



# INSTRUCTIONS

GEK-49817B

## MULTI-CONTACT AUXILIARY RELAYS

TYPE HFA174



GENERAL  ELECTRIC

CONTENTS

	PAGE
DESCRIPTION .....	3
APPLICATION.....	3
CHARACTERISTICS.....	4
RATINGS.....	4
BURDENS.....	5
RECEIVING, HANDLING AND STORAGE.....	5
INSTALLATION .....	6
ADJUSTMENTS .....	6
Contacts .....	6
Pickup .....	7
PERIODIC CHECKS AND ROUTINE MAINTENANCE.....	7
RENEWAL PARTS.....	8

Cover Photo  
(8042040)

**MULTI-CONTACT AUXILIARY RELAYS**

**TYPE HFA174**

**DESCRIPTION**

The HFA174 relays are instantaneous, hinged-armature, multi-contact, electric-reset, auxiliary relays. They have five 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 rests a removable connecting plug that completes 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.

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

The internal connection diagram for these relays is shown in Figure 1 of this instruction book. Outline and panel drilling are shown in Figure 2.

**APPLICATION**

The Type HFA174 relays are intended for application where it is desired to control up to five circuits by the operation of a single drawout-case-mounted auxiliary relay, and to maintain those circuits until the auxiliary relay is manually or electrically reset (HFA174B), or electrically reset (HFA174E).

*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.*

**CHARACTERISTICS**

The general characteristics of HFA174 relays, in addition to the electric reset feature, are summarized in Table I.

TABLE I

MODEL NO.	NO. OF SEPARATE CONTACT CIRCUITS	ADDITIONAL CHARACTERISTICS	CONTACT ARRANGEMENT TABLE
HFA174B	5	Hand Reset	II
HFA174E	5	-	II

The hand reset feature is accomplished 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). The various contact codes are summarized in Table II.

TABLE II

POSITION NO.	CODE NO.					
	60	51	42	33	24	15
CONTACT ARRANGEMENT						
1	a	a	a	a	a	b
2	a	a	a	a	b	b
3	a	a	b	b	b	b
4	a	b	b	b	b	b
5	a	a	a	b	b	b
6*	a	a	a	a	a	a

- a = Normally open
- b = Normally closed
- \* = Used to open reset coil circuit
- a<sub>1</sub> = Normally open, long wipe
- b<sub>1</sub> = normally closed, long wipe

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 40 to 70 milliseconds for DC relays, and 8 to 32 milliseconds for AC relays.

**RATINGS**

The type HFA174 relays are available with coil ratings for standard voltages up to 250 VDC and for 120 and 240 volts 50 and 60 cycles.

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

TABLE III

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

TABLE IV

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

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

TABLE V

RESET COILS (0.5 SECOND INTERMITTENT RATING)					
RATING	DC COILS				AC COILS
		RESISTANCE	FREQUENCY		VOLT-AMPS
250		740	--		---
220		740	50		220
125		185	60		180
110		185	--		---

**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

The Type HVA174 relays should be mounted on a vertical surface. The outline and panel drilling diagrams are shown in Figure 2. The internal connections are shown in Figure 1.

### 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 re-placing it. 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 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 ensure that they exert no force on the contacts. If the above changes are required, the pickup should be rechecked.

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 as possible 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.

### 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 items described under **ADJUSTMENTS** be checked on the same schedule as the associated protective relays.

### CONTACT CLEANING

A flexible burnishing tool should be used for cleaning relay contacts. This is a flexible strip of metal with an etched-roughened surface, which in effect resembles a superfine file. The polishing action of this file is so delicate that no scratches are left on the contacts, yet it cleans off any corrosion thoroughly and rapidly. The flexibility of the tool ensures the cleaning of the actual points of contact.

Fine silver contacts should not be cleaned with knives, files, or abrasive paper or cloth. Knives or files may leave scratches which increase arcing and deterioration of the contacts. Abrasive paper or cloth may leave minute particles of insulating abrasive material in the contacts and thus prevent closing.

The burnishing tool described above can be obtained from the factory.

#### 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.

Since the last edition, changes have been made in Figure 2.



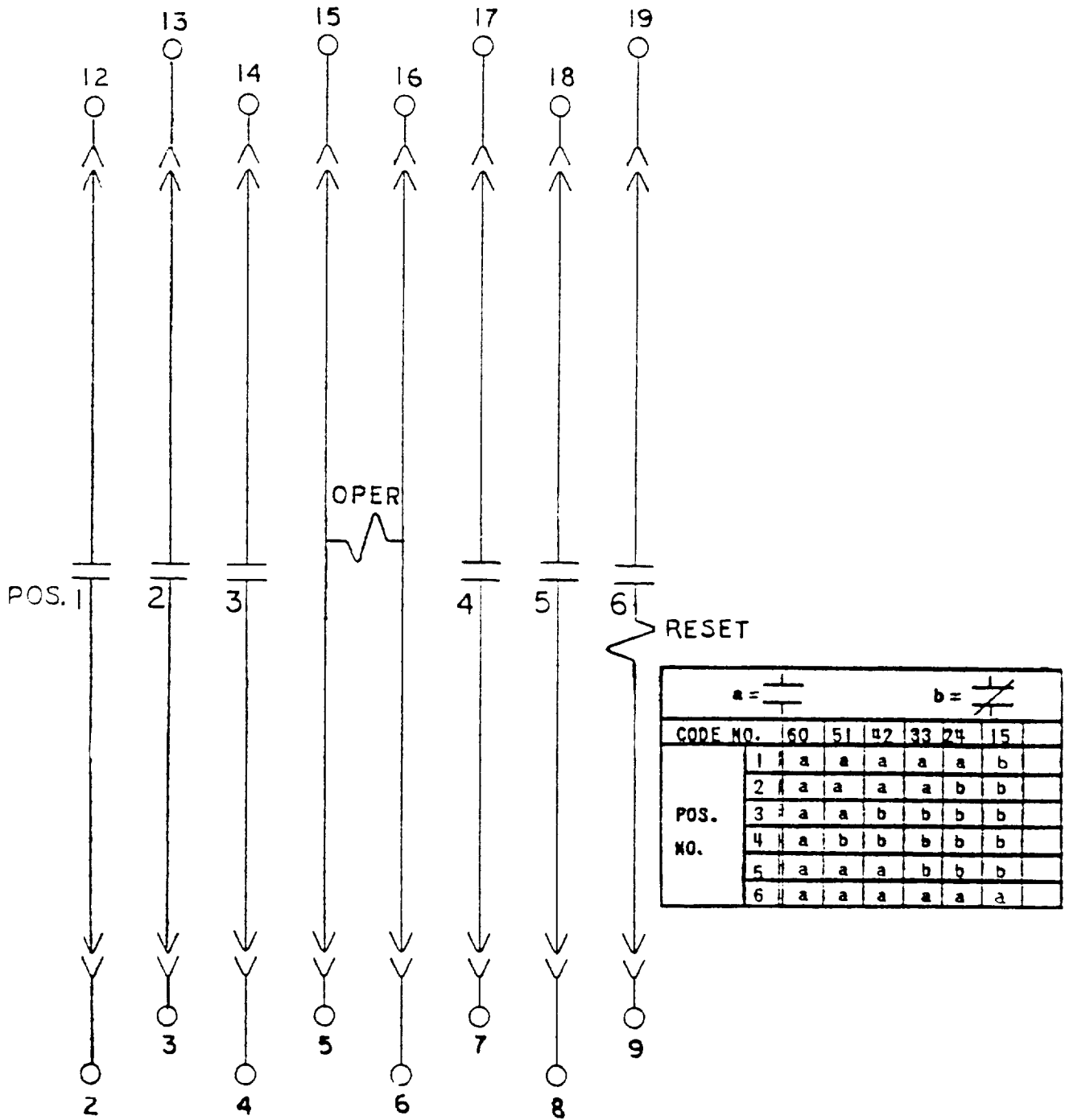


Figure 1 (0246A6924-1) Internal Connection Diagram for Type HFA174B and HFA174E Relays (Front View)

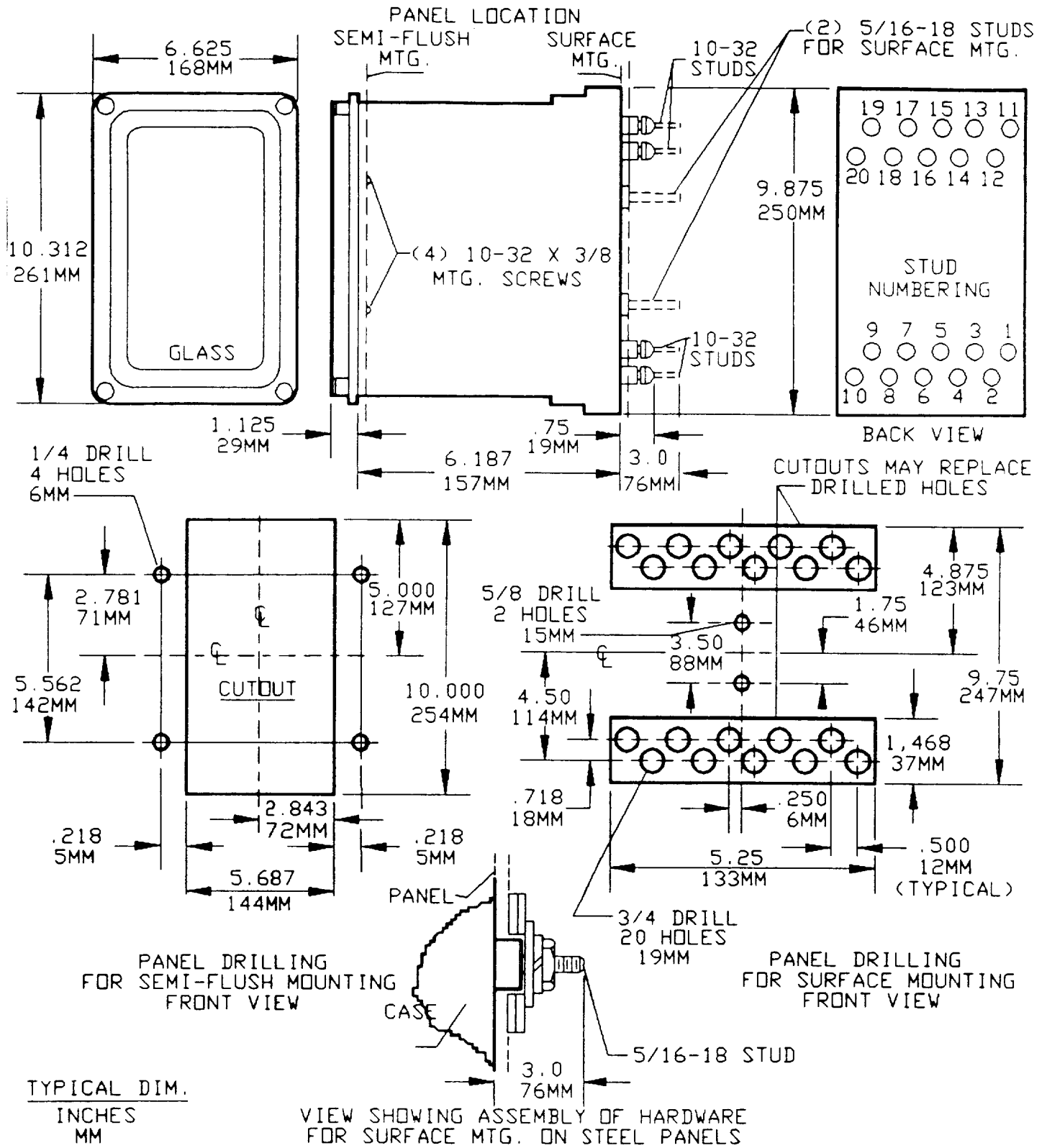


Figure 2 (K-6209272 [7]) Outline and Panel Drilling Diagram for HFA174 Relays





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