



INSTRUCTIONS

GEK-45400

AUXILIARY RELAY

NAA99AE

GENERAL  ELECTRIC

CONTENTS

DESCRIPTION 3

RATINGS 3

 AUXILIARY RELAYS 3

 SEAL-IN UNITS 3

CHARACTERISTICS 4

CONSTRUCTION 4

RECEIVING, HANDLING AND STORAGE 5

ACCEPTANCE TESTS 5

 VISUAL INSPECTION 5

 MECHANICAL INSPECTION 5

 ELECTRICAL CHECKS 6

 AUXILIARY UNITS 6

 TARGET AND SEAL-IN UNIT 6

INSTALLATION PROCEDURE 6

 LOCATION 6

 MOUNTING 6

 INSPECTION AND TESTS 6

PERIODIC CHECKS AND ROUTINE MAINTENANCE 6

 CONTACT CLEANING 6

SERVICING 7

 AUXILIARY UNITS 7

 TARGET AND SEAL-IN UNITS 7

RENEWAL PARTS 7

AUXILIARY RELAY

NAA99AE

DESCRIPTION

The type NAA99AE relay is initially intended as an auxiliary output and tripping target relay for use with a direct transfer trip scheme in which the direct transfer trip circuit is used both for transmission line protection and equipment and/or breaker failure protection.

RATINGS

Auxiliary Relays

The auxiliary relays used in the 12NAA9 AE are an intermittent duty (10 sec. max) DC operated relay. They are available for 48VDC operation.

The relay contacts will close and carry 30 amperes. DC momentarily for tripping duty at control voltages of 250VDC or less. These contacts will carry 3 amperes continuously and have an interrupting rating as given in Table A.

TABLE A

VOLTS	CURRENT INDUCTIVE*	CURRENT NON-INDUCTIVE
48 VDC	1.0	3.0
125 VDC	0.5	1.5
250 VDC	0.25	0.75
115 V 60 Cyc.	0.75	2.0
230 V 60 Cyc.	0.5	1.0

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

Seal-In Units

The ratings for the target and seal-in units are given in Table B.

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 B

CHARACTERISTIC	TAP	
	0.2	2.0
DC Resistance $\pm 10\%$ (ohms)	7.0	0.13
Min. Operating Current (amps.)	0.2	2.0
Continuous Rating (amps.)	0.3	3.0
Carry 30 Amps for (sec)	0.03	4.0
Carry 10 Amps for (sec.)	0.25	30.0
60 HZ Impedance (ohms)	52.0	0.53
Minimum Dropout (amps.)	0.05	0.5

CHARACTERISTICS

The auxiliary units D, AB₁ and AB₂ are adjusted to pick up at less than 80 percent of the nominal DC voltage rating.

The operating times of the auxiliary units are given in Table C.

TABLE C

UNIT	P.U. Time (MS)		D.O. Time (MS)	
	Min.	Max.	Min.	Max.
D	-	16	116	167
AB ₁	-	8	-	8
AB ₂	-	8	-	8

The resistance values of the operating coils and associated resistors are given in Figure 1.

CONSTRUCTION

The type NAA99AE relays are assembled in the standard small size, double-end (S2) drawout case having studs at the upper and lower ends in the rear for external connections. The electrical connections between the relay components and the case studs are made through stationary molded inner and outer blocks between which rests a removable connecting plug which completes the circuits- see Figure 3. The outer block attached to the case has the studs for the external connections, and the inner block has the terminals for the internal connections.

The relay components are mounted on a steel framework called the cradle forming a complete unit with all leads terminated at the inner block. This cradle is held firmly in the case by latches at both top and bottom and by a guide pin at the back of the case. The connecting plugs, between the respective blocks of the cradle and case, also lock the latches in place. The cover, which is drawn to the case by thumb-screws, hold the connecting plugs in place.

A separate testing plug can be inserted in place of the connecting plug to test the relay in place on the panel either from its own source of voltage or from other sources; or the relay can be drawn out and replaced by another which has been tested in the laboratory.

The relay case is suitable for either semi-flush or surface mounting on all panels up to 2 inches thick and appropriate hardware is available. However, panel thickness must be indicated on relay order to insure the proper hardware will be included. For outline and panel drilling dimensions see Fig. 4.

Every circuit in the drawout case has an auxiliary brush, as shown in Fig. 3, to provide adequate overlap when the connecting plug is withdrawn or inserted. Some circuits are equipped with shorting bars and on these circuits it is especially important that the auxiliary brush makes contact as indicated in Fig. 3 with adequate pressure to prevent opening of important interlock circuits.

The cradle assembly includes three auxiliary telephone type units D, AB₁ and AB₂ with their associated resistors and diodes, and two target and seal-in units.

Refer to Fig. 2 where a typical telephone relay is shown.

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

Immediately upon receipt of the relay an INSPECTION AND ACCEPTANCE 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 test indicates that readjustment is necessary, refer to the section on SERVICING.

Visual Inspection

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

Remove the relay from its case and check that there are no broken or cracked molded parts or other signs of physical damage, and that all screws are tight.

Mechanical Inspection

It is recommended that the following mechanical adjustments be checked.

1. Operate each auxiliary telephone-type unit D, AB₁ and AB₂ manually to be sure the armatures are moving freely. With the armature closed the normally open contacts should make with approximately .005" wipe. This can be checked by inserting a .005" shim between the residual screw and the pole piece and operating the armature by hand. The N.O. contacts should make before the residual screw strikes the shim.

With the armature open, each normally open contact should have a gap of .010" to .015".

2. The armature and contacts of the target and seal-in units should move freely when operated by hand. There should be at least 1/32" wipe on the seal-in contacts. The target must come into view and latch when the armature is operated by hand and should unlatch when the target release lever is operated.

3. Check the location of the contact brushes on the cradle and case blocks against the internal connection diagram in Fig. 1. Be sure the short and long brushes, and the shorting bar on the case blocks are in the positions shown in Fig. 1.

Electrical Checks

Auxiliary Units: (D, AB₁ and AB₂ units)

The relay has been adjusted at the factory to pick up at 80 percent or less of rated voltage and should not require further adjustment. Pickup time and dropout time at rated voltage should be those values listed in Table C.

Target And Seal-In Unit

Each target and seal-in unit has an operating coil tapped at 0.6 and 2.0 amperes. The relay is shipped from the factory with the tap screw in the lower 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. This procedure is necessary to prevent the right hand stationary contact from getting out of adjustment. Screws should never be in both taps at the same time.

INSTALLATION PROCEDURE

Location

The location of the relay should be clean and dry, free from dust, excessive heat and vibration, and should be well lighted to facilitate inspection and testing.

Mounting

The relay should be mounted on a vertical surface. The outline and panel drilling dimensions are shown in Fig. 4.

Inspection And Tests

If the relay has been stored for any length of time prior to installation, it is recommended that the visual and mechanical inspection and the electrical tests listed under ACCEPTANCE TESTS be repeated.

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 is found during the acceptance, installation or periodic test routines that any of the factory or field adjustments have been disturbed the settings can be restored as outlined in the following paragraphs.

Auxiliary Units

If it is found that the pickup voltage of a unit is too high, it can be reduced by decreasing the gap between armature and pole face by slightly bending the contact operating arm. To raise the pickup voltage, the armature gap should be increased.

With the relay deenergized each normally open contact should have a gap of .010" - .015". Observe the wipe on each normally closed contact by deflecting the stationary contact member towards the frame. Wipe should be approximately .005".

The wipe on each normally open contact should be approximately .005". This can be checked by inserting a .005" shim between the residual screw and the pole piece and operating the armature by hand. The normally open contacts should make before the residual screw strikes the shim.

The dropout time of the relay 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. Be sure to tighten the locknut after adjusting the screw. The residual screw must not be removed completely. The minimum gap must be 0.002 inch between the armature and the pole face.

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

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

After each adjustment the contact gap and wipe must be rechecked and the contact pressure should never be less than 10 grams measured at the contact wipe.

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

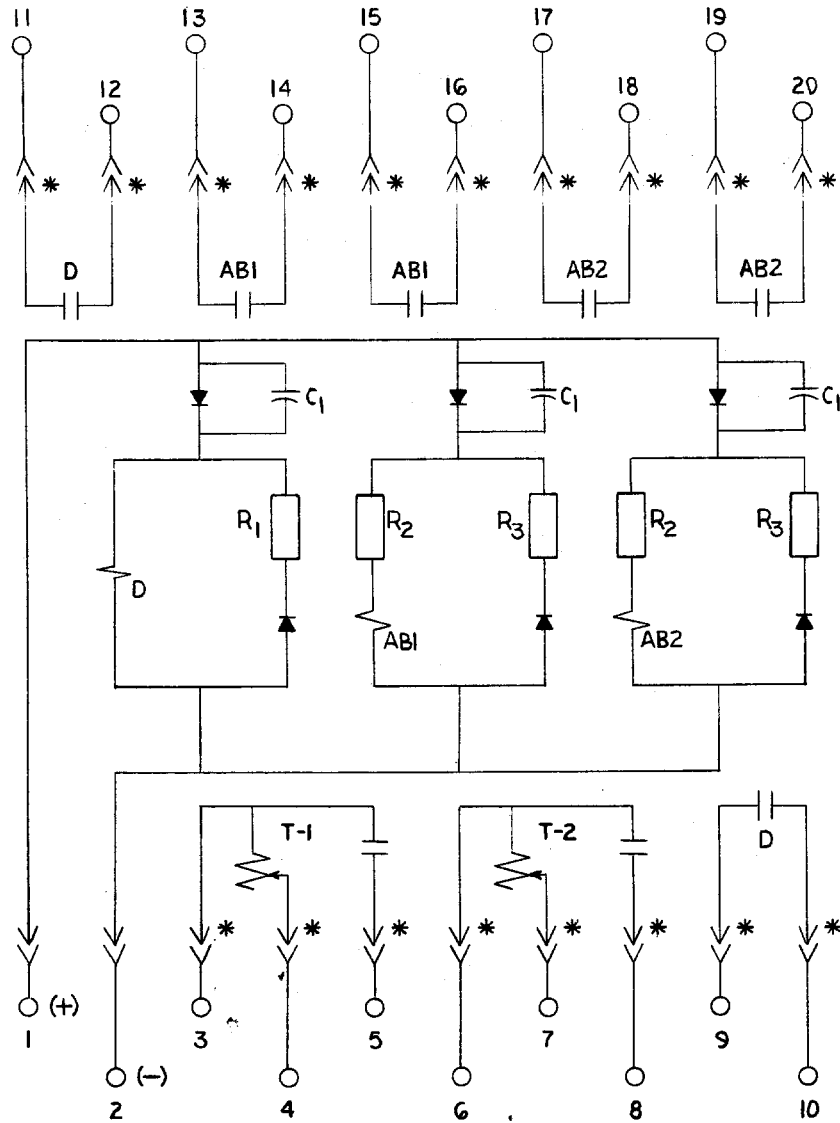
Target And Seal-in Units

Both contacts should close at the same time. The backing strip should be so formed that the forked end (front) bears against the molded strip under the armature. With the armature against the pole piece the cross member of the "T" spring should be in a horizontal plane and there should be at least 1/32 inch wipe on the contacts. Check this by inserting a 0.012 inch feeler gauge between the front half of the shaded pole with armature held close. Contacts should close with feeler gauge in place.

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 requisition number on which the relay was furnished.



* =SHORT FINGERS
 AB1,AB2 & D=TELEPHONE RELAYS

MODEL	FORM NUMBER		
12NAA99AE(-)A	1		
VOLTS DC	48		
RESISTANCE IN OHMS			
D COIL	500		
AB1,AB2 COIL	10		
R1	27		
R2	250		
R3	180		
CAPACITANCE VALUE			
C1	.05 uf		

FIGURE 1 (0257A8359) INTERNAL CONNECTIONS DIAGRAM FOR THE NAA99AE RELAY

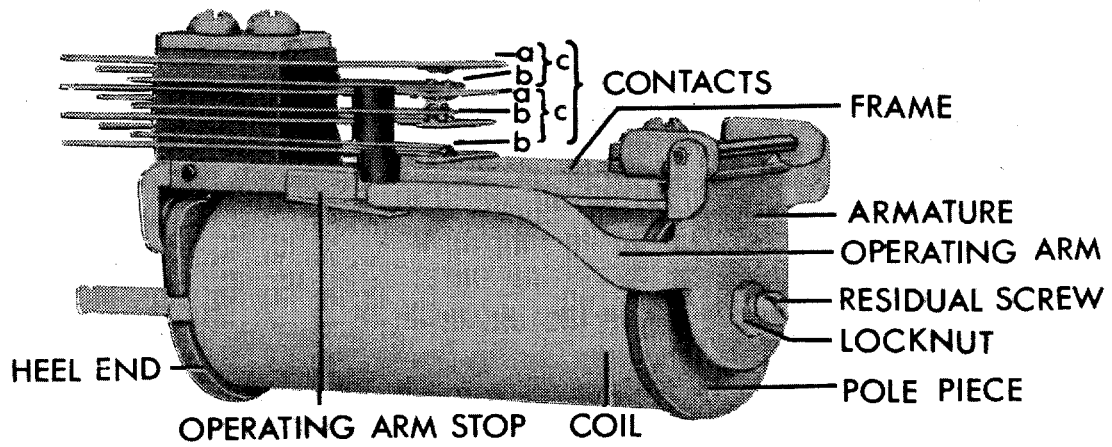
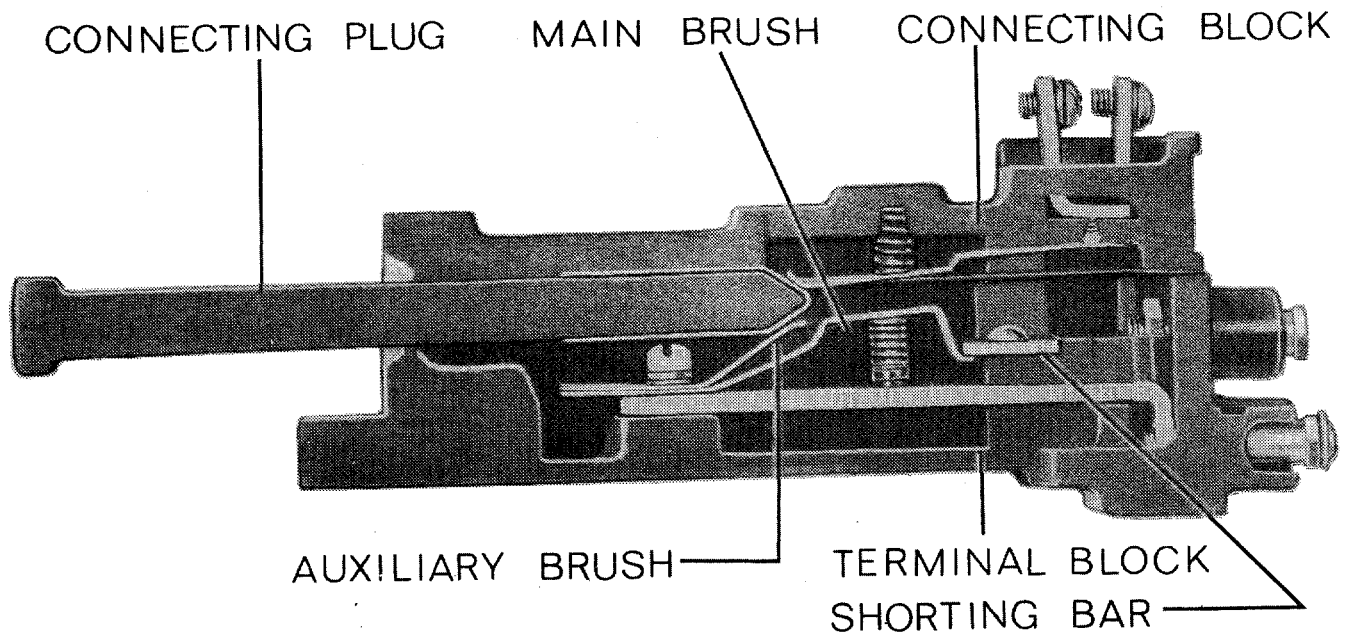
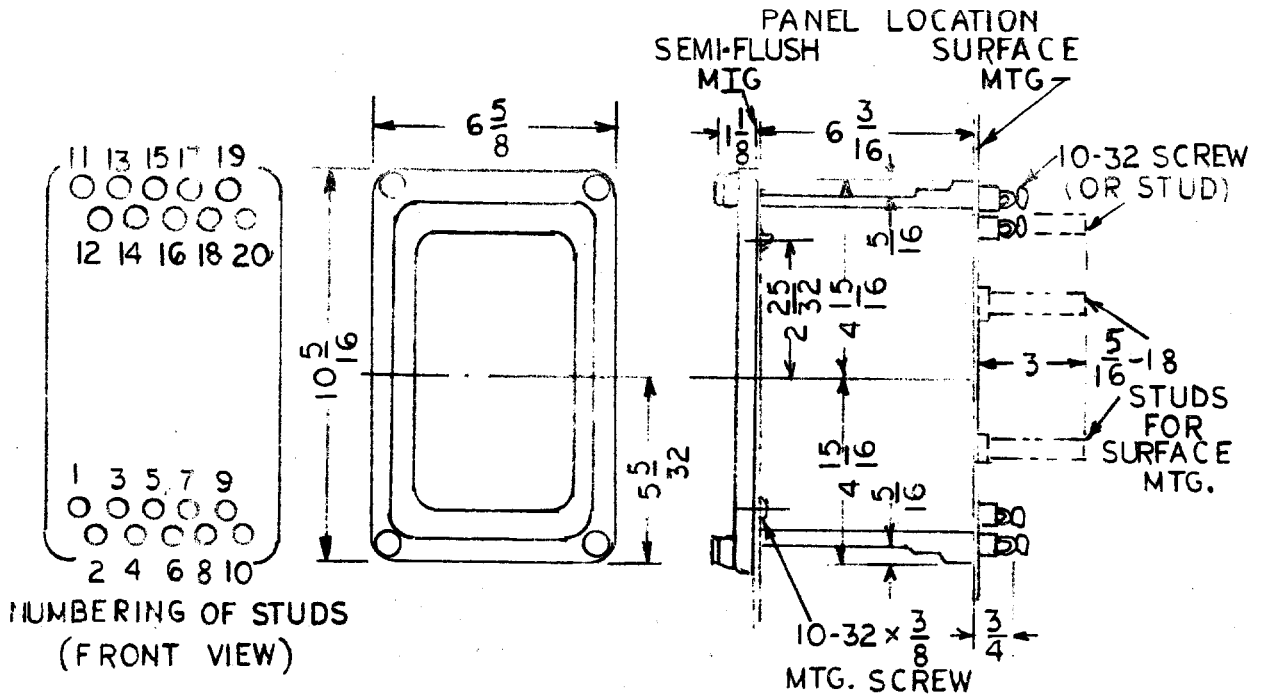


FIGURE 2 (8012106) TYPICAL TELEPHONE RELAY UNIT USED IN THE NAA99AE RELAY



NOTE: AFTER ENGAGING AUXILIARY BRUSH, CONNECTING PLUG TRAVELS $\frac{1}{4}$ INCH BEFORE ENGAGING THE MAIN BRUSH ON THE TERMINAL BLOCK

FIGURE 3 (8025039) CROSS SECTION OF CASE AND CRADLE BLOCK SHOWING AUXILIARY BRUSH AND SHORTING BAR



OUTLINE

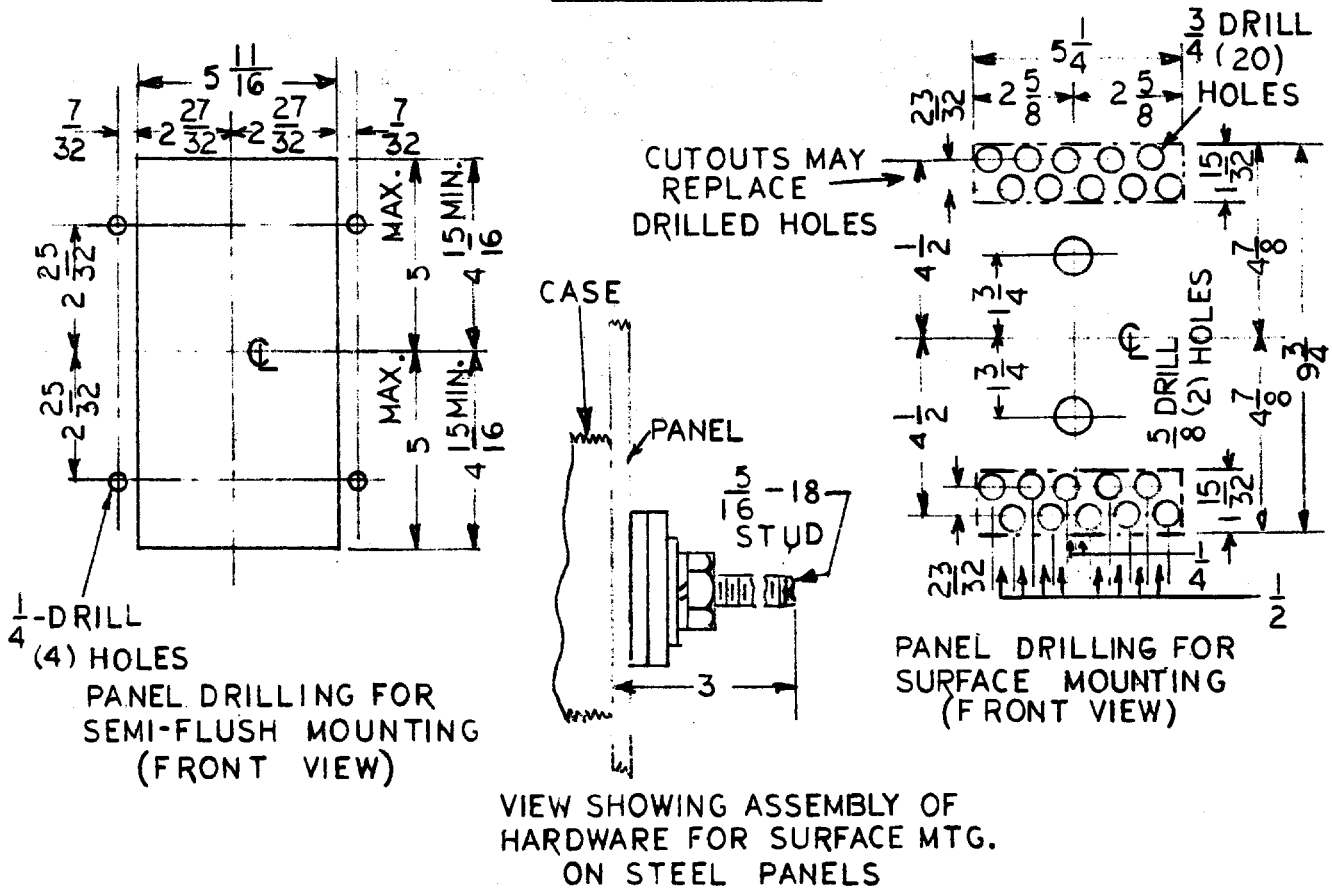


FIGURE 4 (K-6209272-2) OUTLINE AND PANEL DRILLING DIMENSIONS FOR NAA99AE RELAY

**GENERAL ELECTRIC COMPANY
POWER SYSTEMS MANAGEMENT BUSINESS DEPT.
MALVERN, PA 19355**

GENERAL  ELECTRIC