INSTRUCTIONS

GEK- 34085

STATIC AUXILIARY TRIPPING RELAY

TYPE SLAT52A

POWER SYSTEMS MANAGEMENT DEPARTMENT

GENERAL ELECTRIC

CONTENTS

STATIC AUXILIARY TRIPPING RELAY

TYPE SLAT52A

DESCRIPTION

The type SLAT52A relay is a static auxiliary tripping unit which provides extra output circuits when used with a compatible type SLAT tripping unit. The table below shows the forms available of the type SLAT52A relay.

TABLE I

SLAT52A(-)

FORM	1	2	3	4	5	6	7	8
TRIP VOLTAGE	48/125	48/125	48/125	48/125	250	250	250	250
2 SCR'S	X	X	X	X	X	X	X	X
2 BFI	X	X			X	X		
2 RI	X		X		X		X	

The type SLAT52A relay is packaged in a 2 rack unit (1 R.U. = 1 3/4") enclosed metal case suitable for mounting on a 19 inch rack. The outline and mounting dimensions are shown in figure 1. The internal connections for this unit are shown in figure 2. The component and card locations are shown in figure 3.

Depending on the form number, the following functions are provided on the SLAT52A relay.

1. Two electrically separate, silicon controlled recitifers (SCR) tripping circuits; each containing a series hand set mechanical target. Refer to Table I for voltage rating of a particular form number. This information is also listed on the nameplate.

2. Breaker failure initiation (BFI) auxiliary outputs are provided for breaker failure protection. Refer to Table I for availability on a given form number. The nameplate of a unit will indicate the form number.

3. Reclose initiation (RI) auxiliary outputs are provided to initiate automatic reclosing after a high speed tripout. Refer to Table I for availability on a given form number. The nameplate of a unit will indicate the form number.

APPLICATION

The SLAT52A is an auxiliary relay unit for applications of solid state transmission line protective equipment which require additional output circuits. The relay provides two additional SCR trip outputs with hand-reset electromechanical targets, and optional RI and BFI auxiliary relays with two normally open contacts.

These output functions are the same as those provided in the standard SLAT51 relays and are directly cabled into the associated SLAT via the C171 cable. The SCR output leads must be connected directly to the standard surge filter (0.1 uf capacitors to ground and bifilar wound 3 millihenry choke) before making connections to the external breaker control circuits.

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.

The optional BFI reed relay has a maximum continuous rating of 3 amperes and a maximum short time current capability of 3 amperes. Although these BFI contacts would not normally be connected in breaker trip circuits in static relay applications, some schemes may involve such a connection. If the momentary contact duty on the BFI contacts can involve closing on currents above 3 amperes, an alternate model SLAT with a slower BFI must be used to obtain a higher momentary current rating. The BFI auxiliary in such an alternate SLAT is a telephone type relay with a 30 ampere trip duty rating, a 3 ampere continuous rating, and 4 millisecond operate and 16 millisecond reset times.

RATINGS

The type SLA52A relay is designed for use in an environment where the air temperature outside the relay case does not exceed 65°C.

The unit requires a regulated ± 15 volt DC power source which is normally obtained from a type SSA power supply.

The SCR tripping circuits are rated for 48/125 or 250 VDC. Each has a 1.0 ampere series target. The tripping circuits are designed to carry 30 amperes for one second.

The RI telephone relay has the following ratings:

Pick-up time	1 cycle
Drop-out time	8-10 cycles
Contacts make and carry continuously	3 amperes
Contacts make and carry - maximum (1 sec.)	30 amperes
Contact interrupt (maximum 250 VDC)	180 volt-ampere resistive
Contact interrupt (maximum 250 VDC)	60 volt-amperes inductive

The BFI reed relay has the following ratings:

Pick-up time	1-2 milliseconds
Drop-out time	1-2 milliseconds
Contacts make and carry continuously	3 amperes
Contacts make and carry maximum short time	3 amperes
Contact interrupting rating (maximum 250 VDC)	100 volt-amperes resistive
Contact interrupting rating (maximum 250 VDC)	35 volt-amperes inductive

BURDENS

The burden is only a few milliamperes in the standby mode of operation, and less than 100 milliamperes in the trip mode.

TARGETS

Two 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 .40 ohm.

LOGIC CIRCUITS

The functions of the Type SLAT52A relay involve basic logic (AND, OR, AND NOT) where the presence or absence of signals controls the operation rather than the magnitude. Signals are measured with respect to a reference bus accessible at TP1. In general a signal below 1 VDC represents an OFF or LOGIC ZERO condition, an ON or LOGIC ONE state is represented by a signal of approximately +15 VDC.

The symbols used on the internal connection diagram (Fig. 2) are explained by the legend shown in Figure 5.

CONSTRUCTION

The SLAT52B relay is packaged in an enclosed metal case with hinged front cover and removable top cover. The outline and mounting dimensions of the case and the physical location of the components are shown in Figures 1 and 3 respectively.

The SLAT52B relay may contain two printed circuit cards identified by a code number such as A104, and A106, where A designates an auxiliary function. The printed circuit cards plug in from the front of the unit. The sockets are marked with letter designations or "addresses" (R.N.) which appear on the guide strips in front of each socket, on the component location drawing, on the unit internal connection diagram, and on the printed circuit card. The test points (TP1, TP2, etc.) shown on the internal connection diagram are connected to instrument jacks on a test card position T with TP1 at the top of the T card. TP1 is tied to reference; 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 to a card. TP2 is connected to -15V.

The SLAT52A relay receives its inputs from the associated Type SLAT relay via the C171 ten conductor shielded cable. The sockets for this cable and the six conductor power supply cable are located on the rear panel of the unit. The SLAT52A output functions are connected to 12 point terminal strips, which are also located on the rear of the unit.

A window is provided in the hinged cover of the relay to allow target lamps and the mechanical targets to be seen. Push buttons are also provided to reset the targets and lamps without opening the cover.

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 8 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.

TEST INSTRUCTIONS

CAUTION

IF THE SLAT52A RELAY THAT IS TO BE TESTED IS INSTALLED IN AN EQUIPMENT CONNECTED TO THE POWER SYSTEM, BE CERTAIN TO DISCONNECT THE OUTPUTS FROM THE SYSTEM.

A. GENERAL

The SLAT52A 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.

B. OPERATIONAL CHECKS

Operation of the SLAT52A unit can be checked by observing the signals at the test points (TP1 to TP20) in the unit, or by observing the output functions. The test points are located on test cards in position T, and are numbered 1 to 10 from top to bottom. TP1 is the reference bus for the logic circuit, TP10 is at +15 VDC. The remaining points are located at various strategic points throughout the logic as shown in the internal connection diagram (Figure 2). 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.

C. 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.

D. TRIP CIRCUIT TESTS

The SCR trip circuits and series mechanical targets may be checked by connecting an auxiliary lockout relay, such as the Type HEA relay, in series with the SCR circuit. A typical circuit is shown in Figure 6. The HEA relay should have the same D.C. rating as the SCR trip circuit of the SLAT52A. If an auxiliary lockout relay is not available, it can be replaced by a resistive load which limits the trip circuit current to 3 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.

E. If supplied, the BFI should be checked prior to final installation. The BFI will operate in parallel with the trip circuits. The output of the two (2) normally open contacts of the BFI are located on terminals AF6, AG6, and AF7, AG7. In testing, do not exceed contact rating.

Test point TP3 may be energized from test point TP10 to initiate the BFI element as well as the SCR trip circuits.

F. If furnished, the RI should be checked prior to final installation. The RI may be initiated by energizing test point TP4 from TP10. The two (2) normally open contacts of the RI are located on AF4, AG4, and AF5, AG5. In testing, do not exceed contact rating.

G. OVERALL EQUIPMENT TESTS

After the SLAT52A 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 AC current and voltages to the measuring units as specified in the instruction book for the measuring units and checking that proper outputs are obtained when the measuring units operate.

MAINTENANCE

A. PERIODIC TESTS

It should be sufficient to check the outputs produced at test points in the SLA52A where 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 relay itself should be necessary.

B. 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 points 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.

C. 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 buses due to moisture and dust. The wiring diagrams for the cards in the SLAT52A relay are included in the card book GEK-34158.

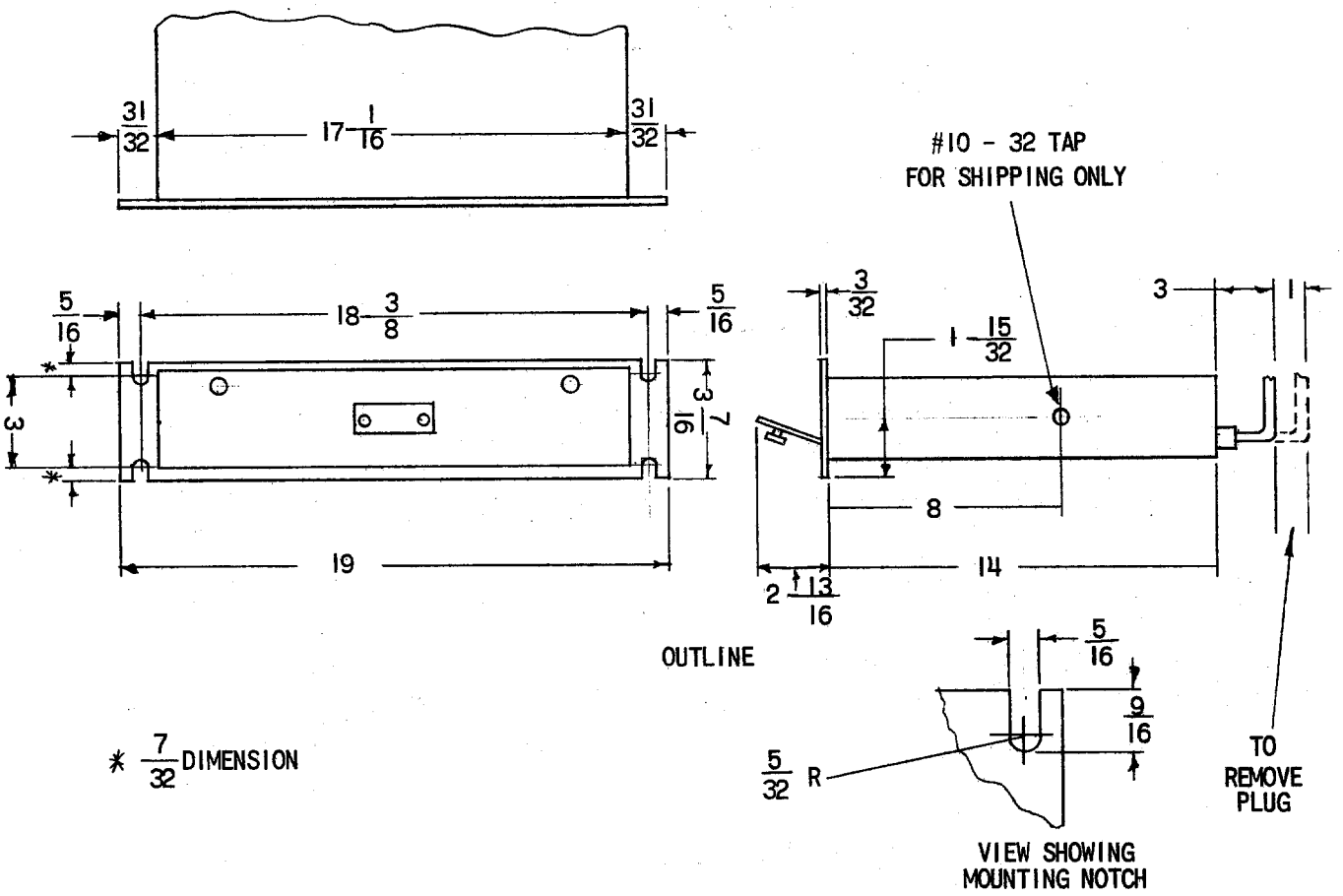
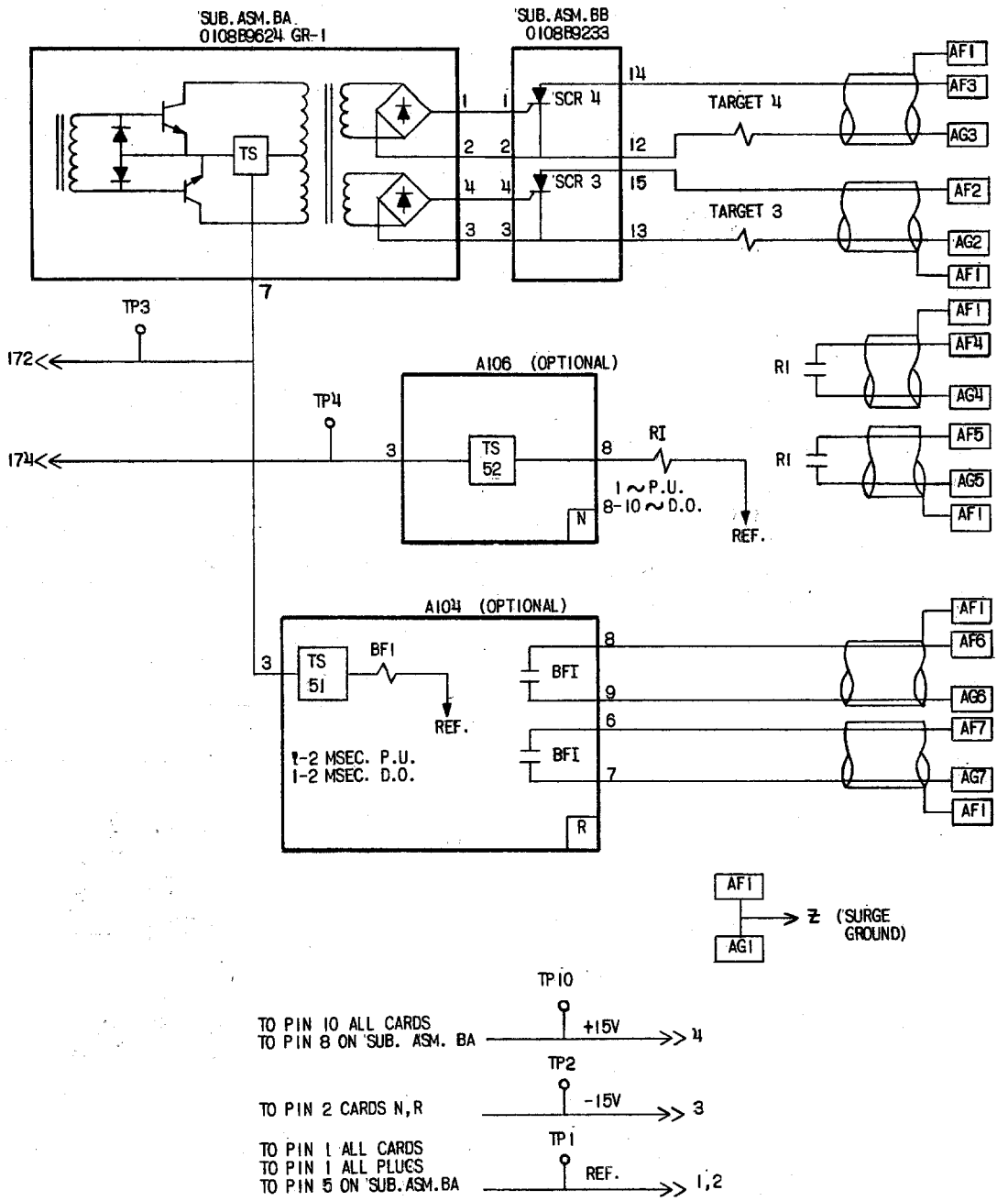


FIG. 1 (0227A2036-0) Outline And Mounting Dimensions



SLAT52A(-)

FORM	1	2	3	4	5	6	7	8
TRIP VOLTAGE	48/125	48/125	48/125	48/125	250	250	250	250
2 SCR'S	X	X	X	X	X	X	X	X
2 BFI	X	X			X	X		
2 RI	X		X		X		X	

FIG. 2 (0165B2650-0) Internal Connection Diagram-SLAT52A

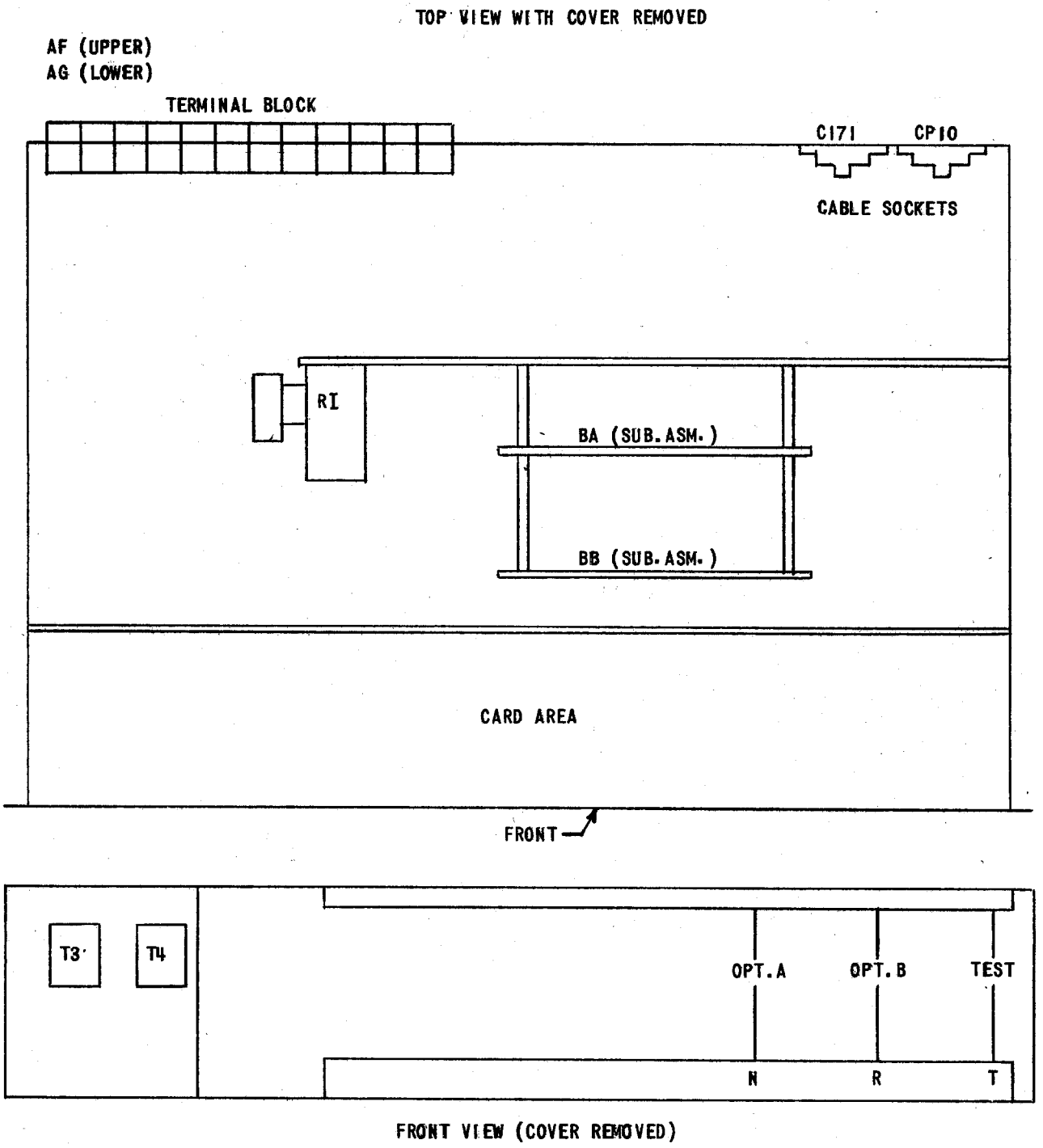


FIG. 3 (0246A6795-0) Component Locations

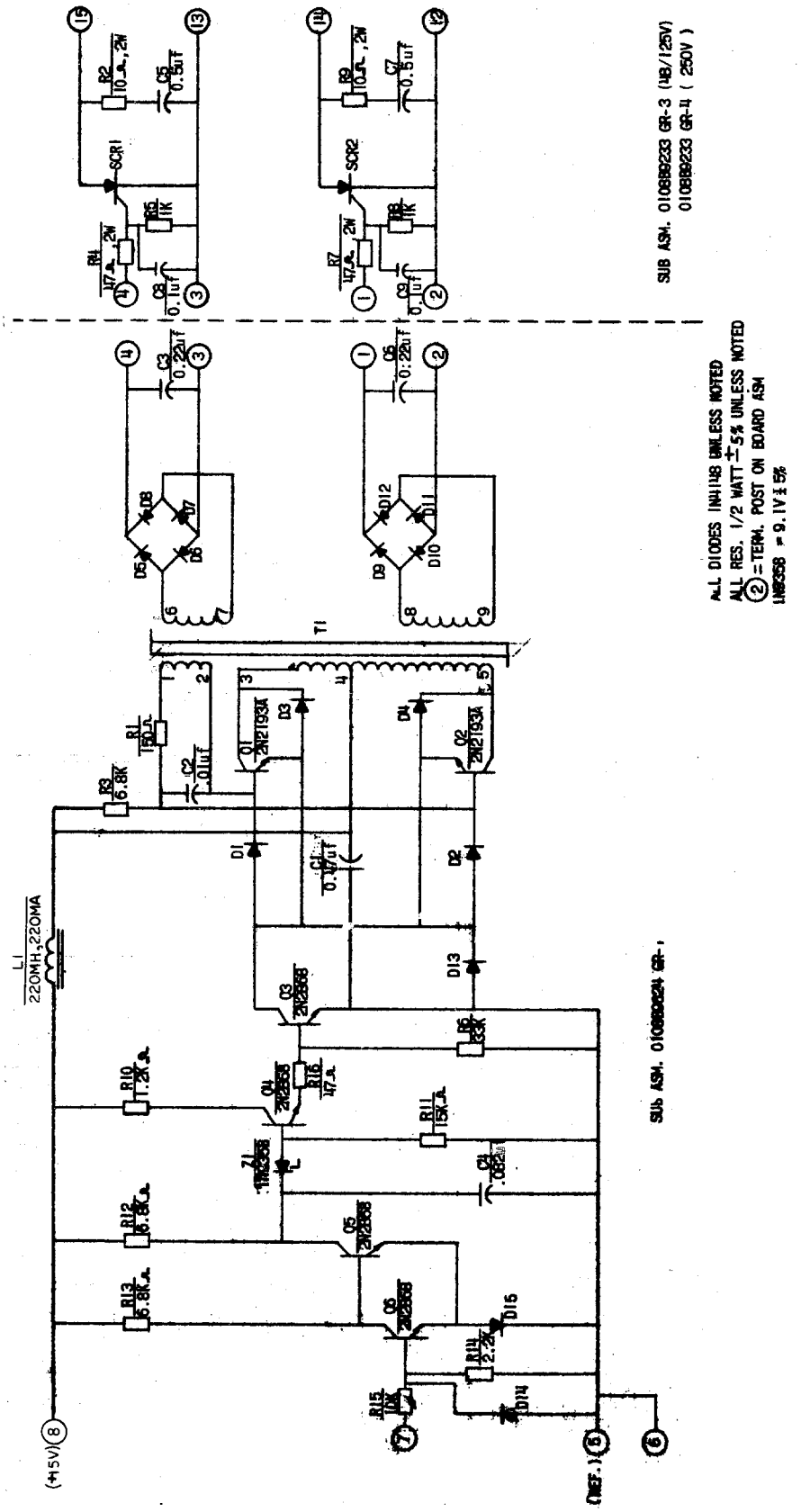


FIG. 4 (0108B9610-0) Internal Connections For The SCR Trip And Isolator Sub Assemblies

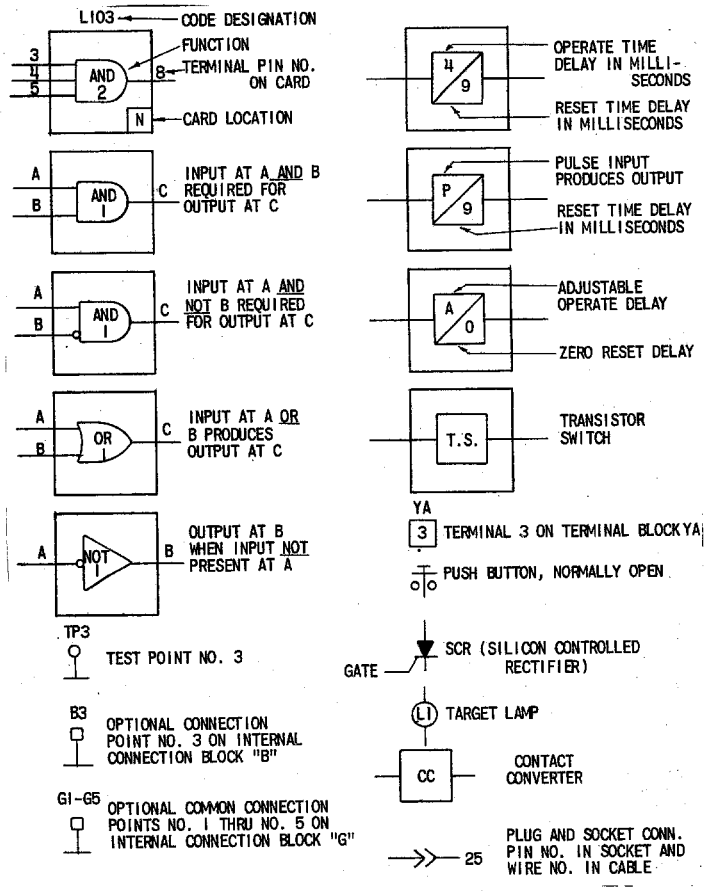


FIG. 5 (0227A2047-0) Logic And Internal Connection Diagram Legend

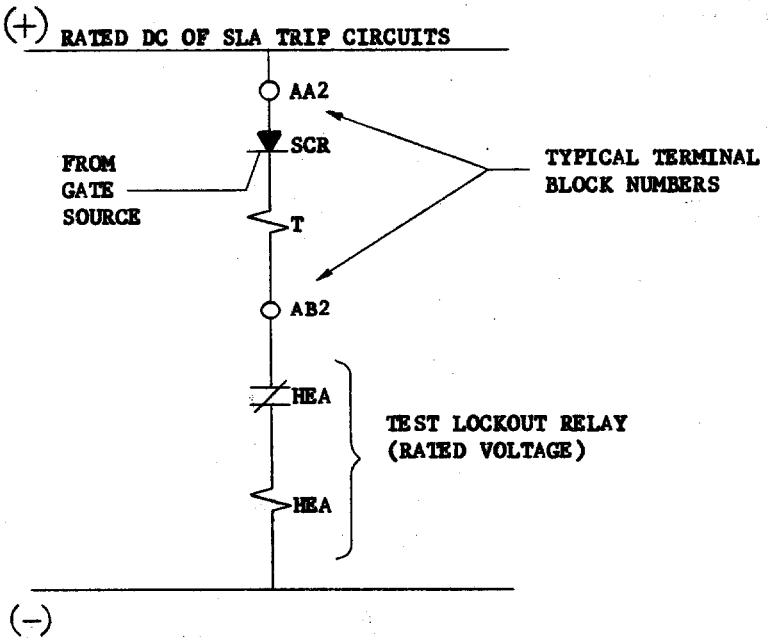


FIG. 7

TYPICAL SCR TEST CIRCUIT FOR TYPE SLA RELAYS

FIG. 6 (0208A2365-0) Typical SCR Test Circuit For Type SLAT Relays

GE Power Management

215 Anderson Avenue
Markham, Ontario
Canada L6E 1B3
Tel: (905) 294-6222
Fax: (905) 201-2098
www.GEindustrial.com/pm