INSTRUCTIONS

GEK-49832

STATIC OUTPUT AND TRIPPING RELAY TYPE SLAT53C

GENERAL ELECTRIC

CONTENTS

STATIC OUTPUT AND TRIPPING RELAY

TYPE SLAT53C

DESCRIPTION

The Type SLAT53C relay is a rack mounted output and tripping unit containing both electromechanical relays and solid state circuitry. The SLAT53C provides the output circuits for a single pole tripping and reclosing scheme. Other solid state relays, a power supply, and a test panel are required for a complete protective system.

APPLICATION

Refer to the overall logic diagram and its associated logic description for specific information regarding the particular scheme in which this relay is employed.

RATINGS

The Type SLAT53C relay is designed for use in an environment where the ambient temperature around the relay case is between -20°C and +65°C.

The Type SLAT53C relay requires a ±15 VDC power source which can be obtained from a Type SSA50/51 power supply.

The SCR trip circuits are rated for 48/125 or 250 VDC. Each has a series target which operates when 1.0 ampere is passed through the trip circuit. The SCR trip circuit, without series contact, is designed to carry 30 amperes for one second. With the series contact, the trip circuit is limited to the contact rating.

The contacts of the telephone-type relays will make and carry three amperes continously; they will make and carry 30 amperes for one second. These contacts will interrupt up to 180 volt-amperes resistive (60 volt-amperes inductive).

The contacts of reed relays RR38, RR39, RR40 and RR42 will make and carry three amperes for tripping duty and are continuously rated for three amperes. The contacts will interrupt up to 100 volt-amperes resistive (35 volt-amperes inductive).

The contacts of reed relays RR31, RR34, RR35 and RR36 will make and carry 0.5 ampere. The contacts will interrupt 10 volt-amperes resistive.

Contact converter CC31 has a link for selecting the proper voltage for the coil circuit of the converter. The available taps are for 48, 125 and 250 VDC.

BURDEN

The SLAT53C relay presents a maximum burden to the Type SSA power supply of:

200 MA from the +15 VDC supply
200 MA from the -15 VDC supply

The contact converter, when energized, draws 10 milliamperes from the station battery.

FUNCTIONS

Not all of these functions will be supplied on every unit. Refer to the unit nameplate or associated overall logic diagram for the included functions.

SCR TRIP CIRCUITS

Four pairs of SCR trip circuits are provided, one pair for each phase and one pair for three-pole tripping. Each pair consists of two electrically separate, isolated SCR trip circuits. One SCR in each pair is connected in series with a contact from reed relay RR38, RR39, RR40 or RR41.

The internal connections for the SCR trip and isolator subassemblies are shown in Fig. 3. The isolator card, by means of a DC-to-DC converter, provides a signal path but maintains metallic isolation. This provides isolation between the relay logic voltage and the trip circuit voltage.

Eight electromechanical target coils are included, one in series with each SCR. These targets operate on one ampere of trip current when the associated SCR passes current.

The trip circuit resistance in the relay is 0.4 ohm.

RI - RECLOSE INITIATE CIRCUIT

Two electrically separate, normally open contacts are provided. These contacts close within 17 milliseconds from the time the relay coil is energized by the logic. The contacts open within 170 milliseconds from the time the coil is deenergized. The RI function uses a telephone-type relay with contact ratings as stated under RATINGS.

AUXILIARY REED RELAY OUTPUTS

The usage of reed relays RR31, RR34, RR35, RR36 and RR42 is determined by the particular scheme in which the SLAT53C is employed. Each relay has two normally open contacts whose ratings are specified under RATINGS.

CONTACT CONVERTER-CC31

When the contact associated with CC1 is closed, all reed relays and telephone relays are prevented from operating. This contact converter is used to disable the relaying equipment.

LOGIC CIRCUITS

The functions of the Type SLAT53C relay involve basic logic (AND, OR, and NOT) where the presence or absence of signals, rather than their magnitude, controls the operation. Signals are measured with respect to a reference bus accessbile at TP1. In general, a signal below one volt DC represents an OFF or LOGIC ZERO condition; an ON or LOGIC ONE condition is represented by a signal of approximately +15 VDC.

The symbols used on the internal connection diagram (Fig. 1) are explained by the legend shown in Fig. 2.

CONSTRUCTION

The SLAT53C relay is packaged in an enclosed metal case with hinged front covers and removable top cover. The outline and mounting dimensions of the case and the physical location of the components are shown in Figs. 4 and 5 respectively.

The SLAT5C relay contains printed circuit cards identified by a code number such as A111, T102, L104 where A designates auxiliary function, T designates time-delay function, and L designates logic function. The printed circuit cards plug in from the front of the unit. The sockets are marked with letter designations or "addresses" (D, E, F, etc.) which appear on the guide strips in front of each socket, on the component location drawing, on the internal connection diagram and on the printed circuit card. The test points (TP1, TP2, etc.) shown in the internal connection diagram are connected to instrument jacks on a test card in position T or AT with TP1 at the top of the AT card. TP10 is tied to +15 VDC through a 1.5K resistor. This resistor limits the current when TP10 is used to supply a logic signal.

RECEIVING, HANDLING AND STORAGE

These relays will normally be supplied as a part of a static relay equipment, mounted in a rack or cabinet with other static relays and test equipment. Immediately upon receipt of a static relay equipment, it should be unpacked and examined 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 Sales Office.

Reasonable care should be exercised in unpacking the equipment. If the equipment is not to be installed immediately, it should be stored indoors in a location that is free from moisture, dust, metallic chips, and severe atmospheric contaminants.

Just prior to final installation the shipping support bolt should be removed from each side of all relay units, to facilitate possible future unit removal for maintenance. These shipping support bolts are approximately eight inches back from the relay front panel. Static relay equipment, when supplied in swing rack cabinets, should be securely anchored to the floor or to the shipping pallet to prevent the equipment from tipping over when the swing rack is opened.

INSTALLATION TESTS

CAUTION

THE LOGIC SYSTEM SIDE OF THE DC POWER SUPPLY USED WITH MOD III STATIC RELAY EQUIPMENT IS ISOLATED FROM GROUND. IT IS A DESIGN CHARACTERISTIC OF MOST ELECTRONIC INSTRUMENTS THAT ONE OF THE SIGNAL INPUT TERMINALS IS CONNECTED TO THE INSTRUMENT CHASSIS. IF THE INSTRUMENT USED TO TEST THE RELAY EQUIPMENT IS ISOLATED FROM GROUND, ITS CHASSIS MAY HAVE AN ELECTRICAL POTENTIAL WITH RESPECT TO GROUND. THE USE OF A TEST INSTRUMENT WITH A GROUNDED CHASSIS WILL NOT AFFECT THE TESTING OF THE EQUIPMENT. HOWEVER, A SECOND GROUND CONNECTION TO THE EQUIPMENT, SUCH AS A TEST LEAD INADVERTENTLY DROPPING AGAINST THE RELAY CASE, MAY CAUSE DAMAGE TO THE LOGIC CIRCUITRY. NO EXTERNAL TEST EQUIPMENT SHOULD BE LEFT CONNECTED TO THE STATIC RELAYS WHEN THEY ARE IN PROTECTIVE SERVICE, SINCE TEST EQUIPMENT GROUNDING REDUCES THE EFFECTIVENESS OF THE ISOLATION PROVIDED.

GENERAL

If the SLAT53C relay that is to be tested is installed in an equipment which has already been connected to the power system, disconnect the outputs from the system before testing.

The SLAT53C relay is supplied from the factory either mounted in a static relay equipment or as a separate unit associated with measuring relays, a Type SSA power supply, and some form of channel equipment. All relay units for a given terminal of static relaying equipment are tested together at the factory, and each unit will have the same summary number stamped on its nameplate.

OPERATIONAL CHECKS

Operation of the SLAT53C unit can be checked by observing the signals at the twenty test points (TP1 to TP20) in the SLAT53C by observing the operation of the associated channel equipment, or by observing the output functions in the associated Type SLAT tripping relay. The test points are located on the test card in position T and AT and are numbered 1 to 20 from top to bottom. TP1 is the reference bus for the logic circuit; TP10 is +15 VDC. The remaining points are located at various strategic points throughout the logic as shown on the internal connection diagram (Fig. 1). Test point voltages can be monitored with a portable high impedance voltmeter, the voltmeter on the test panel of the associated equipment, or an oscilloscope.

Operation of any logic function may be checked by supplying the correct inputs to the card. This is accomplished by placing the card under test in a card extender, removing the cards which normally supply the input signals, and then connecting the card inputs to either TP10 or TP1. An output should be produced when the proper combination of inputs is supplied to the card.

TEST CARD ADAPTER

The test card adapter provides a convenient means of gaining access to any pin of a particular card. Detailed information on the use of the test adapter card is included in the card instruction book GEK-34158.

TRIP CIRCUIT TESTS

The SCR trip circuits and series mechanical targets may be checked by connecting an auxiliary lock-out relay, such as the Type HEA relay, in series with the SCR circuit. A typical circuit is shown in Fig. 6. The HEA relay should have the same DC rating as the SCR trip circuit of the SLAT53C. If an auxiliary lock-out relay is not available, it can be replaced by a resistive load which limits the trip circuit current to three amperes. In most equipments, the SCR can be gated by operating a test push button in the associated units.

Prior to final installation, a check of the overall trip circuit should be made with the SCR outputs connected to trip the circuit breakers.

OVERALL EQUIPMENT TESTS

After the SLAT53C relay and the associated static relay units have been individually calibrated and tested for the desired settings, a series of overall operating circuit checks is advisable.

The elementary, overall logic, and logic description for the specific job will be useful for determining the overall operation of the scheme.

Overall equipment tests can be performed by applying alternating current and voltages to the measuring units as specified in the instruction book for the measuring units and checking that proper outputs are obtained.

MAINTENANCE

PERIODIC TESTS

It should be sufficient to check the outputs produced at test points in the SLAT53C when periodic calibration tests are made on the associated measuring units, for example, the phase and ground relays in line-relaying scheme. No separate periodic tests on the SLAT53C itself should be required.

TROUBLE SHOOTING

In any trouble shooting of equipment, it should first be established which unit is functioning incorrectly. The overall logic diagram supplied with the equipment shows the combined logic of the complete equipment and the various test points in each unit. By signal tracing, using the overall logic diagram and the various test points, it should be possible to quickly isolate the trouble.

A test adapter card is supplied with each static relay equipment to supplement the prewired test point on the test cards. Use of the adapter card is described in the card instruction book GEK-34158.

A dual-trace oscilloscope is a valuable aid to detailed trouble shooting, since it can be used to determine phase shift, operate and reset times as well as input and output levels. A portable dual-trace oscilloscope with a calibrated sweep and trigger facility is recommended.

SPARE PARTS

To minimize possible outage time, it is recommended that a complete maintenance program should include the stocking of at least one spare card of each type. It is possible to replace damaged or defective components on the printed circuit cards, but great care should be taken in soldering so as not to damage or bridge-over the printed circuit busses, or overheat the semi-conductor components. The repaired area should be recovered with a suitable high-dielectric plastic coating to prevent possible breakdowns across the printed busses due to moisture and dust. The wiring diagrams for the cards in the SLAT53C relay are included in the card book GEK-34158.

NOTES

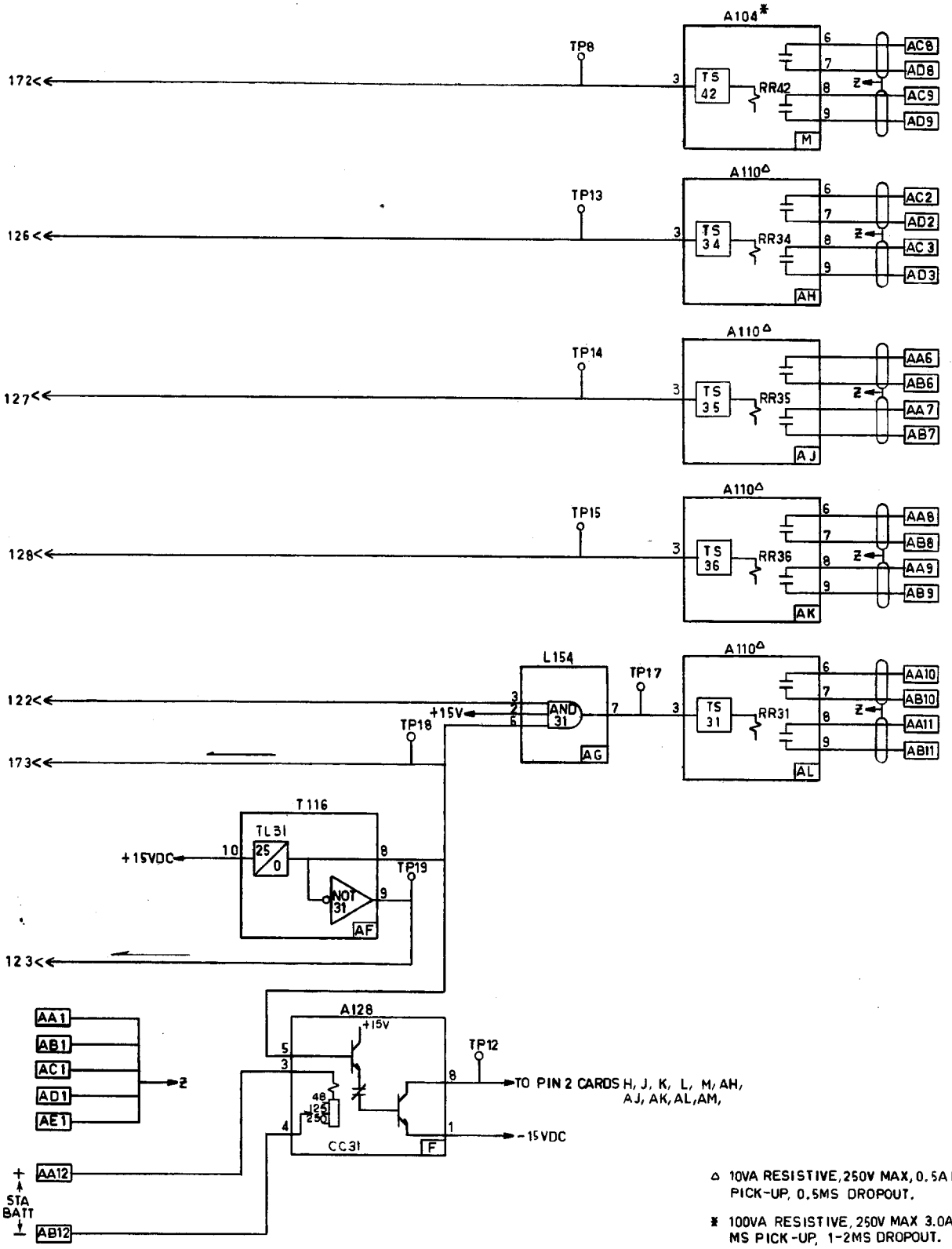
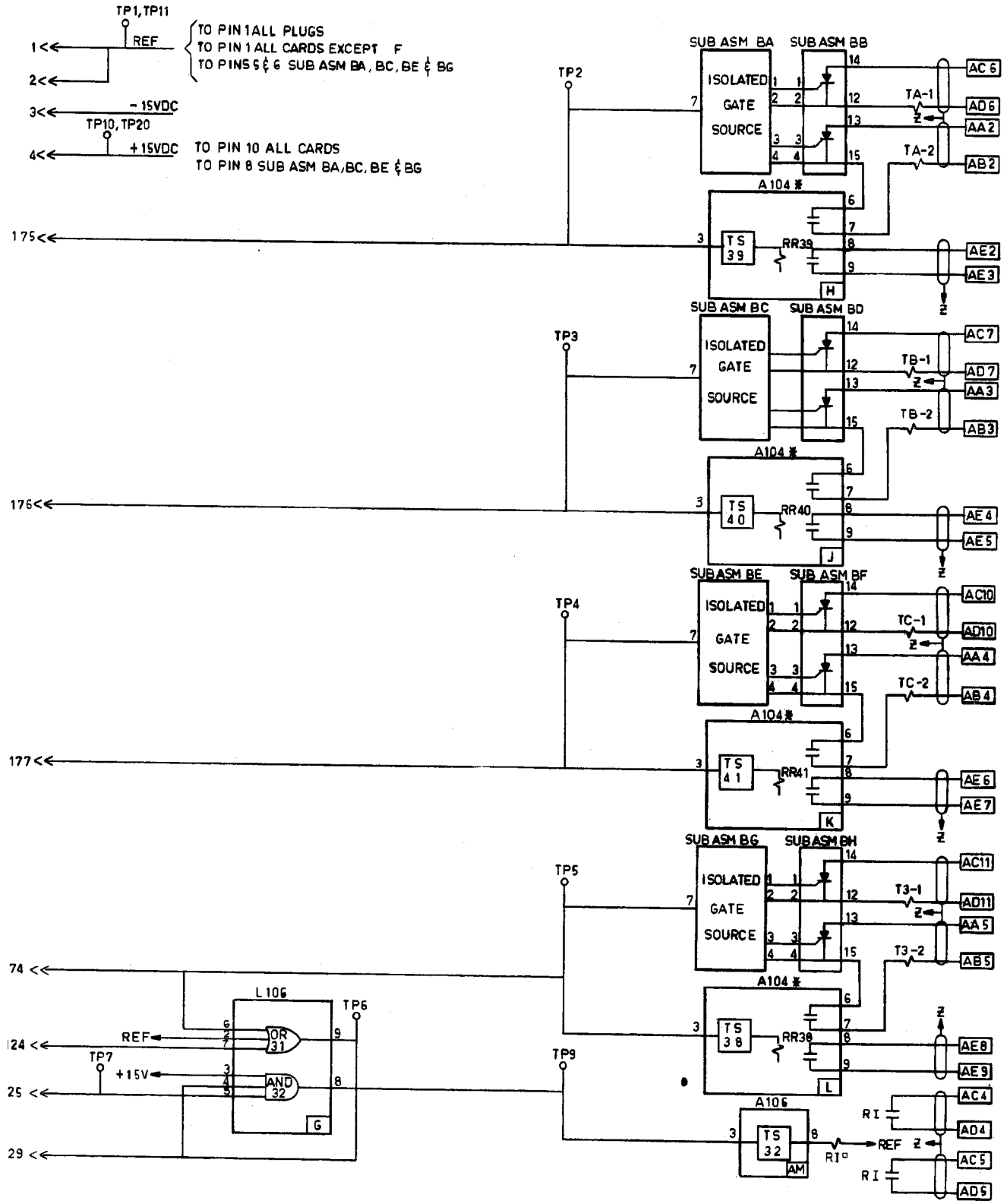


FIG. 1. (0136D3557-0) Internal



gram for the Type SLAT53C Relay

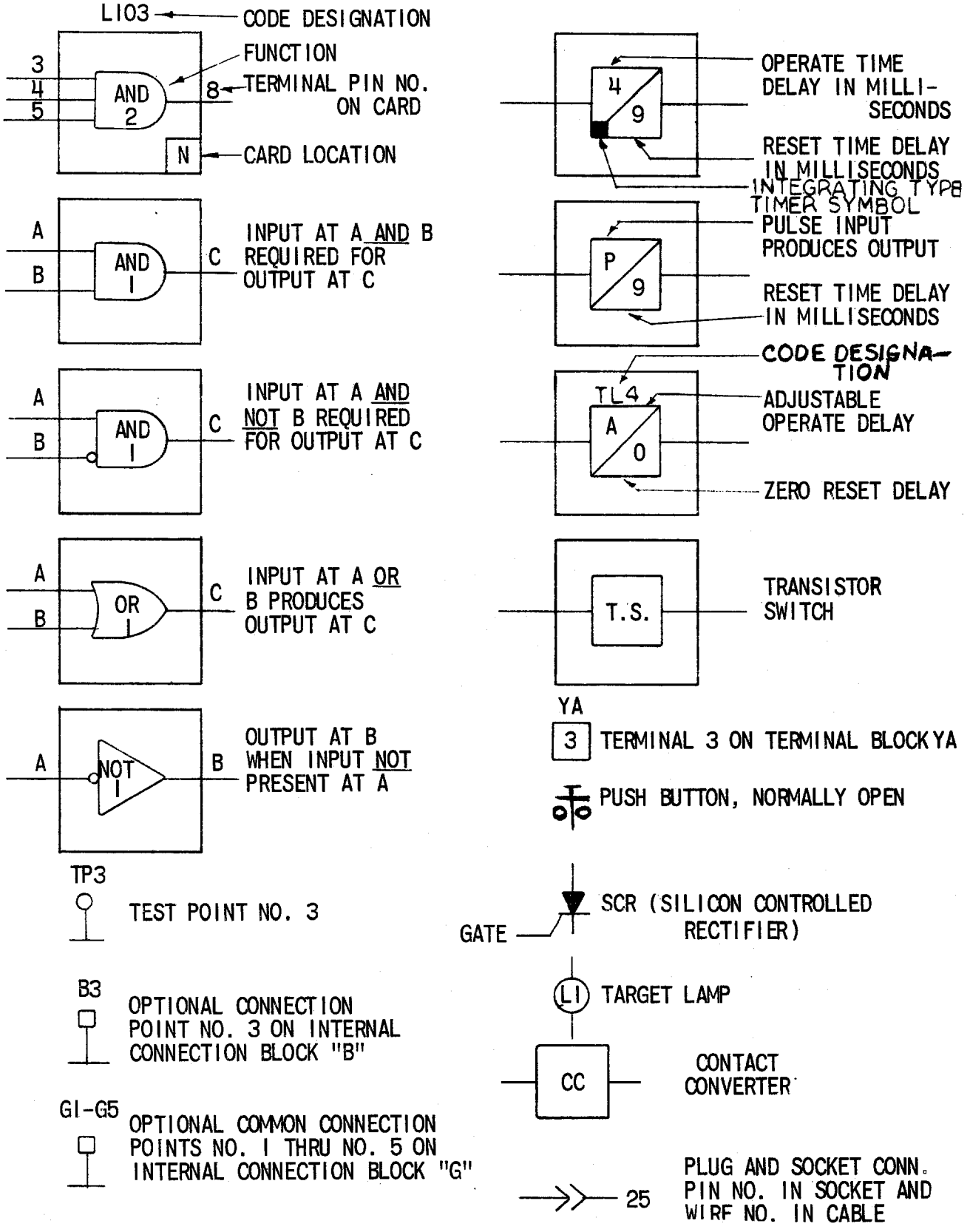


FIG. 2 (0227A2047-1) Internal Connection Diagram Legend

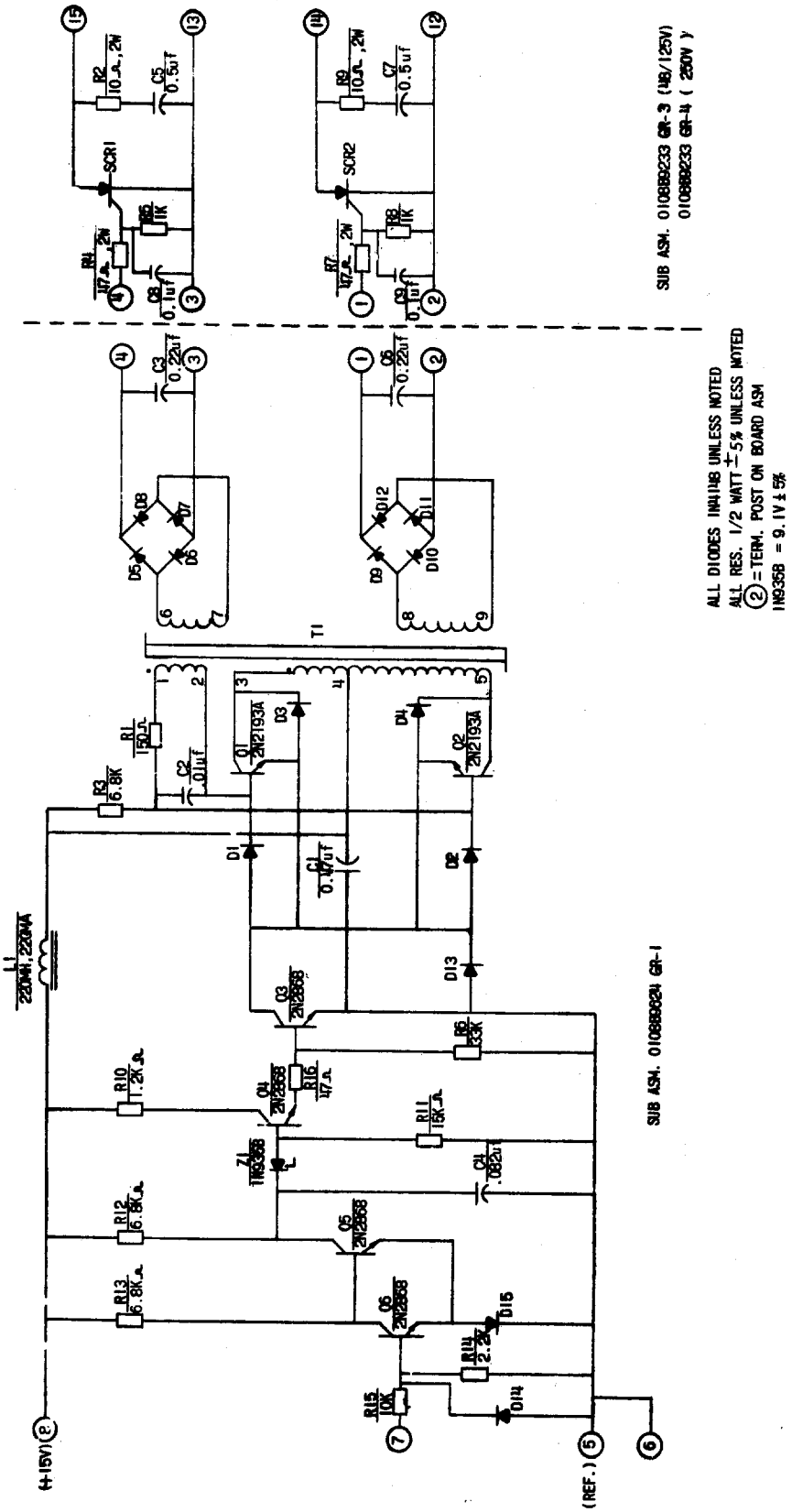


FIG. 3 (0108B9610-0) Internal Connections for the SCR Trip and Isolation Subassemblies

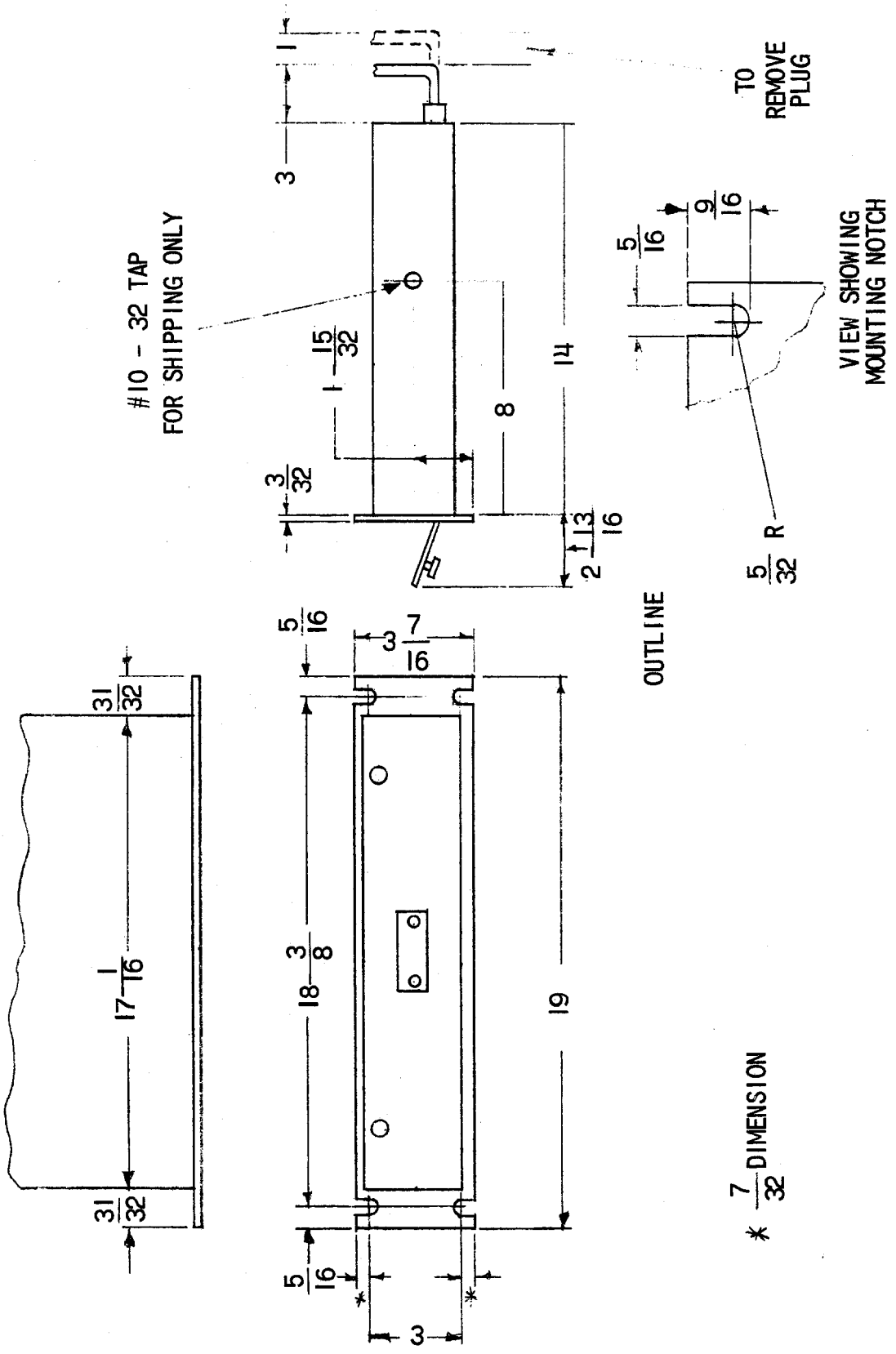
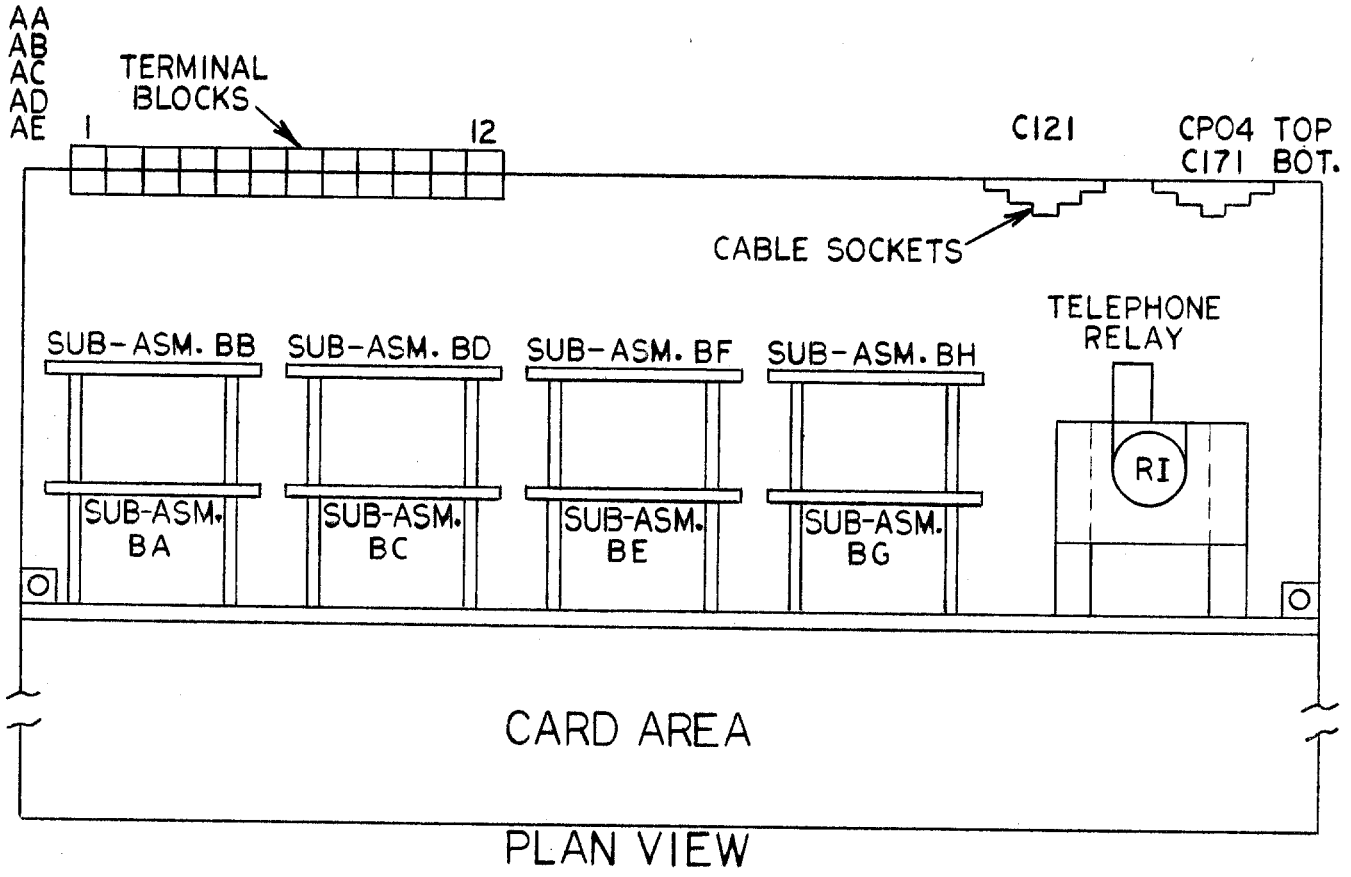
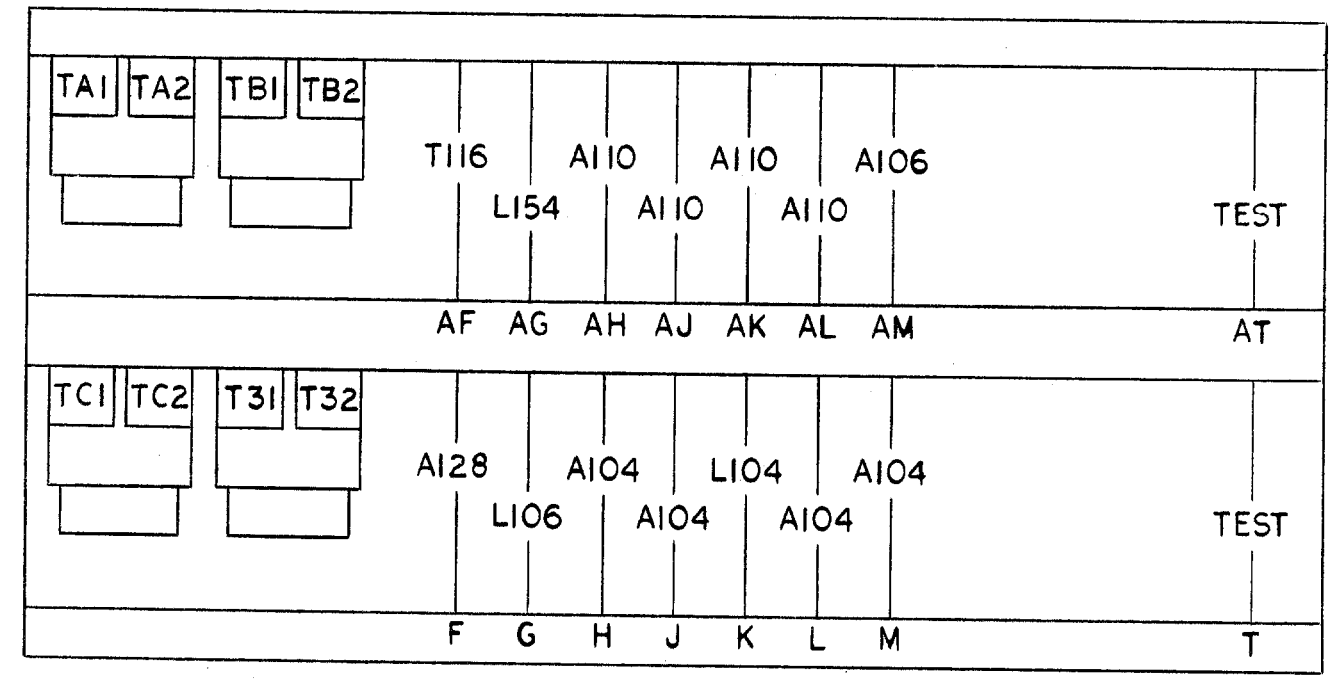


FIG. 4 (0227A2036-0) Outline and Mounting Dimensions for the SLAT53C Relay



PLAN VIEW



*-SEE INTERNAL FOR CARD IDENTIFICATION.(0136D3557)

FIG. 5 (0208A8537-0) Component Location Diagram for the SLAT53C Relay

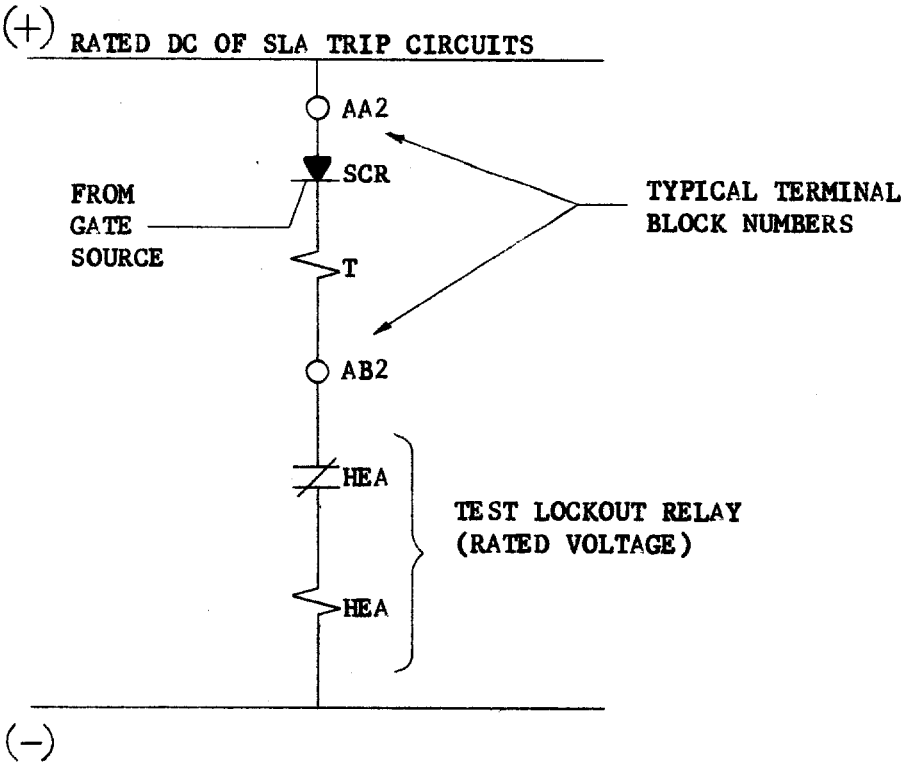


FIG. 7

TYPICAL SCR TEST CIRCUIT FOR TYPE SLA RELAYS

FIG. 6 (0208A2365-0) Typical SCR Trip Circuit Test Connections

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