INSTALLATION • OPERATION • MAINTENANCE

# INSTRUCTIONS

# TYPE SG MECHANICALLY INTERLOCKED AUXILIARY RELAY FOR STEP VOLTAGE REGULATORS STYLE 290B037A9

CAUTION: Before putting relays into service, make sure that all moving parts operate freely, inspect the contacts to see that they are clean and close properly, and operate the relay to check the settings and electrical connections.

## APPLICATION

The type SG mechanically interlocked auxiliary relay is used in the control circuit of step voltage regulators to energize the tap changer motor in the "raise" or the "lower" directions after other relays in the circuit indicate that a tap change should be made. It consists of two magnetic contactors which can be energized individually, with their armatures mechanically interlocked so that both armatures can not be closed simultaneously. It may be used in any other application for which its construction and electrical circuits make it suitable.

## CONSTRUCTION

NOTE: This instruction leaflet pertains only to the style number given in the title.

The type SG mechanically interlocked auxiliary relay consists of two electromagnets mounted on a common insulating sub-base with a bar centrally pivoted between the two armatures so that both armatures can not be closed simultaneously. The armature of each element of relay 290B937A9 carries four moving contact fingers. These engage stationary contacts to provide a total of six make and three break contacts, as shown in the internal wiring diagram. This relay is assembled in a cast iron base with glass cover. The armature of one element of relay S#1339369 has four moving contact fingers similar to relay S#1274697, although only three fingers are used. The second element has a two-contact armature as in the standard SG auxiliary relay. A total of two break, two make, and one break-make contacts are provided. Relay S#1339369 is assembled in the type FT case, which provides test switches in the relay circuits and permits easy removal of the relay element for inspection or maintenance.

## CHARACTERISTICS

Each element of the relay will pick up at a voltage 80% or less of the rated voltage, provided the other element is de-energized. Because of the heavier armature and larger number of contacts, and because the application does not require continuous duty, the energy consumption is allowed to be somewhat greater than in the standard SG auxiliary relay and the coils should not be energized continuously. The burden of each electromagnet is approximately 19 v.a. at 115 volts, 60 cycles. The contacts will carry 12 amperes and will interrupt 30 amperes at 115 volts, 60 cycles.

### Electrical Circuits

Each terminal in the base connects thru a test switch to the relay elements in the chassis as shown on the internal schematic diagram. The relay terminal is identified by numbers marked on both the inside and outside of the base. The test switch positions are identified by letters marked on the top and bottom surface of the moulded blocks. These letters can be seen when the chassis is removed from the case.

The potential and control circuits thru the relay are disconnected from the external circuit by opening the associated test switches.

### Testing

The relays can be tested in service, in the case but with the external circuits isolated or out of the case as follows:

### Testing In Service

Voltage between the potential circuits can be measured conveniently by clamping #2 clip leads on the projecting clip lead lug on the contact jaw.

### Testing In Case

With all blades in the full open position, the ten circuit test plug can be inserted in the contact jaws. This connects the relay elements to a set of

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*Denotes change from superseded issue.

EFFECTIVE SEPTEMBER 1969

binding posts and completely isolates the relay circuits from the external connections by means of an insulating barrier on the plug. The external test circuits are connected to these binding posts. The plug is inserted in the bottom test jaws with the binding posts up.

The external test circuits may be made to the relay elements by #2 test clip leads instead of the test plug.

### Testing Out of Case

With the chassis removed from the base and in its normal upright position, relay elements may be tested by using the ten circuit test plug or by #2 test clip leads as described above.

## INSTALLATION

The relays should be mounted on switchboard panels or their equivalent in a location free from dirt, moisture, excessive vibration and heat. Mount the relay vertically by means of the two mounting studs for the standard cases and the type FT projection case or by means of the four mounting holes on the flange for the semi-flush type FT case. Either of the studs or the mounting screws may be utilized for grounding the relay. The electrical connections may be made direct to the terminals by means of screws for steel panel mounting or to terminal studs furnished with the relay for ebony-asbestos or slate panel mounting. The terminal studs may be easily removed or inserted by locking two nuts on the studs and then turning the proper nut with a wrench.

## ADJUSTMENTS AND MAINTENANCE

The proper adjustments to insure correct operation of this relay have been made at the factory and should not be disturbed after receipt by the customer. If the adjustments have been changed, the relay taken apart for repairs, or if it is desired to check the adjustments at regular maintenance periods, the instruction below should be followed.

The position of the break contact posts should be adjusted to obtain approximately 1/8 inch gap (except approximately 3/16'' inch gap for the make contact of the two-pole element of S#1339369-A relay) between the moving contact and the make contact. The make contacts should have 3/64'' to 1/16'' follow and the break contacts should have 1/32'' follow or more. All make contacts or all break contacts on the same element should close at approximately the same armature position. The position of the interlock arm post should be adjusted (by loosening, adjusting and retightening the two nuts on the post) so that with either armature closed and the interlock arm touching it, and with the second armature in its normal de-energized position, the opposite end of the interlock arm will be 1/64'' or more from the second armature. If there is no clearance, relay operation may be noisy and excessive wear of the interlock arm may result. The de-energized positions of the armatures must be limited by the back contacts and not by the tongues which extend through the openings at the lower ends of the armatures. The interlock arm should not permit the make contacts of one element to touch until the make contacts of the other element are open approximately 1/16'' or more.

The armatures and the interlock arm should operate freely, and the moving contact arms should operate freely on their guide pins.

All moving and stationary make contacts of the type SG interlocked relay are silver, and they should be periodically cleaned with a fine file. S#1002110 file is recommended for this purpose. Excessive removal of material should be avoided. The use of abrasive material for cleaning contacts is not recommended, because of the danger of embedding small particles in the face of the soft silver and thus impairing the contact.

The stationary break contacts are made of an alloy with excellent arc-resistant properties. After a period of operation they may appear burned or discolored, but they should not be filed or dressed under any condition. This would remove the special arc-resisting contact face and might result in faulty relay operation.

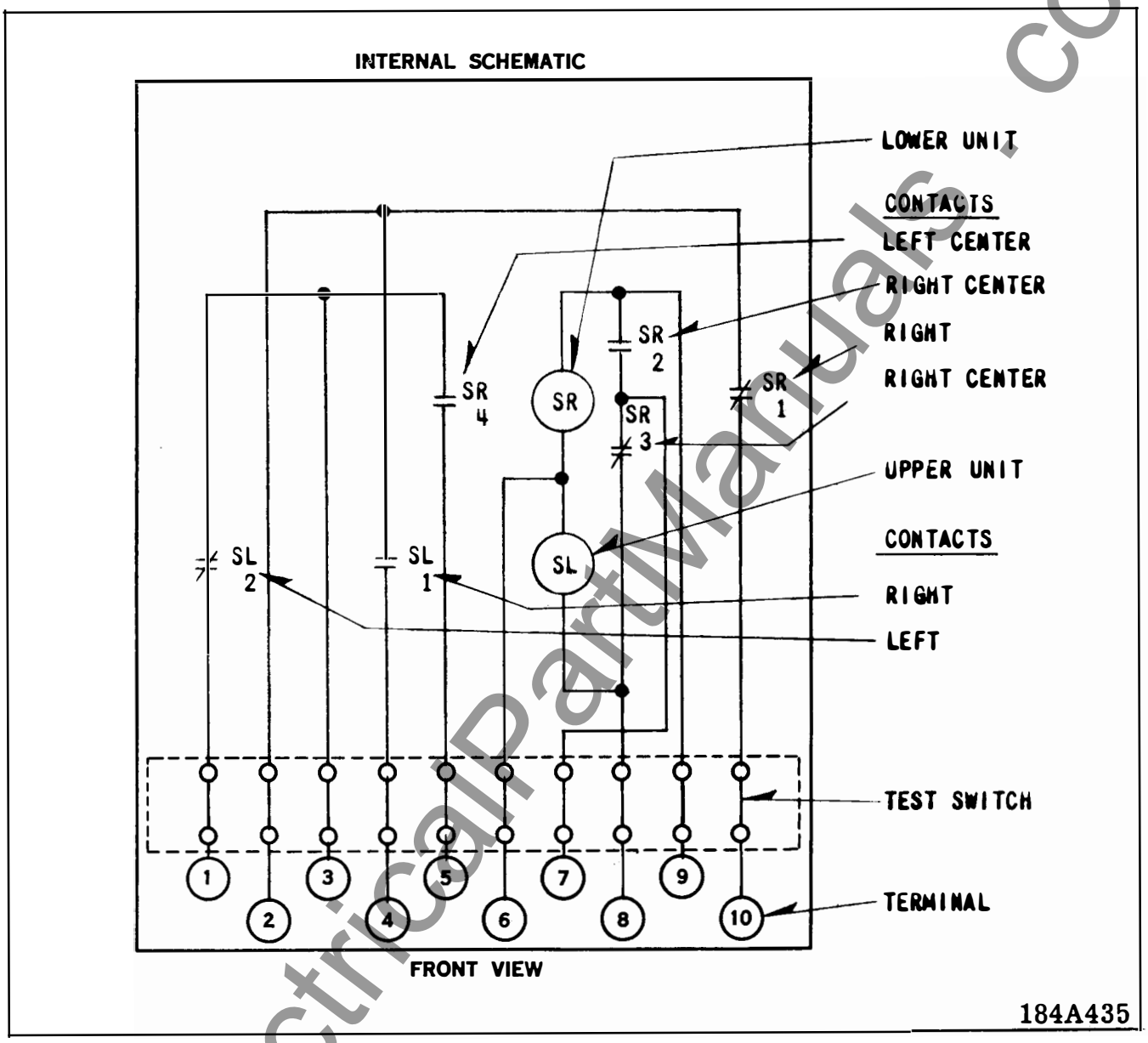


*Fig. 1 — Internal Schematic of 290B037A9 Type SG Relay*

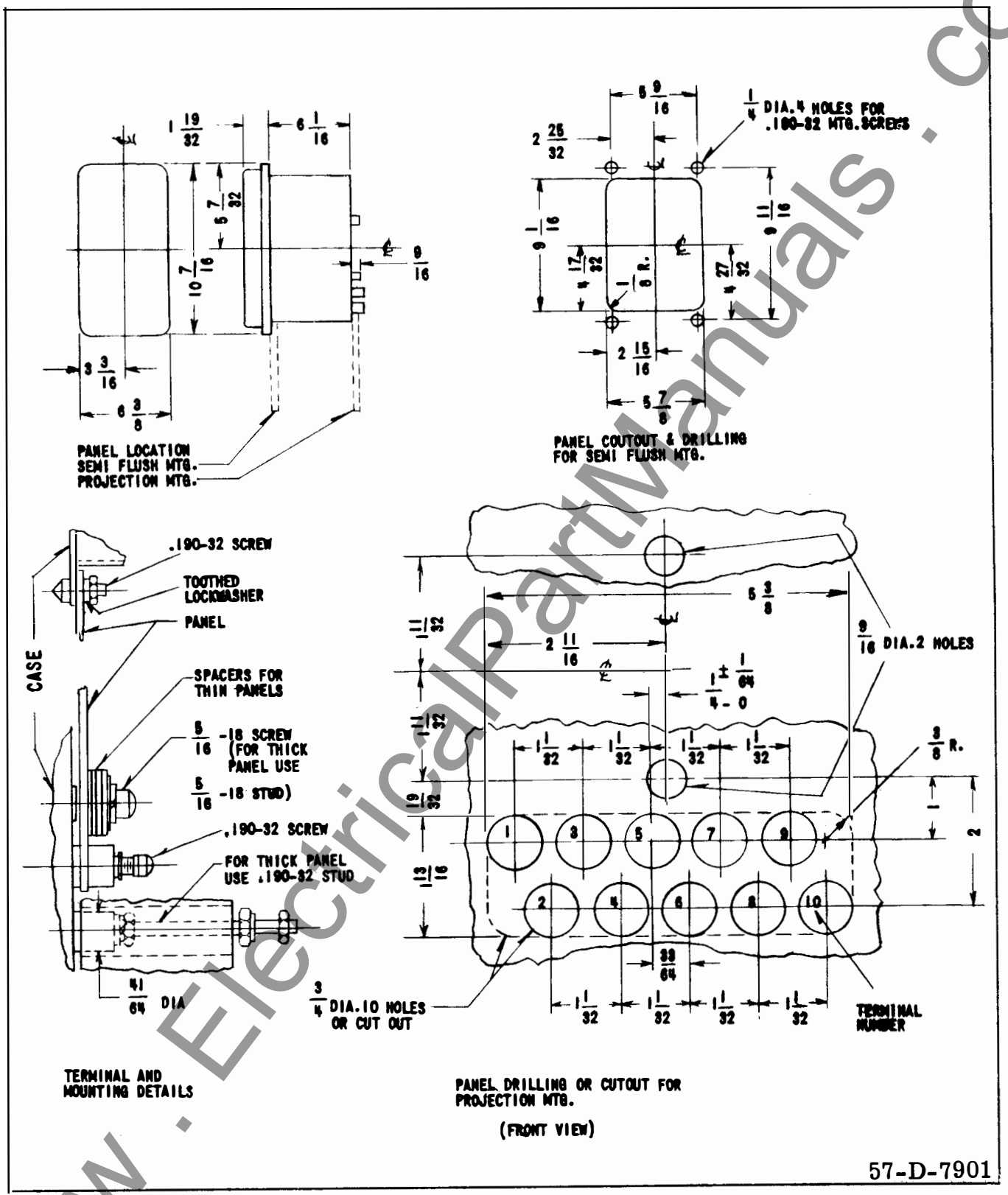


*Fig. 2. Outline & Drilling for the Type SG Relays in the Type FT-21 Case.*

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**RELAY-INSTRUMENT DIVISION** **NEWARK, N. J.**
Printed in U.S.A.