INSTRUCTIONS

Switchgear

Types

IBC31D  IBC34C  IBC39B  IBC42B
IBC32D  IBC35C  IBC40B  IBC42C
IBC33C  IBC38B  IBC41B

DIRECTIONAL OVERCURRENT RELAYS

In Universal and Drawout Cases

GENERAL ELECTRIC
DIRECTIONAL OVERCURRENT RELAYS

TYPE IBC

The Type IBC relays covered by this book are directional-overcurrent relays consisting of three units. The bottom unit is an instantaneous power directional unit. The top unit is a time-over-current unit which is directionally controlled by the directional unit. The instantaneous overcurrent unit is mounted behind the time-overcurrent unit and is not directionally controlled. The target for the time-overcurrent unit is below the contact plate and the target for the instantaneous overcurrent unit is mounted above the contact plate of the top unit.

INVERSE TIME CHARACTERISTIC

The Type IBC31D relay is similar to the Type IBC31A relay with an instantaneous overcurrent unit added. The internal connections are shown in Fig. 3 and the outline and panel drilling in Figs. 1 and 2.

The Type IBC32D relay is similar to the Type IBC32A relay with an instantaneous overcurrent unit added. The internal connections are shown in Fig. 4 and the outline and panel drilling in Figs. 1 and 2.

The Type IBC35C relay is similar to the Type IBC35A relay with an instantaneous overcurrent unit added. The internal connections are shown in Fig. 5 and the outline and panel drilling in Figs. 1 and 2.

The Type IBC39B relay is similar to the Type IBC38A relay but with an instantaneous overcurrent element added. The internal connections are shown in Fig. 12 and the outline and panel drilling in Figs. 1 and 2.

VERY-INVERSE TIME CHARACTERISTIC

The Type IBC33C relay is similar to the Type IBC33A relay with an instantaneous overcurrent unit added. The internal connections are shown in Fig. 6 and the outline and panel drilling in Figs. 1 and 2.

The Type IBC34C relay is similar to the Type IBC34A relay with an instantaneous overcurrent unit added. The internal connections are shown in Fig. 13, and the outline and panel drilling in Figs. 1 and 2.

The Type IBC39B relay is similar to the Type IBC39A relay with an instantaneous overcurrent unit added. The internal connections are shown in Fig. 10 and the outline and panel drilling in Figs. 1A and 2.

The Type IBC40B relay is similar to the Type IBC40A relay with an instantaneous overcurrent unit added. The internal connections are shown in Fig. 7 and the outline and panel drilling in Figs. 1 and 2.

The Type IBC41B relay is similar to the Type IBC41A relay with an instantaneous attachment added. The internal connections are shown in Fig. 11 and the outline and panel drillings in Figs. 1A and 2.

The Type IBC42B relay is similar to the Type IBC42A relay with an instantaneous overcurrent unit added. The internal connections are shown in Figs. 8 and the outline and panel drilling in Figs. 1 and 2.

The Type IBC42C relay is similar to the Type IBC42B relay except the overcurrent units, both time delay and instantaneous, have their contacts in series with an additional directional unit contact. Thus, both overcurrent units are ineffective unless the directional unit contacts are closed. The directional unit also has a special backstop which allows the directional contact to open further for external faults thus increasing its closing time and minimizing the possibility of incorrect tripping due to transients resulting when an external fault is cleared. The additional closing time allows the instantaneous or the time overcurrent units to reset if they have closed for the external fault. The internal connections for this relay are shown in Fig. 14 and the outline and panel drilling dimensions are shown in Fig. 2.

INSTANTANEOUS ATTACHMENT

The instantaneous attachment is mounted on the rear of the top unit frame opposite the tapped operating coil with which its coil is connected in series.

Operation

The instantaneous attachment operates over a 4 to 1 range and has its calibration stamped on the tube surrounding the plunger. The five different coils that are available for use have current ranges of 2 to 8, 4 to 16, 10 to 40, 20 to 80 and 40 to 160 amp respectively. The pick-up is adjusted by raising or lowering the plunger. This is done by turning the adjusting worm stud having a slotted end protruding through the permanent magnet shield at the lower left-hand corner. Turning this adjusting worm stud in a counter-clockwise direction raises the plunger to obtain a lower pickup current value and in a clockwise direction to lower the plunger to obtain a higher pickup current value.

The time-current curves for the instantaneous attachment are given in Fig. 9.

Contact Adjustment

The contact tips should be the same horizontal plane and about 1/16" from the silver disk when the plunger is down. The contacts should close, when the plunger is raised to its highest position, and the contact tips should be deflected vertically at least 1/32" before striking the two stop screws. These stop screws also determine the "drop-out" of the instantaneous attachment.

With the above exceptions the instructions for the above relays are the same as given in included copy of GEH-1159.

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
OUTLINE AND PANEL DRILLING FOR TYPE IBC RELAY IN UNIVERSAL CASE

(a) Types IBC31D, 33C, 35C, 39B, 41B
(b) Types IBC32D, 34C, 38B, 40B, 42B
FIG. 2
OUTLINE AND PANEL DRILLING FOR DRAWOUT CASE - TWO UNIT - SINGLE END
FIG. 3
INTERNAL CONNECTIONS FOR TYPE IBC310 RELAY

FIG. 4
INTERNAL CONNECTIONS FOR TYPE IBC320 RELAY
**Type IBC Directional Overcurrent Relays**

**FIG. 5**

**INTERNAL CONNECTIONS FOR TYPE IBC35C RELAY**

(a) Drawout Case

(b) Universal Case

**FIG. 6**

**INTERNAL CONNECTIONS FOR TYPE IBC33C RELAY**

(a) Drawout

(b) Universal
FIG. 7
INTERNAL CONNECTIONS FOR TYPE IBC40B RELAY

(a) Drawout  (b) Universal

FIG. 8
INTERNAL CONNECTIONS FOR TYPE IBC42B RELAY

(a) Drawout  (b) Universal
FIG. 9
TYPICAL TIME CURRENT CURVES FOR INFaNTANEOUS ATTACHMENT CIRCUIT
CLOSING CONTACTS, 60 CYCLES

CURVE A - MIN. CALIBRATION POINT
CURVE B - SECOND CALIBRATION POINT
CURVE C - THIRD CALIBRATION POINT
CURVE D - MAX. CALIBRATION POINT
FIG. 13
INTERNAL CONNECTIONS FOR TYPE IBC34C RELAY, BACK VIEW
FIG. 14

INTERNAL CONNECTIONS FOR TYPE IBC42C RELAY - BACK VIEW
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

APPARATUS SALES OFFICES

Grand Rapids 2, Mich...148 Monroe Ave., N.W.
Greenville, S. C....106 W. Washington St.
Hagerstown, Md...Professional Arts Bldg.
Hofford 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...303 W. Capitol St.
Jacksonville 2, Fla...700 E. Union St.
Jamesville, N. Y....2 Second St.
Johnstown 4, N. Y....334 E. Main St.
Johnson 1, Ohio...841 Oak St.
Kansas City 6, Mo...106 W. Fourteenth St.
Knoxville 8, Tenn...602 S. Gay St.
Lansing 68, Mich...215 So. Grand Ave.
Lincoln 8, Neb...1001 10th St.
Los Angeles 54, Calif...212 N. Vignes St.
Louisville 2, Ky...455 S. Fourth St.
Madison 3, Wis...111 S. Hamilton St.
Manchester, N. H...899 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. Fifth Ave.
Minneapolis 2, Minn...12 S. Sixth St.
Mobile 13, Ala...54 St. Joseph St.
Nashville 5, Tenn...234 Third Ave., N.
New York 15, N. Y...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.
North Carolina 10, Va...229 W. Bute St.
Oakland 12, Calif...409 Thirteenth St.
Oklahoma City 3, Okla...119 N. Robinson St.
Omaha 2, Neb...409 S. Seventeenth St.
Pasco, Wash...421 W. Clark St.
Peoria 2, Ill...410 Main St.
Philadelphia 5, Pa...1405 Locust St.
Phoenix, Ariz...425 W. Madison St.
Pittsburgh 22, Pa...533 Smithfield St.
Portland 3, Maine...477 Congress St.
Portland 7, Ore...920 S. Sixth Ave.
Previdence 3, R. I...Industrial Trust Bldg.
Reading, Pa...356 Philadelphia St.
Rochester 17, Va...219 E. Franklin St.
Riverside, Calif...3808 Main St.
Roanoke 11, Va...202 S. Jefferson St.
Rochester 4, N. Y...89 E. Ave.
Rockford, Ill...110 S. First St.
Rutland, Vt...385 Center St.
Sacramento 14, Calif...1107 Ninth St.
Saginaw, Mich...107 N. Franklin St.
Salt Lake City 9, Utah...200 S. Main St.
San Antonio 5, Texas...310 S. Mary's St.
San Diego 1, Calif...681 Sixth Ave.
San Francisco 6, Calif...225 Montgomery St.
San Jose, Calif...177 W. Santa Clara Ave.
Savannah, Ga...16 Dayton St.
Seattle 4, Wash...710 Second Ave.
Sheepstead 39, La...803 Jordan St.
Sioux City 13, Iowa...507 Sixth St.
South Bend 11, Ind...112 W. Jefferson Blvd.
Spartan 8, Wash...526 Post St.
Springfield, Ill...607 E. Adams St.
Springfield 3, Mass...1387 Main St.
Stockton, Calif...11 So. San Joaquin St.
Syracuse 2, N. Y...113 S. Salina St.
Tacoma 1, Wash...1019 Pacific Ave.
Tampa 6, Fla...1206 North A St.
Toledo 4, Ohio...420 Madison Ave.
Trenton, N. J...214 Hanover St.
Toledo 3, Ohio...320 S. Boston Ave.
Tulsa 2, Okla...258 Genesee St.
Washington 5, D. C...806 Fifteenth St., N.W.
Waterbury 89, Conn...111 W. Main St.
Waterloo, Iowa...321 W. Eighteenth St.
Wheeling, W. Va...40 Fourth St.
Whitehall, Kan...201 E. First St.
Wilmington, N. C...Town Hall.
Wilmingon, Del...1326 State St.
Worcester 8, Mass...507 Main St.
York, Pa...56 W. Market St.
Youngstown 3, Ohio...25 E. Boardman St.

Hawaii: W. A. Ramsay, Ltd., Honolulu

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Apparatus Department, General Electric Company, Schenectady, N. Y.

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Superseded SEI-144888

Notes