INSTRUCTIONS

GEI-25364F

TIMING RELAYS

Types
RPM11A, RPM11B,
and RPM13A

LOW VOLTAGE SWITCHGEAR DEPARTMENT

GENERAL ELECTRIC

PHILADELPHIA, PA.

A

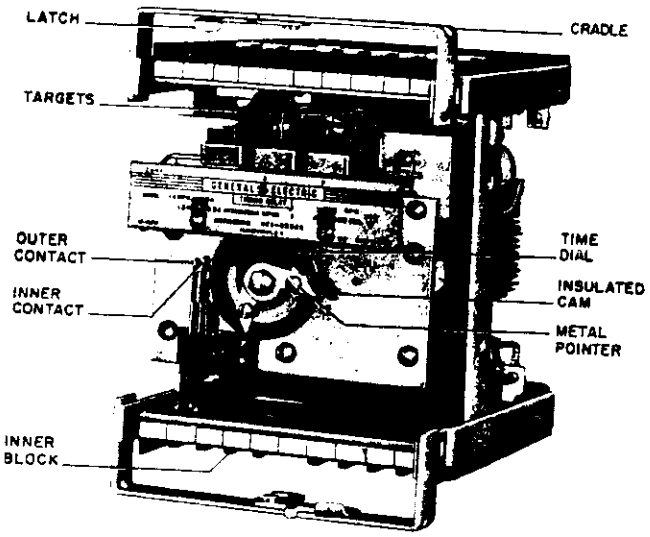


Fig. 1 Type RPM Relay, Unit Withdrawn From Case (Front View)

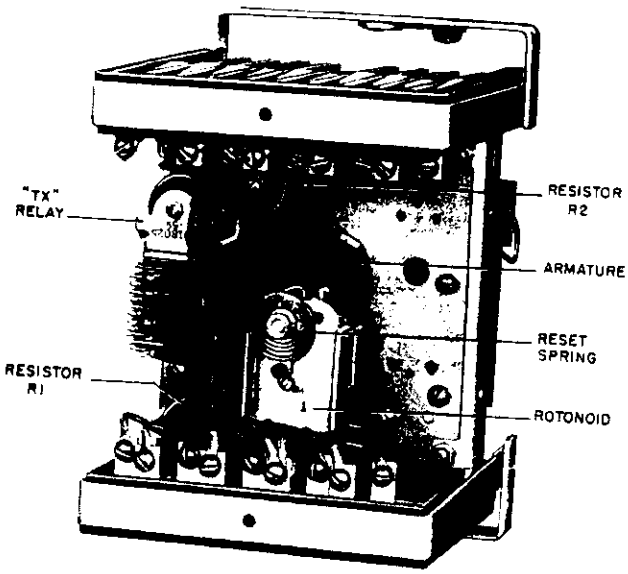
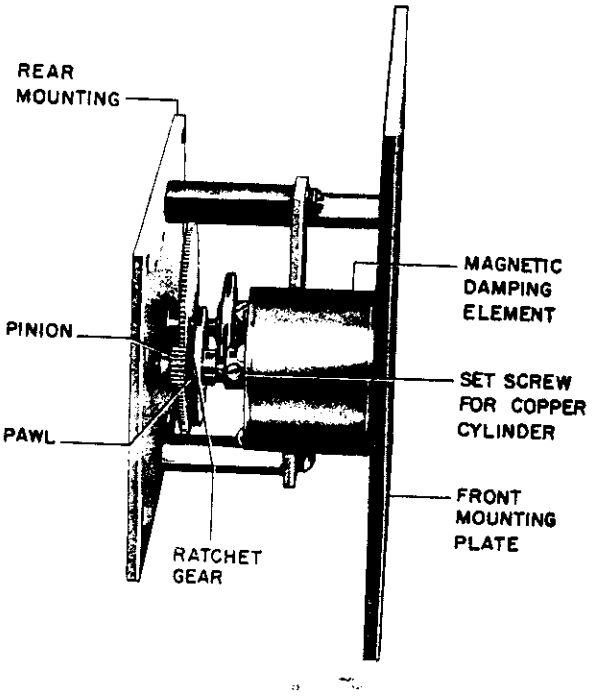
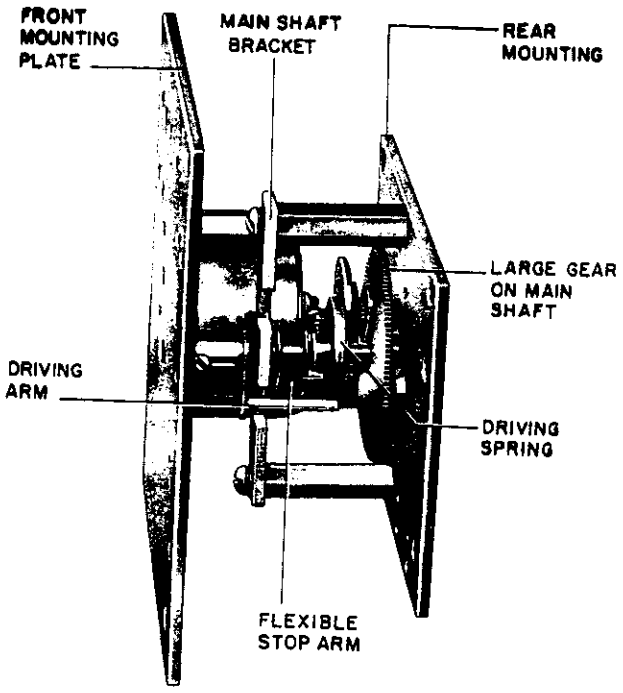


Fig. 2 Type RPM Relay, Unit Withdrawn From Case (Rear View)



Left Side View



Right Side View

Fig. 3 Type RPM11A Relay Unit Subassembly Between Front and Rear Mounting Plates

TIMING RELAYS
TYPE RPM

INTRODUCTION

These relays are intermittently rated direct current timing devices. The timing unit itself has two contacts which close momentarily after time interval (adjustable from 0.15 to 3.0 seconds). The contacts may be adjusted to close at different times (not closer together than 0.2 seconds). There is also a telephone type auxiliary unit through whose contacts the timing unit coil is energized.

The timing unit contacts of the Type RPM11A and RPM11B relays, initiate second and third zone tripping and are protected by seal-in units in the distance relays.

The timing unit contacts of the Type RPM13A relay complete the trip circuit and are protected by an internally mounted seal-in unit.

APPLICATION

The Type RPM11A relay is used with each set of three single-phase Type GCY12 mho distance relays for long line protection and with each set of three single-phase Type GCX17 reactance distance relays for the protection of short lines. It contains three targets which correspond to zone 1, zone 2, and zone 3 of the protected section.

The Type RPM11B relay is similar to the Type RPM11A except for some changes in internal wiring and is used only with certain ratings of Type GCX17A reactance distance relays.

The Type RPM13A relay is used for all general duty timer applications requiring time delays of 0.15 to 3 seconds. It contains a seal-in unit and two targets to indicate which of the passing contacts has energized the seal-in unit.

RATINGS

* Intermittent ratings of the Type RPM11A, RPM11B and RPM13A relays with either 1.0 ampere (0.27 ohm) or 0.2 ampere (7.4 ohm) targets are available to cover 24, 48, 125 and 250 volts d-c applications.

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 the relay, an examination should be made for any damage sustained during shipment. If injury or damage resulting from rough handling is evident, a claim should be filed at once with the transportation company and the nearest Sales Office of the General Electric Company notified promptly.

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.

DESCRIPTION

The operating magnet is a curved solenoid called a rotonoid, having an armature which rotates through approximately 180 degrees. This rotonoid winds up a spiral spring to drive the main shaft which carries a circular calibrated scale and two adjustable insulated cams for operating the contacts. Connected to this main shaft through a set of spur gears is a magnetic damping element for regulating the speed of operation. This element consists of a copper cylinder rotating in an annular air gap across which exists a permanent magnet field. The relative position of the cylinder in the air gap determines the amount of damping obtained.

The circular scale or dial is graduated in tenths of a second up to three seconds. A time setting is easily made by loosening one of the pointer clamping screws at the front of the scale and setting the pointer at the desired time.

CASE

The case is suitable for either surface or semi-flush panel mounting and an assortment of hardware is provided for either mounting. The cover attaches to the case and also carries the reset mechanism when one is required. Each cover screw has provision for a sealing wire.

The case has studs or screw connections at both ends or at the bottom only for the external connections. The electrical connections between the relay units and the case studs are made through spring backed contact fingers mounted in stationary molded inner and outer blocks between which nests a removable connecting plug which completes the circuits. The outer blocks, attached to the case, have the studs for the external connections, and the inner blocks have the terminals for the internal connections.

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.

* Change since last revision.

The relay mechanism is mounted in a steel framework called the cradle and is a complete unit with all leads being terminated at the inner blocks. This cradle is held firmly in the case with a latch at the top and the bottom and by a guide pin at the back of the case. The cases and cradles are so constructed that the relay cannot be inserted in the case upside down. The connecting plug, besides making the electrical connections between the respective blocks of the cradle and case, also locks the latch in place. The cover, which is fastened to the case by thumbscrews, holds the connecting plug in place.

To draw out the relay unit the cover is first removed, and the plug drawn out. Shorting bars are provided in the case to short the current transformer circuits. The latches are then released, and the relay unit can be easily drawn out. To replace the relay unit, the reverse order is followed.

A separate testing plug can be inserted in place of the connecting plug to test the relay in place on the panel either from its own source of current and voltage, or from other sources. Or, the relay unit can be drawn out and replaced by another which has been tested in the laboratory.

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 diagrams are shown in Fig. 16 and 17.

CONNECTIONS

Internal connection diagrams for the various relay types are shown in Figs. 9 to 15 inclusive Typical wiring diagrams are given in Figs. 6 to 8 inclusive.

One of the mounting studs or screws should be permanently grounded by a conductor not less than No. 12 B&S gage copper wire or its equivalent.

External means should be provided to open the rotonoid coil circuit after the relay has operated.

ADJUSTMENTS

The relays are adjusted at the factory and it is advisable not to disturb the adjustments. If, for any reason, they have been disturbed, the following points should be observed in restoring them.

CAUTION: When the time scale is rotated manually it should only be turned far enough so the second cam clears its contact brush.

1. The gap between the contact tips on each set of the timing unit contacts should be approximately 1/16 inch. Each contact brush should bear against its respective scraper brush.

2. When rotated, the insulated cams should touch the inner contact brush at the "V" only, but high enough on the "V" to insure 1/64 inch wipe on the outer contact brush. These cams should not extend beyond the edge of their respective contact brush.

3. With the pointer of the rear insulated cam set for 3.0 seconds on the scale, this cam should rotate far enough beyond the apex of the "V" in the contact brush to allow the contacts to reopen when the timing unit is fully operated.

4. There should be at least 1/32 inch clearance between the time scale assembly and the front mounting plate.

5. The stop arm of the time scale assembly should always rest against the stop post in the front mounting plate with the relay de-energized.

6. There should be no binding between the gear on the main shaft and the pinion on the magnetic damping element shaft.

CIRCUIT RESISTANCE TABLE

Internal Connections	Volts	Resistance				
		TU	R_1	TX	R_2	R_3
Fig. 10 Fig. 13	250	100	300	$\frac{3700}{500}$	2500	$\frac{1200}{2500}$ *
Fig. 10 Fig. 13	220	100	250	$\frac{3000}{550}$	3000	$\frac{1000}{2000}$ *
Fig. 9 Fig. 12	125	100	100	$\frac{3700}{500}$	1200	None
Fig. 9 Fig. 12	110	100	75	$\frac{3000}{550}$	1000	None
Fig. 10 Fig. 13	48	7	13.5	$\frac{340}{130}$	95	$\frac{45}{95}$ *
Fig. 11	32	7	6	$\frac{340}{130}$	95	100
Fig. 9 Fig. 12	24	7	3	$\frac{340}{130}$	45	None
Fig. 14	250	100	300	5000	None	5000
Fig. 14	220	100	250	5000	None	5000
Fig. 15	125	100	100	5000	None	None
Fig. 15	110	100	75	5000	None	None
Fig. 14	48	7	13.5	200	None	200
Fig. 15	24	7	3	200	None	None

*Tapped Resistor $\left[\frac{1200}{2500}\right]$ – 1200 Series Section; 2500 Parallels High Resistance Section of TX

7. The pawl of the ratchet assembly on the magnetic damping element shaft remains engaged to the same tooth when the time scale is rotated from zero on the three second mark and should allow the gear to slip when the scale is released.

8. The flexible stop arm at the rear of the main shaft should clear the supporting bracket by at least 1/32 inch.

9. With the operating magnet in either the de-energized or the fully operated position, the driving arm should clear the cut-out section of the main shaft supporting bracket by at least 1/32 inch.

10. The driving arm assembly should clear the rear mounting plate by at least 1/32 inch.

11. In the de-energized position, the armature of the operating magnet or rotonoid should rest firmly on the leaf spring which should lay flat against the upper section of the rotonoid frame.

12. There should be at least 1/64 inch clearance between the reset spring collet and the rear bearing of the rotonoid.

13. The time of operation for any scale setting may be varied by sliding the copper cylinder forward or backward on its shaft or turning the driving spring collet on its shaft. Be sure to tighten the set screw after adjustments have been made.

14. With the rotonoid de-energized, the reset spring is prewound approximately one-half revolution and the driving spring is prewound approximately three-fourths of a turn.

TIME CALIBRATION

To check the time calibration, connect the Type RPM11A or RPM11B relays as shown in Figure 4 and the Type RPM13A relay as shown in Figure 5. In testing the Type RPM11A or RPM11B relays which have no seal-in unit, the clock will be stopped only momentarily and the reading must be made at that instant since the timing unit contacts are closed only 0.15 seconds. A fast operating self scaling auxiliary relay energized through the timing unit contacts may be used to stop the clock.

Set the pointers of the front and rear insulated cams so that the notched edge coincides with the desired calibration marks on the scale. Check the time by closing S_1, then read the time when the clock stops momentarily when testing the Type RPM11A and RPM11B relays or comes to a definite stop when testing the Type RPM13A relay.

If necessary, the time calibration may be corrected by sliding the copper cylinder forward or backward on the magnetic damping element shaft or by turning the driving spring collet on its shaft.

Moving the copper cylinder forward decreases the time delay and moving it backward increases the time delay. Never move the copper cylinder backward enough to strike the bottom plate of damping magnet element.

Turning the driving spring collet in a counter-clockwise direction (front view) decreases the time delay and in a clockwise direction increases the time delay.

MAINTENANCE

CONTACT CLEANING

For 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. The flexibility of the tool insures the cleaning of the actual points of contact. Sometimes an ordinary file cannot reach the actual points of contact because of some obstruction from some other part of the relay.

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 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.

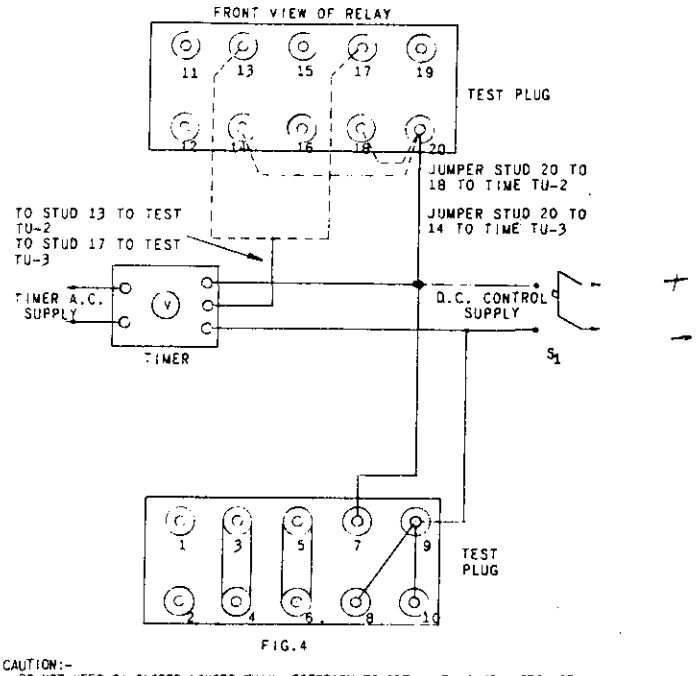
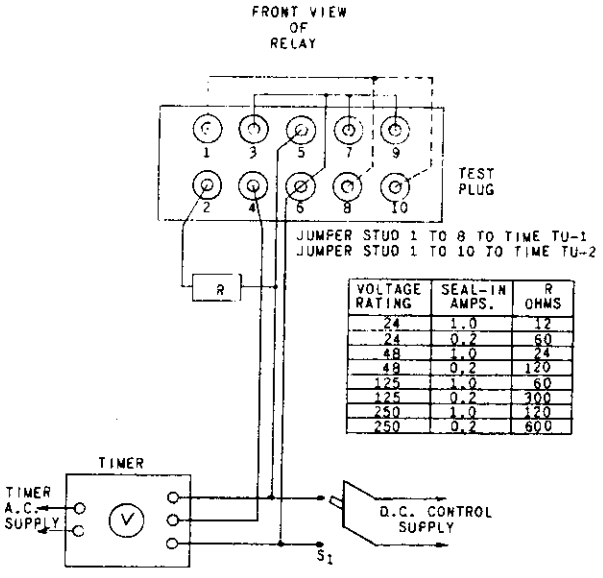


FIG.4

CAUTION:-
DO NOT KEEP S1 CLOSED LONGER THAN NECESSARY TO OBTAIN TIME TEST, BECAUSE OF THE SHORT TIME RATING OF THE ROTONOID.

Fig. 4 (377A130)

Fig. 4 Test Connections For Type RPM11A And RPM11B Relays (Front View)



VOLTAGE RATING	SEAL-IN AMPS.	R OHMS
24	1.0	12
24	0.2	60
48	1.0	24
48	0.2	120
125	1.0	60
125	0.2	300
250	1.0	120
250	0.2	600

FIG.5

CAUTION:- DO NOT KEEP S_1 CLOSED LONGER THAN NECESSARY TO OBTAIN TIME TEST, BECAUSE OF THE SHORT TIME RATING OF THE ROTONOID.

Fig. 5 (377A129)

Fig. 5 Test Connections For Type RPM13A Relay (Front View)

DEVICE FUNCTION NUMBERS	
21	TYPE GCX17A DIRECTIONAL DISTANCE RELAY
52	CIRCUIT BREAKER
62	TYPE RPM11A TIMING RELAY
a	AUXILIARY CONTACT, CLOSED WHEN BREAKER IS CLOSED
M	MHO UNIT (DIRECTIONAL AND THIRD ZONE)
O	OHM UNIT (FIRST AND SECOND ZONES)
OX	OHM UNIT TRANSFER AUXILIARY
POL	POLARIZING COIL
POT	POTENTIAL COIL
RC	RESTRAINT COIL
S	AUXILIARY COORDINATING ELEMENT
ST	SEAL IN
T_1, T_2 & T_3	TARGETS
TAR	TARGETS
TC	TRIP COIL
TU	TIMING UNIT
TU_2 & TU_3	TIMING UNIT CONTACTS
TX	AUXILIARY FOR TIMING UNIT

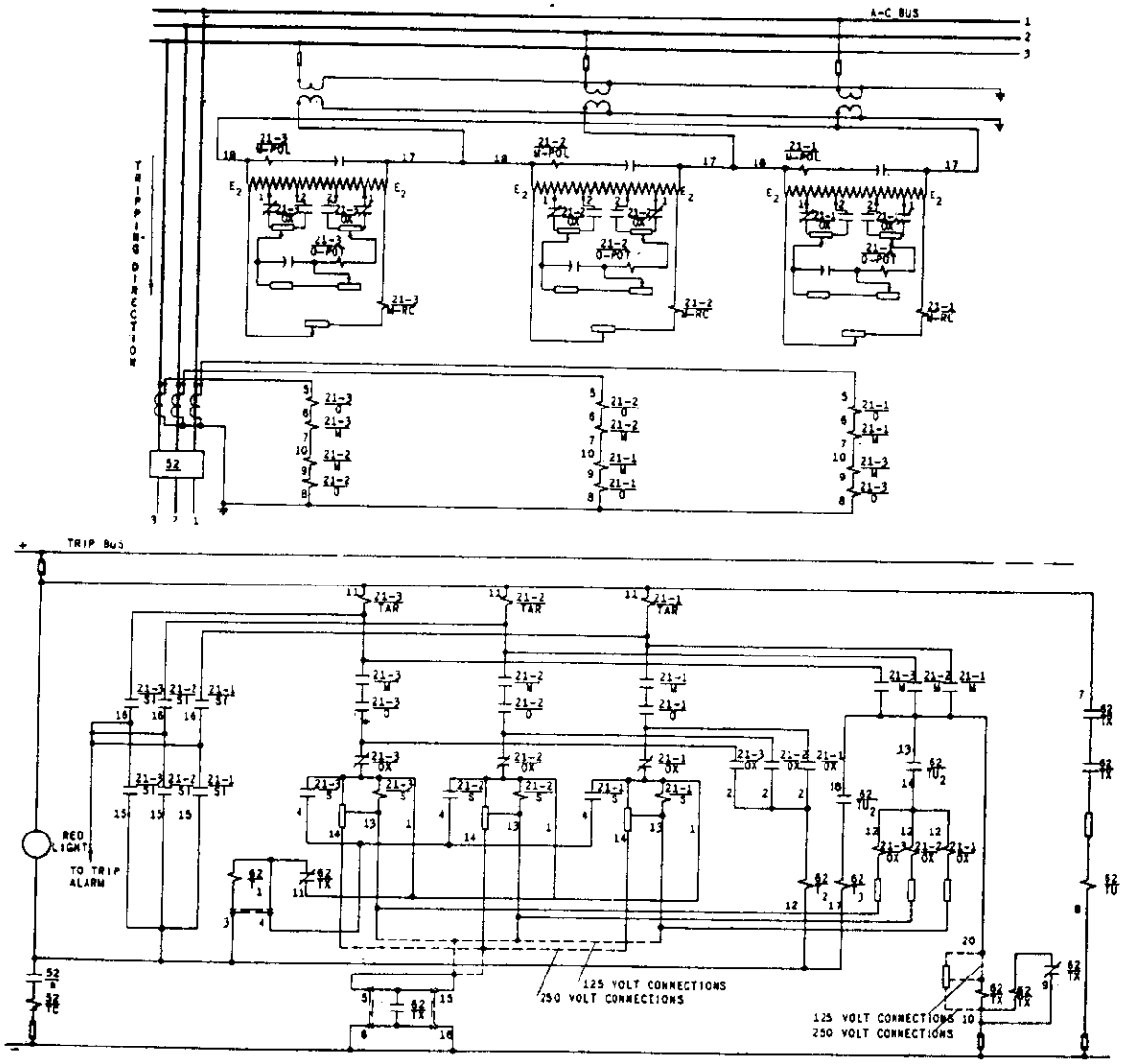


Fig. 6 Typical Elementary Diagram for Type RPM11A Relay

DEVICE FUNCTION NUMBERS	
21	TYPE GCX17A DIRECTIONAL DISTANCE RELAY
52	CIRCUIT BREAKER
62	TYPE RPM11B TIMING RELAY
a	AUXILIARY CONTACT, CLOSED WHEN BREAKER IS CLOSED
M	MHO UNIT (DIRECTIONAL AND THIRD ZONE)
O	OHM UNIT (FIRST AND SECOND ZONES)
OX	OHM UNIT TRANSFER AUXILIARY
POL	POLARIZING COIL
POT	POTENTIAL COIL
RC	RESTRAINT COIL
S	AUXILIARY COORDINATING ELEMENT
SI	SEAL-IN
1, 2 & 3	TARGETS
TAR	TARGET
TC	TRIP COIL
TU	TIMING UNIT
TU_2 & TU_3	TIMING UNIT CONTACTS
TX	AUXILIARY FOR TIMING UNIT

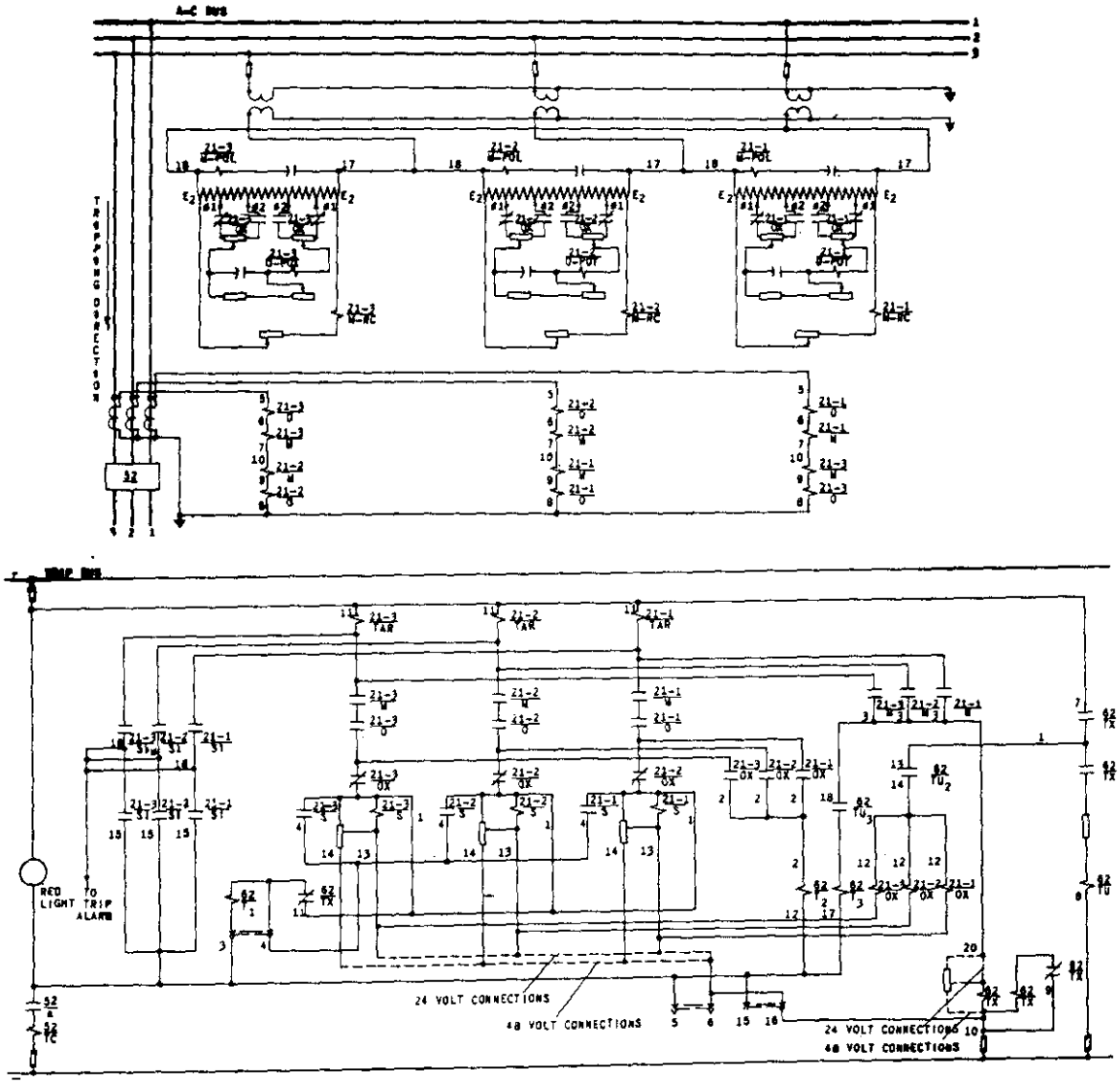
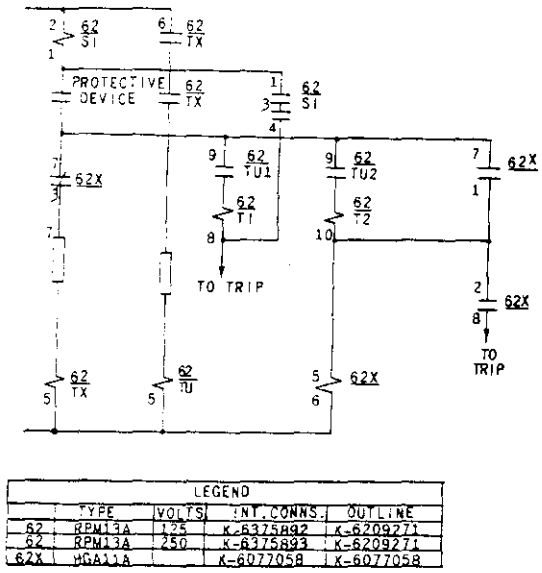


Fig. 7 Typical Elementary Diagram for Type RPM11B Relay

Fig. 7 (P-0229021)



LEGEND				
	TYPE	VOLTS	INT. CONNS.	OUTLINE
62	RPM13A	125	K-6375892	K-6209271
62	RPM13A	250	K-6375893	K-6209271
62X	HGA11A		K-6077058	K-6077058

* Fig. 8 Typical Elementary Diagram For Type RPM13A Relay

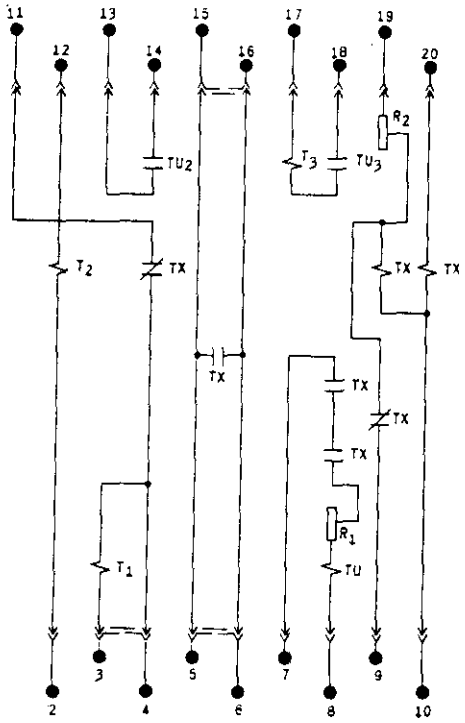


Fig. 9 Internal Connections For Type RPM11A Relay (Front View) For 24, 110 And 125 Volts d-c Rating

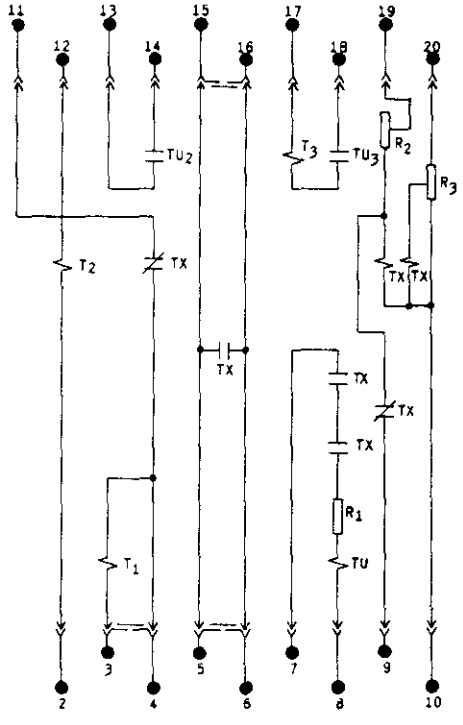


Fig. 10 Internal Connections For Type RPM11A Relay (Front View) For 48, 220 And 250 Volts d-c Rating

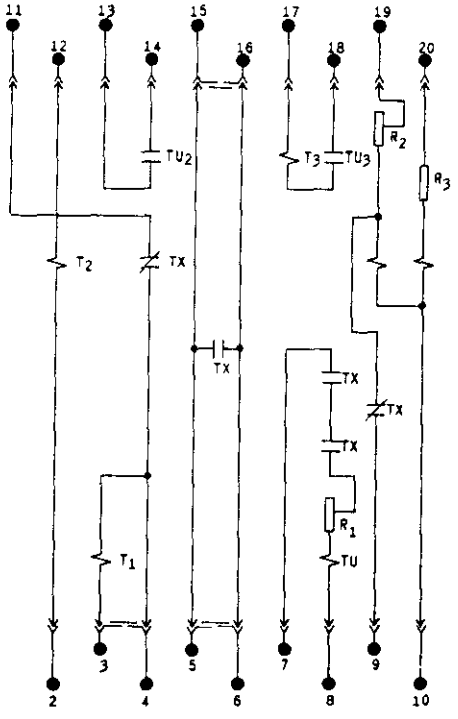


Fig. 11 Internal Connections For Type RPM11A Relay (Front View) For 32 Volts d-c Rating

* Change since last revision.

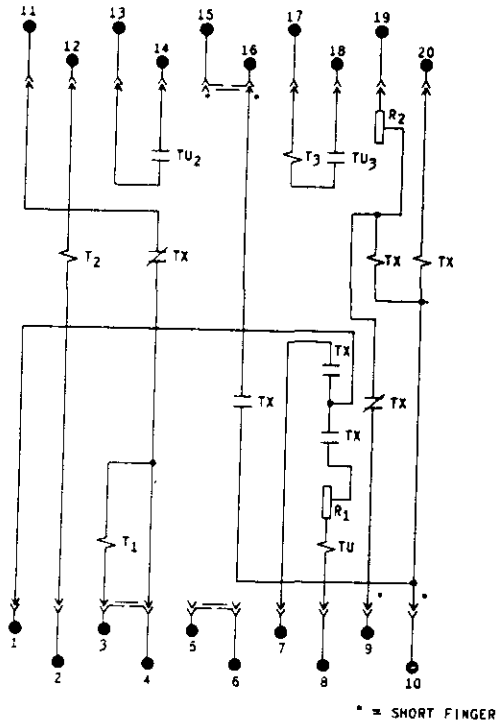


Fig. 12 Internal Connections For Type RPM11B Relay (Front View) For 24, 110 And 125 Volts d-c Rating

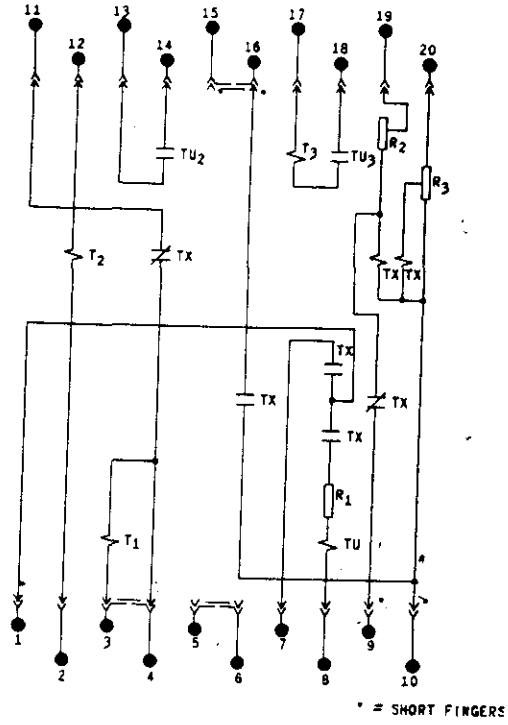


Fig. 13 Internal Connections For Type RPM11B Relay (Front View) For 48, 220 And 250 Volts d-c Rating

VOLTS	RESISTANCE			
	TX	RS	TU	RI
250	5000	5000	100	300
48	200	200	7	13.5
220	5000	5000	100	250
32	200	70	7	8

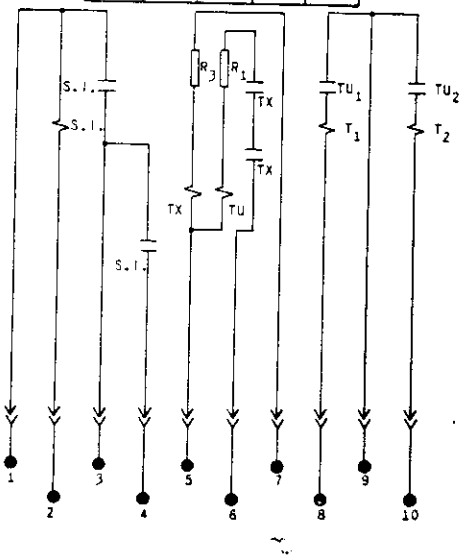


Fig. 14 Internal Connections For Type RPM13A Relay (Front View) For 48, 220 And 250 Volts d-c Rating

VOLTS	RESISTANCE		
	TX	TU	RI
125	5000	100	100
110	5000	100	75
24	200	7	3

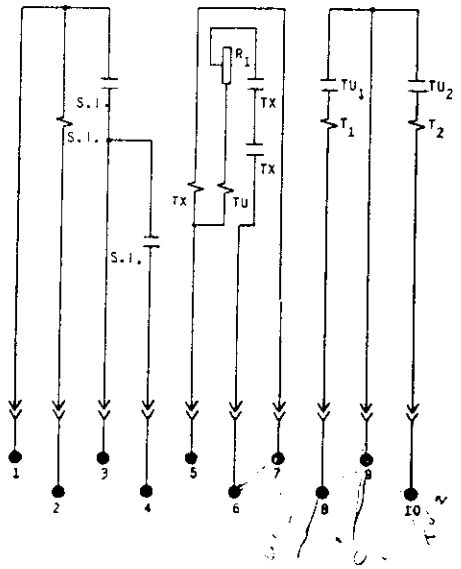


Fig. 15 Internal Connections For Type RPM13A Relay (Front View) For 24, 110 And 125 Volts d-c Rating

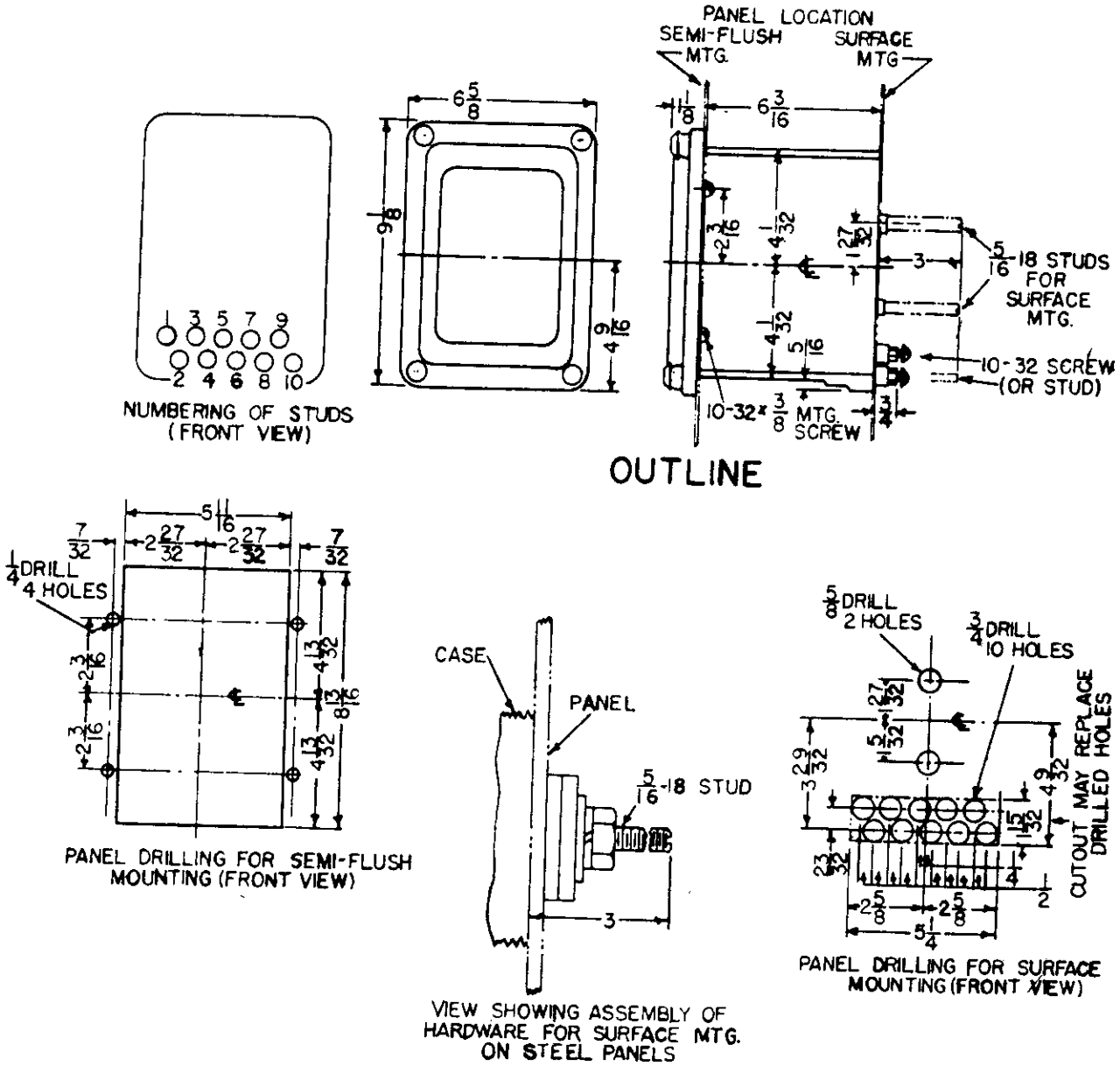


Fig. 17 (K-6209271)

Fig. 17 Outline and Panel Drilling Dimensions for Type RPM13A Relay