INSTRUCTIONS

GEH-1790 C
Supersedes GEH-1790 B
Handbook Reference 7226

INSTANTANEOUS CURRENT RELAYS

Type PJC

GENERAL ELECTRIC

CONTENTS

INSTANTANEOUS CURRENT RELAYS
TYPES 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 relays are normally used for overcurrent protection of feeder circuits. When used in conjunction with thermal or time-overcurrent relays, these relays can be used to protect a motor against very high currents since the Type PJC relays will operate before the main relays respond. The Type PJC relays are 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 curves are shown in Fig. 2.

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 for tapped coils.

The a-c dropout is approximately 90 to 95 per cent of pickup at any point within the calibrating range when the contact arrangement includes one or more circuit-closing contacts. When the contact arrangement has all circuit-opening contacts, the percentage dropout is 75 to 85 per cent of the pick-up value. The d-c dropout is 60 to 90 per cent of the pick-up setting. The dropout will be within the above specified range assuming that the contacts are in adjustment as specified under the heading ADJUSTMENTS.

RATINGS

COIL

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

The ratings of the shunt-operated Type PJC relays are given in the following table:

Model	Rated Amps	* Calibration Range (Volts)	Core Res. (Ohms)	Shunt-Lead Res. (Ohms)	Shunt-Lead Length (Ft.)
12PJC18A1	100	0.05-0.200	0.00045	0.0005	5
12PJC19A1	25	0.07-0.280	0.0032	0.0032	30

* Pick-up volts across coil and leads.

CONTACT

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

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

The following burdens are measured with the armature in the dropped-out position.

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	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

Values are for minimum pick-up settings.

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.

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 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.

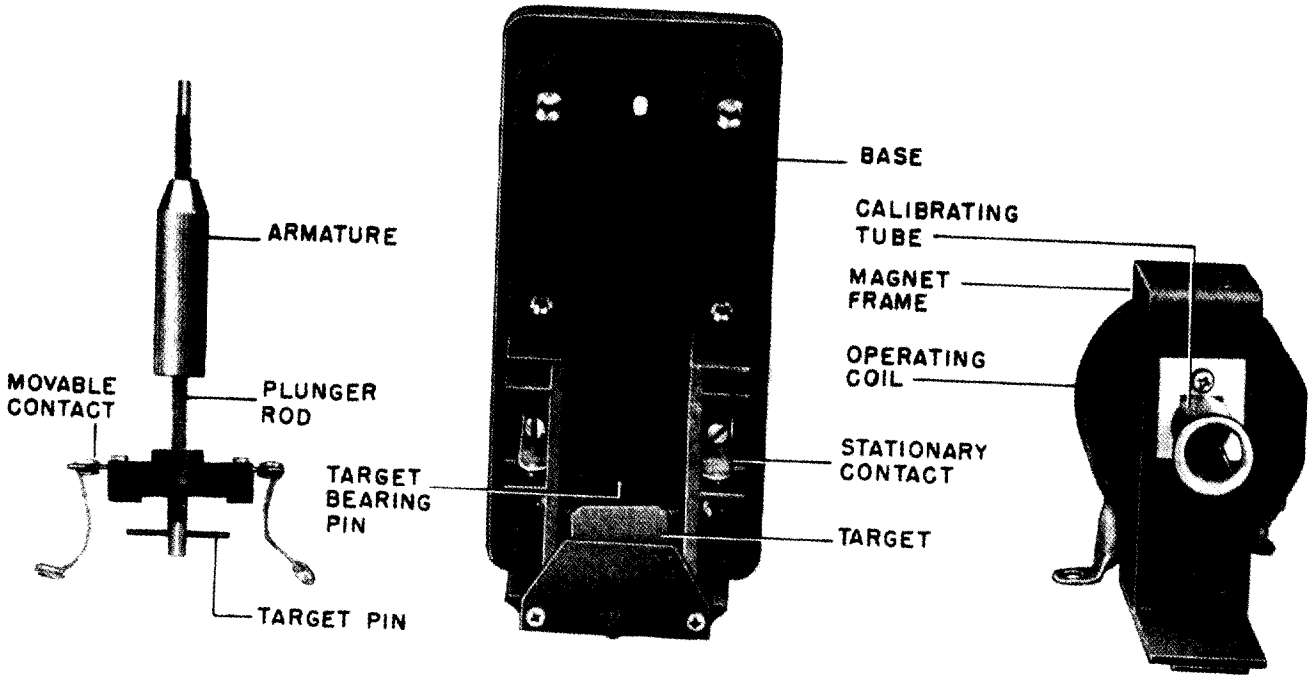
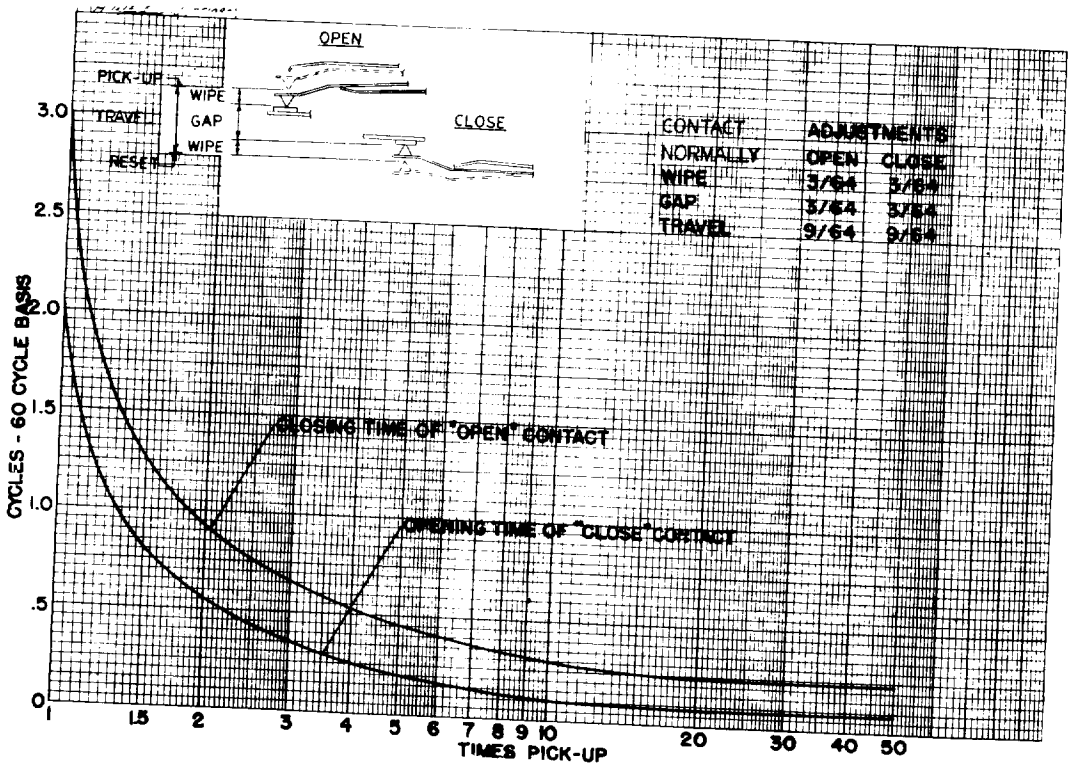


Figure 1. (8014170) Type PJC11A Relay Disassembled (Cover Not Shown)



* Figure 2. (418A711-1) Time-Current Curves for Type PJC Relays.

*Denotes change since superseded issue.

DESCRIPTION

Figs. 1 and 3 illustrate the typical relay construction of the Type PJC relays described in these instructions. The relays are the plunger type and have an adjustable armature assembled on a threaded aluminum rod having a molded, compound contact carrier. The position of this armature determines the current required to move the plunger-rod assembly upward into the core of the coil, operating the relay contacts. All parts are mounted on a molded compound base. The standard relays are furnished with a molded cover consisting of a glass window.

Table I lists the available relay models and their modifications. The individual models have one or a combination of the following features: mechanical target, electrical target, electrical holding, self reset or hand reset contacts, two or four contacts, and coils with or without taps.

Relays with mechanical targets are provided with external reset buttons which also reset the contacts of hand-reset relays.

The standard contact arrangement for two-contact relays is two normally open (code 20) and for four-contact relays is two normally open and two normally closed (code 22). Other contact arrangements available on request are shown in Figs. D, E, H, I, J, and K of Fig. 7. The code numbers are a convenient way of requesting the contact arrangement desired. The first digit represents the number of normally-open contacts, the second digit represents the number of normally-closed contacts.

Relays that are similar to relays mentioned in Table I are described in the following paragraphs:

The Type PJC11C relay is similar to the Type PJC11A relay except that it has a drop-out calibration instead of the conventional pick-up calibration. The same range of adjustment is available.

The Type PJC11R relay is similar to the Type PJC11A relay except that it has a higher d-c drop-out current percentage (75-85 percent of pickup). The relay is provided with a mechanical target.

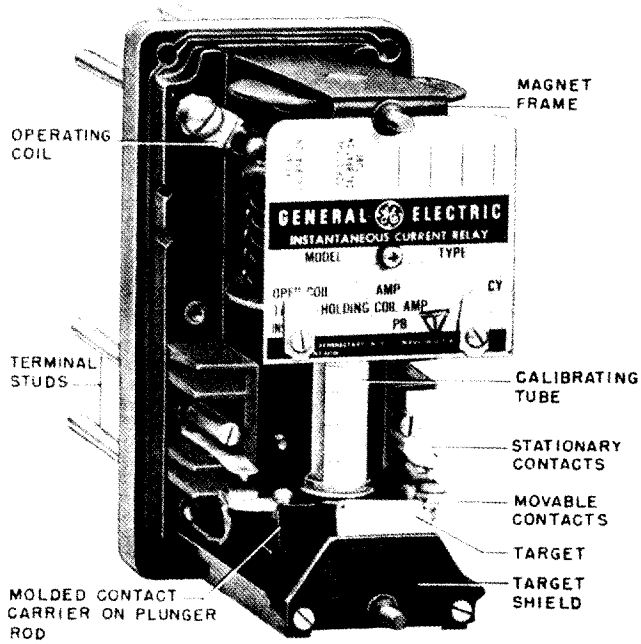


Fig. 3 Type PJC11A Relay Without Cover (Front View)

The Type PJC18A relay is similar to the Type PJC11A relay except that it is used with a 100 millivolt shunt. The model 12PJC18A1 is provided with 5-foot shunt leads. (Refer to Fig. 8).

The Type PJC19A relay is similar to the Type PJC12A relay except that it is used with a 100 millivolt shunt. The model 12PJC19A1 is provided with 30 foot shunt leads. (Refer to Fig. 8). The Type PJC11N relay is similar to the Type PJC11A except that it is used with a rectifier for high frequency operation.

TABLE I

Type	Coils Taps	Contacts No.	Contacts Reset S=Self H=Hand	Holding O=None E=Electrical M=Mechanical	Target O=None E=Electrical M=Mechanical	Outline (Fig.)	Panel Drilling (Fig.)	Int. Conn. (Fig.)
PJC11A	0	2	S	O	M or O	5	6A	7A
PJC11B	2	2	S	O	M	5	6B	7B
PJC12A	0	2	H	O	M	5	6A	7A
PJC13A	0	2	S	E	E	5	6C	7C
PJC14A	0	4	S	E	E	5	6D	7F
PJC14B	0	4	S	O	O	5	6E	7G
PJC12S	2	2	H	o	M	5	6B	7B
PJC14D	0	4	S	O	M	5	6E	7G
PJC14F	0	4	H	O	M	5	6E	7G
PJC18A	2	2	S	O	MorO	8	8	8

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 relays should be mounted on a vertical surface. The outline and panel drilling diagrams for the various relays are referred to in Table I.

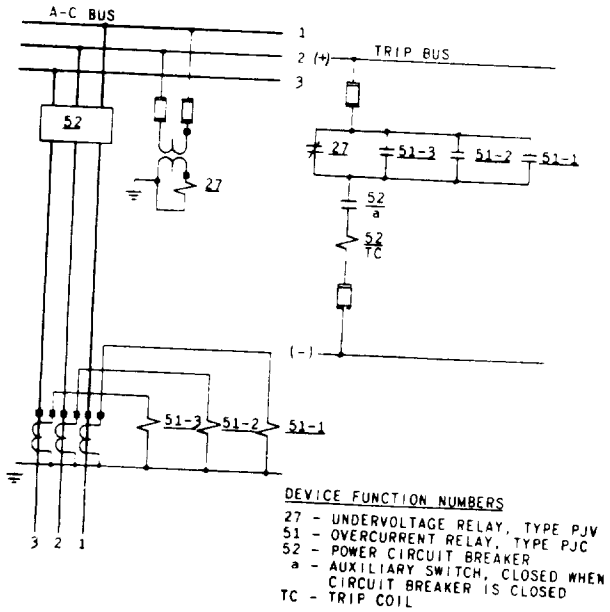


Figure 4. (376A948-0) Elementary Connections of Circuit Protected Against Overcurrent and Undervoltage.

CONNECTIONS

The internal connection diagrams are referred to in Table I. A typical external connection diagram is shown in Fig. 4.

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 adjusting.

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 a Type PJC relay the number associated with any given calibrating mark on the calibrating tube is found on the nameplate. This is a 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 the "b" contact will decrease the pick-up value. With excessive wipe, the armature will tend to creep up with increasing current values until the contact has unwiped. An increase in wipe on the "a" or "b" contacts will also decrease the 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. 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. The normal contact pressure on relays with one "a" contact and one "b" contact is 15 grams, measured at the contact tip. This is the initial pressure required to just lift the contact away from its contact stop. When 2 "a" or 2 "b" contacts are used, this initial pressure should be 5 grams on each contact.

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 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 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 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 in the cover.

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

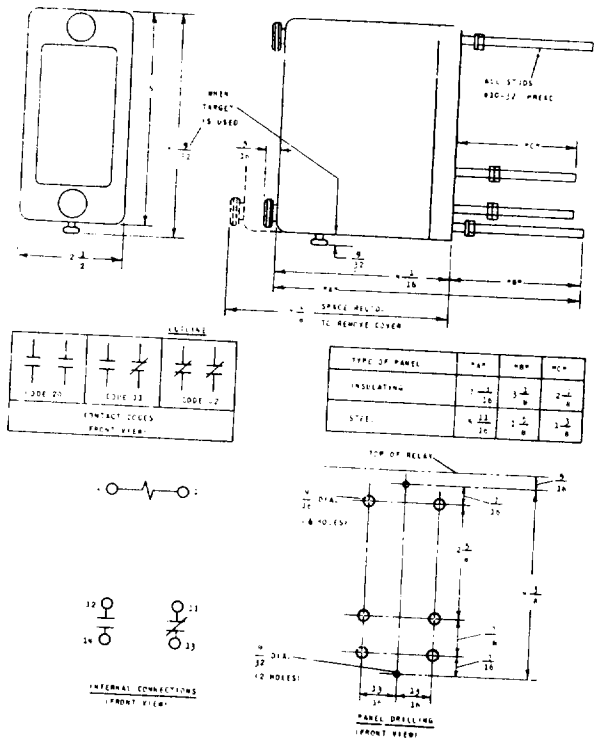


Figure 5. (K-6174680-6) Outline Dimensions of the Type PJC Relays.

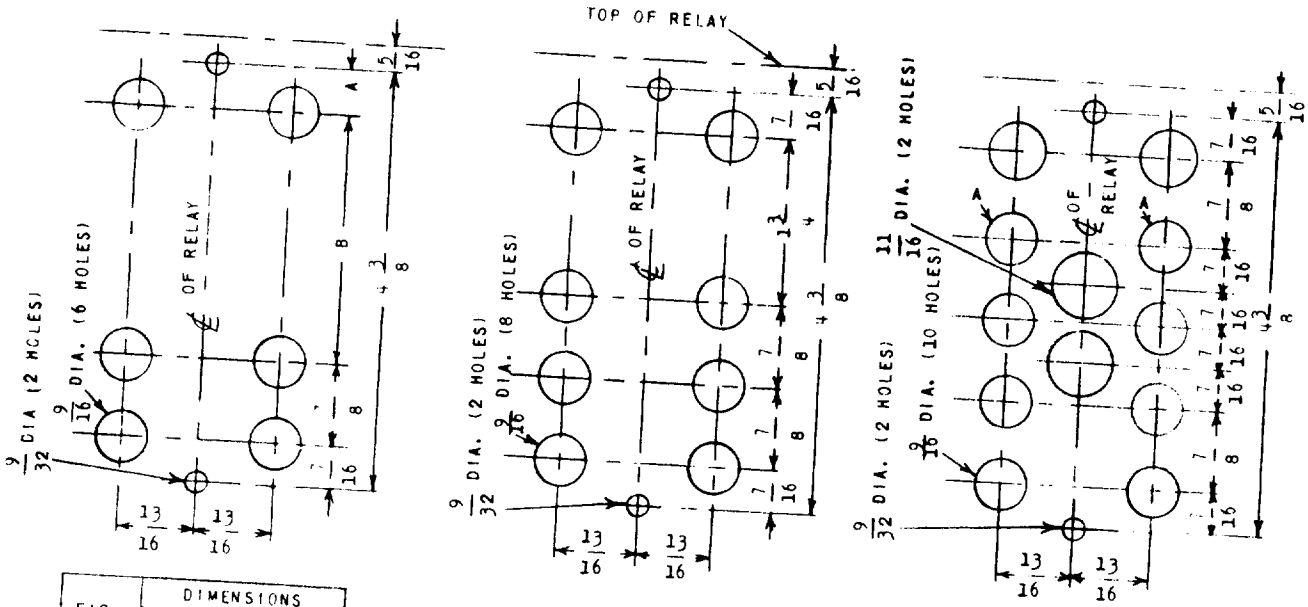


FIG.	DIMENSIONS	
	A	B
6A	7/16	2 5/8
6B	7/8	2 3/16

FIG.	HOLES A
6D	INCLUDE
6E	OMIT

Figure 6. (376A945-1) Panel Drilling Dimensions of the Type PJC Relays.

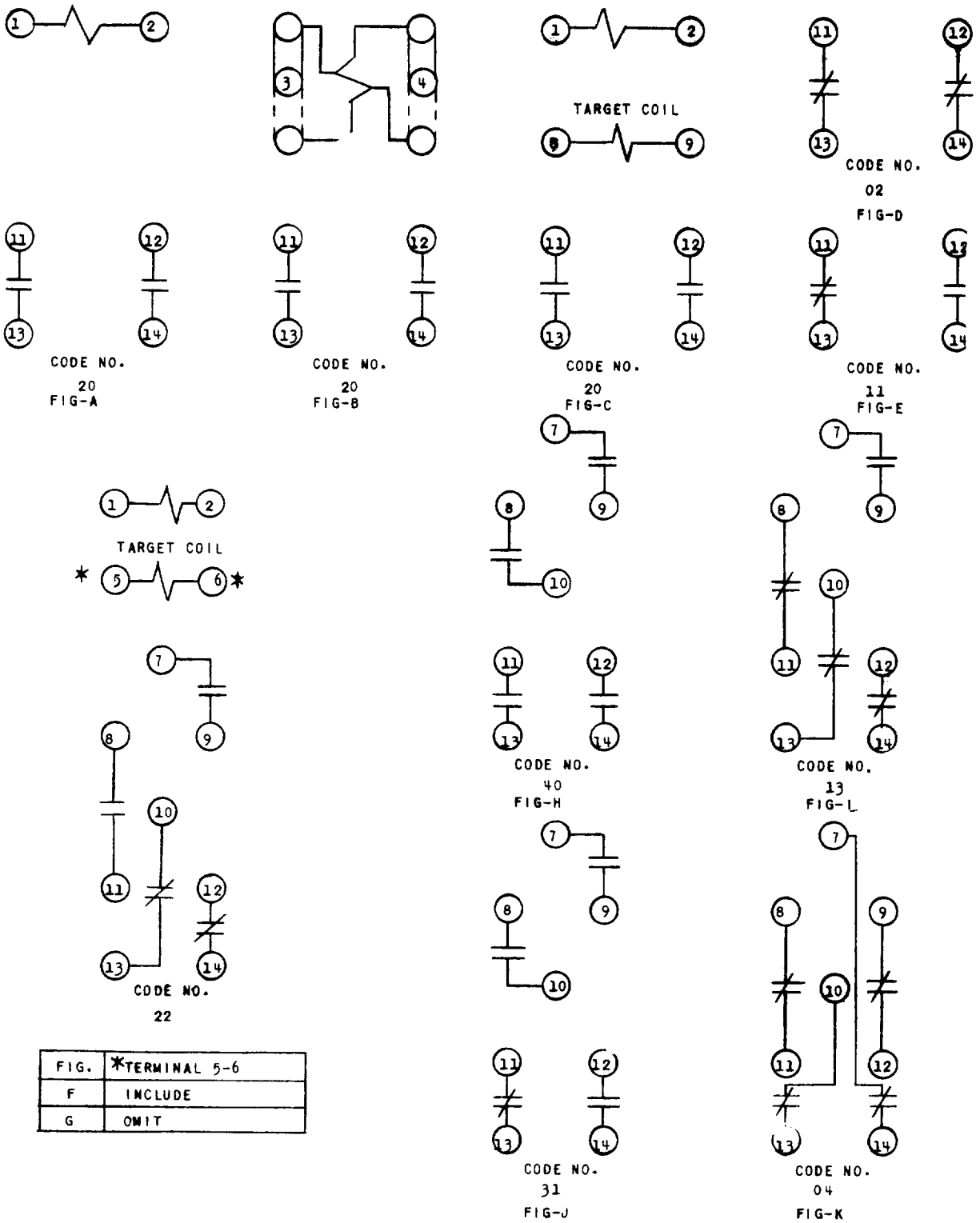
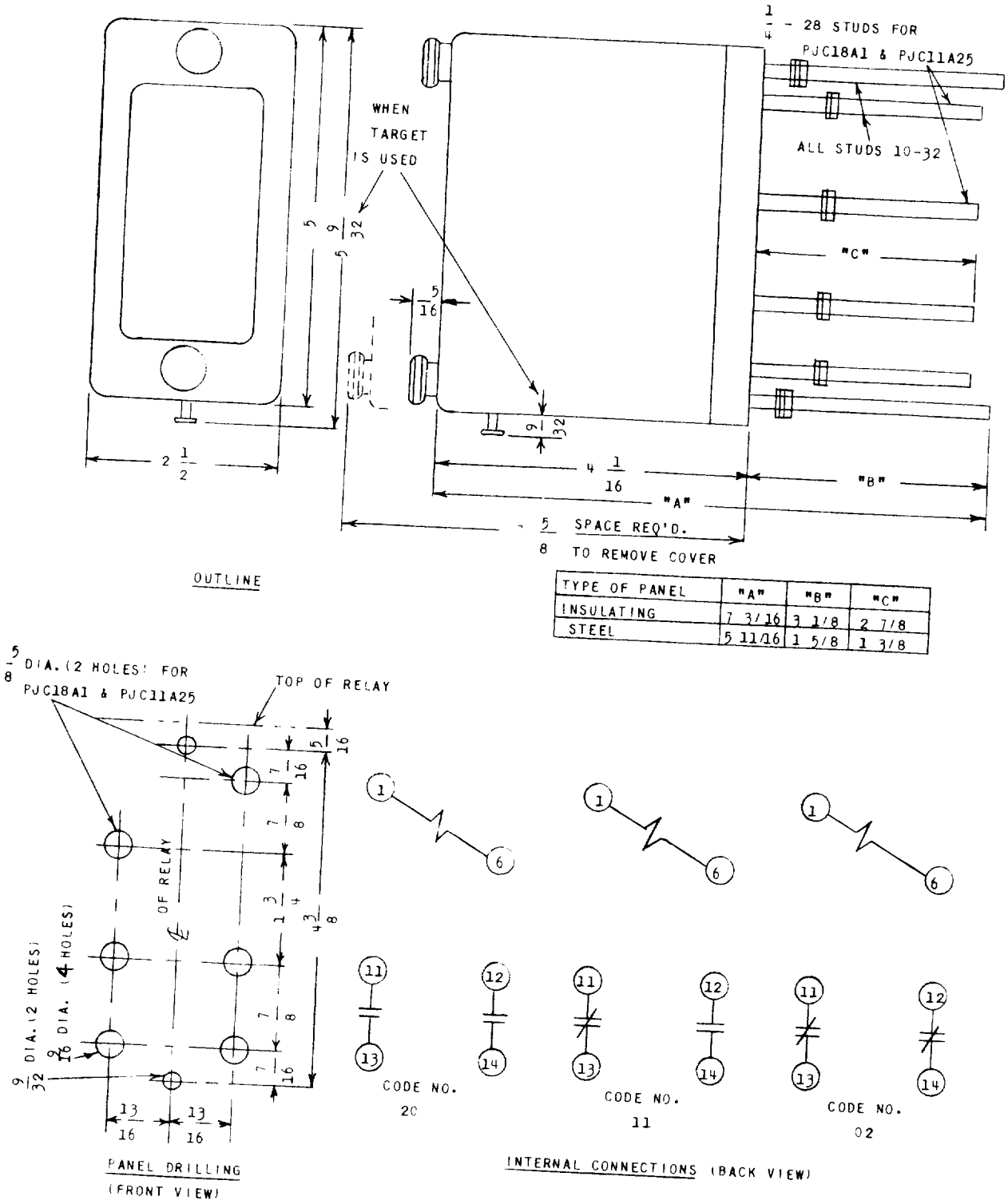


FIG.	*TERMINAL 5-6
F	INCLUDE
G	OMIT

* Figure 7. (376A946-2) Internal Connections of the Type PJC Relays (Back View)

*Denotes change since superseded issue.



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

Figure 8. (K-6209737-5) Outline, Panel Drilling and Internal Connection Diagrams For Relay Type: PJC18A and PJC19A.

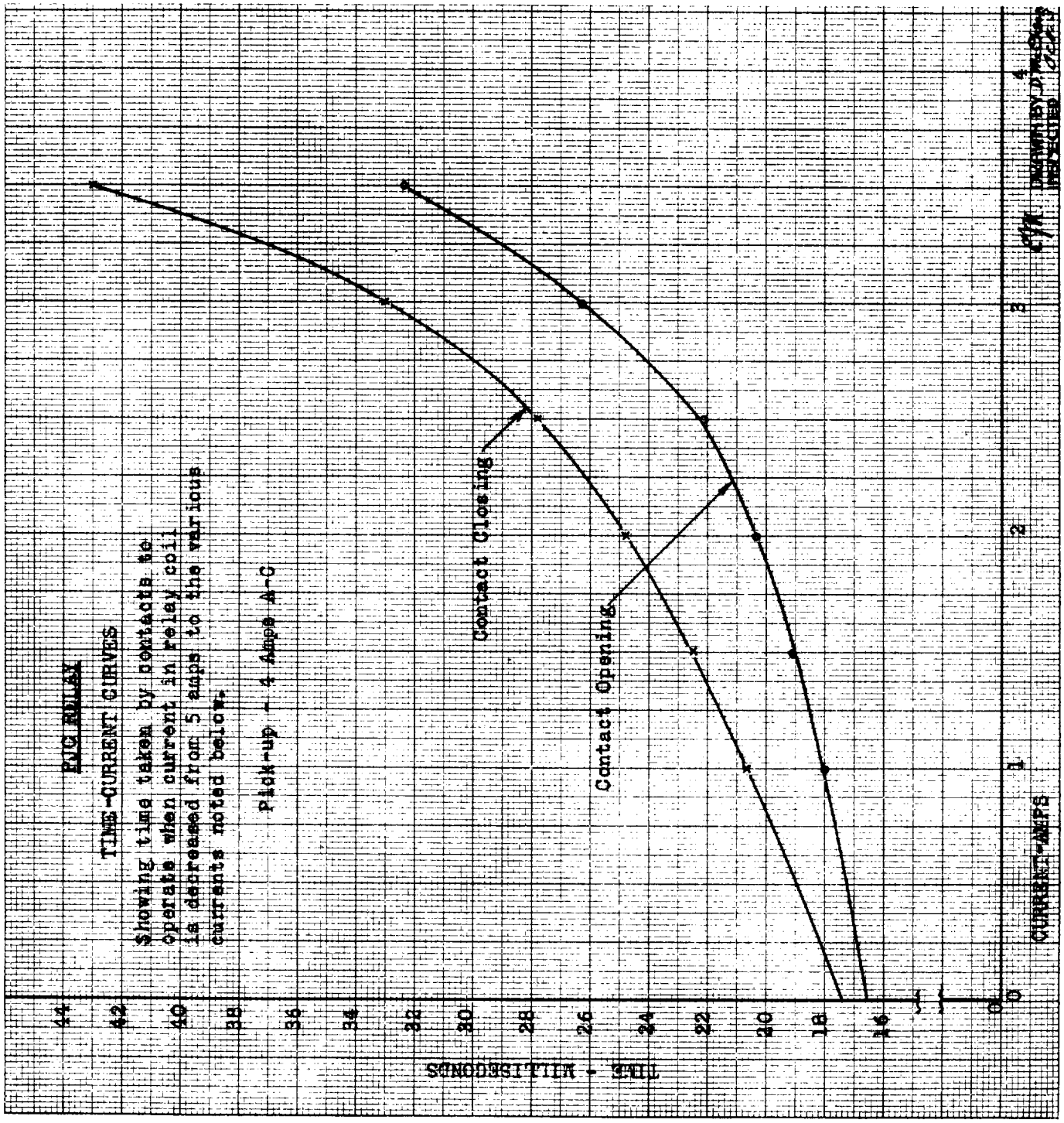


Figure 9 (6154693-1) Time-current Drop-out Characteristics of PJC relays when current is suddenly reduced from 5 amperes to values on curves

* Indicates revision

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