compound D50P53 and immediately clamp down on the gasket to insure proper seating. Where Nitrile rubber gaskets are used in place of the copper-clad asbestos gaskets, a coating of Dow Corning High Vacuum Silicone Grease, or its equivalent, should be applied either to each gasket or to the metal surfaces in contact with each gasket.

On vented and metal-enclosed assembly-type cutouts, Fig. 1 and 2, the presence of damaged or worn gaskets in the caps of the fuse carrier is determined by the carrier's turning too freely.

INSTALLATION OF METAL-ENCLOSED OIL CUTOUT ASSEMBLIES

GENERAL

Remove the cover of the terminal housing of the assembly (Fig. 26) and follow the general instructions for installation on pages 4 to 9, inc. Knockouts are provided for mounting the assembly on the wall unless the specifications indicate otherwise. After the assembly is mounted and all connections made as described below, replace the cover of the terminal housing. Tighten the bolts evenly so that they clamp down tightly on the gasket to provide the dust- and weather-tight joint furnished with the equipment.

CONNECTING CONDUIT TO METAL-ENCLOSED ASSEMBLIES

1. Select the knockout located on the bottom or sides through which the rigid conduit is to be inserted.
2. Remove the knockout by striking it several sharp blows with a ball hammer at a point opposite the metal bridge, which attaches the knockout to the wall of the terminal housing.
3. Insert the proper size of conduit, with one conduit locknut already turned up on the end of the conduit into the knockout opening.

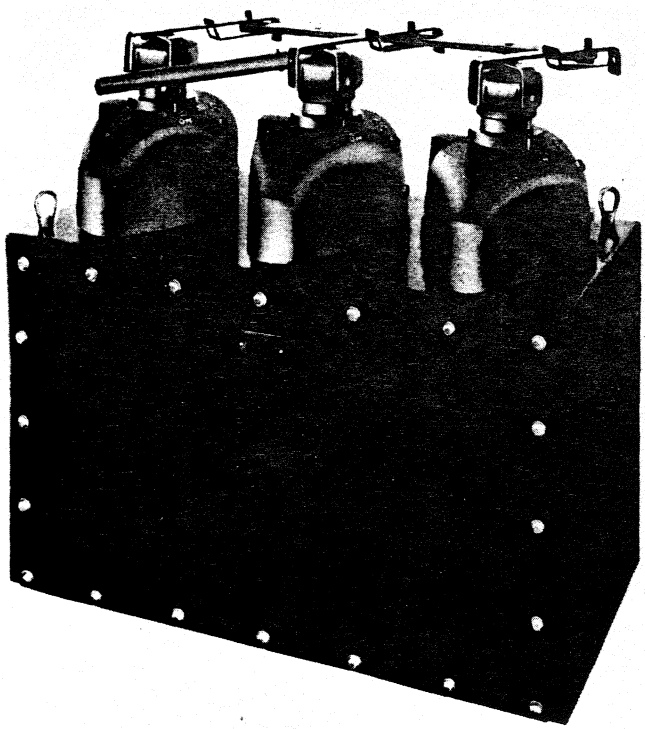


Fig. 26. Metal-enclosed oil cutout assembly, with vented cutouts

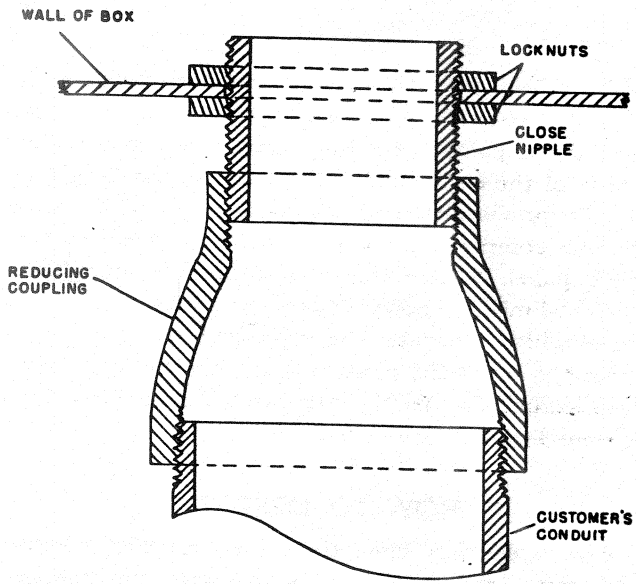


Fig. 27. Section of reducing coupling

4. Turn a second conduit locknut or a conduit bushing on this same end of the conduit and tighten.
5. Use a reducing coupling to adapt the knockout opening to the next larger size of conduit, Fig. 27.
6. Use a female conduit reducer to adapt the knockout opening to the next smaller size of conduit, Fig. 28.

CONNECTING POTHEADS TO METAL-ENCLOSED ASSEMBLIES

1. Mount and connect the pothead according to the specific instructions sent with the pothead.

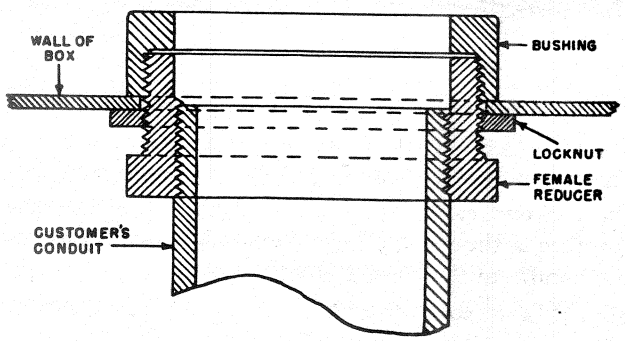


Fig. 28. Section of female conduit reducer

INSTALLATION AND OPERATION OF FUSED OIL INTERRUPTER SWITCH

GENERAL

This device consists of oil cutouts in series with EJO-1 current-limiting power fuses mounted in separated compartments. For connections and maintenance of the oil cutouts, follow the instructions given on the previous pages. Normally, access to the incoming compartment will be through the removable back panel. Where this is not possible, the EJO-1 current-limiting power fuses and their mounting panel which separates the compartments may be removed to make the incoming line connections. Make load connection to the terminals furnished on the current-limiting power fuses.

HOW TO OPERATE

Always open or close the oil cutout with positive and rapid movement. A spring-assist mechanism is furnished to aid in this movement. To remove fuse carriers for oil filling and re-fusing, loosen the spring-tightening lever and allow it to swing forward, see Fig. 29. Fill cutouts to exact level with 10-C oil. DO NOT OVERFILL. See instructions on page 4.

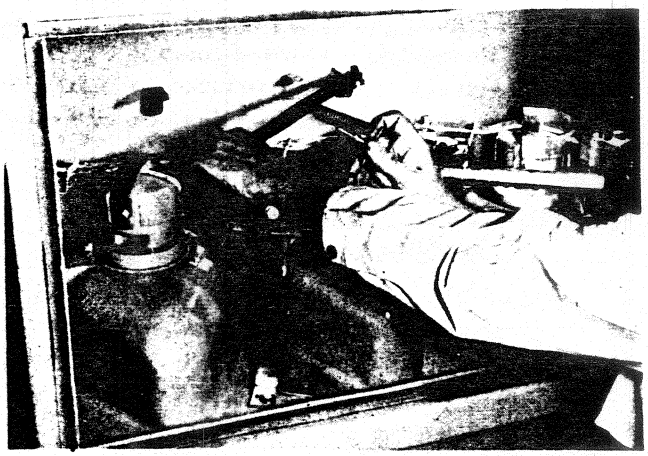


Fig. 29.

When closing the cutouts, see Fig. 30, do not reopen immediately if short-circuit conditions are suspected. This delay will give the fuses time to blow if a short circuit exists. To avoid an involuntary opening reaction, a time-delay latch is provided which latches the handle in the closed position until released manually. Make sure this latch is operating properly when completing installation.

The oil cutout operating mechanism and the door to the EJO-1 current-limiting power fuse compartment are provided with key interlocks, see Fig. 31 and 32, to prevent access to the current-limiting power fuse compartment unless the coil cutouts are locked in the "off" position. Make sure that these interlocks are working properly and make any necessary adjustments.

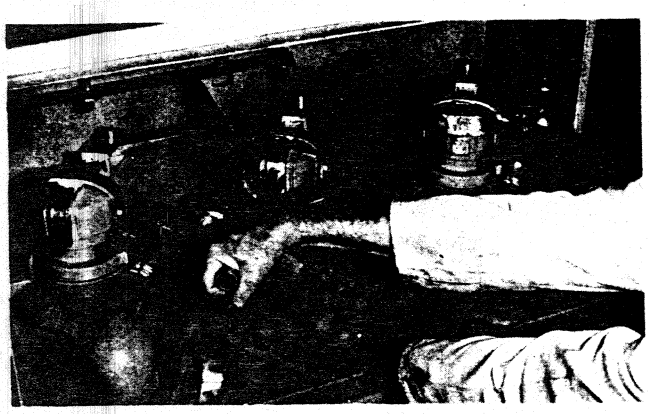


Fig. 30.

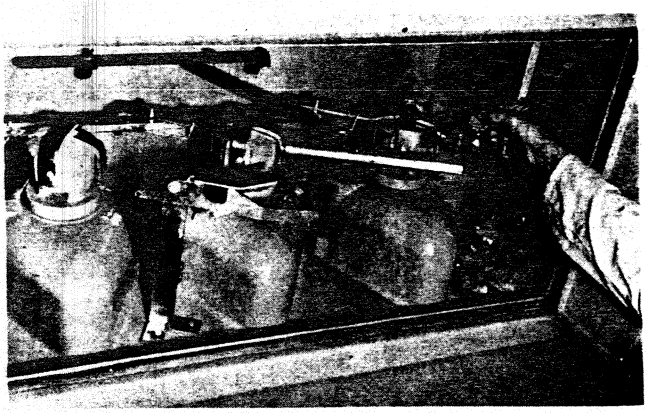


Fig. 31.

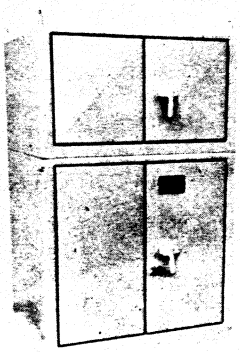


Fig. 32.

HISTORY OF OIL CUTOUTS
Including D & W Type

Cat. No. Series	Type	Form	Service	Years Built	For Nomenclature Use Fig.
			CUTOUTS		
.....	D	.....	Pole and Subway	1916–	Uneconomical to Repair
230000	D	B	Pole	*....–1920	Uneconomical to Repair
230000	D	A	Subway	*....–1920	Uneconomical to Repair
230000	D	C	Pole	1921–1926	Uneconomical to Repair
246100	D	B	Subway	1921–1926	Uneconomical to Repair
230000	D	E	Pole	1926–1927	Uneconomical to Repair
246100	D	E	Subway	1926–1927	Uneconomical to Repair
1X386	D	EP	Pothead	1926–1927	Uneconomical to Repair
295300	D	F	Pole	1926–1927	Uneconomical to Repair
			Subway	1926–1927	Uneconomical to Repair
4X100	D	E	Pole—Note 1	1927–1930	Uneconomical to Repair
			Subway—Note 1	1927–1930	Uneconomical to Repair
5X400	D	EP	Pothead—Note 1	1927–1930	Uneconomical to Repair
4X200	D	F	Pole—Note 2	1927–1930	Uneconomical to Repair
			Subway—Note 2	1927–1930	Uneconomical to Repair
Model No. 9F2A1	50 Amp	.....	Pole—Note 2	1930–1944	Uneconomical to Repair
9F2A6	50 Amp	.....	Subway—Note 2	1930–1936	Uneconomical to Repair
9F2A	100–200–300 Amp	.....	Pole—Note 2	1930–1944	34
			Subway—Note 2	1930–1936	35
9F2C	.....	.....	Subway—Note 3	1936–1944	35
9F2D	.....	.....	Pothead—Note 4	1944–1945	34●
			Pole—Note 4	1944–1945	34
			Subway—Note 4	1944–1945	35
9F2E	.....	.....	Pothead—Note 4	1945–1948	34●
			Pole—Note 4	1945–1948	34
			Subway—Notes 4, 5	1945–1948	35
9F2F	.....	.....	Pothead—Note 6	1948–1960	34●
			Pole—Note 6	1948–....	34
			Subway—Note 6	1948–....	35
9F2L	Flange	.....	Nonsubmersible	1941–1945	34#
			Submersible	1941–1945	35#
9F32	.....	.....	New Numbering System for 9F2F Note 7	1960–....	.....
			Note 8	1968–....	
			METAL-ENCLOSED ASSEMBLIES		
9F2J	Metal-enclosed assembly	.....	Dust- and Weather-tight	1942–1951	34
9F2K	Metal-enclosed assembly	.....	Dust- and Weather-tight with knockouts	1951–1960	34
9F31	Metal-enclosed assembly	.....	New Numbering System for 9F2K	1960–....	.....

* Cutouts built in Providence at earlier dates.
\# Similar to these cutouts, except for leads and bushings.
● See Fig. 35 for Renewal Parts for wiping sleeve and Fig. 34 for all other Renewal Parts.

HISTORICAL NOTES ON IMPROVEMENTS

1. First type with high dielectric strength required by modern systems.
2. Has straight-faced self-aligning contacts for switching under load. Cat. No. 4X200-series experimental design—only very few manufactured.
3. Vertical entrance terminals as shown on Fig. 3.
4. Fuse carriers notched for universal fuse links, 9F18B-series.
5. Has stronger insulating base and improved contacts for switching under load. (Flange-type cutouts included in this series.) Fuse carriers from 9F2A, 9F2C, and 9F2D cutouts are not readily interchangeable in these cutouts.
6. Same as 4 except fuse carriers from 9F2A, 9F2D, 9F2E, and 9F2L cutouts are interchangeable in these cutouts.
7. Molded leads introduced on some 5-kv cutouts.
8. Epoxy-coated tanks and molded carriers.

RENEWAL PARTS

To properly select the correct renewal parts required to replace damaged or worn parts of an oil cutout, the following steps should be taken.

1. Inspect the nameplate of the oil cutout and determine its *voltage* and *current rating*.
2. Determine the type of oil cutout (sealed or vented).
3. From the following table and Figs. 33–36, select the renewal part model number.

To replace bushings and leads requires special factory process. In case of bushing or lead damage please refer to the factory.

RENEWAL PARTS
Sealed and Vented
5.2 kV

Part	Part Number
Carrier Complete (Including gasket)	
100 amp sealed	9F32FLW017
100 amp vented	9F32FLW014
200 amp sealed	9F32FLW023
200 amp vented	9F32FLW020
300 amp sealed	9F32FLW030
300 amp vented	9F32FLW026
Carrier Gasket	
100 amp sealed	9F32FLW065
100 amp vented	9F32FLW042
200 amp sealed	9F32FLW092
200 amp vented	9F32FLW069
300 amp sealed	9F32GLW127
300 amp vented	9F32GLW096
Wipe Sleeves (Complete with lead plug and sleeve contact)	
100 amp	9F32FLW053
200 amp	9F32FLW080
Entrance Terminal—Rubber Cable	
100 amp	9F32FLW038
200 amp	9F32FLW039
Petrolatum (For two ETRC's or wipe sleeves)	
100 amp	9F32FLW067
200 amp	9F32FLW094
Union Nut	
100 amp	9F32FLW059
200 amp	9F32FLW086
Union Gasket	
100 amp	9F32FLW060
200 amp	9F32FLW087
Stationary Contacts, Springs, and Plates for Base	
100 amp	9F32FLW047
200 amp	9F32FLW074
300 amp	9F32FLW101
‡Tank, Drain Plug and Sealing Compound (Liner not required)	
100 amp	9F32FLW044
200 amp	9F32FLW071
300 amp	9F32GLW097
Expansion Chamber	
100 and 200 amp	9F32FBW008
300 amp	9F32FBW040

‡ Tank coated with epoxy—replaces side liners.

RENEWAL PARTS
Sealed and Vented
15 kV, 100 and 200 amp

Part	Part Number
Carrier Complete (Includes gasket and contact springs)	
100 amp sealed	9F32FLW166
100 amp vented	9F32FLW162
200 amp sealed	9F32GLW123
200 amp vented	9F32GLW105
Carrier Gasket	
Sealed	9F32GLW127
Vented	9F32GLW096
Carrier Contact Spring	
100 amp	9F32FLW167
200 amp	9F32GLW157
Stuffing Box (Includes gasket, plugs and hardware)	9F32GLW155
Wipe Sleeve (Includes gasket, plugs and hardware)	9F32GLW154
Compound (For 2 stuffing boxes or wipe sleeves)	9F32GLW130
Arc Cells Complete (9F32G..... cutouts only)	9F32GLW115
Stationary Contacts, Springs, Nuts and Plates for Base	
100 amp	9F32FLW101
200 amp	9F32GLW144
‡Tank with Drain Plug and Sealing Compound	9F32GLW097
Expansion Chamber	9F32FBW040
Connectors for Copper Cable	
Package of 2 connectors	
No. 4 Cable	9F32GLW131
No. 2 Cable	9F32GLW132
No. 2/0 Cable	9F32GLW133
No. 4/0 Cable	9F32GLW134
No. 6 Cable	9F32GLW136
No. 1 Cable	9F32GLW164
No. 1/0 Cable	9F32GLW165
No. 3/0 Cable	9F32GLW166
250 MCM Cable	9F32GLW167
350 MCM Cable	9F32GLW168
Connectors for Aluminum Cable*	
Package of 2 connectors	
No. 6 Str. or No. 4 Sol.	9F32GLW158
No. 4 Str. or No. 2 Sol.	9F32GLW159
No. 2 Str. or No. 1 Sol.	9F32GLW160
No. 1 Str. or No. 1/0 Sol.	9F32GLW161
No. 1/0 Str. or No. 2/0 Sol.	9F32GLW162
No. 2/0 Str.	9F32GLW163

* See Table IV for recommended crimp tools and dies.

RENEWAL PARTS
Sealed and Vented
7.8 kV, 100 and 200 amp

Part	Part Number
Carrier Complete (Includes gasket and contact springs)	
Sealed	9F32FLW166
Vented	9F32FLW162
Carrier Gasket	
Sealed	9F32GLW127
Vented	9F32GLW096
Carrier Contact Spring	9F32FLW167
Stationary Contacts, Springs, Nuts and Plates for Base	9F32FLW101
Expansion Chamber	9F32FBW040
‡Tank with drain plug and sealing compound	9F32GLW097

‡ Tank coated with epoxy—replaces side liners.

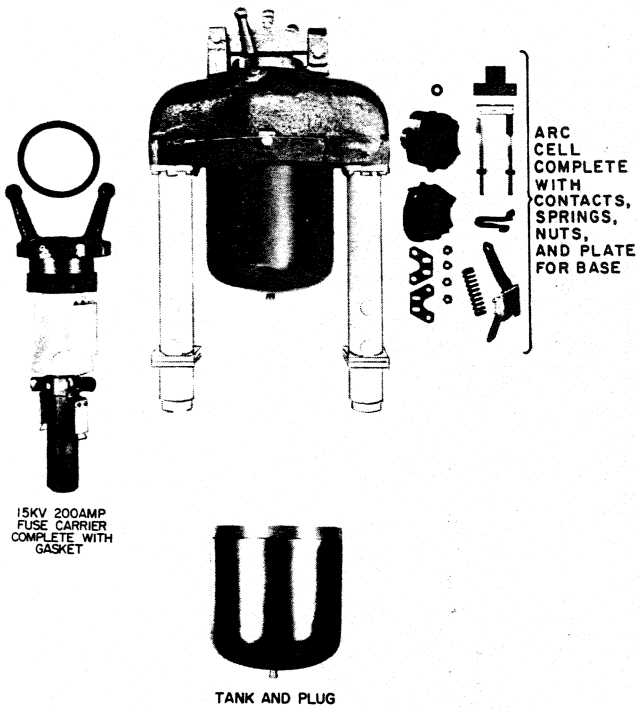


Fig. 33. Sealed cutouts, 15 kv

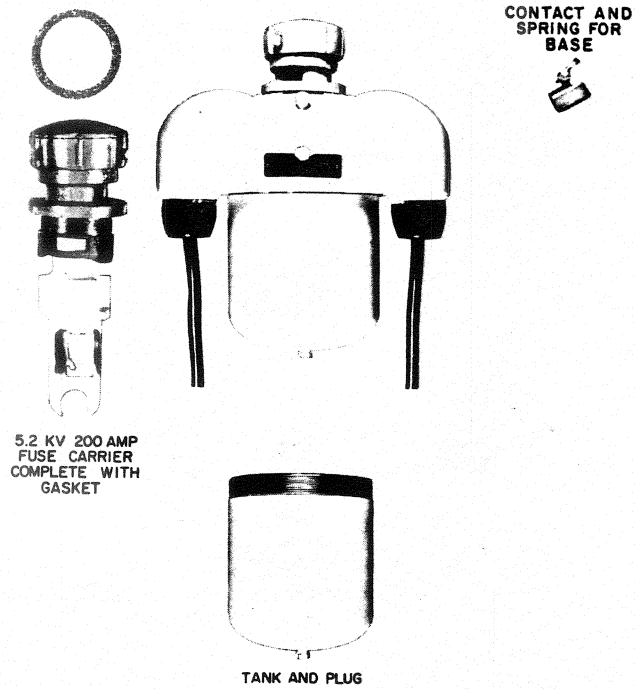


Fig. 34. Vented cutouts, 5.2 and 7.8 kv

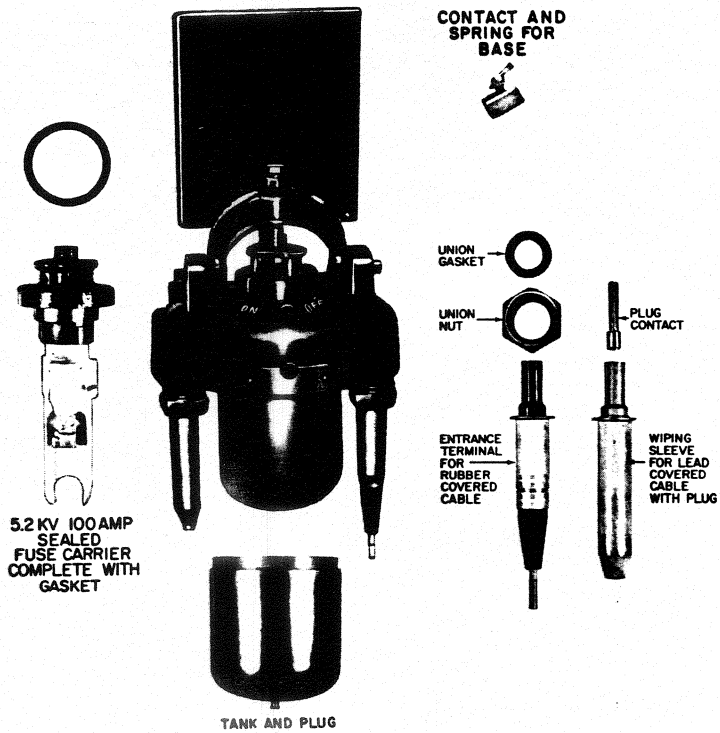


Fig. 35. Sealed cutouts

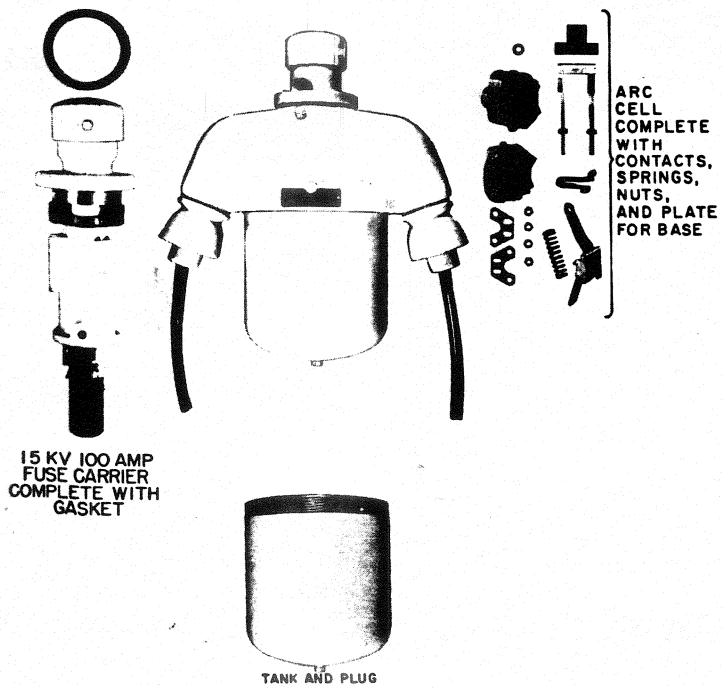


Fig. 36. Vented cutouts, 15 kv

NOTES

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