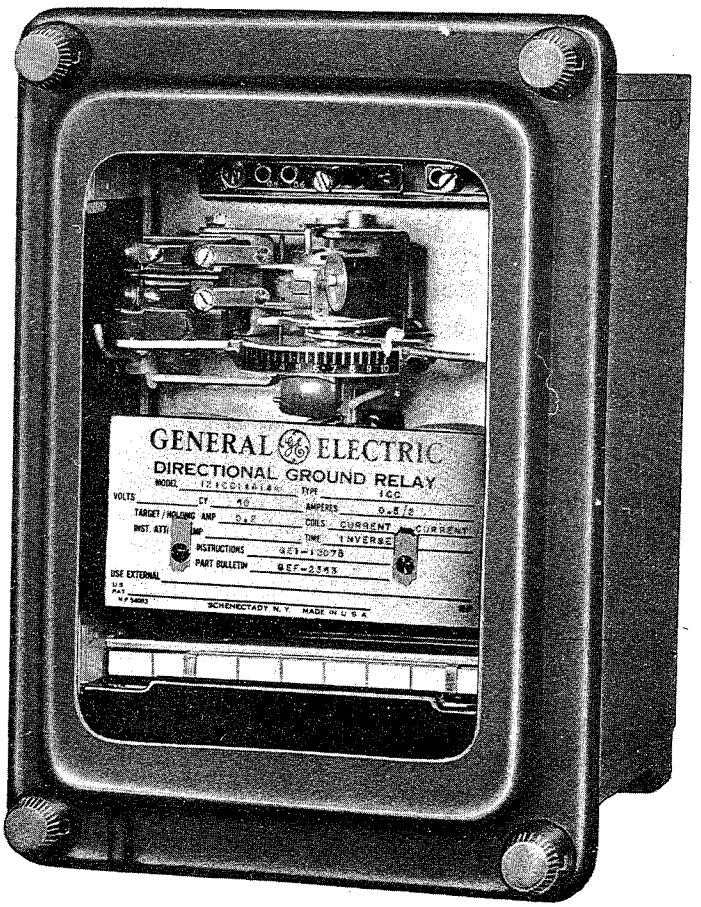
OBSOLETE

INSTRUCTIONS

Switchgear

DIRECTIONAL GROUND RELAYS



Types

ICC11A ICC12A
ICC11B ICC13A
ICC11C ICC13B
ICC18A

GENERAL ELECTRIC

A

CONTENTS

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

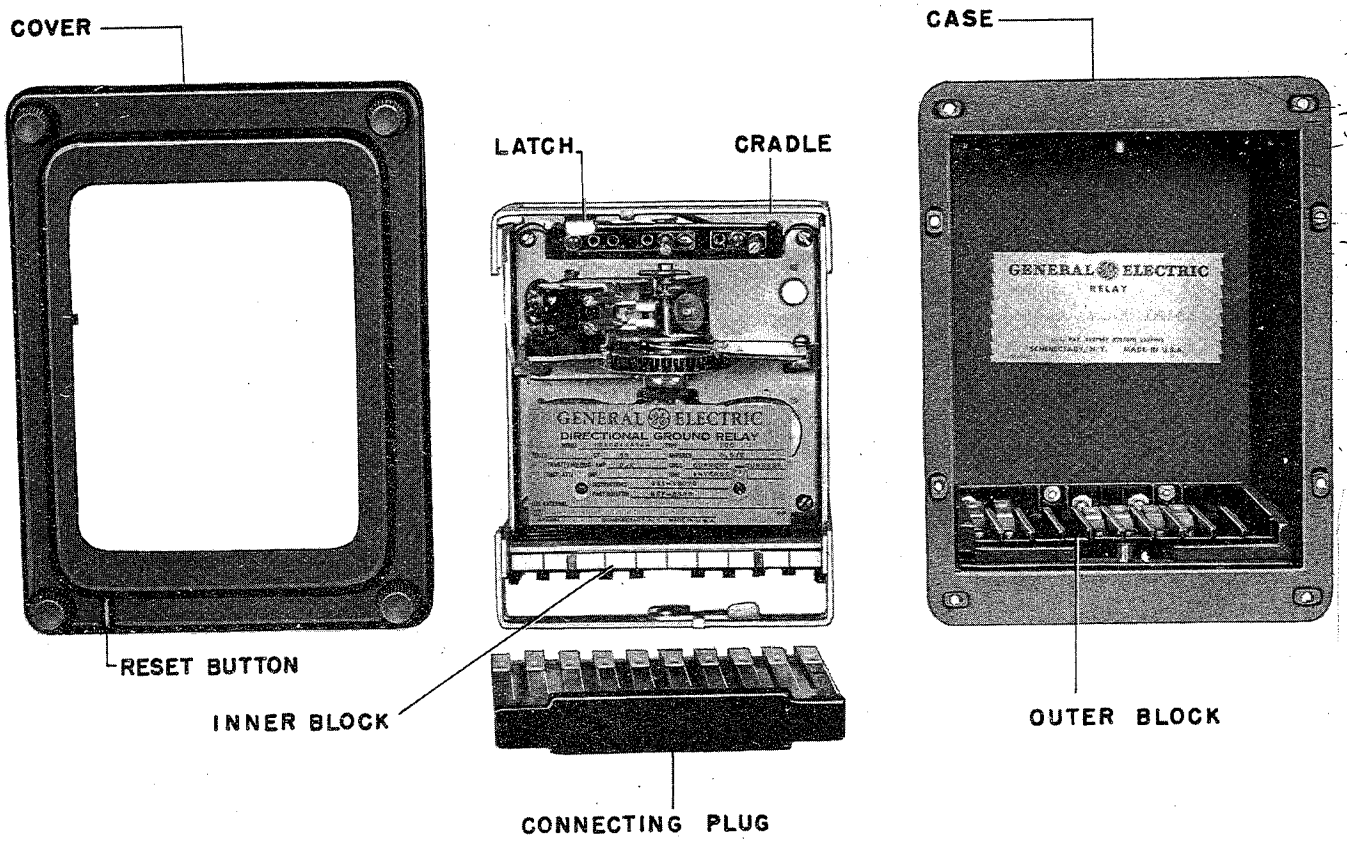


Fig. 1 The Type ICC11A Relay Disassembled

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DIRECTIONAL GROUND RELAYS
TYPE ICC

INTRODUCTION

The type ICC relays comprise a group of relays that are employed principally to protect transmission lines against ground faults. The various relays in this group operate on two currents. The torque produced in the ICC relays is proportional to the product of these currents and a function of the phase angle between them. Contact closing torque is produced only when the fault occurs in the proper direction with respect to the relay. On through faults, only restraining torque is produced.

The various relays in this group are identified by Model Numbers; and the relays differ in the number of circuits they close, the length of time delay, as well as features that are determined by the characteristics of the protected circuits.

The case is suitable for either surface or semi-flush panel mounting and an assortment of hardware is provided for either mounting. The cover attaches to the case and also carries the reset mechanism when one is required. Each cover screw has provision for a sealing wire.

The case has studs or screw connections at both ends or at the bottom only for the external connections. The electrical connections between the relay units and the case studs are made through spring backed contact fingers mounted in stationary molded inner and outer blocks between which nests a removable connecting plug which completes the circuits. The outer blocks, attached to the case, have the studs for the external connections, and the inner blocks have the terminals for the internal connections.

The relay mechanism is mounted in a steel framework called the cradle and is a complete unit with all leads being terminated at the inner block. This cradle is held firmly in the case with a latch at the top and the bottom and by a guide pin at the back of the case. The cases and cradles are so constructed that the relay cannot be inserted in the case upside down. The connecting plug, besides making the electrical connections between the respective blocks of the cradle and case, also locks the latch in place. The cover, which is fastened to the case by thumbscrews, holds the connecting plug in place.

To draw out the relay unit the cover is first removed, and the plug drawn out. Shorting bars are provided in the case to short the current transformer circuits. The latches are then released, and the relay unit can be easily drawn out. To replace the relay unit, the reverse order is followed.

A separate testing plug can be inserted in place of the connecting plug to test the relay in place on the panel either from its own source of current and voltage, or from other sources. Or, the relay unit can be drawn out and replaced by another which has been tested in the laboratory.

APPLICATION

Ground relays are recommended, in association with phase relays for the protection of lines in grounded neutral systems, because they generally provide faster and more sensitive protection for ground faults without jeopardizing selectivity. Greater sensitivity is obtained because ground relays, by their connections and location in the circuit, are immune to load current. Figures 4, 5, and 6 demonstrate their application to the protection of a line against ground faults.

OPERATING CHARACTERISTICS

The type ICC11A relay consists of an induction-disk directional unit with single-circuit closing contacts. The time delay between the occurence of a fault and the closing of the contacts is determined by the position of the time lever over the graduated scale on the contact mechanism plate. Typical time curves are shown in Fig. 2.

The type ICC11B relay differs from the type ICC11A only in that it is provided with a small plunger-type overcurrent element operating in very fast time, when the current through it exceeds a predetermined and relatively high value. The time characteristics of this overcurrent element are shown in Fig. 3. The contacts of this overcurrent element are connected in parallel with the contacts of the main unit.

The type ICC11C relay differs from the ICC11B in that it has a target included in the contact circuit of the instantaneous element.

The type ICC12A relay is similar in principle of operation and in general construction to the ICC11A but has features which give it fast operating time. The time lever and the graduated scale is replaced by a short lever for adjusting the contact travel. At the factory, this travel is adjusted to give approximately 1/16" contact gap. The time to close the contacts at 10 times pick-up current is about .07 second and the time to close the contacts when the current is removed is about .06 second.

The type ICC13A relay differs from the ICC11A in that it has two circuit closing contacts.

The type ICC13B relay differs from the ICC11B in that it has two circuit closing contacts.

The type ICC18A relay differs from the ICC12A in that it has two circuit closing contacts.

RATINGS

The coils of these relays are not intended for continuous operation, but will carry the following currents continuously on the lowest tap:

Rating	Continuous Current-Carrying Capacity
0.15 to 0.6 amp	2.5 amp
0.5 to 2.0 amp	2.5 amp
1.5 to 6 amp	6.0 amp

The current-closing rating of the contacts is 30 amperes for voltages not exceeding 250 volts. The current-carrying ratings are limited by the two different ratings of target and holding coils as indicated in the following table:

Function	Amperes, AC or DC	
	1 Amp coil (0.25 Ohm)	0.2 Amp coil (7 Ohm)
Tripping Duty	30	5
Carry Continuously	4	0.8

The 0.2 ampere coil is for use with trip coils that operate on currents ranging from 0.2 up to 1.0 ampere at the minimum control voltage. If this coil is used with trip coils that take 1.0 ampere or more, there is a possibility that the 7 ohms resistance will reduce the tripping current to so low a value that the breaker will not be tripped. This coil can safely carry tripping currents as high as 5 amperes.

The 1.0 ampere coil should be used with trip coils that take 1.0 ampere or more at the minimum control voltage, provided the tripping current does not exceed 30 amperes at the maximum control voltage. If the tripping current exceeds 30 amperes, an auxiliary relay must be used to control the trip coil circuit, the connections being such that the tripping current does not pass through the contacts or the target and holding coil of the protective relay.

When it is desirable to adopt one type of relay as standard to be used anywhere on a system, relays with the 1.0 ampere coil should be chosen. These relays should also be used when it is impossible to obtain trip coil data, but attention is called to the fact that the target may not operate if used with trip coils taking less than 1.0 amp.

BURDENS

The burdens imposed on the current transformers by these relays are given in the table below. Under normal conditions, however, no burdens are imposed, as no current flows in the relay coils.

Relay	Ratings		Winding	Tap Connection	At Rated Tap Current			At 5 Amps 60 Cycles	
	Amp	Cyc.			Impedance in ohms	Effective Resistance in ohms	Inductance in mu h	P.F.	VA
ICC11A	1-4	60	Upper	1	0.646	0.575	780	0.89	16.2
ICC11B*			Lower	X1	0.140	0.068	326	0.49	3.5
ICC11C*									
ICC12A	1.5-6	60	Upper	1.5	0.780	0.718	808	0.92	19.5
ICC13A			Lower	X1	0.056	0.028	128	0.50	1.5
ICC13B*									
ICC18A									

* A slight additional burden is imposed by the instantaneous element.

RECEIVING, HANDLING AND STORAGE

These relays, when not included as a part of a control panel, will be shipped in cartons designed to protect them against damage. Immediately upon receipt of a relay, an examination should be made for any damage sustained during shipment. If injury or damage resulting from rough handling is evident, a claim should be filed at once with the transportation company and the nearest Sales Office of the General Electric Company notified promptly.

Reasonable care should be exercised in unpacking the relay in order than none of the parts are injured or the adjustments disturbed.

If the relays are not to be installed immediately, they should be stored in their original cartons in a place that is free from moisture, dust, and metallic chips. Foreign matter collected on the outside of the case may find its way inside when the cover is removed and cause trouble in the operation of the relay.

INSTALLATION

LOCATION

The location should be clean and dry, free from dust and excessive vibration, and well lighted to facilitate inspection and testing.

MOUNTING

The relay should be mounted on a vertical surface. The outline and panel diagram is shown in Fig. 15.

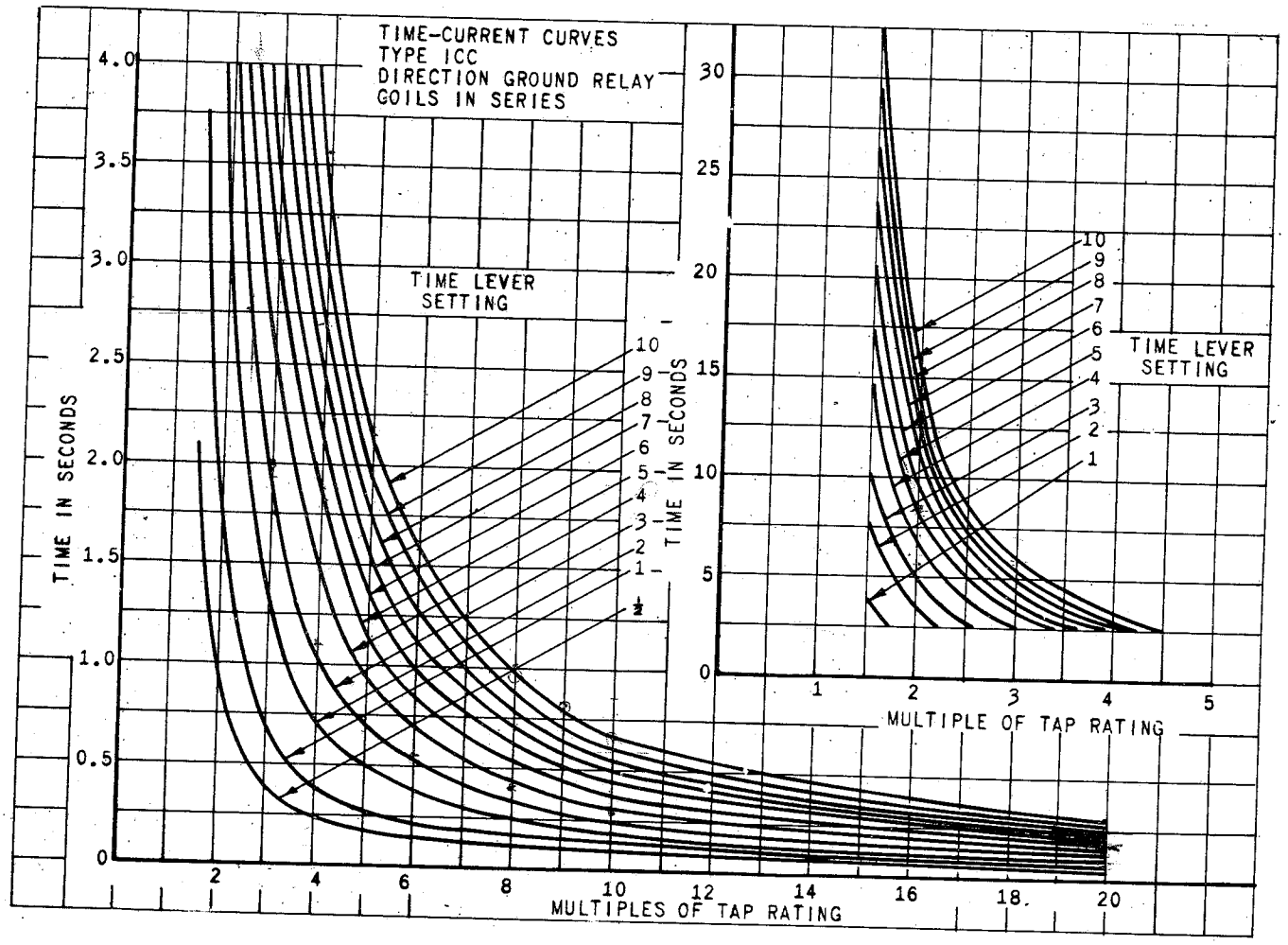

Fig. 2 Time-Current Curves for Relay Types ICC11A, ICC11B, ICC11C, ICC13, and ICC13B.

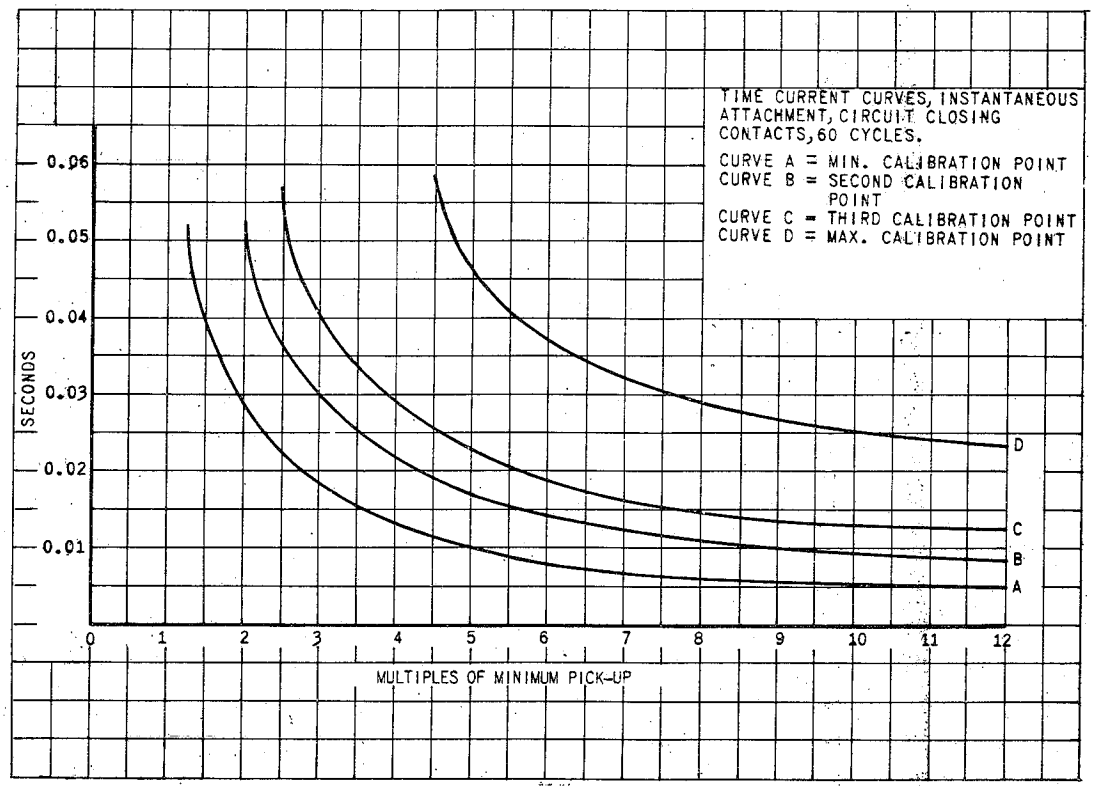

Fig. 3. Time-Current Curves of Instantaneous Overcurrent Element

CONNECTIONS

Internal connection diagrams for the various relay types are shown in Fig. 9 to 13 inclusive. Typical wiring diagrams are given in Fig. 4 to 6 inclusive.

One of the mounting studs or screws should be permanently grounded by a conductor not less than No. 12 B & S gage copper wire or its equivalent.

ADJUSTMENTS

The minimum current at which the contacts will just close is determined by the positions of the plugs in the tap block at the top of the relay. There are two separate tap plates and the right-hand plate has two receptacles marked "Multiply by 1" and "Multiply by 2". With the plug inserted in the "Multiply by 1" receptacle the minimum operating current corresponds to the setting of the plug in the left-hand plate; when inserted in the "Multiply by 2" receptacle this value is doubled.

When changing the current setting of the relay while in the case, remove the connection plug to short the current transformer secondary circuit. Next, screw the tap plug into tap marked for the desired current and then replace the connection plug.

The time delay at any given current is determined by the position of the time lever over the graduated scale on the contact mechanism plate for those relays described above that are provided with time levers.

The time-current curves for all these relays are given for equal currents in the two circuits, in phase with each other. If the currents are not equal, the time delay will be approximately the same as for equal currents giving the same product. For example, 10 amperes in one circuit and 4.9 amperes in the other circuit (in phase with the 10 amperes) will give the same time delay as would 7 amperes in each circuit; the product is 49 in either case. For this relation (the same time for the same product of currents) to hold true, neither current should be more than 5 times the other current, nor more than 5 times the tap value. It is therefore best to select current transformer ratios so that the two currents will be nearly equal under fault conditions.

The current-tap settings for time delay relays should be selected to take fullest advantage of the very inverse part of the time curve (between 2 and 10 times tap current) for securing time selectivity between ground faults in the protected section of the transmission line and ground faults in more remote parts of the system. The following general remarks will serve to suggest the method to follow in determining the best setting for any particular case under consideration.

Usually two values of ground fault current should be known; the greatest current expected for a fault elsewhere than in the protected section of line, and the least current expected for a fault in the protected section. A tap setting should then be chosen which will make the first current correspond to about 3 times tap value, and the second current to about 10 or more times tap value, if possible. These figures

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DEVICE FUNCTION NUMBERS FOR USE WITH EXTERNAL DIAGRAMS

50N - Instantaneous Ground Overcurrent Element

52 - Power Circuit Breaker

67N - Directional Ground Overcurrent Relay, Type ICC

a - Auxiliary contact, closed when breaker closes

H.C. - Holding coil

T.C. - Trip coil

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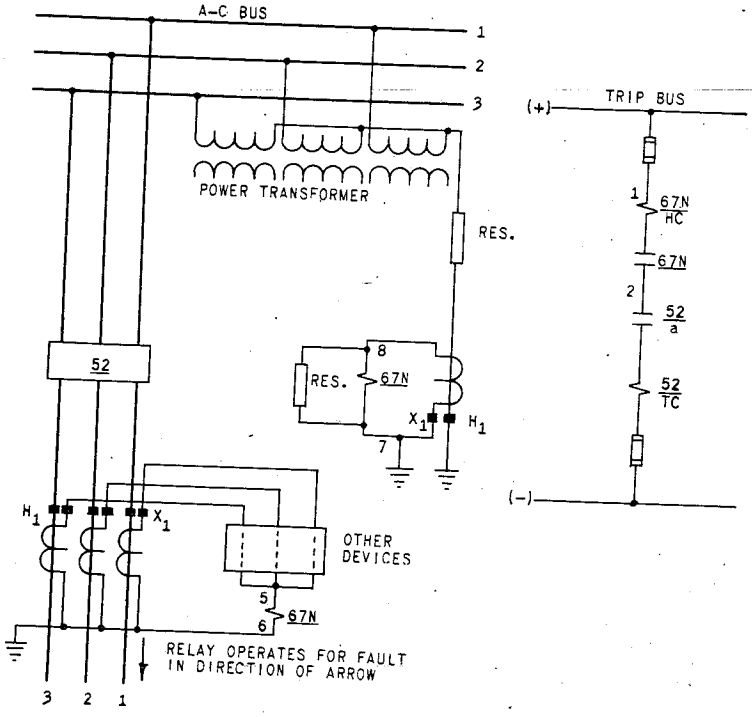

Fig. 4 Typical External Connections of Type ICC11A and Type ICC12A Relays

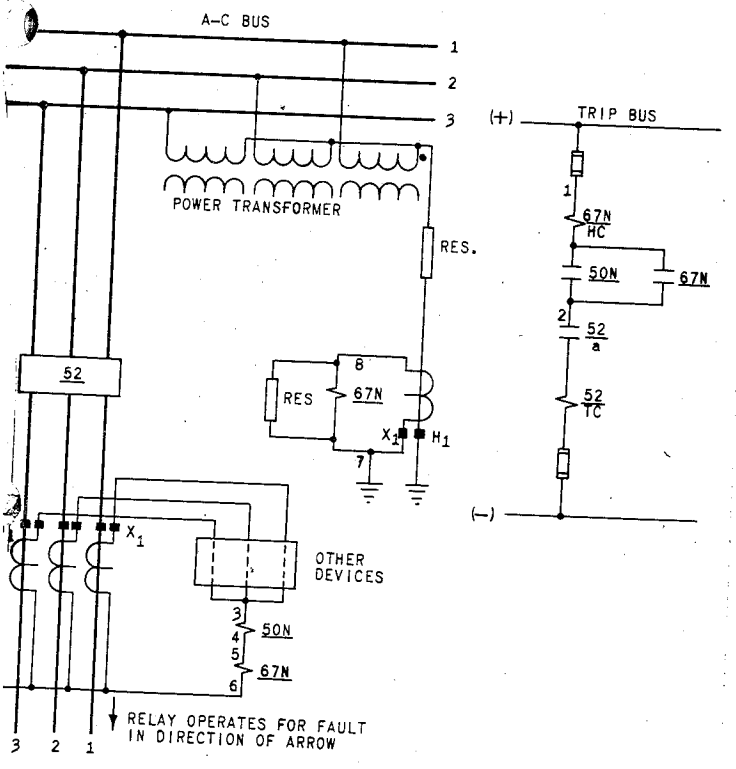

Fig. 5 Typical External Connections of the Type ICC11B Relay

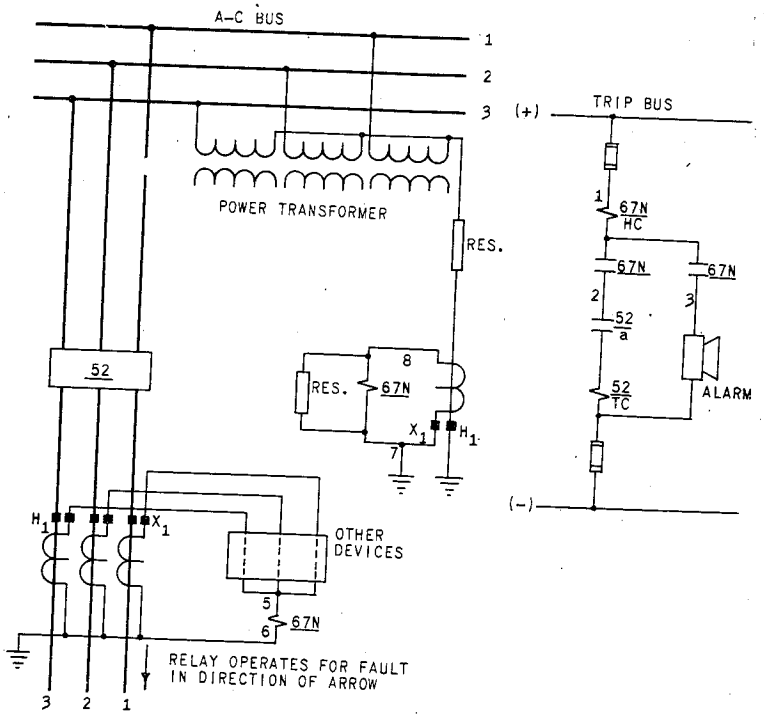

Fig. 6 Typical External Connections of the Type ICC13A Relay

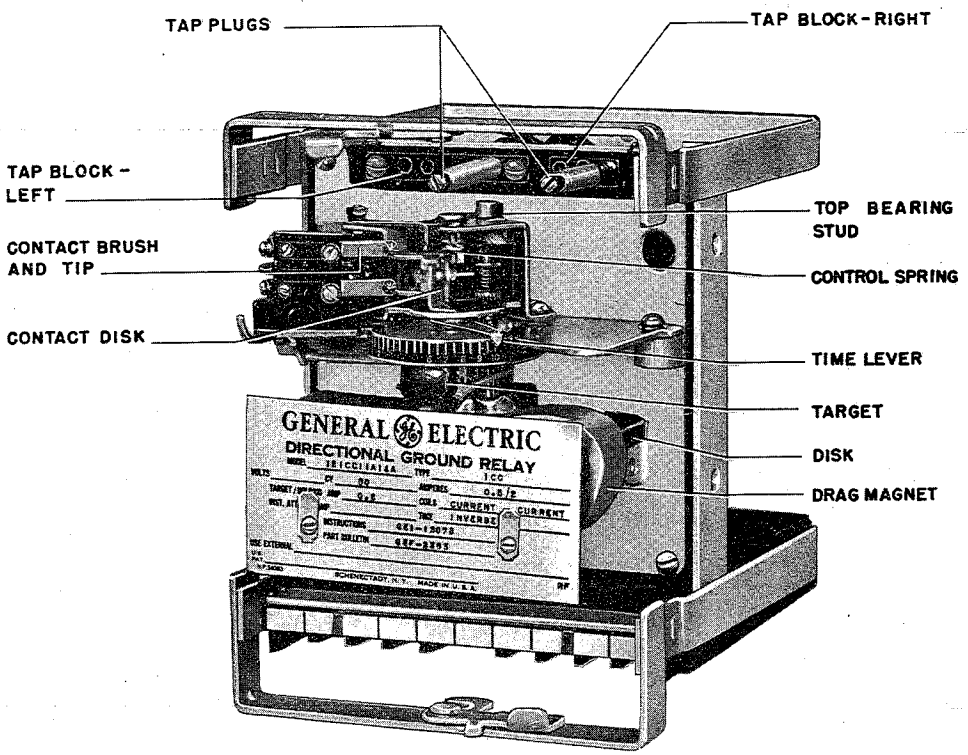

Fig. 7 The Type ICC11A Relay Removed from the Case,(Front View)

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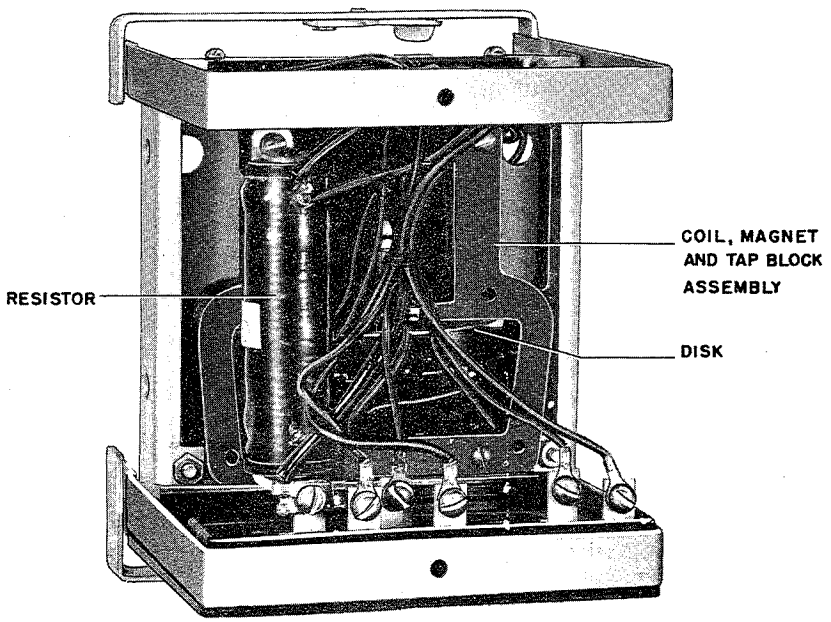

Fig. 8 The Type ICC11A Relay Removed from the Case (Rear View)

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are given only as a suggestion; large departures from them will sometimes give the best results. A time-lever setting should next be chosen to make the type ICC relay time greater than that of the particular relay which should operate for each typical fault condition on remote parts of the system, and less than that of any other relay for ground faults in the protected section.

OPERATION

Before placing the relay in operation, the connections and polarity should be checked with the diagram in this book that applies and suitable current-tap and time-lever settings made as described under "Adjustments". Under normal load conditions, no current should exist in the relay coils and hence there should be no torque other than that due to the control spring.

MAINTENANCE

The relays are adjusted at the factory and it is advisable not to disturb the adjustments. If, for any reason, they have been disturbed the following points should be observed in restoring them.

DISK AND BEARINGS

The lower jewel may be tested for cracks by exploring its surface with the point of a fine needle. If it is necessary to replace the jewel a new pivot should be screwed into the bottom of the shaft at the same time. A very small drop of General Electric meter-jewel oil, Cat. 66X728, or fine watch oil should be placed on the new jewel before it is inserted. The jewel should be turned up until the disk is centered in the air gaps, after which it should be locked in this position by the set-screw provided for this purpose. The upper bearing pin should next be adjusted until very little end play can be felt between the pin and the steel ball in the recess at the top of the shaft; about 0.005 in. is correct.

GEAR MESH

The gear and pinion should be meshed as deeply as possible without binding in any position when the disk is rotated. This adjustment is correct when a slight backlash can be felt in all disk positions. The two screws holding the contact mechanism assembly to the relay frame would be tightened securely after this adjustment is made.

CONTACT CLEANING

For cleaning fine silver contacts, a flexible burnishing tool should be used. This consists of a flexible strip of metal with an etched roughened surface, resembling in effect a superfine file. The polishing action is so delicate that no scratches are left, yet corroded material will be removed rapidly and thoroughly. The flexibility of the tool insures the cleaning of the actual points of contact. Sometimes an ordinary file cannot reach the actual points of contact because of some obstruction from some other part of the relay.

Fine silver contacts should not be cleaned with knives, files, or abrasive paper or cloth. Knives or files may leave scratches which increase arcing and deterioration of the contacts. Abrasive paper or cloth may leave minute particles of insulating abrasive material in the contacts and thus prevent closing.

The burnishing tool previously described can be obtained from the factory.

CONTACT ADJUSTMENT

With the contacts just closed there should be enough space between the contact-holding armature and the poles of the holding magnet to permit the fixed contact tips to be deflected about 1/32" when the armature is finally pushed against its poles. The tips should lie on the same vertical plane. These adjustments are obtained by moving each contact brush by means of the screw in the front of the brush block which pushes against it near its center.

When the relay has a time lever, and it is moved to the position where it holds the contacts just touching, (and closed) it should indicate zero on the time lever scale. If it does not, and the brushes are correctly adjusted, shift the scale slightly after loosening the two small screws holding it to the under side of the contact plate.

TESTING

The recommended testing connections are shown in Fig. 14.

The testing source should be at least 110 volts, and of good wave-form and constant frequency. Low-voltage transformers (or phantom loads) should not be used for testing induction relays as their use will result in a distorted wave-form.

MINIMUM OPERATING CURRENT

The least current required to rotate the disk very slowly and close the contacts should be within 5 per cent of the values marked on the tap plate.

Adjustment of the minimum operating current is made by changing the tension of the spiral on the contact shaft by shifting the adjustable support for the outer end of the spring.

TIME-CURRENT CURVES

Be sure that the timing device begins to record at exactly the moment the relay current circuit is closed, and will stop as soon as the contacts close.

For types ICC11A, ICC11B, ICC11C, ICC13A, and ICC13B adjust the position of the damping mag-

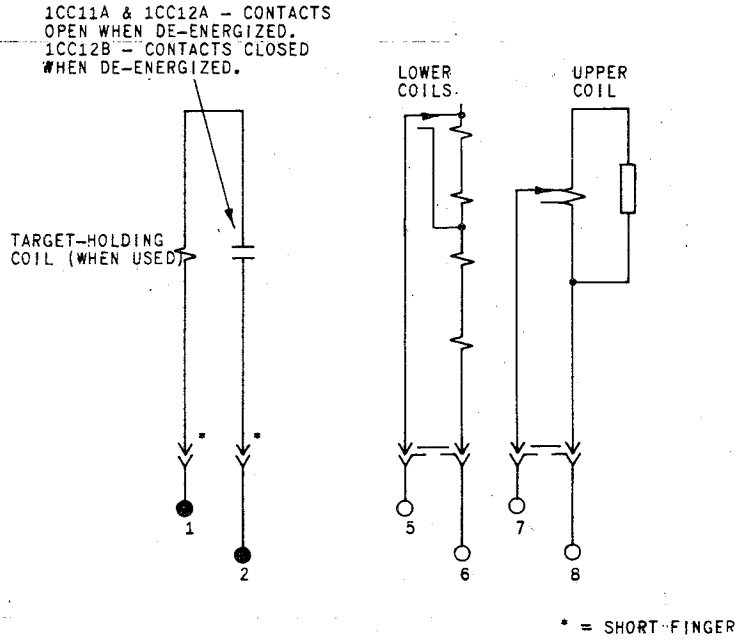

Fig. 9 Internal Connections of Relay Types ICC11A and ICC12A (Front View)

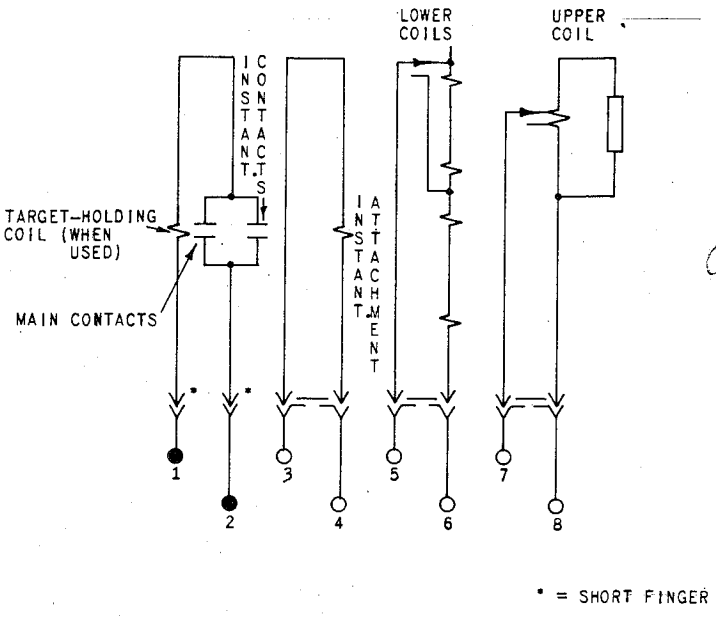

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Fig. 10 Internal Connections of the Type ICC11B Relay (Front View)

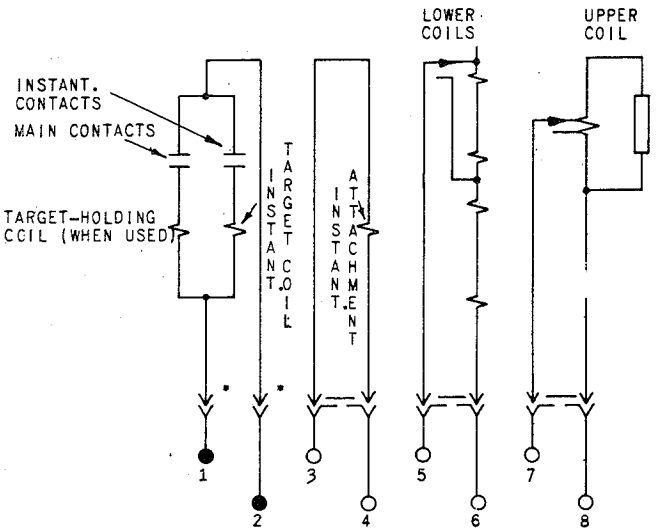

Fig. 11 Internal Connections of the Type ICC11C Relay (Front View)

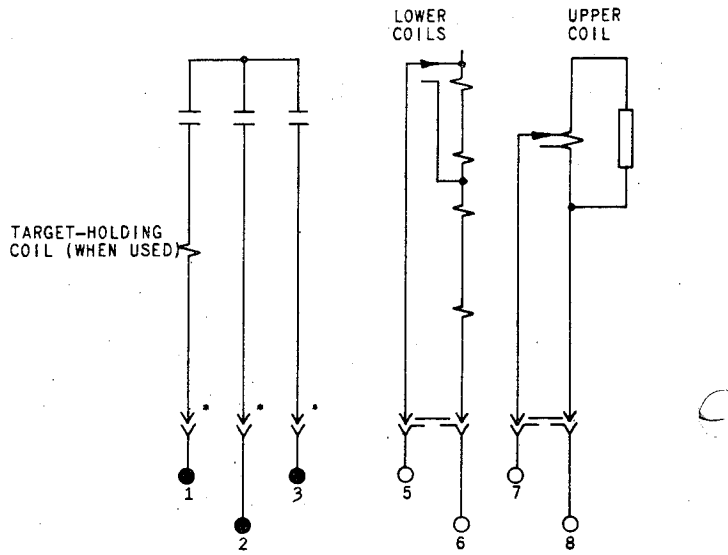

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Fig. 12 Internal Connections of Relay Types ICC13A and ICC18A (Front View)

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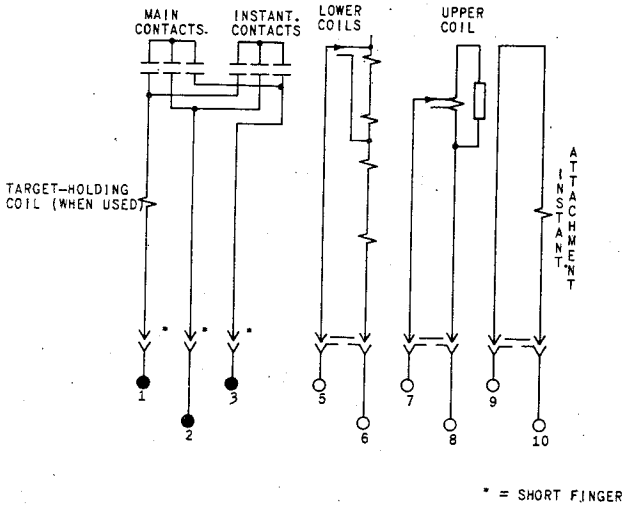

Fig. 13 Internal Connections of the Type ICC13B Relay (Front View)

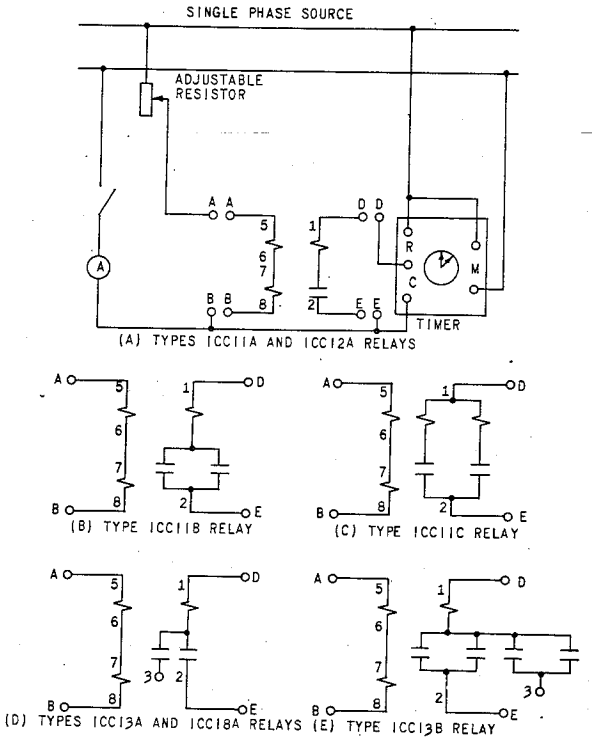

Fig. 14 Testing Connections of Type ICC Relays

net on its shelf until 2.1 seconds is obtained at 5 times tap current and No. 10 time-lever position.

Note that moving the magnet toward the disk shaft decreases the time; moving it toward the disk edge increases the time. The magnet should not be moved farther out than the point at which the magnet shoe comes in line with the end of the shelf.

Other points on the time curve may then be checked as desired. The time values should be within plus or minus 7 per cent of the values shown on the curves for currents exceeding 3 times tap current. It is best, of course, to take time readings at the critical values of fault current expected in service and with the actual tap and time-lever settings to be used.

RENEWAL PARTS

It is recommended that sufficient quantities of renewal parts be carried in stock to enable the prompt replacement of any that are worn, broken, or damaged.

When ordering renewal parts, address the nearest Sales Office of the General Electric Company, specify quantity required, name of part wanted, and give complete nameplate data, including serial number. If possible, give the General Electric Company requisition number on which the relay was furnished.

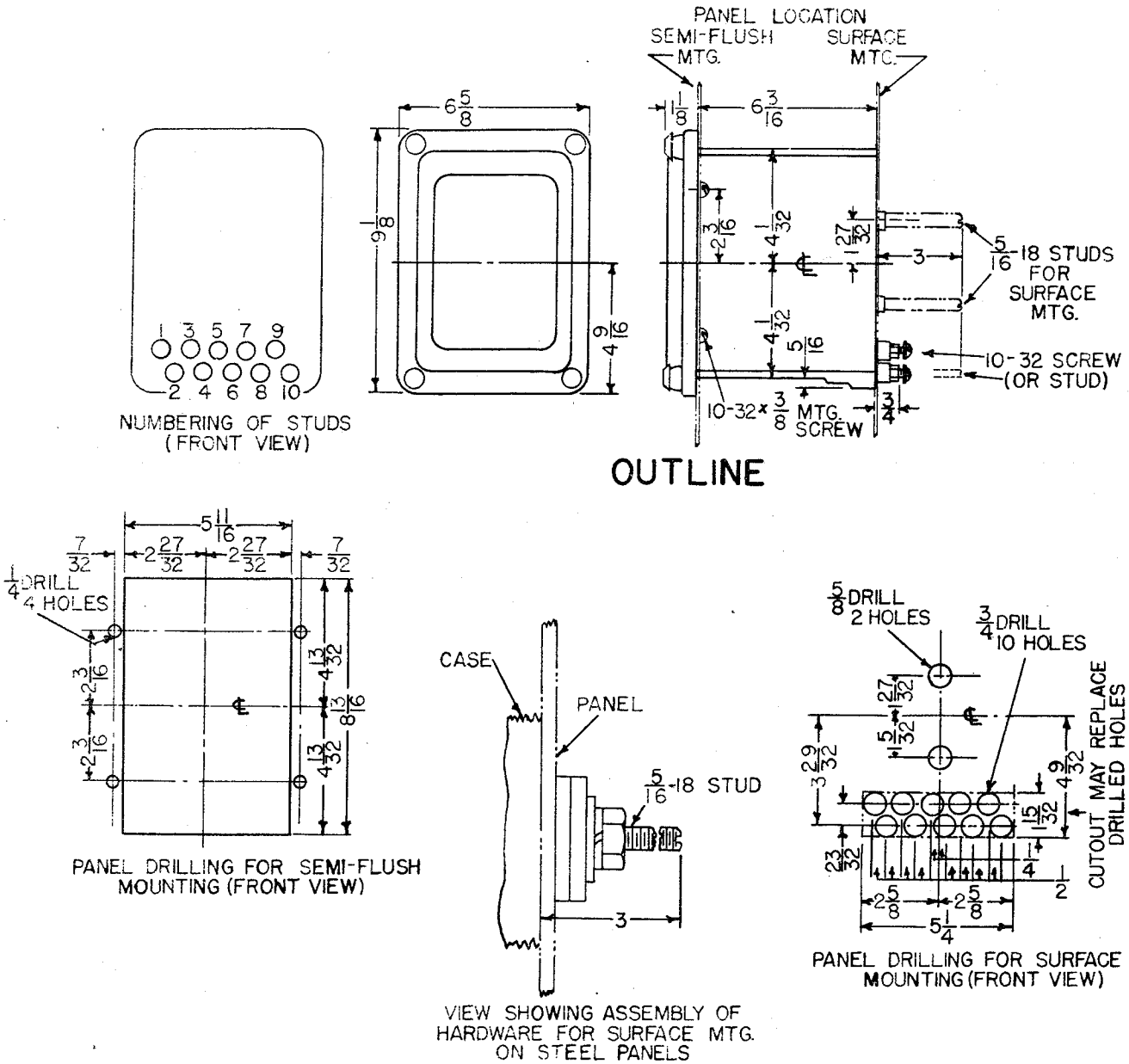

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Fig. 15 Outline and Panel Drilling for Relay Types ICC11A, ICC11B, ICC11C, ICC12A, ICC13A, ICC13B and ICC18A

IF YOU REQUIRE SERVICE

IF AT ANY TIME you find it necessary to repair, recondition, or rebuild your G-E apparatus, there are 29 G-E service shops whose facilities are available day and night for work in the shops or on your premises. Factory methods and genuine G-E renewal parts are used to maintain the original performance of your G-E apparatus. If you need parts only, immediate shipment of many items can be made from warehouse stock.

The services of our factories, engineering divisions, and sales offices are also available to assist you with engineering problems. For full information about these services, contact the nearest service shop or sales office listed below:

APPARATUS SERVICE SHOPS

Atlanta 3, Ga. . . . . 496 Glenn St., S. W.
*Baltimore 30, Md. . . . . 920 E. Fort Ave.
Boston—Medford 55, Mass. . . . . Mystic Valley Pkwy.
Buffalo 11, N. Y. . . . . 318 Urban St.
Charleston 28, W. Va. . 306 MacCorkle Ave., S.E.
Chicago 80, Ill. . . . . 849 S. Clinton St.
Cincinnati 2, Ohio. . . . . 444 W. Third St.
Cleveland 4, Ohio. . . . . 4966 Woodland Ave.
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Denver 5, Colo. . . . . 3353 Larimer St.
Detroit 2, Mich. . . . . 5950 Third Ave.
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Johnstown, Pa. . . . . 841 Oak St.
Kansas City 8, Mo. . . . . 819 E. 19th St.
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Pittsburgh 6, Pa. . . . . 6519 Penn Ave.
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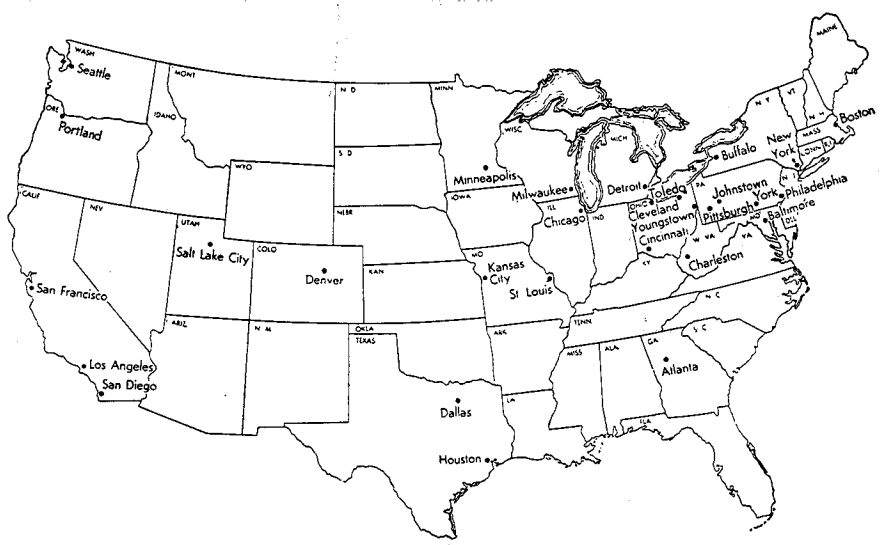
St. Louis 1, Mo. . . . . 1110 Delmar Blvd.
Salt Lake City 9, Utah. . . 141 S. Third West St.
San Diego 1, Calif. . . . . 2045 Kettner Blvd.
San Francisco 3, Calif. . . . . 1098 Harrison St.
Seattle 4, Wash. . . . . 3422 First Ave., S.
Toledo 4, Ohio. . . . . 1 So. St. Clair St.
York, Pa. . . . . 50-66 N. Harrison St.
Youngstown, Ohio. . . . . 272 E. Indianola Ave.

*Convenient G-E Renewal Parts Center for over-the-counter purchases of industrial parts, located at same address.



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Albany 1, N. Y. . . . . 90 State St.
Albuquerque, N. Mex. . . . . 323 S. 3rd St.
Allentown, Pa. . . . . 1014 Hamilton St.
Amarillo, Texas. . . . . 300 Polk St.
Atlanta 3, Ga. . . . . 187 Spring St., N.W.
Bakersfield, Calif. . . . . 211 E. 18th St.
Baltimore 1, Md. . . . . 39 W. Lexington St.
Bangor, Maine. . . . . 77 Central St.
Beaumont, Texas. . . . . 398 Pearl St.
Binghamton, N. Y. . . . . 19 Chenango St.
Birmingham 2, Ala. . . . . 600 N. Eighteenth St.
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Boston 1, Mass. . . . . 140 Federal St.
Buffalo 3, N. Y. . . . . 535 Washington St.
Butte, Mont. . . . . 20 West Granite St.
Canton 1, Ohio. . . . . 700 Tuscarawas St., W.
Cedar Rapids, Iowa. . . . . 203 Second St., S.E.
Charleston 28, W. Va. . 306 MacCorkle Ave., S.E.
Charlotte 1, N. C. . . . . 200 S. Tryon St.
Charlottesville, Va. . . . . 123 E. Main St.
Chattanooga 2, Tenn. . . . . 832 Georgia Ave.
Chicago 80, Ill. . P.O. Box 5970A, 840 S. Canal St.
Cincinnati 2, Ohio. . . . . 215 W. Third St.
Cleveland 4, Ohio. . . . . 4966 Woodland Ave.
Columbia 23, S. C. . . . . 1225 Washington St.
Columbus 15, Ohio. . . . . 40 S. Third St.
Corpus Christie, Texas. . 108½ N. Chaparral St.
Dallas 2, Texas. . . . . 1801 N. Lamar St.
Davenport, Iowa. . . . . 511 Pershing Ave.
Dayton 2, Ohio. . . . . 25 N. Main St.
Denver 2, Colo. . . . . 650 Seventeenth St.
Des Moines, Iowa. . . . . 418 W. Sixth Ave.
Detroit 2, Mich. . . . . 700 Antoinette St.
Duluth 2, Minn. . . . . 14 W. Superior St.
Elmira, N. Y. . . . . Main and Woodlawn Aves.
El Paso, Texas. . . . . 109 N. Oregon St.
Erie 2, Pa. . . . . 10 E. Twelfth St.
Evansville 19, Ind. . . . . 123 N.W. Fourth St.
Eugene, Ore. . . . . 612 Willamette St.
Fairmont, W. Va. . . . . 511 Jacobs Bldg.
Fergus Falls, Minn. . . . . 102 W. Lincoln Ave., P.O. Box 197
Fort Wayne 2, Ind. . . . . 127 W. Berry St.
Fort Worth 2, Texas. . . . . 408 W. Seventh St.
Fresno 1, Calif. . . . . Tulare and Fulton St.
Grand Rapids 2, Mich. . 148 Monroe Ave., N.W.
Greensboro, N. C. . . . . 301-3 S. Elm St.
Greenville, S. C. . . . . 106 W. Washington St.
Hagerstown, Md. . . . . Professional Arts Bldg.
Harrisburg, Pa. . . . . 229 N. Second St.
Hartford 3, Conn. . . . . 410 Asylum St.
Houston 1, Texas. . . . . 1312 Live Oak St.
Indianapolis 4, Ind. . . . . 110 N. Illinois St.
Jackson, Mich. . . . . 120 W. Michigan Ave.
Jackson 1, Miss. . . . . 203 W. Capitol St.
Jacksonville 2, Fla. . . . . 700 E. Union St.
Jamestown, N. Y. . . . . 2 Second St.
Johnson City, Tenn. . . . . 334 E. Main St.
Johnstown, Pa. . . . . 841 Oak St.
Kansas City 6, Mo. . . . . 106 W. Fourteenth St.
Knoxville 08, Tenn. . . . . 602 S. Gay St.
Lansing 68, Mich. . . . . 215 So. Grand Ave.
Lincoln 8, Neb. . . . . 1001 "O" St.
Little Rock, Ark. . . . . 103 W. Capitol Ave.
Los Angeles 54, Calif. . . . . 212 N. Vignes St.
Louisville 2, Ky. . . . . 455 S. Fourth St.
Madison 3, Wisc. . . . . 16 N. Carroll St.
Manchester, N. H. . . . . 875 Elm St.
Medford, Ore. 2015 E. Main St., P.O. Box 1349
Memphis 3, Tenn. . . . . 8 N. Third St.
Miami 32, Fla. . . . . 25 S.E. Second Ave.
Milwaukee 3, Wisc. . . . . 940 W. St. Paul Ave.
Minneapolis 2, Minn. . . . . 12 S. Sixth St.
Mobile 13, Ala. . . . . 54 St. Joseph St.
Nashville 3, Tenn. . . . . 234 Third Ave., N.
Newark 2, N. J. . . . . 744 Broad St.
New Haven 6, Conn. . . . . 129 Church St.
New Orleans 12, La. . . . . 837 Gravier St.
New York 22, N. Y. . . . . 570 Lexington Ave.
Niagara Falls, N. Y. . . . . 253 Second St.
Norfolk 10, Va. . . . . 229 W. Bute St.
Oakland 12, Calif. . . . . 409 Thirteenth St.
Oklahoma City 2, Okla. . . 119 N. Robinson St.
Omaha 2, Nebr. . . . . 409 S. Seventeenth St.
Pasco, Wash. . . . . 421 W. Clark St.
Peoria 2, Ill. . . . . 410 Main St.
Philadelphia 2, Pa. . . . . 1405 Locust St.
Phoenix, Ariz. . . . . 303 Luhrs Tower
Pittsburgh 22, Pa. . . . . 535 Smithfield St.
Portland 3, Maine. . . . . 477 Congress St.
Portland 7, Ore. . . . . 920 S.W. Sixth Ave.
Providence 3, R. I. . . . . Industrial Trust Bldg.
Raleigh, N. C. . . . . 336 Fayetteville St.
Reading, Pa. . . . . 31 N. Sixth St.
Richmond 17, Va. . . . . 700 E. Franklin St.
Riverside, Calif. . . . . 3808 Main St.
Roanoke 11, Va. . . . . 202 S. Jefferson St.
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Rockford, Ill. . . . . 110 S. First St.
Rutland, Vt. . . . . 38½ Center St.
Sacramento 14, Calif. . . . . 1107 Ninth St.
Saginaw, Mich. . . . . 107 N. Franklin St.
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San Antonio 5, Texas. . . . 310 S. St. Mary's St.
San Diego 1, Calif. . . . . 861 Sixth Ave.
San Francisco 6, Calif. . . . 235 Montgomery St.
San Jose, Calif. . . . . 177 W. Santa Clara Ave.
Savannah, Ga. . . . . 16 Drayton St.
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Shreveport 39, La. . . . . 803 Jordan St.
Sioux City 13, Iowa. . . . . 507 Sixth St.
Sioux Falls, S. D. . . . . 321½ S. Phillips Ave.
South Bend 11, Ind. . . . 112 W. Jefferson Blvd.
Spokane 8, Wash. . . . . S. 162 Post St.
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Springfield 3, Mass. . . . . 1387 Main St.
Stockton, Calif. . . . . 11 So. San Joaquin St.
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Tulsa 3, Okla. . . . . 320 S. Boston Ave.
Utica 2, N. Y. . . . . 258 Genesee St.
Washington 5, D.C. . . . 806 Fifteenth St., N.W.
Waterbury 89, Conn. . . . . 111 W. Main St.
Waterloo, Iowa. . . . . 206 W. 4th St.
Wheeling, W. Va. . . . . 40 Fourteenth St.
Wichita 2, Kan. . . . . 201 E. First St.
Williamston, N. C. . . . . Town Hall
Wilmington, Del. . . . . 1326 N. Market St.
Worcester 8, Mass. . . . . 507 Main St.
York, Pa. . . . . 56 N. Harrison St.
Youngstown, Ohio. . . . . 272 E. Indianola Ave.

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