INSTRUCTIONS

**MULTI-CONTACT
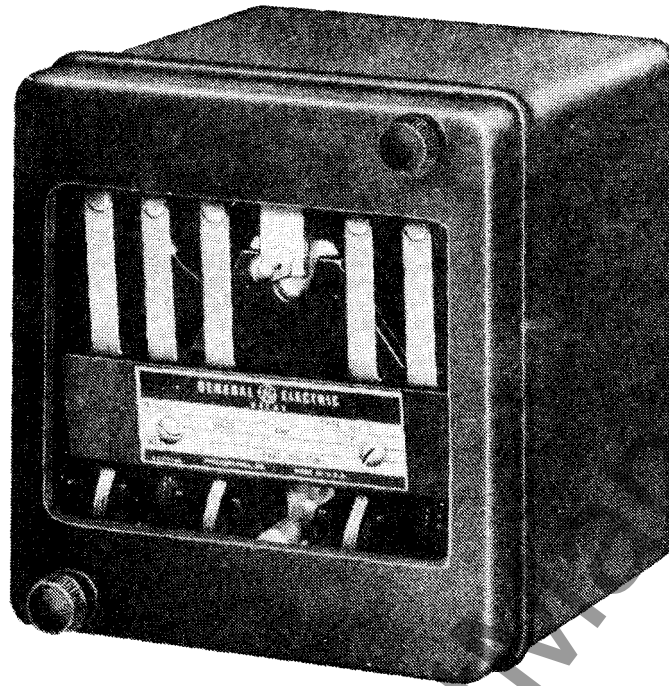AUXILIARY RELAYS**

TYPE HFA53

Figure 1 (8025536) HFA53 Back-Connected Relay in a Standard Case (Front View).
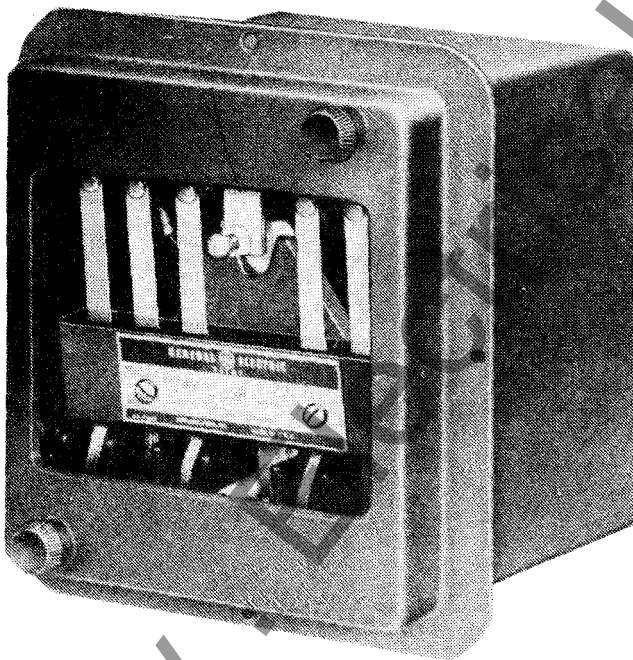Plunger on Hand-reset Relays Only

Figure 2 (8025537) HFA53 Back-
Connected Relay with Flange
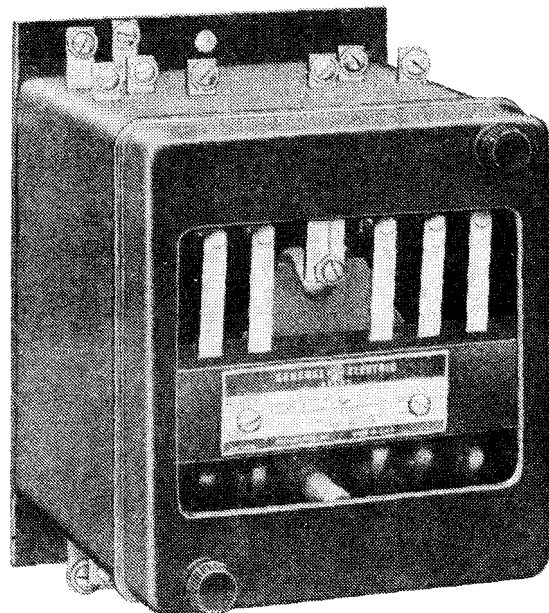for Semi-flush Mounting
(Front View)

Figure 3 (8025264) HFA53 Front-
Connected Relay in Standard Case
(Front View)

MULTI-CONTACT AUXILIARY RELAYS
TYPE HFA53

DESCRIPTION

INTRODUCTION

The Type HFA 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 HFA53 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.

CHARACTERISTICS

Some of the contacts are built with a special offset so that when a circuit-opening contact and circuit-closing contact are used as a pair, a make-before-break circuit results. The use of these contacts requires an additional strong contact spring to prevent contact bounce and ensure contact overlap. These contacts are designated as long-wipe contacts.

The HFA53L relay is hand reset by means of a plunger assembly installed through the transparent cover. All other HFA53 relays covered by these instructions are self reset and have an instantaneous dropout.

The HFA53K, HFA53M, HFA53N, HFA53R, and HFA53T relays are designed to be connected with an external resistor to obtain a pickup time of 1/2 cycle (60 cycle basis).

The contact code must be specified by the arrangements listed in Table III. Only those contact arrangements listed are available.

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 current-closing rating of each contact is 30 amperes. The current-carrying rating is 12 amperes continuous or 30 amperes for one (1) minute. Table I lists the non-inductive interrupting capacity of each contact.

3

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		

The one second rating of the contact's circuit is 125 amps.

BURDENS

The burdens are measured with the relay in the picked-up position and at rated voltage.

TABLE II

DC COILS			AC COILS	
WATTS		FREQ.	VOLT-	
COLD	HOT	CYCLES	AMPERES	WATTS
		25	10	4
7.8	6.0	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 6 through 9. Surface mounting on steel panels requires an insulating bushing for each terminal.

ADJUSTMENTS

The relays are shipped from the factory with all necessary adjustments made. If the relays should need adjustments, refer to the **MAINTENANCE** section of this book.

4

MAINTENANCE

ADJUSTMENTS

Contacts

HFA53 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).

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

        a) Insert a 0.058 gage between the armature and pole face and close the armature.

        b) Bend the left-hand moving contact to just light the continuity lamp.

        c) Remove the 0.058 gage and where necessary bend the remaining moving contacts so that all moving contacts make at approximately the same time.

        d) 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.

        e) 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

A. The moving contact arms shall be adjusted so that the normally-closed contacts make approximately simultaneously ($+$ .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:

a) Turn the stop screw clockwise until the first normally-closed contact opens.

b) Turn the stop screw an additional 1/2 turn clockwise. All normally-closed contacts should be open.

c) Turn the stop screw Clockwise until there is an approximately 1/8" gap between the stop screw and armature. Lock the stop screw in this position.

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

It is essential that AC relays be quiet when the voltage is above pickup.

Pickup

The relays are adjusted at the factory to pick up at 80% of the rating for AC coils and 60% of rating for DC coils. Normally these adjustments should not change; if it is necessary to readjust the relay, the 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, and that the contact surfaces align properly and open quickly when the coil is deenergized on the self-reset models.

Pick-Up Time

The HFA53K, HFA53M, HFA53N, and HFA53T 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.

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 materials will be removed rapidly and thoroughly.

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

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. Refer to publication GEF-2757.

TABLE III

RELAY	CODE	CONTACT ARRANGEMENT POSITION					
		1	2	3	4	5	6
HFA53B	1	a1	b1	a1	b1	a1	b1
	2	a1	a1	b1	b1	b1	a1
HFA53D	1	a	b1	a1	b1	a1	b1
	2	b	b1	a1	b1	a1	b1
	3	a	b1	a1	a1	a1	b1
	4	b	b1	a1	a1	a1	b1
HFA53E	1	a	a1	b1	a1	b1	a
	2	b	a1	b1	a1	b1	a
	3	b	a1	b1	a1	b1	b
HFA53F	1	a	a	b1	a1	b1	a
	2	b	a	b1	a1	b1	a
	3	b	b	b1	a1	b1	a
	4	b	b	b1	a1	b1	b
	5	a	a	b1	a1	a1	a
	6	b	a	b1	a1	a1	a
	7	b	a	b1	a1	a1	b
	8	b	b	b1	a1	a1	b
HFA53H	1	a	a	a1	b1	a	a
	2	a	b	a1	b1	a	a
	3	a	b	a1	b1	a	b
	4	b	b	a1	b1	a	b
	5	b	b	a1	b1	b	b
HFA53J	1	a	a	b1	a	a	a
	2	a	a	b1	a	b	a
	3	b	a	b1	a	b	a
	4	b	a	b1	a	b	b
	5	b	b	b1	a	b	b
	6	b	b	b1	b	b	b

a = Normally-open contact
a1 = Normally-open contact, long wipe
b = Normally-closed contact
b1 = Normally-closed contact, long wipe

TABLE III

RELAY	CODE	CONTACT ARRANGEMENT					
		POSITION					
		1	2	3	4	5	6
HFA53K	1	a	a	b1	a	a	a
	2	a	a	b1	a	b	a
	3	a	a	b1	b	b	a
	5	a	b	b1	b	b	a
HFA53L	1	a	a	b1	a	a	a
	2	b	a	b1	a	b	a
	3	a	a	b1	a	b	a
HFA53M	1	a	a	b1	b1	a	a
HFA53N	1	a	a	b1	a	a	a
	2	a	a	b1	a	b	a
	3	a	a	b1	b	b	a
HFA53R	1	a	a1	b1	a1	b1	a
	2	a	a1	b1	a1	b1	b
	3	b	a1	b1	a1	b1	a
HFA53T	1	a	a	b1	a	a	a
	2	a	a	b1	a	b	a
	3	a	a	b1	b	b	a

a = Normally-open contact
a1 = Normally-open contact, long wipe
b = Normally-closed contact
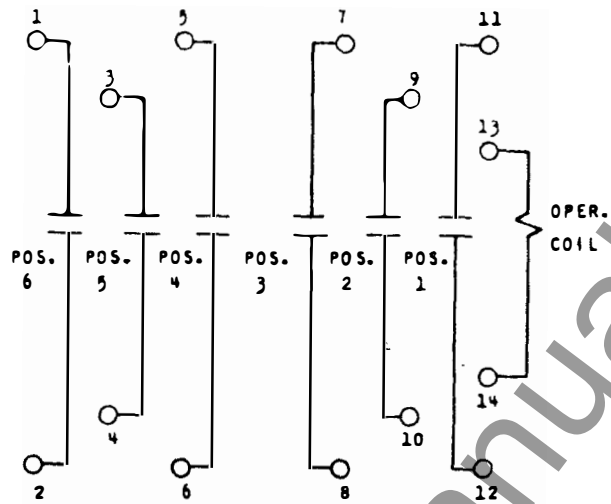b1 = Normally-closed contact, long wipe

8

Figure 4 (6375767-3) Internal Connections for HFA53B, HFA53D, HFA53E,
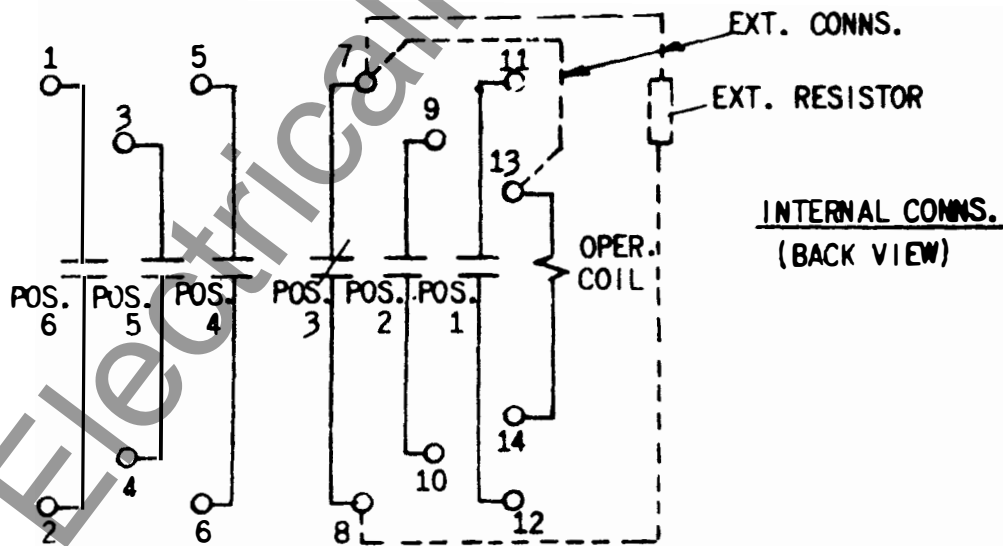HFA53F, HFA53H, HFA53J and HFA53L Relays (Back View)

Figure 5 (459A231 Sh.1 [9]) Internal Connections for HFA53K, HFA53M,
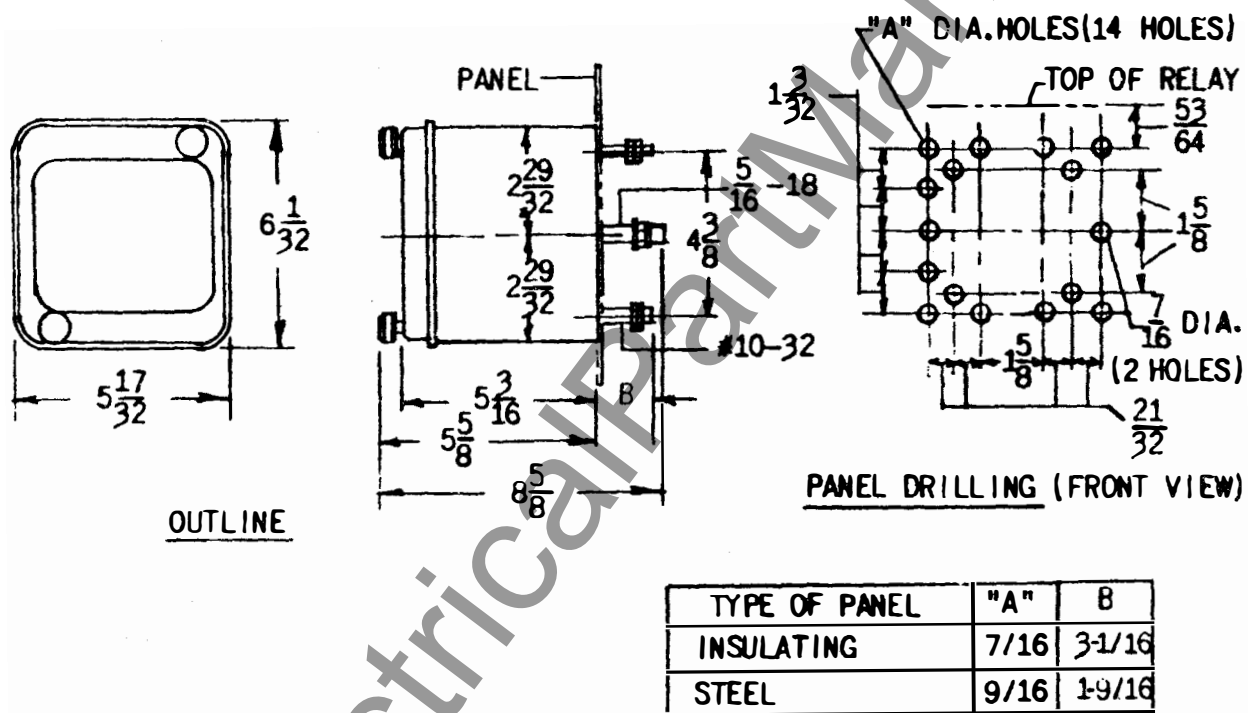HFA53N, HFA53R, HFA53T Relays (Back View)

OUTLINE

PANEL

$2\frac{29}{32}$

$2\frac{29}{32}$

$4\frac{3}{8}$

$\frac{5}{16}$—18

#10-32

$5\frac{3}{16}$

$5\frac{5}{8}$

$8\frac{5}{8}$

B

"A" DIA.HOLES(14 HOLES)

TOP OF RELAY

$1\frac{3}{32}$

$\frac{53}{64}$

$1\frac{5}{8}$

$\frac{1}{16}$ DIA.

(2 HOLES)

$1\frac{5}{8}$

$\frac{21}{32}$

$6\frac{1}{32}$

$5\frac{17}{32}$

PANEL DRILLING (FRONT VIEW)

TYPE OF PANEL	"A"	B
INSULATING	7/16	3-1/16
STEEL	9/16	1-9/16

Figure 6 (459A231Sh.1 [9]) Outline and Panel-Drilling Dimensions for HFA53
Surface-Mounted Relays (Typical Model Number is HFA53B(-)

10

OUTLINE

PANEL DRILLING

Figure 7 (418A799 Sh.1 [8]) Outline and Panel-Drilling Dimensions for HFA53 Relays for
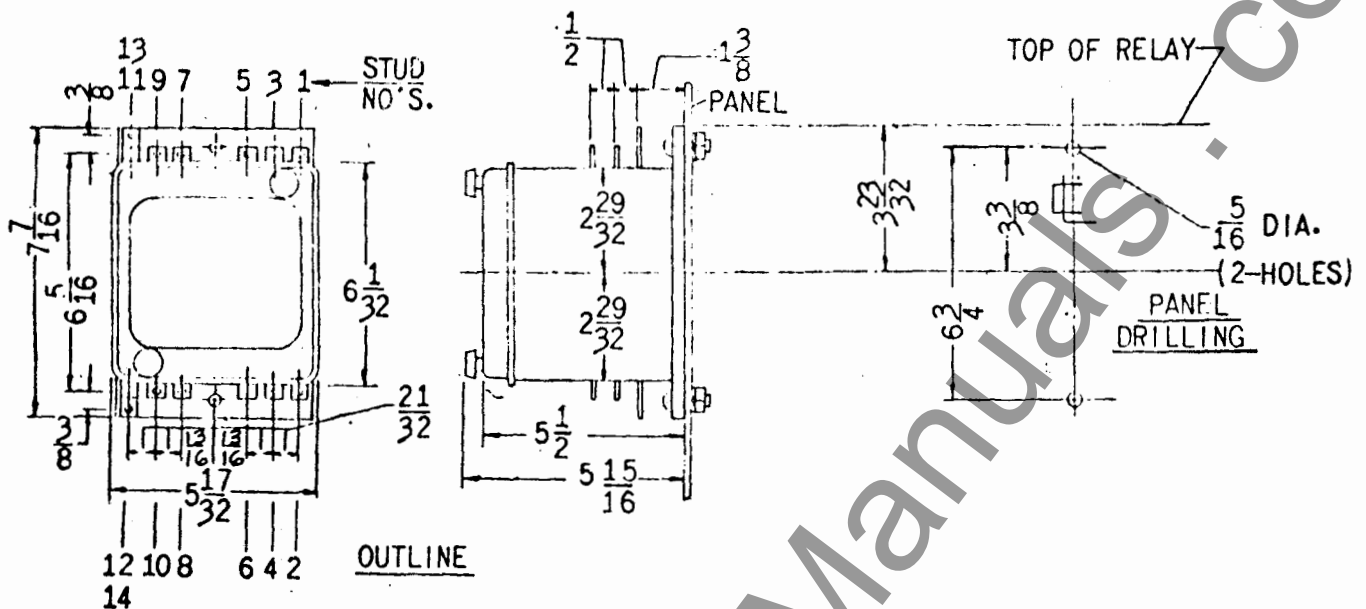Semi-flush Mounting (Typical Model Number is HFA53K(-)F)
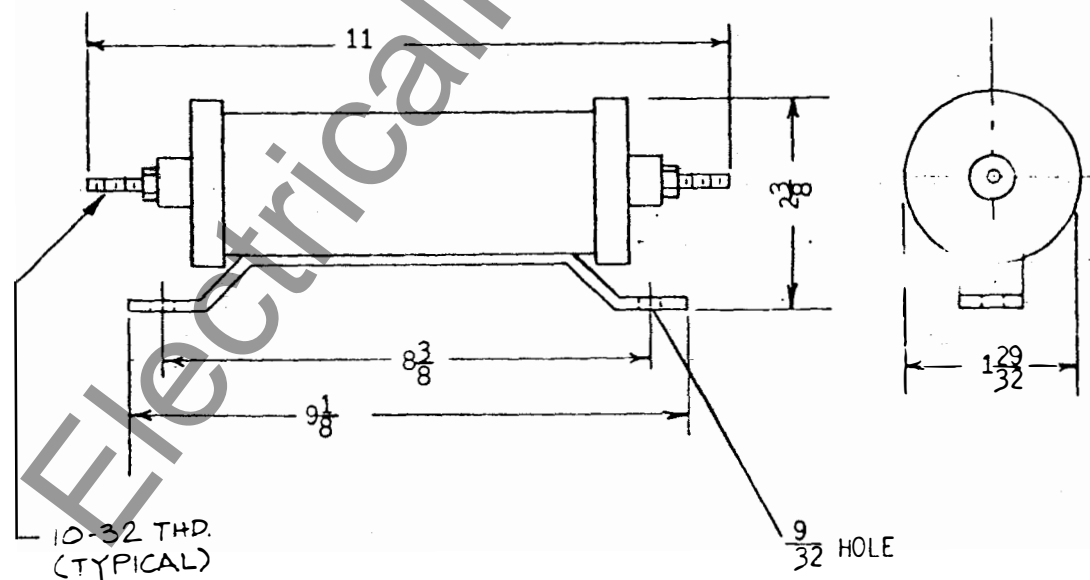
Figure 8 (104A8527-5) Outline and Panel-Drilling Dimensions for HFA53
Front-Connected Relays, (Typical Model Number is HFA53B(-)H)

* Figure 9 (389A752 [2]) Outline of External Resistor Used with
HFA53K, HFA53M, HFA53N, HFA53R and HFA53T Relays

* Indicates revision