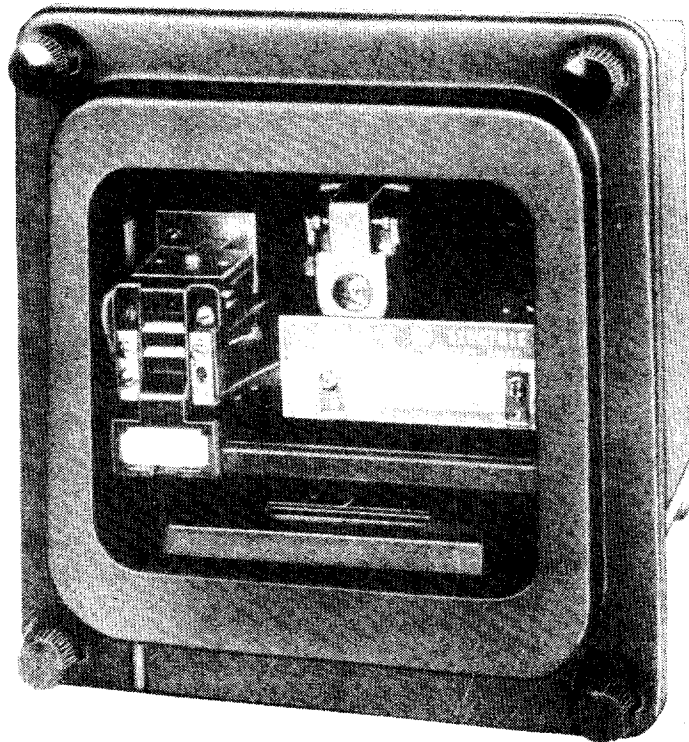




INSTRUCTIONS

GEK-49824A

**STATIC VACUUM DETECTOR RELAY
TYPE SVC**



GENERAL  ELECTRIC

CONTENTS

	PAGE
DESCRIPTION	3
APPLICATION	3
RATINGS AND BURDEN	3
NOMINAL OPERATING TIME CURVE	3
PICKUP LEVEL	3
OPERATING FREQUENCY	3
CONTINUOUS OPERATING CURRENT	3
MAXIMUM INPUT CURRENT	3
VOLTAGE INSULATION RATING	3
OUTPUT CONTACT RATING	3
HIGH-SEISMIC TARGET	4
BURDEN	4
AMBIENT TEMPERATURE	4
CHARACTERISTICS	4
OPERATING PRINCIPLES	4
CONSTRUCTION	4
RECEIVING, HANDLING AND STORAGE	5
ACCEPTANCE TESTS	5
VISUAL INSPECTION	5
MECHANICAL INSPECTION	5
ELECTRICAL INSPECTION	5
INSTALLATION PROCEDURE	6
PERIODIC CHECKS AND ROUTINE MAINTENANCE	6
RENEWAL PARTS	6

Cover (8043174)

STATIC VACUUM DETECTOR RELAY

TYPE SVCDESCRIPTION

The SVC relay is a sensitive, current-operated time-delay relay specifically designed for detection of inadequate vacuum and subsequent insulation breakdown in a vacuum power circuit breaker. One SVC relay is used in the residual circuit of the three current transformers normally used for relaying. An "a" contact of the circuit breaker is wired in parallel with the input of the SVC relay for proper operation. The SVC relay operates when the breaker opens and zero sequence current above the pickup level exists longer than the normal clearing time of the breaker. Two isolated "C" trip contacts are provided with one "C" contact containing a 0.2/2.0 amp target in series with one of the normally open contacts. The case is the compact V1 size. The outline and panel drilling are shown in Fig. 6. The relay internal connections are shown in Fig. 1.

APPLICATION

The SVC relay is intended for use with vacuum circuit breakers such as furnished in the *POWER/VAC metal-clad switchgear. One relay per breaker is used to detect an incipient failure due to vacuum loss. The current detection scheme senses zero sequence current when the breaker is open and has a 50 millisecond minimum delay for 10 amps or more in the secondary winding.

RATINGS AND BURDENNOMINAL OPERATING TIME CURVE

See Fig. 3 for nominal operating curve. Response time is 50 to 85 milliseconds for 10 amps RMS input.

PICKUP LEVEL

The relay will pick up for input currents equal to or greater than 150 milliamps RMS.

OPERATING FREQUENCY

50/60 hertz.

CONTINUOUS OPERATING CURRENT

5.0 amperes RMS

MAXIMUM INPUT CURRENT

100 amperes for 200 milliseconds
50.0 amperes for 1.00 second

VOLTAGE INSULATION RATING

The relay is in the 300 volt class and will withstand 1500 volt, 60 hertz hipot from input to output and from case to all terminals.

OUTPUT CONTACT RATING

The maximum voltage rating is 250 VDC. The relay contacts will make and carry 30 amperes resistive for at least 500 duty cycles at 20°C ambient with the relay in case and the cover secured. One duty cycle is:

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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.

To the extent required the products described herein meet applicable ANSI, IEEE and NEMA standards; but no such assurance is given with respect to local codes and ordinances because they vary greatly.

ON 200 milliseconds
 OFF 300 milliseconds
 ON 200 milliseconds
 OFF 15 seconds
 ON 200 milliseconds
 OFF 30 seconds
 ON 200 milliseconds
 OFF 120 seconds

Current is interrupted by external means at the end of each ON cycle.

Current is interrupted by external means at the end of each ON cycle.

HI-SEISMIC TARGET

Ratings for the target unit are shown in Table I.

TABLE I

	Tap	
	0.2	2.0A
DC Resistance $\pm 10\%$ (ohms)	8.0	0.24
Minimum operating amps $+0, -25\%$	0.2	2.0
Carry continuous (amps)	0.3	3.0
60 Hz impedance (ohms)	68.6	0.73

BURDEN

At 100 amps RMS input current, the voltage drop across the input terminals is less than 10 volts RMS.

AMBIENT TEMPERATURE

These relays are designed for use in ambient temperatures between -20°C (-4°F) and $+55^{\circ}\text{C}$ ($+131^{\circ}\text{F}$).

CHARACTERISTICS

OPERATING PRINCIPLES

A detailed schematic is shown in Fig. 1. During normal operation, the input terminals are short circuited external to the relay by the "a" contacts of the circuit breaker. The "a" contacts of the breaker reflect the status of the power contacts. The closed breaker deactivates the SVC relay completely by shunting the current through the "a" contacts.

When the breaker is opened, either manually or by relay action due to a fault, the residual current from the current transformers is rectified in a full wave bridge (CR1 through CR4) and applied to the coil (K1) of a slugged telephone relay with a minimum time delay of 50 milliseconds. The relay coil voltage is limited by a diode clamp (CR5, CR6). Capacitors C1 through C6 are used to suppress transient surges and to protect the rectifiers.

A secondary alternating current of 150 milliamps or more will trip the SVC relay.

CONSTRUCTION

The case is suitable for either surface or semi-flush panel mounting and an assortment of hardware is available for either mounting. Each cover screw has provision for a sealing wire.

This case has studs or screw connections at the bottom for external connections. The electrical connections between the relay and the case studs are made through spring-backed contact fingers mounted in stationary molded inner and outer blocks. A removable connecting plug completes the circuits. The outer block, attached to the case, has the studs for the external connections, and the inner block has the terminals for the internal connections. The contact assembly is shown in Fig. 9.

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. The cradle is held firmly in the case with a latch at the bottom and by a guide pin at the back of the case. The case and cradle are constructed so 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. The latch is 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 on the panel, either from its normal source of power or from other sources. Or, the relay unit can be withdrawn for testing and replaced by a spare unit. Observe caution when using the test plug since the current transformer shorting bar will be opened and high potential could exist at the test terminals.

RECEIVING, HANDLING AND STORAGE

The 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.

ACCEPTANCE TESTS

The relay should be examined and tested upon delivery to ensure that no damage has been sustained in shipment and that the relay functions properly.

The following tests may be performed as part of the installation of the relay at the discretion of the user. Since most operating companies use different procedures for acceptance and installation tests, the following section includes all applicable tests that may be performed on the relays.

VISUAL INSPECTION

Check the nameplate stamping to ensure that the model number agrees with the relay model number which was ordered.

Remove the relay from its case and check that there are no broken or cracked molded parts or other signs of physical damage, and that all the screws are tight.

MECHANICAL INSPECTION

The telephone relay units in these relays should be checked to have between 8 and 11 mils gap between the armature stop and the armature when it is at the rest position. The normally open contacts should have at least 5 mils overtravel.

Make sure that the fingers in the relay cradle and case blocks agree with the internal connections diagram Fig. 1

The target in the target unit must come into view and latch when the armature is operated by hand and should unlatch when the target release lever is operated.

ELECTRICAL INSPECTION

Refer to Fig. 4 for the suggested test circuit for checking pickup level and pickup time. Since the pickup level is much lower than the maximum allowable input current, several ammeter ranges must be used during test.

PICKUP TEST

Slowly raise the input current from less than 10 milliamps and determine when the normally open contacts close. Pickup should occur at less than 150 milliamps RMS.

TIME TEST

Set the input current to 10.0 amps RMS and then open the switch. Reset the timer and close the switch to measure trip time. Trip time should be 50.0 to 85.0 milliseconds.

HI-SEISMIC TARGET UNIT

The target unit has an operating coil tapped at 0.2 and 2.0 amperes. The relay is shipped with the tap screw in the 2.0 amp position. The tap screw is the screw holding the right-hand stationary contact. To change the tap setting, first remove one screw from the left-hand stationary contact and place it in the desired tap. Next remove the screw from the undesired tap and place it on the left-hand stationary contact where the first screw was removed. This procedure is necessary to prevent the right-hand stationary contact from getting out of adjustment. Screws should never be left in both taps at the same time.

PICKUP AND DROPOUT TEST

Connect relay studs 1 and 3 to a DC voltage source, ammeter and load box so that the current can be controlled over a range of 0.1 to 2.0 amperes.

Increase the current slowly until the target unit picks up. See Table II.

TABLE II

Tap	Pickup Current	Dropout Current
0.2	0.12 - 0.19	0.05 or more
2.0	1.2 - 1.9	0.50 or more

INSTALLATION PROCEDURE

The relay should be installed in a clean, dry location, free from dust and excessive vibration and well lighted to facilitate inspection and testing. The relay should be mounted on a vertical surface. The outline and panel drilling dimensions are shown in Fig. 6.

The internal connection diagram for the relay is shown in Fig. 1.

A typical external connection diagram is shown in Fig. 2.

TEST PLUGS

All General Electric drawout case relays may easily be tested in the case by using the XLA13A test plug. The XLA13A test plug brings only the ten relay connections to the front of the relay.

For further information on this test plug refer to Section 7332 in the General Electric Apparatus Handbook or contact the nearest General Electric Apparatus Sales Office.

PERIODIC CHECKS AND ROUTINE MAINTENANCE

In view of the vital role of protective relays in the operation of a power system it is important that a periodic test program be followed. It is recognized that the interval between periodic checks will vary depending upon environment, type of relay and the user's experience with periodic testing. Until the user has accumulated enough experience to select the test interval best suited to his individual requirements it is suggested that the points listed under ACCEPTANCE TESTS be checked at an interval of from one to two years.

CONTACT CLEANING

For cleaning relay 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 it will clean off any corrosion thoroughly and rapidly. Its flexibility insure the cleaning of the actual points of contact. Do not use knives, files, abrasive paper or cloth of any kind to clean relay contacts.

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 the complete model number of the relay for which the part is required.

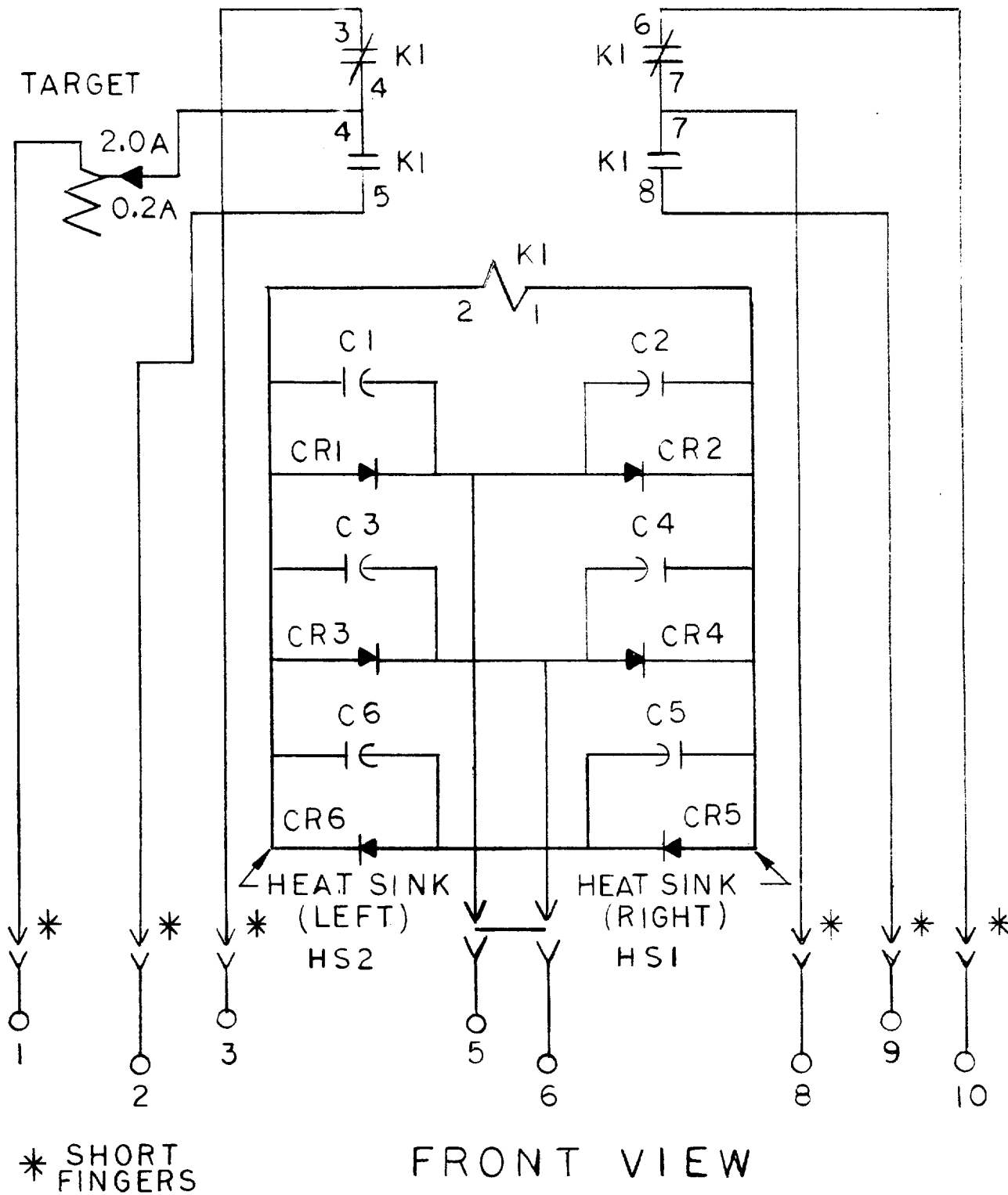


FIG. 1 (0269A3064-0) Internal Connections Diagram

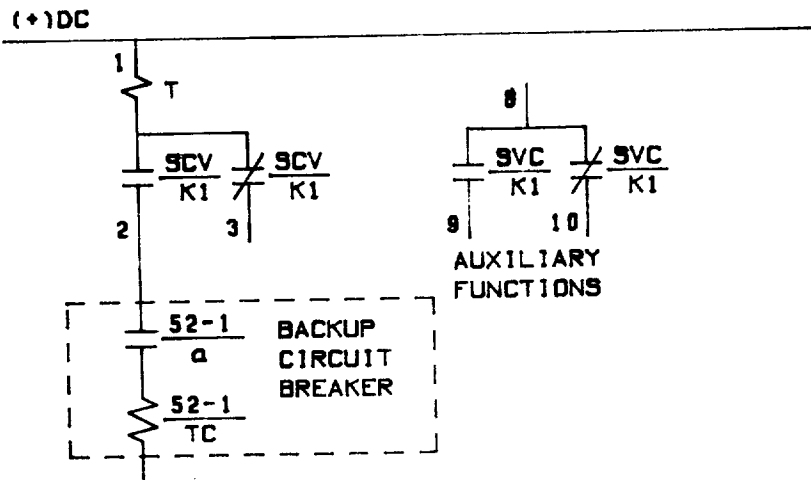
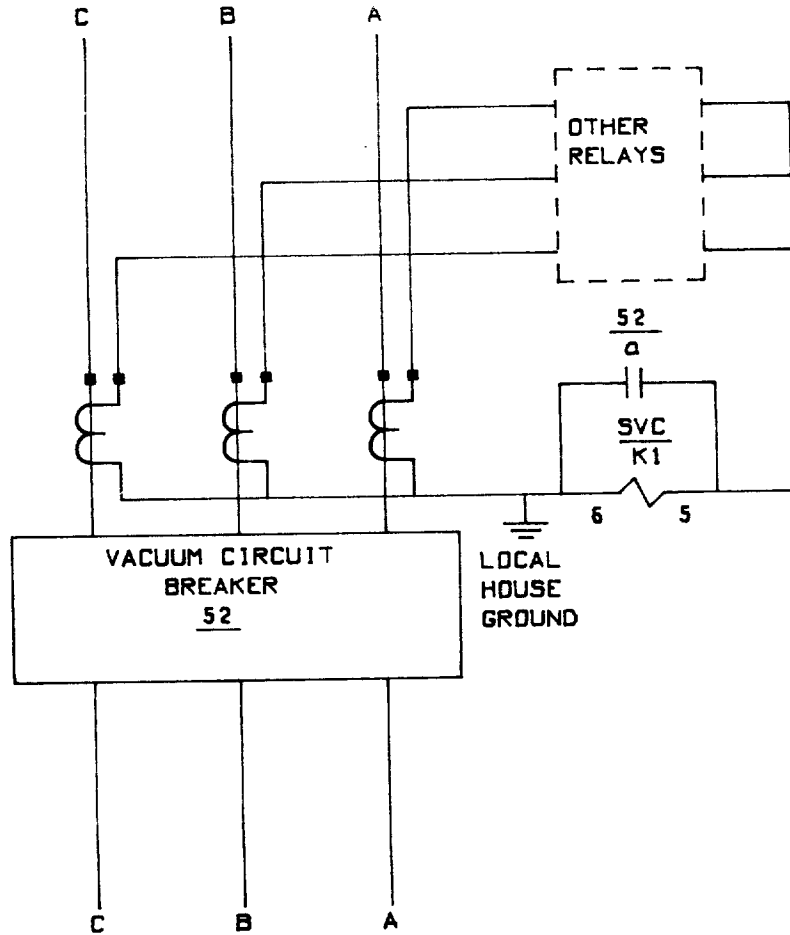


FIG. 2 (0257A9789-0 & 0257A9790-0) External Connection Diagram

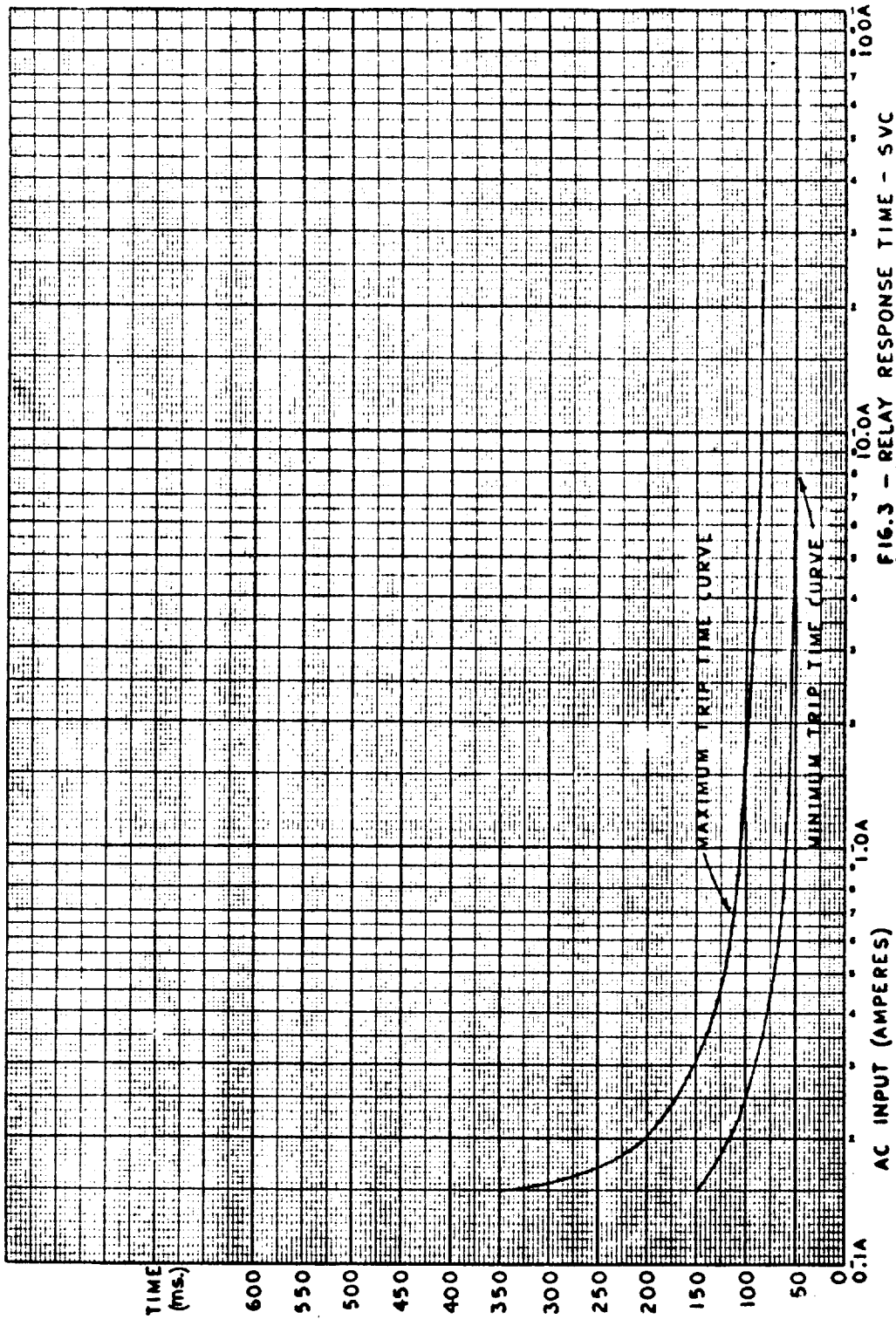


FIG. 3 - RELAY RESPONSE TIME - SVC

FIG. 3 (0257A9688-0) Relay Response Time

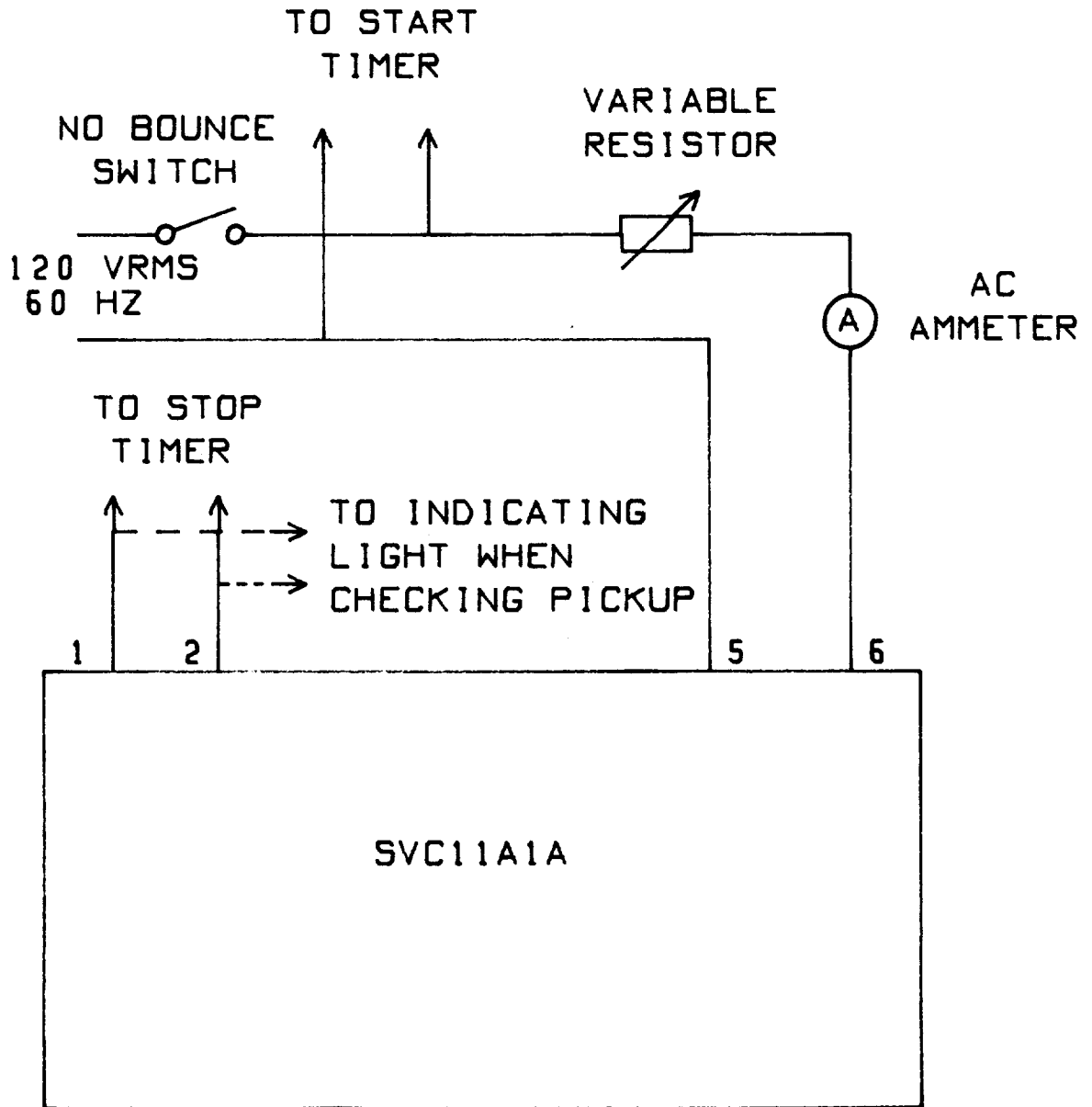


FIG. 4 (0257A9690-0) Test Connections for Pickup Level and Operating Time

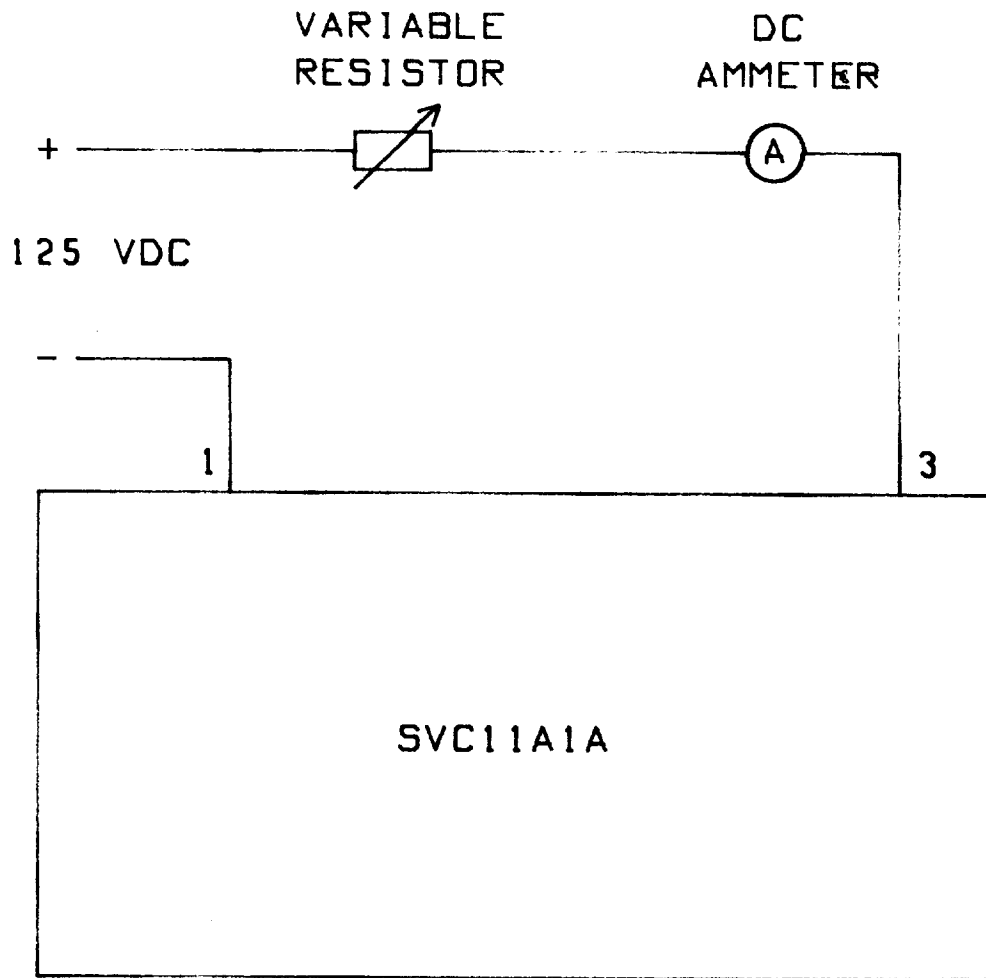


FIG. 5 (0257A9689-0) Test Connections for Target Unit

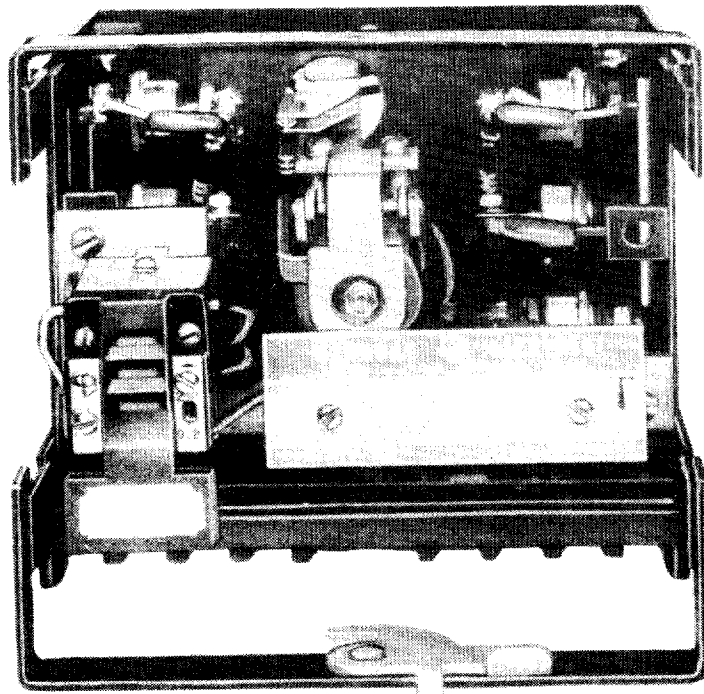


FIG. 6 (8043175) SVC Relay - Front View (Removed from Case)

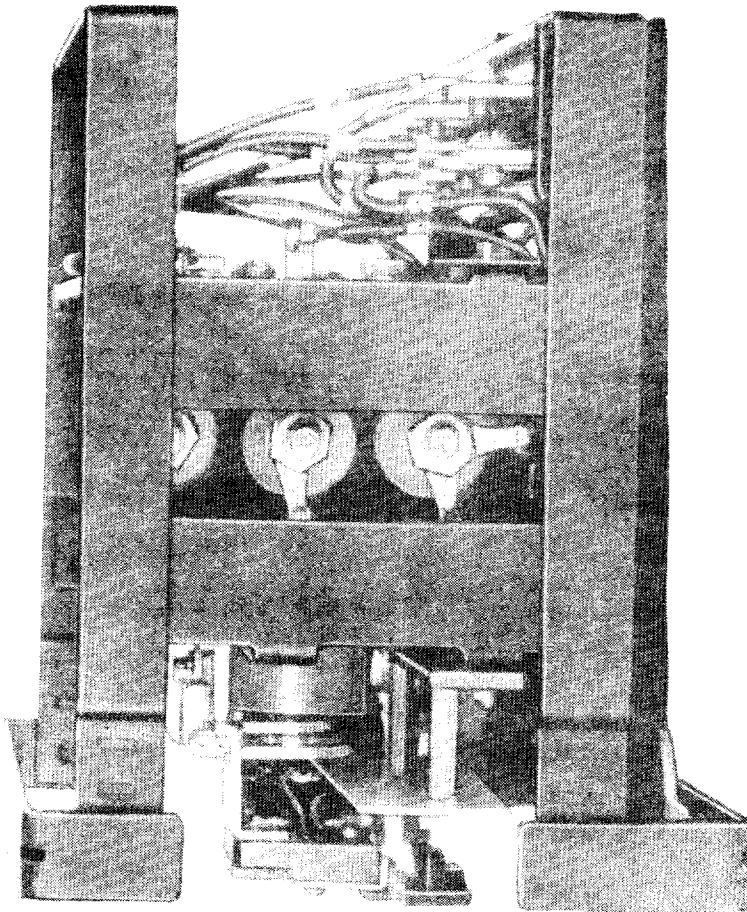


FIG. 7 (8043177) SVC Relay - Side View (Removed from Case)

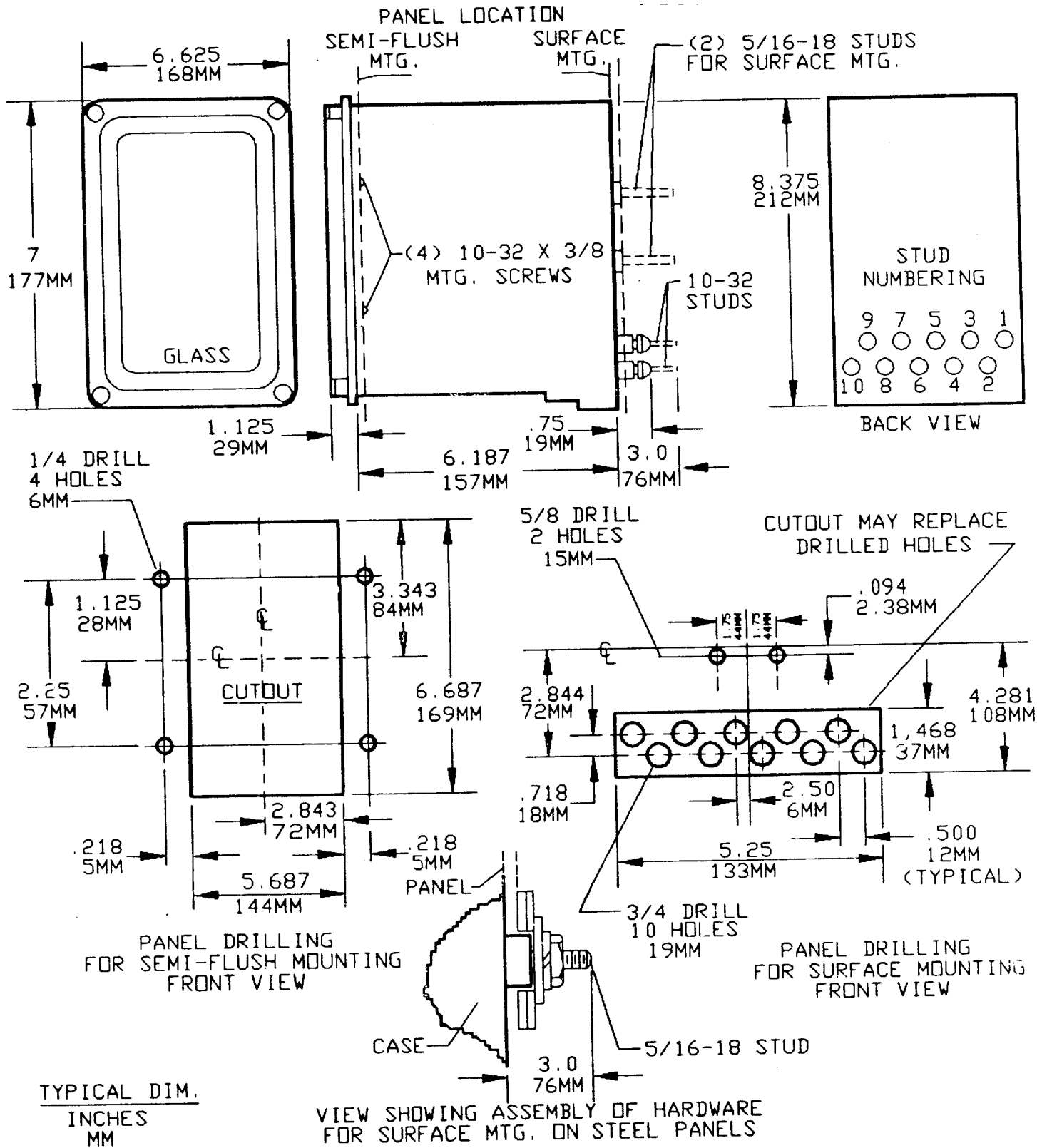
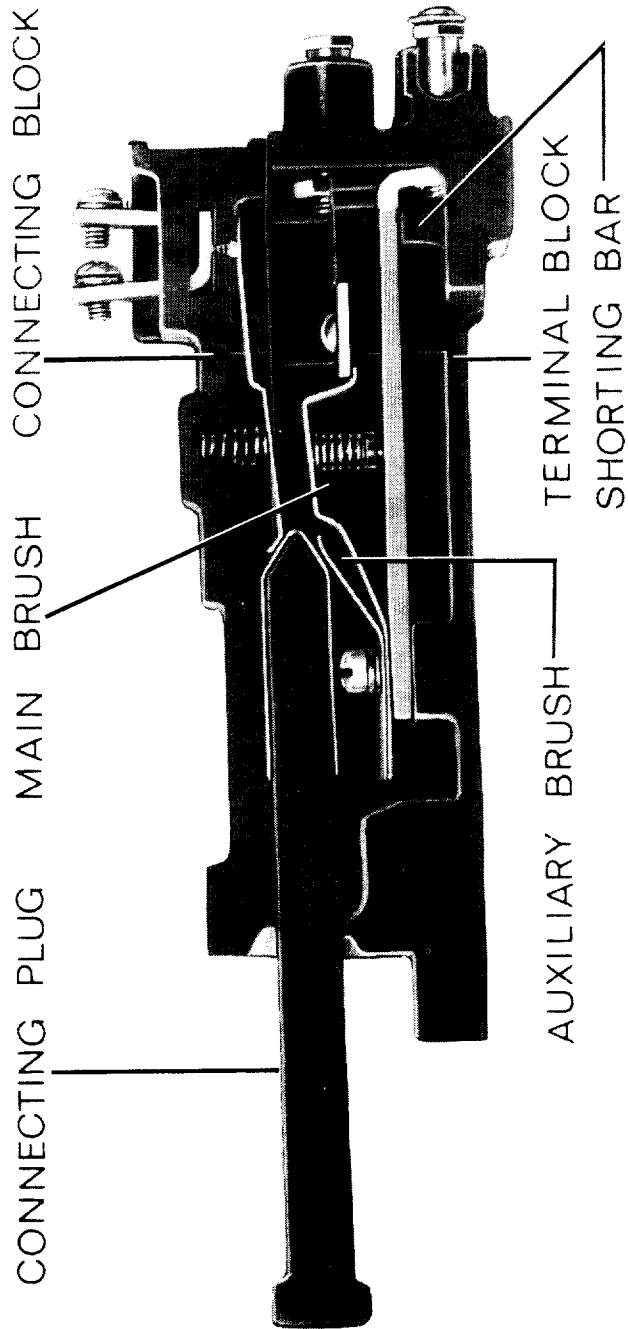


Figure 8 (0246A7968 [4]) V1 Case Outline and Panel Drilling Dimensions



NOTE: AFTER ENGAGING AUXILIARY BRUSH CONNECTING PLUG TRAVELS 1/4 INCH BEFORE ENGAGING THE MAIN BRUSH ON THE TERMINAL BLOCK

FIG. 9 (8025039) Contact Assembly Cutaway



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