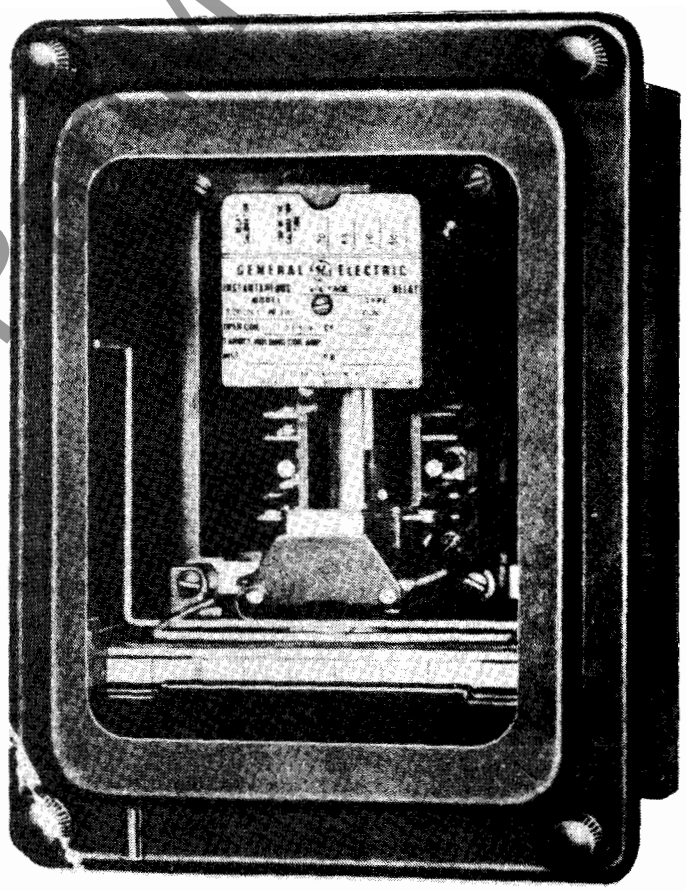
INSTRUCTIONS

GEI-31094J

INSTANTANEOUS OVERCURRENT AND VOLTAGE RELAYS



TYPES PJC and PJV IN DRAWOUT CASE

GENERAL ELECTRIC

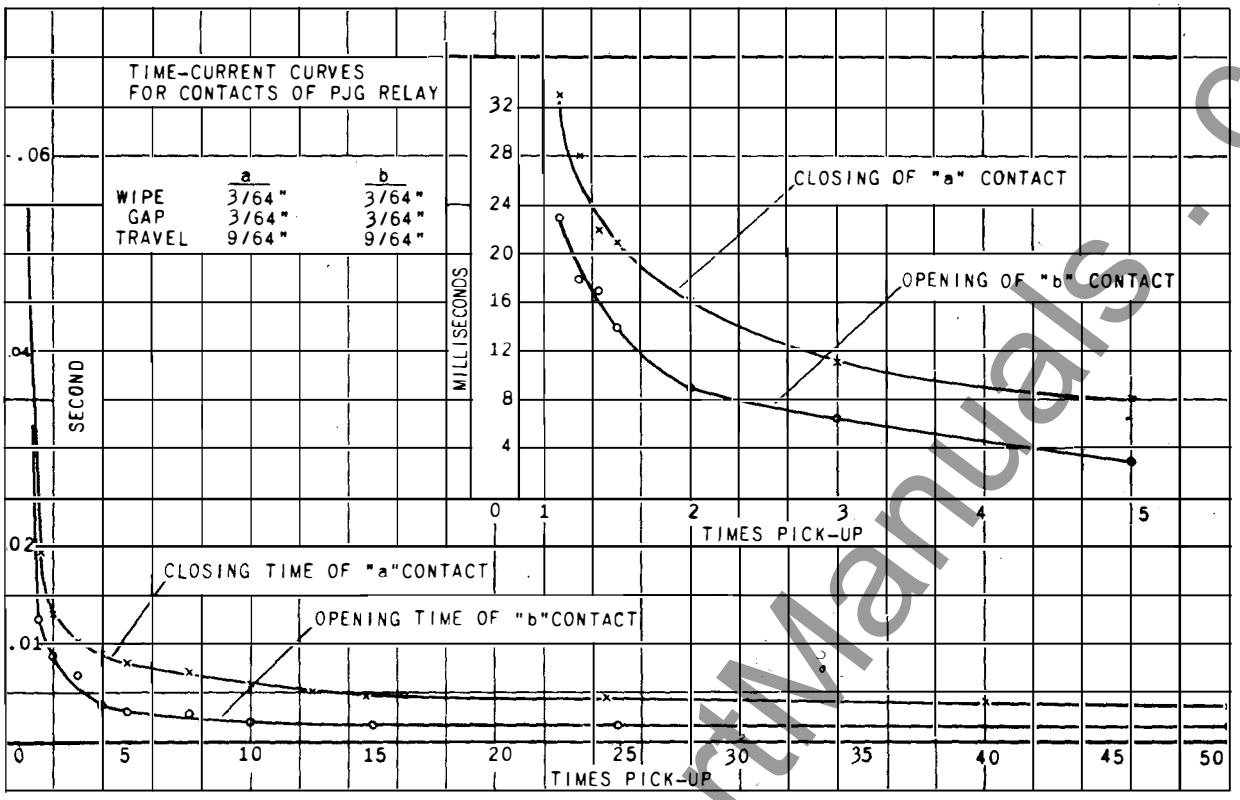


Fig. 1 Time-Current Curves For Type PJC Relays

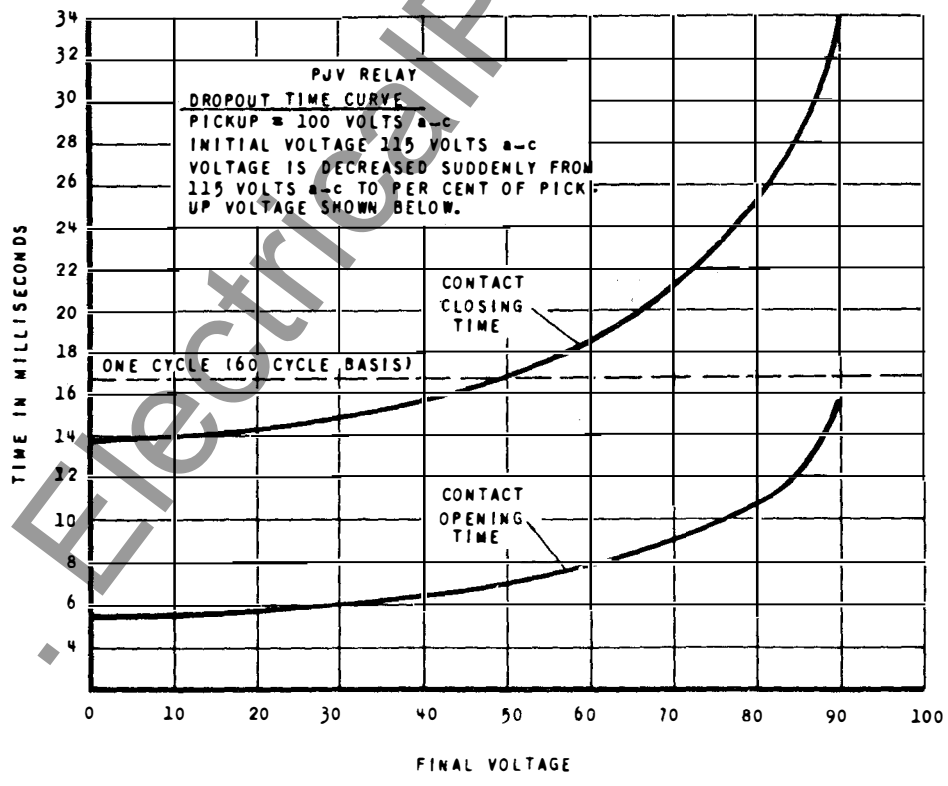


Fig. 2 Dropout-Time Curves For Type PJV Relay

INSTANTANEOUS OVERCURRENT AND VOLTAGE RELAYS

TYPES PJC AND PJV

INTRODUCTION

APPLICATION

* The Type PJC and Type PJV 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. When used in conjunction with thermal or time-overcurrent relays, it can be used to protect a motor against very high currents since it will operate before the main relays respond. The Type PJC relay is also used for other current-control functions. The a-c relays are applicable where continuous operation in the pick-up position is not required.

CHARACTERISTICS

The time-current and time-voltage curves are shown in Figs. 1, 2, and 3 respectively.

The pickup of the Type PJC relays without taps is 1/3 to 1-1/3 of the continuous rating, up to and including the 12 ampere rating. Refer to the data given under BURDENS for ratings higher than 12 amperes and tapped coils. The pickup of the Type PJV relays is adjustable from 61 to 139 per cent of rating.

The a-c dropout is approximately 90 to 95 per cent of pickup at any point within the calibrating range when using the contact arrangement of one "a" and one "b". The d-c dropout is 60 to 90 per cent of pickup.

RATINGS

COIL

Type PJC

Tapped - 5 and 10 amperes
Untapped - 1.5, 3, 6, 12 and 25 amperes, d-c or 25 to 60 cycles

Type PJV

Untapped - 115, 230 and 460 volts at 25, 50 or 60 cycles - 125, 250 volts, d-c

TARGET AND SEAL-IN UNIT

TABLE I

	2 Amp Tap	0.2 Amp Tap
Carry-Tripping Duty	30 Amps	5 Amps
Carry Continuously	3 Amps	0.3 Amps
D-C Resistance	0.13 Ohms	7 Ohms
Impedance (60 Cycles)	0.53 Ohms	52 Ohms

CONTACT

The carrying rating of the contacts is 5 amperes continuously or 30 amperes for tripping. The interrupting ratings of resistive loads are given in Table II.

TABLE II

	D-C				A-C		
V	24	48	125	250	115	230	460
A	5	2	1	0.3	5	2	1

BURDENS

CURRENT RELAYS

TABLE III

Rated Amps	Cal. Range	VA at 5 Amps 60 cyc.	W at 5 Amps 60 cyc.	W at 5 Amps d-c
1.5	0.5-2	165	55	31
3	1-4	41	12.7	7.6
5	2-50	9.6	5.3	1.98
6	2-8	11.5	3.56	2.0
10	4-100	2.65	0.8	0.5
12	4-16	2.65	0.8	0.53
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

Values are for minimum pick-up setting.

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

* DENOTES CHANGE SINCE SUPERSEDED ISSUE

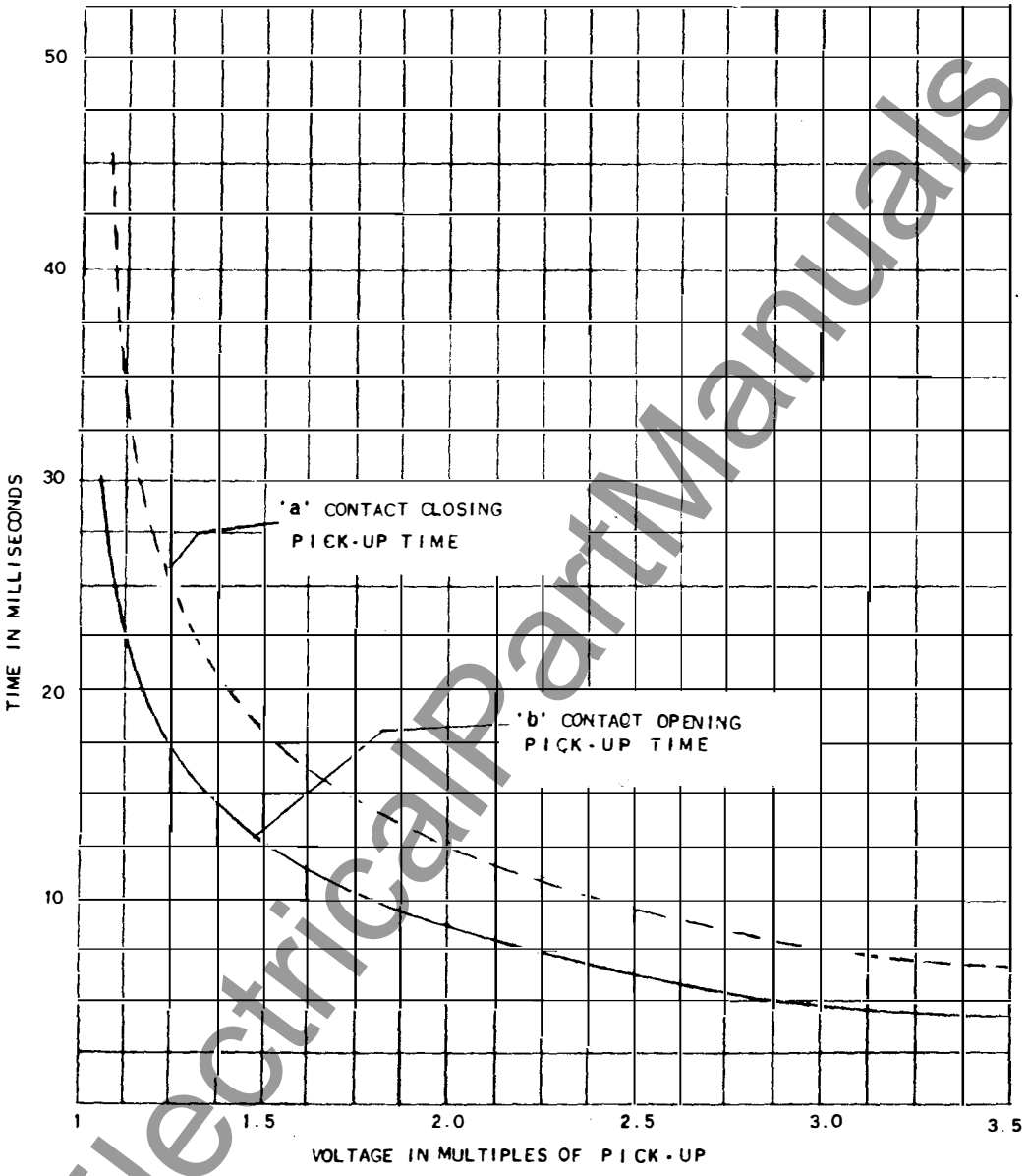


Fig. 3 (K-6154246-3)

Fig. 3 Time-Voltage Curves For Type PJV Relays (60 Cycles)

VOLTAGE RELAYS

TABLE IV

Ratings			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	1.9
125	d-c	50-160	-	-	-	5.1	5.1	5.1
250	d-c	100-320	-	-	-	5.0	5.0	5.0

A = at 115 volts with plunger set for pickup at minimum point of range.

B = at 115 volts with plunger set for pickup at 115 volts.

C = at 115 volts with plunger set for pickup at maximum point of range.

AUXILIARY COILS

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

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.

TABLE V

	Relay Model	No. Relay Units	Contact Code	No. Contacts Per Unit	Reset H-Hand S-Self	Holding	Target	Taps	Outline & P.D. Fig.	Int. Conn. Fig.	Size of Case
	PJC11E(-)A	2	11	2	S	0	M-O	No	23	5	S1
	11AD(-)A	4	20	2	S	0	M	No	26	6	M2
**	11AH(-)A	1	A11	2	S	0	O	No	23	7	S1
	11AL(-)A	2	20	2	S	0	M-O	Yes	23	8	S1
	11AR(-)A	2	11	2	S	0	M-O	No	23	9	S1
	11AX(-)A	2	11	2	S	0	M-O	Yes	23	10	S1
	12C(-)A	3	20	2	H	M	M	No	25	11	M1
	12F(-)A	3	11	2	H	M	M	No	25	12	M1
	12L(-)A	2	A11	2	H	M	M	No	23	5	S1
	12T(-)A	3	02	2	H	M	M	No	25	13	M1
	15C(-)A	3	13	4	S	0	M	No	26	14	M2
	15D(-)A	3	22	4	S	0	M	No	26	15	M2
	15E(-)A	3	40	4	S	0	△	No	26	16	M2
	15F(-)A	3	40	4	S	0	M	No	26	14A	M2
	16A(-)A	2	11 13	2 4	S	E	E	No	26 24	16 17	S2
	21A(-)A	1	20	2	S	0	†	No	23	18	S1
	PJV11W(-)A	1	A11	2	S	0	0	No	23	‡19	S1
	11AD(-)A	2	02	2	S	0	0	No	23	14	S1
	11AE(-)A	1	A11	2	S	0	0	No	23	21	S1
	14D(-)A	3	22	4	S	M	M	No	26	22	M2

‡ - External Conn. Fig. 4
† - Universal Target and Seal-in Unit - 0.2/2 amp. rating.
** - PJC11AH has a current dropout calibration.
△ - Universal Target without Seal-in Contacts

DESCRIPTION

The Type PJC and Type PJV relays consist of one or more units mounted in a drawout case. The units are of the plunger type with the armature, on a plunger rod, being adjustable to vary pickup. The moving contacts are fastened to a * Textolite contact carrier which is molded to the plunger rod. The armature assembly is positioned by a calibrating tube which is assembled to a magnet frame. All of 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 that performs an electrical holding function. All targets are provided with external reset buttons, which also reset the contacts of relays that are designed to be hand reset.

Table V itemizes the different features of the types of relays included in this book. The contact code indicates the different combinations that are available (pertaining to the one relay). The first digit indicates the number of circuit-closing contacts and the second digit indicates the number of circuit-opening contacts. When "All" is specified, it is meant that any possible combination can be obtained upon request.

Example:

To get a complete description of the Type PJC-11E relay, refer to Table V and you will find that this relay has two units, each unit having one circuit opening and one circuit-closing contact. The armature is self reset and a mechanical target can be had if required. The two units are mounted in a size S1 case, as shown in Fig. 24. The internal connections are shown in Fig. 5.

The Type PJC relays have current ratings and are calibrated in amperes. The Type PJV relays have voltage ratings and are calibrated in volts. The calibration ranges available are listed under BURDENS.

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. 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.

The outline and panel drilling diagrams are referred to in Table V.

CONNECTIONS

The internal connection diagrams for the various relays and the external connection diagram for the Type PJV11W relay were referred to in Table V.

ADJUSTMENTS

The relays have been adjusted at the factory; however, before the relays 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.

PICKUP

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

On relays with tapped coils, the pickup depends on the tap connection as well as the armature setting. For such relays, the pick-up value for a given calibrating mark and tap connection is given on the nameplate. On any model of Type PJC and Type PJV relays, the number associated with any given calibrating mark on the calibrating tube is found on the nameplate. This is the value at which the relay will just pick up and close its "a" contacts if the bottom of the armature is adjusted to the calibrating mark when in the de-energized position.

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 "b" contact affects the pickup for a given armature setting in the de-energized position. An increase in wipe on either the "a" or the "b" contacts decreases the contact gap and increases the difference between pick-up and drop-out points and vice-versa.

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.

* Reg. Trade-Mark of General Electric Company

Adjustments of 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.

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 excessible 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 percent of its rating. If a target is provided, it should operate and be in full view when the holding coil is energized.

OPERATION

In all models covered by these instructions, the moving contacts are operated directly by the plunger assembly.

On relays equipped with a mechanical target, the target is lifted by a cross-pin through the plunger rod. On relays equipped with an electrical target, the target has no mechanical relation with the plunger assembly; instead, it is lifted by the auxiliary armature. In either the mechanical or electrical types, when the target is lifted, arising from behind the target shield to a position where it is visible, it must be reset by hand.

Electric holding 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 provided by passing the target wires through the two pins in the bottom of the plunger rod. When the armature is atracted 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 in the cover. The voltage relays are hand reset on the noarmally-closed contacts only.

MAINTENANCE

PERIODIC INSPECTION

These 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 throughly. The flexibility of the tool insures the cleaning of the actual points of contacts.

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 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. If possible, give the General Electric Company requisition number on which the relay was furnished.

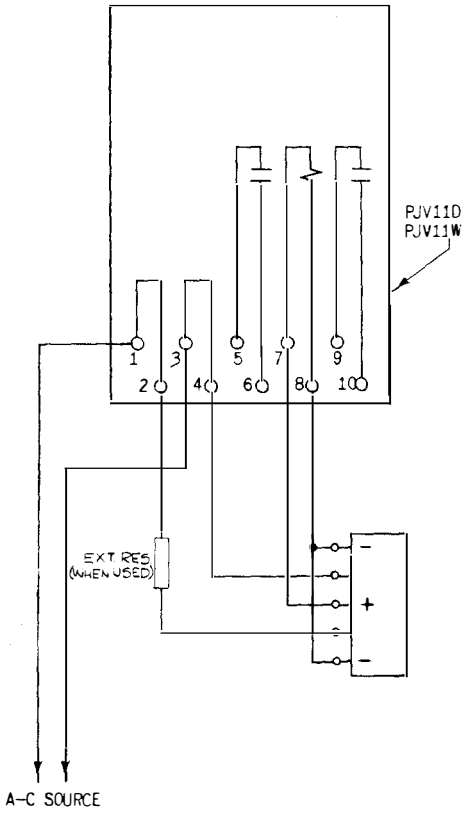


Fig. 4 External Connections for Type PJV11W Relay

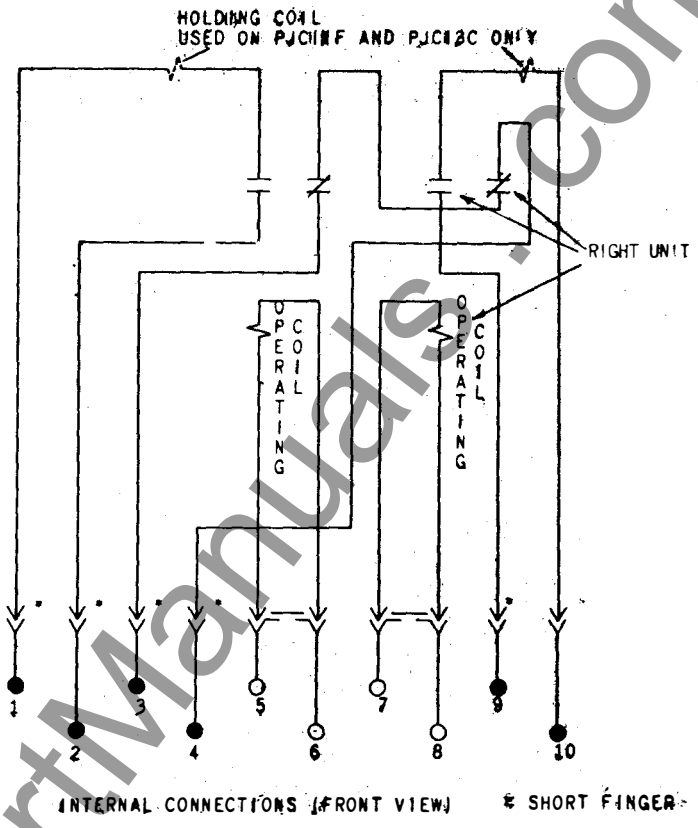


Fig. 5 (K-6154731-6)

Fig. 5 Internal Connections for Types PJC11E and PJC12L Relays

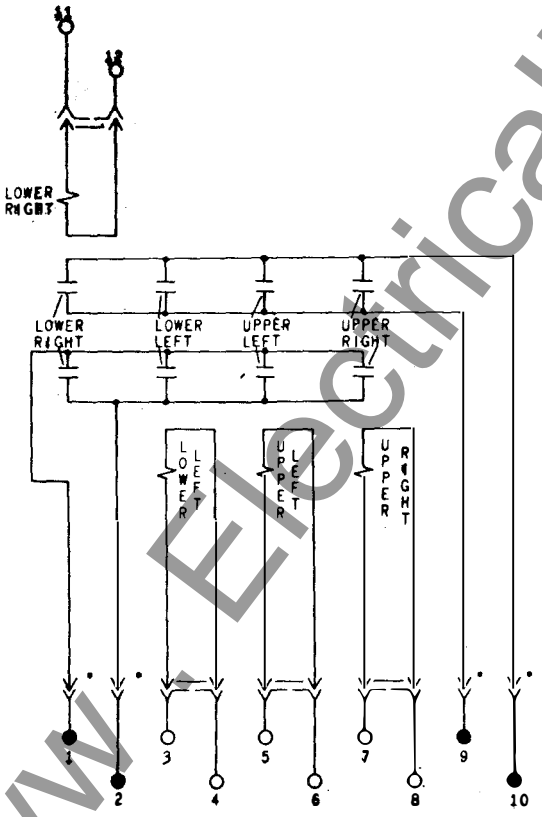


Fig. 6 Internal Connections for Type PJC11AD Relay

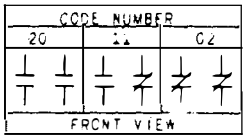


Fig. 6 (K-6400537-1)

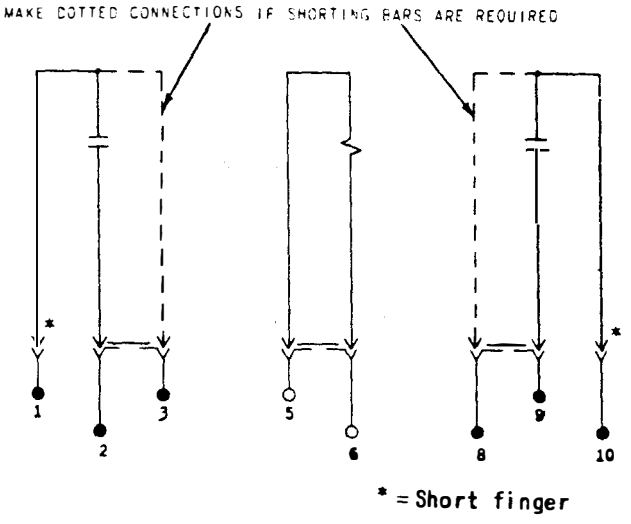


Fig. 7 K-6375600-4)

Fig. 7 Internal Connection for Type PJC11AH Relay

Fig. 8 (K-6400696-2)

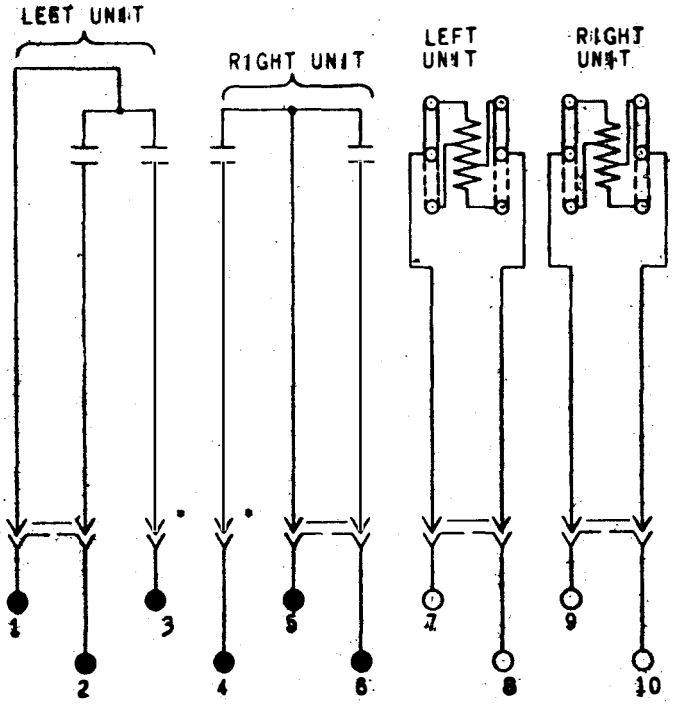


Fig. 8 Internal Connections for Type PJCIIAL Relay

Fig. 9 (K-6305852-1)

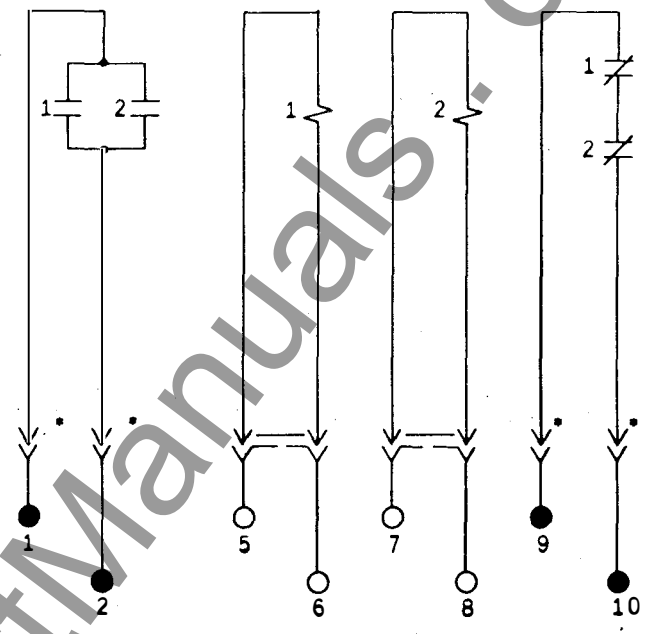


Fig. 9 Internal Connections for Type PJCIIAR Relay

Fig. 10 (362A591)

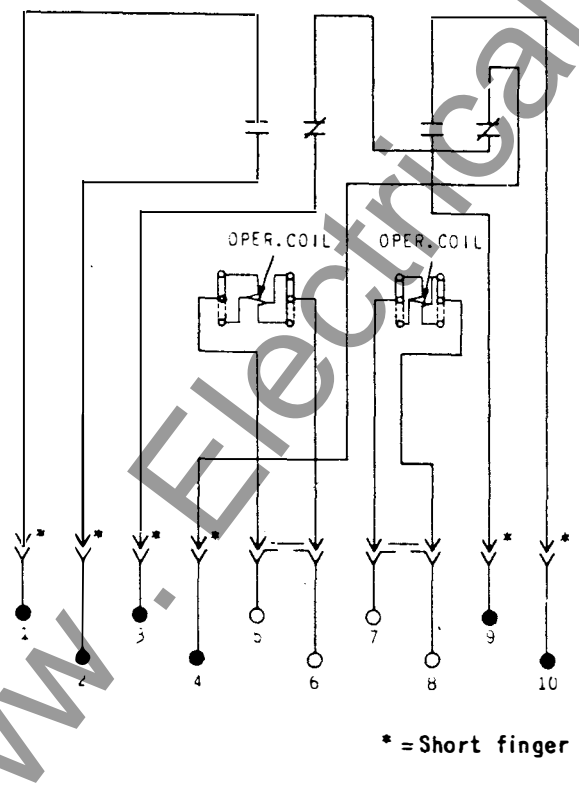


Fig. 10 Internal Connections for Type PJCIIAX Relay

Fig. 11 (K-6154875-5)

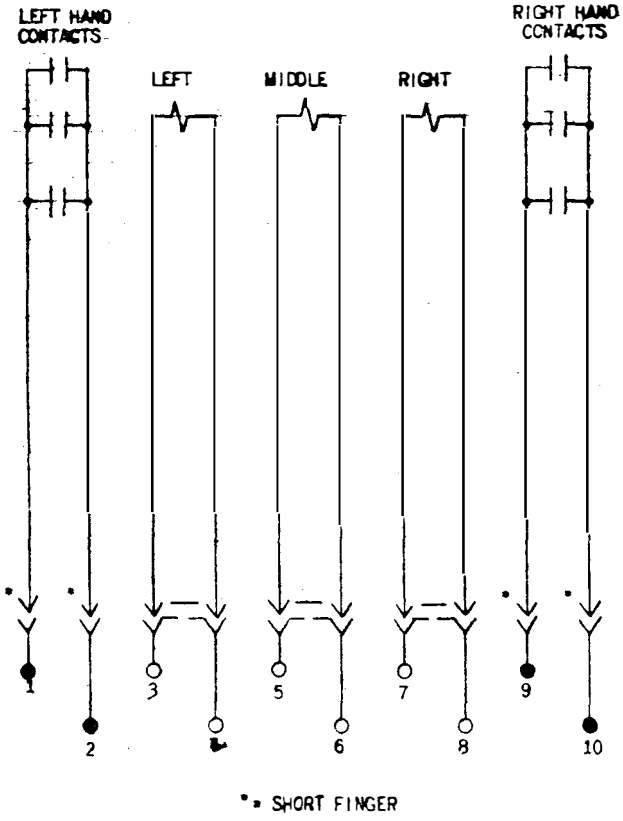


Fig. 11 Internal Connections for Type PJC12C Relay

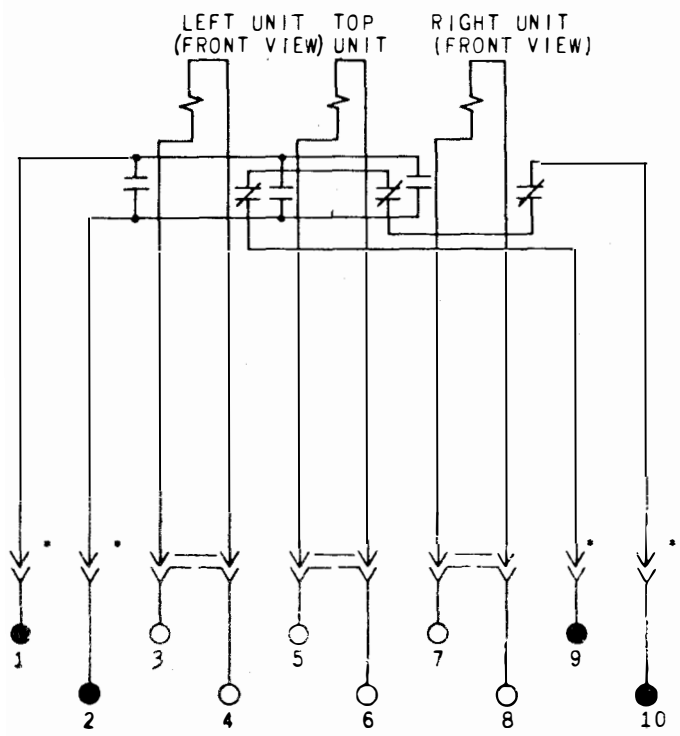


Fig. 12 Internal Connections for Type PJC12F Relay

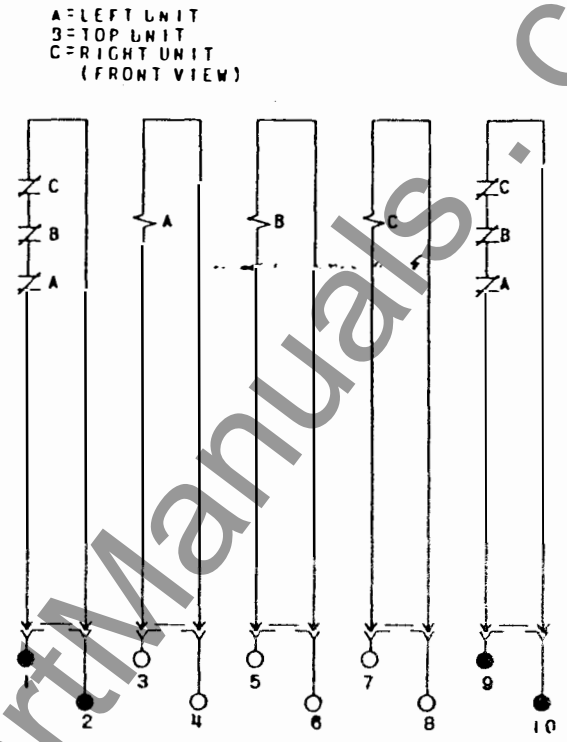


Fig. 13 Internal Connections for Type PJC12T Relay.

Fig. 12 (K-6154963-3)

Fig. 13 (K-6556419)

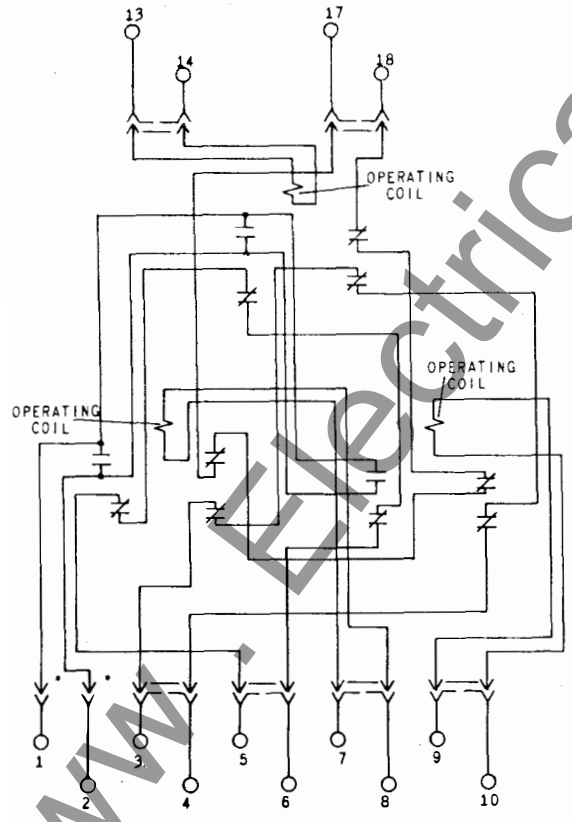


Fig. 14 Internal Connections for Type PJC15C Relay

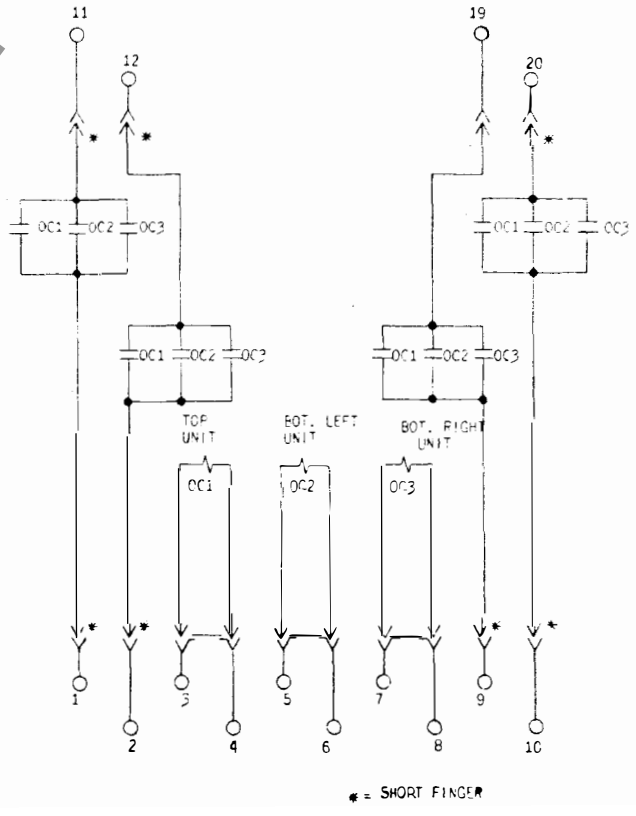


Fig. 15 Internal Connections for Type PJC15F Relay

Fig. 14 (K-6154916-2)

Fig. 15 (0165A7590-1)

Fig. 16 (K-6209699-4)

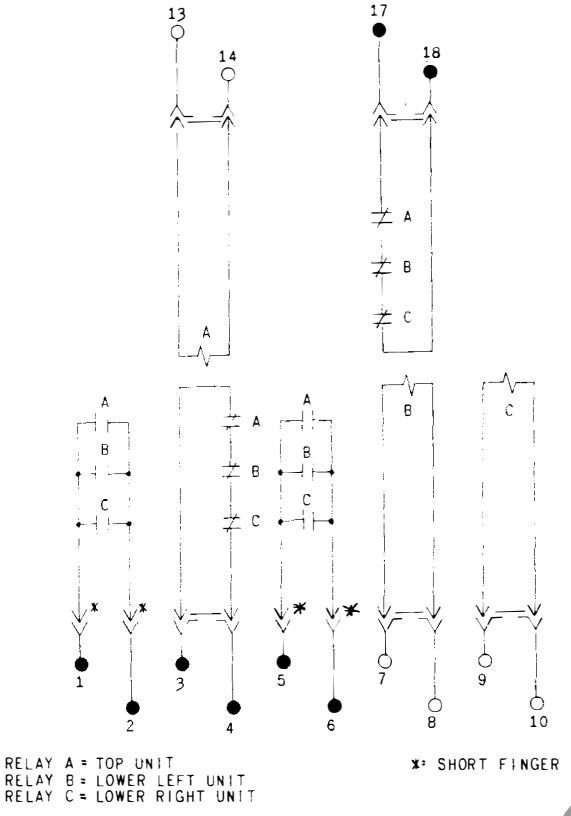


Fig. 16 Internal Connections for Type PJC15D Relay

Fig. 17 (0104A8567-1)

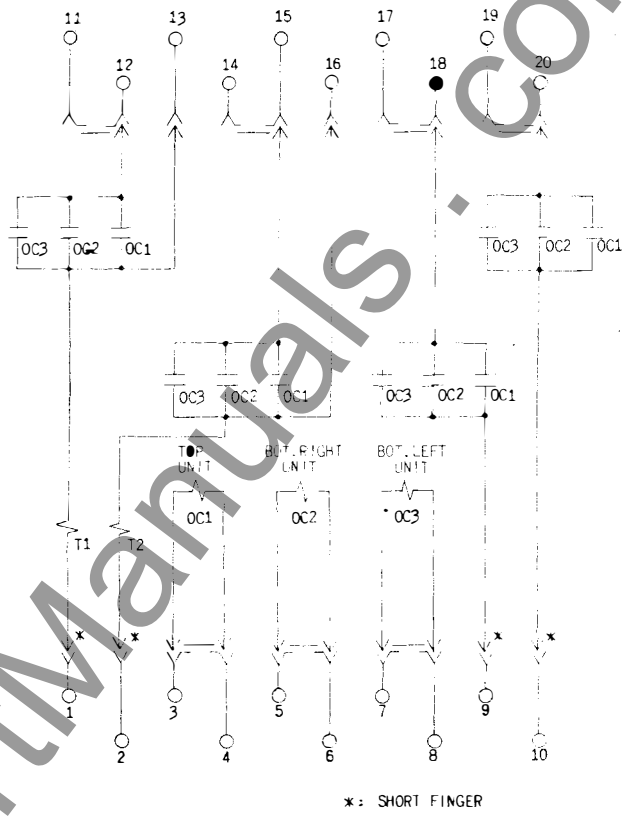


Fig. 17 Internal Connections for Type PJC15E Relay

Fig. 18 (K-6154919-3)

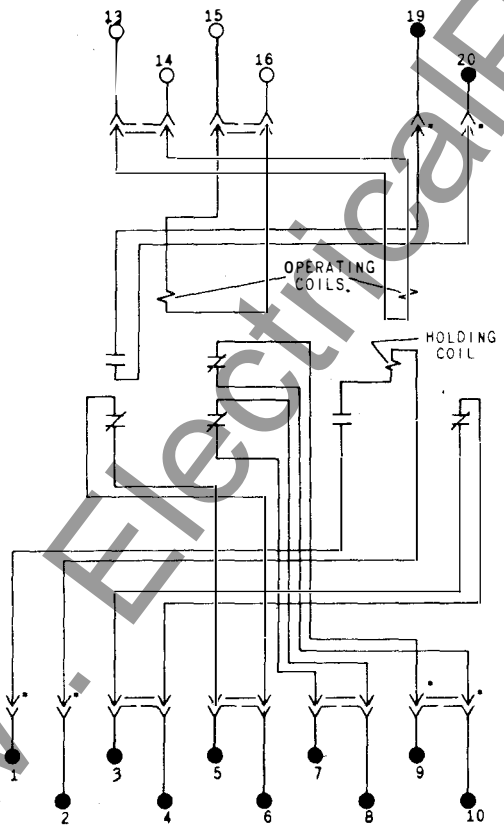


Fig. 18 Internal Connections for Type PJC16A Relay

Fig. 19 (K-6556450-1)

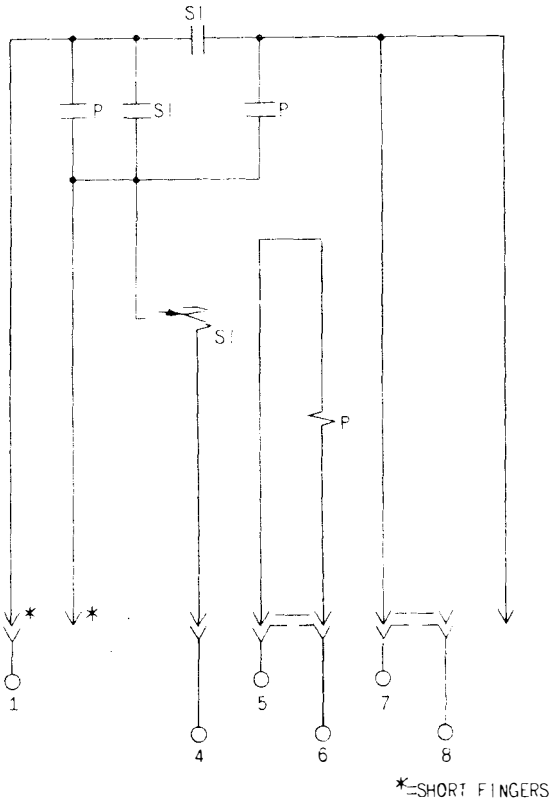


Fig. 19 Internal Connections for Type PJC21A Relay

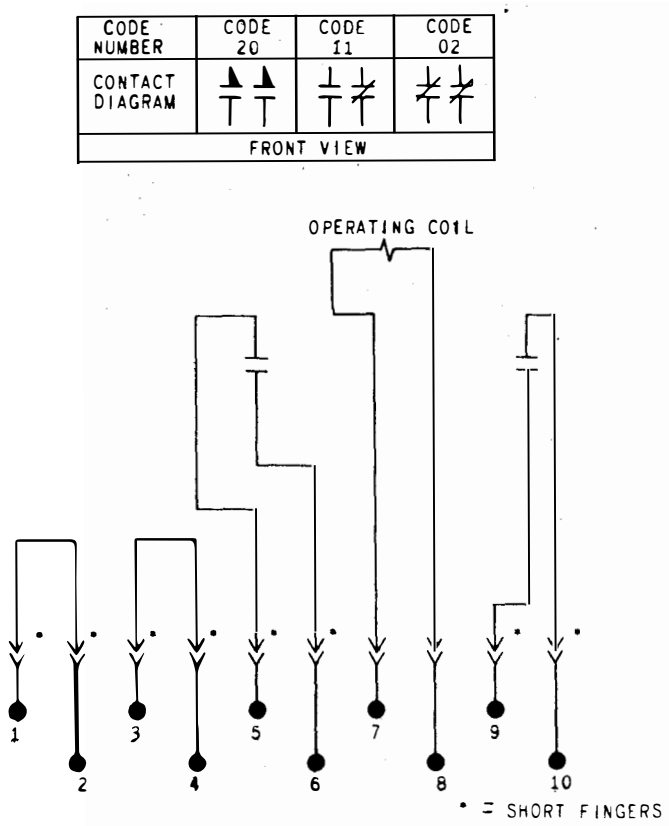


Fig. 20 Internal Connections for Type PJV11W Relay

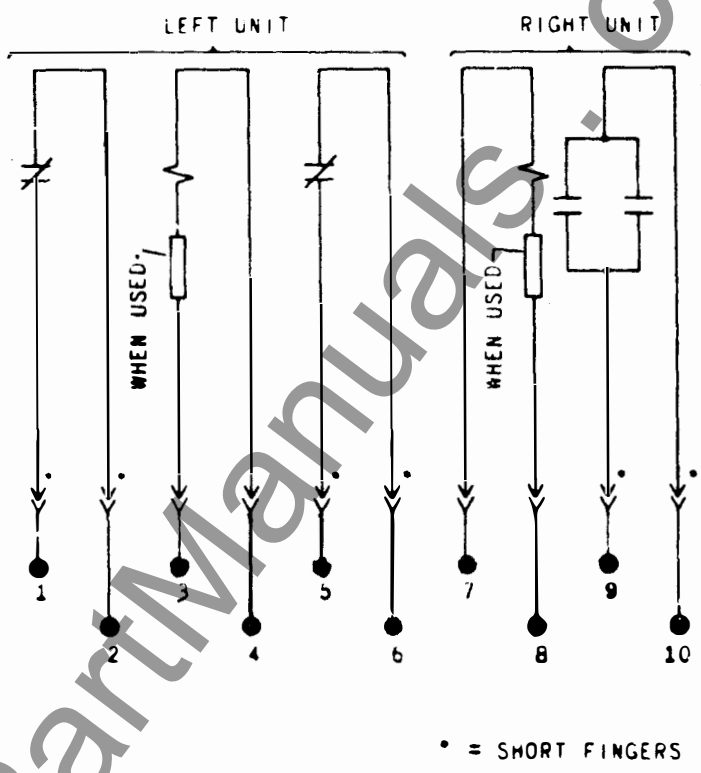


Fig. 21 Internal Connections for Type PJV11AD Relay

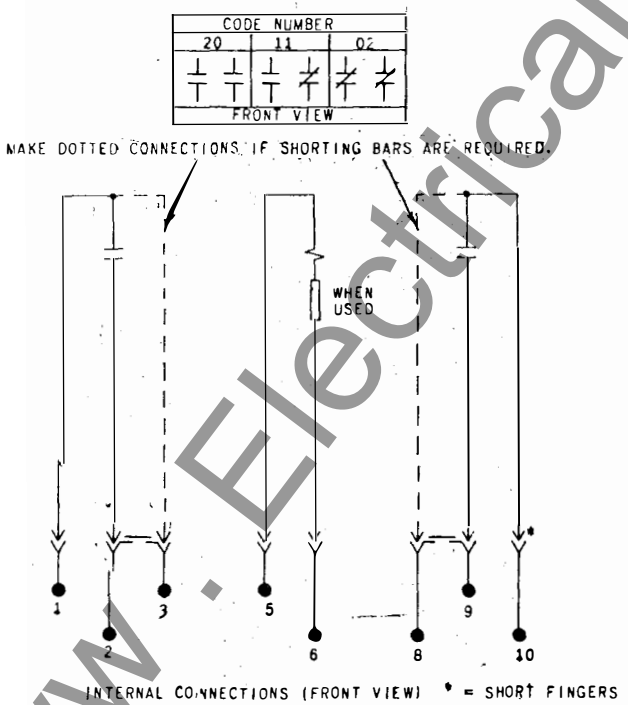


Fig. 22 Internal Connections for Type PJV11AE Relay

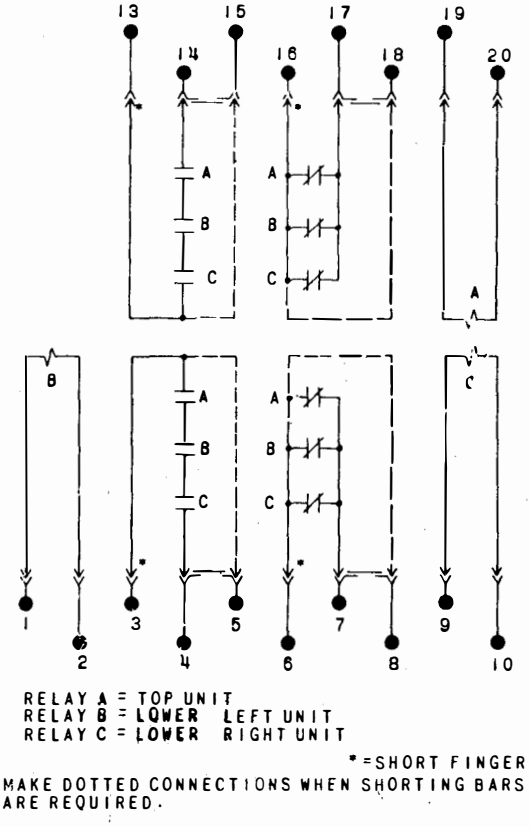


Fig. 23 Internal Connections for Type PJV14D Relay

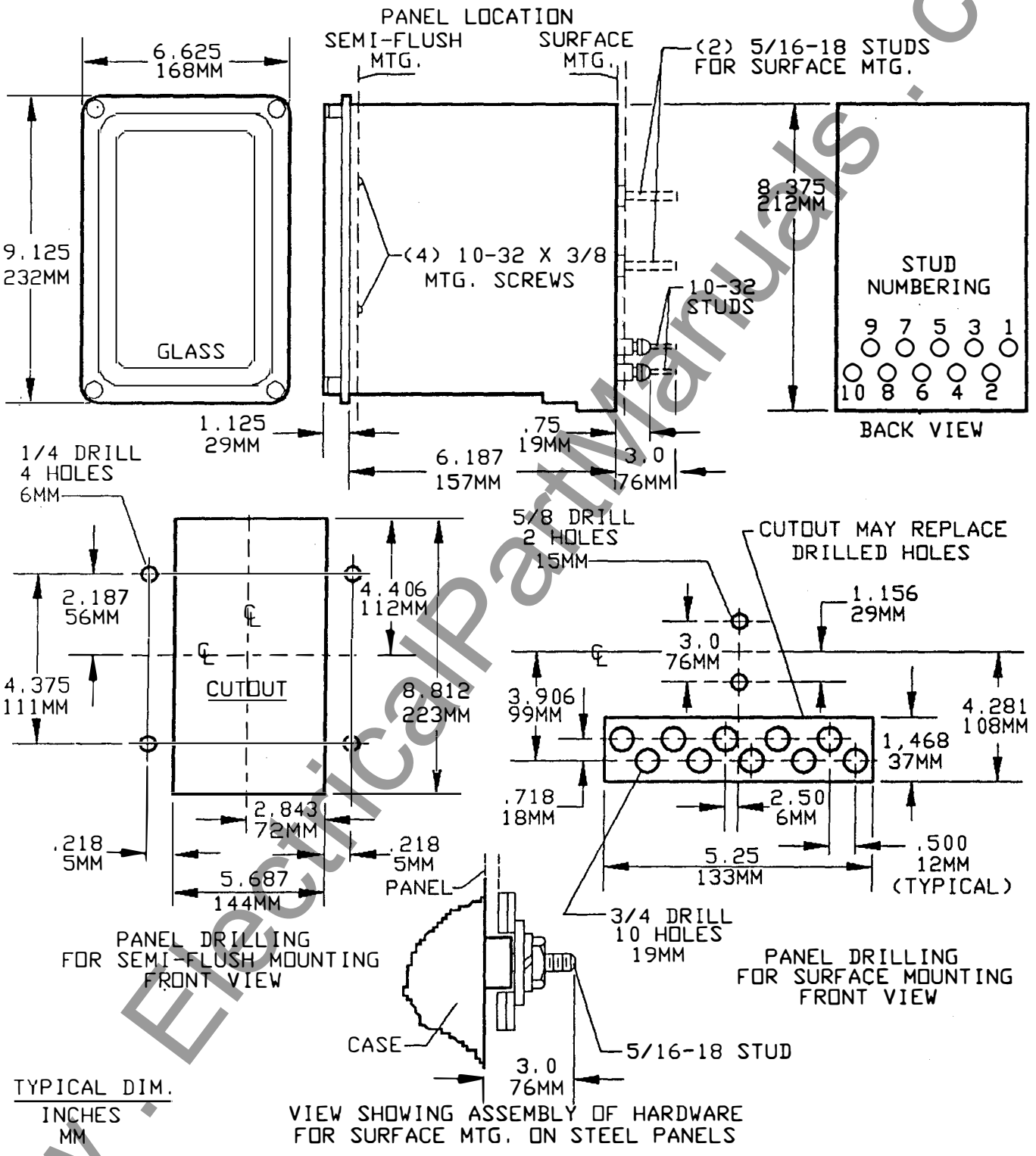


Fig. 24 (K-6209271-8)

Fig. 24 Outline and Panel Drilling Dimensions for Drawout Relays - Size SI Case

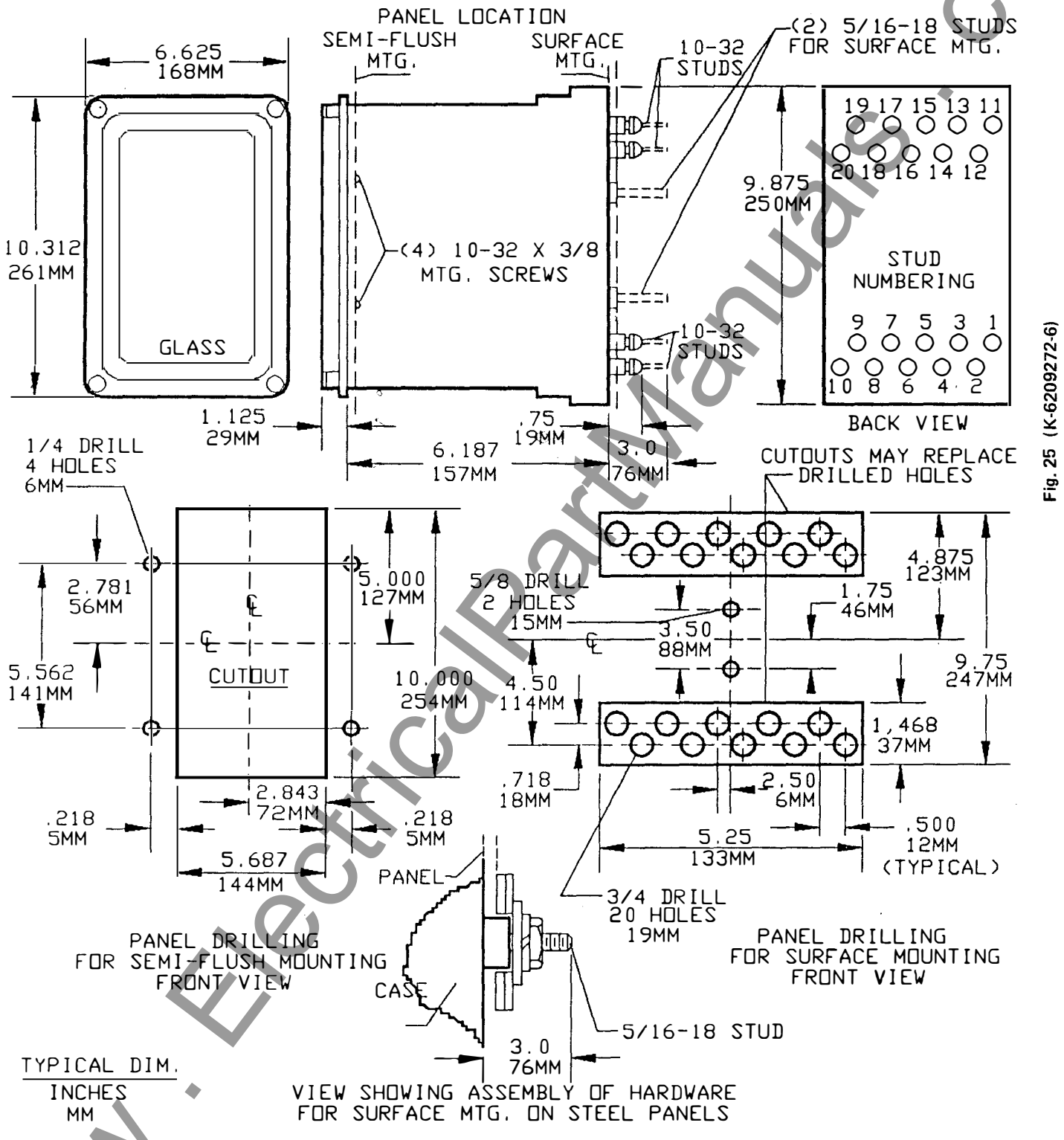


Fig. 25 (K-6209272-6)

Fig. 25 Outline and Panel Drilling Dimensions for Drawout Relays - Size S2 Case

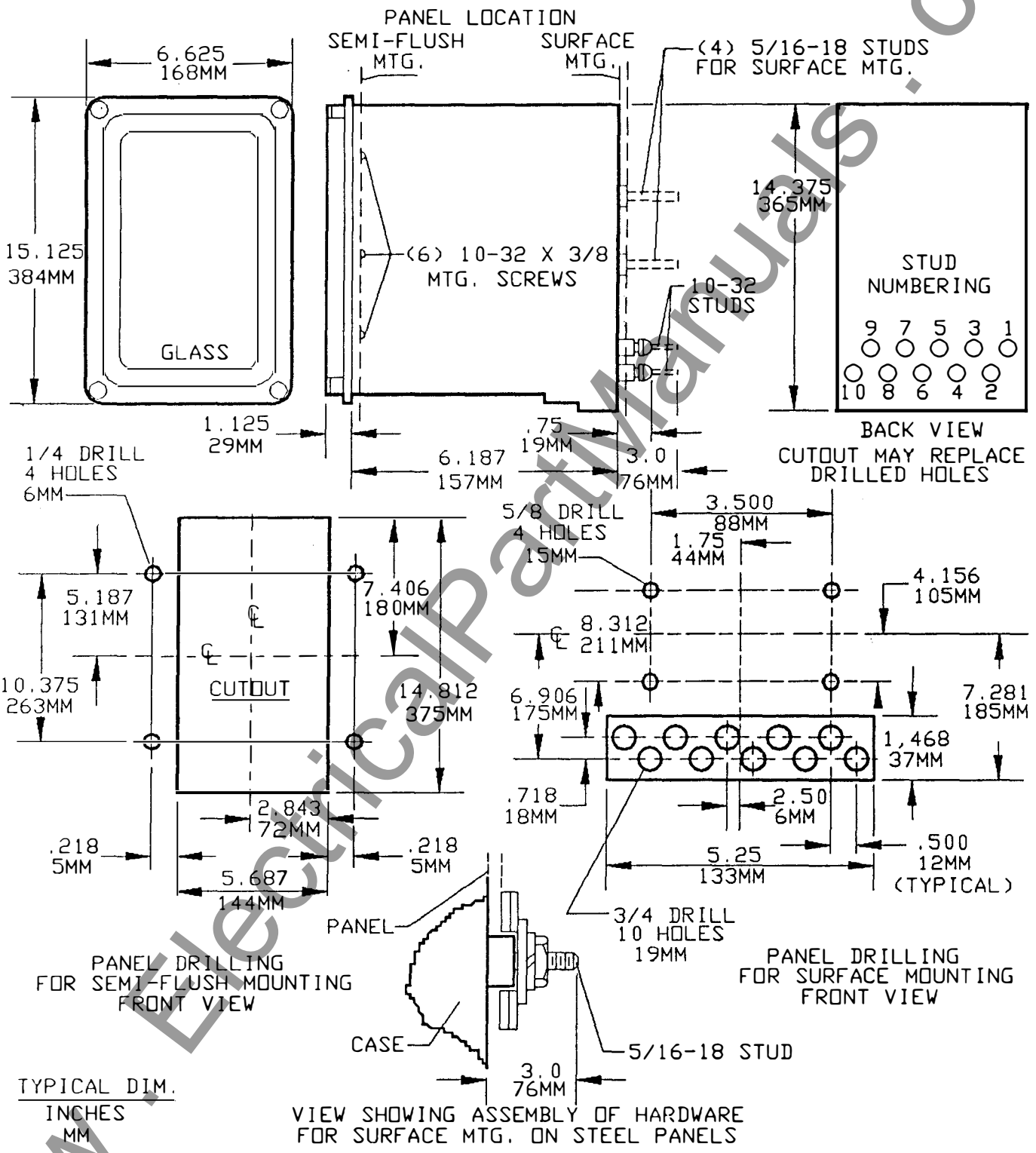


Fig. 26 (K-6209273-5)

Fig. 26 Outline and Panel Drilling Dimensions for Drawout Relays-Size MI Case

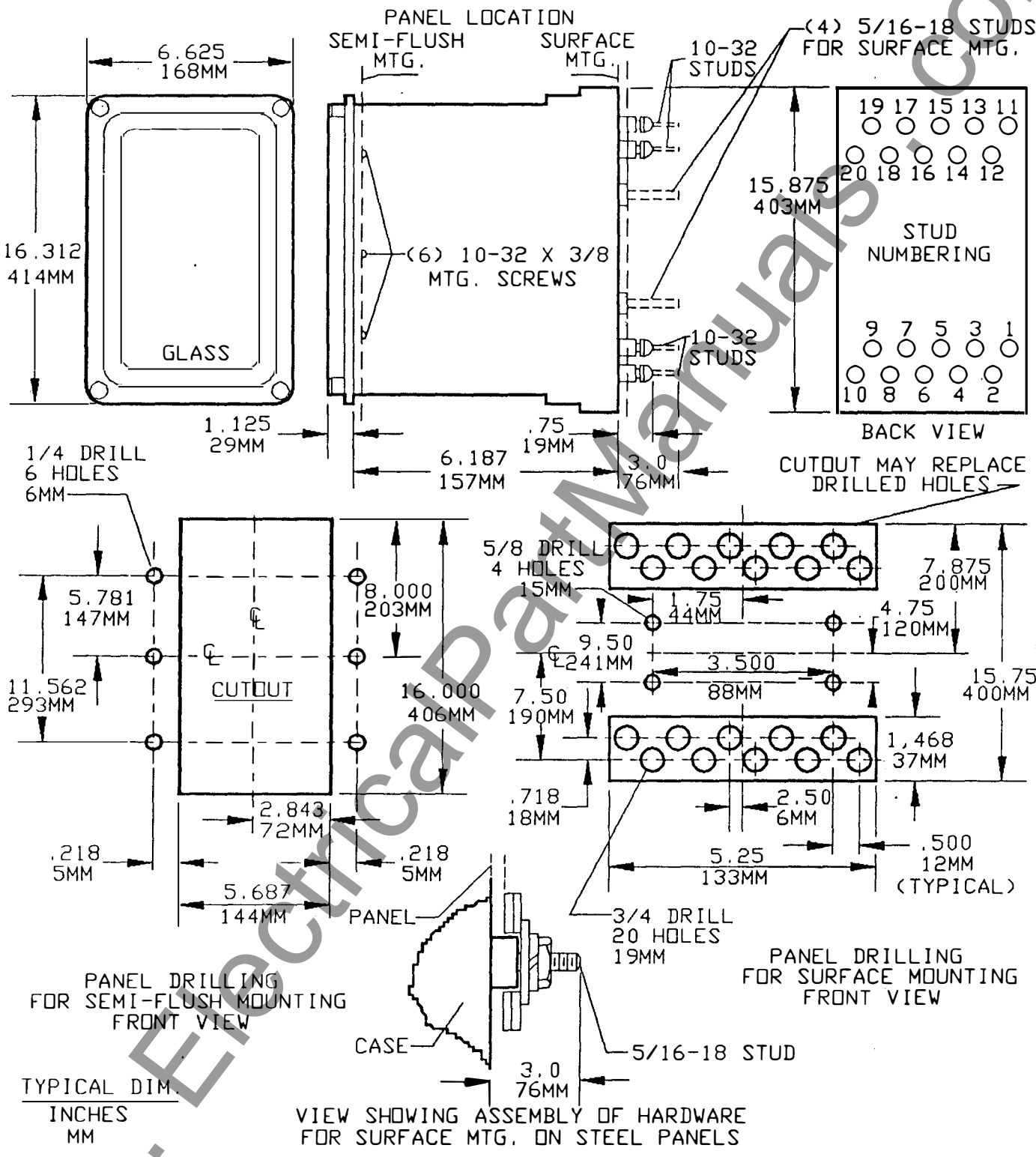


Fig. 27 (K-6209274)

Fig. 27 Outline and Panel Drilling Dimensions for Drawout Relays - Size M2 Case