INSTRUCTIONS

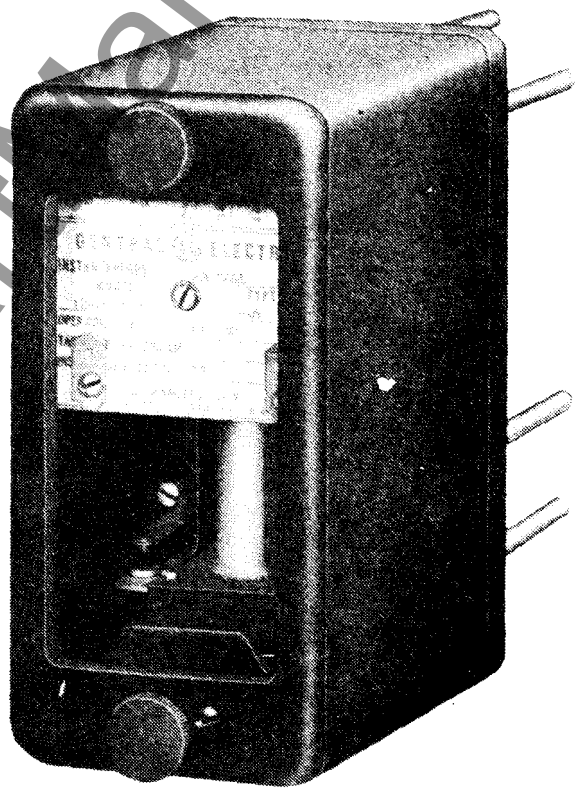
GEI-3097IF
Supersedes GEI-3097IE

INSTANTANEOUS VOLTAGE RELAY

TYPES

PJV11A PJV11B

PJV11Z PJV12A



GENERAL ELECTRIC

CONTENTS

Cover Photo (8009443)

INSTANTANEOUS VOLTAGE RELAY

TYPES PJV11A, PJV11B, PJV11Z, AND PJV12A

DESCRIPTION

The PJV11A, PJV11B, PJV11Z, and PJV12A relays are all single element high speed plunger type voltage relays. The PJV11A, and PJV12A are single frequency AC or DC operated devices. The PJV11B is designed for DC operation. The PJV11Z is comprised of an element designed for DC operation but supplied with an external full wave bridge rectifier to make it suitable for use on AC over a range of frequencies from 25-5000 hertz. All these relays come in small molded case for projection (surface) mounting. See figure 4 for outline and drilling dimensions. Table I below provides information on the basic differences between these devices.

TABLE I

TYPE	2 CONTACT CODE +	TARGET		INT. CONN. AND OUTLINE	AC OR DC
		TYPE	RESET		
PJV11A	11, 02, and 20	Mechanical++	Self	Figure 4	AC, DC**
PJV11B	11, 02, and 20	Mechanical	Self	Figure 4	DC
PJV11Z	11, 02, and 20	Mechanical	Self	Figure 4	AC***
PJV12A	11, 02, and 20	Mechanical	Hand*	Figure 4	AC, DC

\+ For contact code arrangements see internal connection diagram
++ Forms 21-40 have no target
* Hand reset on normally closed contacts only
** Operating coils available for either AC or DC operation.
*** For multi-frequency use, 25-5000 hertz. Includes an external rectifier.

APPLICATION

The PJV11A and the AC versions of the PJV11A and PJV12A are not generally suitable for application as continuously picked up undervoltage relays because the alternating voltage causes vibration of the parts when the relay is picked up. Over long periods of time this vibration can damage the relay. For AC undervoltage applications the NGV relay is recommended. The PJV11B, being DC operated is suited for use as either an overvoltage or an undervoltage device.

Aside from the limitations noted above, these PJV relay may be applied whenever a high speed, relatively high drop out voltage type of device is required. The operating time and other characteristics of these relays are given in the section under CHARACTERISTICS.

CHARACTERISTICS

OPERATING PRINCIPLES

These plunger type relays operate on the principle of electromagnetic attraction. The contacts are opened or closed by an armature which is drawn up vertically into a solenoid.

PICKUP AND DROPOUT

Table 3 shows the calibrating ranges for the various operating coils used in these relays. Pickup voltage is continuously adjustable over the calibrating range. Pickup is set by adjusting the vertical position of the armature on the plunger rod. The four factory pickup calibrations appear on the top of the

relay nameplate and correspond to the scribed marks on the calibrating table. The factory pickup calibrations are the voltage ±5 percent required to pick up the relay with voltage gradually applied.

Dropout is defined as the de-energized plunger position. The reset or dropout voltage is 90 to 95 percent of the pickup voltage setting for PJC11A relays with AC operated coils when using the contact arrangement of one normally open and one normally closed contact. When these PJC11A relays have two normally closed contacts the dropout voltage is 80-85 percent of pickup.

The dropout of the PJV11B and PJV11Z is 85-95 percent of pickup voltages for any contact arrangement. PJC11A relays with DC operated coils dropout at 60 percent or more of pickup voltage. The ratio of pickup to dropout voltage is not adjustable; however, contact adjustments will effect this ratio.

The PJC12A relay is hand set on normally closed contacts only. Once operated the plunger will not return to reset position until the reset button is pushed. When this relay is latched, the normally closed contacts remain open; however, the normally open contacts may not remain closed.

OPERATING TIME

The time voltage characteristics of these relays are shown in Figures 2 and 3.

RATINGS AND BURDENS

CONTACT RATINGS

The contacts are rated at 5 amperes for continuous duty and at 30 amperes for tripping duty. The interrupting ratings are given in Table 2.

TABLE 2
INTERRUPTING RATINGS

AC VOLTS	AMPS	
	INDUCTIVE	NON-INDUCTIVE
115	2	5
230	1	2
460	0.5	1

DC VOLTS	AMPS	
	INDUCTIVE	NON-INDUCTIVE
24	1.0	5
48	0.5	2
125	0.3	1
250	0.15	0.3

BURDENS AND COIL RATINGS

Table 3 shows the burdens and coil ratings for these relays. The coil ratings shown are the continuous electrical voltage rating of the operating coil. The AC operated forms of these relays cannot be operated continuously in the picked up position for mechanical reasons. This includes the PJV11Z.

TABLE III

BURDENS

Rating			Volt-Amps			Watts		
Volts	Freq.	Cal. Range	A	B	C	A	B	C
115	60	70-160	5.52	8.56	9.3	2.56	4.15	4.9
115	50	70-160	5.0	6.8	7.8	2.03	3.2	4.1
115	25	70-160	1.9	2.5	2.8	1.0	1.6	5.1
230	60	140-320	4.9	7.6	8.3	2.34	3.8	4.5
230	50	140-320	4.93	6.7	7.7	2.06	3.25	4.16
230	25	140-320	1.9	2.5	2.8	1.0	1.6	5.1
460	60	280-640	4.9	7.6	8.25	2.34	3.8	4.5
460	50	280-640	4.85	6.6	7.56	2.03	3.2	4.1
125	D-C	50-160				5.1	5.1	5.1
250	D-C	100-320				5.0	5.0	5.0
125*	D-C	50-160				10.5	10.5	10.5
250*	D-C	100-320				46.5	46.5	46.5

A - At rated volts with plunger set for pickup at minimum point of range.
B - At rated volts with plunger set for pickup at rated volts.
C - At rated volts with plunger set for pickup at maximum point of range.

* For forms of PJV11A with external resistor.

CONSTRUCTION

All of the PJV relays are of the same plunger type construction. (Refer to Fig. 1). The adjustable armature is mounted on the threaded portion of a plunger rod which carries the moving contacts upward as the armature is operated. The armature is drawn upward into the coil by the flux created in the rectangular magnet frame and a cylindrical pole piece inside the coil. Guides for the plunger rod are provided at the top by a hole in the pole piece, and at the bottom by the fit of the molded contact carrier inside the calibration tube. Openings in the sides of the calibration tube allow access to the armature to adjust pickup. The normally closed fixed contacts are similar to the normally open fixed contacts except they are mounted below the moving contact instead of above it, and the backstop arm is omitted.

The PJV relays covered by these instructions are all mounted on a small molded case and are supplied with a cover with a glass window. The outline and panel drilling diagram for these relays is shown in Figure 4.

The internal connections and contact code definitions for these relays are shown in Figure 4.

Figure 5 shows the wiring diagram for the PJV11Z used with its external rectifier. Figure 6 shows its outline drawing of this external rectifier. Figure 7 shows the outline of a typical external resistor used with some forms of these relays.

RECEIVING, HANDLING AND STORAGE

These relays when not included as a 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 Apparatus 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.

ACCEPTANCE TESTS

Immediately upon receipt of a relay an inspection and acceptance test should be made to insure that no damage has been sustained in shipment and that the relay calibrations have not been disturbed.

VISUAL INSPECTION

Check that the nameplate stamping to insure that the model number, rating and calibration range of the relay received agree with the requisition.

Examine the relay by visual inspection that there are no broken or cracked molded parts or other signs of physical damage, and that all screws are tight. Also check to see that the flexible moving contact leads extend straight back from the contacts and have not been deformed.

MECHANICAL INSEPCTION

It is recommended that the following mechanical adjustments be checked:

1. Operate the plunger on each unit by hand and allow it to reset to insure that the unit is free from friction or binds. If two normally open contacts are present, observe that with one contact just making there is less tnan 1/64 inch gap on the other contact.

2. The wipe on a normally open or normally closed contact should be approximately 3/64 inch. The normally open contact gap with the armature fully reset should be approximately 3/32 inch for either contact arrangement. Backstops should be present above all normally open contact only. The gap between the backstop and contact brush at the tip should be approximately 1/16 with the armature reset.

3. For PJV12B relays the manual reset feature should be checked for proper operation. The latch should hold normally closed contacts open but may not hold the normally open contacts closed. The plunger should fall to reset position when the reset button is pushed.

ELECTRICAL TESTS

It is recommended that the following electrical checks be made immediately upon receipt of the relay. Note that all tests should be made with the relay in its case and in a level position.

1. Pickup and Reset - The units are normally supplied form the factory with the bottom of the armature aligned with the top mark on the calibration tube. This corresponds to the minimum pickup setting on the nameplate. It should be sufficient to check the pickup of each unit at this setting. With normally open contacts with one continuous motion at the calibrated voltage level. The test voltage should then be gradually decreased until the contacts reset. The dropout to pickup voltage ratio should be as described in the characteristics section of this book.

INSTALLATION

LOCATION

The location should be clean and dry, free from dust and excessive vibration, and well lighted to facilitate inspection and testing.

MOUNTING

The relay should be mounted on a vertical surface. The outline and panel diagram is shown in Fig. 4.

CONNECTIONS

The internal connection diagram for the various relay types is shown in Fig. 4. Typical external connections for the PJV11Z is shown in Fig. 5.

INSTALLATION PROCEDURE

If after the performance of the ACCEPTANCE TESTS, the relay is held in storage before shipment to the job site, it is recommended that the visual and mechanical inspection described in the section on ACCEPTANCE TEST be repeated before installation.

Also the relay should be set at the pickup voltage value to be used and it should be checked. When making this check, the relay should be installed in its permanent location.

MAINTENANCE

The relay is simple in construction and repairs may be effected easily.

It is recommended that the relay be returned to the factory if major repairs are necessary.

PERIODIC INSPECTION

A mechanical inspection of the relay should be made once every six months.

CONTACT CLEANING

For cleaning 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. The flexibility of the tool insures the cleaning of the actual points of contact.

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 and thus prevent closing.

The burnishing tool described is included in the standard relay tool kit obtainable from the factory.

RENEWAL PARTS

It is recommended that sufficient quantities of renewal parts be carried in stock to enable 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 quantity required, name of part wanted, and give complete nameplate data, including serial number. If possible, give the General Electric Company requisition number on which the relay was furnished.

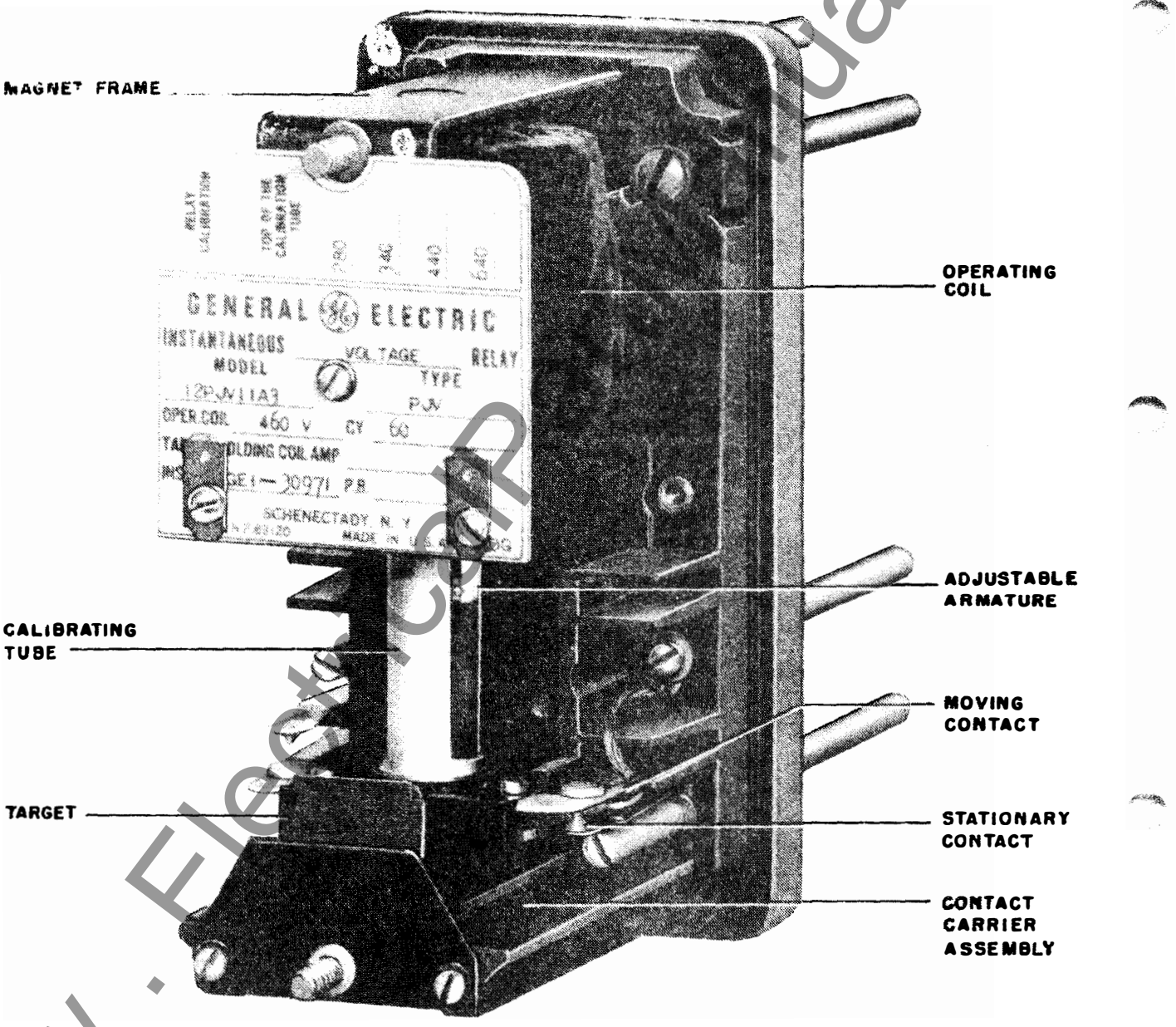
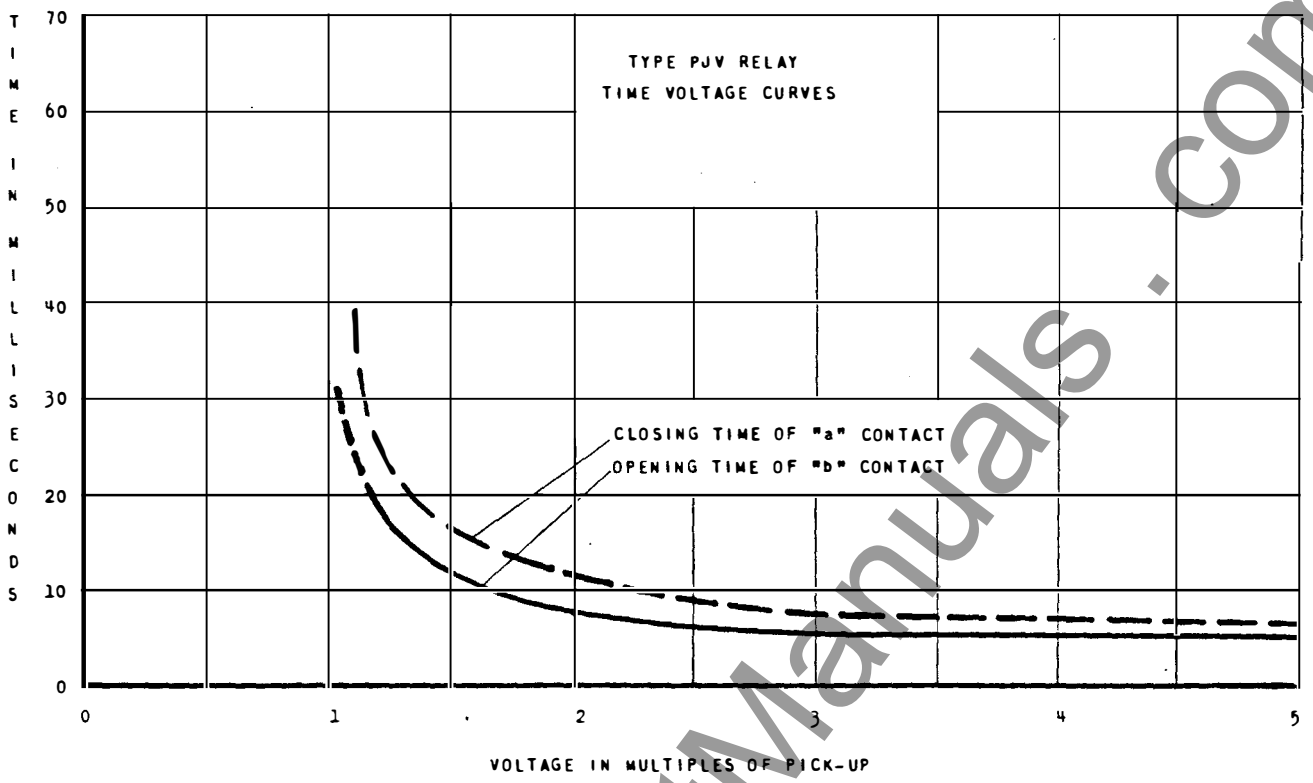
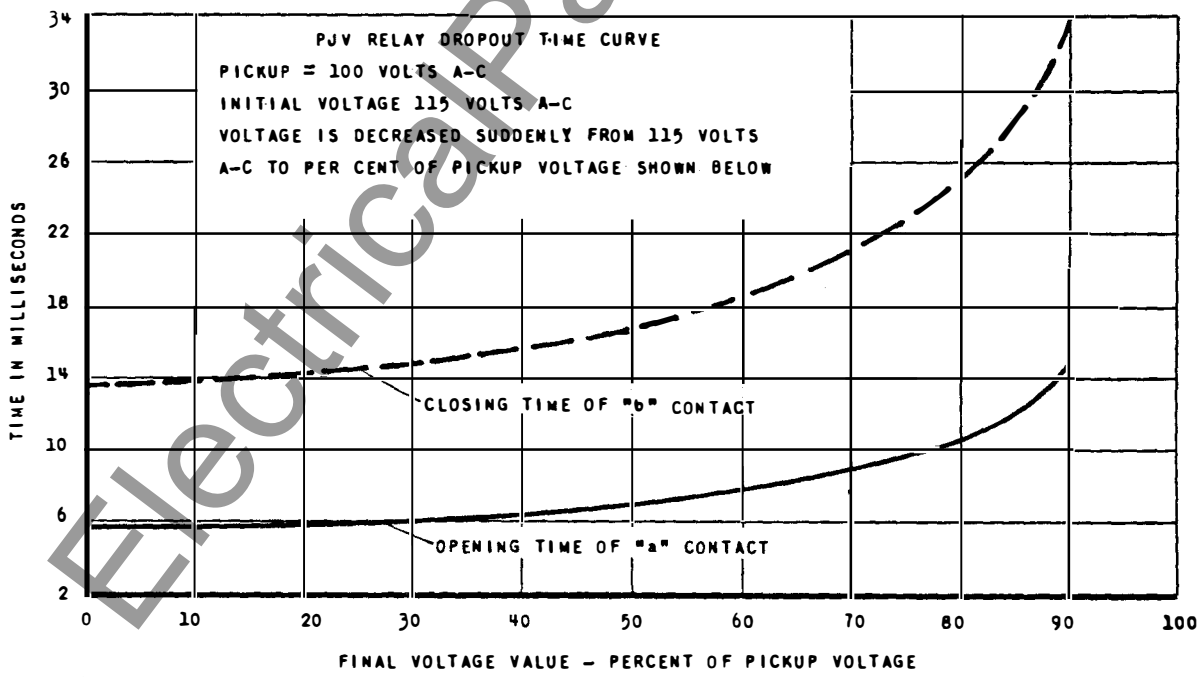


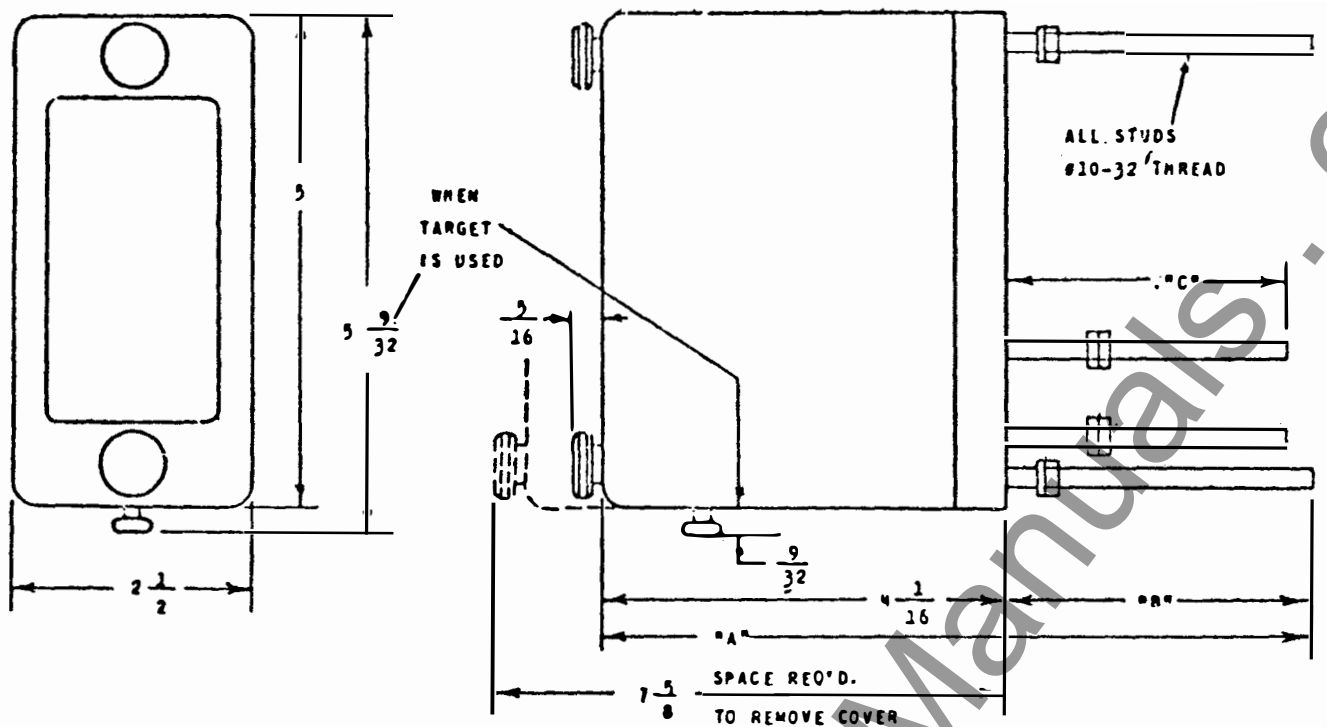
FIG. 1 (8009444) Type PJV11A Relay With Cover Removed



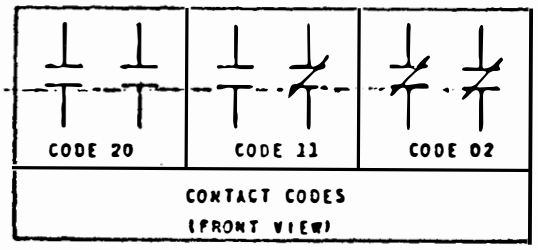
* Figure 2 (K-6375897-2) Typical Time Voltage Characteristics for Type PJV Relays



* Figure 3 (K-6375898-2) Typical Dropout Time Characteristics for Type PJV Relays

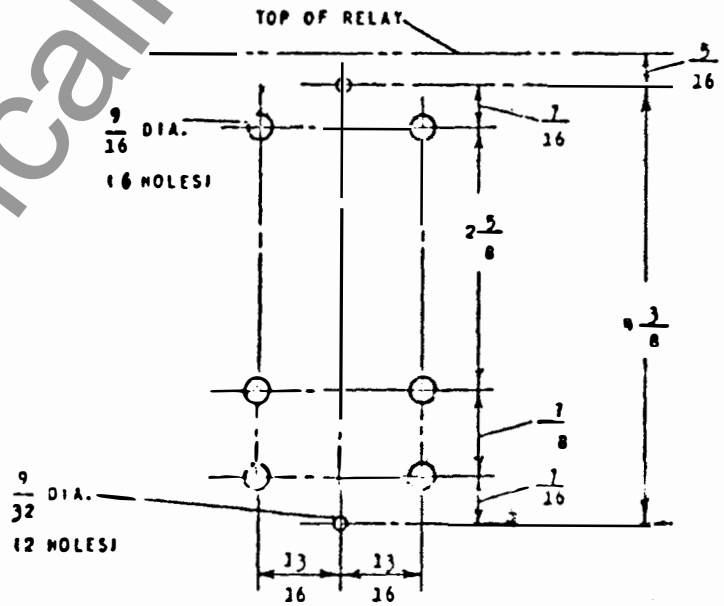


OUTLINE



TYPE OF PANEL	"A"	"B"	"C"
INSULATING	7 3/16	3 1/8	2 7/8
STEEL	5 11/16	1 5/8	1 3/8

INTERNAL CONNECTIONS
(FRONT VIEW)



PANEL DRILLING
(FRONT VIEW)

FIG. 4 (K-6174680-6) Internal Connections, Outline And Panel Drilling Dimensions For PJV11A, 11B, 11Z, 12A Relays

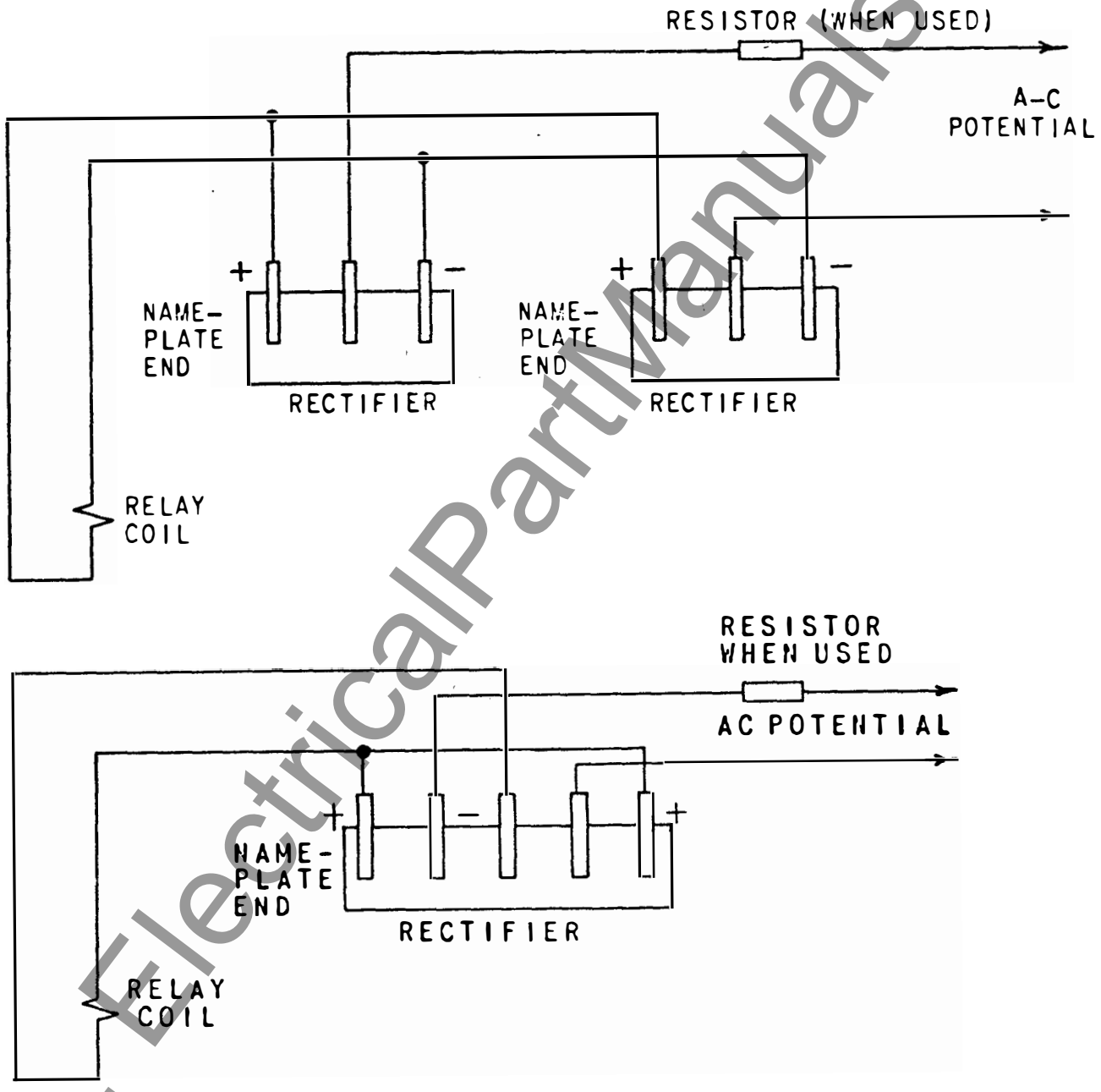


FIG. 5 (K-6174144-4) External Connections For PJV11Z Relay
With External Rectifier And Resistor

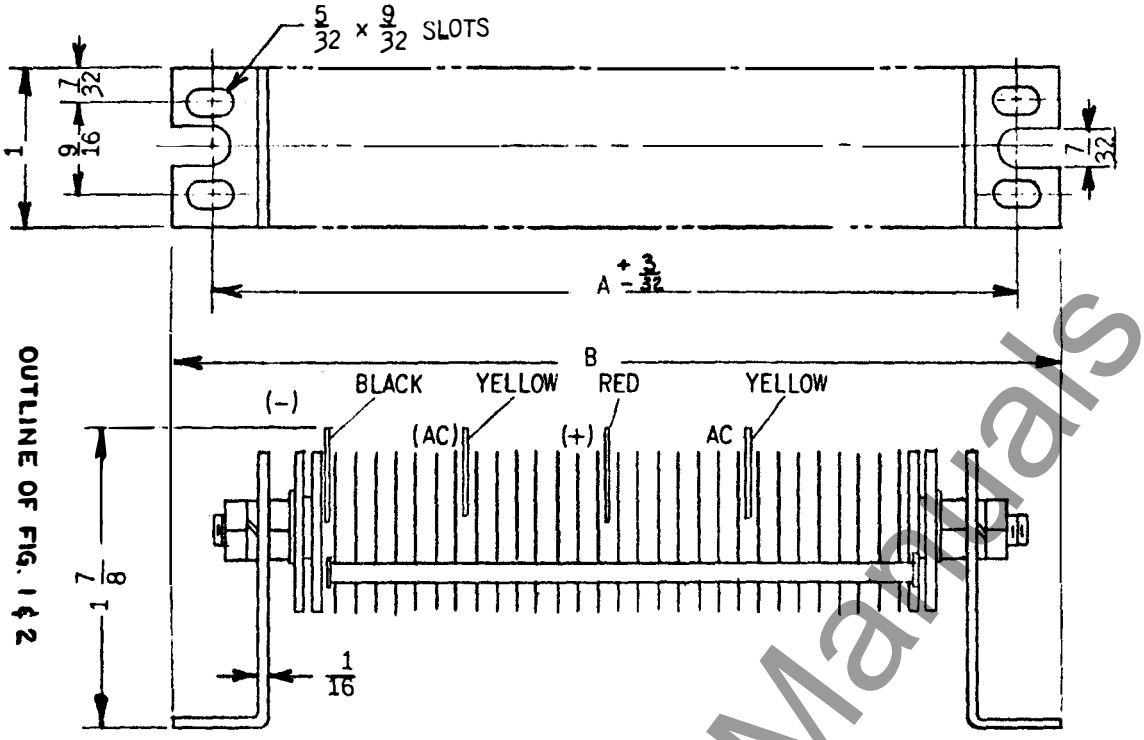


FIG.	RECTIFIER	A	B
1	6RS21PB7ABDI	5-1/4	5-5/8
2	6RS21PB6ABDI	4-1/2	5-1/16
3	6RS21PD14ABDI	4 15/16	5 1/2

FIG. 6 (0148A3784-4) Outline Of External Rectifier Used With PJV11Z Relays

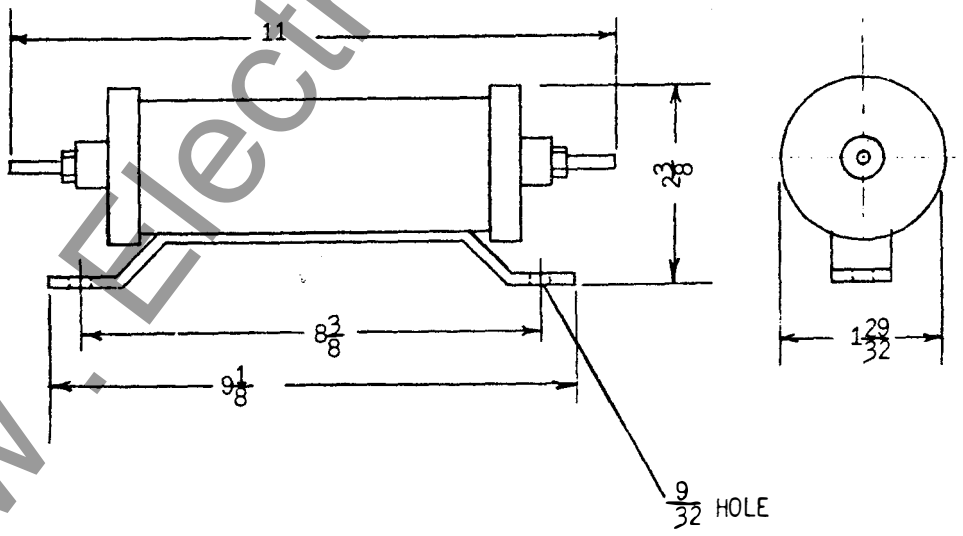


FIG. 7 (389A752-1) Outline Of A Typical External Resistor Used With Some Of These PJV Relays