INSTRUCTIONS

GEK-49817B

MULTI-CONTACT AUXILIARY RELAYS

TYPE HFA174

GENERAL ELECTRIC

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

	CODE NO.					
POSITION 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_1 = Normally open, long wipe
b_1 = 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)				
DC COILS WATTS			AC COILS VOLT-AMPERES	WATTS
COLD	HOT	FREQUENCY CYCLES		
7.3	6.0	--	--	--
---	---	50	23	9
---	---	60	32	12

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

TABLE V

RESET COILS (0.5 SECOND INTERMITTENT RATING)			
DC COILS		AC COILS	
RATING	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 pigtails 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.

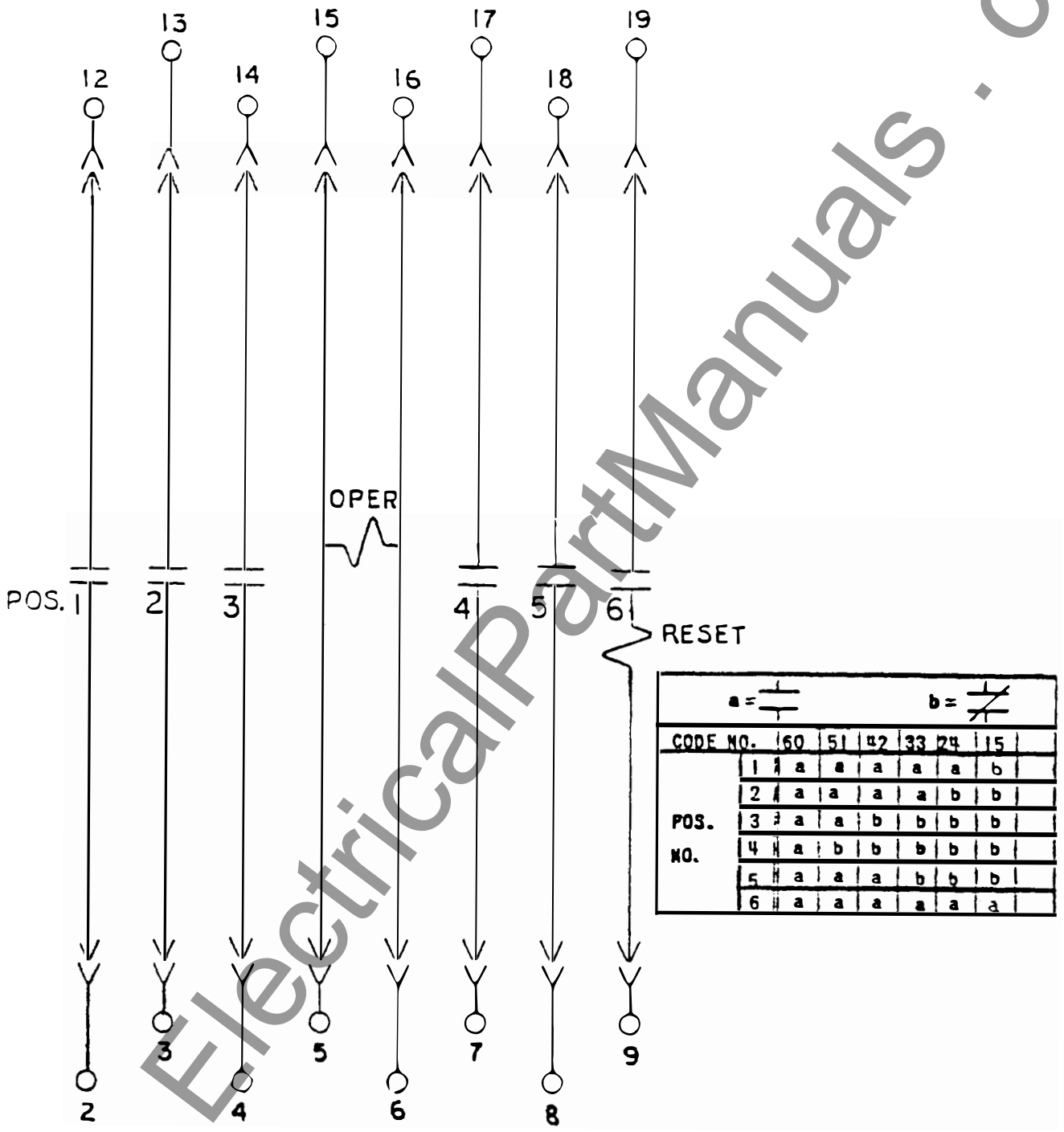
The burnishing tool described above can be obtained from the factory.

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.



a = ⊣⊢		b = ⊣/⊢				
CODE NO.	60	51	42	33	24	15
POS. NO. 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

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

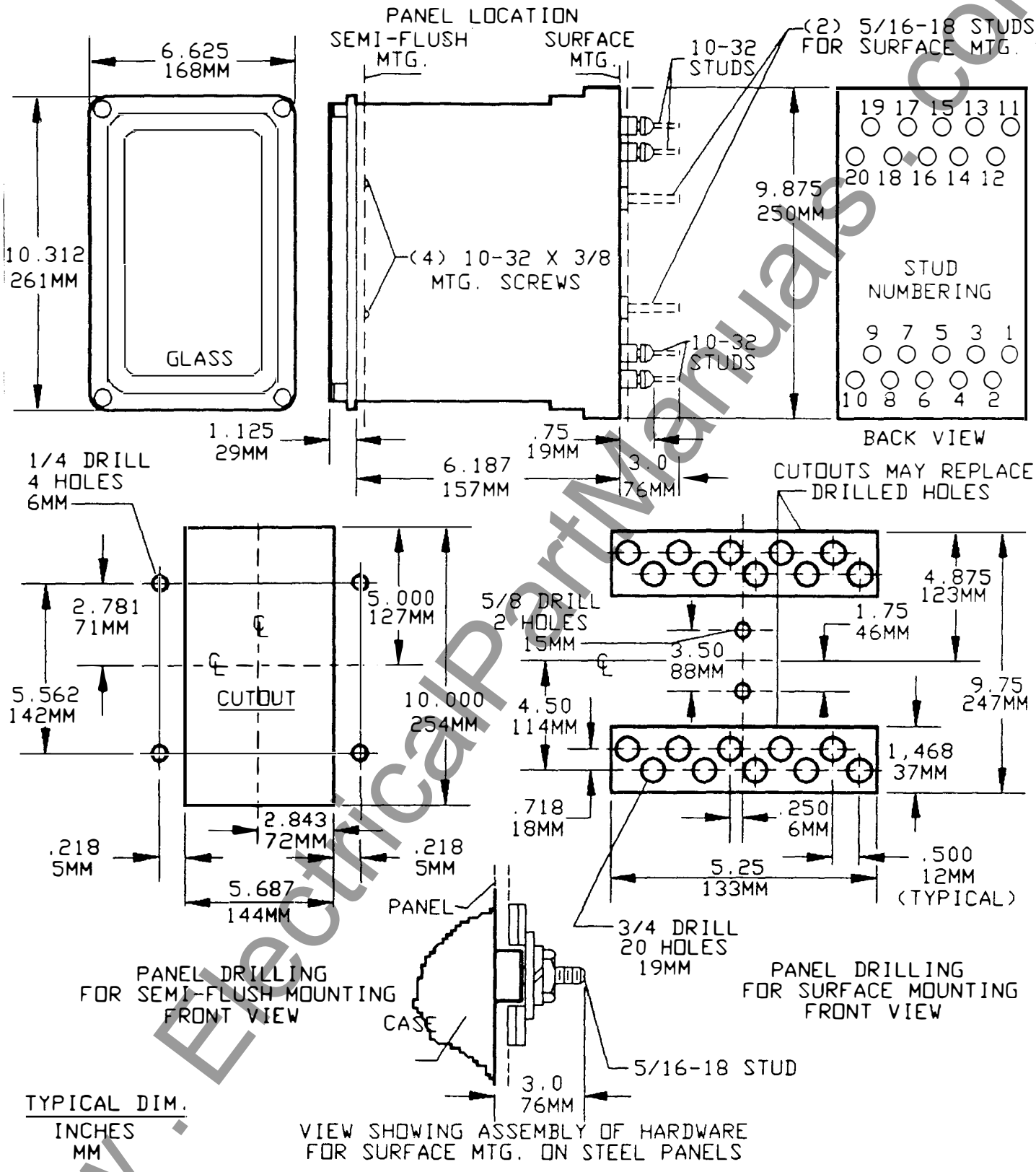


Figure 2 (K-6209272 [7]) Outline and Panel Drilling Diagram for HFA174 Relays

Meter and Control Business Department

(4/93) (100)

General Electric Company
Protection and Control
205 Great Valley Parkway
Malvern, Pennsylvania 19355-1337