



INSTRUCTIONS

GEK-41971B

SUPERSEDES GEK-41971A

TRANSFER TRIP AUXILIARY RELAY

TYPE NAA

MODEL NAA27AA(-)A

GENERAL  ELECTRIC

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TRANSFER TRIP AUXILIARY RELAY

TYPE NAA
MODEL NAA27AA(-)A

DESCRIPTION

The Type NAA27AA relay is a special purpose auxiliary relay intended for use at the receiving end of dual-channel, direct-trip transferred tripping schemes, such as are frequently used in conjunction with transformer differential relaying when a remote breaker must be tripped. The relay has no other general field of application. It includes three telephone-type auxiliary relay units, identified as X_1 , X_2 and T_x , a target seal-in unit, a tripping diode, and the necessary resistors and capacitors, all mounted in the S2 size drawout case.

Internal connections for the relay are shown in Figure 1, and the outline and mounting dimensions in Figure 3.

APPLICATION

The NAA27AA relay is designed specifically for use at the receiving terminal of dual-channel direct transferred trip installations, using General Electric Type 30 or TRI-CAP tone equipments, when an automatic throwover to single-channel is desired. A typical application of the relay in such a scheme is shown in Figure 5. The units included in the NAA27AA relay perform the functions noted below:

 X_1 AND X_2 UNITS

The auxiliary units X_1 and X_2 are normally held in the picked-up position by normally closed contacts of the receiver alarm units in the tone receivers. The function of the X_1 and X_2 units is to initiate a throwover of the scheme to single-channel operation should either tone channel fail. These units have a dropout time of 0.3 seconds and will drop out if a channel failure, resulting in loss of guard frequency, causes the associated receiver alarm unit to be picked up for 0.3 seconds or more. Throwover to single-channel operation is achieved by contacts of the X_1 or X_2 unit bypassing the trip output contacts of the failed channel. If both channels are lost, dropout of both X_1 and X_2 will block the transferred trip scheme.

TX UNIT

This is a high-speed unit operated by the output of the transferred trip circuit. Contacts of the TX unit can be used to provide fast blocking of high-speed reclosing circuits following a transformer differential transferred trip.

RATINGS

The model NAA27AA relay is rated for continuous operation at rated nameplate voltage. The resistance values of the telephone relays and associated resistors are listed on the internal connection diagram shown in Figure 1.

The combination target and seal-in unit is rated as shown in Table I.

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.

To the extent required the products described herein meet applicable ANSI, IEEE and NEMA standards; but no such assurance is given with respect to local codes and ordinances because they vary greatly.

TABLE I
RATINGS OF TARGET AND SEAL-IN UNIT

| Function | 2 Amp Tap | 0.6 Amp Tap |
|--------------------|-----------|-------------|
| Operating Range | 2-30 | 0.6-2 |
| Carry 30 Amps for | 4 sec. | 0.5 sec |
| Carry Continuously | 3.0 | 0.9 |
| Resistance, Ohms | | |

If the tripping current should exceed thirty (30) amperes, it is recommended that an auxiliary tripping relay be used.

Diode D1 will carry 10 amperes continuously or 30 amperes for tripping duty. Diode D2 will carry a maximum of one ampere, all diodes will withstand 500 volts in the reverse direction.

The contacts of the TX, X1, and X2 units will make and carry 3 amperes continuously or 30 amperes for tripping. The interrupting rating of these contacts is given in Table II.

TABLE II
INTERRUPTING RATINGS

| A-C VOLTS | AMPS | |
|-----------|-------------|---------------|
| | INDUCTIVE** | NON-INDUCTIVE |
| 115 | 0.75 | 2.0 |
| 230 | 0.5 | 1.5 |
| D-C VOLTS | | |
| 48 | 1.0 | 3.0 |
| 125 | 0.5 | 1.5 |
| 250 | 0.25 | 1.0 |

**The inductive rating is based on the inductance of an average trip coil.

CHARACTERISTICS

X1 AND X2

* These units have a pickup time of 46 to 70 milliseconds and a dropout time of 280 to 320 milliseconds at rated voltage.

TX

The TX unit has a pickup time of 4 milliseconds or less. The dropout time is also 4 milliseconds.

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, 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.

*Indicates revision

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

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. Of course, the 12XLA12A test plug may also be used. Although this test plug allows greater testing flexibility, it also requires CT shorting jumpers and the exercise of greater care since connections are made to both the relay and the external circuitry.

Relays requiring DC control power should be tested using batteries or well filtered DC. Unless the rectified supply is well filtered, many relays will not operate properly due to ripple. Zener diodes, for example, can turn off due to excessive ripple. As a general rule the DC source should not contain more than 5 percent ripple.

Using the test connections shown in Figure 2, the pickup should be checked on all units. The TX, X1, and X2 units should pick up at 80 percent of rated voltage or less. The seal-in unit pickup tolerance is +0 and -25 percent of tap value.

INSTALLATION PROCEDURE

The relay should be inspected at the time of installation and the following points checked.

1. Contacts should not be tarnished.
2. The normally open contacts of both telephone relays should have a gap of 0.015 inch.
3. The normally closed contacts should have a 0.005 inch wipe.
4. When the telephone relays are operated by hand, the open contacts should have a 0.015 inch gap and the closed contacts should have a 0.005 inch wipe.

The operating times of the TX, X1, and X2 units should be checked using the test connections of Figure 2. The correct operating times are given in the CHARACTERISTICS section of this booklet. If readjustment should be necessary, follow the procedure given in the SERVICING section.

The internal connections are shown in Figure 1. This relay should be mounted on a vertical surface. The outline and panel drilling dimensions are shown in Figure 3.

Unless mounted on a steel panel which adequately grounds the relay case, it is recommended that the case be grounded through a mounting stud or screw with a conductor not less than #12 B&S gauge copper wire or its equivalent.

Settings on the seal-in unit are made using the tap selection screw.

The tap screw is the screw holding the right-hand stationary contact of the seal-in unit. To change the tap setting, first remove the connecting plug. Then take a screw from the left-hand stationary contact and place it in the desired tap. Next, remove the screw from the other tap and place it in the left-hand contact. This procedure is necessary to prevent the right-hand stationary contact from getting out of adjustment. Screws should not be in both taps at the same time.

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 under INSTALLATION PROCEDURE be checked at an interval of from one to two years.

CONTACT CLEANING

For cleaning relay 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 it will clean off any corrosion thoroughly and rapidly. Its flexibility insures the cleaning of the actual points of contact. Do not use knives, files, abrasive paper or cloth of any kind to clean relay contacts.

SERVICING

If it should become necessary to adjust the telephone type units in this relay, the following procedures should be followed. Refer to Figure 4 for the identification of the parts of a telephone relay.

PICKUP

To decrease the percentage of rated voltage at which the X₁, X₂ or TX unit picks up, decrease the spacing of the armature from the pole face by bending the contact operating arm stop. After this adjustment, all contacts must be readjusted to have a 0.005 inch wipe and a gap of 0.015 inch.

To increase the percentage of rated voltage at pickup, reverse the above procedure.

PICKUP TIME

In order to decrease the pickup time of the TX unit, reduce the pressure of the normally closed contacts by bending slightly the flexible contact arm.

The pickup time may be increased by reversing this procedure.

DROPOUT TIME

The dropout time of the TX unit may be adjusted by means of the residual screw in the armature. The more the residual screw is turned in the shorter the dropout time will be. Be sure to tighten the locknut after adjusting this screw. The X₁ and X₂ units have a fixed residual plate.

Any change in the residual screw setting must be accompanied by a readjustment for the correct contact wipe and gap. This can easily be accomplished by bending the contact operating arm.

NOTE: The residual screw must not be removed completely. The minimum gap must be 0.002 inch between the armature and the pole piece.

The dropout time of both units may be adjusted a small amount by varying the amount of pressure on the closed contacts.

All of the adjustments in this section may be most easily made with the tools supplied in the relay tool kit XRT11A1.

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

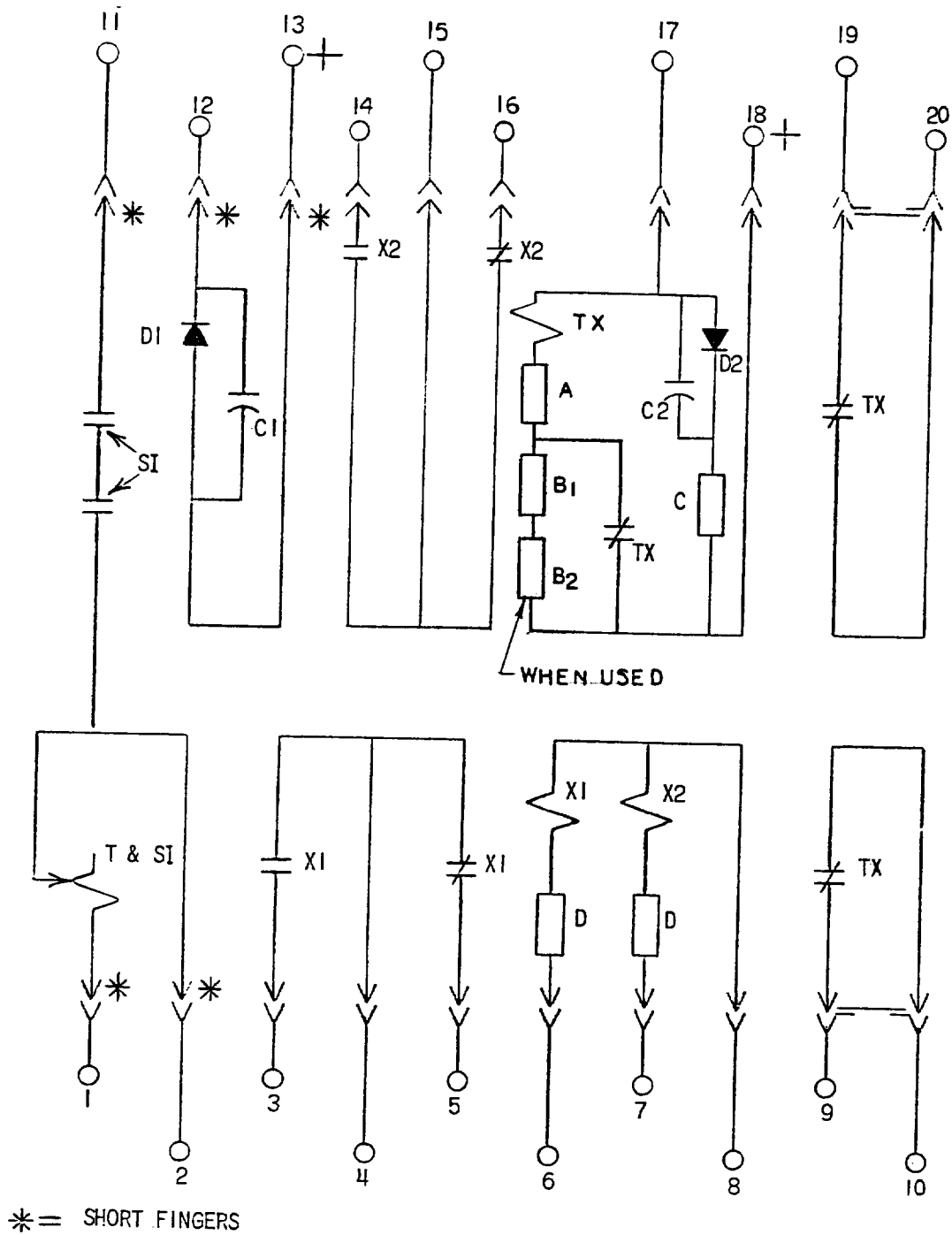
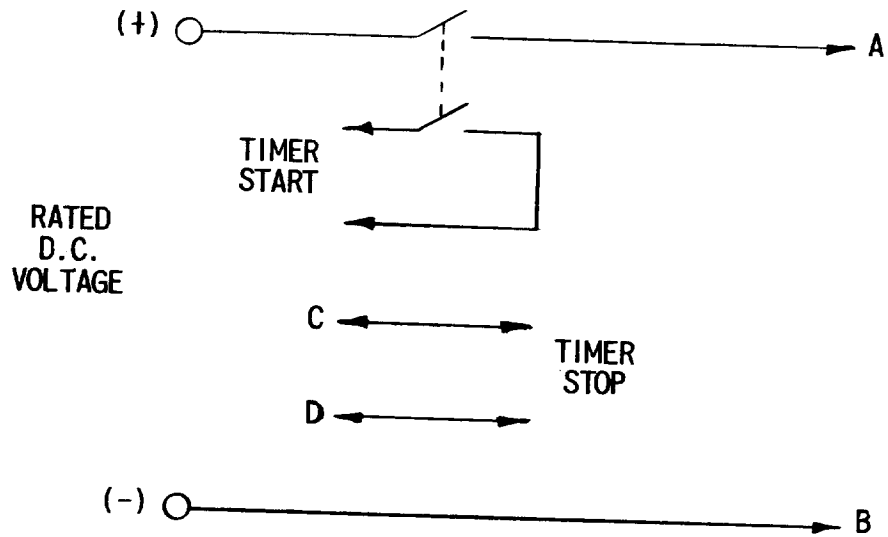


FIG. 1 (0257A5001-2 SH. 1) Internal Connections for NAA27AA

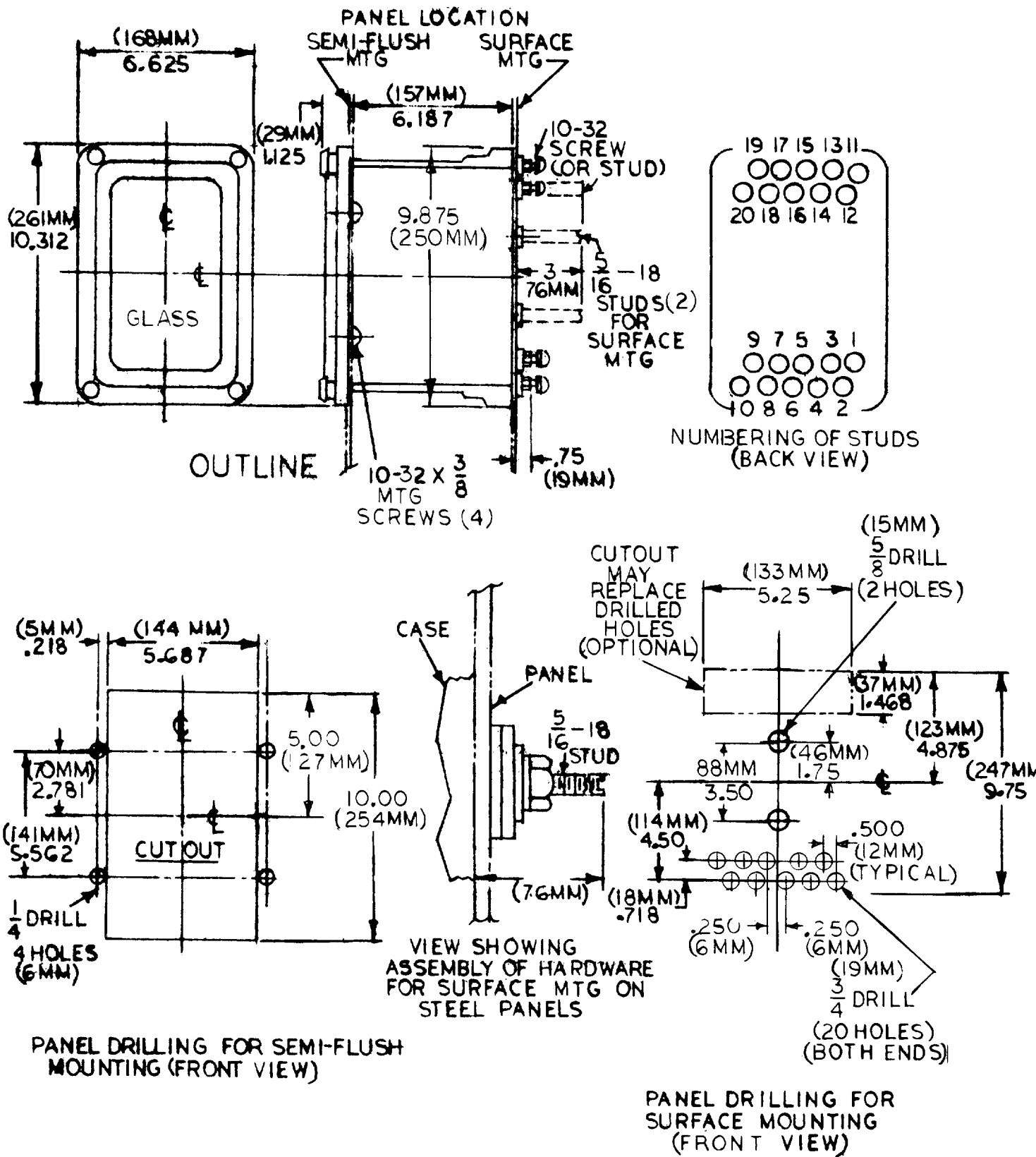
| NAA27AA FORM # | DC VOLTS | RESISTANCE-OHMS | | | | | | | MFD | | |
|-------------------|-------------|-----------------|------|----|-----|------|------|-----|------|-----|-----|
| | | X1 | X2 | TX | A | B1 | B2 | C | D | C1 | C2 |
| 1 | 125 | 2.5K | 2.5K | 58 | 300 | 2K | — | 500 | 1.5K | 0.5 | .05 |
| 2 | 48 | 75 | 75 | 10 | 50 | 300 | — | 500 | 500 | 0.5 | 0.5 |
| 3 | 220 | 2.5K | 2.5K | 58 | 300 | 2000 | 1800 | 500 | 6.2K | 0.5 | .05 |

*FIG. 1A (0257A5001-2 SH. 2) Component Values



| TEST | LEAD CONNECTIONS | | | |
|---------|------------------|----|----|----|
| | A | B | C | D |
| TX UNIT | 18 | 17 | 9 | 10 |
| X1 UNIT | 8 | 6 | 3 | 4 |
| X2 UNIT | 8 | 7 | 14 | 15 |

FIG. 2 (0257A5004-0) Test Connections for NAA27AA



* FIG. 3 (K-6209272-4) Outline and Panel Drilling for NAA27AA

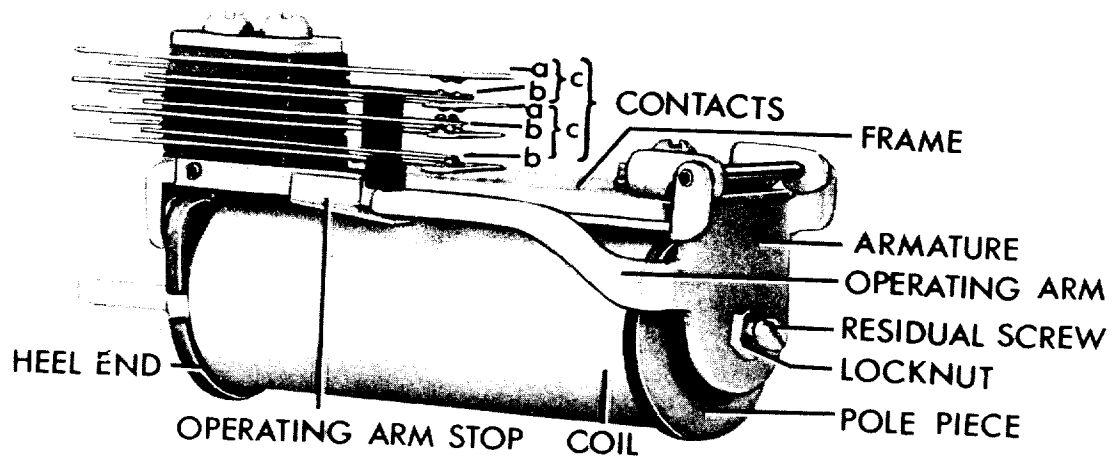


FIG. 4 (8012106) Typical Telephone Relay Used In NAA27AA

| (PICK VIEW) | | | | | | | | | |
|---------------------------|-------|----------------------------|---|-----|-----|----------------------------|---|---|--|
| TSS-SBIC (G127AE008 C-1) | | | | | | | | | |
| CONTACTS HANDLE END | | TEST 2 HANDLE IN/OUT | | OFF | NOR | TEST 1 HANDLE IN/OUT | | | |
| 1 | 1C 2C | 1 | X | | | | | | |
| 2 | | 2 | X | | | | | X | |
| 3 | 3C 4C | 3 | X | X | | | | | |
| 4 | | 4 | | | | | X | X | |
| 5 | 5C 6C | 5 | | | | X | X | X | |
| 6 | | 6 | X | X | | Y | | | |

| LEGEND | | | | |
|------------|-------------|---------------------------|----------------------|-----------|
| DEVICE NO. | DEVICE TYPE | DESCRIPTION | INTERNAL CONNECTIONS | OUTLINE |
| TSS | SEIC | TEST SWITCH | 0127A6C0E | 0127A6C0E |
| 86T | HEAFI | LOCKOUT RELAY | | |
| 87T | | TRANSF. DIFF. RELAY | | |
| P | RECT. | 295B233G-12(125V) & (43V) | | 456A205 |
| P | RECT. | 295B233G-13(250V) | | 456A205 |

NOTE 1: THE FOLLOWING MINIMUM VOLTAGES BETWEEN TB1-12 OR TB1-22 AND NEGATIVE ARE NECESSARY TO ASSURE RELIABLE KEYING. THE DROP IN 821 CONTACT CIRCUIT, INCLUDING TARGET OR SEAL IN COIL IF PRESENT, MUST NOT RESULT IN A KEYING VOLTAGE BELOW THAT LISTED WITH BATTERY VOLTAGE AT MINIMUM EXPECTED VALUE.

| NOMINAL BATTERY VOLTAGE | MINIMUM KEYING VOLTAGE |
|-------------------------|------------------------|
| 48 | 30 |
| 125 | 70 |
| 250 | 140 |

NOTE 2: CONNECTIONS TO TYPE-30 TONE TRANSMITTER AND RECEIVER ARE SHOWN TO TERMINAL BLOCK TEL OF SHELF UNIT. USER MUST INTERPOSE CABINET T.B. POINTS FOR SPECIFIC EQUIPMENT.

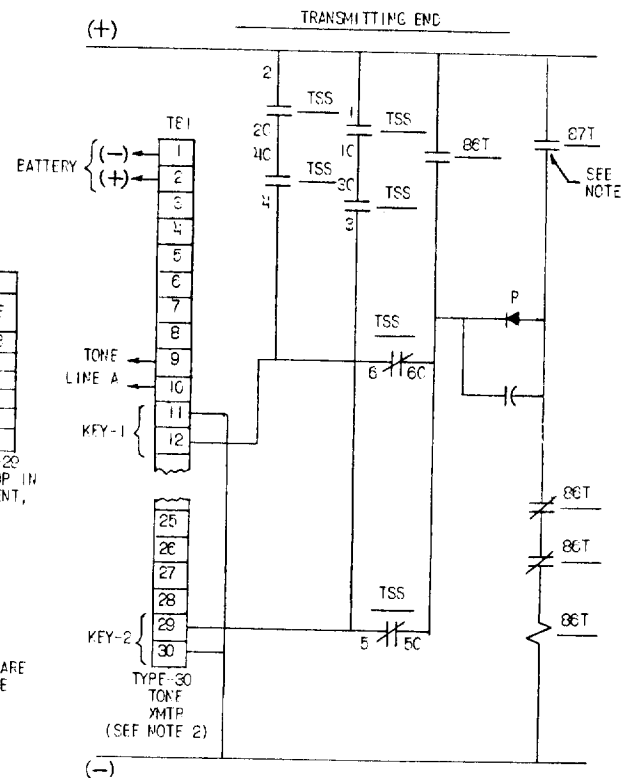


FIG. 5A (0124B8234-1) Typical Elementary Diagram Illustrating Use of the Type NAA27AA Relay in a Dual Channel Transformer Differential Transferred Trip Scheme, Transmitting End

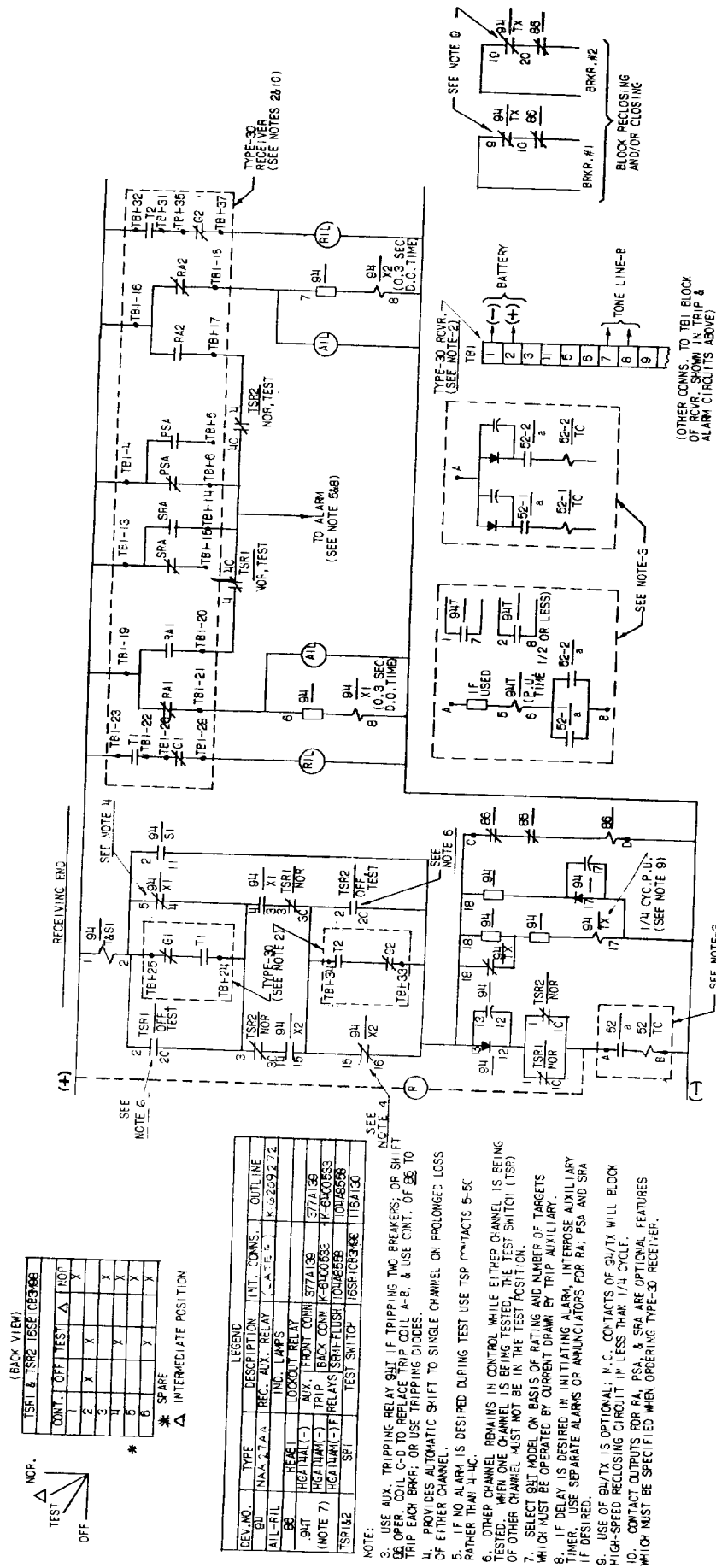


FIG. 5B (0124B8234-1) Typical Elementary Diagram Illustrating Use of the Type NAA27AA Relay in a Dual Channel Transformer Differential Transferred Trip Scheme, Receiving End