

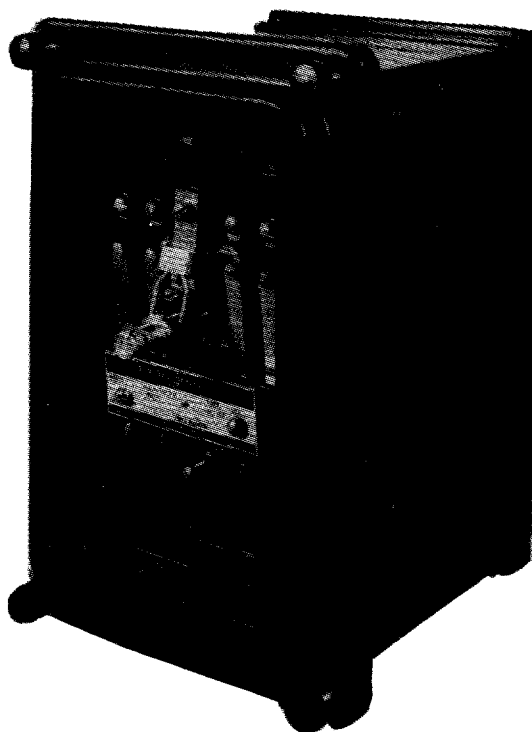


INSTRUCTIONS

GEK-41898B
Supersedes GEK-41898A

MULTI-CONTACT AUXILIARY RELAYS

TYPE
HFA74



GENERAL  ELECTRIC

GEK-41898

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MULTI-CONTACT AUXILIARY RELAYS

TYPE HFA74

DESCRIPTION

The HFA74 relays are instantaneous, hinged armature, multi-contact, electric reset, auxiliary relays. They have five or six electrically-separate contact circuits adaptable for either circuit-opening or circuit-closing application. This arrangement permits a number of operations to be performed simultaneously.

These relays remain in the picked-up position until the mechanical latch holding the armature is released.

The relays are mounted in single-unit double-end drawout-type cases. The case has studs for external connections at both ends. The electrical connections between the relay and the case are made through stationary molded inner and outer blocks, between which rest two removable connecting plugs that complete the circuits. The molded outer blocks carry the studs for the external connections, while the inner blocks carry the terminals for the internal connections. The operating coil is connected in parallel with both the upper and the lower inner molded blocks, while the contact circuits and reset circuit are connected in series with these blocks. In this way, insertion of either the upper or lower connecting plug will energize the operating coil, but the contact circuits and reset circuit will not be completed until the second connecting plug is inserted.

Internal connection diagrams for these relays are shown in Figures 1 and 2. Outline and panel drilling are shown in Figure 3.

CHARACTERISTICS

The general characteristics of HFA74 relays, in addition to the electric reset feature common to all of them, are summarized in Table I.

The hand reset feature is accomplished, where used, with a plunger assembly installed through the transparent cover.

Unless the relays are ordered with a specific contact arrangement, they will be shipped with six (6) circuit-closing contacts (Code 60). HFA74D and HFA74K relays are available with contact Code 33 only. The various contact codes are summarized in Tables II, III and IV.

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

| MODEL NO. | NO. OF SEPARATE CONTACT CIRCUITS | CHARACTERISTICS IN ADDITION TO ELECTRIC RESET | CONTACT ARRANGEMENT TABLE |
|-----------|---|--|---------------------------------|
| HFA74B | 5 | Hand Reset | II |
| HFA74C | 5 | Hand Reset & Mechanical Target | II |
| HFA74D | 5 | Hand Reset with Overlapping Contacts in Positions 2 & 3 | IV |
| HFA74E | 5 | ----- | II |
| HFA74H | 6 | Hand Reset | III |
| HFA74J | 6 | Hand Reset & Mechanical Target | III |
| HFA74K | 6 | Hand Reset with Overlapping Contacts in Positions 2 & 3 | IV |
| HFA74L | 6 | ----- | III |

TABLE II
CONTACT ARRANGEMENT FOR HFA74B, HFA74C AND HFA74E

| Code No. | 60 | 51 | 42 | 33 | 24 | 15 |
|--------------|---------------------|------|------|------|------|------|
| Position No. | Contact Arrangement | | | | | |
| 1 | N.O. | N.O. | N.O. | N.O. | N.O. | N.C. |
| 2 | N.O. | N.O. | N.O. | N.O. | N.C. | N.C. |
| 3 | N.O. | N.O. | N.C. | N.C. | N.C. | N.C. |
| 4 | N.O. | N.C. | N.C. | N.C. | N.C. | N.C. |
| 5 | N.O. | N.O. | N.O. | N.C. | N.C. | N.C. |
| 6 * | N.O. | N.O. | N.O. | N.O. | N.O. | N.O. |

* Used to open reset coil circuit

TABLE III
CONTACT ARRANGEMENT FOR HFA74H, HFA74J AND HFA74L

| Code No. | 60 | 51 | 42 | 33 | 24 | 15 | 06 |
|--------------|---------------------|------|------|------|------|------|------|
| Position No. | Contact Arrangement | | | | | | |
| 1 | N.O. | N.O. | N.O. | N.O. | N.O. | N.C. | N.C. |
| 2 | N.O. | N.O. | N.O. | N.O. | N.C. | N.C. | N.C. |
| 3 | N.O. | N.O. | N.C. | N.C. | N.C. | N.C. | N.C. |
| 4 | N.O. | N.C. | N.C. | N.C. | N.C. | N.C. | N.C. |
| 5 | N.O. | N.O. | N.O. | N.C. | N.C. | N.C. | N.C. |
| 6 | N.O. | N.O. | N.O. | N.O. | N.O. | N.O. | N.C. |

TABLE IV
CONTACT ARRANGEMENT FOR HFA74D AND HFA74K

| CODE NO. | 33 |
|--------------|---------------------|
| POSITION NO. | CONTACT ARRANGEMENT |
| 1 | N.O. |
| 2 | N.O., Long Wipe |
| 3 | N.C., Long Wipe |
| 4 | N.C. |
| 5 | N.C. |
| 6 * | N.O. |

* Used to open reset coil circuit

The operating coil should pick up at 80% of rated voltage for AC relays and 60% of rated voltage for DC relays (see **ADJUSTMENTS** section of this book). The dropout voltage is 45% to 60% of rated voltage for AC relays and 5% to 10% of rated voltage for DC relays.

The operating time at rated voltage is 45 to 65 milliseconds, and at 65% of rated voltage it is 130 to 170 milliseconds.

RATINGS

The Type HFA relays are available with coil ratings for standard voltages up to 575 volts at 25, 50, or 60 cycles, and up to 250 volts DC.

The operating coil is continuously rated, but the reset coil has a five (5) second intermittent rating.

The current-closing rating of each contact is 30 amperes. The current-carrying rating is 12 amperes continuous, 30 amperes for 1 minute or 125 amperes for 1 second. Table V lists the non-inductive interrupting capacity of each contact.

TABLE V

| DC | | AC | |
|-------|---------|-------|---------|
| VOLTS | AMPERES | VOLTS | AMPERES |
| 12 | 30 | 115 | 30 |
| 24 | 15 | 230 | 20 |
| 32 | 10 | 460 | 15 |
| 48 | 8 | 575 | 10 |
| 125 | 3 | | |
| 250 | 1 | | |

BURDENS

The operating coil burdens listed in Table VI are measured with the relay in the picked-up position and at rated voltage.

TABLE VI

| OPERATING COILS (CONTINUOUS RATING) | | | | | |
|-------------------------------------|-------|-----|--------------------|--------------|-------|
| DC COILS | | | AC COILS | | |
| COLD | WATTS | HOT | FREQUENCY (CYCLES) | VOLT-AMPERES | WATTS |
| 7.3 | | 6.0 | 25 | 10 | 4 |
| | | | 50 | 23 | 9 |
| | | | 60 | 32 | 12 |

The burdens of the reset coil are listed in Table VII.

TABLE VII

| RESET COILS (0.5 SECOND INTERMITTENT RATING) | | | | |
|--|------------|-----------|-----------|--|
| DC COILS | | AC COILS | | |
| RATING | RESISTANCE | FREQUENCY | VOLT-AMPS | |
| 250 | 740.0 | 25 | 55 | |
| 125 | 185.0 | 50 | 220 | |
| 62.5 | 53.0 | 60 | 180 | |
| 48 | 26.0 | | | |
| 32 | 13.3 | | | |
| 24 | 6.5 | | | |
| 12 | 1.60 | | | |
| 6 | 0.40 | | | |

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 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.

INSTALLATION

MOUNTING AND CONNECTIONS

The Type HFA74 relays should be mounted on a vertical surface. The outline and panel drilling diagrams are shown in Figure 3. The internal connections are shown in Figures 1 and 2.

ADJUSTMENTS

These relays have been calibrated at the factory, and under normal conditions will require no further adjustments. If further adjustments are required, refer to the **MAINTENANCE** section of this book.

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. Unless otherwise dictated by unusual environmental conditions, it is recommended that the following points be checked at an interval of from one to two years.

CONTACT CLEANING

In 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.

Fine silver contacts should not be cleaned with knives, files or abrasive paper or cloth.

The burnishing tool described is included in the standard XRT11A relay tool kit obtainable from the factory.

ADJUSTMENTS

CONTACTS

The contacts should not require readjustment, since they are self-aligning.

Any contact circuit can be changed (except as noted in the **CHARACTERISTICS** section) from circuit-opening to circuit-closing, or vice versa, by removing the fixed contact, turning it over, and returning it to its place. After the change, the contacts should be checked to see that all circuit-closing contacts make simultaneously when the relay is operated by hand, and that all circuit-opening contacts reclose simultaneously when the relay is allowed to drop out. All moving contacts should have at least 1/32 inch wipe. It may be necessary to bend the moving contact arms to make them meet these requirements.

It may be necessary to increase the armature travel by means of the armature adjusting screw, to get sufficient wipe on the normally-closed contacts. All pigtailed should be checked to be sure that they exert no force on the contacts. If the above changes are required, the pickup should be rechecked after adjustment.

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In order to maintain the seismic qualifications of the normally-closed contacts of an HFA relay, the following adjustments are necessary.

1. All normally-open "a" contacts shall have a wipe of $3/64$ to $3/32$ of an inch. This can be adjusted by forming the moving contact arms and checking the wipe with go/no go gauges.
2. All normally-closed "b" contacts shall have a wipe of 0.067 inches $\pm .007$ inches. This can be accurately accomplished by using the stop screw as a wipe adjustment.
3. Connect a continuity light to each of the normally-closed contacts.
4. Loosen the stop screw locknut and turn the stop screw clockwise until the first of the normally-closed contacts open.
5. Turn the stop screw an additional $1-1/4$ turns; all the normally-closed contact lights should go out, indicating that the normally-closed contacts are adjusted within $1/32$ of an inch overall from the first open to the last open. Adjust the contact arms if necessary.
6. Return the stop screw adjustment to the position mentioned in paragraph 4.
7. Note the position of the slot of the stop screw. With that as a reference, turn the stop screw counterclockwise $2-1/2$ turns $\pm 1/4$ turn and lock into position. Make sure that the armature rests against the stop screw in the de-energized and reset position.

Set the relay pickup as close to the maximum pickup setting listed in the **CHARACTERISTICS** section of this instruction book, except on those relays where an operating time is involved.

PICKUP

The main coil should be adjusted to pick up at 80% (minimum 73%, maximum 81%) of rated voltage for AC relays and 60% (minimum 55%, maximum 61%) of rated voltage for DC relays. This adjustment may be obtained by unseating the adjusting nut at the lower end of the armature and turning this nut in a clockwise direction to raise the pickup. The pickup is decreased by turning the nut in the counterclockwise direction.

The reset coil should pick up at 80% (minimum 50%) of rated AC voltage and 50% to 75% of rated DC voltage. There is no adjustment available to alter this pickup. Since the reset coil is rated intermittently, care should be exercised when applying this voltage.

After all adjustments are completed, the mounted relay should be operated a few times to be certain that the mechanism operates freely and that the contact surfaces align properly. Check to see that the armature latches in when operated by hand, and opens readily when reset.

RENEWAL PARTS

Sufficient quantities of renewal parts should be kept in stock for 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 the name of the part wanted, quantity required, and complete nameplate data, including the serial number, of the relay. If possible, give the General Electric Company requisition number on which the relay was furnished.

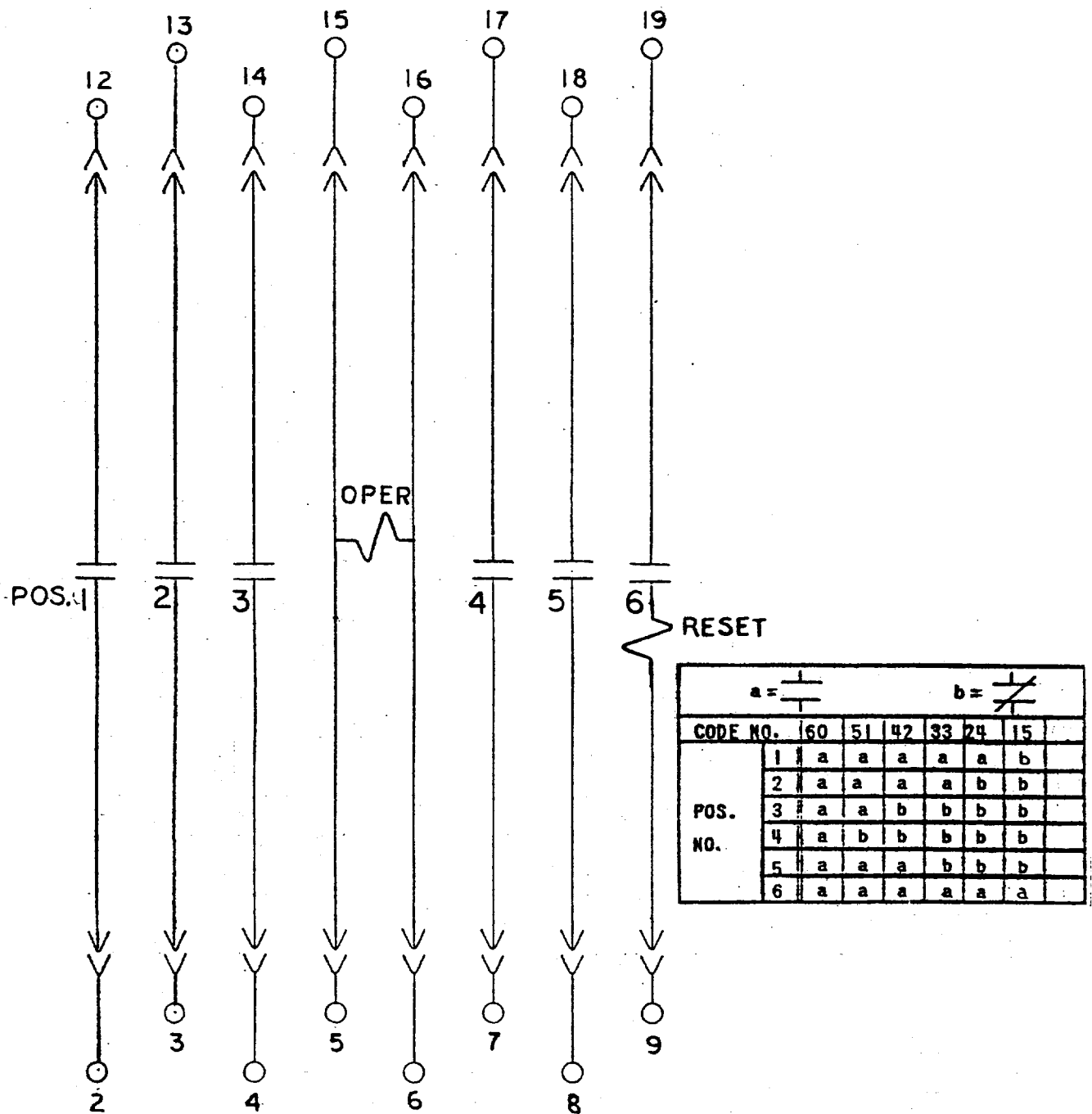
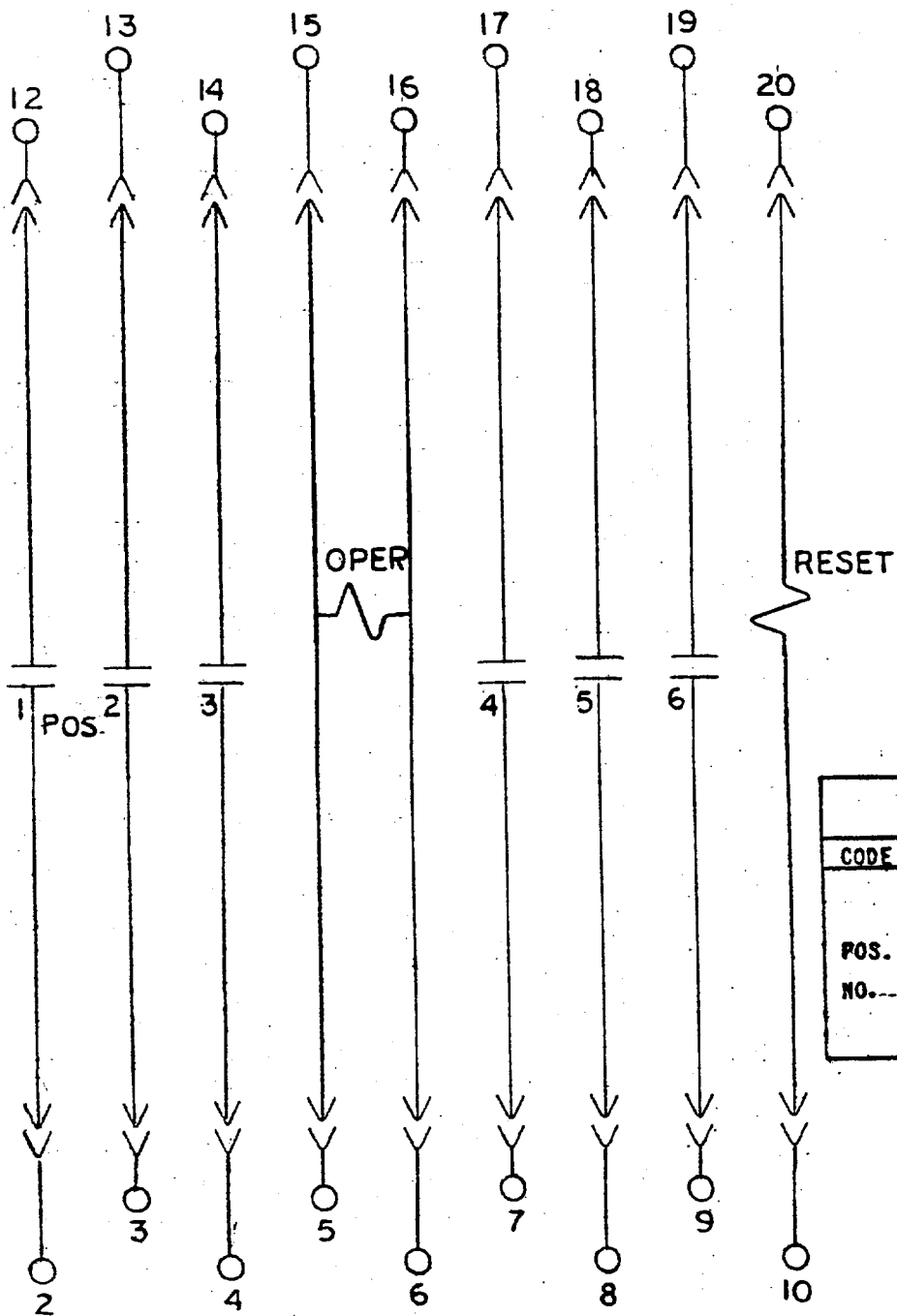


Figure 1 (0246A6924-1) Internal Connection Diagram
for Type HFA74B, HFA74C, HFA74D and HFA74E Relays (Front View)





| | | a =  b =  | | | | | | | |
|-------------|---|---|----|----|----|----|----|----|--|
| CODE NO. | | 60 | 51 | 42 | 33 | 24 | 15 | 08 | |
| POS. NO. | 1 | a | a | a | a | a | b | b | |
| | 2 | a | a | a | a | b | b | b | |
| | 3 | a | a | b | b | b | b | b | |
| | 4 | a | b | b | b | b | b | b | |
| | 5 | a | a | a | b | b | b | b | |
| | 6 | a | a | a | a | a | a | b | |

Figure 2 (0246A6934-0) Internal Connection Diagram
for Type HFA74H, HFA74J, HFA74K and HFA74L Relays (Front View)

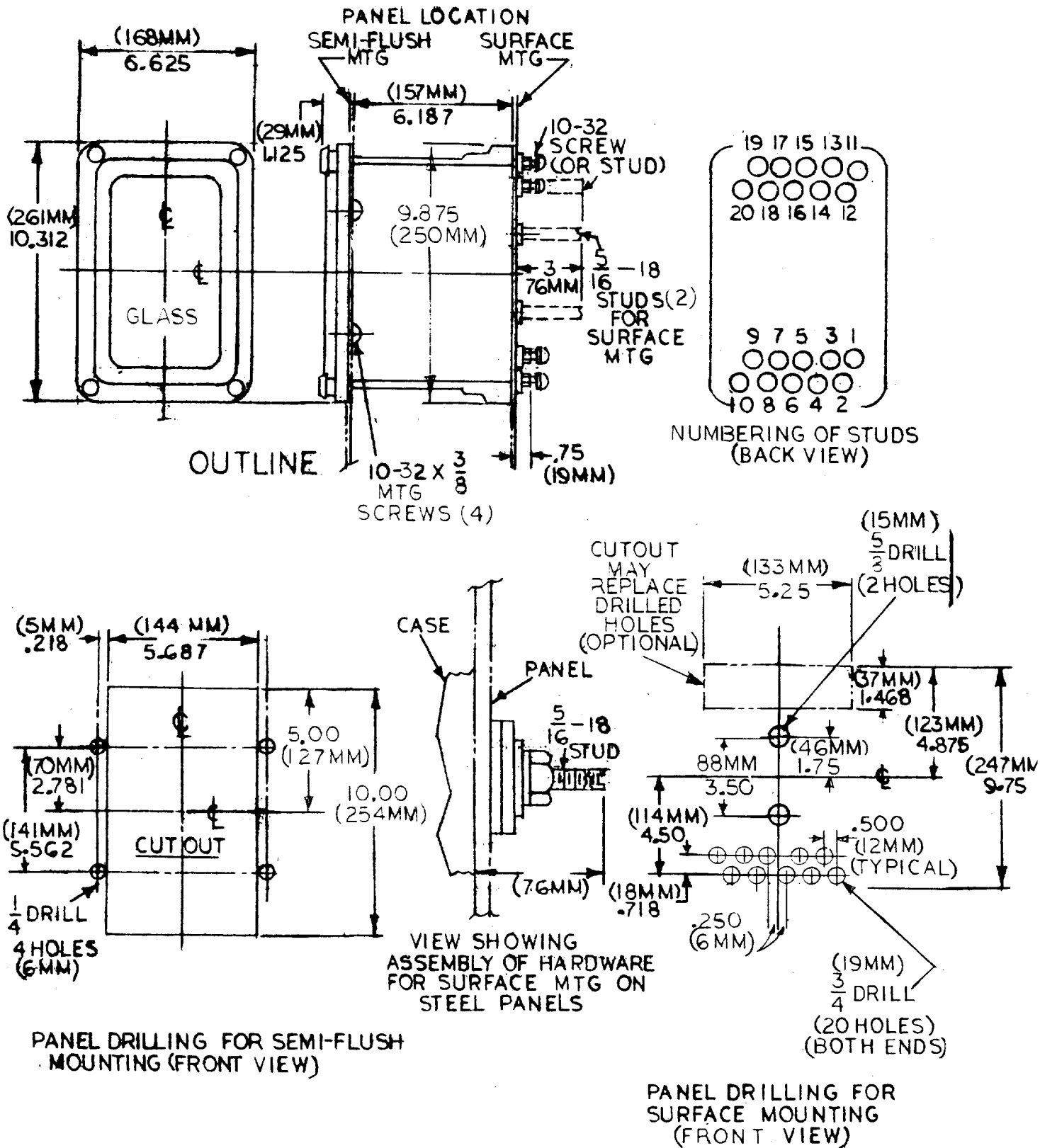


Figure 3 (K-6209272-5) Outline and Panel Drilling for HFA74 Relays