INSTRUCTIONS

GEI-83948B

NEGATIVE SEQUENCE DIRECTIONAL RELAY

CNP11A

GENERAL ELECTRIC

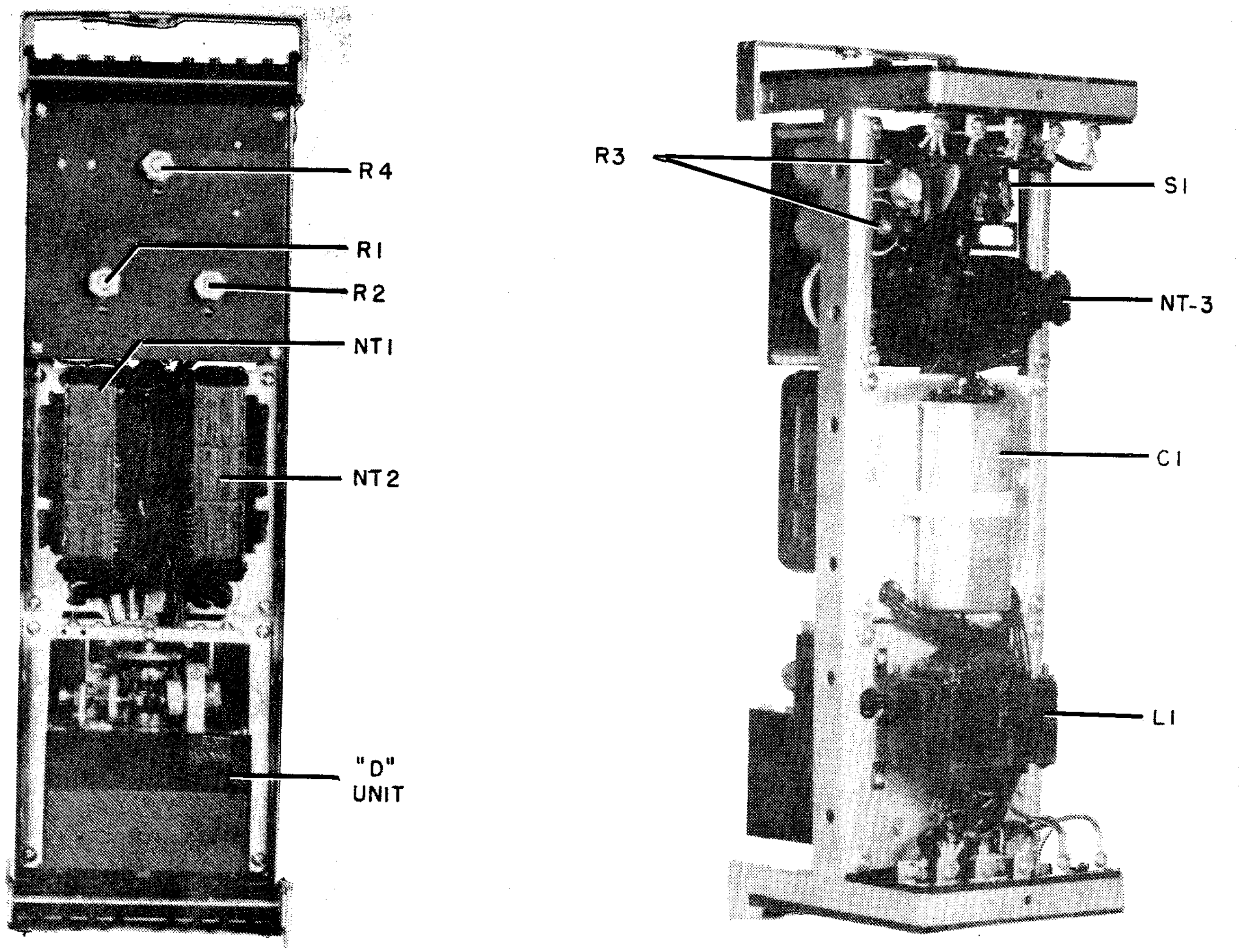

Fig. 1 (8029776 and 8029777) CNP11A Relay Removed from Case
Front View Top and Rear View Bottom

NEGATIVE SEQUENCE DIRECTIONAL RELAY

TYPE CNP11A

DESCRIPTION

The CNP11A relay is a negative-phase-sequence directional relay for directional comparison carrier relaying applications used to determine the direction of ground faults for selective tripping. it consists of an eight pole cup-type unit energized from negative-sequence current and potential filters which are housed within the drawout case except for two external capacitors. This relay is installed in a double-ended drawout case, size L2, and only one is used at a terminal.

APPLICATION

The CNP11A is intended for use in the ground fault portion of directional comparison relaying on lines where the effect of zero-sequence mutual reactance with one or more parallel lines makes it difficult or impossible to insure correct directional response of a directional unit supplied with zero-sequence quantities. The CNP relay is used to determine the direction of the ground fault.

The CNP is intended for use with a Type CFC instantaneous overcurrent unit, which provides the G1 carrier starting function and the G2 tripping level function as in the Type CLPG relay.

When used as described above, the CNP relay can be connected to also provide directional control of the back-up relay, Type JCC, which has time and instantaneous overcurrent units. This provides in the CNP-JCC combination the functions of Type JBCG time and instantaneous overcurrent relay without danger of operation when the fault is in the wrong direction.

RATINGS

The Type CNP directional negative-phase-sequence relay is continuously rated for a balanced three-phase input of 120 volts and five amperes at 60 cycles. The one second rating of the CT current coils is 280 amperes.

CONTACTS DIRECTIONAL UNIT

The contacts of the directional unit will close and carry momentarily 30 amperes DC for tripping duty at control voltages of 250 VDC or less. The breaker trip coil circuit must be opened by a circuit breaker auxiliary switch or other suitable means as the CNP relay contacts have no interrupting rating.

SEAL-IN UNIT

The ratings of the seal-in unit are listed in Table A.

TABLE A

	DUAL RATED			
	0.2/2.0 AMP		0.6/2.0 AMP	
	0.2	2.0	0.6	2.0
Carry 30 Amps for (sec.)	0.05	2.2	0.5	3.5
Carry 10 Amps for (sec.)	0.45	2.0	5.0	30
Carry Continuously (Amp)	0.37	2.3	1.2	2.6
Minimum Operating (Amp)	0.2	2.0	0.6	2.0
Minimum Drop-out (Amp)	0.05	0.5	0.15	0.5
DC Resistance (Ohms)	8.3	0.24	0.78	0.18
60 Hz Impedance (Ohms)	50	0.65	6.2	0.65
50 Hz Impedance (Ohms)	42	0.54	5.1	0.54
DC Resistive Interrupting Rating (Amps)	2.5 Amp @ 125 VDC			

CHARACTERISTICS

OPERATING PRINCIPLE

The directional unit is a product induction cylinder eight-pole unit. Operating torque results from the interaction of the magnetic fluxes produced by the corner coils supplied with negative-phase-sequence current and the side coils supplied with negative-phase-sequence voltage. Maximum operating torque occurs when the negative-phase-sequence current applied to the relay leads the negative-phase-sequence voltage by 105 degrees.

PICKUP

The relay can be set to pick up, i.e., close the left-hand contact, at 0.25 to 5.0 negative-phase-sequence volt-ampere product. The pickup is adjusted with the upper control spring as described under **INSTALLATION PROCEDURE**. The relay will drop out, i.e., open the left-hand contact, at approximately 98 percent of the pickup setting.

OPERATING TIMES

Pickup time curves for the Type CNP relay as a function of multiples of pickup are shown in Fig. 2.

BURDEN

Potential

With the potential transformers connected in wye as shown in Fig. 3A, the relay burden is as shown in Table B. If the potential transformers are connected in open delta, as shown in Fig. 3B, the burden is shown in Table C.

Current

The current burden of the relay with positive sequence currents applied, (see Fig. 4) is shown in Table D.

The current burden measured with single-phase current applied through each of the current coils (one at a time) is shown in Table E.

TABLE B

THREE PT's IN WYE	V	I	HERTZ	WATTS	VARS	VA
Potential Transformer connected to Stud 17	69	0.025	60	-0.73	1.6	1.7
Potential Transformer connected to Stud 18	69	0.41	60	0	-28.2	28.2
Potential Transformer connected to Stud 19	69	0.41	60	25.4	-12.7	28.4

TABLE C

TWO PT's IN OPEN DELTA	V	I	HERTZ	WATTS	VARS	VA
Potential Transformer connected to Stud 18	120	0.41	60	-24.5	-42.4	49.0
Potential Transformer connected to Stud 19	120	0.41	60	49.3	3.0	49.3

TABLE D

FREQUENCY HERTZ	AMPERES		VOLTS		VOLT-AMPERES		WATTS		P.F.	
	I_{5-6}	I_{9-10}	V_{5-6}	V_{9-10}	5-6	9-10	5-6	9-10	5-6	9-10
60	5	5	2.36	2.25	11.75	11.5	11.13	9.8	0.96	0.95

TABLE E

FREQUENCY HERTZ	COIL	AMPERES	VOLTS	WATTS	VOLT-AMPERES	P.F.
60	5-6	5	2.05	9.96	10.25	.97
60	7-8	5	0.87	4.10	4.35	.94
60	9-10	5	2.16	9.32	10.8	.87

CALCULATION OF SETTINGS

The only setting that should require adjustment is the pickup. Pickup is expressed in terms of the product of single-phase-sequence secondary volts and amperes necessary to close the normally open contacts 2-13.

When using the test circuit shown in Fig. 5, the pickup in terms of the product of single-phase inputs is 5.2 times as high as it would be with line-to-neutral negative sequence inputs.

When using the test circuit shown in Fig. 6, the pickup in terms of the product of single-phase inputs is 5.4 times as high as it would be with line-to-neutral negative sequence inputs. It is preferable to specify the desired setting in single-phase terms, to avoid the need of conversion by the tester.

For two-terminal lines, the relay can be set so that the minimum single-phase-to-ground fault at the remote terminal will just operate the relay with suitable margin.

For either multi-terminal or two-terminal lines, there is no coordination requirement of the CNP pickup setting with the setting of any relay at any other terminal. Coordination between fault detecting relays controlled by the CNP relay and other fault detecting relays may be required.

Approximate values of negative-sequence current and voltage can be obtained from available fault studies if those studies:

1. Used a value of positive-sequence generator reactance nearly equal to the negative-sequence generator reactance;

2. Assumed all generator voltage in phase, and

3. Included readings of positive-sequence voltage at the desired points.

In subject conditions one and two above, the magnitude of the negative-sequence voltage at a given location equals the difference between the positive-sequence voltages at the same point with and without the fault on the system. The negative-sequence current equals the positive-sequence current.

CONSTRUCTION

DIRECTIONAL UNIT

The main element of the CNP relay is an induction cylinder eight-pole unit. It has three contacts. Two of these are barrel type construction, (front right hand - between studs 12 and 13 and back right hand - between studs 1 and 13), and one is the low gradient type (front left hand - between studs 1 and 2). When the unit is de-energized the front right-hand contact is closed. When energized in the tripping direction, the unit operates to open the front right-hand contact and then close the front left-hand contact and the back right-hand contact.

The low gradient contacts of the directional unit are shown in Fig. 7. Both the stationary and the moving contact brushes are of low gradient material, and require a minimum increase in operating torque to wipe-in after the contacts make. This makes it possible for both contacts (right-hand back and left-hand front) to close at approximately the same negative-phase-sequence volt-ampere product input.

Referring to Fig. 7 the contact dial (A) supports the stationary contact brush (B) on which is mounted a conical contact tip (C). The moving contact arm (D) supports the moving contact brush (E) on which is mounted a button contact tip (F). The end of the the moving contact brush bears against the inner face of the moving contact brush retainer (G). Similarly, the end of the stationary contact brush bears against the inner face of the stationary contact brush retainer (H). The stop (J), mounted on the contact dial, functions to stop the motion of the contact arm by striking the moving contact brush retainer after the moving and stationary contact members have made contact. The stationary contact support (K) and the contact dial are assembled together by means of a mounting screw (L) and two locknuts.

The barrel type contacts shown in Fig. 8 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 steel 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 thence 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.

The moving contacts are supported on a molded plastic arm which is attached to the rotor shaft. This arm is held from rotating freely by a control spring which maintains a torque in the direction that holds the normally open contacts open and determines the pickup of the unit.

The stator has eight laminated magnetic poles which are fitted with coils and project inward. They are arranged symmetrically around a central magnetic core. The four side coils are connected internally in series to form a single circuit which is supplied with negative-phase-sequence voltage from the negative-phase-sequence voltage filter. The four corner coils are also connected in series and are supplied with negative-phase-sequence current from the negative-phase-sequence current filter.

In the annular air gap between the poles and central core is the cylindrical cup-like part of the aluminum rotor which turns freely in the gap. The rotor shaft is supported at the bottom by a steel pivot which projects downward through a bronze guide bearing mounted in the end of the shaft. The shaft carries the movable contact arm through which the contact circuits are complete.

NEGATIVE-PHASE-SEQUENCE FILTERS

Current Filter

The negative-phase-sequence current filter consists of two auxiliary current transformers (NT1 and NT2), each with a two-winding primary and a single secondary winding. The inductor-resistor load (L_1 and R_2 across NT2 secondary and resistor R_1 across NT1 secondary, see Fig. 9) are so selected and adjusted that with proper primary connections (see Fig. 10), the current flowing into the relay coils "D" is proportional to the negative-sequence component of the current supplied to the relay.

Voltage Filter

The negative-phase-sequence voltage filter consists of a tapped voltage transformer (NT3) and a capacitor-resistor load (C_2 and R_3 and R_4) so selected and adjusted that with proper voltage connections (see Fig. 10), the voltage across the relay coils "D" is proportional to the negative-sequence component of the voltage applied to the relay.

SEAL-IN UNIT

The CNP relay is equipped with a seal-in unit whose coil is connected in series with the directional element contacts, and whose contacts are connected to bypass the contacts of the directional element when the unit picks up. The seal-in unit is a small hinged armature type relay consisting of a "U" shaped magnet frame, fixed pole piece, armature and a tapped coil. The armature carries a "T" shaped moving contact which bridges the two stationary contacts.

The components of the relay are mounted on a cradle assembly which can be easily removed from the relay case. The cradle is locked in the case by means of the latches at the top and bottom. The electrical connections between the case block and cradle block are completed through removable connection plugs which can be replaced by separate testing plugs to facilitate testing the relay in its case. The cover is attached to the case from the front and includes interlock arms to prevent the cover from being replaced until the connection plugs have been inserted.

The case is suitable for either semi-flush or surface mounting on panels up to two inches thick, but panel thickness must be specified on the order to insure that the proper hardware will be provided. Outline and panel drilling dimensions are shown in Fig. 14.

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.

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 examination and test should be made to insure that no damage has been sustained in shipment and that the relay calibrations have not been disturbed. If the examination or tests indicate that readjustment is necessary, refer to the section on **SERVICING**.

VISUAL INSPECTION

Check the nameplate to insure that the model number rating and calibration range of the relay received agree with the requisition. Remove the relay from its case and check that there are no broken or cracked compound parts and that all screws are tight.

MECHANICAL INSPECTION

It is recommended that the following mechanical adjustments be checked:

1. There should be no noticeable friction in the rotating structure of the directional unit. The normally closed contacts should be closed when the relay is in an upright position.

2. There should be an end play of from 0.005 to 0.015 inch on the shaft of the rotating structure. The lower jewel screw bearing of the unit should be screwed firmly in place, and the pivot at the top of the shaft locked by its set screw.

3. The contact gap of the normally open contacts should be approximately 0.020 inch.

4. The armature and contacts of the seal-in unit should move freely when operated by hand. There should be at least 1/32 inch wipe on the seal-in contacts.

5. Check the location of the contact brushes on the cradle and case blocks against the internal connection diagram for the relay (see Fig. 9). Be sure that the shorting bars are in the proper locations on the case blocks, and that the long and short brushes on the cradle block agree with the internal connection diagram. Fig. 13 shows a sectional view of the case and cradle blocks with the connection plug in place. Note that there is an auxiliary brush in each position on the case block. This brush should be formed high enough so that when the connecting plug is inserted it engages the auxiliary brush before striking the main brush. This is especially important in current circuits and other circuits with shorting bars since an improper adjustment of the auxiliary brush could result in a CT secondary circuit being momentarily open circuited.

ELECTRICAL TESTS

Directional Unit Pickup

Connect the relay as shown in Fig. 5. Apply a single-phase current equal to 3.47 amperes (this corresponds to 2.0 amperes negative sequence) and a single-phase voltage V_{17-18} equal to 1.13 volts (this corresponds to $\frac{1.13}{3}$ = 0.377 volts negative sequence). Rotate the phase shifter until the current leads the voltage by 195 degrees. This corresponds to the negative-sequence current component leading the negative-sequence voltage component by 105 degrees. The normally open contacts of the directional unit should close within plus or minus ten percent of the voltage inputs, (V_{17-18}), to the relay. The factory pickup of the front left-hand contact of the directional unit at the angle of maximum torque, (negative-sequence current leading the negative-sequence voltage by 105 degrees), is set at 0.75 negative-sequence volt-ampere product. The pickup of the back right-hand contact is set at 0.75 to 0.83 negative-sequence volt-ampere product. A neon light connected across the normally open contacts is recommended to indicate contact closure.

Seal-in Unit

Check the seal-in unit using connections shown in Fig. 11. The unit should pick up at two amperes (plus or minus ten percent) when the 2.0A tap is used and at 0.6 amperes (plus or minus ten percent) when the 0.6A tap is used.

INSTALLATION PROCEDURE

If after the **ACCEPTANCE TESTS** the relay is held in storage before shipment to the job site, it is recommended that the visual and mechanical inspection described under the section on **ACCEPTANCE TESTS** be repeated before installation.

Before any of the following electrical adjustments are made, the relay should be in its case, preferably mounted in its permanent location.

RELAY SETTINGS

Refer to the section on **CALCULATION OF SETTINGS** for a discussion of suggested procedures for determining the settings of the three main units.

DIRECTIONAL UNIT

If the required setting is different from the factory setting (0.75 negative-sequence volt-amperes) connect the relay as shown in Fig. 5. Rotate the phase shifter to indicate current leading voltage 195 degrees. Apply the required current and voltage. Now loosen the hexagonal locking screw located at the rear of the spiral spring assembly. Then slip the adjusting ring, (to which the control spring is attached), in a direction to cause the front left-hand normally open contacts to just close. Retighten the locking screw and recheck the setting by varying one of the input quantities (current or voltage).

SEAL-IN UNIT

As shipped from the factory the tap screw of the seal-in unit will be in the 2.0A tap. To change the setting, remove the spare tap screw from the left stationary contact member and place it in the spare position on the right contact member. Then remove the original screw from the right contact member and place it in the spare position on the left contact member. This procedure is necessary to avoid distorting the adjustment of the right stationary contact. Screws should never be left in both tap positions on the right contact member.

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 following points be checked once a year.

MECHANICAL CHECKS

Operate the contacts by hand and check that the contacts are making with proper wipe. Allow the contacts to reset and check that there is no excessive friction.

Examine the contact surfaces for signs of tarnishing or corrosion. Fine silver contacts should be cleaned with a burnishing tool which consists of a flexible strip of metal with an etched roughened surface. Burnishing tools designed especially for cleaning relay contacts can be obtained from the factory. Do not use knives, files, abrasive paper or cloth of any kind to clean relay contacts.

ELECTRICAL TESTS

Connect the relay as shown in Fig. 6 and check that the pickup of the directional unit is within plus or minus five percent of the original setting. The pickup in terms of the product of single-phase inputs is 5.4 times as high as it would be with line to neutral negative-phase-sequence inputs at the angle of maximum torque.

Connect the relay as shown in Fig. 11 and check that the pickup of the seal-in unit is within plus or minus five percent of the original pickup current.

SERVICING

If any of the mechanical or electrical check points described in the previous sections are found to be out of limits, the following points should be observed in restoring them.

MECHANICAL ADJUSTMENTS

1. Directional unit low gradient (front left-hand) contact adjustment

    a. With the relay upright and the moving contact held away from the stationary contact, both the stationary contact brushes should touch their respective retainers.

    b. With the relay lying on its left side and the moving contact held clear, the stationary contact brush should just part from its retainer under its own weight.

    c. With the moving contact held clear, the moving contact brush should just part from its retainer under its own weight.

    d. With the relay vertical and de-energized, the gap of the front left-hand contact should be 0.020 inch to 0.025 inch and the wipe should be 0.010 inch to 0.015 inch (when contact is closed by hand). The contact gap and wipe of the back right contact should be approximately the same or a little less than the front left-hand contact.

2. Contact Gap

    a. With the unit completely de-energized, retract the back right-hand contact barrel (two revolutions counterclockwise), and adjust the upper control spring so that the center line of the moving contact arm is parallel to the side of the relay.

    b. Using a neon light as an indication of contact closure, turn the front right-hand contact barrel and the front left-hand contact dial into the moving contact until they just touch.

    c. Lock the right barrel in place by means of the clamping screw.

    d. Rotate the left-hand contact dial to obtain 0.020 inch to 0.025 inch gap between the moving contact and the left-hand stationary contact. The back right-hand contact is adjusted when the relay pickup is set.

3. Shaft End Play

    End play of the shaft should be 1/64 inch. This can be adjusted by the position of the upper pivot. Be sure to tighten the set screw which holds the upper pivot in position after the adjustment is made.

4. Seal-in Unit

    There should be at least 1/32 inch wipe on the contacts of the seal-in unit, measured at the end of the armature adjacent to the contacts. If the wipe is too small, it can be increased by lowering the position of the stationary contact members. In the final adjustment the contacts should make approximately at the same instant when the armature is operated by hand, and the target should latch in the exposed position slightly before the contacts close.

ELECTRICAL ADJUSTMENTS

Negative-sequence Voltage Network Adjustment

1. Choose a balanced three-phase voltage supply of rated frequency and voltage and good sine wave form with a properly designated positive phase sequence (one-two-three).

2. Connect the test circuit shown in Fig. 12. Make sure that the three phases of the supply connect to the corresponding points shown in the test circuit.

3. Adjust the voltage applied to the relay so that:

   $$V17\text{-}18 = V18\text{-}19 = V19\text{-}17 = 120\ V$$

   Connect a low range voltmeter (use a high resistance voltmeter - 1,000 ohms or more) across relay studs 15 and 20 and carefully adjust rheostat (R_4) to obtain a minimum voltage across studs 15 and 20. The minimum should be less than 1.0 volt. If the minimum voltage is relatively high, phase sequence may be wrong or connections to the relay may be inaccurate. If the minimum obtainable voltage approaches the 1.0 volt limit but is slightly high, the wave form may be poor or the applied voltages are not perfectly balanced.

4. After final adjustment of (R_4), tighten its locknut securely to prevent accidental changes in resistance setting

Negative-sequence Current Network Adjustment

1. Connect the relay to a three-phase source (rated frequency) capable of supplying 20 amperes balanced load, as shown in Fig. 4.

2. It is essential that the phase sequence be (one-two-three) and that the current waveform be as good as possible. Meters I_1, I_2 and I_3 must be subjected to a preliminary test to insure identical calibration. This can be done by connecting the three meters in series with a five amp load. If all meters do not read the same and meters cannot be obtained which do read the same, it will be necessary to calibrate two of the meters on the basis of the third. For example, I_2 reads 4.95 and I_3 reads 4.93 when I_1 reads five amps.

3. Connect a low range voltmeter (use a high resistance voltmeter - 1,000 ohms per volt or more) from stud 8 to a point between the 7.0 microfarad capacitor (C_1) and the resistor (R_1).

4. Set the load resistors to give a balanced load of five amperes; i.e., $I_1 = I_2 = I_3 = 5$ A. Adjust R_1 and R_2 so that with the balanced load of five amperes, the voltmeter reads less than 1.0 volt.

   This is accomplished by "cross-adjustment" of R_1 and R_2. That is, set R_1 for maximum ohms and adjust R_2 to give a minimum voltage; then set R_1 for minimum voltage and again set R_2 for minimum voltage. Repeat this cross adjustment until the point is reached where adjusting either resistor tends to increase the voltage.

5. If the resistors cannot be set to the voltage below the 1.0 volt limit, the following troubles may exist:

   a. If the minimum voltage is relatively high, phase sequence may be incorrect or connections made to the relay may be wrong.

   b. If the minimum obtainable voltage approaches the 1.0 volt limit, but is slightly high, the waveform may be poor or the load currents are not perfectly balanced.

6. After final adjustment of the rheostats, tighten their locknuts securely to prevent accidental changes in resistance settings.

Directional Unit Pickup

If it is necessary to readjust the pickup, connect the relay as shown in Fig. 5 if the test is made in the laboratory, or as in Fig. 6 if the relay is being tested in position on the panel.

Rotate the phase shifter so that the phase angle meter reads current leading voltage by 195 degrees. Apply the current and voltage required for pickup (see **CALCULATIONS OF SETTINGS**) and adjust the upper control spring windup so that the front left normally open contacts just close. Now increase the negative-sequence product input to the relay slightly (by approximately ten percent) and advance the back right-hand barrel contact until it just touches the moving contact. Lock the barrel contact in position.

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 the part wanted, and give complete nameplate data. If possible give the General Electric Company requisition number on which the relay was furnished.

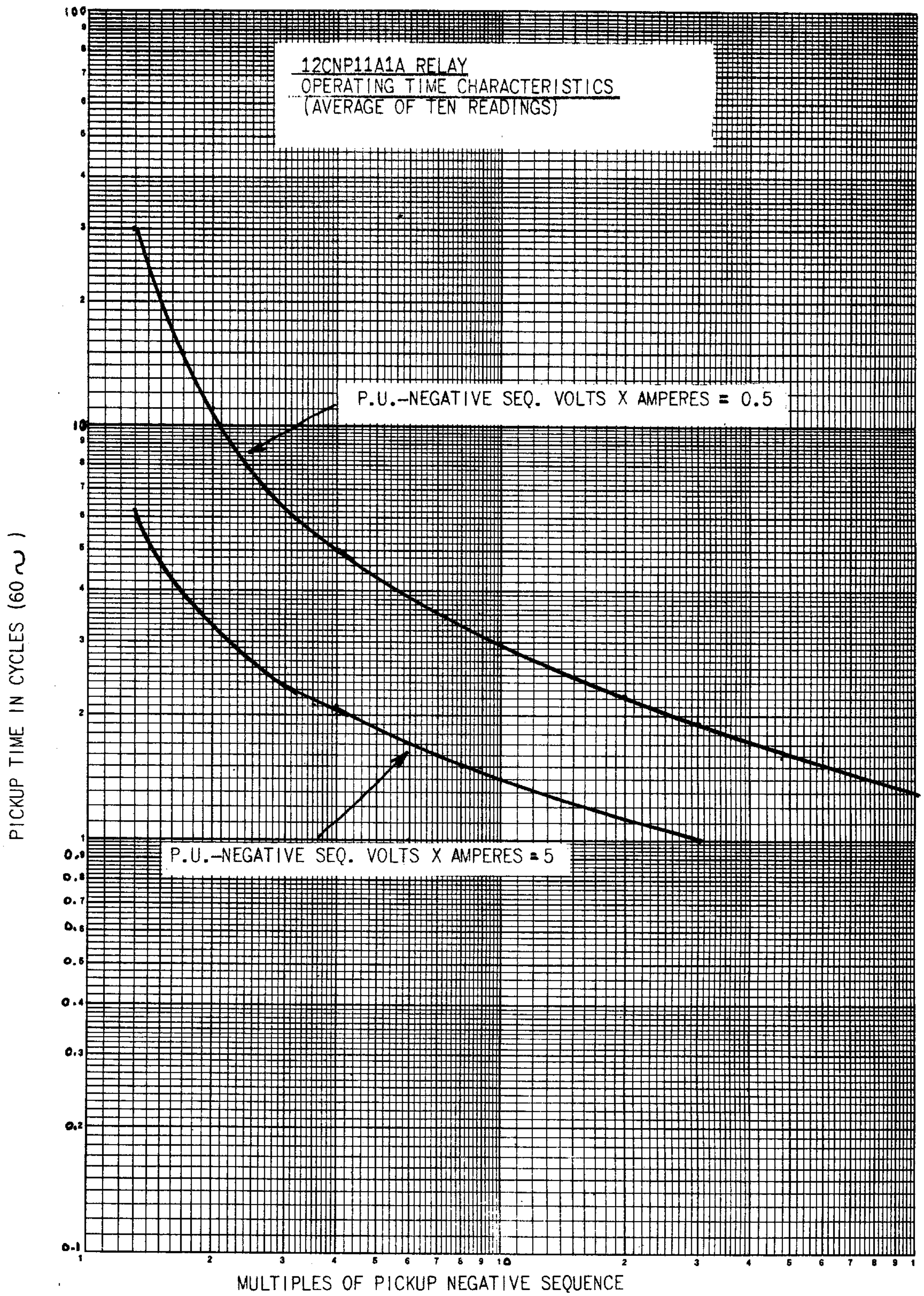

Fig. 2 (0165A6023-1) Typical Time-Current Curves for the CNP11A Relay

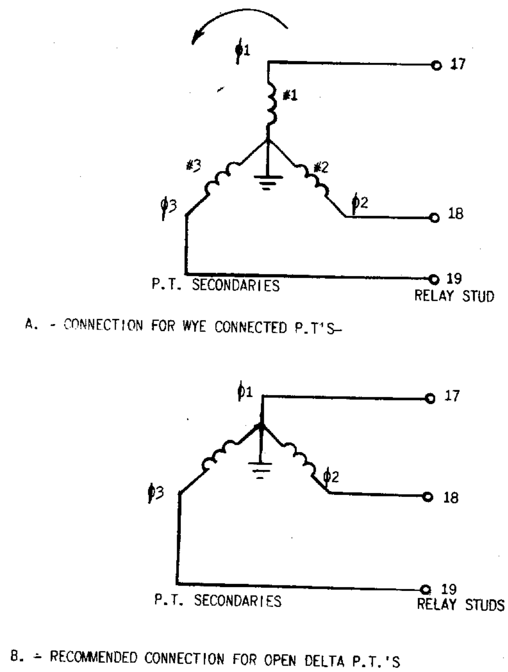

Fig. 3 (0165A6019-0) Potential Transformer Connections for the CNP11A Relay

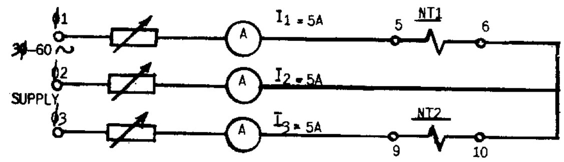

Fig. 4 (0165A6020-0) Connections to the CNP11A Relay for Positive Sequence Current

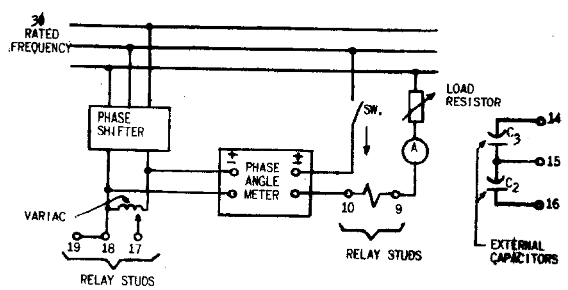

Fig. 5 (0165A6021-0) Laboratory Test Connection Diagram for the CNP11A Relay

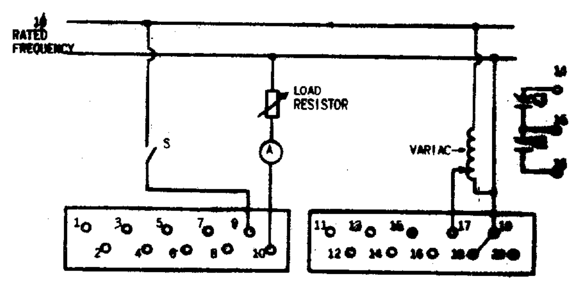

Fig. 6 (0165A6022-0) Field Test Connection Diagram for the CNP11A Relay

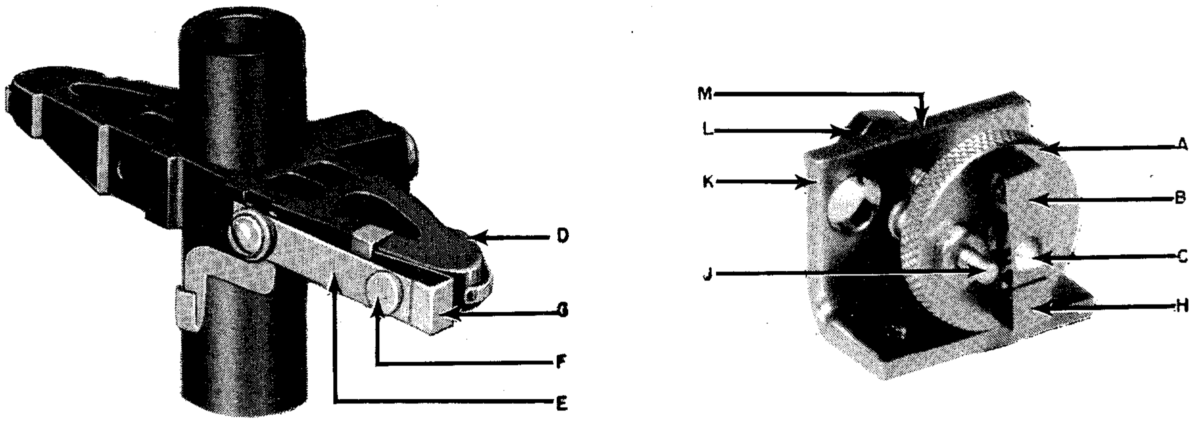

Fig. 7 (8027688 and 8023399) Low Gradient Contact Assembly of the CNP11A Relay

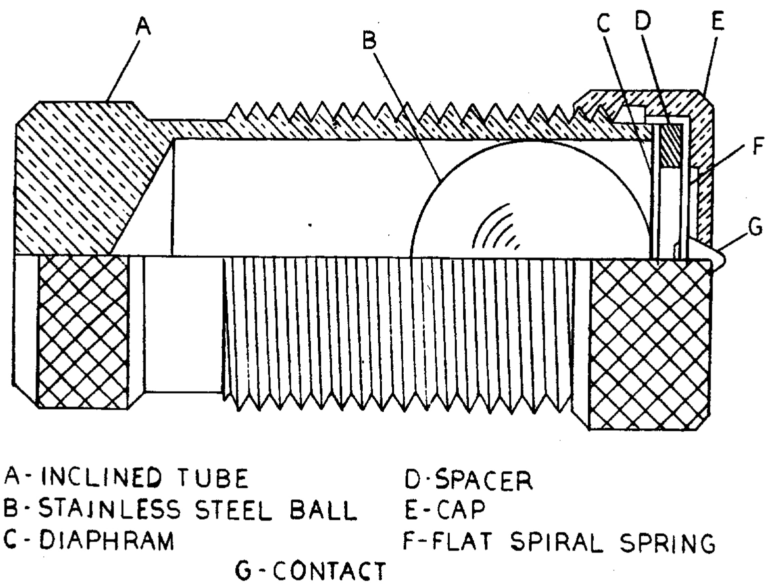

*Fig. 8 (6077069 [4]) Barrel Type Contact Assembly of the CNP11A Relay

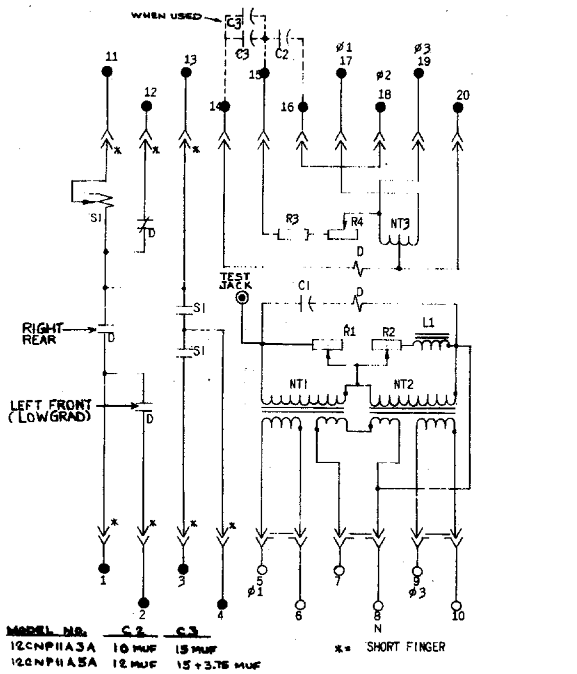

Fig. 9 (0148A3986-4) Internal Connections (Front View) for the CNP11A Relay

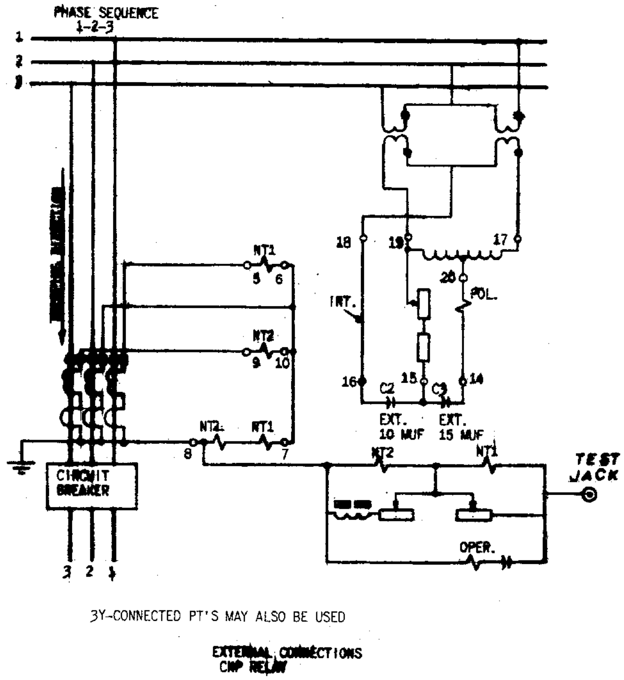

Fig. 10 (0165A6006-2) External Connection Diagram for the CNP11A Relay

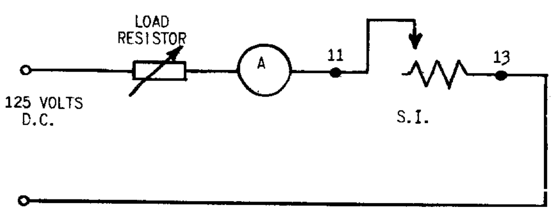

Fig. 11 (0165A6018-0) Connection Diagram for Testing the Seal-in Unit of the CNP11A Relay

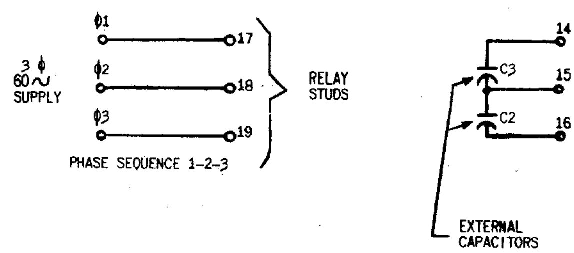

Fig. 12 (0165A6017-0) Connections for Adjusting the Negative-Sequence Voltage Network of the CNP11A Relay

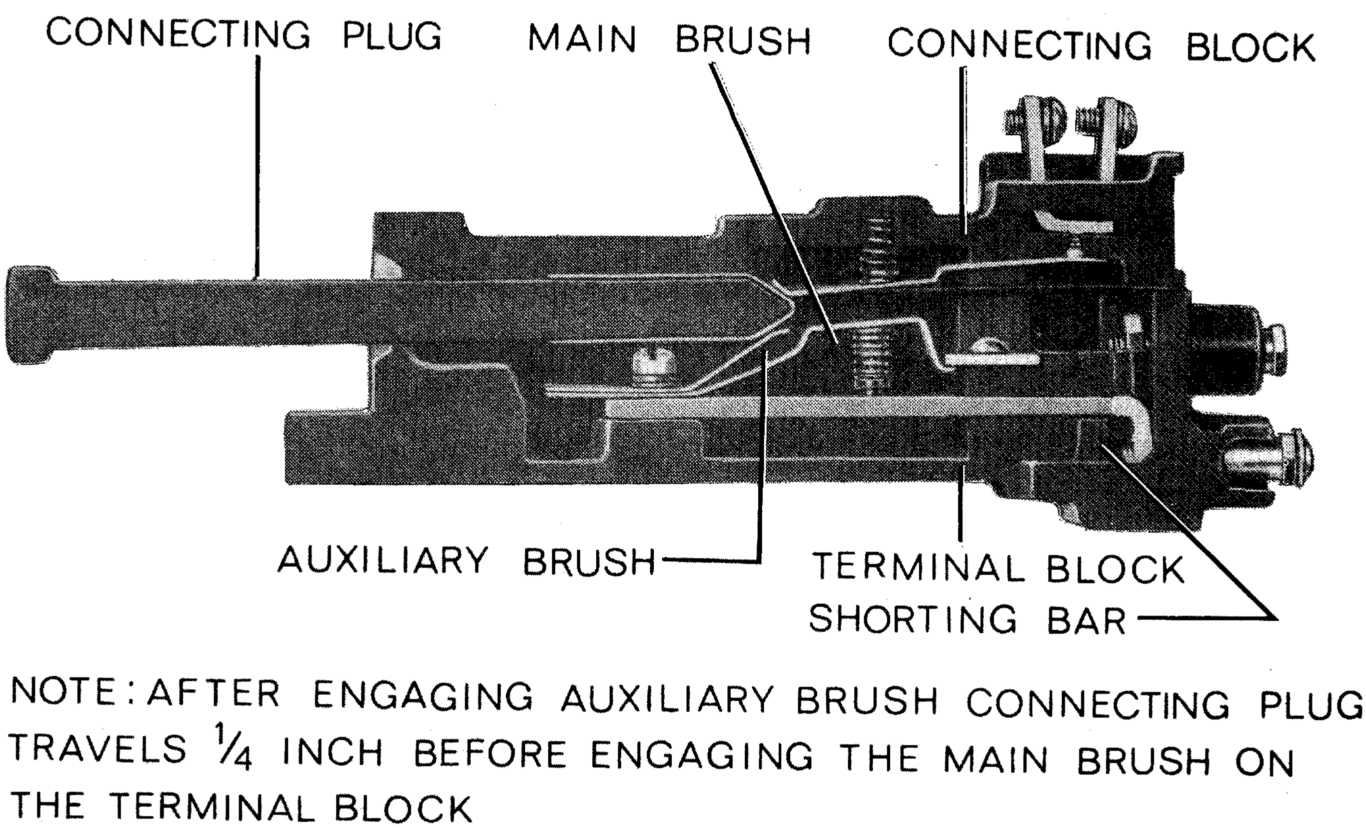

Fig. 13 (8025039) Cross Section of Drawout Case Showing Position of Auxiliary Brush

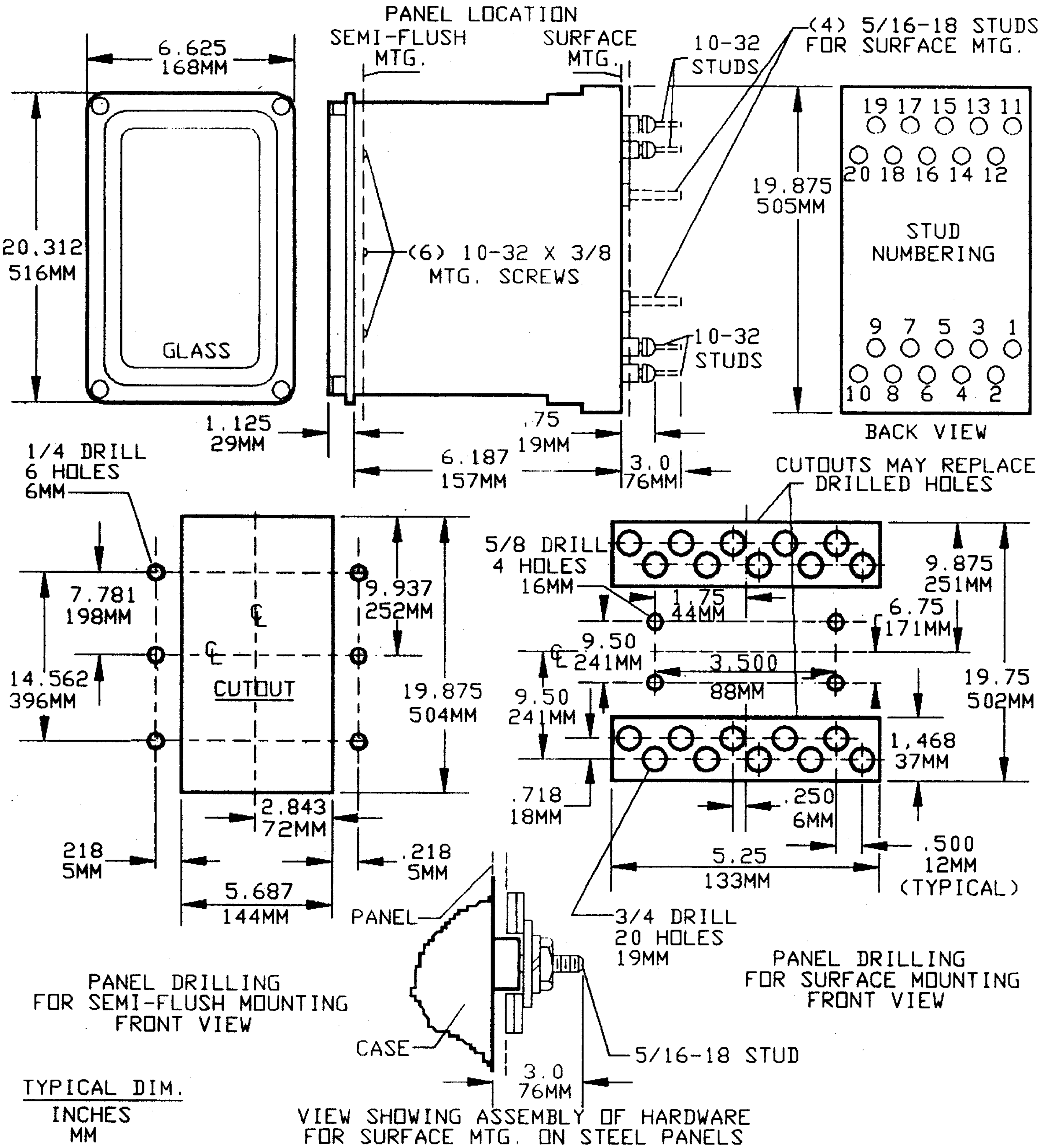

Fig. 14 (6209276-3) Outline and Panel Drilling Dimensions for the CNP11A Relay

* Indicates revision

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