



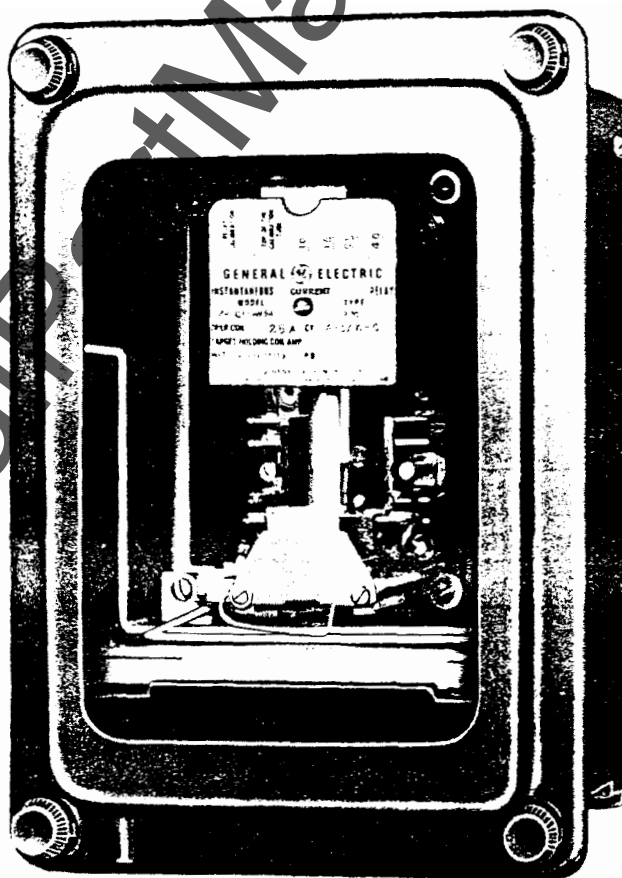
INSTRUCTIONS

GEI-28803B
SUPERSEDES GEI-28803A

INSTANTANEOUS OVERCURRENT RELAYS

Types

PJC11M	PJC12N
PJC11X	PJC12R
PJC11Z	PJC12U
PJC11AV	PJC13E
PJC11AW	PJC13H
PJC12D	PJC13J
PJC12E	PJC14C
PJC14E	



LOW VOLTAGE SWITCHGEAR DEPARTMENT

GENERAL  **ELECTRIC**

PHILADELPHIA, PA.

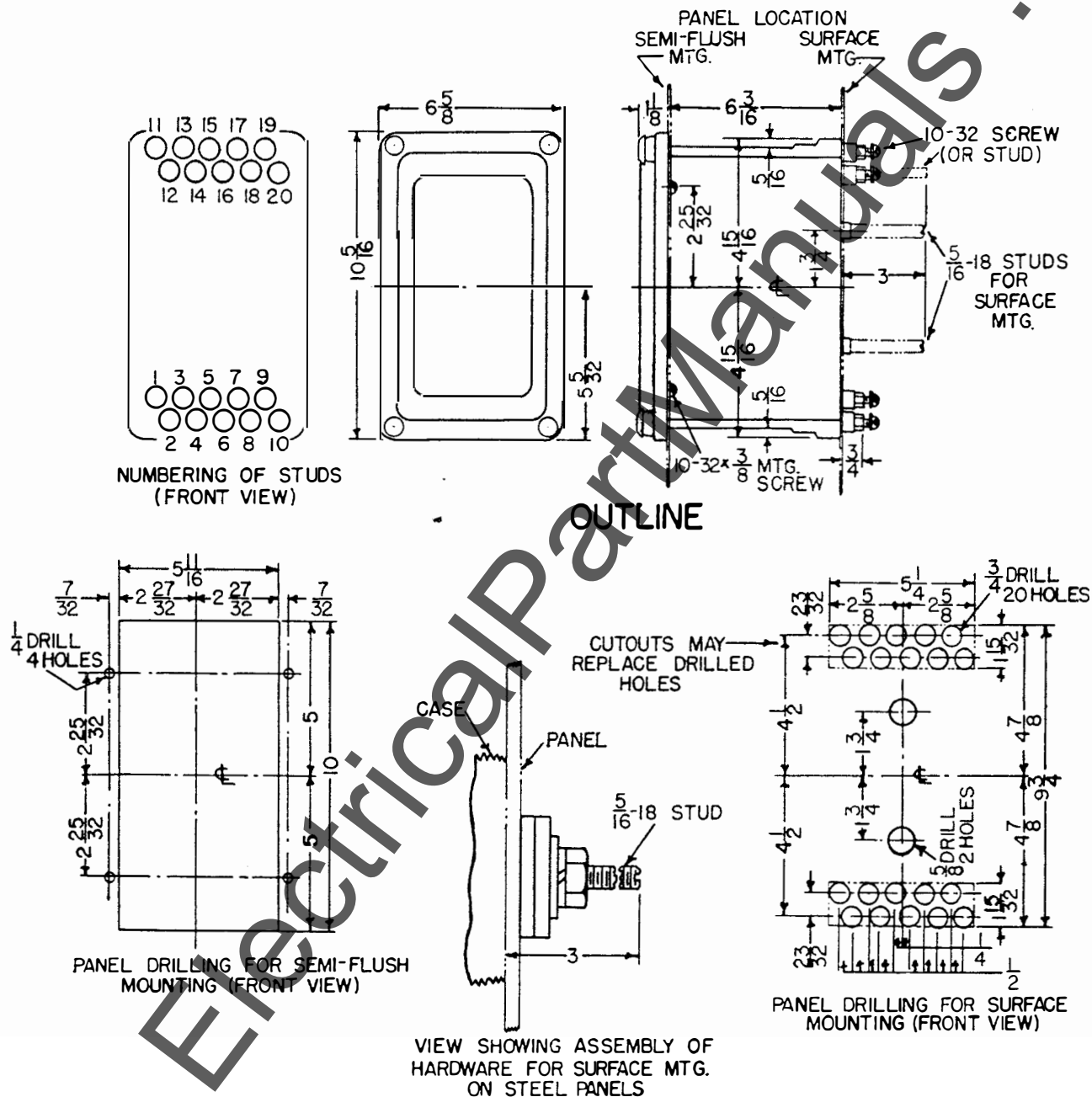


Fig. 13 Outline and Panel Drilling Dimensions for Size S2 Case

Fig. 14 (K-6209273)

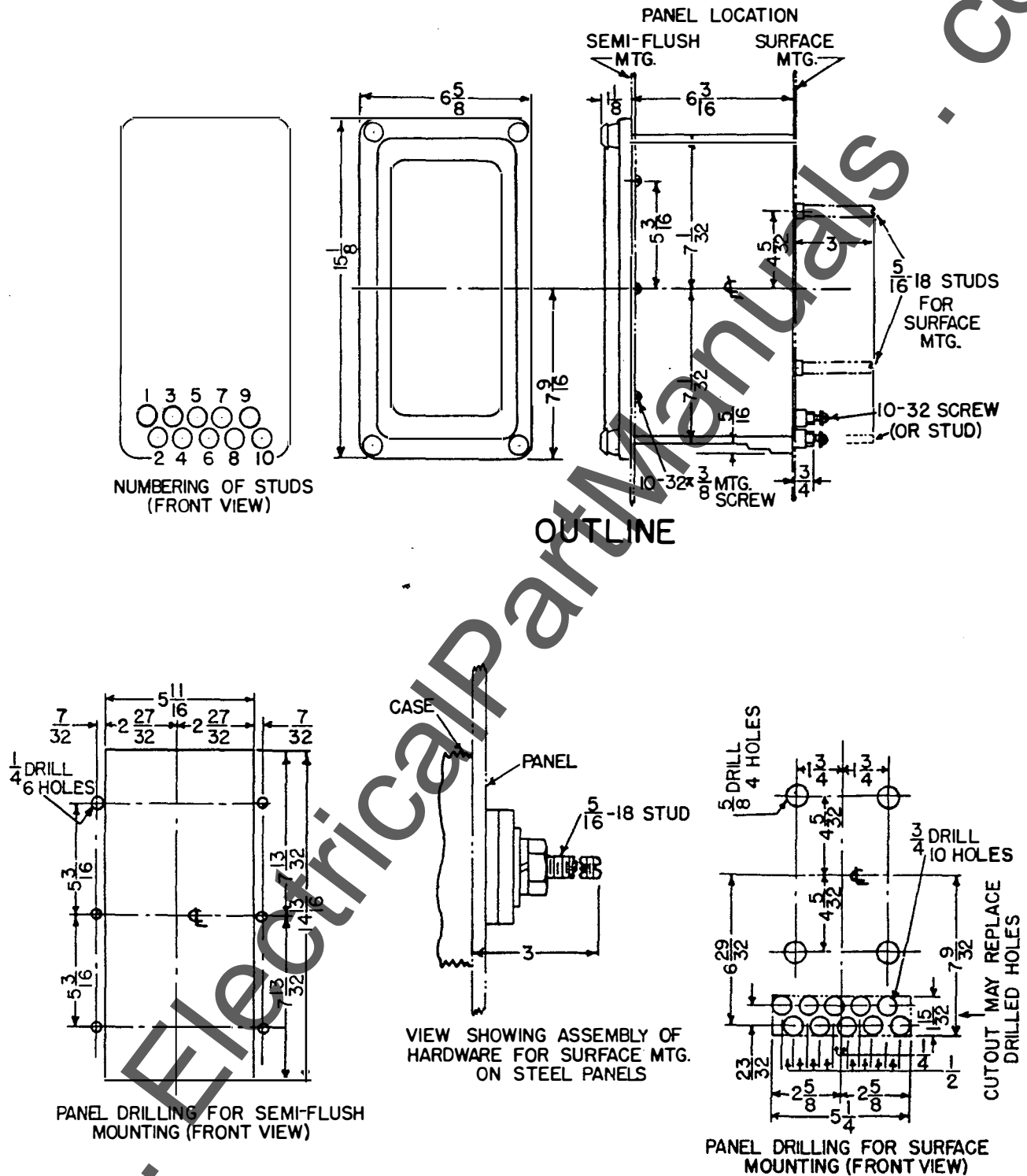


Fig. 14 Outline and Panel Drilling Dimensions for Size M1 Case

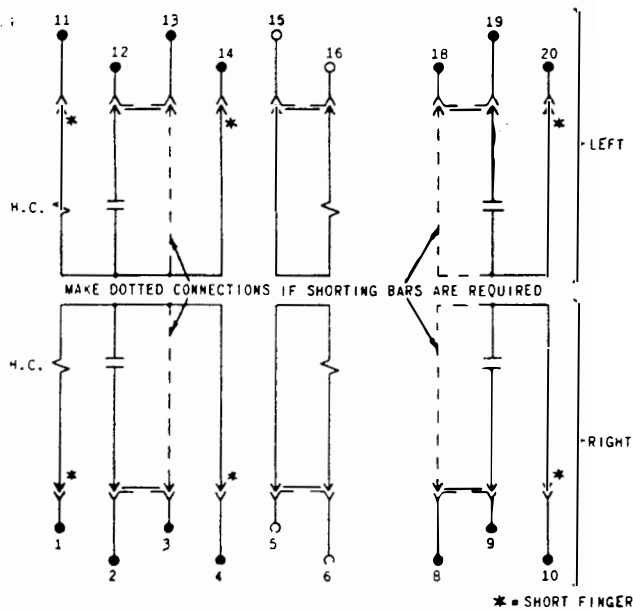


Fig. 8 Internal Connections for Type PJC13H Relay (Front View)

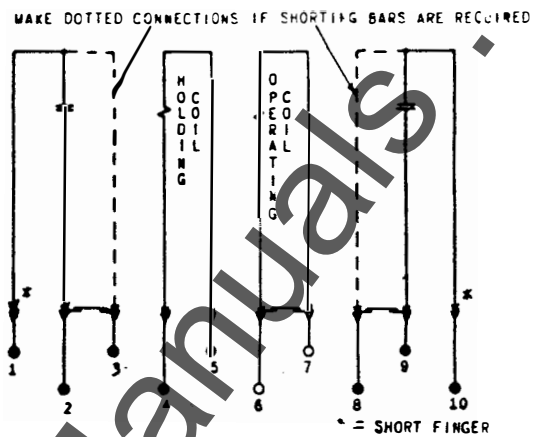


Fig. 9 Internal Connections for Type PJC13J Relay (Front View)

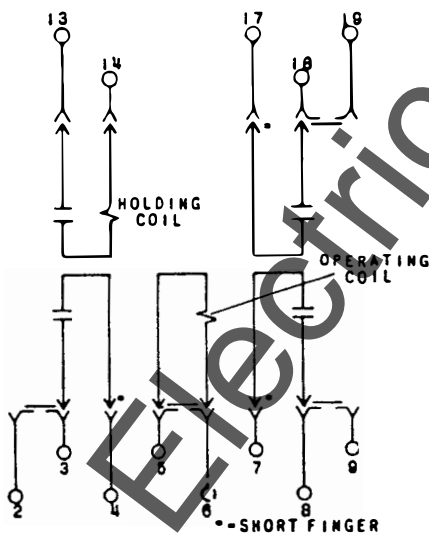


Fig. 10 Internal Connections for Type PJC14E Relay (Front View)

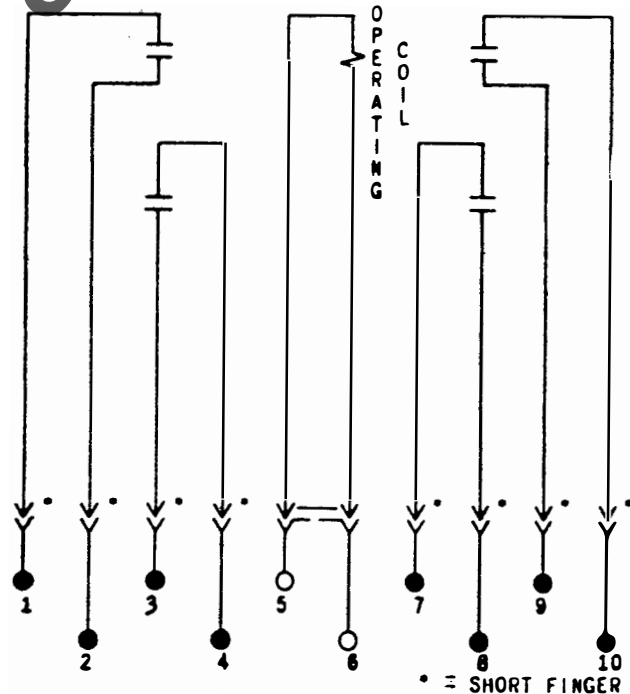


Fig. 11 Internal Connections for Type PJC14C Relay (Front View)

Fig. 8 (K-6375601)

Fig. 9 (K-6375829)

Fig. 10 (K-6556533)

Fig. 11 (K-6400542)

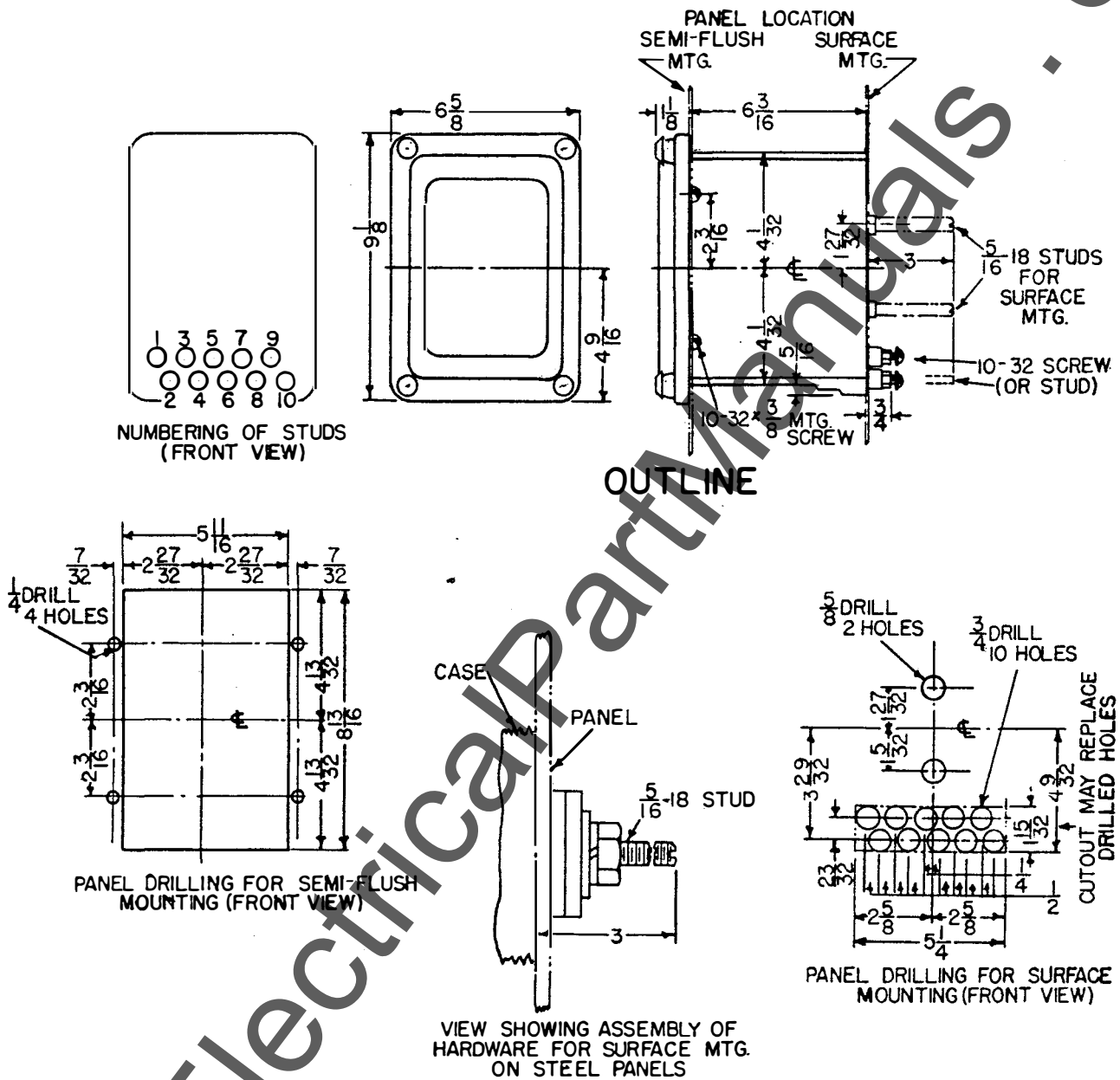


Fig. 12 Outline and Panel Drilling Dimensions for Size SI Case

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, specifying the quantity required and describing the parts by catalogue numbers as shown in Renewal Parts Bulletin No. GEF-3333.

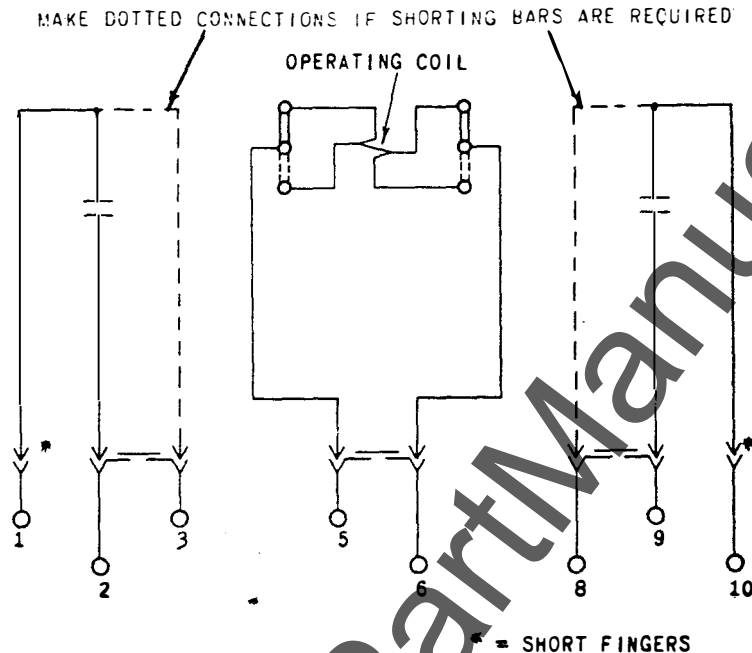


Fig. 2 Internal Connections for Type PJC11M and Type PJC12E Relays (Front View)

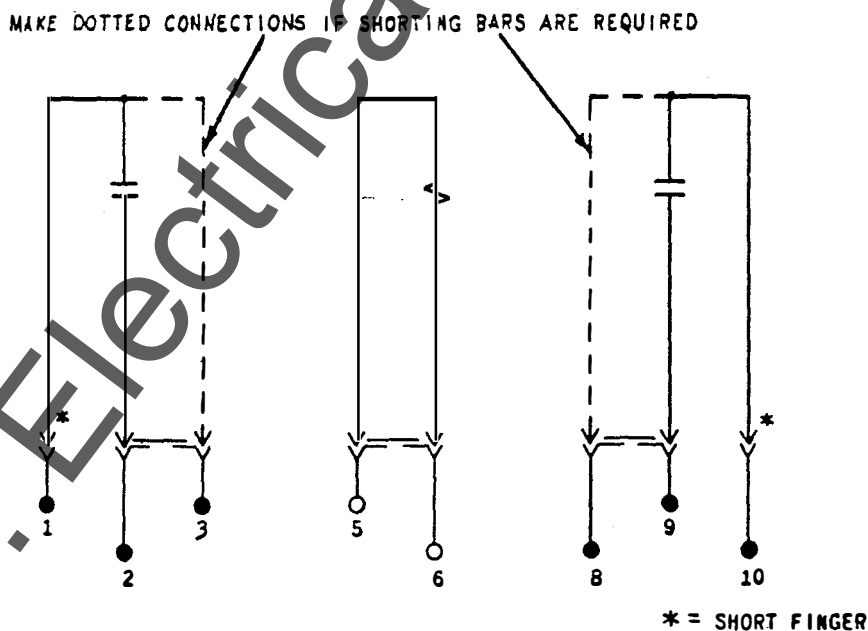


Fig. 3 Internal Connections for Type PJC11AV and Type PJC12D Relays (Front View)

Fig. 2 (K-6209009)

Fig. 3 (K-6375600)

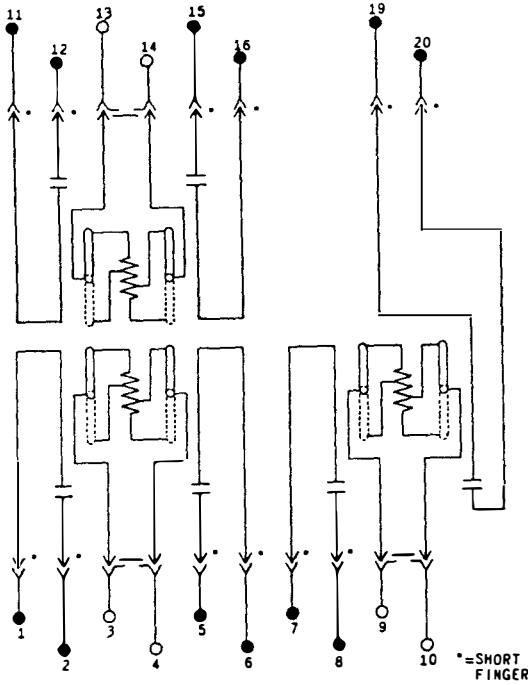


Fig. 4 Internal Connections for Type PJC11X Relay (Front View) *

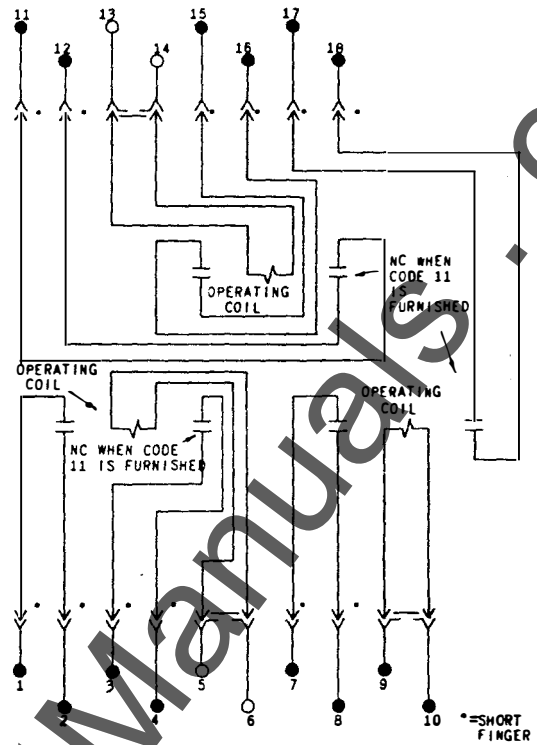


Fig. 5 Internal Connections for Type PJC11Z and Type PJC12R Relays (Front View)

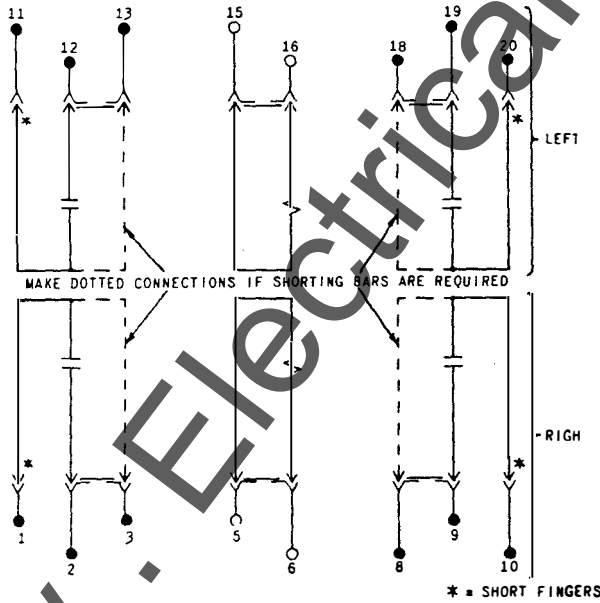


Fig. 6 * Internal Connections for Type PJC11AW, PJC12N and PJC12U Relays (Front View)

* Denotes change from superseded book

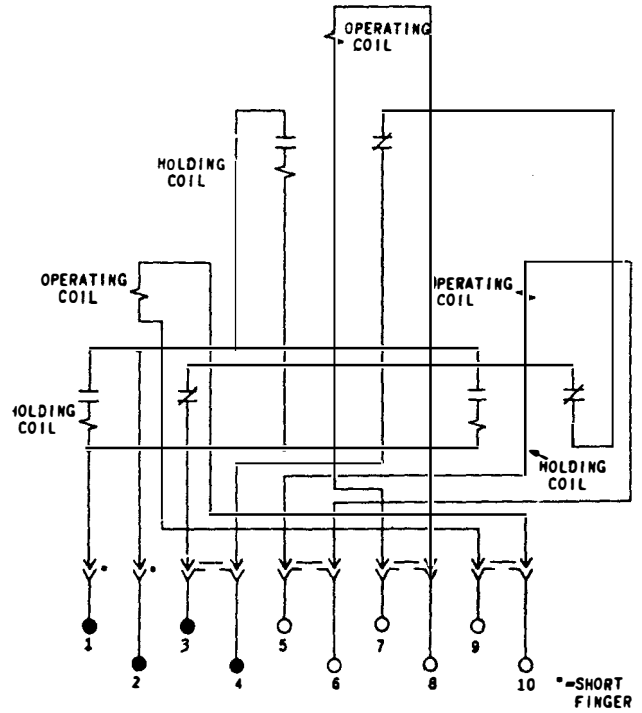


Fig. 7 Internal Connections for Type PJC13E Relay (Front View)

DESCRIPTION

The Type PJC relays consist of one or more units mounted in a metal case. The units are of the plunger type and have an adjustable pick-up current range. The moving contacts are fastened to a * Textolite contact barrier which is molded to the plunger rod. The armature assembly is positioned by a calibrating tube which is assembled to a magnet frame. These parts, including a coil, pole-piece, stationary contacts and a target, are assembled on a molded * Textolite base. In some units, there is an additional coil mounted on the magnet frame which is part of a hinged-armature element. The coil performs an electrical holding function, keeping the plunger-rod assembly and the target in the operated position until the holding coil is de-energized.

The types of relays summarized in Table I have any of a combination of the following features; one or more relay units, two or four contacts, with or without a mechanical target, electrical target and holding, self or hand reset of contacts and coils with or without taps.

All targets are provided with external reset buttons, which also reset the contacts of hand-reset types of relays.

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.

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 block. 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 drilling diagrams are referred to in Table I.

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.

CONNECTIONS

The internal connection diagrams for the various relays are referred to in Table I.

All relays, except those having three units, are provided with shorting bars on the individual contacts and operating coils. The shorting bars on the coils are required to prevent opening the secondary of the current transformer when the connection plug is withdrawn. The shorting bars on the contacts are arranged to be optional and an internal connection lead is provided to make the extra connection. For example, Fig. 2, for the Type PJC11M relay shows that one end of the connection lead on terminal 3 can be connected to terminal 1. Then, if terminals 2 and 3 are used, the contacts will be shorted out when the plug is removed. When terminals 1 and 2 are used, the connections from terminals 1 to 3 should be removed.

ADJUSTMENTS

The relays have been adjusted at the factory; however, before they are put into operation, it is advisable to check each relay to be sure that the adjustments have not been disturbed. The following points should be observed in restoring them.

* Reg. Trade-Mark of General Electric Company

CONTACTS

The normal adjustment of contacts will give 3/64 inch wipe. This may be adjusted by bending the contact stops which are located between the stationary contact springs and the ribs on the molded base. The bend should be made about 1/4 inch from the front tip of the stop. A change in wipe on the normally-closed contacts affects the pickup for a given armature setting in the de-energized position. A decrease in wipe will increase the pickup and an increase in wipe will decrease the pick-up value. The normal wipe should not be exceeded since this produces excessive creeping of the armature below the pick-up value of the relay. Another undesirable effect is reduction of contact gap.

The contact pressure at the maximum pick-up or drop-out positions may be adjusted by bending the stationary-contact springs, near the part attached to the base. This adjustment may change the contact gap and contact wipe slightly. Adjustment of the contact stops within the normal range, does not affect the contact pressure at the maximum pick-up or drop-out positions, as the contact

springs are separated from the stops in these positions.

When there is one normally-open and one normally-closed contact, the initial tension should be adjusted for 15 grams, measured at the contact tip. If there are two normally-open or two normally-closed contacts, the initial tension must be reduced to 5 grams.

AUXILIARY HOLDING UNIT

The holding unit is normally adjusted to keep the plunger in the operated position after the main coil has been de-energized. If adjustment is required, the polepiece, while in the operated position, should be set so that approximately 1/32 inch gap is between its end and the surface of the armature. The slotted end of the polepiece is accessible through a hole in the top of the magnet frame. The locknut provided should be tightened after the proper setting has been obtained. The holding unit should operate at 80 per cent of its rating. If a target is provided, it should operate and be in full view when the holding coil is energized.

OPERATION

In these types of relays, the moving contacts are operated directly by the plunger assembly. For models provided with an electrical target, the target has no mechanical relation with the plunger assembly; instead, it is lifted by the armature of the auxiliary element. All targets, regardless if mechanical or electrical, when lifted, rise from behind the target shield to a position where the target face is visible. The target is latched up in the exposed position until reset by hand.

The electrical holding of a target is provided by an auxiliary armature holding up the plunger assembly when the auxiliary coil is energized. It is not intended to lift the plunger from the de-energized position.

Hand-reset contact action is made possible by passing the target wires through the two pins located at the bottom of the plunger rod. When the plunger armature is attracted upward, the target

is lifted and is held by the target latch. The top target pin prevents the plunger rod from dropping until the latch is disturbed by the manual movement of the reset button on the relay cover.

SETTING

Any desired setting, within the calibrating ranges may be obtained by turning the armature on the plunger rod. The armature is provided with an internal locking spring which requires no adjustments.

For relays with tapped coils, the pickup depends on the tap connection as well as the armature setting. The pick-up value for these relays is given on the nameplate. The pick-up values for all Type PJC relays are given on the nameplate. This is the value at which the relay will just pick-up and close its "a" contacts if the armature is adjusted to the calibrating mark in the de-energized position.

MAINTENANCE

PERIODIC INSPECTION

The relays should be inspected at least once every six months. When checking the relay, it is advisable to keep in mind the points covered under ADJUSTMENTS.

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.

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.

TABLE I *

Type	No. of Relay Units	Contacts Each Unit		Target M Mech. F Elec. O None	Reset H Hand S Self	Coil Taps	Holding Coil	Size of Case	Outline & Panel Drilling Figs.	Int. Conn. Figs.
		No.	Code							
PJC11M	1	2	all	M	S	X	-	S1	12	2
PJC11X	3	2	all	M	S	X	-	M2	15	4
PJC11Z	3	2	all	M	S	-	-	M2	15	5
PJC11AV	1	2	all	M-O	S	-	-	S1	12	3
PJC11AW	2	2	all	M-O	S	-	-	S2	13	6
PJC12D	1	2	all	M	H	-	-	S1	12	3
PJC12E	1	2	all	M	H	X	-	S1	12	2
PJC12N	2	2	all	M	H	-	-	S2	13	6
PJC12R	3	2	all	M	H	-	-	M2	15	4
PJC12U	2	2	all	M	‡ H - S	-	-	S2	13	6
PJC13E	3	2	all	E	S	-	X	M1	14	7
PJC13H	2	2	all	E	S	-	X	S2	13	8
PJC13J	1	2	all	E	S	-	X	S1	12	9
PJC14E	1	4	all	E	S	-	X	S2	13	10
PJC14C	1	4	all	M	S	-	-	S1	12	11

‡ Left unit, self reset; Right Unit, hand reset

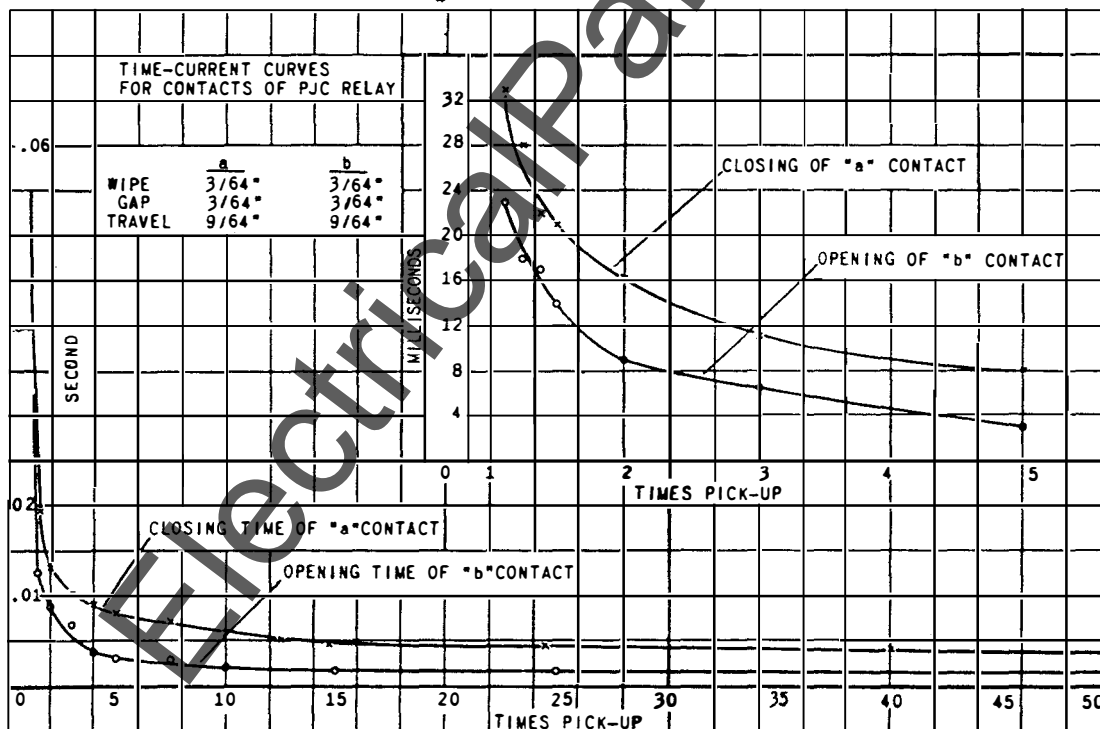


Fig. 1 Typical Time-Current Curves For The Contacts Of Type PJC Relays

* Denotes change from superseded book

INSTANTANEOUS OVERCURRENT RELAYS TYPE PJC

INTRODUCTION

APPLICATION

The Type PJC plunger relays are designed for general service. These relays are non-directional and instantaneous when in operation.

The Type PJC relay is normally used for over-current protection of feeder circuits; they can also be used for various current control functions. When these relays are used in conjunction with thermal or time-overcurrent relays, they can be used to protect a motor against very high currents, since they will operate before the main relays respond. The a-c relays are applicable where continuous operation in the pick-up position is not required.

CHARACTERISTICS

Characteristic time-current curves are shown in Fig. 1.

The pickup of current relays without taps is adjustable from 1/3 to 1-1/3 of the continuous rating up to and including the 12 ampere rating. The calibration ranges of the tapped coil and higher current relays are listed in the table under BURDENS.

The contacts reset at approximately 90 to 95 per cent of the pickup on a-c circuits when using the contact arrangement of one normally-open contact and one normally-closed contact. For d-c circuits, the dropout is 60 to 90 per cent of the pick-up current. These values are not adjustable; however, a slight change could be made by varying the contact pressures (refer to ADJUSTMENTS).

RATINGS

CONTACTS

The carrying rating of the contacts is 5 amperes continuously or 30 amperes for tripping. The interrupting ratings of the contacts are as follows:

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 unpack-

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.

TABLE II

V A	D-C				A-C		
	24 5	125 2	125 1	250 0.3	115 5	230 2	460 1

COILS

The ratings of the standard coils are listed below. These coils are suitable for d-c and frequencies from 25 to 60 cycles.

Tapped: 5 and 10 amperes

Untapped: 1.5, 3, 6, 12 and 25 amperes

OPERATING COILS

TABLE III

Rated Amps	Cal. Range	VA at 5 amps 60 cycles	W at 5 amps 60 cycles	W at 5 amps d-c
1.5	0.5-2	165	55	24
3	1-4	41	12.7	6
5	2-50	9.6	5.3	1.98
6	2-8	11.5	3.56	1.6
10	4-100	2.65	0.8	0.43
12	4-16	2.65	0.8	0.43
25	10-40	0.4	0.125	0.08
25	20-80	0.1	0.03	0.056
25	40-160	0.025	0.008	0.025

VA and W in the drop-out position, with pickup current applied on the minimum pick-up setting at 60 cycles, are approximately 1.7 and 0.6, respectively.

AUXILIARY COILS

The resistance of the 0.2 ampere and one ampere coils are 6.1 and 0.24 ohms, respectively.

ing 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.

