



## INSTRUCTIONS

GEH-2024E  
Supersedes GEH-2024D

MULTICONTACT AUXILARY

RELAY

TYPE HFA51

GENERAL  ELECTRIC

MULTICONTACT AUXILIARY  
RELAY  
TYPE HFA51

**DESCRIPTION**

The HFA51 relays are instantaneous, hinged-armature, multi-contact, auxiliary relays. They have six (6) 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 HFA51 relays is shown in Figure 4. The HFA51 relays are available for front or back connection. The front-connected relays are suitable for surface mounting only.

The back-connected relays are suitable for either surface mounting or semi-flush mounting; a steel flange is necessary for the latter to provide mounting with normal covers. The outline and panel-drilling diagrams for HFA51 relays are shown in Figures 5, 6 and 7.

**APPLICATION**

The Type HFA relays are auxiliary devices that are suitable for application where the operating characteristics and ratings as described in this book are required.

**CHARACTERISTICS**

The HFA51A relay is self reset and has an instantaneous dropout.

The HFA51B relay is hand reset by means of a plunger assembly installed through the transparent cover.

The HFA51P is similar to the HFA51A except that it has palladium contacts.

The HFA51S is similar to the HFA51A except that the (b) contact in the No. 3 position is used with an external resistor to obtain a pickup time of 8 milliseconds for high-speed operation. The resistor is shorted by the (b) contact until the relay picks up. When the relay picks up, the (b) contact opens and places the resistor in series with the relay coil.

Unless relays are ordered with specific contact arrangements, they are shipped with six circuit-closing contacts (Code 60), with the exception of HFA51S, which is shipped with Code 01 contacts. Code 01 is available in the HFA51S only. The HFA51S is not available in Codes 51 and 60.

Subject to the limitations noted in the preceding paragraph, the contact arrangement can be changed to provide any of the combinations 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

| Code No.     | 60                  | 51 | 42 | 33 | 24 | 15 | 06 | 01 |
|--------------|---------------------|----|----|----|----|----|----|----|
| Position No. | Contact Arrangement |    |    |    |    |    |    |    |
| 1            | a                   | a  | a  | a  | a  | a  | b  | a  |
| 2            | a                   | a  | a  | a  | b  | b  | b  | a  |
| 3            | a                   | a  | b  | b  | b  | b  | b  | b  |
| 4            | a                   | b  | b  | b  | b  | b  | b  | a  |
| 5            | a                   | a  | a  | b  | b  | b  | b  | a  |
| 6            | a                   | a  | a  | a  | a  | b  | b  | a  |

Note: a = Normally Open b = Normally Closed  
HFA51S is not available in Codes 51 and 60.  
Code 01 is available in HFA51S only.

**RATINGS**

The HFA51A, HFA51B and HFA51P 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 inclusive. The HFA51S relay is available in DC voltage rating up to 250 VDC inclusive.

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 II lists the non-inductive interrupting capacity of each contact.

TABLE II

| 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 burdens are measured with the relay in the picked up position and at the rated voltage; they are listed in Table III. Table III does not apply to the HFA51S because of the external resistor.

TABLE III

| DC COILS     |     |              | AC COILS    |       |
|--------------|-----|--------------|-------------|-------|
| <u>Watts</u> |     | <u>Freq.</u> | <u>Volt</u> |       |
| Cold         | Hot | Cycles       | Amperes     | Watts |
| 7.8          | 6.0 | 25           | 10          | 4     |
|              |     | 50           | 23          | 9     |
|              |     | 60           | 32          | 12    |

**INSTALLATION**MOUNTING AND CONNECTIONS

The Type HFA relays should be mounted on a vertical surface. The outline and panel-drilling diagrams are shown in Figures 5, 6 and 7. Surface mounting on steel panels requires an insulating bushing for each terminal. The internal-connection diagram for Type HFA relays is shown in Figure 4.

ADJUSTMENTS**PICKUP**

- \* The relays are adjusted at the factory to pick up at 73-81% of rating for AC coils and 55-61% 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 counterclockwise to lower pickup, and then reseated in the hexagonal groove in the armature tailpiece.

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.

**PICKUP TIME**

The HFA51S relays should pick up in eight milliseconds (8 ms) or less when rated voltage is applied across the resistor and relay coil combination. This time may be altered by adjustment of the armature stop screw.

**CONTACTS**

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

\*Revised since last issue

- \* HFA51 contact circuits can be changed from circuit-opening to circuit-closing, or vice versa, by removing the fixed contact, turning it over and replacing it.

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:

- \* Normally-Open Contacts Wipe and Gap (Normally-open contacts shall be adjusted before normally-closed contacts).

The moving contact arms shall be adjusted so that the normally-open contacts make approximately simultaneously ( $\pm .008$  inch) when the relay is operated by hand. All normally-open contacts shall have a wipe of 3/64 to 3/32 inches. The contact gap shall 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 the 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.

- \* Normally-Closed Contact Gap and Wipe

The moving contact arms shall be adjusted so that the normally-closed contacts make approximately simultaneously ( $\pm .008$ ) when the relay is 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:

\*Revised since last issue

- 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" gap between the stop screw and armature. Lock the stop screw in this position.

\* Recheck pickup after the above changes or adjustments have been made.

## MAINTENANCE

### CONTACT CLEANING

In cleaning fine silver contacts a flexible burnishing tool should be used. This consists of a flexible strip of metal with an etch-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.

### RENEWAL PARTS

When ordering renewal parts, address the nearest Sales Office of the General Electric Company, specify quantity required, name of part wanted, and give complete nameplate data. The renewal parts publication is GEF-2757.

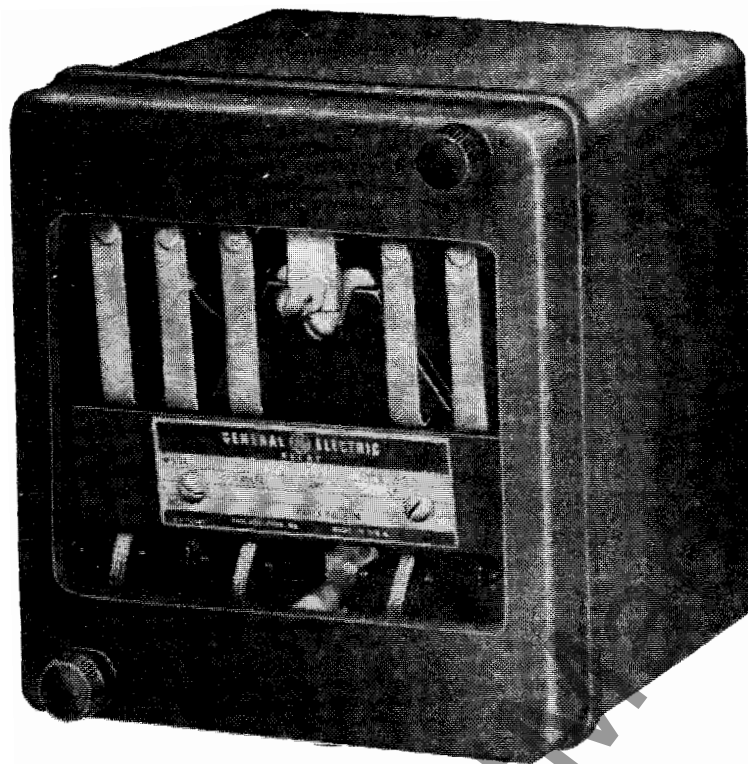


Figure 1 (8025536) HFA51 Back Connected Relay in Standard Case



Figure 2 (8025264) HFA51 Front Connected Relay in Standard Case

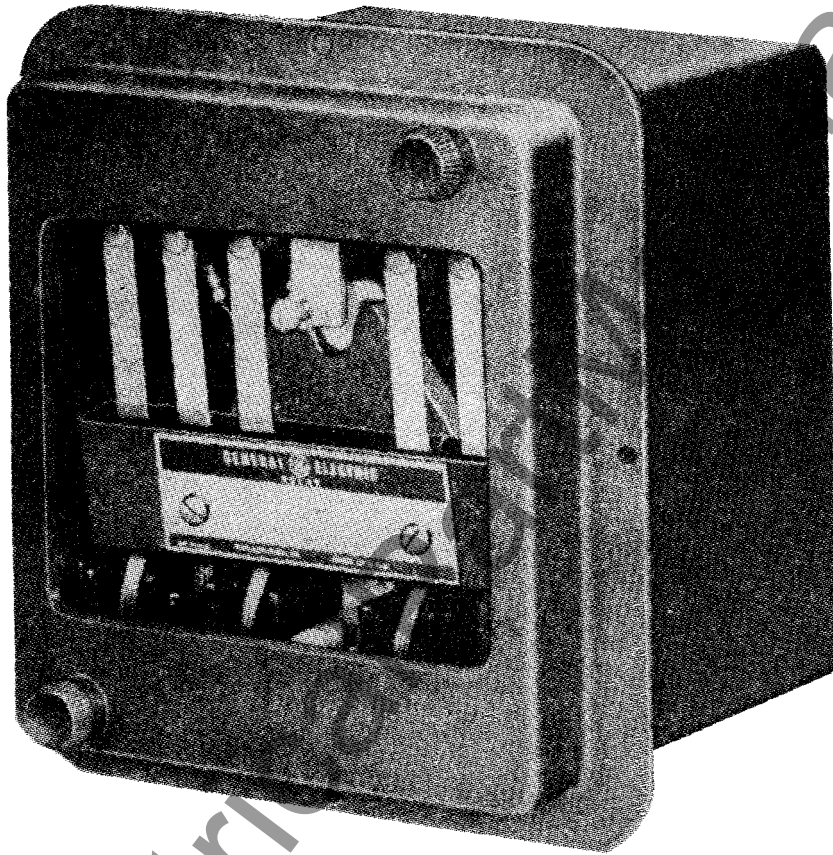
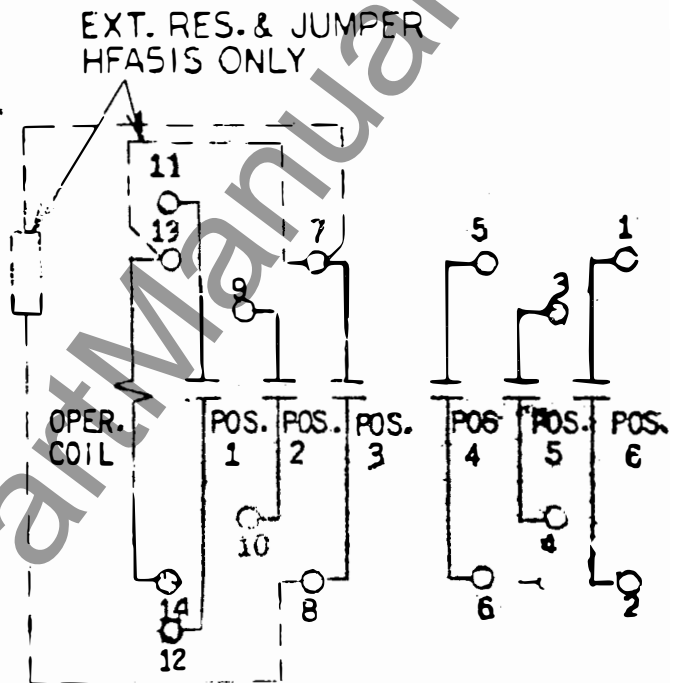


Figure 3 (8025535) HFA51 Back Connected Relay with Flange for Semi-Flush Mounting  
(Front View)



NOTE-CODE 01 HFA51S ONLY;  
HFA51S, ONLY, NO CODE 51 OR 60.

|   |                            |                            | CONTACT<br>ARRANGEMENT |   |   |   |   |   |    |
|---|----------------------------|----------------------------|------------------------|---|---|---|---|---|----|
|   |                            |                            | CODE                   | 1 | 2 | 3 | 4 | 5 | 6  |
| HFA51A<br>51B<br>51D<br>51S<br>65D<br>65E | *<br>*<br>*<br>*<br>*<br>* | H<br>H<br>H<br>H<br>H<br>H | 60                     | a | a | a | a | a | a  |
|   |                            |                            | 51                     | a | a | a | b | a | a  |
|   |                            |                            | 42                     | a | a | b | b | a | a  |
|   |                            |                            | 33                     | a | a | b | b | b | a  |
|   |                            |                            | 24                     | a | b | b | b | b | a  |
|   |                            |                            | 15                     | a | b | b | b | b | -b |
|   |                            |                            | 06                     | b | b | a | b | b | b  |
|   |                            |                            | 01                     | a | a | b | a | a | a  |



INTERNAL CONNS  
FRONT VIEW

EACH CONTACT CONVERTIBLE  
ONLY ACCORDING TO CONTACT  
ARRANGEMENT CODE.

Figure 4 (0104A8526-7) Internal-Connection Diagram for Type HFA51 Relays  
(Front View)

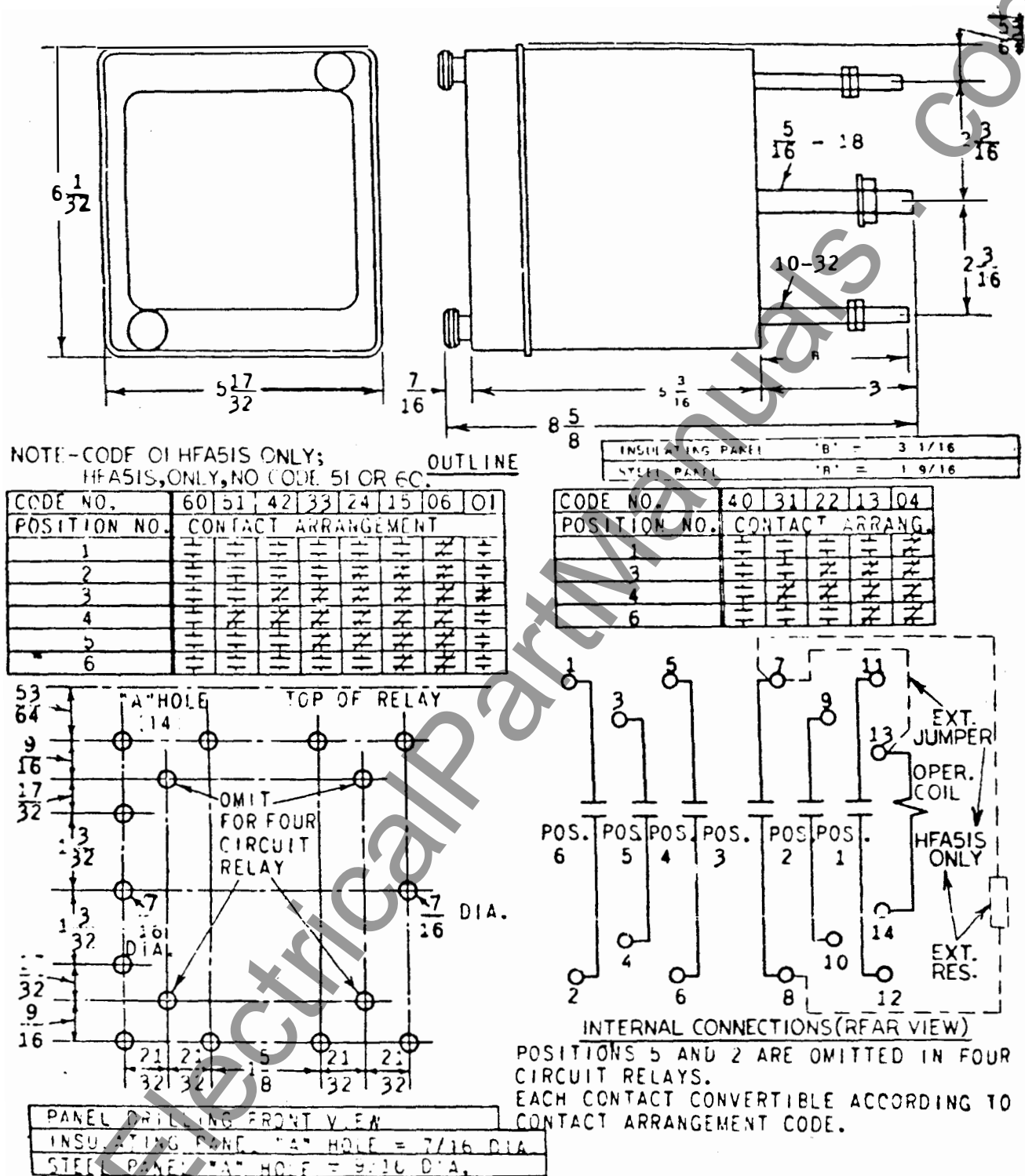


Figure 5(K-6178931-12) Outline and Panel Drilling for Surface Mounted Type HFA51--Relays

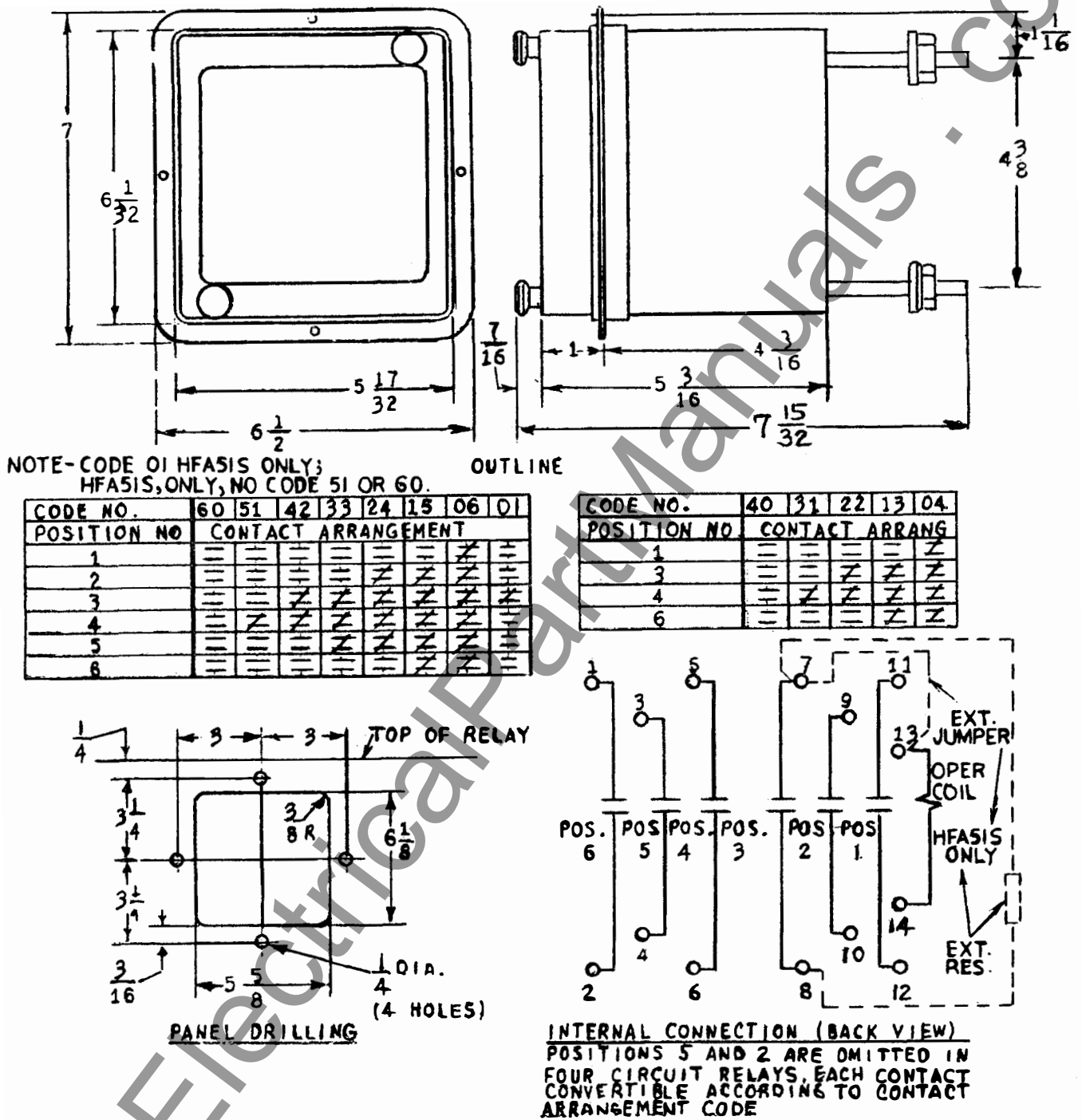


Figure 6 (K-6178972-9) Outline and Panel Drilling for Semi-Flush-Mounted Type HFA51-\*F Relays

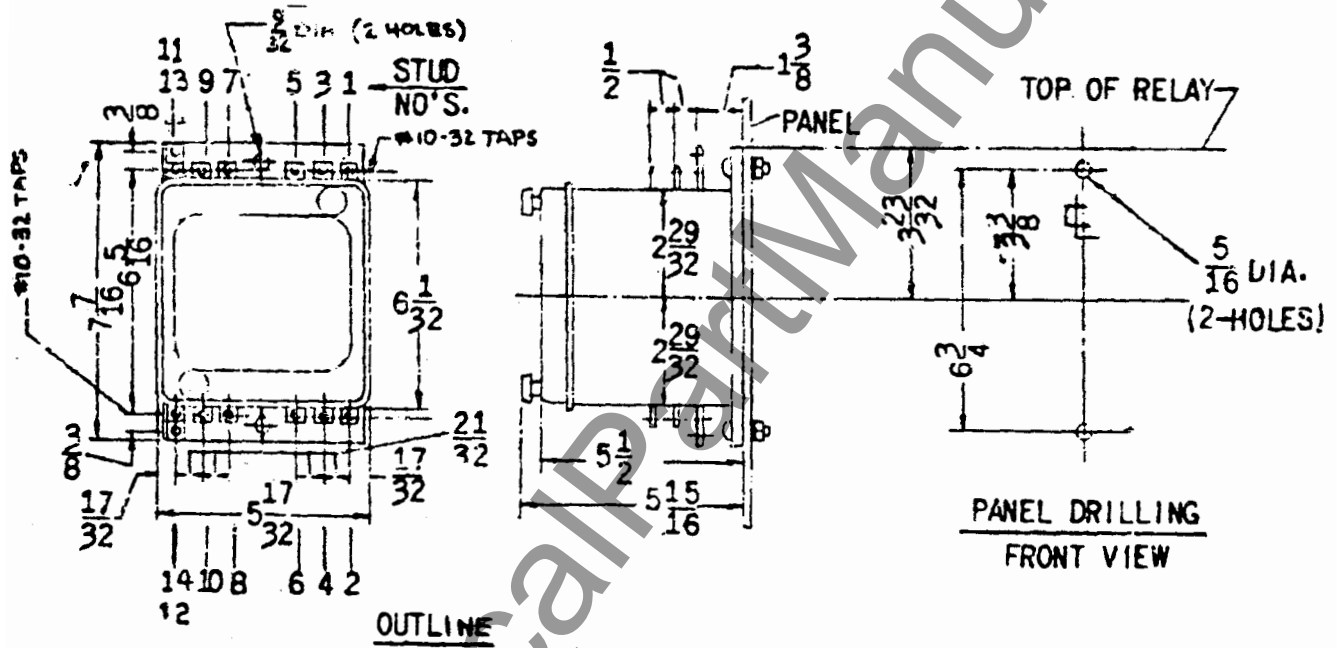


Figure 7 (0104A8526-7) Outline and Panel Drilling for Front Connected Type HFA51-\*H Relays

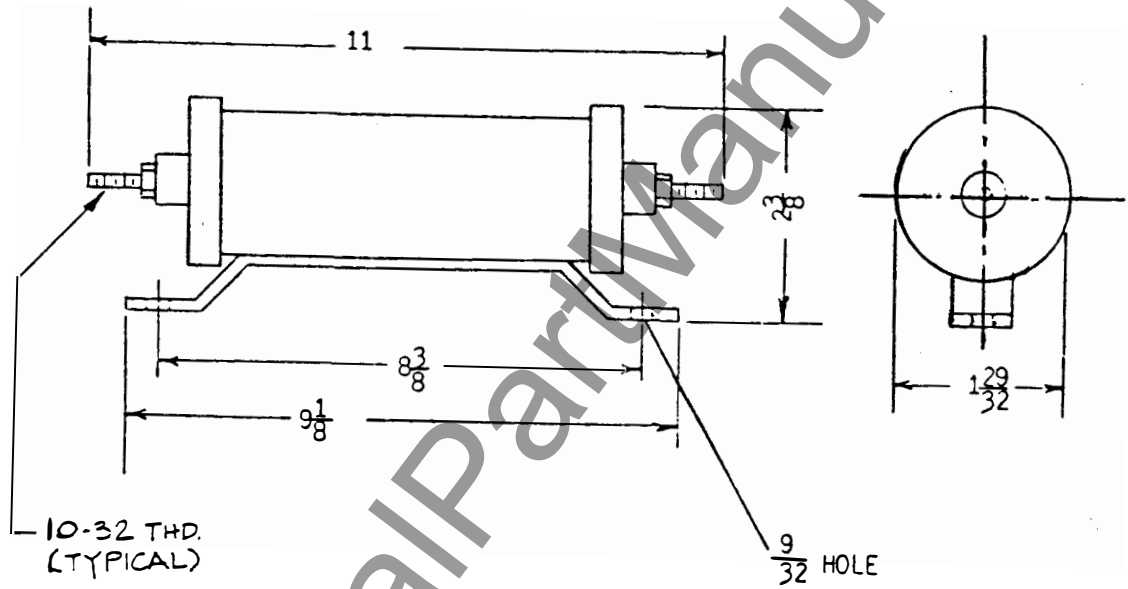


Figure 8 (0389A0752-2) Outline of External Resistor used with HFA51S Relays

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***Meter and Control  
Business Department***

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**ST-1/94 (1200)**

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