



# ***INSTRUCTIONS***

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**MULTI-CONTACT AUXILIARY RELAY**

**TYPE HFA151**

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*These instructions do not purport to cover all details or variations in equipment nor 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.*

**MULTI-CONTACT AUXILIARY RELAY**

**TYPE HFA151**

**DESCRIPTION**

The HFA151 relays are instantaneous, hinged-armature, multi-contact, auxiliary relays. They have 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. The internal connection diagram for HFA151 relays is shown in Figure 4. The HFA151 relays are available as back-connected semi-flush mounted relays, HFA151A(-)F and HFA151B(-)F, and as front-connected surface-mounted relays, HFA151A(-)H and HFA151B(-)H.

The outline and panel drilling diagrams for the HFA151 relays are shown in Figures 5, 6 and 7.

The operating coils are specially designed for long life, even when operated continuously near maximum ambient temperature.

**APPLICATION**

The Type HFA151 relays are intended for application where it is necessary to perform up to six auxiliary functions simultaneously by the operation of a single auxiliary relay. If more than six circuits are to be controlled, the coils of two HFA relays may be connected, in series (DC only), or in parallel.

**RATINGS**

HFA151 relays are available with coil ratings for 120 and 240 volts, 50 or 60 cycles, and for up to 250 volts DC. The coils are designed for long life, even when operated continuously near maximum ambient temperature of 55°C.

The current-closing rating of each contact is 30 amperes. The current-carrying rating is 12 amperes continuous or 30 amperes for one minute. Table I lists the non-inductive interrupting capacity of each contact.

TABLE I

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		

**CHARACTERISTICS**

The HFA151A relay is self reset and has an instantaneous dropout.

The HFA151B relay is hand reset by means of a plunger assembly installed through the transparent cover.

Unless the relays are ordered with a specific contact arrangement, they will be shipped with six circuit-closing contacts (Code 60). The contact arrangement can be easily changed to provide any of the combinations shown in Table II.

TABLE II

CODE NO.	60	51	42	33	24	15	06
POSITION NO.	CONTRACT ARRANGEMENT						
1	a	a	a	a	a	a	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	b	b

Note: a = Normally Open b = Normally Closed

Approximate pickup times times to close a normally-open contact are 33 milliseconds or less for AC relays and 84 milliseconds or less for DC relays.

BURDENS

Burdens with the relay in the picked-up position and at rated voltage are listed in Table III.

TABLE III

DC COILS		AC COILS		
WATTS		FREQUENCY	VOLT-	
COLD	HOT	(CYCLES)	AMPERES	WATTS
7.8	6.0	50	23	9
		60	32	12

**CONSTRUCTION**

The HFA151A(-)F and HFA151B(-)F relays are assembled in a back-connected case with a flange for semi-flush mounting. See Figures 1, 2, and 5. The HFA151A(-)H and HFA151B(-)H are assembled in a front-connected case for surface mounting. See Figures 3 and 6 and 7; otherwise they are the same as the semi-flush mounted relays.

They all have six electrically-separate contact circuits adaptable for either circuit-opening or circuit-closing application; see Figure 4.

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HFA151A relay is self reset. HFA151B is hand reset by means of a plunger assembly installed through the transparent cover.

The contact circuits are opened and closed by moving contact arms controlled by a hinge-type armature, which in turn is actuated by an operating coil and restrained by an adjustable control spring.

The long-life coils are capable of continuous operation near maximum ambient temperature.

### 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 Sales Office.

Reasonable care should be exercised in unpacking the relay in order that none of the parts are injured nor 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

Check the nameplate stamping to make sure that the model number and rating of the relay agree with the requisition. Make sure that the contact arrangement agrees with the code specified on the requisition.

Check that there are no broken or cracked parts or other signs of physical damage.

Check that the armature is free of binding when operated by hand.

### PICKUP

The relays are adjusted at the factory to pick up at 73% to 81% of rating for AC coils and 55% to 61% of rating for DC coils. Normally these adjustments should not change; if it is necessary to readjust the relay, see the instructions in the section on **SERVICING**.

### INSTALLATION

#### MOUNTING AND CONNECTIONS

Type HFA151 relays should be mounted on a vertical surface. The outline and panel drilling diagrams are shown in Figures 5 and 6. The internal connection diagram is shown in Figure 4.

MECHANICAL CHECK

1. Check that there are no broken or cracked parts or other signs of physical damage.
2. Check that the armature is free of binding when operated by hand.
3. Check condition of relay contacts.

ELECTRICAL TESTS

The relays are adjusted at the factory to pick up at 73% to 81% of rating for AC coils and 55% to 61% of rating for DC coils.

After the relay has been mounted it should be operated a few times to be certain that the mechanism operates freely, that the contact surfaces align properly and that self-reset models drop out quickly when the coil is de-energized.

Check latching in and reset of hand-reset models.

**PERIODIC CHECKS AND ROUTINE MAINTENANCE**

In view of the vital role of 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 be checked on the same schedule as the associated protective relays. If maintenance or readjustment is required, see the section on SERVICING.

**SERVICING**

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 ensures cleaning of the actual points of contact. Do not use knives, files, abrasive paper or cloth of any kind to clean relay contacts.

PICKUP

The relays are adjusted at the factory to pick up at 73% to 81% of rating for AC coils and 55% to 61% of rating for DC coils. Normally these adjustments should not change; if it is necessary to readjust the relay, the armature adjusting nut should be lifted 1/16 inch, turned clockwise to raise pickup or counter clockwise to lower pickup, and then resealed in the hexagonal groove in the armature tailpiece.

CONTACT ADJUSTMENT

The contacts are adjusted at the factory, and normally should not require readjustment since they are self-aligning.

HFA151 contact circuits can be changed from circuit-opening to circuit-closing, or vice versa, by removing the fixed contact, turning it over and restoring it to its place.

If for any reason it becomes necessary to readjust the contacts, for instance if a contact is changed from circuit-opening to circuit-closing, the following checks and adjustments should be made:

1. Make sure that all contact and coil studs are tight.
2. Make sure that the armature is free of binding when operated by hand. The braided "pigtail" lead on all contacts must be adjusted to exert minimum force on the contacts.
3. Make mechanical contact adjustments as follows:
  - 3.1. Normally-Open Contacts, Wipe and Gap (Normally-open contacts must be adjusted before normally-closed contacts.)
    - a. The moving contact arms must be adjusted so that the normally-open contacts make approximately simultaneously ( $\pm 0.008$ ) when the relay is operated by hand. All normally-open contacts must have a wipe of 3/64 to 3/32 inches. The contact gap must be approximately 7/32 inch. This can be adjusted as follows:
      - i) Insert a 0.058 gage between the armature and pole face and close the armature.
      - ii) Bend the left-hand moving contact to just light the continuity lamp.
      - iii) Remove the 0.058 gage and bend the remaining moving contacts so that all moving contacts make at approximately the same time.
      - iv) To check performance, turn the stop screw in until one contact continuity lamp is lit. Turn stop screw in an additional 1/2 turn and all continuity lamps should be lit.  
  
Back off the stop screw to obtain at least 1/4 inch contact gap.
      - v) Insert a 7/32-inch gage between any of the normally-open moving and stationary contacts, and turn the stop screw clockwise until the continuity lamp lights. Lock the stop screw in this position with the locking nut.

3.2. Normally-Closed Contact Gap and Wipe

- a. The moving contact arms must be adjusted so that the normally-closed contacts make approximately simultaneously ( $\pm 0.008$ ) when the relay is

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operated by hand. The wipe and gap are automatically set by the formation of the stationary contacts and the strength of the control spring. Adjustments can be made as follows:

- i) Turn the stop screw clockwise until the first normally-closed contact opens.
  - ii) Turn the stop screw an additional 1/2 turn clockwise. All normally-closed contacts should be open.
  - iii) Turn the stop screw counterclockwise until there is approximately 1/8 inch gap between the stop screw and armature. Lock the stop screw in this position.
4. Recheck pickup after the above changes or adjustments.

### 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.

Since the last edition, Figure 5 has been changed.



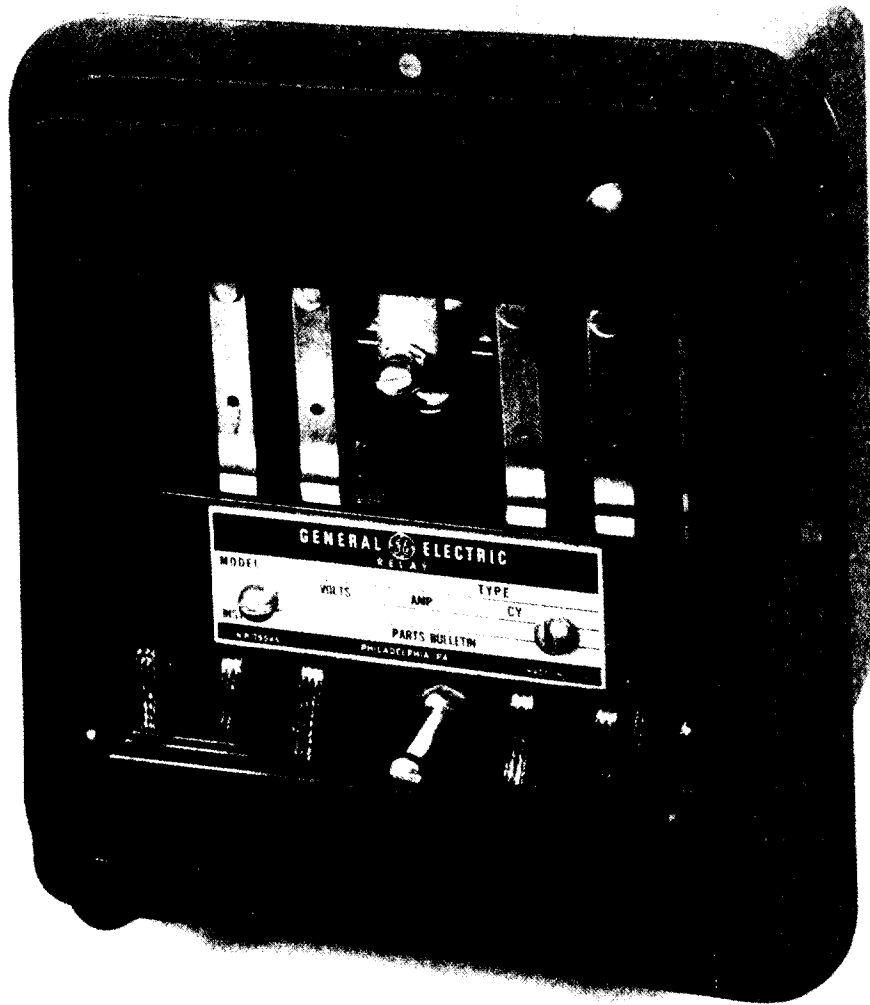


Figure 1 (8042731) HFA151 Back-connected Relay with Flange for Semi-flush Mounting (Front View)

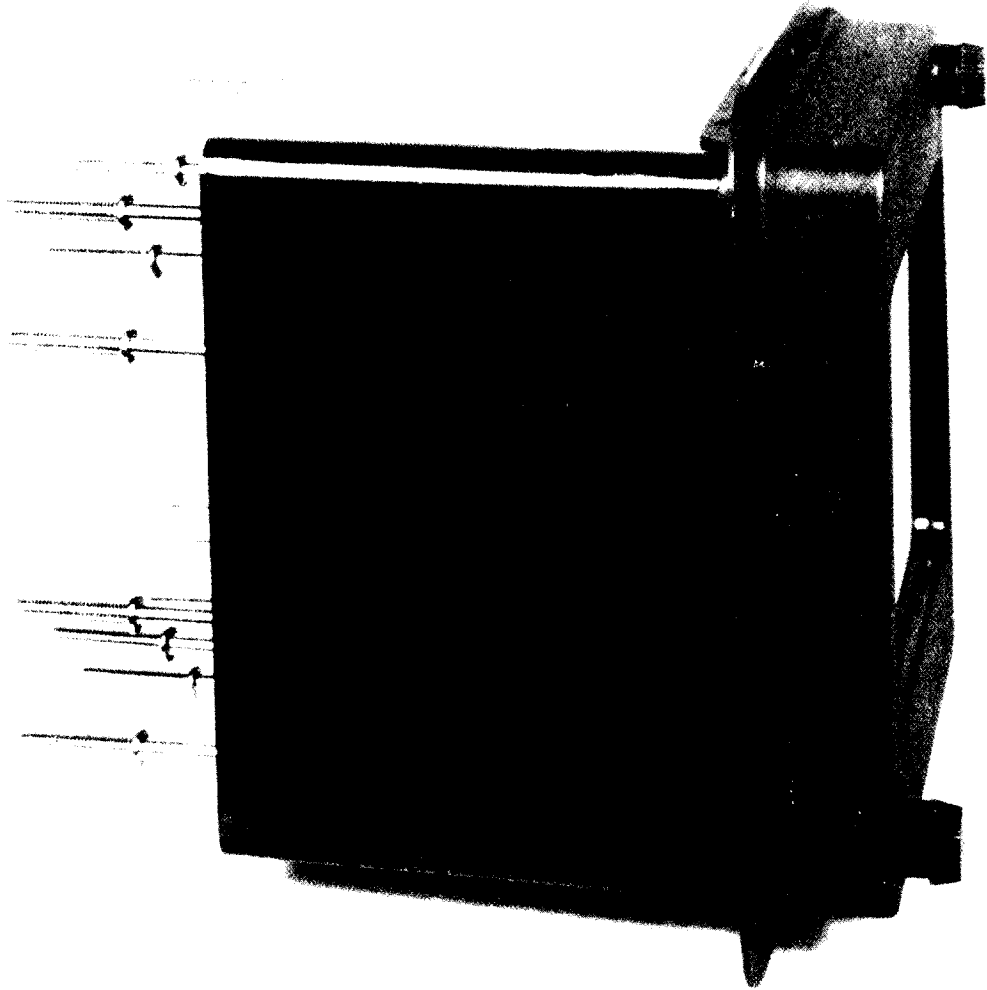


Figure 2 (8042732) HFA151 Relay (Side View)

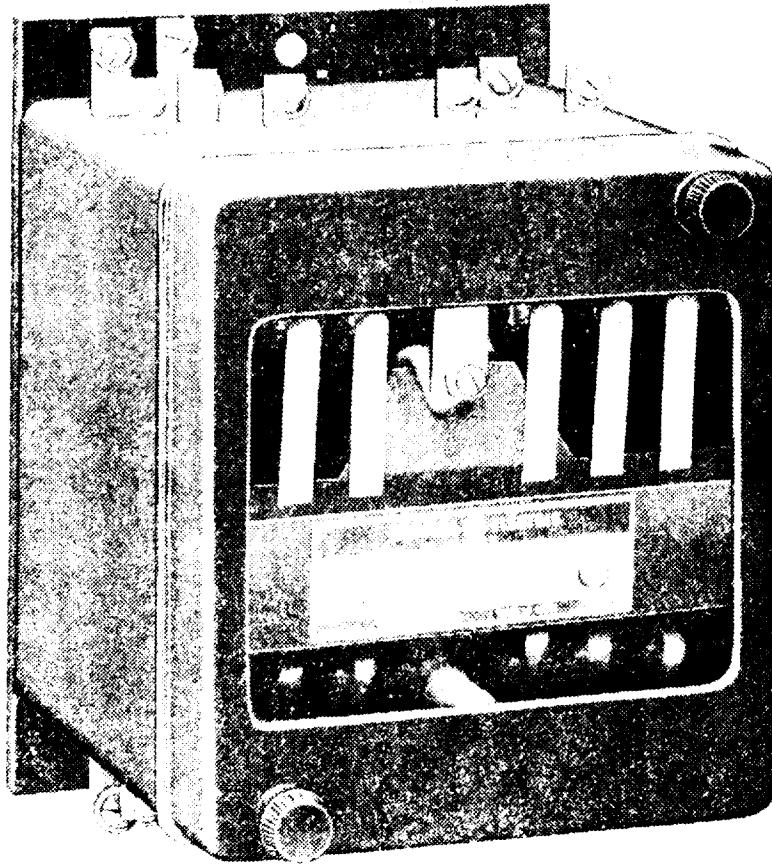


Figure 3 (8025264) HFA151 Front-connected Relay for Surface Mounting (Front View)

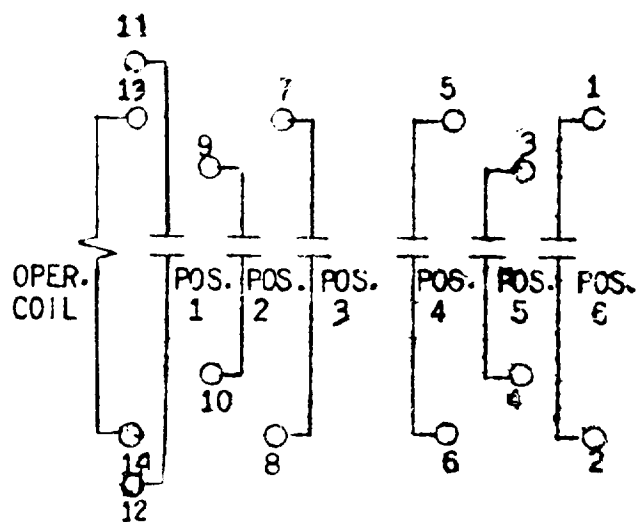
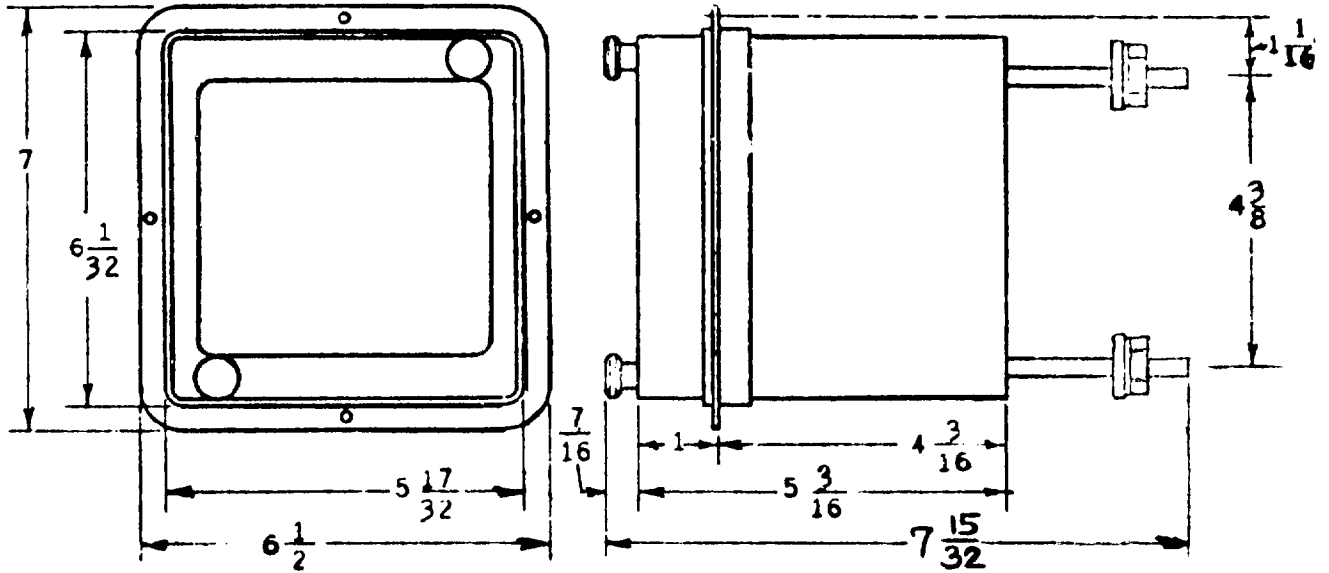


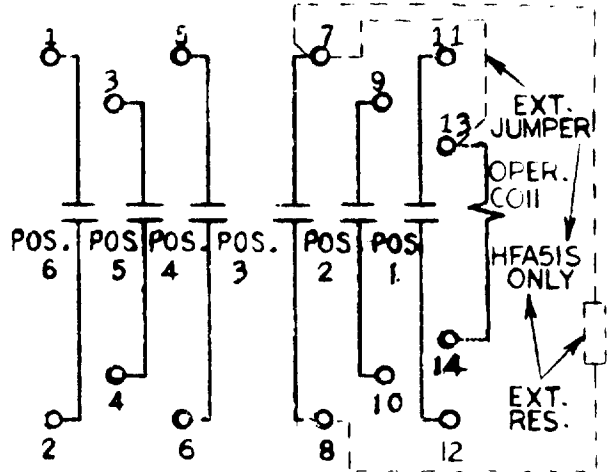
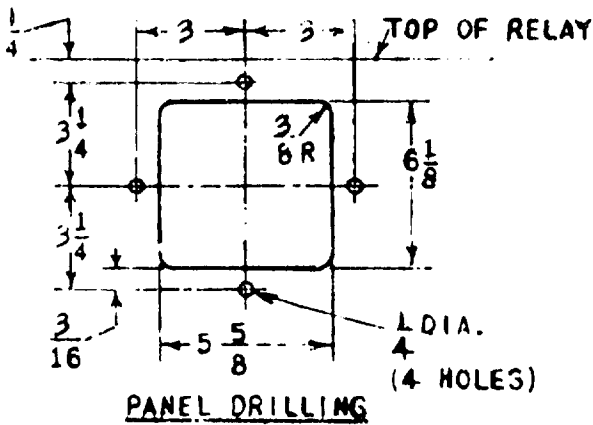
Figure 4 (0104A8526-7) Internal-Connections Diagram for HFA151 Relays (Front View)



NOTE-CODE 01 HFA515 ONLY;  
HFA515, ONLY, NO CODE 51 OR 60. OUTLINE

CODE NO.	60	51	42	33	24	15	06	01
POSITION NO.	CONTACT ARRANGEMENT							
1								
2								
3								
4								
5								
6								

CODE NO.	40	31	22	13	04
POSITION NO.	CONTACT ARRANG.				
1					
3					
4					
6					



INTERNAL CONNECTION (BACK VIEW)  
POSITIONS 5 AND 2 ARE OMITTED IN  
FOUR CIRCUIT RELAYS. EACH CONTACT  
CONVERTIBLE ACCORDING TO CONTACT  
ARRANGEMENT CODE

Figure 5 (K-6178972-9) Outline and Panel Drilling for Semi-flush Mounted HFA151 Relays

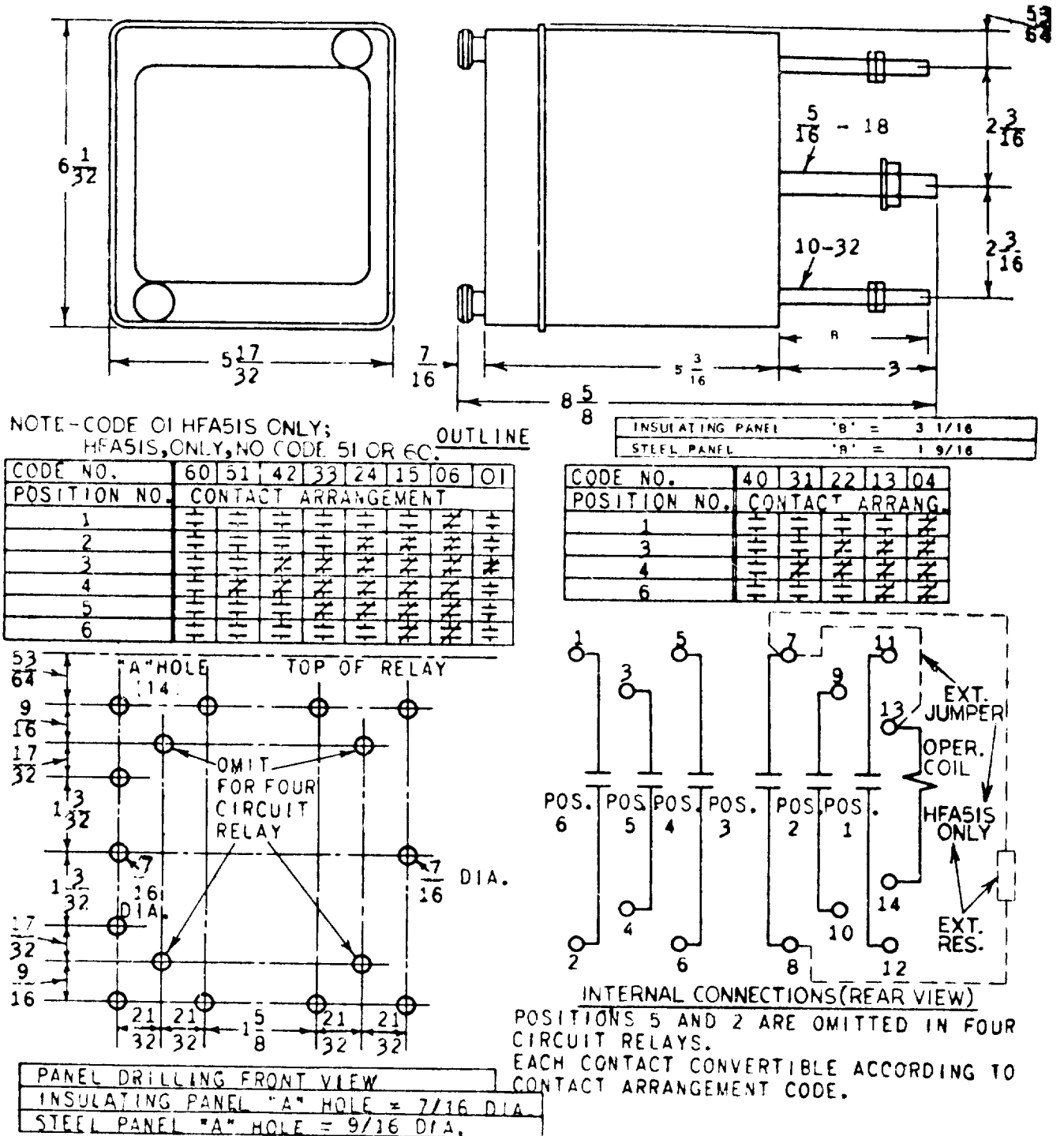


Figure 6 (K-6178931-12) Outline and Panel Drilling for Surface-mounted Type HFA151 Relay

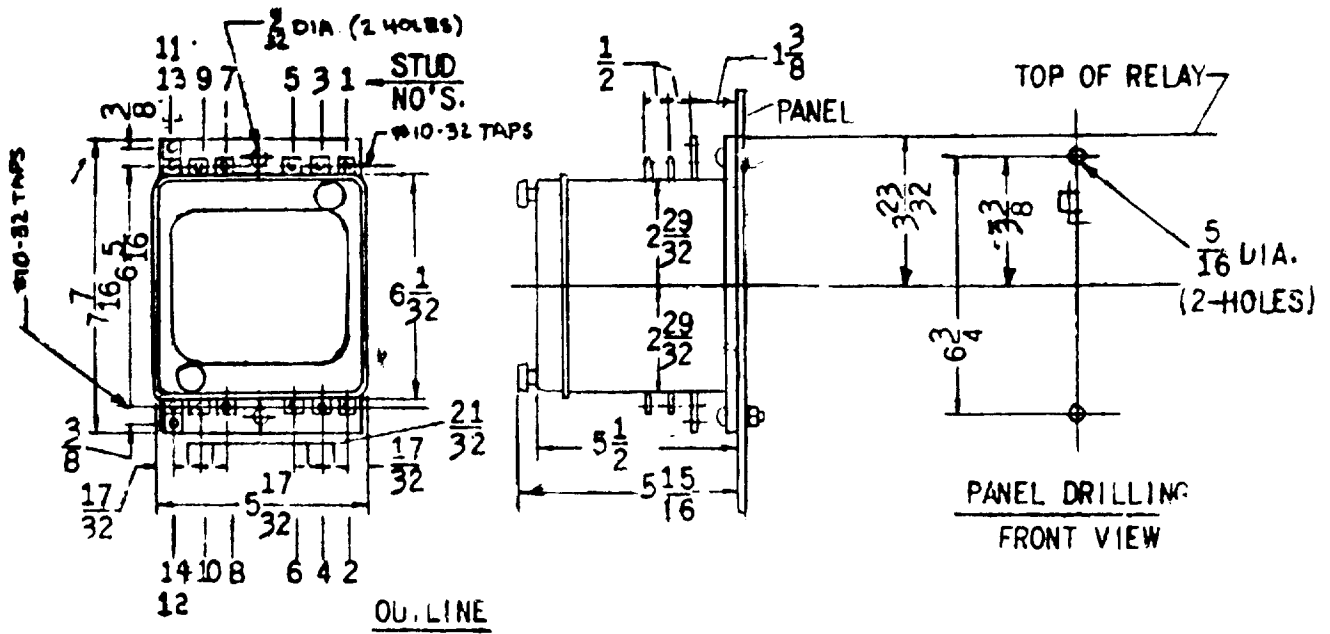


Figure 7 (0104A8526-7) Outline and Panel Drilling for Front-Connected Type-HFA151 Relay



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