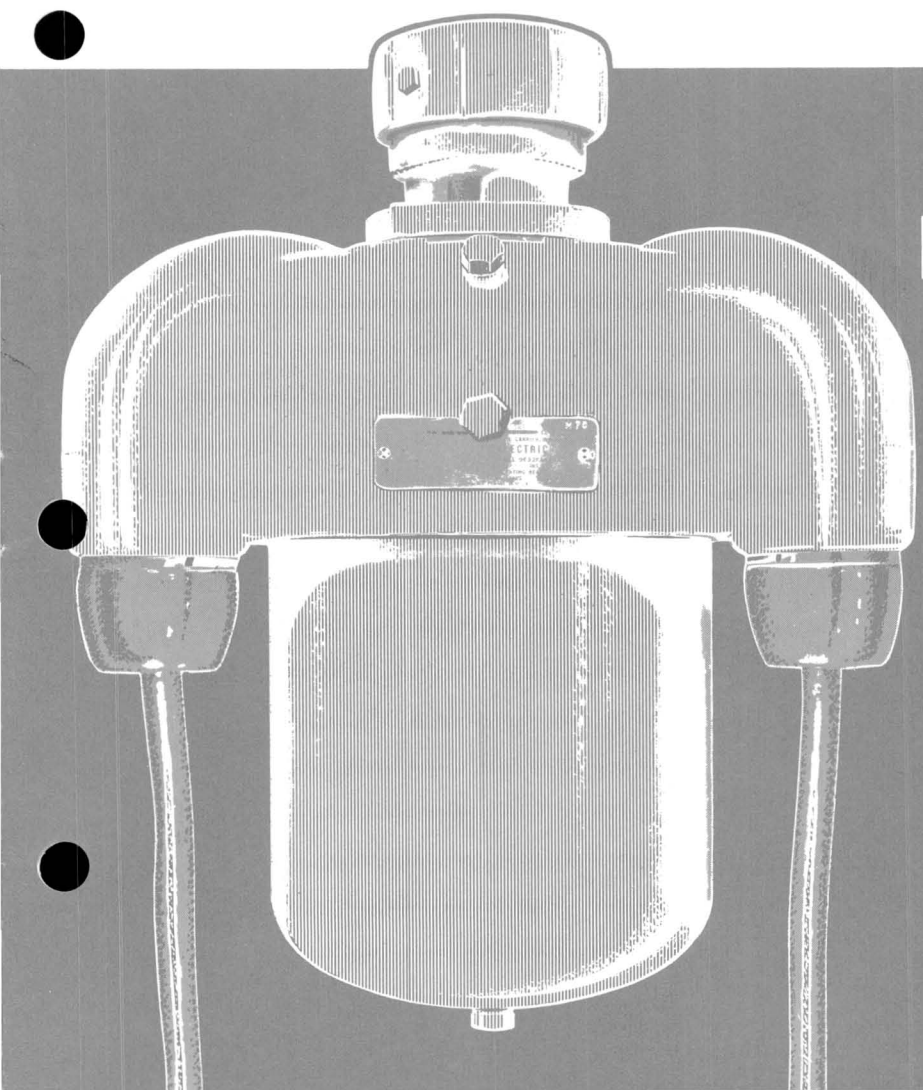
GEA 7191C
HB REF 5850

Vented & Sealed
OIL CUTOUTS



for overcurrent protection with high switching capability

METAL-ENCLOSED ASSEMBLIES

RACK AND GANG MECHANISMS

Reliable overcurrent protection and load-break

VERSATILE APPLICATION

General Electric oil cutouts provide positive, yet economical, overcurrent protection and load-break operation on distribution systems.

These versatile cutouts can be installed . . .

1. In buildings — such as schools, hospitals and office buildings;
2. In manholes or subway vaults;
3. On poles in stadiums or other recreational areas;
4. On unit substations or load centers;
5. In industrial areas for centralized load break or switching of single- or three-phase load (such as motors) and in hazardous areas such as oil refineries.

FIGURE 1
Three-phase oil cutout metal enclosed assemblies affording centralized switching and overcurrent protection at service entrance.

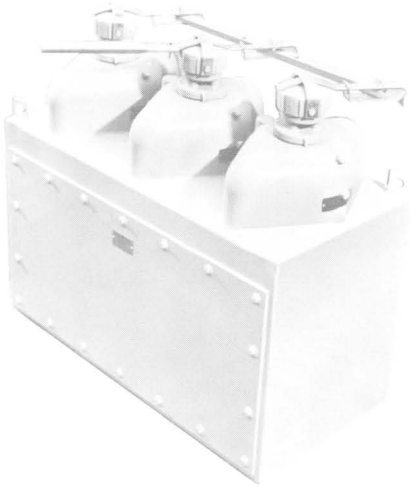


FIGURE 2
Free-standing three-phase metal enclosed assembly which provides for loop or multiple feed of incoming and/or outgoing cables available in all ratings.

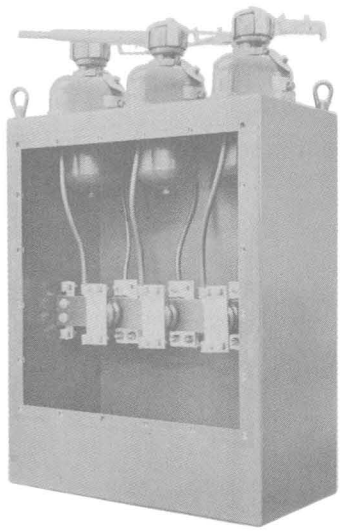


FIGURE 3
Vented cutouts with flexible leads.

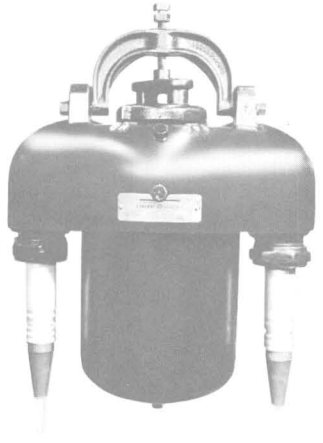


FIGURE 4
Sealed cutout with entrance terminations for shielded rubber covered cable (5.2 kv, 100 and 200 amp).

Two basic designs

1. *Vented cutouts* (Fig. 3) are used in all areas not requiring watertight or explosion-proof equipment. Vented cutouts are not only more economical than sealed cutouts, but they *can be used on the majority of applications.* Gases generated as a result of load break or fault clearing are vented through the screen-filled tubes and baffles in the fuse-carrier hood (see Fig. 6). This prevents any external flame when relieving the internal pressure of arc interruption.

2. *Sealed cutouts* (Figs. 4-5) are used for applications where complete submersion in water is necessary or possible — such as in vaults or subways. Sealed units are also used for hazardous areas requiring explosion-proof equipment. An expansion chamber accommodates the gas created during load-break operation or fault clearing.

FEATURES

1. *No arc flame* — Gases from load-break or fault-current interrupting arcs are vented through screens in the fuse-carrier hood. In the sealed design, gases expand within expansion chamber.

2. *No exposed live parts* — Since all live parts are totally enclosed in a metal housing, there is virtually no danger of personnel being electrically shocked by these parts.

3. *Long-life contacts* — Silver-plated, spring-loaded contacts are self-wiping; and arcing tips provide years of trouble-free load-break performance.

4. *Interruption capacities* for normal applications are listed on Page 8.

5. *Load break* at currents up to 900 amps is easily and reliably performed.

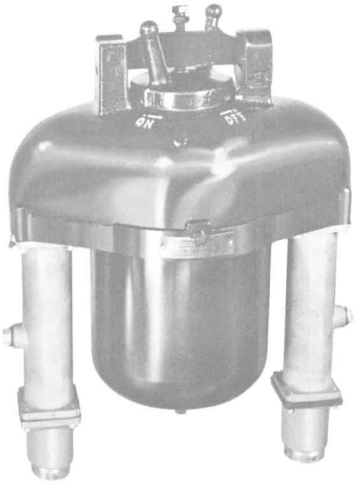


FIGURE 5
Sealed cutout rated 15 kv, 200 amp.

Cable terminations for GE oil cutouts

Figure 3 illustrates the porcelain bushing and flexible cable termination which is adaptable to connection to overhead lines or to enclosed wiring as in metal-enclosed assemblies.

Shielding of rubber cable may be terminated in a stress cone and connected separately to ground.

Figure 4 illustrates the entrance termination for shielded rubber covered cable (ETRC).

ETRC'S and wiping sleeves for lead-sheathed insulated cable are interchangeable for each current rating and are available on vented or sealed cutouts rated 5.2 kv, 100 or 200 amp.

This type of termination permits quick, easy disconnection of the cutout for cable testing or repair without unnecessarily cutting the cable. It also permits a quick means of cutout changeout.

Figure 5 shows a detachable, stuffing box type termination for connection to shielded rubber covered cable.

Construction features

FIGURE 6 — Sectional drawing of vented oil cutout — 5.2 kv, 100, 200 and 300 amp and 7.8 kv, 200 amp.

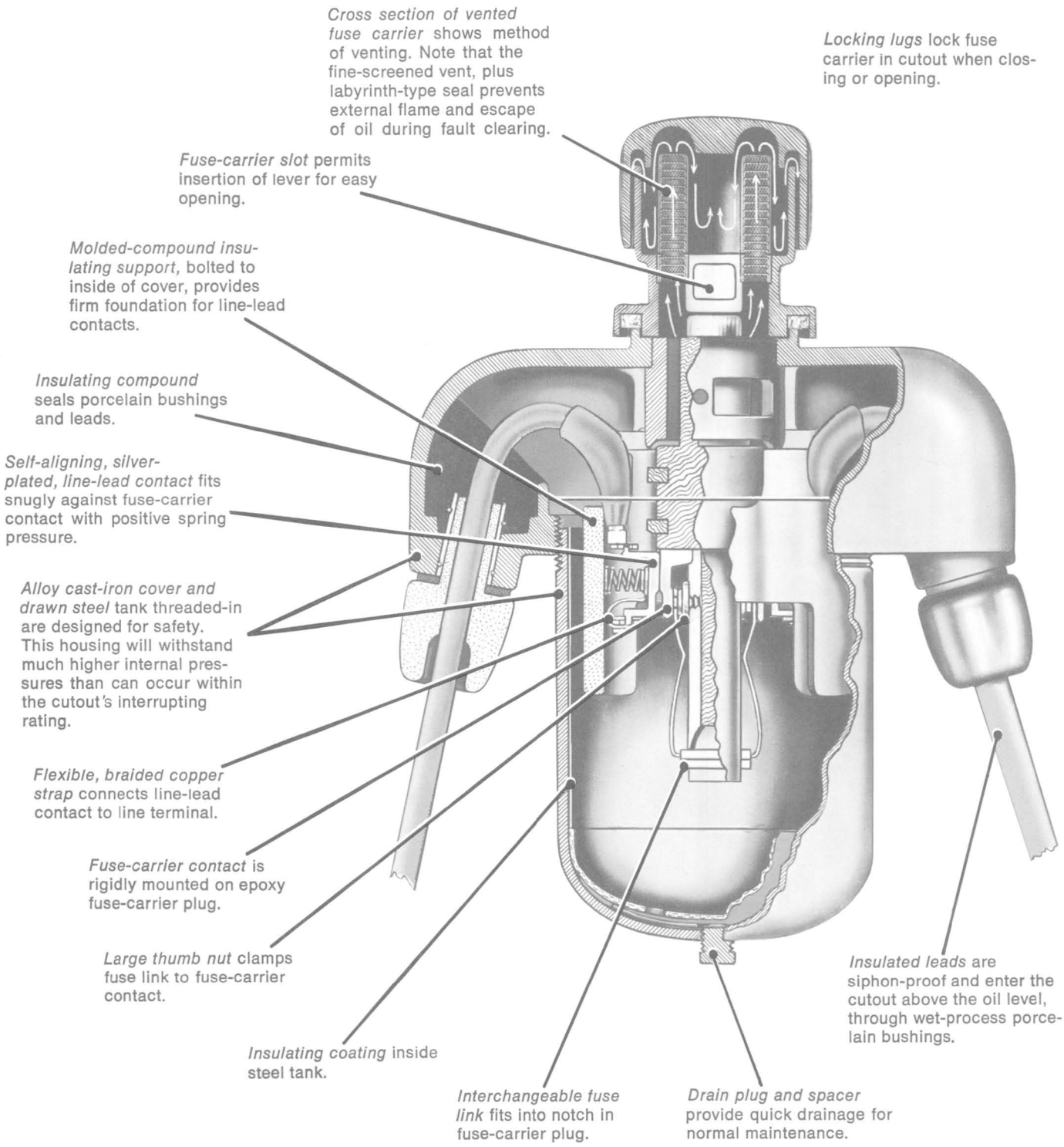


FIGURE 7 — Sectional drawing of sealed oil cutout — 5.2 kv, 100, 200, 300 amp; 7.8 kv, 200 amp.

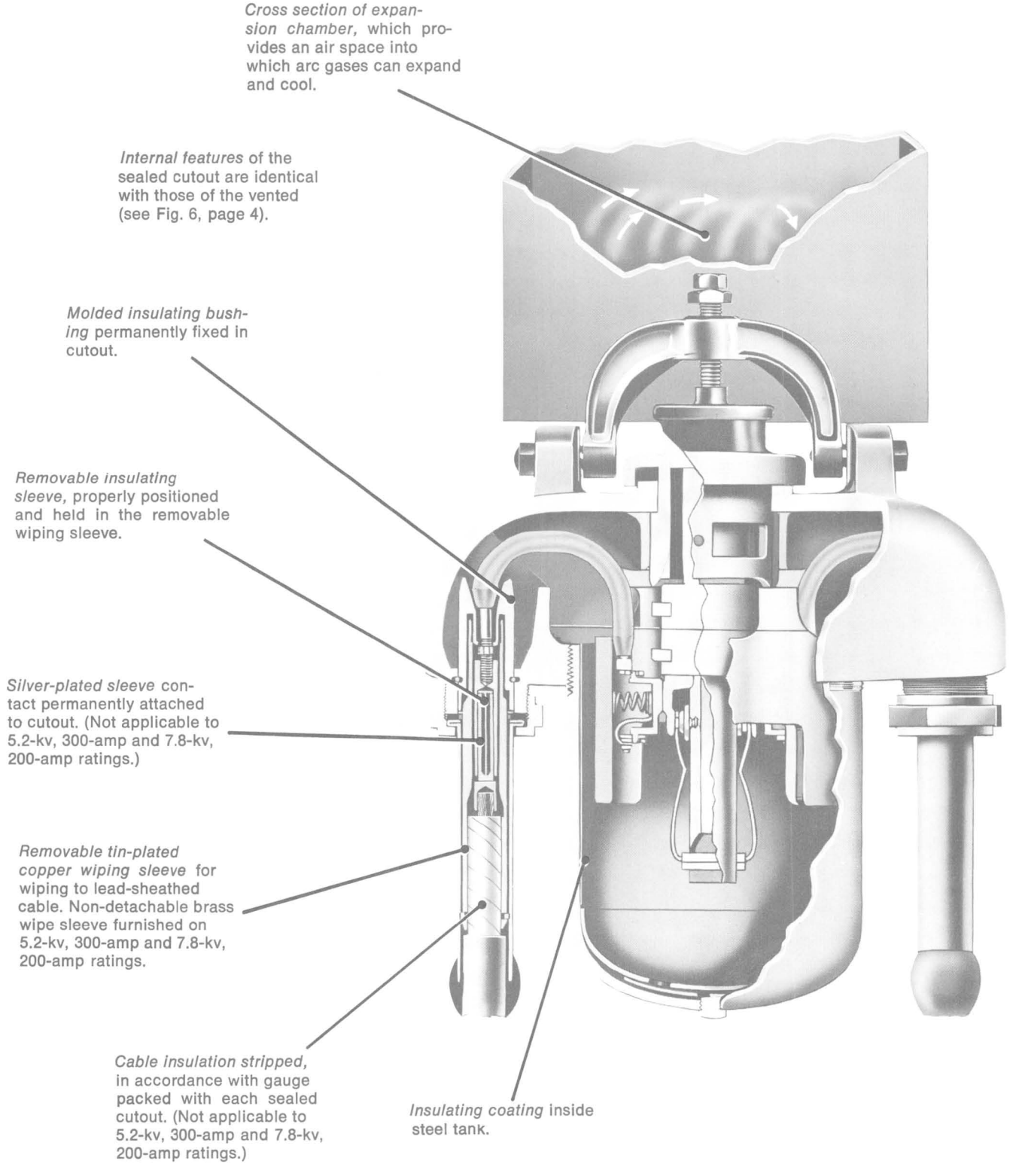
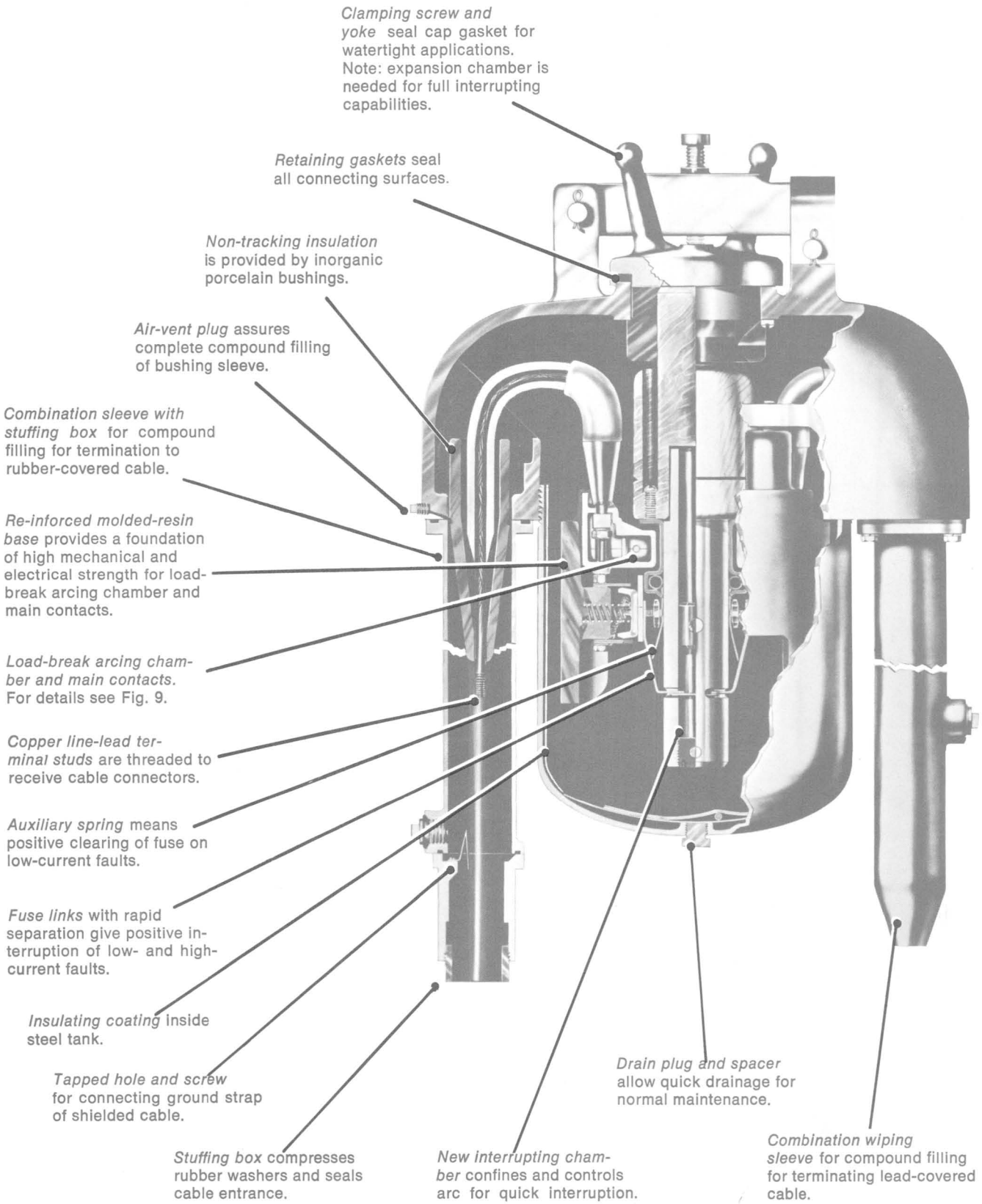


FIGURE 8 — Sectional drawing of sealed oil cutout — 15 kv, 200 amp.



Operation of 15kV cutouts

By using the time-proven "oil blast" principle in 15-kv cutouts, complete safety for the operator and long life of the cutout are assured.

The 15-kv cutout has a five-shot switching ability of 900 amperes at 0.8 power factor.

This means the unit can be switched when low-current, short-time faults occur, and the cutout fuse has not blown.

Long life of the cutout is assured because the two sets of contacts (main and load-break) are set in parallel and the main contacts part about 30 degrees before the load-break contacts break. This delay prevents arcing or pitting from occurring on the main contacts.

When the load-break contacts attain the position shown in Fig. 9, the auxiliary contacts part, causing an arc to be drawn. This confined arc generates gas pressure in the arc chamber. The pressure built up in the arc chamber forces oil through the orifice, when the main load-break contacts part, quenching the arc.

This cutout allows for emergency opening of overload currents several times greater than the normal load-break ratings. This is possible because the higher the current, the greater the force available in the oil blast and the more efficient the current interruption.

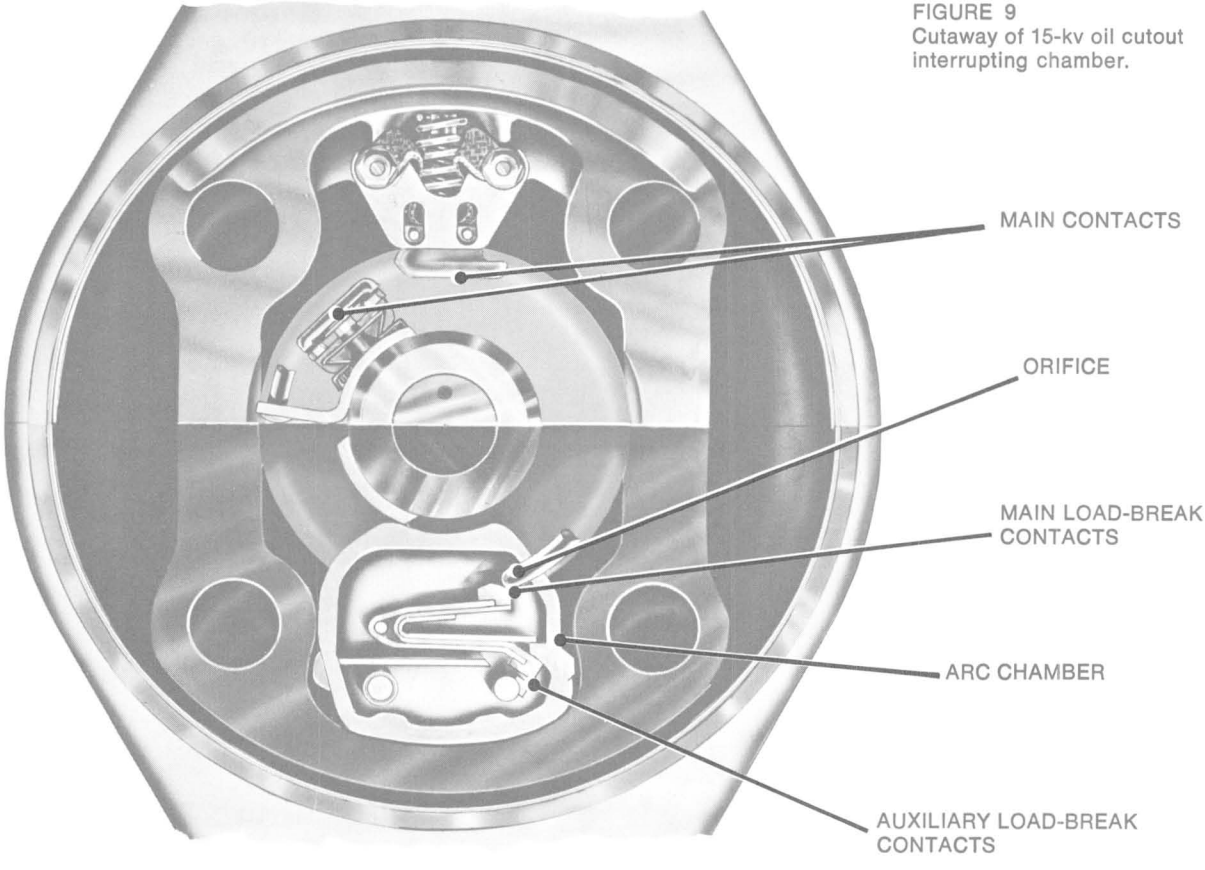


FIGURE 9
Cutaway of 15-kv oil cutout interrupting chamber.

Oil cutout application data

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 and given in the following tabulations. They may be used with a fuse link or a non-fusible copper disconnecting blade by installing a fuse link or a blade on the fuse carrier at the option of the purchaser. Refer to Table 3. 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 1 and 2 for load-break short-time, and interrupting ratings.

NOTE: Because of the small quantity of oil used, the National Electrical Code does not require indoor vault for installation of oil cutouts.

TABLE 1 — Load-break and Short-time Ratings

Cutout Voltage Rating Kv	Continuous Current Rating Rms Amps		Load-break Rating† (Rms Amps)			Short-time Rating 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	200	200	7200 Delta or wye	200	300	9000	4000
15.0	200	200	14,400 Delta or wye	200	900	16000	4000

TABLE 2 — Interrupting Ratings, Three-phase, Wye or Delta Systems

Type	Rating		Maximum System Voltage Line-to-line Kv	Single-phase Interrupting Rating Asymmetrical Amperes ‡	Maximum Three-phase Interrupting Capability Asymmetrical Amperes §	Maximum Permissible Calculated Symmetrical Fault Kva for Systems Having X/R Constants	
	Kv	Amps				X/R Less than 4 ¶	X/R More than 4 △
Vented or Sealed	5.2	100	2.6	6,000	27,000	22,500	16,900
		200		11,000	49,000	41,000	30,600
		300		11,000	49,000	41,000	30,600
Sealed 9F32H Series	5.2	200	2.6	15,000	67,500	56,000	42,000
Vented or Sealed	5.2	100	5.2	5,000	45,000	37,500	28,000
		200		10,000	90,000	75,000	56,000
		300		10,200	92,000	77,000	57,800
Sealed 9F32H Series	5.2	200	5.2	14,000	126,000	105,000	79,000
Vented or Sealed	7.8	200	7.8	5,000	67,500	56,000	42,000
Vented or Sealed	15.0	200	15.0	7,000	182,000	151,000	115,000

† When a disconnect 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.

‡ Ratings apply to vented or sealed 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.

Cutouts with fuse links can be switched closed on short circuits up to their published interrupting rating.

§ Interrupting capability is based on (maximum design voltage) X (maximum interrupting current) X (1.73). This corresponds to a symmetrical rating on a system having X/R = O.

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

△ 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.

Data subject to change without notice

Rack and gang operating mechanisms

Safe and fast switching of either single- or three-phase load current is obtainable by mounting two or three General Electric oil cutouts on a rack with a gang-operating mechanism.

Switching of vented cutouts
The construction of G-E vented cutouts permits immediate switching at any time.

Switching of sealed cutouts
General Electric sealed oil cutouts may be released for switching by simply loosening the single clamping screw in the top of each cutout yoke. Fuse carriers are locked in the cover except when the carrier is in the full "off" removable position.

FOR VENTED CUTOUTS

1. *The lever arms* are easily fastened to metal fuse-carrier hoods, using the same two screws which hold the hood to the fuse carrier.

2. *Operating handle* and its lever arm can be located on whichever cutout is most convenient for operation. The mechanism can be padlocked open or closed by additional locking bar.

FIGURE 10
Gang-operating mechanism for vented oil cutouts arranged for three-phase switching operation.

3. *Rack* provides for convenient mounting on wall, pole or structural members.

FOR SEALED CUTOUTS

1. *Rocker catch* positively locks lever arms to fuse-carrier plugs.

2. *Lever arms,* attached to common horizontal bar with a convenient operating handle, ensure simultaneous opening and closing of all cutouts.

3. *Channel rack* provides for convenient mounting on wall or structural members. The operating mechanism is hot-dip galvanized for protection against corrosion.

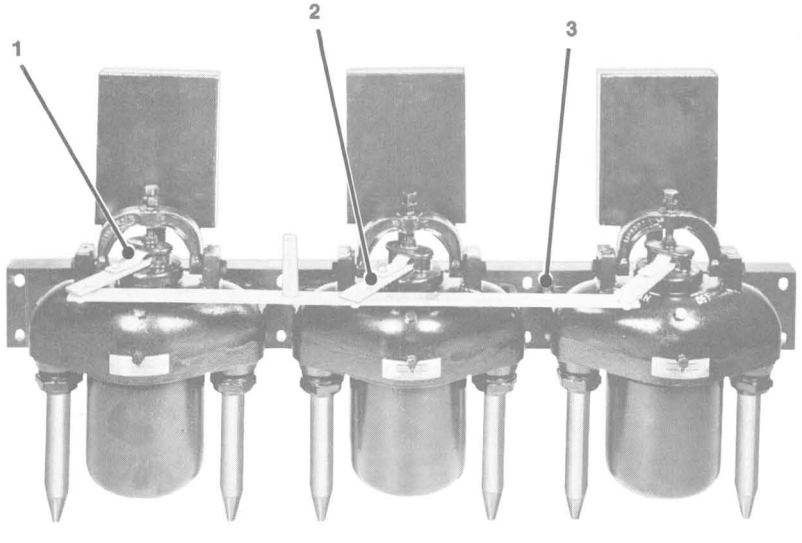


FIGURE 11
Sealed oil cutout assembly mounted long way for three-phase gang operation.

POLE-BASE SWITCHING MECHANISM

Pole-top installations of gang-operated oil cutouts or metal-enclosed assemblies can be operated from the ground with a special pole-base switching mechanism. This mechanism can be padlocked. This application is ideally suited for primary control of outdoor lighting or fused sectionalizing of lines.

FIGURE 12
Hand-operating lever for pole-base switching mechanism. Switch can be padlocked.

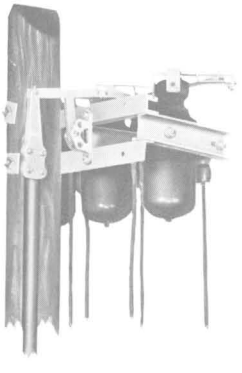


FIGURE 13
Upper connection of pole-base switching mechanism to vented oil cutouts.

Oil cutout metal enclosed assemblies

General Electric metal-enclosed assemblies of oil cutouts are particularly suited for applications such as industrial plants (indoor or outdoor) to provide economical short-circuit protection and load or disconnect switching for:

- Feeder and branch circuits
- Individual transformers or banks
- Motors and control apparatus
- Electric-heating and other types of equipment

The metal-enclosed unit is factory-assembled, with flexible, insulated cable leads ready for connection to circuit wiring. Assemblies are available for three-phase applications, and may be mounted either free standing, on metal stands, on walls, or directly on the apparatus.

1. *Operating handle* for gang switch can be used on any one of the three fuse carriers.

2. *Screened vents* in carrier permit escape of gas without ejection of flame or oil. Fuse or blade carriers are easily removed individually.

3. *Fuse carrier* can be removed from cutout when in the open position without disturbing connecting rod or other switch parts.

4. *Weather-tight enclosure* of No. 11-gauge steel with long-lasting Melaglyp finish and gasketed cover.

5. *Bolted joint* between cutout and connection box is dust-tight and weather-tight.

6. *Flexible cable lead* furnished for connecting directly to incoming cable. Cutouts may be equipped with wiping sleeves for single-conductor lead-sheathed cable.

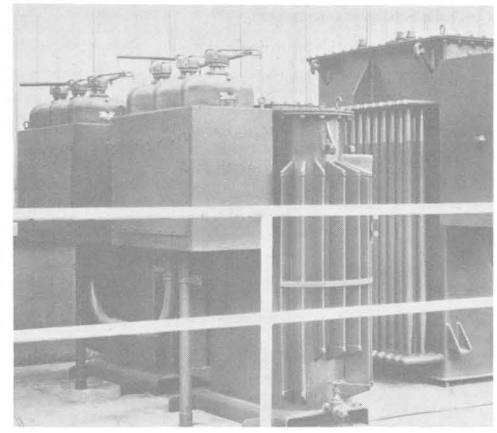


FIGURE 14
Installation of two three-phase, metal-enclosed assemblies of oil cutouts serving as high-voltage switches and overcurrent protective devices.

7. *Bolted and gasketed flange joint* of connection-box cover is dust-tight and weather-tight.

8. *Combination knockouts* eliminate field cutting. 100-ampere ratings are furnished with combination 2- and 3-inch I.P.S. concentric knockouts, and all larger ratings are furnished with combination 3- and 4-inch I.P.S. concentric knockouts.

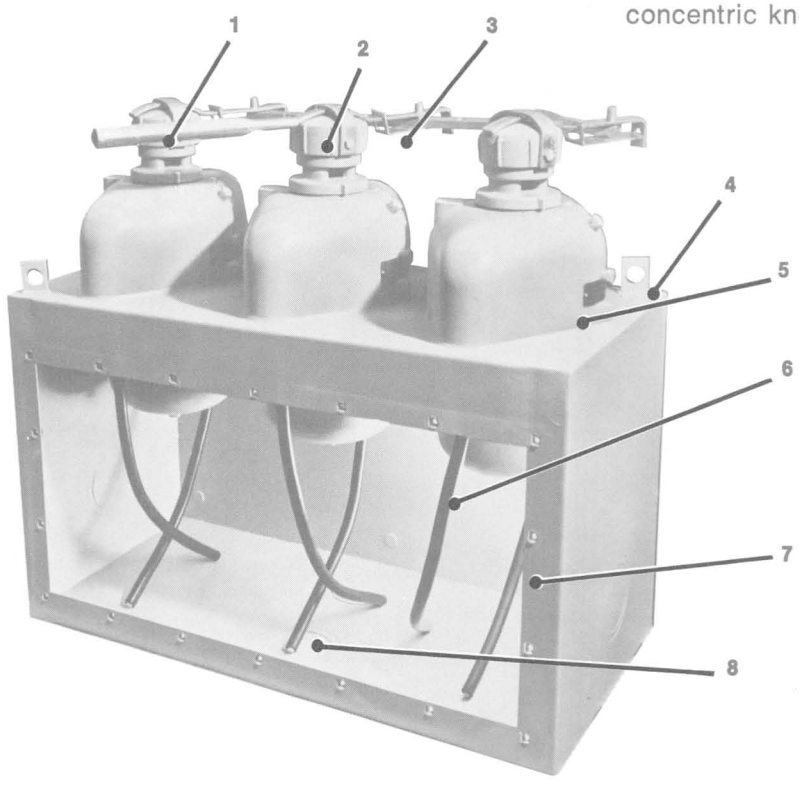


FIGURE 15
Metal-enclosed oil cutout assembly with cover removed. Assemblies may be designed for wall, platform, or stand mounting.

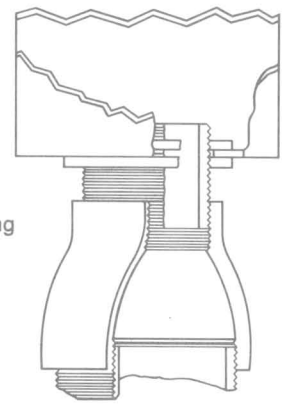


FIGURE 16
Reducing coupling for terminating large-size conduit to metal-enclosed assemblies.

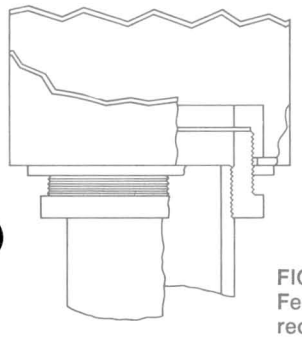


FIGURE 17
Female conduit reducer for terminating smaller-size conduit to metal-enclosed assemblies.

TERMINATIONS

Metal-enclosed assemblies are furnished with combination knockouts for easy conduit entrance. Assemblies rated 100 amp have 2- and 3-inch knockouts, one in each end and two in the bottom. On assemblies rated 200 amp or larger, the combination knockouts are 3 and 4 inches. For other sizes of conduit, use reducing couplings or female reducers as shown in Figs. 16 and 17.

Oil cutout fuse links and disconnect blades

General Electric fuse links for oil cutouts can carry 100 percent of their rated current continuously. (See curves on back page for time-current characteristics.)

These fuse links are designed for use in all present and earlier General Electric oil cutouts except the 50-ampere, 2500-volt cutout. All oil cutouts of the 9F2D, E, and F series have notched fuse-carrier plugs to accommodate the links. Interchangeable fuse links also can be used in all superseded designs of General Electric cutouts in the 9F2C series and earlier (except 50-ampere, 2500-volt cutouts) by simply cutting a notch in the lower end of the wooden fuse-carrier plug.

TABLE 3 — Fuse Links, Coordinating Fuse Links and Disconnecting Blades

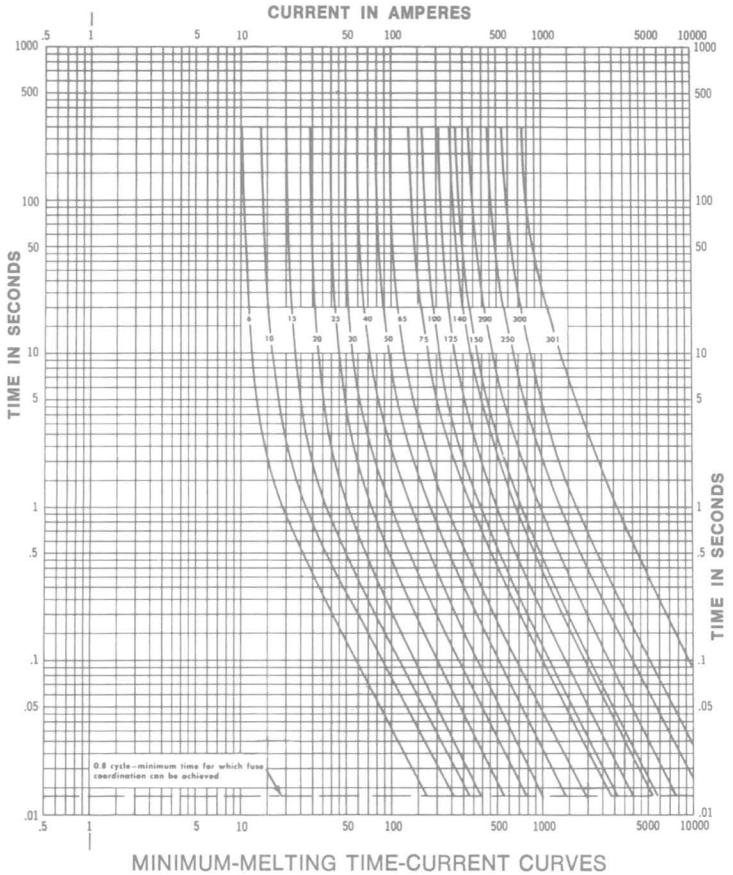
Capacity in Amperes 100% Rating	Model Number		
	Fuse Link	Coordinating Fuse Link	Disconnecting Blade
6	9F57CAA006	.....	.....
10	9F57CAA010	.....	.....
15	9F57CAA015	.....	.....
20	9F57CAA020	.....	.....
25	9F57CAA025	.....	.....
30	9F57CAA030	.....	.....
40	9F57CAA040	.....	.....
50	9F57CAA050	.....	.....
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.

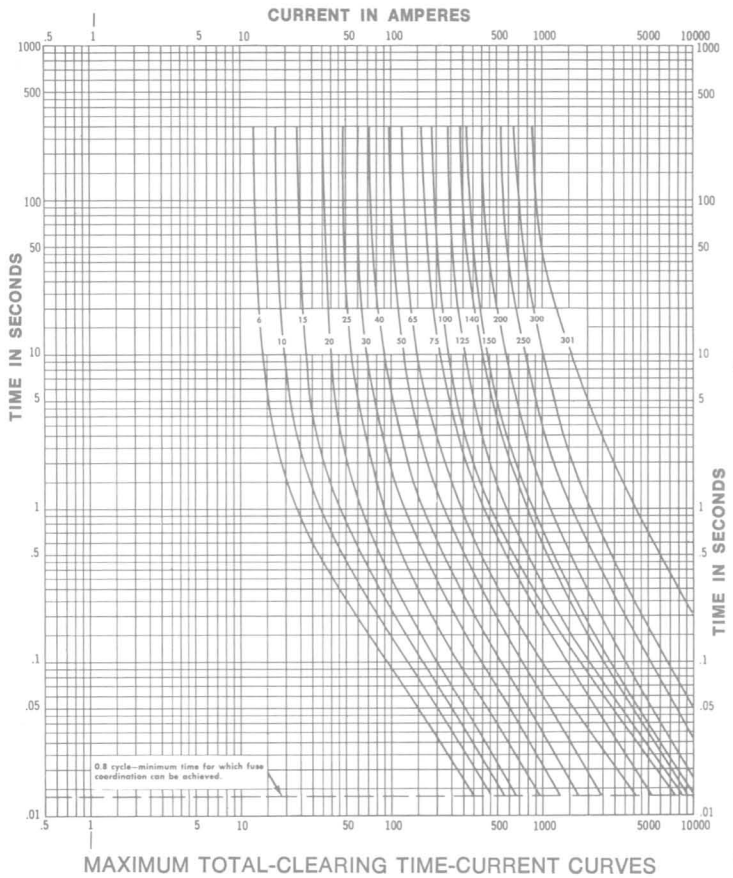
The U-shaped fuse links consist of laminated copper terminal strips and a low-melting fusible element. A strain wire keeps tension from the fusible alloy. On fuse links rated below 100 amp, insulated strain wire carries no current until the fusible element melts. At this point the voltage is placed across the gapped strain wire which causes arcing. This burns and releases the strain wire. The fusible section is housed in a specially formed expulsion tube of insulating material which assists in the arc interruption.

When the fusible element melts, the combined effect of rapid separation, expulsion, and the cooling effect of the insulating oil quickly extinguishes low- as well as high-current arcs. This rapid separation is accomplished by the outward magnetic forces of the loop formed by the U-shaped link, the spring action of the terminal strips, and the expulsion of arc gases from the expulsion tube. Oil quickly fills and insulates the gap between the terminal strips.

TIME-CURRENT CHARACTERISTIC CURVES FOR OIL FUSE CUTOUT FUSE LINKS — TYPE 9F57B & C.



MINIMUM-MELTING TIME-CURRENT CURVES



MAXIMUM TOTAL-CLEARING TIME-CURRENT CURVES

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