

INSTRUCTIONS

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H.B. Section #7240

TRANSFER TRIP AUXILIARY RELAY

TYPE NAA

MODEL NAA27X(-)A

POWER SYSTEMS MANAGEMENT DEPARTMENT

GENERAL  ELECTRIC

PHILADELPHIA, PA.

CONTENTS

| | <u>PAGE</u> |
|--|-------------|
| DESCRIPTION..... | 3 |
| APPLICATION..... | 3 |
| RATINGS..... | 3 |
| CHARACTERISTICS..... | 4 |
| RECEIVING, HANDLING AND STORAGE..... | 4 |
| ACCEPTANCE TESTS..... | 5 |
| DRAWOUT RELAYS GENERAL..... | 5 |
| POWER REQUIREMENTS GENERAL..... | 5 |
| INSTALLATION PROCEDURE..... | 5 |
| PERIODIC CHECKS AND ROUTINE MAINTENANCE..... | 6 |
| CONTACT CLEANING..... | 6 |
| SERVICING..... | 6 |
| PICKUP..... | 6 |
| DROPOUT TIME..... | 6 |
| RENEWAL PARTS..... | 6 |

TRANSFER TRIP AUXILIARY RELAY

TYPE NAA

MODEL NAA27X(-)A

DESCRIPTION

The Type NAA27X relay is a special purpose auxiliary relay that is employed at the receiving end of double-channel direct transferred trip schemes, such as way used in conjunction with transformer differential protection 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 GX1, GX2 and TX, and a target seal-in unit, mounted in an S2 drawout case. Internal connections are shown in Figure 2. A more complete description of the use of this relay is given in the section on APPLICATION.

APPLICATION

The NAA27X relay is designed specifically for use at the receiving terminal of a double channel direct transferred trip scheme using General Electric Type 30 tone equipments without receiver logic module. On applications where the receiver logic module is not included with the Type 30 equipment, a different Type NAA auxiliary relay is required. Refer to the factory for recommendations.

The auxiliary units in the NAA27X perform the following functions:

GX1 AND GX2 UNITS - These units are associated with the receiving auxiliary units G1 and G2 which respond to the guard frequencies of the two channels. GX1 and GX2 are held in the picked up position when guard frequency is being received and on G1 and G2 respectively for the two channels are picked up. On prolonged loss of guard frequency, in excess of the nominal 0.3 second dropout time setting, GX1 or GX2 for the particular channel will drop out and a contact is provided to sound an alarm indicating channel failure. A second contact of the GX unit is arranged to bypass the receiver contacts of the failed channel causing the scheme to shift to single channel operation. If both guard frequencies are lost, indicating failure of both channels, contacts of GX1 and GX2 are arranged to block tripping by received transferred trip signal.

During a normal transferred trip operation, where both channels are shifted rapidly from the guard to the trip frequency, the GX1 and GX2 units will be held in the picked up position by contacts T1 and T2 respectively of the tone receivers.

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

RATINGS

The model NAA27X 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 Fig. 2.

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. Diodes D2, D3, D4, and D5 will carry a maximum of one ampere, all diodes will withstand 500 volts in the reverse direction.

The contacts of the TX, GX1, and GX2 units will make and carry 3 amperes continuously or 70 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

GX1 AND GX2

These units have a pickup time of 48 to 58 milliseconds and a dropout time of 285 to 315 milliseconds at rated voltage.

TX

The TX unit has a pick-up time of 4 milliseconds or less. The dropout time is also 4 milliseconds (12 milliseconds for 48 volt models).

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.

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 case, it is recommended that they be tested in their case 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 C.T. 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 wave forms.

Similarly, relays requiring dc control power should be tested using dc and not full wave rectified power. Unless the rectified supply is well filtered, many relays will not operate properly due to the dips in the rectified power. Zener diodes, for example, can turn off during these dips. As a general rule the dc source should not contain more than 5% ripple.

Using the test connection shown in Figure 3, the pickup should be checked on all units. The TX, GX1, and GX2 units should pick up at 80 percent of rated voltage or less. The seal-in unit should pick up at tap value or less.

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 wiper.
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 wiper.

The operating times of the TX, GX1, and GX2 units should be checked using the test connections of Figure 3. The correct operating times are given in the Characteristics Section of this booklet. If readjustment should be necessary, follow the procedures given in the Servicing section.

The internal connections are shown in Figure 2. This relay should be mounted on a vertical surface. The outline and panel drilling dimensions are shown in Figure 4.

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 5 for the identification of the parts of a telephone relay.

PICKUP

To decrease the percentage of rated voltage at which the GX 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 pick up time of the TX unit, reduce the pressure of the normally closed contacts by bending slightly the movable flexible contact arm.

The pick up time may be increased by reversing this procedure.

DROPOUT TIME

The drop out 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 drop-out time will be. Be sure to tighten the locknut after adjusting this screw. The GX1 and GX2 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 drop out 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.

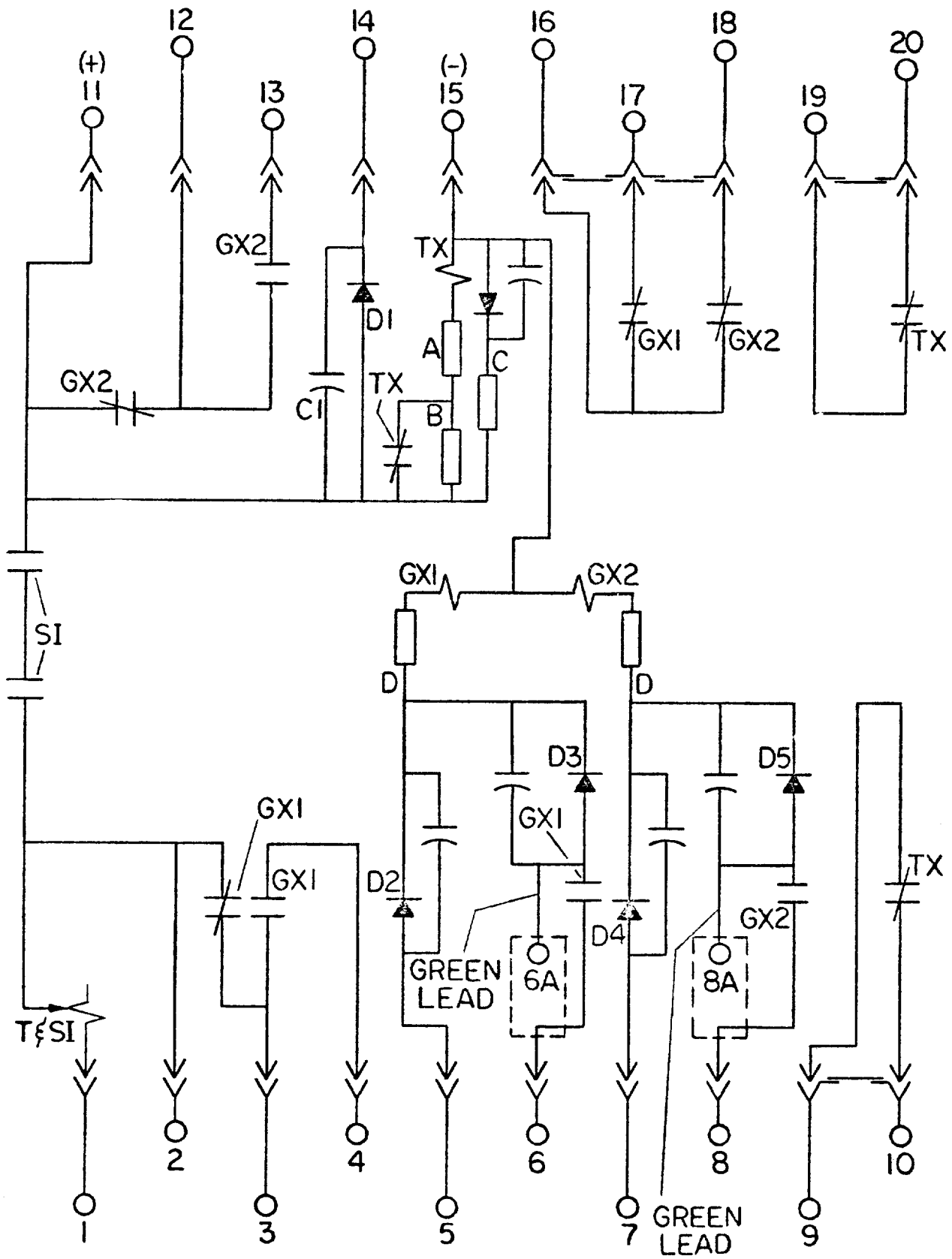
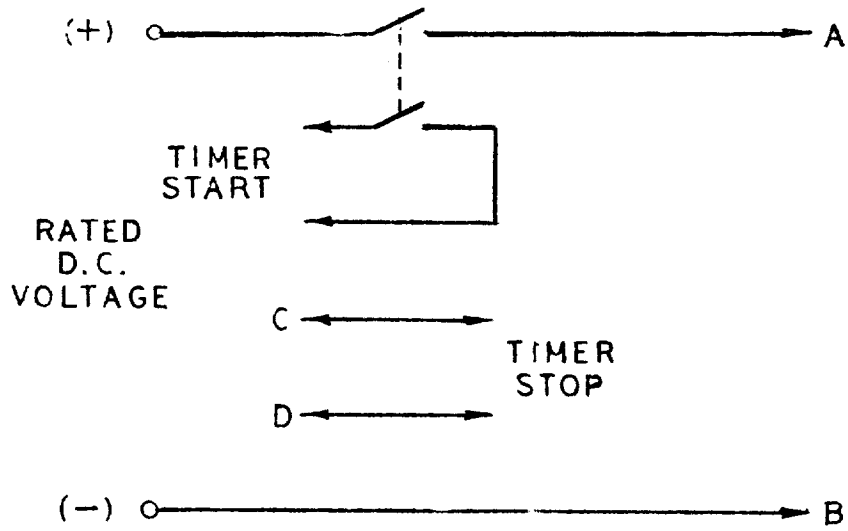


FIG. 1 (0246A3341-0) Sh. 1 Internal Connections For NAA27X(-)A

| NAA27X FORM # | D-C VOLTS | RESISTANCE - OHMS | | | | | | | MFD CI |
|------------------|--------------|-------------------|------|----|-----|----|-----|------|-----------|
| | | GX1 | GX2 | TX | A | B | C | D | |
| 1 | 125 | 2.5K | 2.5K | 58 | 300 | 2K | 500 | 1.5K | 0.5 |

FIG. 1A (0246A3341-0) Sh. 2 For Relay



| TEST | LEAD CONNECTIONS | | | |
|--------------|------------------|----|----|----|
| | A | B | C | D |
| TX UNIT | 11 | 15 | 9 | 10 |
| GX1 UNIT | 5 | 15 | 16 | 17 |
| GX2 UNIT | 7 | 15 | 16 | 18 |
| SEAL-IN UNIT | 1 | 2 | - | - |

FIG. 2 (0246A3349-0) Test Connections For NAA27X(-)A

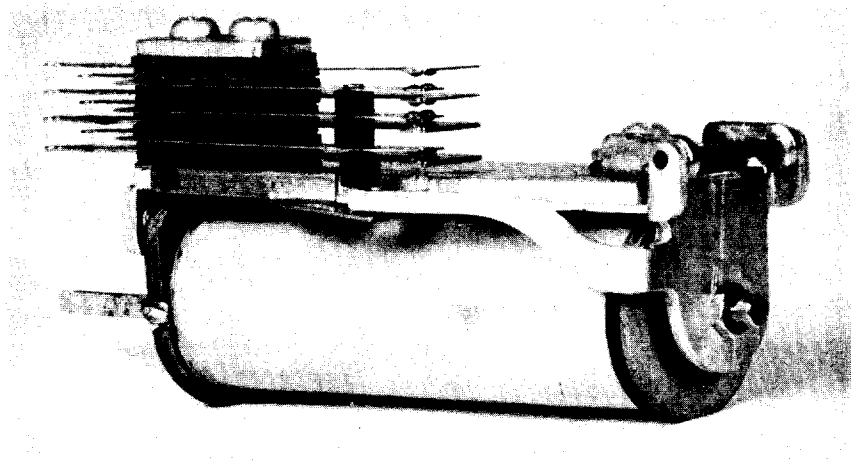


FIG. 4 (8012106) Typical Telephone-Relay Unit Used In NAA Relays



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