



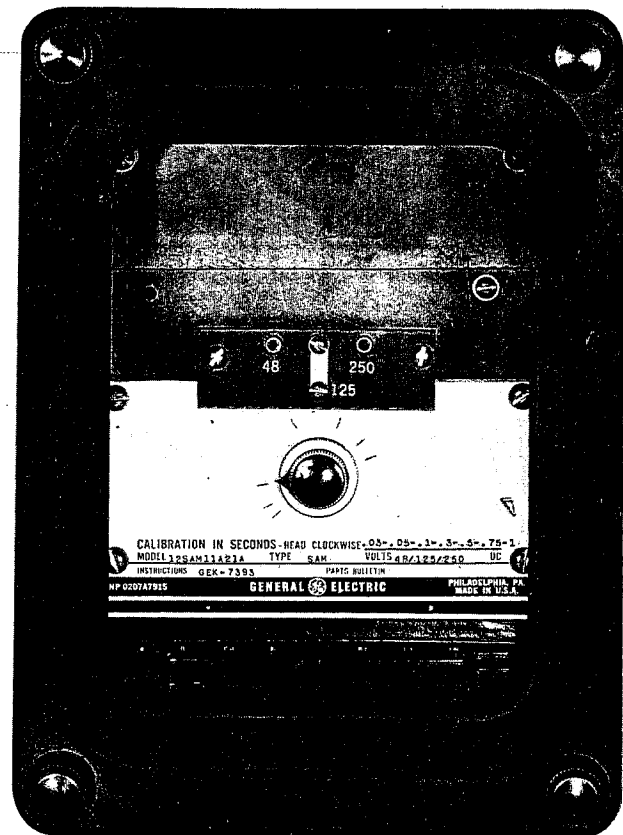
INSTRUCTIONS

GEK-7393A

DC OPERATED TIMING RELAYS

TYPES

SAM11A AND SAM11B FORMS 21 AND UP



POWER SYSTEMS MANAGEMENT DEPARTMENT

GENERAL  **ELECTRIC**

PHILADELPHIA, PA.

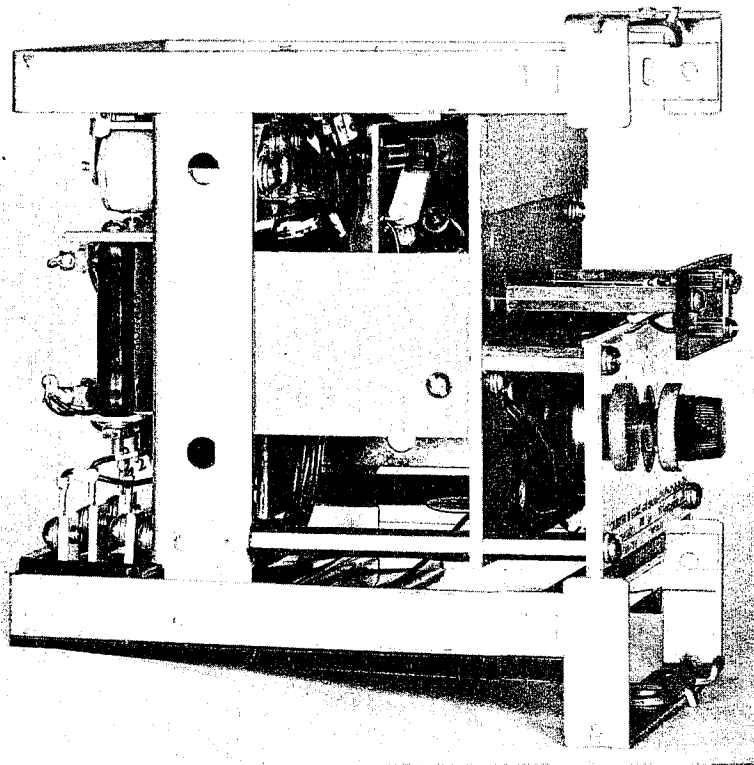


FIG. 1A (8039881) Relay Type SAM11A21A Removed From Case (Rt. Side View)

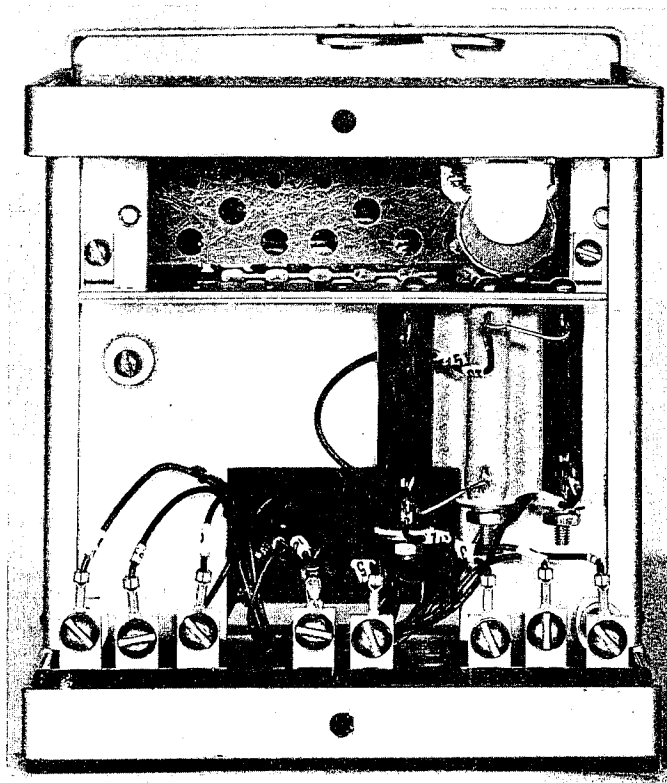


FIG. 1B (8039884) Relay Type SAM11A21A Removed From Case (Rear View)

GEK-7393
D-C OPERATED TIMING RELAY
TYPE SAM11A AND SAM11B
FORMS 21 AND UP

INTRODUCTION

The SAM11A and SAM11B are D-C operated timing relays that employ solid-state components to provide an extremely stable time delay function. These relays employ a low energy resistance-capacitance timing circuit that is regulated to make the timing independent of variations in supply voltage. The output of the timing circuit is amplified by solid-state circuitry to provide sufficient energy to operate a small telephone-type relay having two electrically separate transfer contacts. Both the SAM11A and SAM11B relays have adjustable time delay in ranges of 0.03 to 1.0 second or 0.05 to 3.0 seconds and they are packaged in S₁ cases. The SAM11A has no targets while the SAM11B has one target in series with one of the normally open contacts. See Figs. 3 and 4 for internal connections.

APPLICATION

The SAM11A and SAM11B relays find application wherever short D-C operated timing functions are required. The negligible overtravel and reset times of these relays plus their repeatability characteristics, regardless of supply voltage variations, make them particularly well suited for applications where consistent operating times are essential under all conditions. Specifically, these relays are ideal for application in circuit breaker failure back-up schemes where accurate and repeatable time settings are essential. For typical external connections, see Fig. 2.

RATING

The SAM11 relays have a triple rating of 48V, 125V and 250V D-C. A voltage selecting link is included to permit the selection of the desired control voltage. The relay contacts will close and carry momentarily 30 amperes D-C at control voltages of 250 volts or less. These contacts will carry 3 amperes continuously and have an interrupting rating as given in Table A.

TABLE A

Volts	Current Inductive*	Current Non-Inductive
48	1.0	3.0
125V D-C	0.5	1.5
250V D-C	0.25	0.75
115V 60 Cyc.	0.75	2.0
230V 60 Cyc.	0.5	1.0

* Induction of Average Trip Coil

CHARACTERISTICS

The SAM11 relay measures the time it takes to charge a capacitor through an adjustable resistor after the initiating contact closes. Zener regulators keep the voltage across the resistor-capacitor combination constant to produce a charging time that varies directly with the resistance in the charging circuit. When the capacitor charge reaches a definite voltage level it triggers a control rectifier, by means of an unijunction, and this picks up a telephone type unit to terminate the timing period. Fig. 5 shows the time variation when the control voltage changes from 64 to 120 percent of normal.

Fig. 6 shows the changes in relay time produced by changing the ambient temperature from -40°C to 60°C.

The relay contains a discharge rectifier which provides a low resistance discharge path for the capacitor charge the instant that the initiating contact opens the timing circuit. This permits the SAM11

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.

relay to be completely reset as soon as the telephone type unit drops out. The maximum reset time is 16 milliseconds.

Under identical conditions the relay will repeat its operation as accurately as the relay can be set or within one percent of its original setting. An electronic timer must be used in making the SAM11 relay settings.

The SAM11 relay has practically no overtravel.

BURDENS

The relay watts at rated voltage is given in Table B.

TABLE B

VOLTS	MAX. RELAY WATTS
48	2.5
125	7.5
250	15.5

The target resistance is .35 ohms approximately.

CONSTRUCTION

The relay components are mounted in a cradle assembly which is latched into a drawout case when the relay is in operation but it can be easily removed when desired. To do this, the relay is first disconnected by removing the connection plug which completes the electrical connections between the case block and the cradle block. To test the relay in its case this connection block can be replaced by a test plug. The cover, which is attached to front of the relay case, contains the target reset mechanism and an interlock arm which prevents the cover from being replaced until the connection plugs have been inserted.

The relay case is suitable for either semi-flush or surface mounting on all panels up to 2 inches thick and appropriate hardware is available. However panel thickness must be indicated on the relay order to insure that proper hardware will be included. For outline and drilling dimensions, see Fig. 8. Every circuit in the drawout case has an auxiliary brush, as shown in Fig. 7 to provide adequate overlap when the connecting plug is withdrawn or inserted. Some circuits are equipped with shorting bars (see Figs. 3 and 4) and on these circuits it is especially important that the auxiliary brush makes contact as indicated in Fig. 7 with adequate pressure to prevent the opening of important interlock circuits.

RECEIVING, HANDLING AND STORAGE

These relays, when not included as 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. 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.

Also check the nameplate stamping to insure that the model number and the rating of the relay received agree with the requisition. Check the operation manually and check that the contact gap and wipe agree with values given under the section on ADJUSTMENTS AND INSPECTION.

ADJUSTMENT AND INSPECTION

Mechanical Check

Before installation, the relay should be checked mechanically to see that it operates smoothly and that the contacts are correctly adjusted.

With the relay de-energized each normally open contact should have a gap of .010" - .015". Observe

the wipe on each normally closed contact by deflecting the stationary contact member towards the frame. Wipe should be approximately .005".

The wipe on each normally open contact should be approximately .005". This can be checked by inserting a .005" shim between the residual screw and the pole piece and operating the armature by hand. The normally open contacts should make before the residual screw strikes the shim.

Electric Test

The relay should be tested before installation and periodically thereafter by connecting a variable source of D-C voltage to the coil studs and checking the pickup voltage. The relay should be adjusted by means of the variable resistor (R_1) to the time delay required at its final location (see Figs. 1 and 2). An electronic timer should be used in making this setting.

A variable source of D-C power should be connected to the target circuits if they are present and the pickup amperes checked. The target should pick up at or below its rating.

SERVICING

For cleaning relay contacts a flexible burnishing tool should be used. This consists of an etched roughened strip of flexible metal, resembling a superfine file which removes corroded material quickly without scratching the surface. The flexibility of the tool insures the cleaning of the actual points of contact. Never use knives, files, abrasive paper or cloth to clean relay contacts. A burnishing tool as 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, specify quantity required, name of the part wanted, and give complete nameplate data. If possible, give the General Electric requisition number on which the relay was furnished.

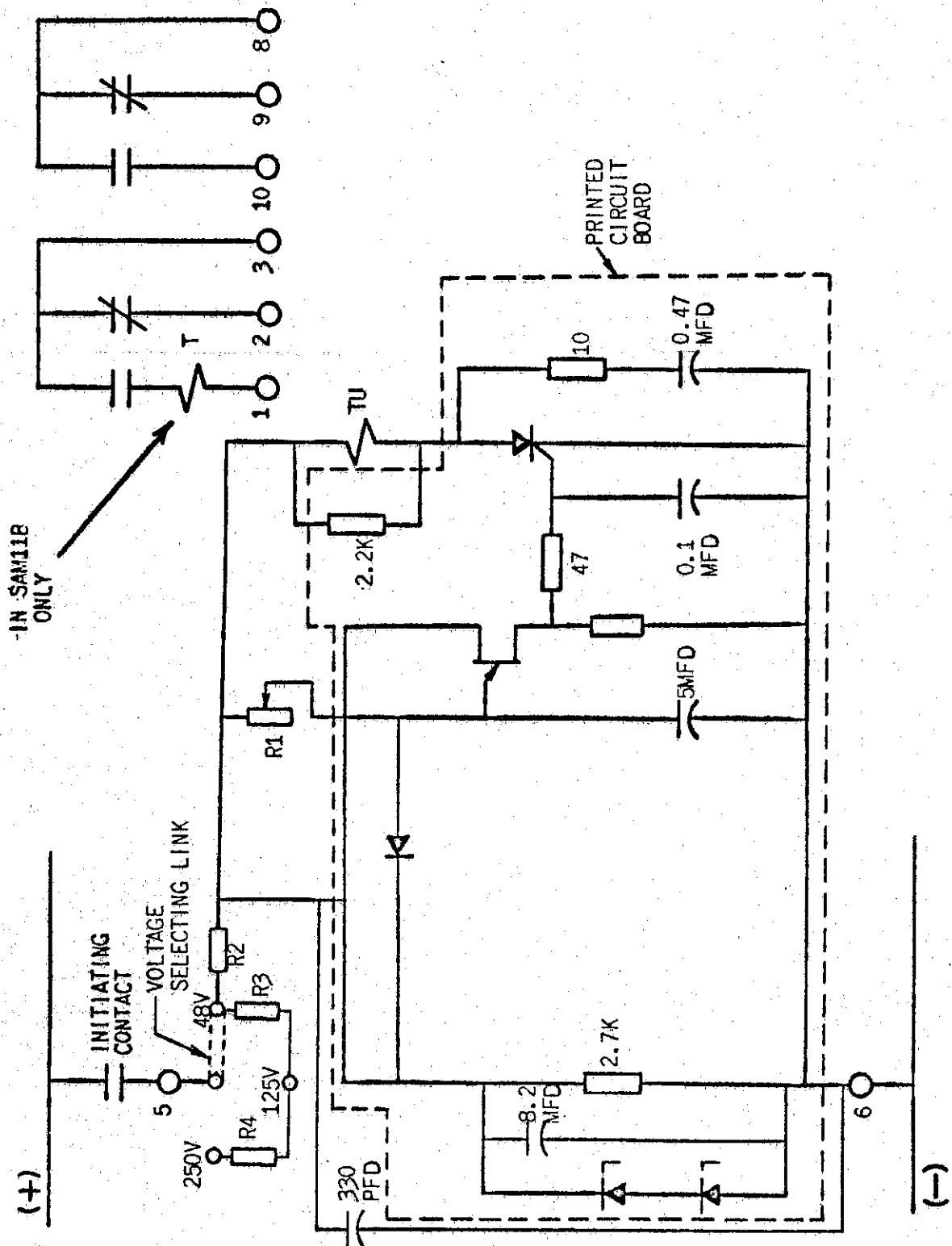


Fig. 2 (208A2480-0) Typical External Connection for Type SAM11B21A and up, SAM11A21A and up Relays

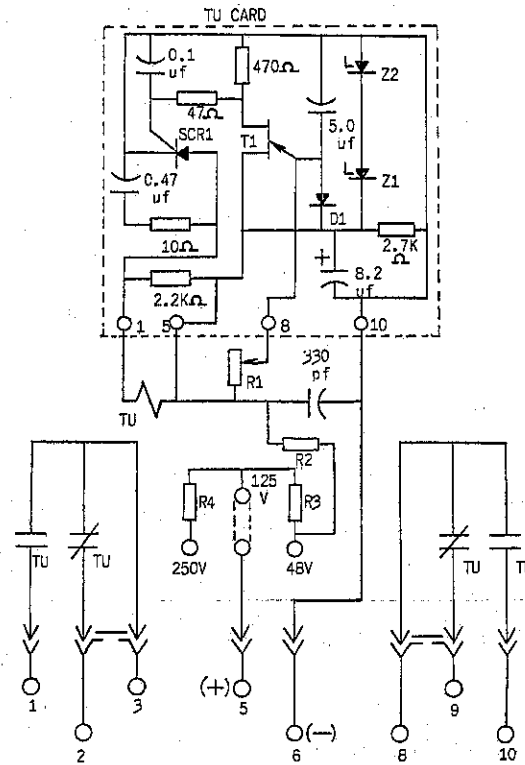
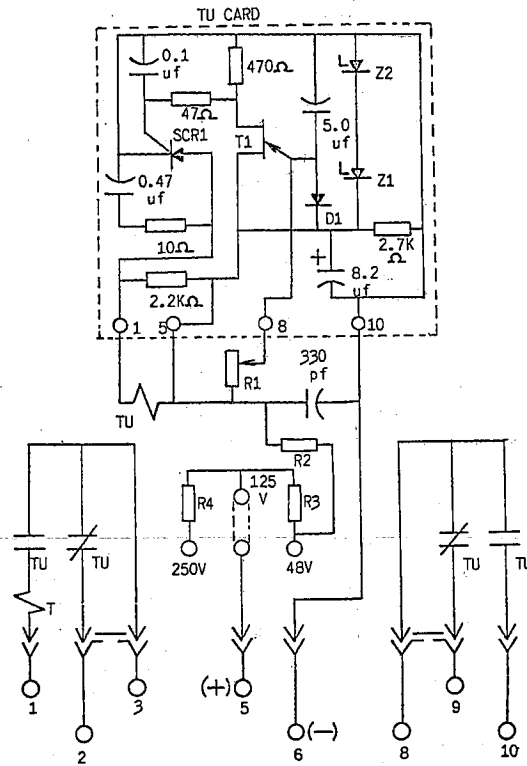


Fig. 3A (208A2420-0 Sh.1) Internal Connection for Type SAM11A21 and up Relay (Front View).

MODEL	FORM		
12SAM11A(-)A	21	22	
VOLTS D.C.	48/125/ 250	48/125/ 250	
RESISTANCE IN OHMS			
TU COIL	650	650	
R1	0.5 MEG.	1.5 MEG	
R2	500	500	
R3	1200	1200	
R4	2000	2000	

Fig. 3B (208A2420-Sh.2) Internal Connection for Type SAM Relay (Front View).



5O= TIP NO ON PRINTED CIRCUIT CARD

Fig. 4A (208A2421-0-Sh.1) Internal Connection for Type SAM11B21 and up. Relay (Front View).

MODEL	FORM		
12SAM11B(-)A	21	22	
VOLTS D.C.	48/125/ 250	48/125/ 250	
RESISTANCE IN OHMS			
TU COIL	650	650	
R1	0.5 MEG.	1.5 MEG	
R2	500	500	
R3	1200	1200	
R4	2000	2000	

Fig. 4B (208A2421-0-Sh.2) Internal Connection for Type SAM Relay (Front View).

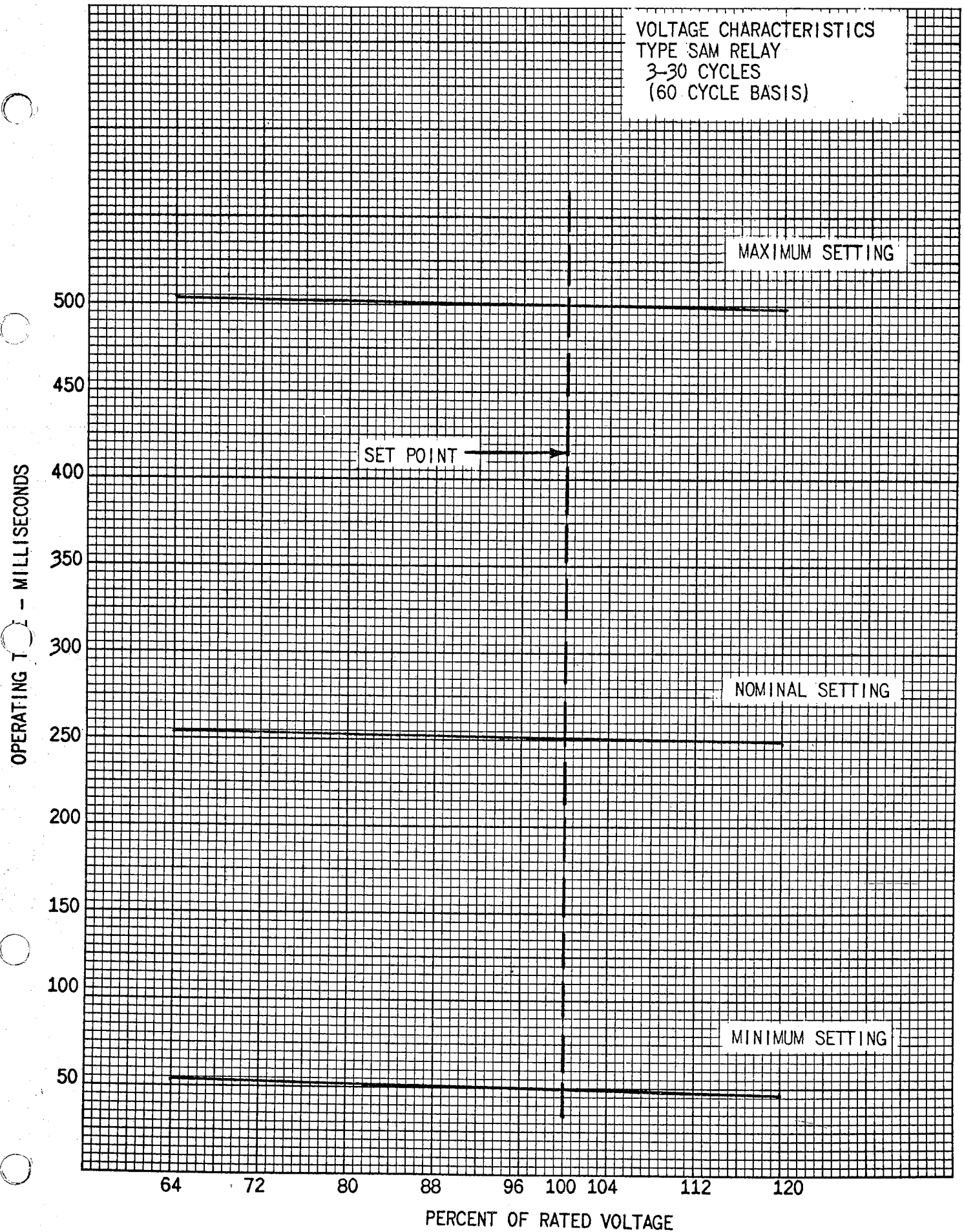


Fig. 5 (165A7626-3) Voltage Characteristics Type SAM Relay.

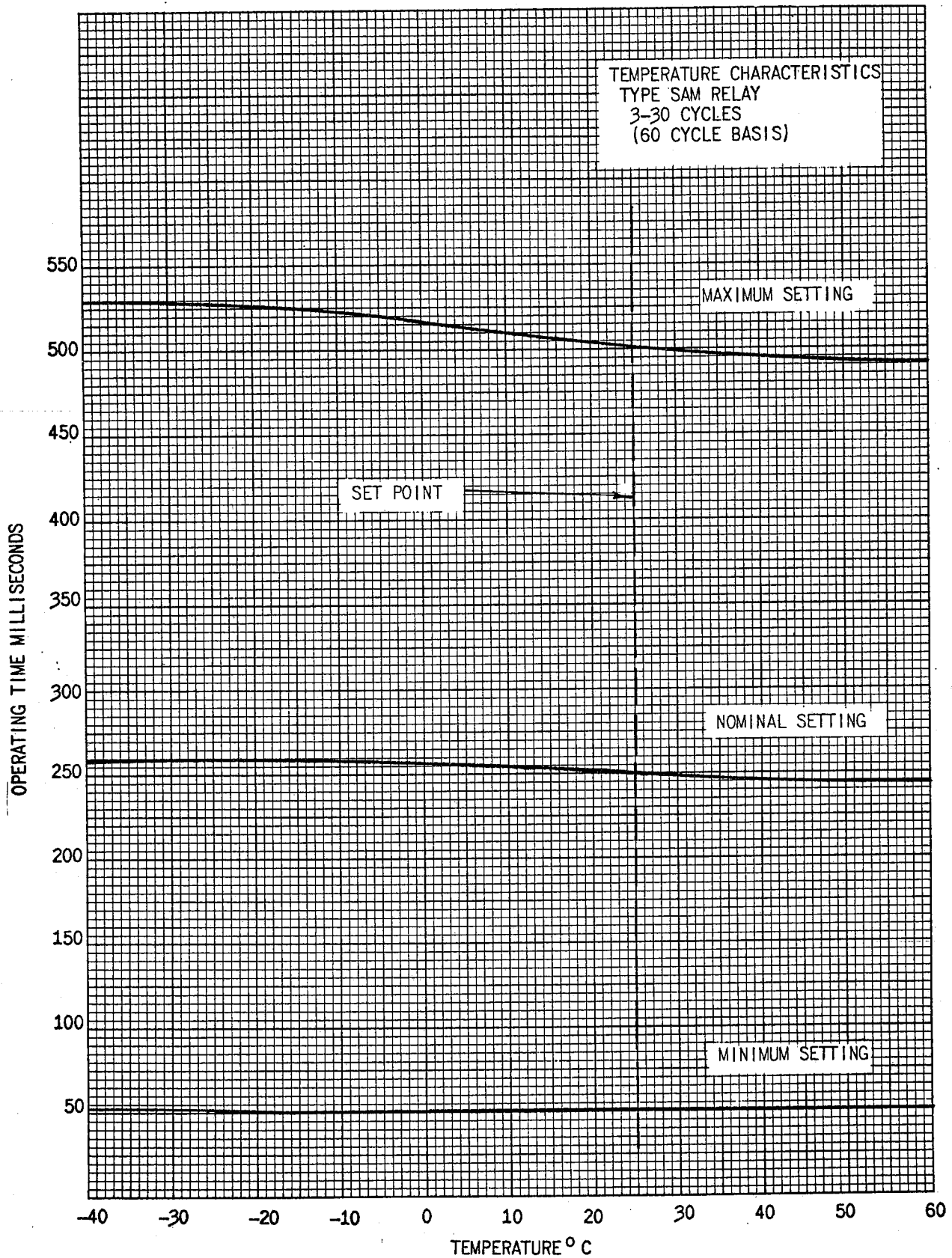
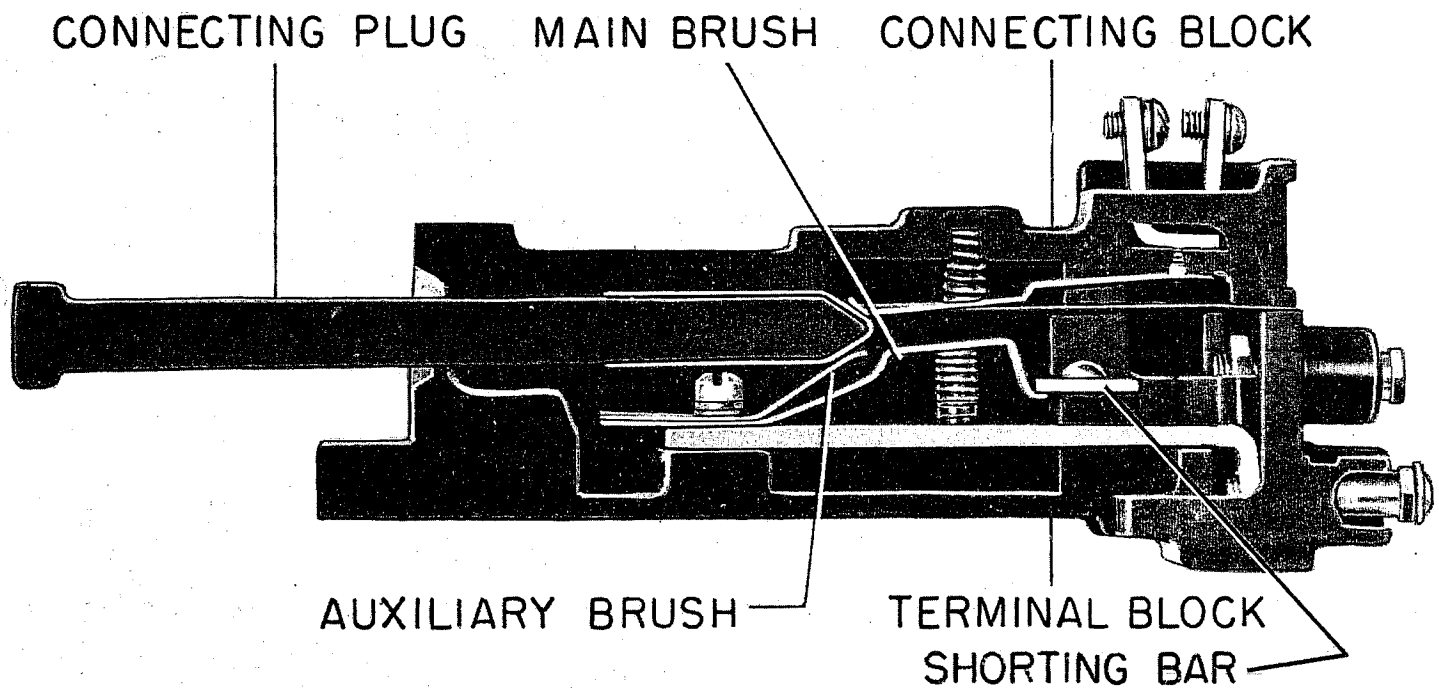


Fig. 6 (165A7625-0) Temperature Characteristics Type SAM Relay.



NOTE: AFTER ENGAGING AUXILIARY BRUSH, CONNECTING PLUG TRAVELS $\frac{1}{4}$ INCH BEFORE ENGAGING THE MAIN BRUSH ON THE TERMINAL BLOCK

Fig. 7 (8025039) Cross Section of Drawout case showing position of Auxiliary Brush.

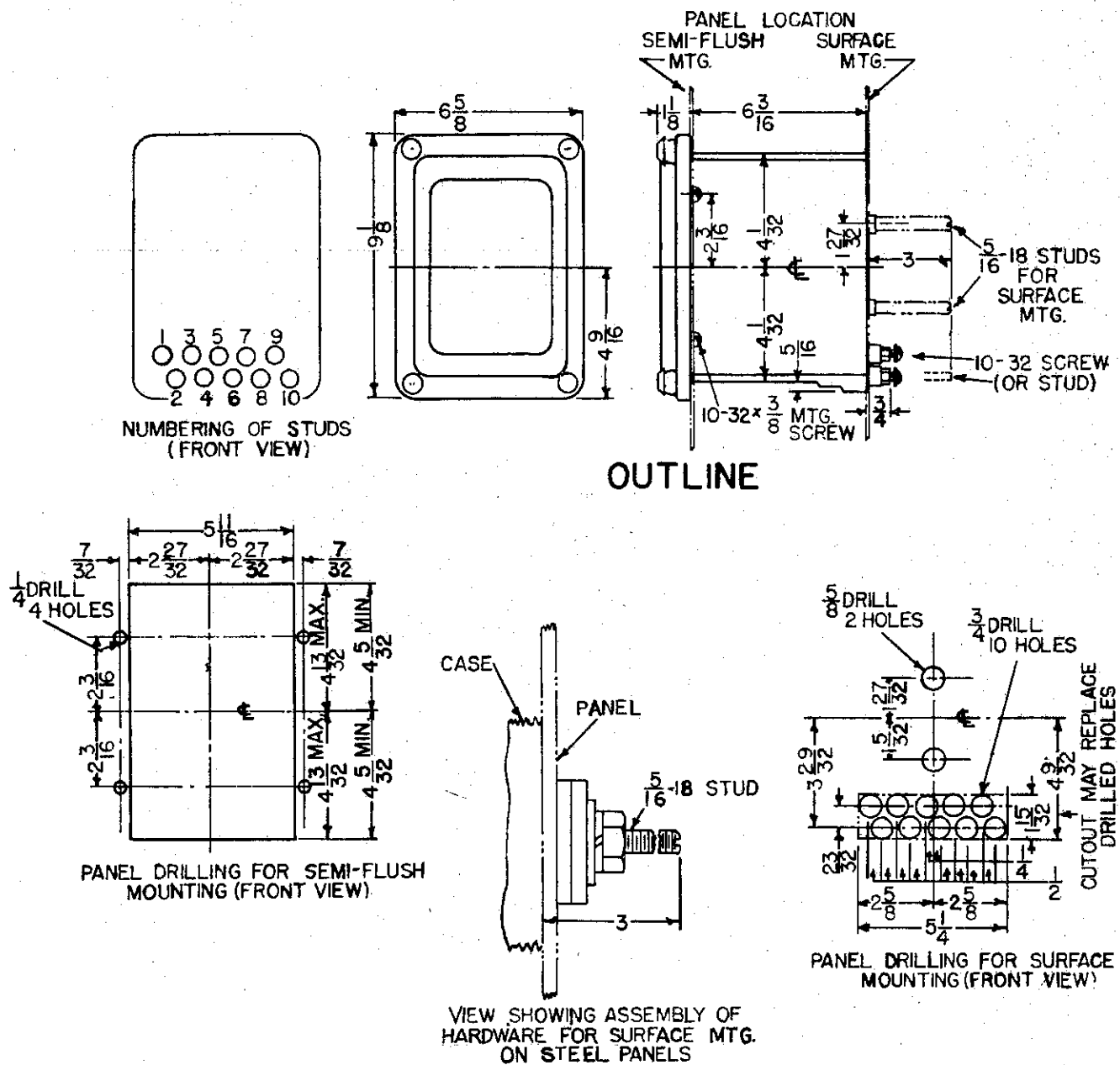


Fig. 8 (6209271-3) Outline of Panel Drilling for Drawout Relays.