



**INSTRUCTIONS**

**GEI-68749A**  
SUPERSEDES GEI-68749

# **MULTI-CONTACT AUXILIARY RELAYS**

**Types**

**HFA65D  
and  
HFA65E**

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**LOW VOLTAGE SWITCHGEAR DEPARTMENT**

**GENERAL  ELECTRIC**

**PHILADELPHIA, PA.**



Fig. 1 HFA65 Back Connected Relay for Surface Mounting (Front View)



Fig. 2 HFA65 Front Connected Relay for Surface Mounting (Front View)

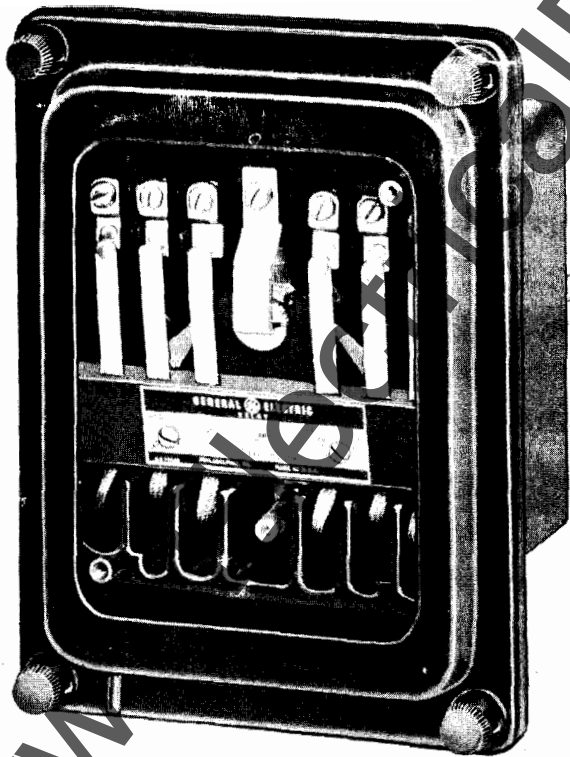


Fig. 3 HFA65 Back Connected Relay with Flange for Semi-flush Mounting to Line-up with Cover of Drawout Case (Front View)



Fig. 4 HFA65 Back Connected Relay with Flange for Semi-flush Mounting (Front View)

Fig. 1 (8025882)

Fig. 2 (8025884)

Fig. 3 (8025885)

Fig. 4 (8025883)

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# MULTI-CONTACT AUXILIARY RELAYS

## HFA65D AND HFA65E

### DESCRIPTION

#### INTRODUCTION

The HFA65 relays are hinged armature, multi-contact, self reset, auxiliary relays with time delay on dropout. 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 HFA65D and HFA65E 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. There are two types of flanges available: one provides mounting with normal cover; one provides mounting with the drawout-case type cover.

#### CHARACTERISTICS

The HFA65D relay has an instantaneous pick-up time and an adjustable time delay dropout of 0.25 to 2.0 seconds.

The HFA65E relay has an adjustable pick-up time of 0.067 to 0.100 second and a fixed drop-out time delay of 0.25 second.

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.

### INSTALLATION

#### MOUNTING AND CONNECTIONS

The Type HFA relays should be mounted on a vertical surface. The outline and panel drilling diagrams are shown in Figs. 7 to 10. Surface mounting on steel panels requires an insulating bushing for each terminal.

*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.*

#### RATINGS

The HFA65 relays are available with continuous coil ratings of up to 250 volts DC and 115 and 230 volts AC.

The HFA65 relays available for AC operation require an external rectifier and therefore may be used for any frequency from 25 to 5000 cycles.

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		

#### BURDENS

The burden of the DC relays is approximately 13 watts when cold and 10 watts when hot. The burden of the AC relays, including rectifiers, is approximately 30 volt-amperes and 20 watts.

The internal connections diagram is shown in Fig. 5. The external wiring diagram of the AC relays with rectifiers is shown in Fig. 6. It should be noted that the contact which de-energizes the relay coil must be connected on the AC side of the rectifier. The external rectifier outlines are shown in Figs. 11 and 12.

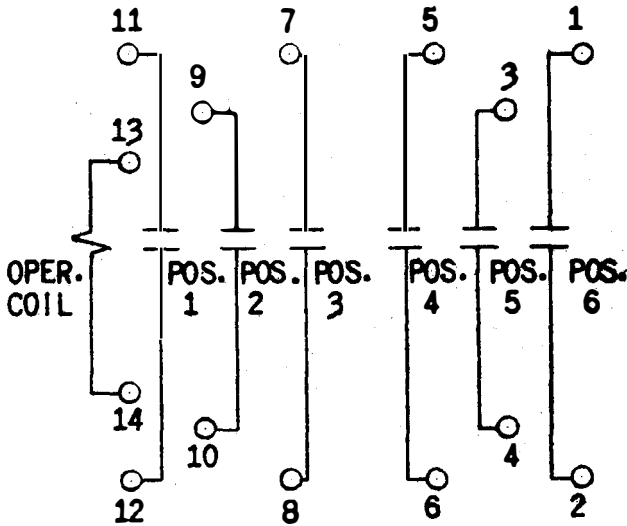


Fig. 5 Internal Connection Diagram for HFA65 Relays (Front View)

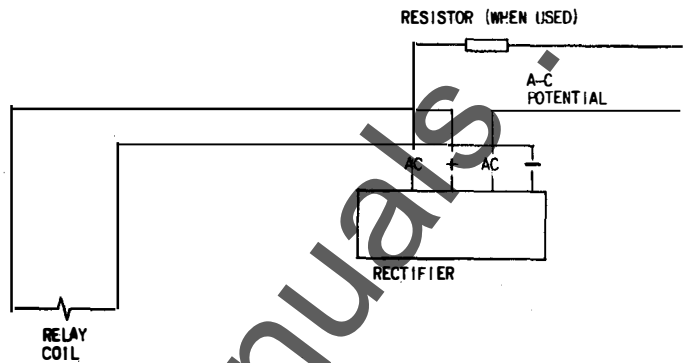


Fig. 6 External Connections for HFA65 Relays Designed for AC Operation

### ADJUSTMENTS

These relays have been calibrated at the factory and under normal conditions, no further adjustments are necessary. If the requisition does

not specify a drop-out time for the HFA65D, the time-delay will be set for two (2) seconds at rated voltage. If no pick-up time is specified for the HFA65E, it will be set for 0.083 second at rated voltage.

## MAINTENANCE

### CONTACTS

#### 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 material will be removed rapidly and thoroughly.

Five 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.

#### ADJUSTMENT

The contacts should not require readjustment since they are self-aligning.

Any contact circuit can be changed from circuit opening to circuit closing, or vice versa, by removing the fixed contact, turning it over and

replacing it. (See Table II.) 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 3/64 inch wipe when in their operated position. It may be necessary to bend the moving contact arms to realize these requirements.

TABLE II

Contact Code No.	60	51	42	33	24	15	06
Position No.	Contact 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

a = Normally Open

b = Normally Closed

## ELECTRICAL TESTS

### PICKUP AND DROPOUT (HFA65D)

The HFA65D relays designed for AC operation pick up between 35% and 80% of rated voltage. The HFA65D relays designed for DC operation pick up between 30% and 60% of rated voltage.

Since the values of time delay dropout and voltage pickup cannot be adjusted independently, it is necessary to make the time delay adjustment first and then check that the pick-up value falls within approximate limits.

To obtain a particular drop-out time, the following procedure is necessary:-

1. Set control spring for maximum tension by turning the knurled adjusting nut clockwise. Reseat the nut in hexagonal groove in the armature tail piece.
2. Adjust the residual screw to obtain the required time delay. The relay dropout time is measured from the time the coil is de-energized until a normally open contact opens. Turning the screw clockwise decreases the time delay. It is permissible to lessen the control spring tension to obtain the required time delay.

Check the value of voltage at which the relay will pick up and seal-in. This pick-up voltage may be varied by adjusting the control spring. Any change in the control spring tension requires

a recheck on the drop-out time as it will be affected.

### PICKUP AND DROPOUT (HFA65E)

The pick-up and drop-out times are to be taken on the normally closed contacts. Code 60 contacts obviously require that all times be measured on a normally open contact. Table III lists the approximate pick-up setting required by adjustment of the control spring to obtain the specified pick-up times.

TABLE III

P.U. Time at Rated Volts Min. Seconds	P.U. Time At 0.72 X Rated Volts Max. Seconds	Approx. P.U. Voltage Setting
0.067	0.100	0.44 x Rated
0.083	0.135	0.50 x Rated
0.100	0.180	0.58 x Rated

After obtaining the required pick-up time, the residual calibrating screw may be adjusted to obtain the 0.25 to 0.30 second drop-out time.

## 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.

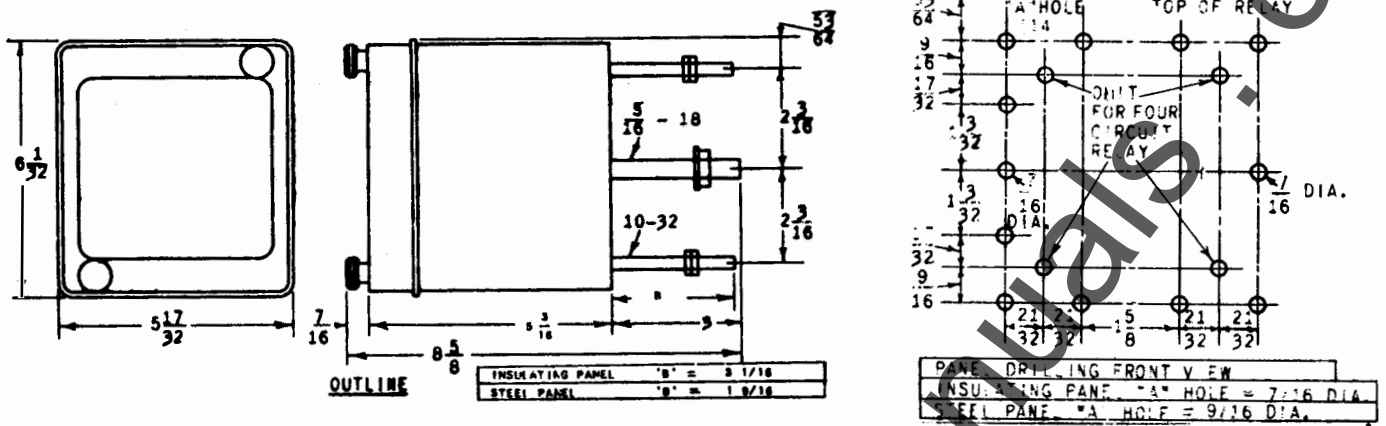


Fig. 7 Outline and Panel Drilling for Surface Mounted Type HFA Relays (Typical Model Number is HFA65D(-))

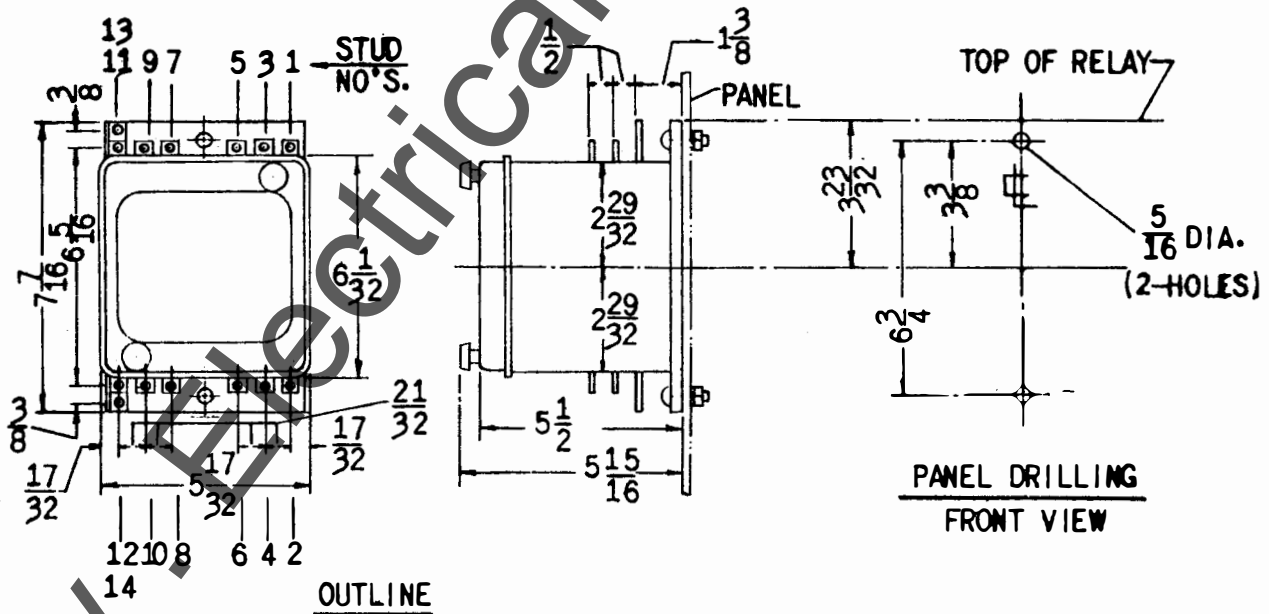


Fig. 8 Outline and Panel Drilling for Front Connected Type HFA Relays (Typical Model Number is HFA65D(-)H)

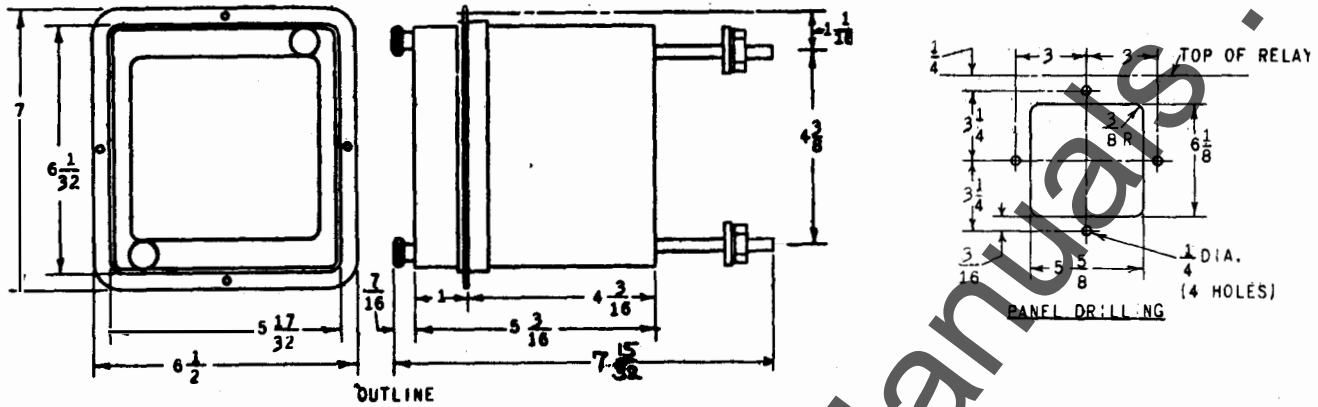


Fig. 9 Outline and Panel Drilling for Semi-flush Mounted Type HFA Relays (Typical Model Number is HFA65D(-)F)

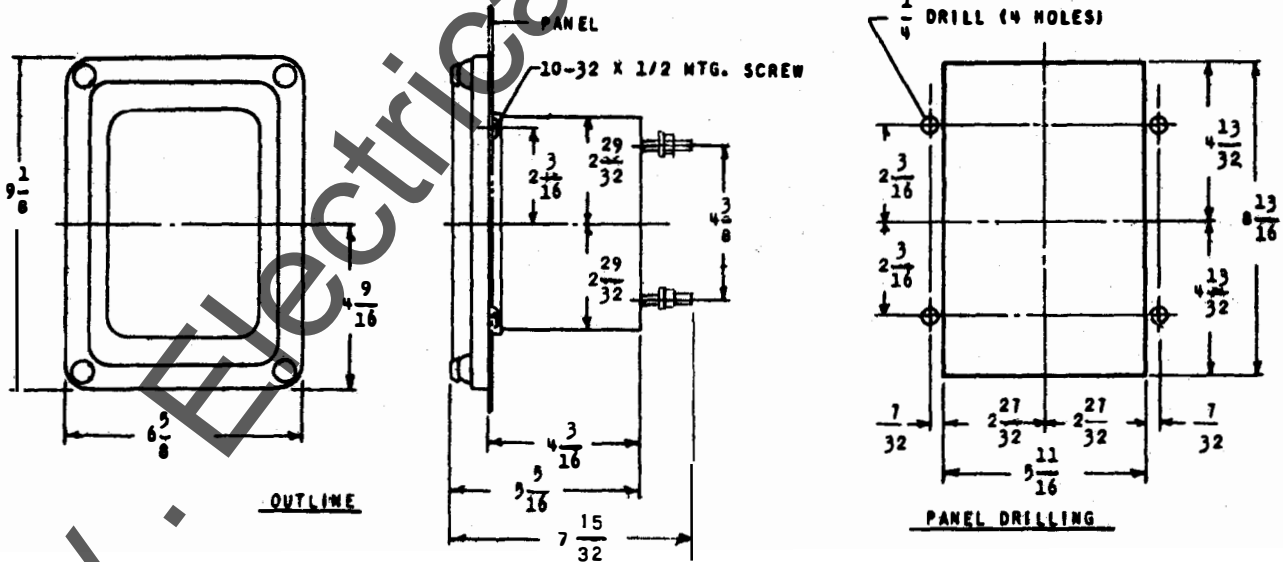


Fig. 10 Outline and Panel Drilling for Semi-flush Mounted Type HFA Relays that Line Up with Drawout-out Type Cases (Typical Model Number is HFA65D(-)E)

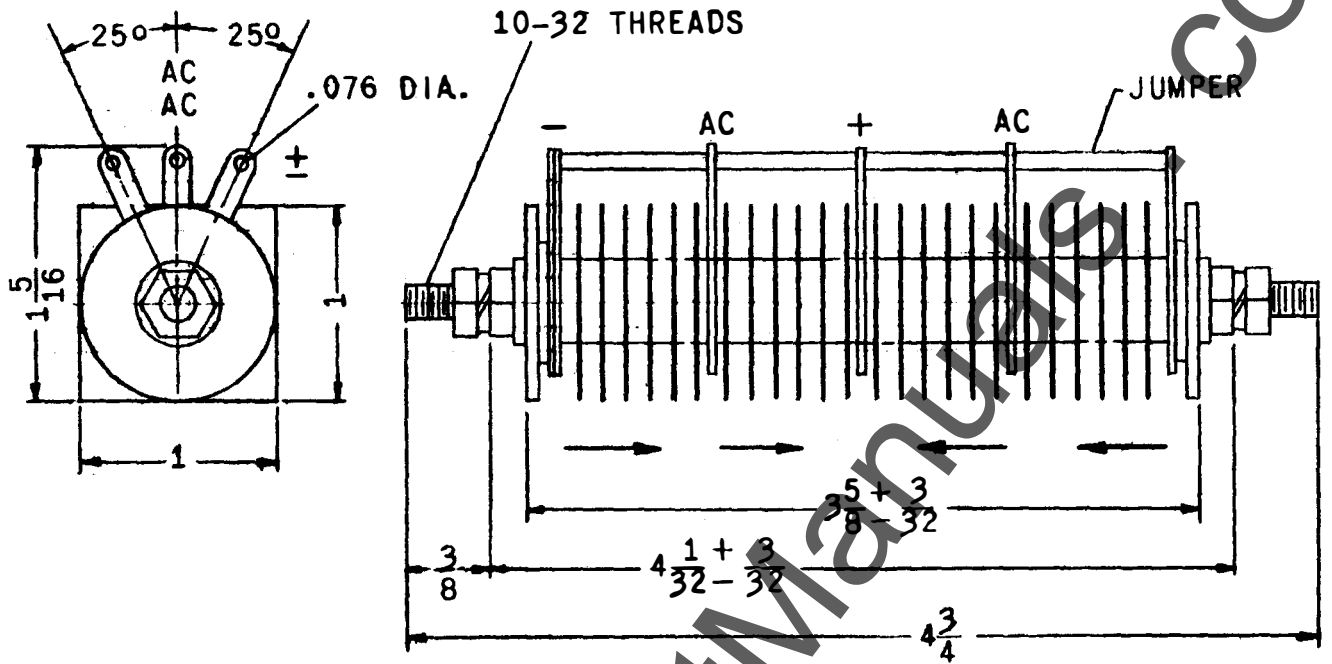


Fig. 11 Outline of External Rectifier Used with HFA65 Relays Designed for AC Operation up To 115 Volts

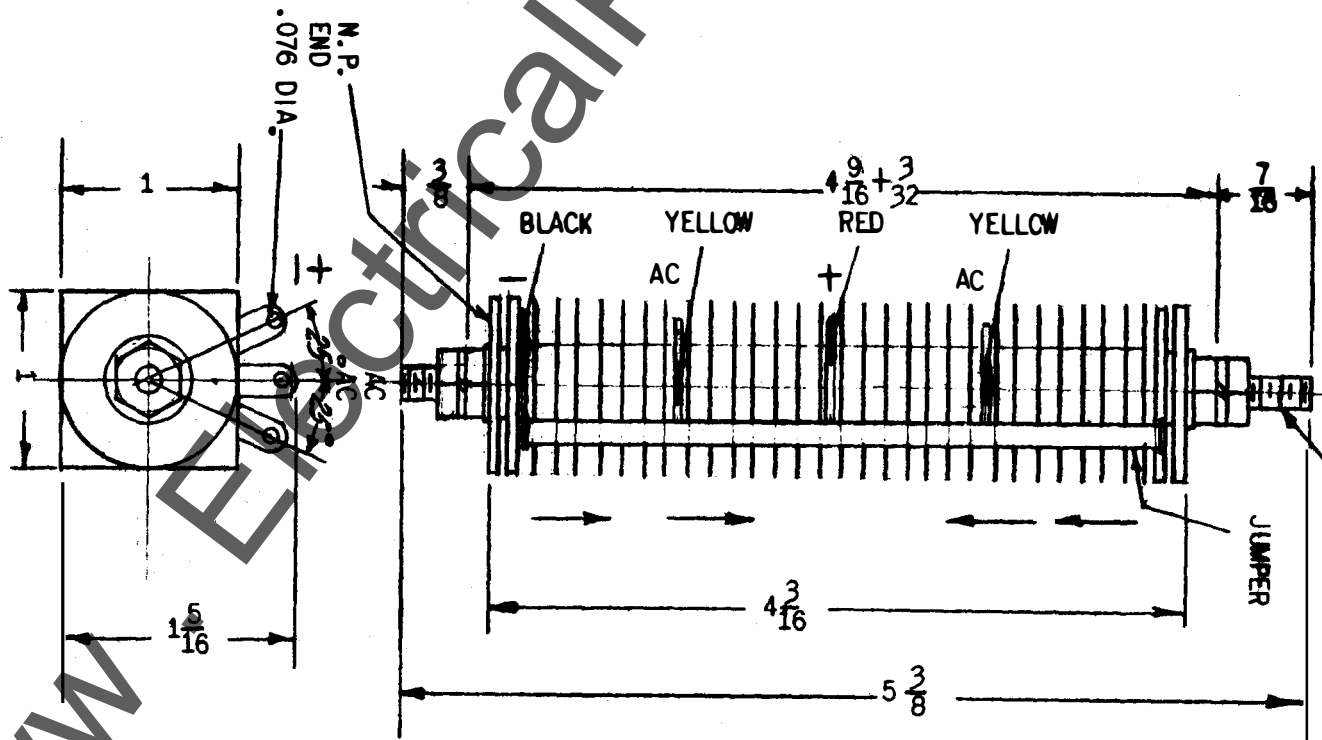


Fig. 12 Outline of External Rectifier Used with HFA65 Relays Designed for AC Operation Above 115 Volts

Fig. 11 (402A922-0)

Fig. 12 (10M8578-0)