INSTRUCTIONS

OVERCURRENT RELAY

TYPE JCC53C

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CONTENTS

OVERCURRENT RELAY
TYPE JCC53C

DESCRIPTION

The JCC53C relay consists of two overcurrent units in an M1 size drawout case. One of the units is of the induction disk type with inverse time current characteristics. The other unit is of the induction cup type with an instantaneous time current characteristic. Each of the units is meant to be torque-controlled externally, and the appropriate inputs must be jumpered, or a suitable device must be used to provide this torque control. A separate target and seal-in unit is provided for each of the overcurrent functions. Internal connections for the relay are shown in Fig. 3.

APPLICATION

The JCC53C relay is meant to be used with an appropriate directional relay to provide time and instantaneous directional overcurrent protection for ground faults. See Fig. 4 for typical external connections wherein a type CNP negative sequence directional relay is used to provide the torque control.

The pickup of the time overcurrent function should be low enough to provide selectivity with and backup protection for the relaying in adjacent line sections. The pickup of the instantaneous function must be greater than the maximum zero zequence current seen for a fault at the remote terminal of the protected line section.

If continuous torque control is required, or if directional control is not required, jumper studs 7, 8 and 9 of the JCC53C relay.

CONSTRUCTION

The Type JCC53C relay is mounted in a M1 size case. The case has terminals at the bottom in the rear for external connections.

The electrical connections between the relay units and the case terminals are made through stationary molded inner and outer blocks between which nests a removable connection 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.

Every circuit in the drawout case has the auxiliary brush, as shown in Fig. 10, to provide adequate overlap when the connecting plug is withdrawn or inserted. Some circuits are equipped with shorting bars (see internal connections in Fig. 3) and on those circuits, it is especially important that the auxiliary brush make contact as indicated in Fig. 10 with adequate pressure to prevent the opening of important interlocking circuits.

The relay mechanism is mounted in a steel framework called the cradle and is a complete unit with all leads terminated at the inner block. The cradle is held firmly in the case with a latch at both top and bottom and by a guide pin at the back of the case. 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 drawn to the case by thumbscrews, holds the connecting plug in place.

The relay case is suitable for either semi-flush or surface mounting on all panels up to two inches thick and appropriate hardware is available. However, panel thickness must be indicated on the relay order to insure that proper hardware will be included.

The relay consists of two induction units, an induction disk unit and an induction cylinder unit.

The induction disk unit, which is a time overcurrent unit, consists of a tapped current operating coil wound on a U-magnet iron structure. The tapped operating coil is connected to taps on the tap block. The U-magnet contains wound shading coils that produce a split-phase field which, in turn, develops torque on the operating disk.

The induction cylinder unit, which is the instantaneous overcurrent unit, consists of a laminated stator having eight poles projecting inward and arranged symmetrically around a stationary core. The cuplike aluminum induction rotor is free to operate in the annular air gap between the poles and the core. The four corner poles are fitted with coils that consist of two windings, an inner winding consisting of a large number of turns of fine wire, and an outer winding having a few turns of heavy wire. The outer windings of these corner coils are connected either in series or in parallel with the four side coils by tap links provided on the relay. These series or parallel combinations are connected in series with the operating coil of the time overcurrent unit. The inner windings of the corner coils are all connected in series, and in turn are connected in series with a capacitor.

The induction cylinder contacts (see Fig. 9) are especially constructed to suppress bouncing. The stationary contact (G) is mounted on a flat spiral spring (F) backed up by a thin diaphragm (C). These are both mounted in a slightly inclined tube (A). A stainless ball (B) is placed in the tube before the diaphragm is assembled. When the moving contact hits the stationary contact, the energy of the former is imparted to the latter and then to the ball, which is free to roll up the inclined tube. Thus, the moving contact comes to rest with substantially no rebound or vibration.

There are two Hi-Seismic target and seal-in units mounted at the top of the relay. When the Hi-Seismic target and seal-in units are picked up, targets are raised into view and latch up and remain exposed until released by the reset mechanism located at the lower left-hand corner of the cover assembly.

RATINGS

The JCC relay is rated for 60 hertz and the time overcurrent and instantaneous units have eight to one extended range. Ratings of the time overcurrent and instantaneous units are shown individually. However, since the operating circuits are connected in series, the operating coil ratings of both units should be considered in determining the rating of the entire operating circuit.

TIME OVERCURRENT UNIT

The one second ratings of the time overcurrent units are given in Table I. The continuous ratings for the various taps of each unit are given in Table II and III.

TABLE I

One Second Rating

Range (Amps)	One Second Rating (Amps)
0.5 - 4	140
1.5 - 12	260

TABLE II

Continuous Rating of 0.5-4 Ampere Unit

Tap	0.5	0.6	0.7	0.8	1.0	1.2	1.5	2.0	2.5	3.0	4.0
Rating	4.0	4.5	5.5	5.5	6.0	7.0	7.5	9.0	10.0	11.0	13.0

TABLE III

Continuous Rating of 0.5-12 Ampere Unit

Tap	1.5	2.0	2.5	3.0	4.0	5.0	6.0	7.0	8.0	10.0	12.0
Rating	10.0	11.5	13.0	14.5	17.0	19.0	21.0	23.0	23.5	27.5	30.5

INSTANTANEOUS OVERCURRENT UNIT

Ranges and ratings of the instantaneous units are shown in Table IV. The operating coils have dual ratings obtained with series or parallel connections.

TABLE IV

Continuous and One Second Rating of Instantaneous Units

Total Range (Amps)	Connections	Pickup Range (Amps)	Continuous Rating (Amps)	One Second Rating (Amps)
2-16	Series	2-8	5.0	200
	Parallel	4-16	6.5	260
10-80	Series	10-40	9.0	220
	Parallel	20-80	15.0	260

HI-SEISMIC TARGET AND SEAL-IN UNIT

The Hi-Seismic target and seal-in unit ratings are shown in Table V.

TABLE V

	TAP	
	0.2	2
Carry 30 Amps for (Second)	0.05	2.2
Carry 10 Amps for (Second)	0.45	20
Carry continuously (Amp)	0.37	2.3
Minimum operating (Amp)	0.2	2.0
Minimum dropout (Amp)	0.05	0.5
DC Resistance (Ohms)	8.3	0.24
60 Hertz Impedance (Ohms)	50	0.65
50 Hertz Impedance (Ohms)	42	0.54

If the tripping current exceeds 30 amperes an auxiliary relay should be used, the connections being such that the tripping current does not pass through the contacts, or the target and seal-in coils of the protective relay.

BURDENS

The burdens of the overcurrents units (time and instantaneous) at 60 hertz are given in Table VI.

TABLE VI

Range			Burdens at Min. Pickup Min Tap of TOC Unit					Burden Ohms (Z)		≠VA
TOC Unit	IOC Unit	IOC Unit Connections	R	J_X	**Z	+VA	P.F.	3 Times Min P U	10 Times Min P U	At 5 Amps
0.5-4	2-16	Series 2-8	1.64	4.47	4.76	1.2	0.35	4.83	3.43	119
		Parallel 4-16	1.45	4.00	4.25	1.1	0.34	4.31	3.01	106
	10-80	Series 10-40	1.48	4.04	4.31	1.1	0.34	4.36	3.06	108
		Parallel 20-80	1.41	3.91	4.15	1.0	0.34	4.21	2.92	104
1.5-12	2-16	Series 2-8	0.47	1.10	1.20	2.7	0.39	1.20	0.53	30
		Parallel 4-16	0.28	0.63	0.69	1.6	0.41	0.69	0.47	17
	10-80	Series 10-40	0.31	0.67	0.74	1.7	0.42	0.74	0.52	19
		Parallel 20-80	0.24	0.54	0.59	1.3	0.41	0.59	0.38	15

** The impedance values given are those for the minimum tap of each range. The impedance for other taps, at pickup current (tap value), varies inversely approximatley as the square of the current rating. Example: for the 1.5-12 ampere range, with impedance of the 1.5 ampere tap of 1.20 ohms, the impedance of the three ampere tap, at three amperes, is approximately $(1.5/3)^2 \times 1.20 = 0.3$ ohms.

+ Some companies list relay burdens only as the volt-ampere input to operate at minimum pickup. This column is included so a direct comparison can be made. It should not be used in calculating volt-ampere burdens in a CT secondary circuit, since the burden at five amperes is used for this purpose.

≠ Calculated from burden at minimum pickup.

CHARACTERISTICS

TIME OVERCURRENT UNIT

Pickup of the time overcurrent unit is defined as the current required to close its contact from the 0.5 time dial position with three percent of tap value.

The setting of the time dial determines the length of time the unit requires to close its contacts when the current reaches the predetermined value. The contacts are just closed when the dial is set at zero. When the dial is set at 10, the disk must travel the maximum distance to close the contacts; this gives the maximum time setting. The unit resets at 80 percent of the minimum closing value of current.

The time to reset to the No. 10 time dial position, when the current is reduced to zero, is approximately 60 seconds.

Fig. 5 shows the time current characteristics for the JCC53C time overcurrent unit.

INSTANTANEOUS OVERCURRENT UNIT

Pickup of the instantaneous unit can be adjusted over an eight-to-one range. The time curves are shown in Fig. 6.

HI-SEISMIC TARGET AND SEAL-IN UNIT

The Hi-Seismic target and seal-in units have two tap selections located on the front of the unit. See Fig. 1.

RECEIVING, HANDLING AND STORAGE

These relays, when not included as part of a control panel will be shipped in cartons designed to protect them against damage. Immediately upon receipt of a relay, examine it for any damage sustained in transit. If injury or damage resulting from rough handling is evident, file a damage claim at once with the transportation company and promptly notify the nearest General Electric Apparatus Sales Office.

Reasonable care should be exercised in unpacking the relay in order that 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.

ACCEPTANCE TESTS

Immediately upon receipt of the relay an INSPECTION AND ACCEPTANCE TEST should be made to ensure that no damage has been sustained in shipment and that the relay calibrations have not been disturbed. If the examination or test indicates that readjustment is necessary, refer to the section on **SERVICING.**

These tests may be performed as part of the installation or acceptance tests at the discretion of the user.

Since most operating companies use different procedures for acceptance and installation tests, the following section includes all applicable tests that may be performed on these relays.

VISUAL INSPECTION

Check the nameplate stamping to ensure that the model number and rating of the relay agree with the requisition.

Remove the relay from its case and check that there are not broken or cracked molded parts or other signs of physical damage, and that all the screws are tight.

MECHANICAL INSPECTION

Time Overcurrent Unit

1. There should be no noticeable friction when the disk is rotated slowly clockwise. The disk should return by itself to its rest position.

2. Make sure the control spring is not deformed nor its convolutions tangled or touching.

3. The rotating shaft end play should be 0.005 - 0.015 inch.

4. The disk should be centered in the air gaps of both the electromagnet and drag magnet and both air gaps should be free of foreign matter.

5. The moving contact should just touch the stationary contact when the time dial is at the zero time dial position.

Instantaneous Overcurrent Unit

1. The rotating shaft end play should be 0.015 - 0.020 inch.

2. The contact gap should be 0.028 - 0.036 inch.

3. There should be no noticeable friction in the rotating structure.

4. With the relay well leveled and in its upright position, the contact should be open and resting against the backstop.

Hi-Seismic Target and Seal-in Units

1. The armature and contacts should move freely when operated by hand.

2. The target should latch into view when the armature is raised and should unlatch when the target release arm is operated.

CAUTION:

EVERY CIRCUIT IN THE DRAWOUT CASE HAS AN AUXILIARY BRUSH. IT IS ESPECIALLY IMPORTANT ON CURRENT CIRCUITS AND OTHER CIRCUITS WITH SHORTING BARS THAT THE AUXILIARY BRUSH BE BENT HIGH ENOUGH TO ENGAGE THE CONNECTING PLUG OR TEST PLUG BEFORE THE MAIN BRUSHES DO. THIS WILL PREVENT THE CT SECONDARY CIRCUITS FROM BEING OPENED.

DRAWOUT RELAYS, GENERAL

Since all drawout relays in service operate in their cases, it is recommended that they be tested in their cases or an equivalent steel case. In this way, any magnetic effects of the enclosure will be accurately duplicated during testing. A relay may be

tested without removing it from the panel by using a 12XLA13A test plug. This plug makes connections only with the relay and does not disturb any shorting bars in the case. The 12XLA12A test plug may also be used. Although this test plug allows greater testing flexibility, it requires CT shorting jumpers and the exercise of greater care, since connections are made to both the relay and the external circuitry.

POWER REQUIREMENTS GENERAL

All alternating current operated devices are affected by frequency. Since non-sinusoidal waveforms can be analyzed as a fundamental frequency plus harmonics of the fundamental frequency, it follows that alternating current devices (relays) will be affected by the applied waveform.

Therefore, in order to properly test alternating current relays, it is essential to use a sine wave of current and/or voltage. The purity of the sine wave (i.e., its freedom from harmonics) cannot be expressed as a finite number for any particular relay; however, any relay using tuned circuits, R-L or RC networks, or saturating electromagnets (such as time overcurrent relays) would be essentially affected by non-sinusoidal waveforms.

TIME OVERCURRENT UNIT

Rotate the time dial slowly and check by means of a lamp that the contacts just close at the zero time dial setting.

Where the contacts just close can be adjusted by running the stationary contact brush in or out by means of its adjusting screw. This screw should be held securely in its support.

With the contacts just closing at No. 0 time setting, there should be sufficient gap between the stationary contact brush and its metal backing strip to ensure approximately 1/32 inch wipe.

The minimum current at which the contacts will just close is determined by the position of the tap screw in the tap block at the top of the relay.

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 screws into the tap marked for the desired current and then replace the connection plug.

The pickup of the unit for any current tap is adjusted by means of a spring-adjusting ring. See Fig. 1. The ring may be turned by inserting a screw driver in the notches around the edge. By turning the ring, the operating current of the unit may be brought into agreement with the tap setting employed, if for some reason, this adjustment has been disturbed. This adjustment also permits any desired setting intermediate between the various tap settings to be obtained. The unit is adjusted at the factory to close its contacts from any time-dial position at a minimum current within five percent of the tap-plug setting. The unit resets at 80* percent of the minimum closing value.

*Revised since last issue

Time Setting

The setting of the time dial determines the length of time the unit requires to close its contacts when the current reaches a predetermined value. The contacts are just closed when the dial is set on 0. When the dial is set on 10, the disk must travel the maximum amount to close the contacts and therefore this setting gives the maximum time setting.

The primary adjustment for the time of operation of the unit is made by means of the time dial. However, further adjustment is obtained by moving the permanent magnet along its supporting shelf; moving the magnet toward the disk shaft decreases the time, while moving it away increases the time.

Pickup Test

Set the relay at the 0.5 time-dial position and 2.0 ampere tap. Using the test connections in Fig. 7, the main unit should close its contacts within plus or minus two percent of tap value current.

Time Test

Set the relay at No. 5 time-dial position setting and the 2.0 ampere tap. Using the test connection in Fig. 7, apply five times tap current (10.0 amperes) to the relay. The relay should operate at 1.31 seconds plus or minus 0.04 second.

INSTANTANEOUS OVERCURRENT UNIT

Pickup Setting

The pickup of the instantaneous overcurrent unit can be adjusted over an eight-to-one range, by varying the tension of the spiral control spring and by selection of the appropriate series or parallel connections. The outside end of this spring is fastened to a post on the adjusting ring above the moving contact, and the ring is in turn clamped in position by a hexagonal-head locking screw. If this screw is loosened, the ring can be slipped to vary the spring tension.

Make test connections as shown in Fig. 8. In adjusting pickup, the desired pickup current should be passed through the coils and the control spring should be adjusted until the contact just closes. The adjusting ring should then be locked in position and the pickup current rechecked.

HI-SEISMIC TARGET AND SEAL-IN UNIT

The target and seal-in units have an operating coil tapped at 0.6 and 20 amperes. The relay is shipped from the factory with the tap screw in the higher ampere position. The tap screw is the screw holding the right-hand stationary contact. To change the tap setting, first remove one screw from the left-hand stationary contact and place it in the desired tap. Next remove the screw from the undesired tap and place it on the left-hand stationary contact where the first screw was removed. See Fig. 1. This procedure is necessary to prevent the right-hand stationary contact from getting out of adjustment. Screws should never be left in both taps at the same time.

Pickup and Dropout Test

1. Connect relay terminals 1-10 and 2-8 together.

2. Connect a DC source between terminals 1 and 2 with a series load box that can control the current between 0.5 and 6.0 amperes.

3. Close the time overcurrent and instantaneous contacts manually.

4. Increase the current slowly until the seal-in units pick up. See Table VII. The targets shall latch in.

5. Decrease the current slowly until the seal-in unit drops out. See Table VII. The targets shall remain latched in. Reset the target before checking pickup again.

TABLE VII

TAP	PICKUP CURRENT	DROPOUT CURRENT
0.6	0.36-0.6	0.15 or more
2.0	1.2-2.0	0.50 or more

INSTALLATION

The relay should be installed in a clean, dry location, free from dust, and well lighted to facilitate inspection and testing.

The relay should be mounted on a vertical surface. The outline and panel drilling dimensions are shown in Fig. 11.

The internal connection diagram for the relay is shown in Fig. 3. Typical external connections are shown in Fig. 4.

TIME OVERCURRENT UNIT

Set tap screw on desired tap. Using the test circuit in Fig. 7, apply approximatley twice tap value until contacts just close. Reduce the current until the light in series with the contacts begins to flicker. This value of current is defined as pickup and should be within five percent of tap value. Check the operating time at some multiple of the tap value. This multiple of tap value may be five times tap rating or the maximum fault current for which the relay must coordinate. The value used is left to the discretion of the user.

INSTANTANEOUS OVERCURRENT UNIT

Check pickup setting; see **ACCEPTANCE TESTS.**

HI-SEISMIC TARGET AND SEAL-IN UNIT

Make sure that the tap screw is in the desired tap. Perform pickup and dropout tests as outlined in the **ACCEPTANCE TESTS** section.

PERIODIC CHECKS AND ROUTINE MAINTENANCE

In view of the vital role of protective relays in the operation of a power system, it is important that a periodic test program be followed. It is recognized that the interval between periodic checks will vary depending upon environment, type of relay and the user's experience with periodic testing. Until the user has accumulated enough experience to select the test interval best suited to his individual requirements, it is suggested that the points listed below be checked at an interval of from one to two years.

These tests are intended to insure that the relays have not deviated from their original settings. If deviations are encountered, the relay must be retested and serviced as described in the **ACCEPTANCE TESTS** section.

SERVICING

These relays are adjusted at the factory and it is advisable not to disturb the ajdustments. If, for any reason, they have been disturbed or it found during installation or periodic testing that the relay is out of limits, the checks and adjustments outlined in the following paragraphs should be observed. It is suggested that this work be done in the laboratory.

TIME OVERCURRENT UNIT

Disk and Bearings

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 so that the disk shaft has about 1/64 inch end play.

Contact Adjustment

The contacts should have about 1/32 inch wipe. That is, the stationary contact tip should be deflected about 1/32 inch when the disk completes its travel. Wipe is adjusted by turning the wipe adjustment screw thereby adjusting the position of the brush relative to the brush stop.

When the time dial is moved to the position where it holds the contacts just closed, it should indicate zero on the time-dial scale. If it does not and the brushes are correctly adjusted, shift the dial by changing the position of the arm attached to the shaft just below the time dial. Loosen the screw clamping the arm to the shaft and turn the arm relative to the shaft until the contacts just make for zero time-dial setting.

Pickup and Time Tests

See the **ACCEPTANCE TESTS** section.

INSTANTANEOUS OVERCURRENT UNIT

Bearings

The lower jewel bearing should be screwed all the way in until its head engages the end of the threaded core support. The upper bearing should be adjusted to allow about 1/64 inch end play in the shaft.

To check the clearance between the iron core and the inside of the rotor cup, press down on the contact arm near the shaft, thus depressing the spring-mounted jewel until the cup strikes the iron. The shaft should move about 1/16 inch.

Cup and Stator

Should it be necessary to remove the cup-type rotor from the directional unit, the following procedure should be followed:

All leads to the unit should first be disconnected and tagged for identification in reconnecting. The unit can then be removed from the cradle with its mounting plate still attached.

The upper of the three flat-head screws holding the unit to the plate should now be removed. On some models, it may be necessary to remove a resistor or capacitor to expose this screw. The four corner screws clamping the unit together, should next be removed, and the entire top structure lifted off. This gives access to the cup assembly and exposes the stator assembly, which should be protected to keep it from dust and metallic particles until the unit is reassembled.

To remove the shaft and rotor from the contact head assembly, the spring clip at the top of the shaft must be pulled out and the clutch adjusting screw taken out of the side of the molded contact arm. The shaft and cup can now be pulled out of the molding. The rotor must be handled very carefully while it is out of the unit.

Contact Adjustments

The contact gap may be adjusted by loosening slightly the screw at the front of the contact support. The screw should only be loose enough to allow the contact barrel to rotate in its sleeve.

The backstop screw fastened with a locknut should hold the moving contact arm in a neutral position, i.e., with the arm pointing directly forward. Then, by rotating the barrel, advance the stationary contact until it just touches the moving contact. Next, back it away two-thirds of a turn to obtain approximately 0.020 inch gap. Last, tighten the screw which secures the barrel.

The moving contact may be removed by loosening the screw which secures it to the contact arm and sliding it from under the screw head.

Clutch Adjustment

Using the test connection of Fig. 8, the clutch on the instantaneous overcurrent unit can be adjusted by means of the screw located on the right-hand side of the moving contact arm. If the locknut is loosened and the screw turned in, the current at which the clutch will slip will be increased. Place the tap plugs in the lower range taps (series). Adjust the clutch so that the current at which the cup just starts to slip falls within the limits listed in Table VIII.

TABLE VIII

Pickup Range	Suddenly Applied Current Clutch Must Not Slip (Amps)	Suddenly Applied Current Clutch Must Slip (Amps)
2-8	12	15
10-40	44	58

Note that too frequent or too long application of these currents will overheat the coils.

HI-SEISMIC TARGET AND SEAL-IN UNITS

Repeat the visual and mechanical inspections and the pickup and dropout current checks as outlined in the **ACCEPTANCE TESTS** section.

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.

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, thus preventing contact closing.

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

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 the complete model number of the relay for which the part is required.

LIST OF FIGURES

ILLUSTRATION
LATER

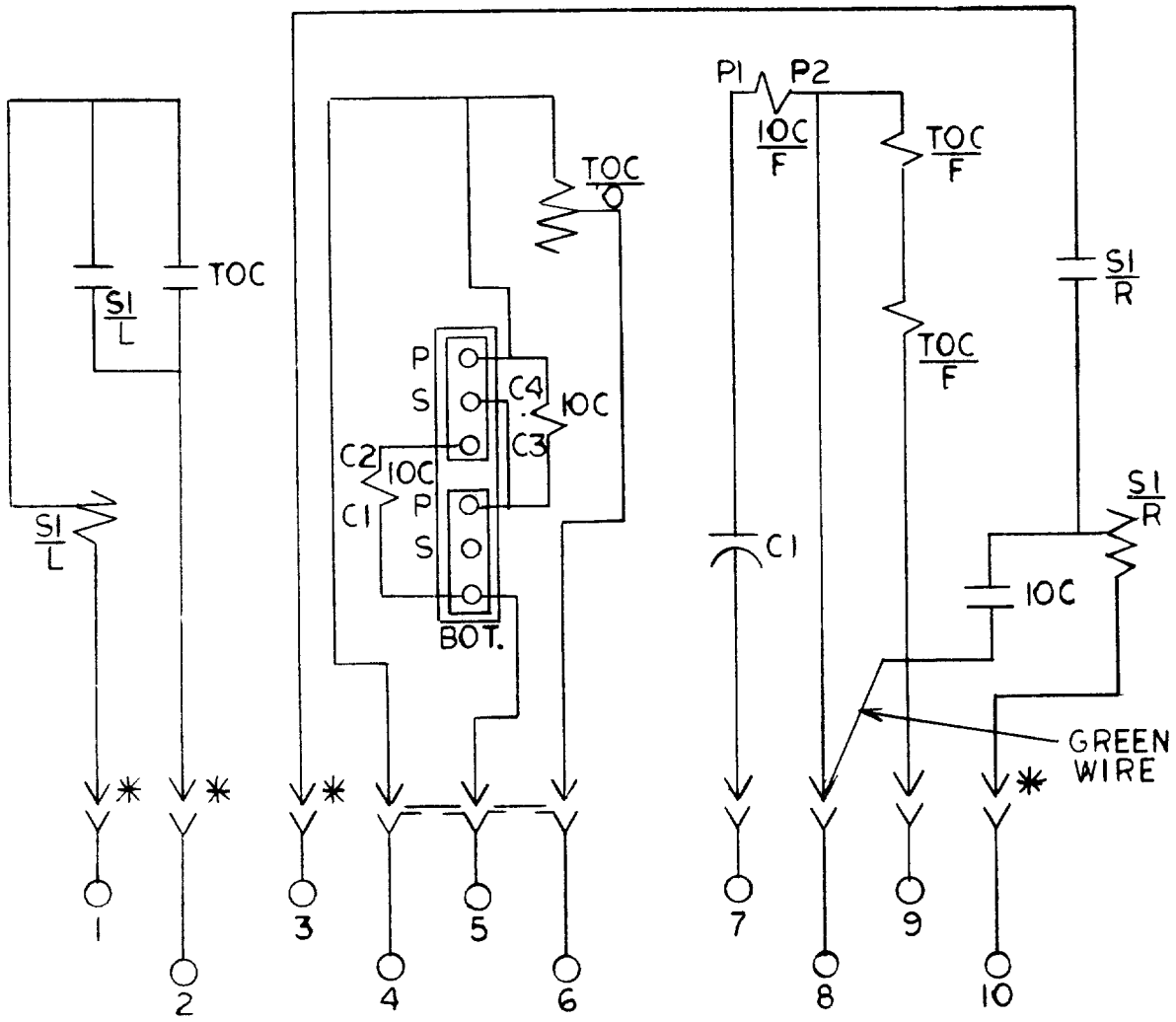
Fig. 1 () Type JCC53C Relay Removed from Case, Front View

ILLUSTRATION
LATER

Fig. 2 () Type JCC53C Relay Removed from Case, Rear View

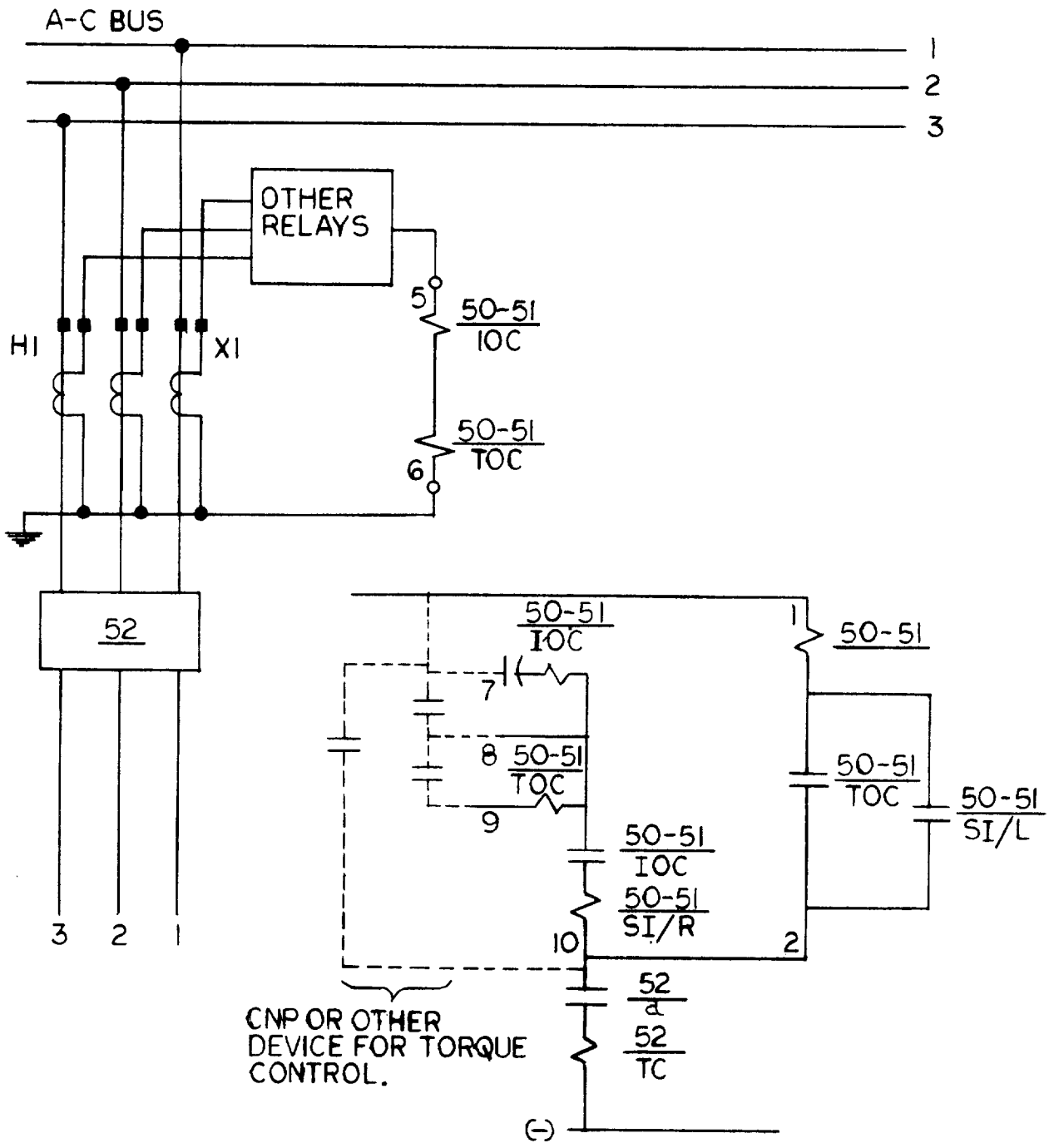
TOC—TIME OVERCURRENT
IOC—INSTANTANEOUS OVERCURRENT UNIT
O —OPERATING COIL
F — TORQUE CONTROL WINDING
SI/R — SEAL-IN UNIT(RIGHT)
SI/L — SEAL-IN UNIT(LEFT)

NOTE: GREEN WIRE SHOWN CONNECTED TO TERMINAL 8. CONNECT GREEN WIRE TO TERMINAL 3 IF SEAL-IN CIRCUIT IS DESIRED



✳ SHORT FINGER

Fig. 3 (0275A4364-0) Type JCC53C Relay, Internal Connections



50-51-GROUND OVERCURRENT RELAY JCC53C
TOC-TIME OVERCURRENT UNIT
IOC- INSTANTANEOUS OVERCURRENT UNIT
SI- SEAL-IN WITH TARGET

Fig. 4 (0275A4548-0) Typical External Connections for Type JCC53C Relay

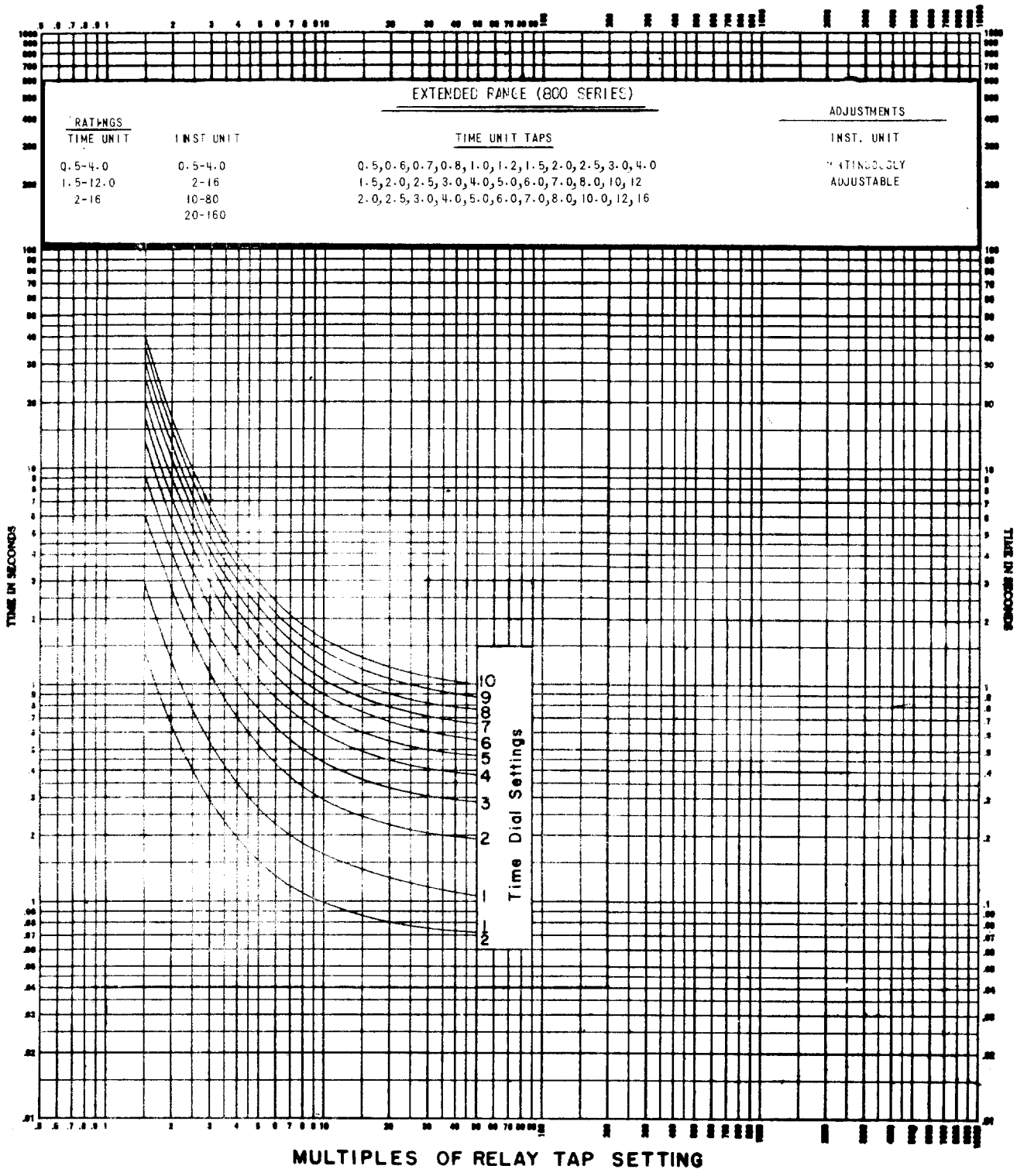


Fig. 5 (0888B0270-3) Time-current Characteristic of Very Inverse Time Overcurrent Unit

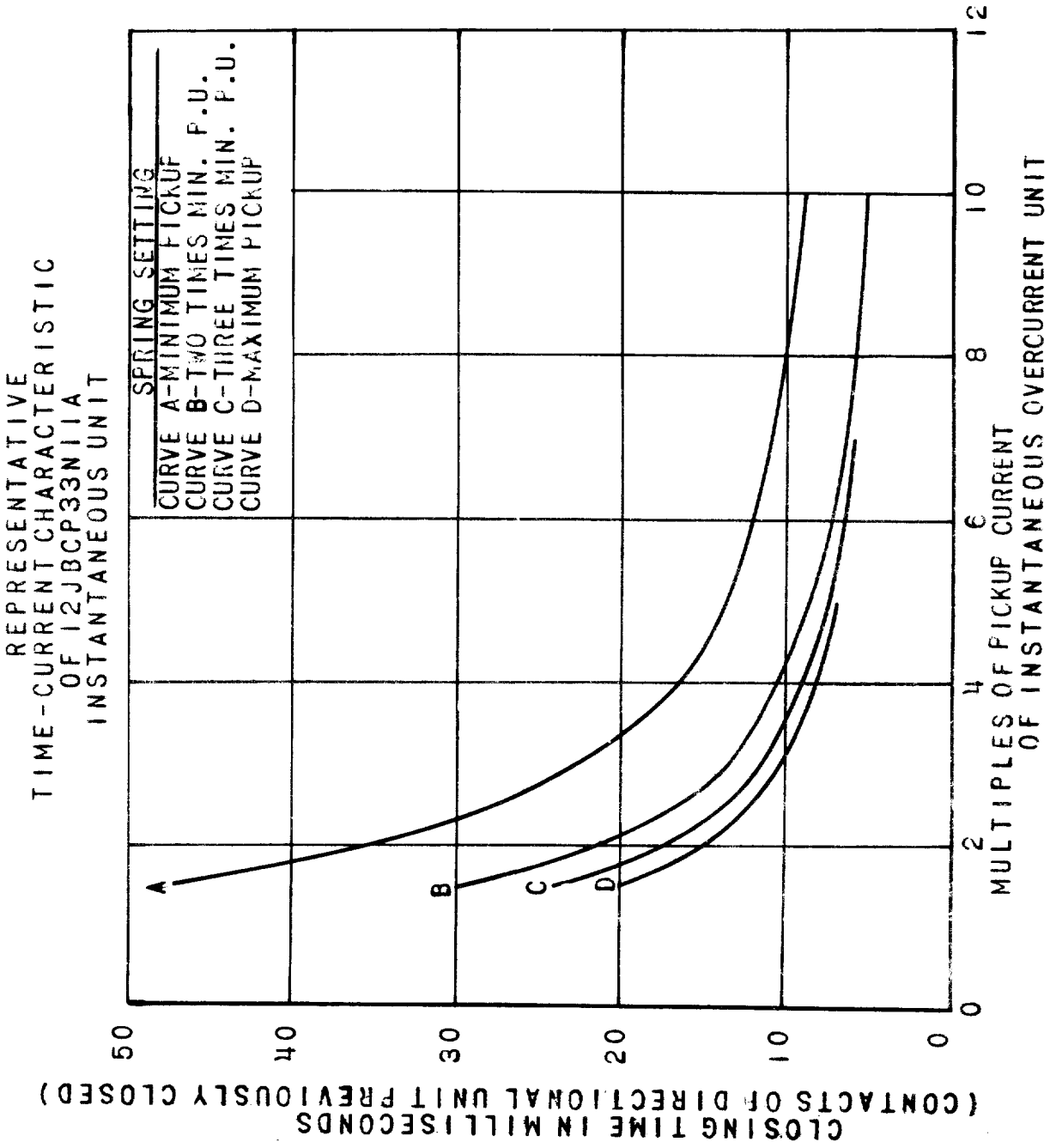


Fig. 6 (K6556439-2) Representative Time-current Characteristic of Instantaneous Overcurrent Unit

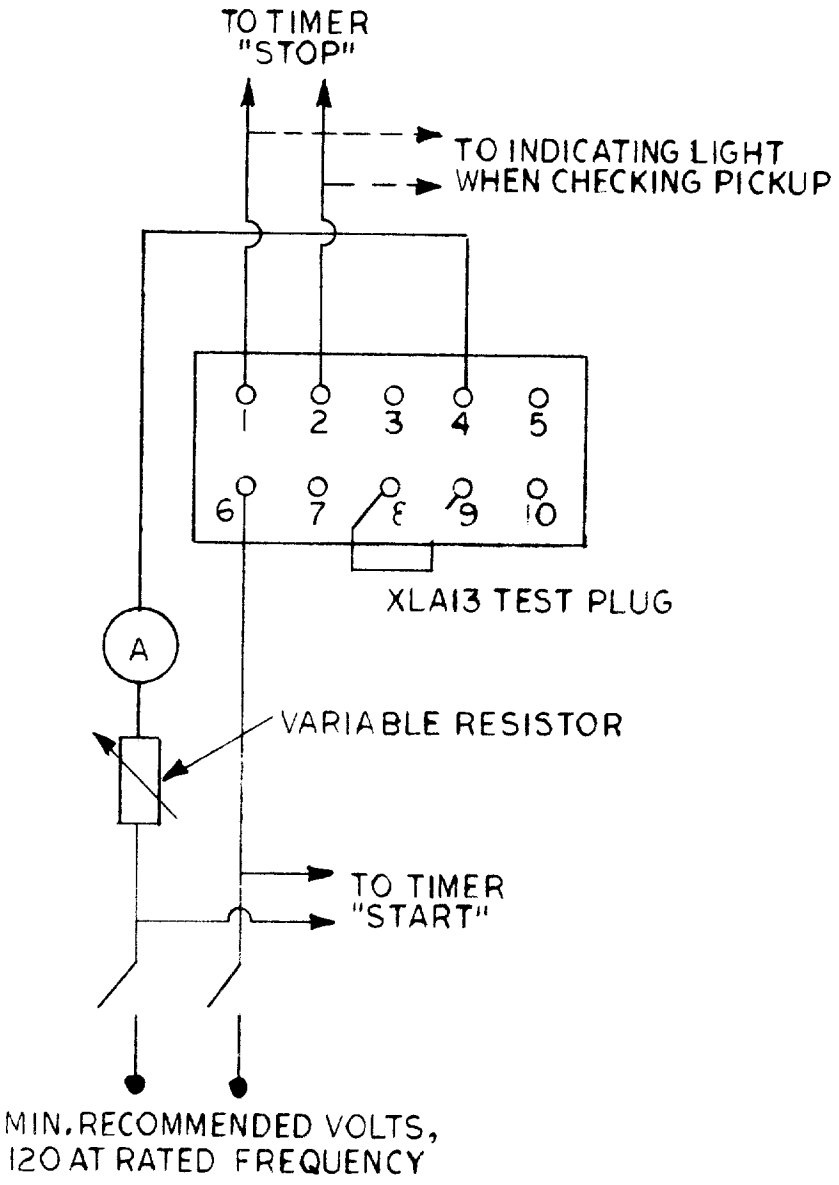


Fig. 7 (0275A4556-0) Test Connections: Time Overcurrent Unit

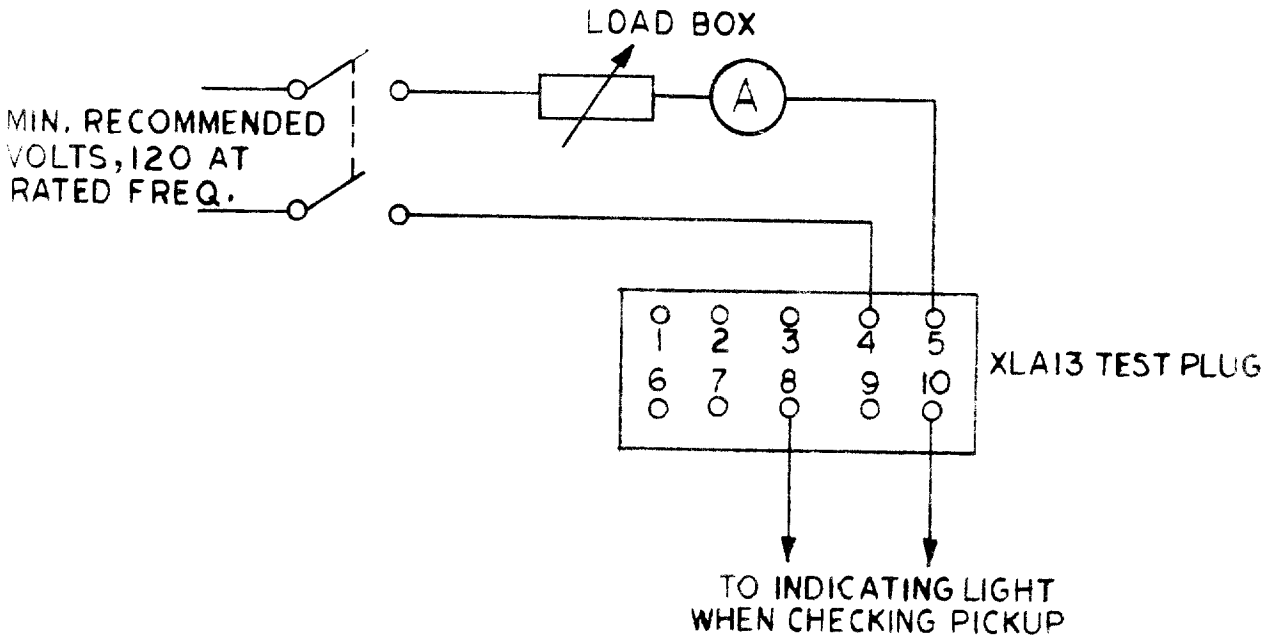
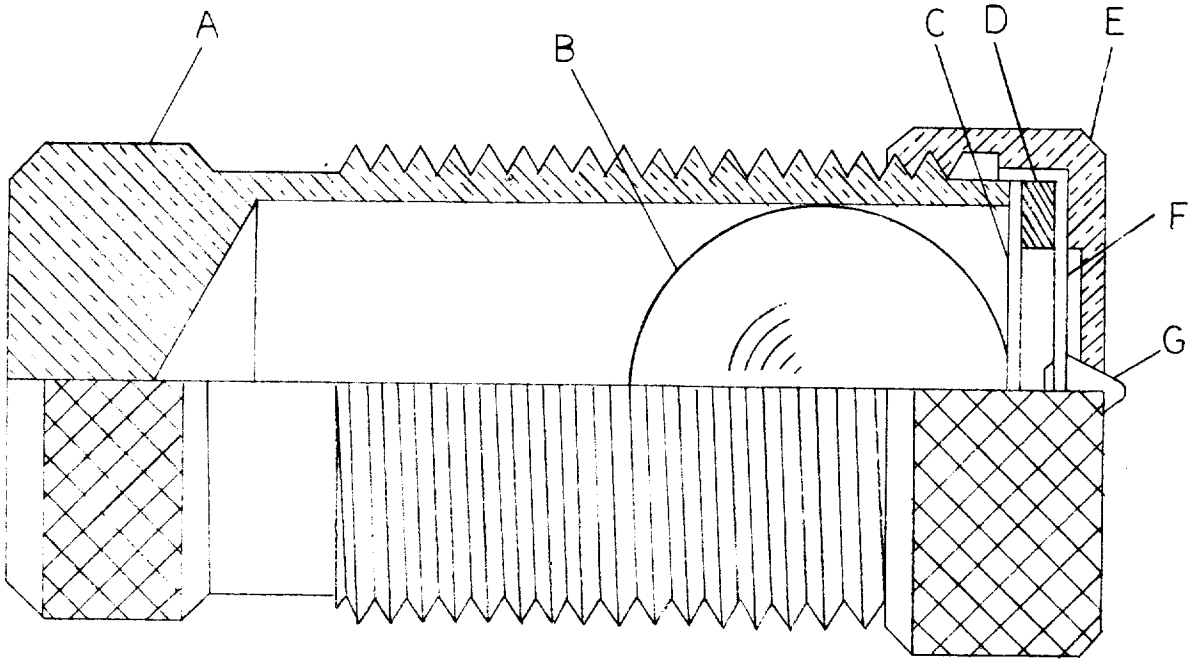


Fig. 8 (0275A4557-0) Test Connections: Instantaneous Unit



A - INCLINED TUBE
B - STAINLESS STEEL BALL
C - DIAPHRAM
D - SPACER
E - CAP
F - FLAT SPIRAL SPRING
G - CONTACT

Fig. 9 (K6077069-2) Barrel Type Contact Assembly

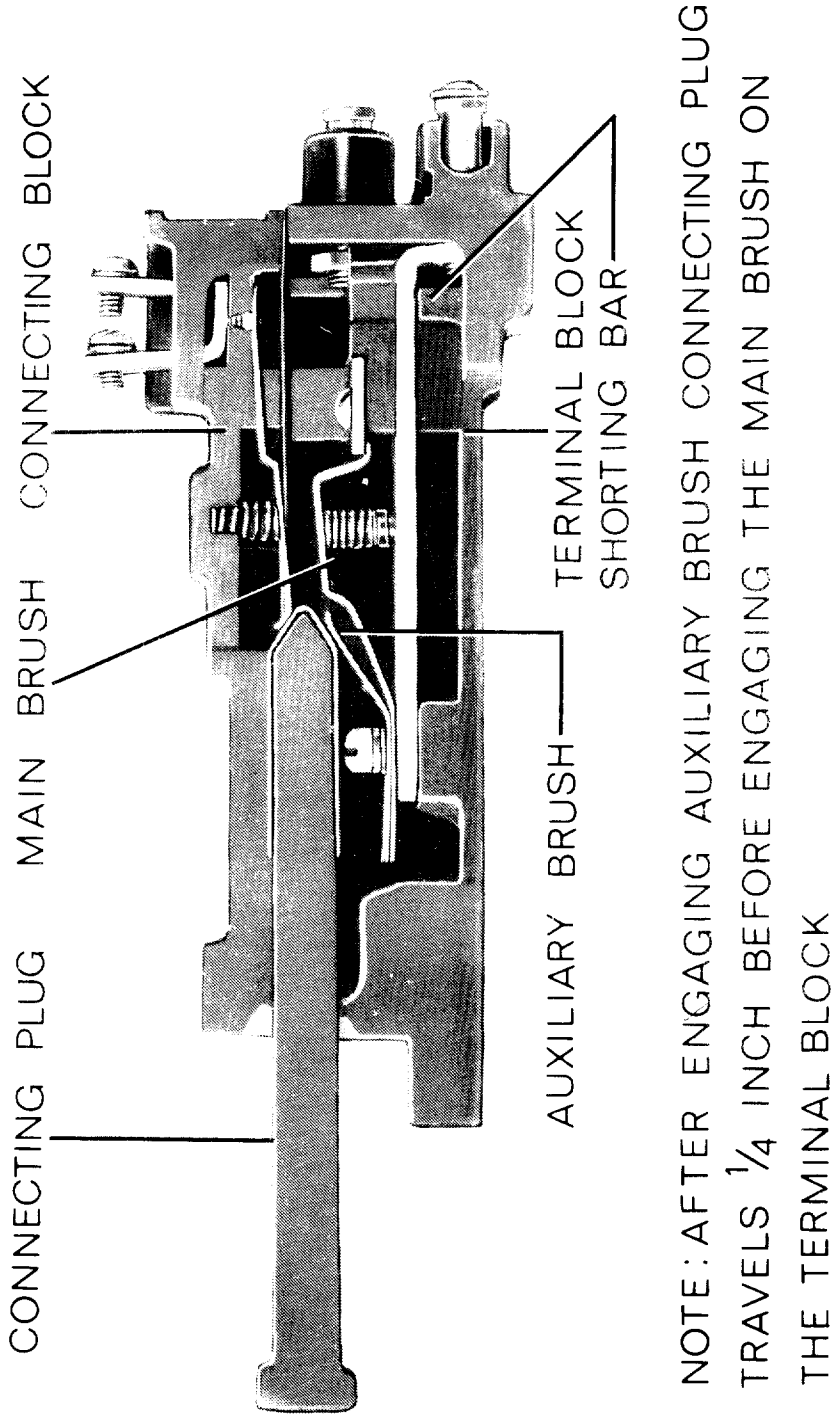


Fig. 10 (8025039) Cross Section of Drawout Case Showing Position of Auxiliary Brush

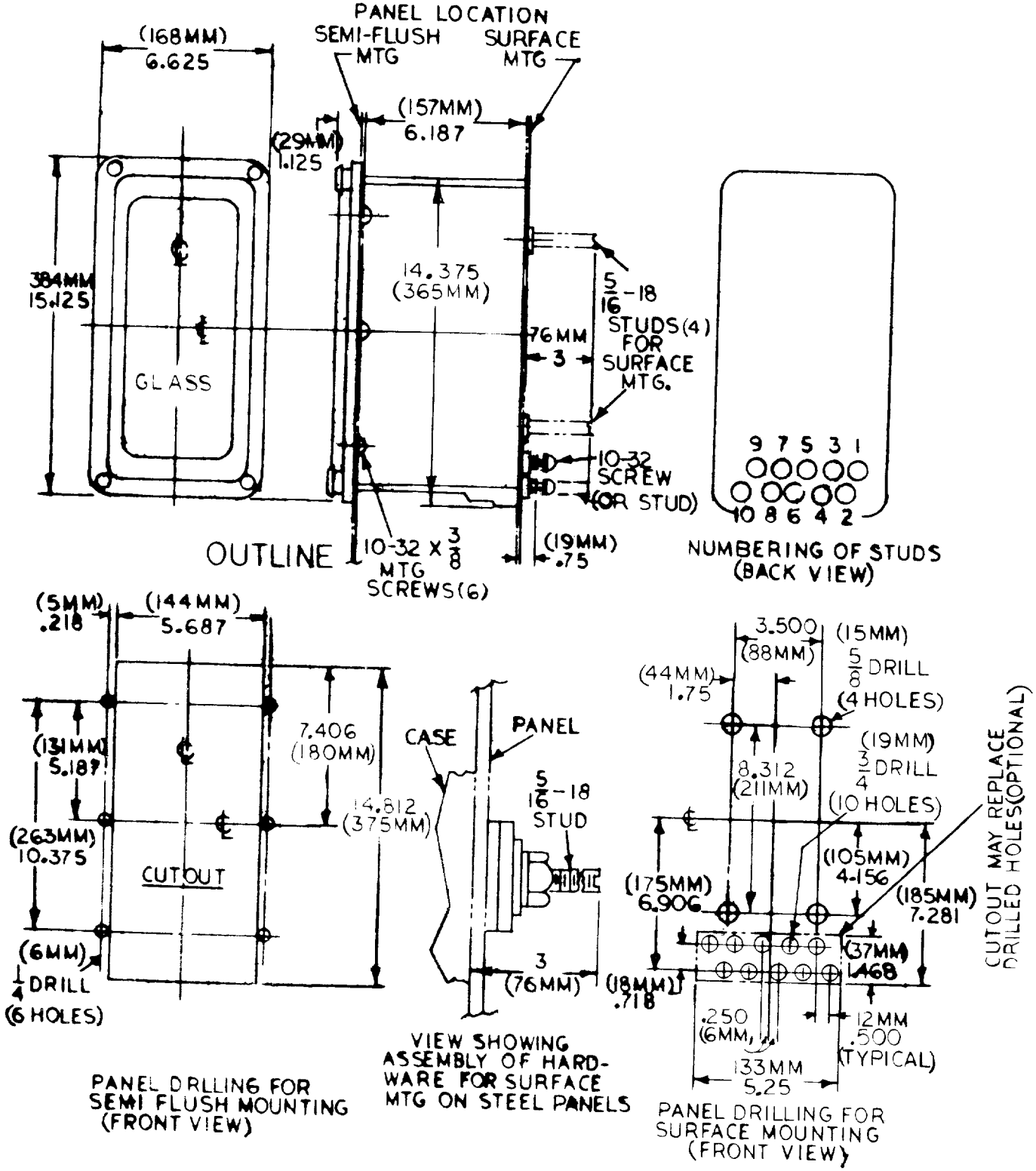


Fig. 11 (K6209273-4) Outline and Panel Drilling Dimensions Diagram for Type JCC53C Relay