INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

TYPE TJ AUXILIARY TIMING RELAY

CAUTION: Before putting relays into service, remove all blocking which may have been inserted for the purpose of securing the parts during shipment, 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 TJ relay is an auxiliary timing relay. When used in conjunction with a capacitor switching master relay such as the types CJ4, CJ5 or CJ7 wired for multiple step operation, it provides additional steps for voltage control. The fixed time delay may be changed by plugging in a new time delay element having the desired time interval.

CONSTRUCTION

Each additional step consists of a type SX toggle unit, two socket mounted thermally operated time delay relays and a counter.

SX Toggle Units (90Y and 90Z)

The toggle units consist of two electromagnets, with a common armature having two pins resting in a groove in the molded base. The other end of the armature is held in one of two positions by means of a toggle spring which produces the toggle action.

The spring is protected by a lock pin which may be left in after installation. The moving contacts are mounted at one end of the armature and stationary contacts are mounted on either side.

Time Delay Units (2Y, 62Y, 2Z, 62Z)

The time delay units have sealed-in glass elements and are mounted in standard radio-type octal sockets. They have a single set of contacts, which are normally open and are operated by a heater winding acting upon a bimetal arm. The construction is such that the contact gap and the time-delay are not affected by variations

in ambient temperature. The time-delay of a given unit is non-adjustable. Units of various time-delay values are available for direct substitution. Typical time delays are 20 sec. or 60 sec.

OPERATION (Example. CJ-4 plus 2 unit TJ)

Assume the CJ-4 has put the first capacitor bank (X) on the line and a low voltage condition still exists, the TJ relay, supervised by the sensing element contact (90R) will operate as follows:

Time delay unit 2Y is energized through SX contact 90-X-R pre-closed by master relay operation - (refer to external schematic 791C956) through the remaining SX contacts 90-Y-L and 90-Z-L. When the thermal unit 2Y times out, SX Raise coil 90-Y-R will be energized through contacts 2Y and SX contacts 90-Y-L and 90-Z-L. SX lower Contacts 90-Y-L open de-energizing the time delay unit and SX Raise contacts 90-Y-R close energizing counter CY and the close coil which connects capacitor bank (Y) to the line.

If low voltage conditions persist, time delay unit 2Z becomes energized through SX contacts 90-Y-R and 90-Z-L. When thermal unit 2Z times out, SX Raise coil 90-Z-R will be energized through contacts 2Z and SX lower contact 90-Z-L. SX contactor 90-Z-L opens de-energizing thermal unit 2Z and SX Raise contacts 90-Z-R close energizing counter CZ and the close coil which connects capacitor bank (Z) to the line.

If ahigh voltage condition exists sufficient to close the master relay sensing contacts (90L), time delay units 62Z, 62Y and SX lower coils 90-Z-L and 90-Y-L will become energized in a reverse manner to that described or low voltage conditions and subsequently capacitor banks Z and Y will be removed from the line. The equipment is then ready for a similar cycle of operation.

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 four mounting holes on the flange for semi-flush mounting or by means of the rear mounting stud or studs for projection mounting. Either a mounting stud or the mounting screws may be utilized for grounding the relay. The electrical connections may be made directly to the terminals by means of screws for steel panel mounting or to the terminal studs furnished with the relay for thick panel mounting. The terminal studs may be easily removed or inserted by locking two nuts on the stud and then turning the proper nut with a wrench.

For detailed FT case information refer to I. L. 41-076.

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 instructions below should be followed.

Acceptance Check

The following check is recommended to insure that the relay is in proper working order:

A. SX Toggle Unit

1. Calibration Check - If correctly adjusted, the unit will operate without chattering through its own contacts at 80% of rated voltage.

Thermal Time Delay Units

B. Operating Time - The time delay of the thermally operated units should be 20 or 60 seconds, plus or minus 15% at 117 volts depending on rating ordered.

Routine Maintenance

All relays should be inspected periodically and the time of operation should be checked at least once every year or at such other time intervals as may be dictated by experience to be suitable to the particular application.

All contacts should be periodically cleaned. A contact burnisher #182A836H01 is recommended for this purpose. 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.

CALIBRATION

Use the following procedure for calibrating the relay if the relay has been taken apart for repairs or the adjustments disturbed. This procedure should not be used until it is apparent that the relay is not in proper working order (See "Acceptance Check").

SX Toggle Unit

If the SX Toggle Unit has been dismantled, it is necessary to check the toggle action and the contact follow after re-assembling it. Set the gap between the lower pole pieces at 11/64". The contact follow should be set at .037". This may be obtained by adjusting the stationary contacts to just make when there is an .020" gap between the residual pin in the armature, and the upper pole pieces. The adjusting screw assembly should be pushed down until there is enough tension to cause the residual pin to rest against the pole piece. With the lock nut tightened, adjust the adjusting screw until there is equal toggle pressure on each side. This may be done mechanically with a gram gage or electrically by applying a voltage to the coils.

1. Insulation Test

Ground test relay at 2000 volts for one second between switch jaws 1, 2, 3, 5, 7, 9, 11, 12, 13, 14, 15, 17 and ground.

2. Toggle Unit Check

Contacts should have .037" follow which can be checked by seeing that the contacts just make when an .020" gage is put between the residual pin of the armature and the pole piece.

3. Raise Check

Set both SX armature to right
Apply jumper between terminals 6 & 8
" " " " 7 & 18
" " " " 9 & 16
Jumper terminals 3, 5, 15 and 13 together

Connect test lamp between terminals 3 & 19

Apply 115V ± 1 volt to terminals 3 and 17 through test switch.

Step One (Thermal Unit 2Y)

Time from closing of test switch to closing of Raise circuit (terminal 1 and 10) should be at least 48 seconds. See that counter CY registers.

Step Two (Thermal Unit 2Z)

At the instant counter CY operated, begin timing thermal unit 2Z, time to close Raise circuit (term 20 & 11) should be at least 48 seconds. See that counter CZ registers and test light comes on.

Lower Check

Remove test lamp.
Remove jumper from term 3 and 13 and jumper term 4, 14, 5 and 15 together.
Apply 115V ± 1 volt to term 4 and 17 through test switch.

Step Two (Thermal Unit 62Z)

Time from closing of test switch to closing of Lower circuit (term 20 and 12) should be a least 48 seconds.

Step One (Thermal Unit 62Y)

At the instant the Lower circuit closed, begin timing thermal unit 62Y. Time to close Lower circuit (term 10 and 2) should be at least 48 seconds.

RENEWAL PARTS

Repair work can be done most satisfactorily at the factory. However, interchangeable parts can be furnished to the customers who are equipped for doing repair work. When ordering parts, always give the complete nameplate data.

ENERGY REQUIREMENTS

The 60 cycle burdens for the TJ relay are as follows:

SX Toggle Unit, VA = 31.8 / 46° lag at 120 volts.
Toggle unit is rated for intermittent duty. Time Delay Unit, VA = 5 at unity p.f. at 117 volts.

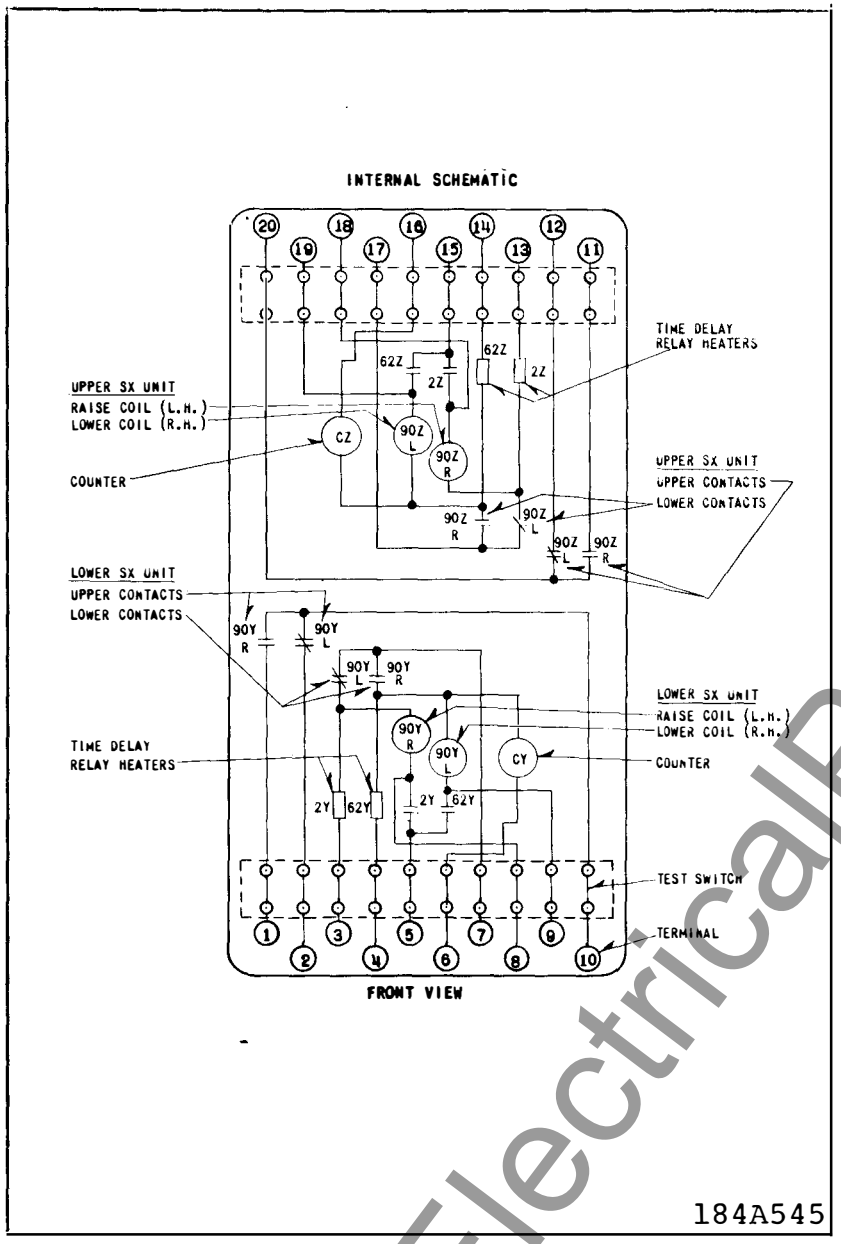

Fig. 1 Internal Schematic (2 Unit)

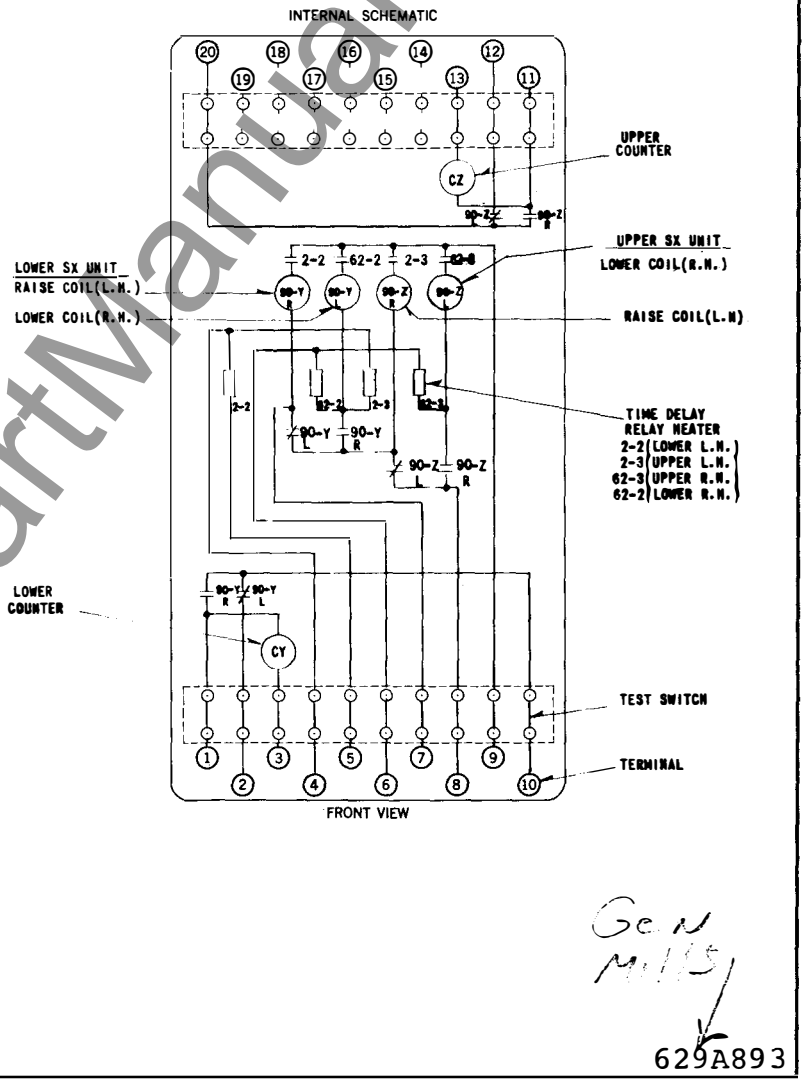

Fig. 2 Internal Schematic (2 Unit Separate Counter)

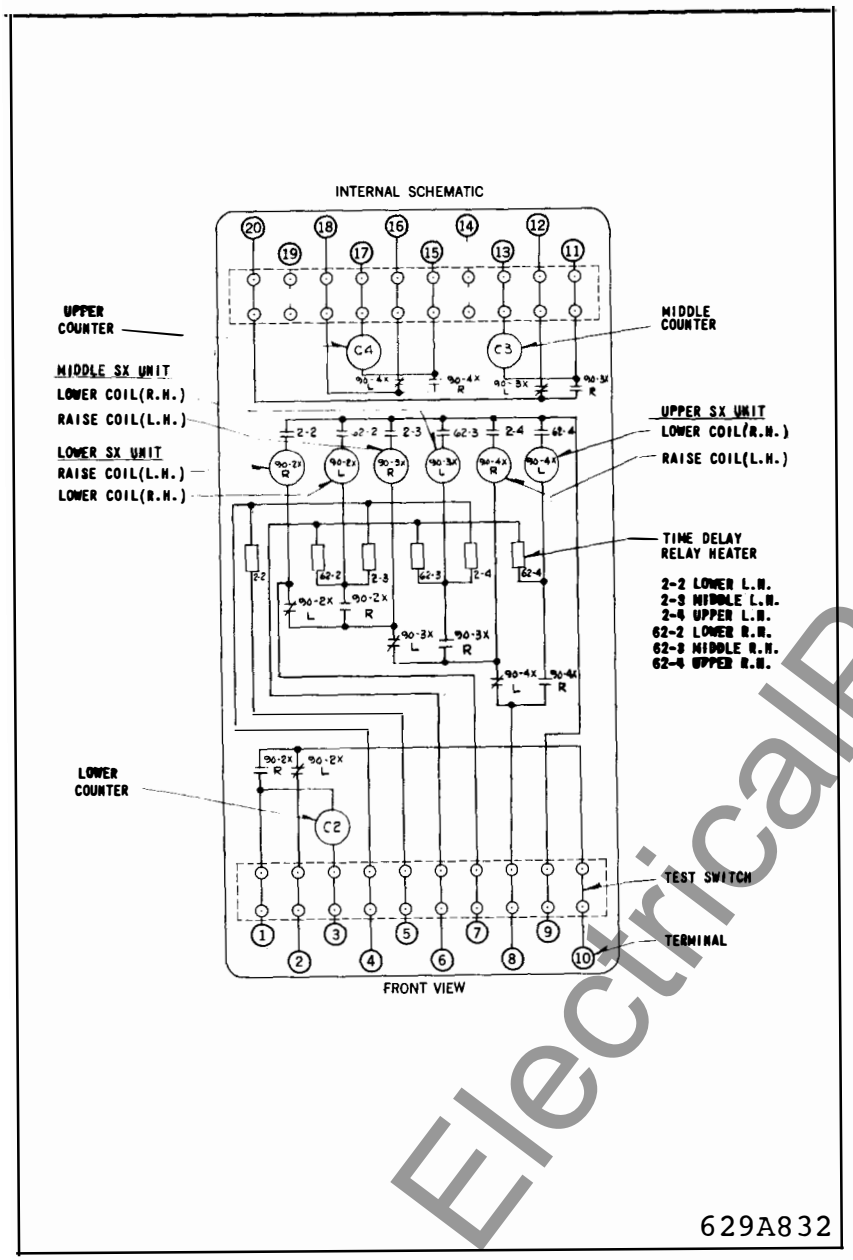

Fig. 3 Internal Schematic (3 Unit)

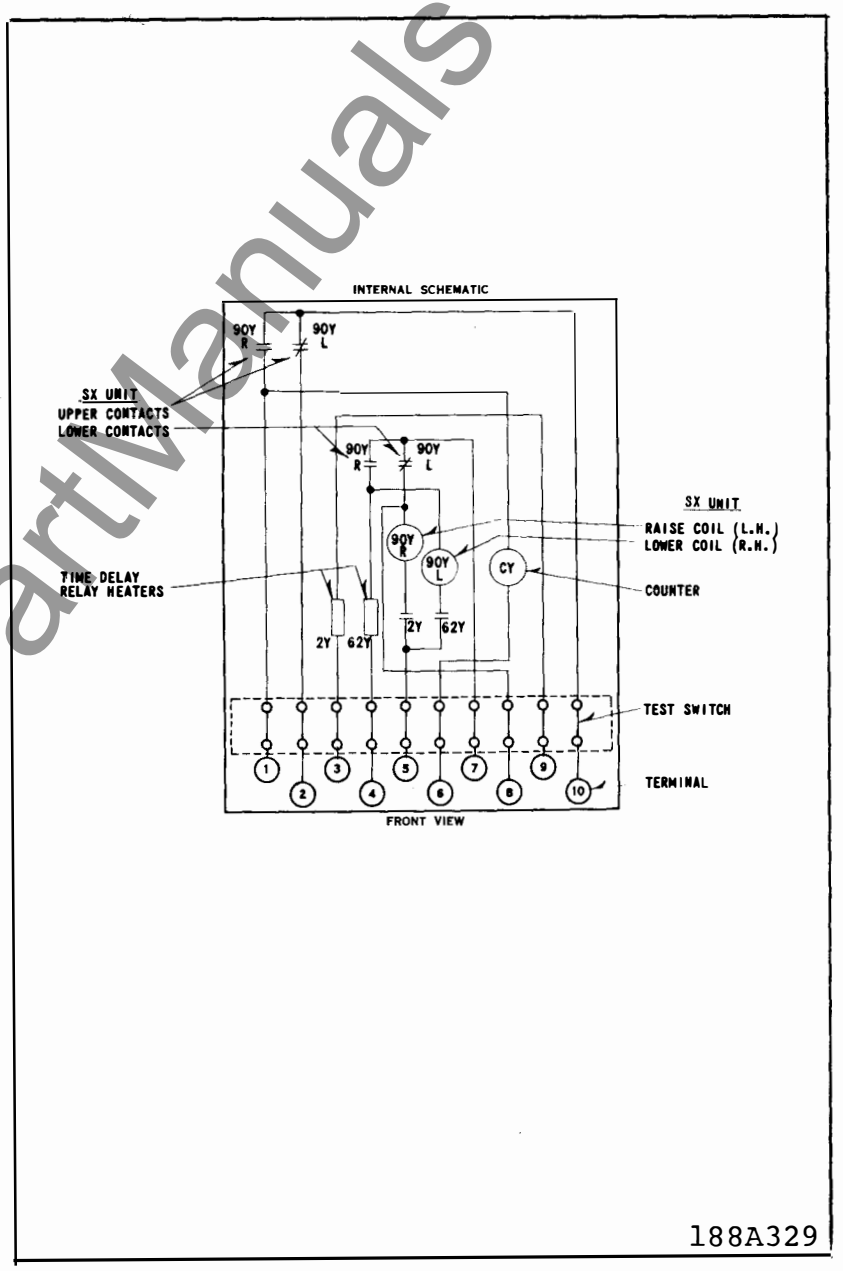

Fig. 4 Internal Schematic (1 Unit)

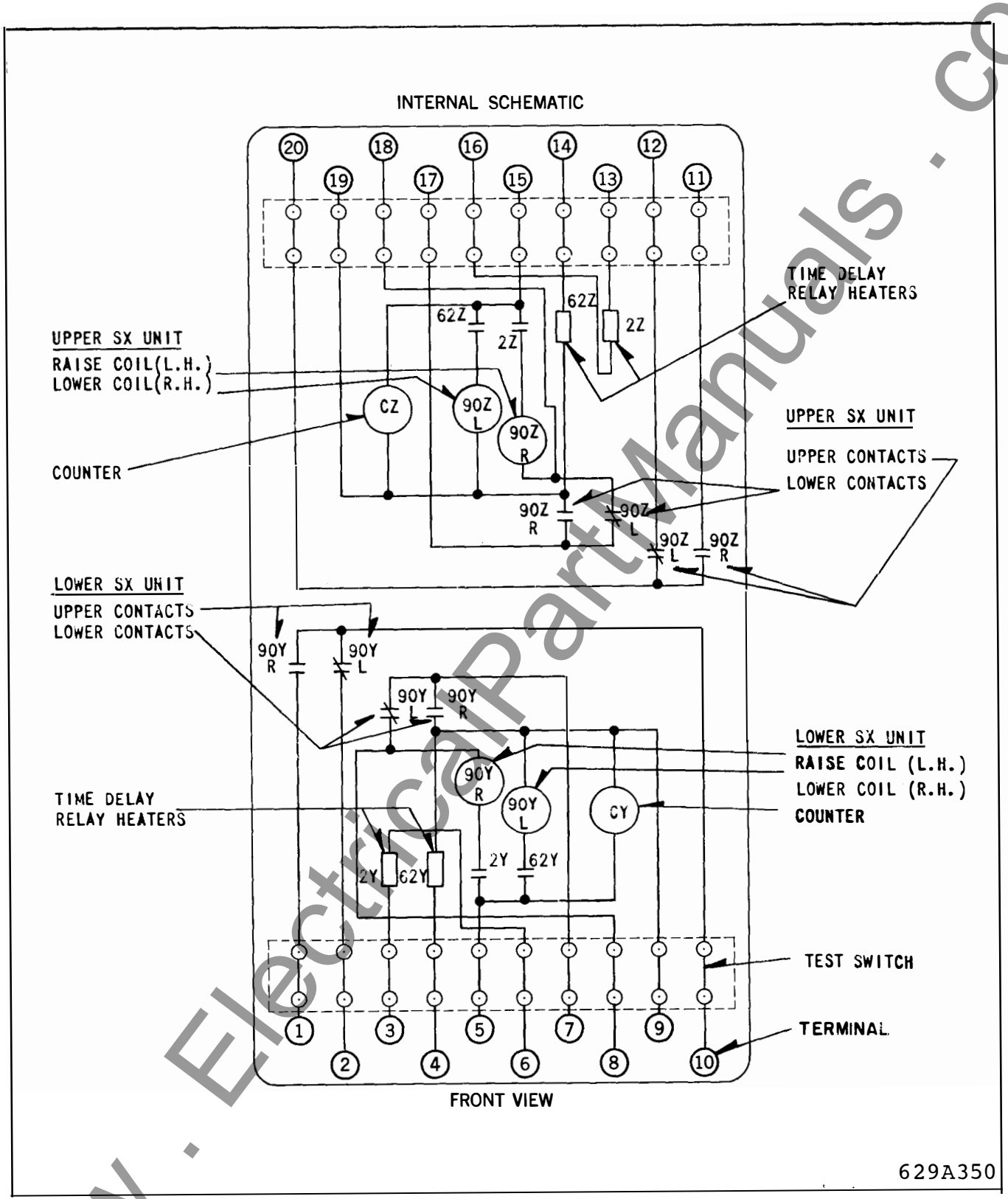

Fig. 5 Internal Schematic (2 Unit)

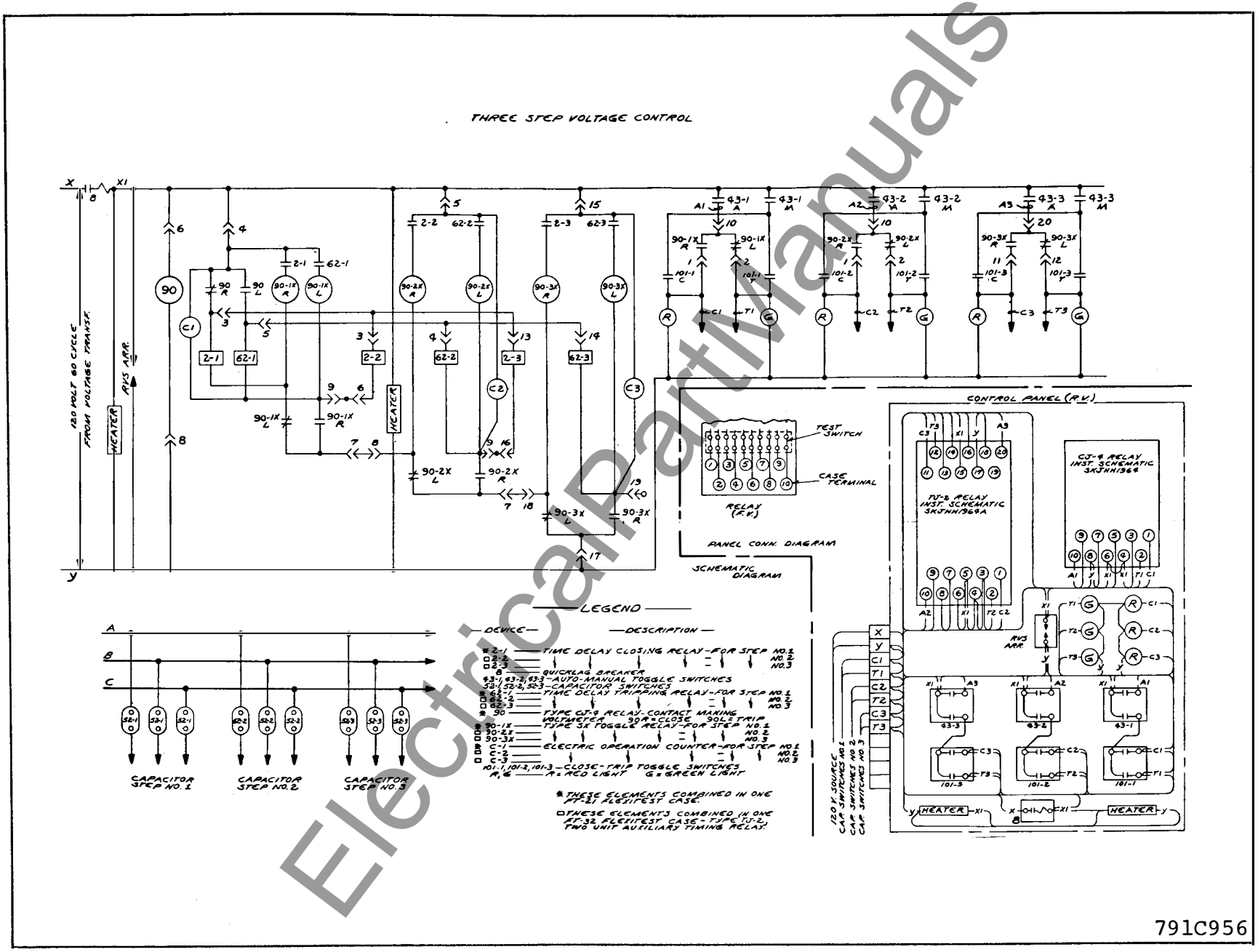

Fig. 6 External Schematic

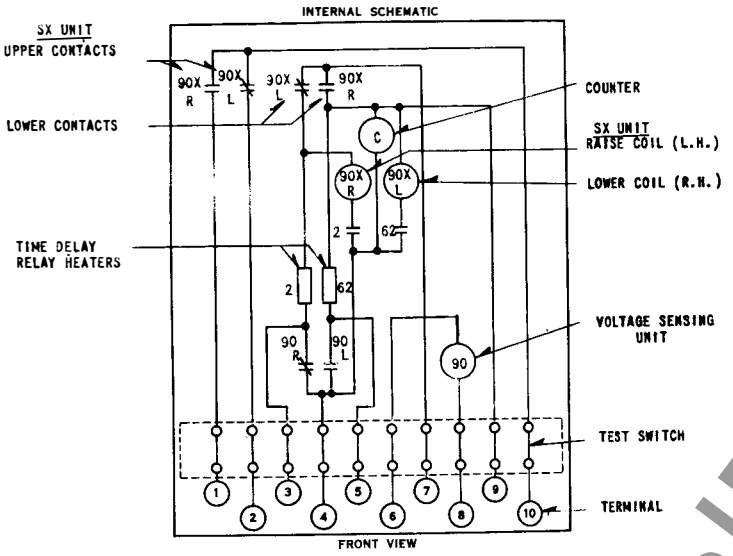

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Fig. 7 Internal Schematic CJ-2

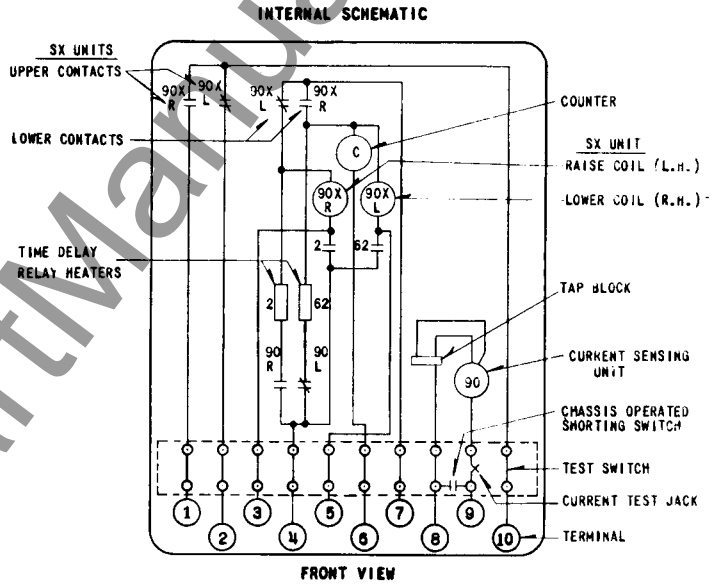

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Fig. 8 Internal Schematic CJ-5

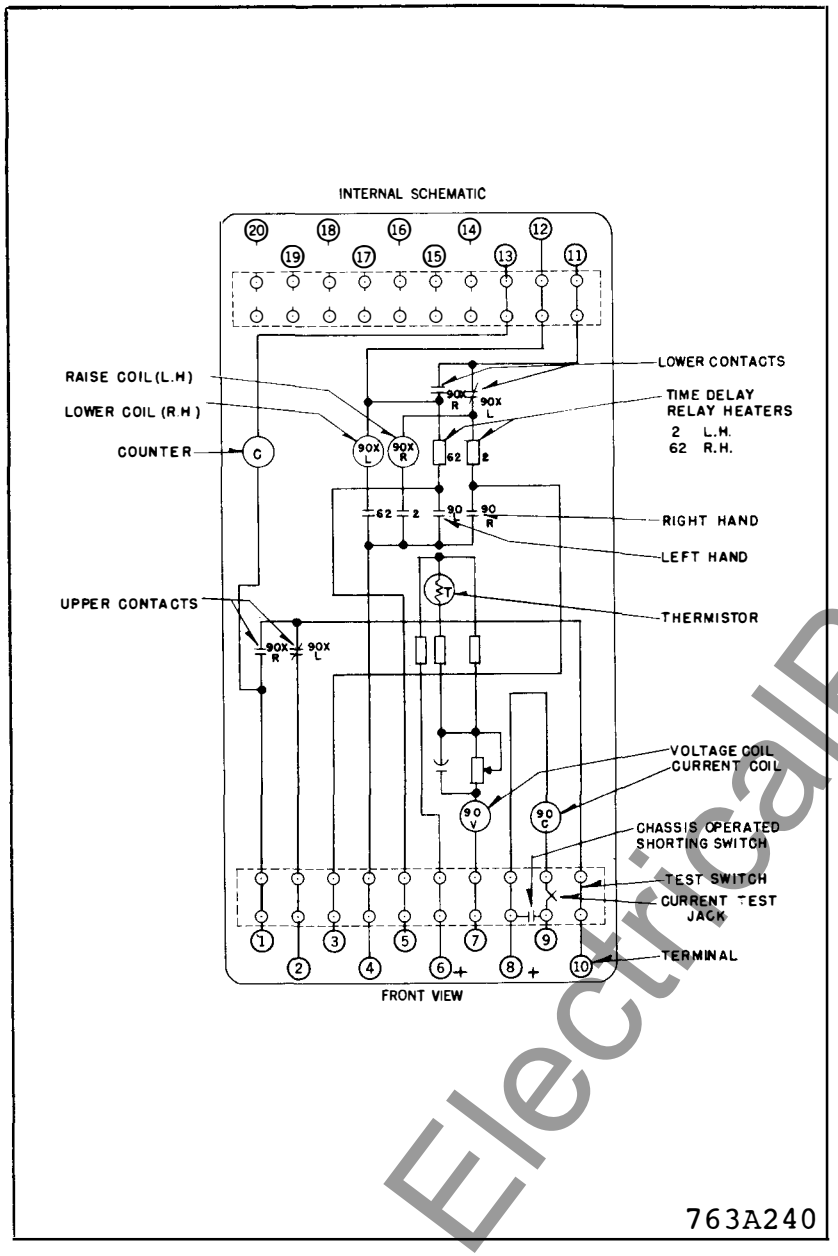

Fig. 9 Internal Schematic CJ-7 Y

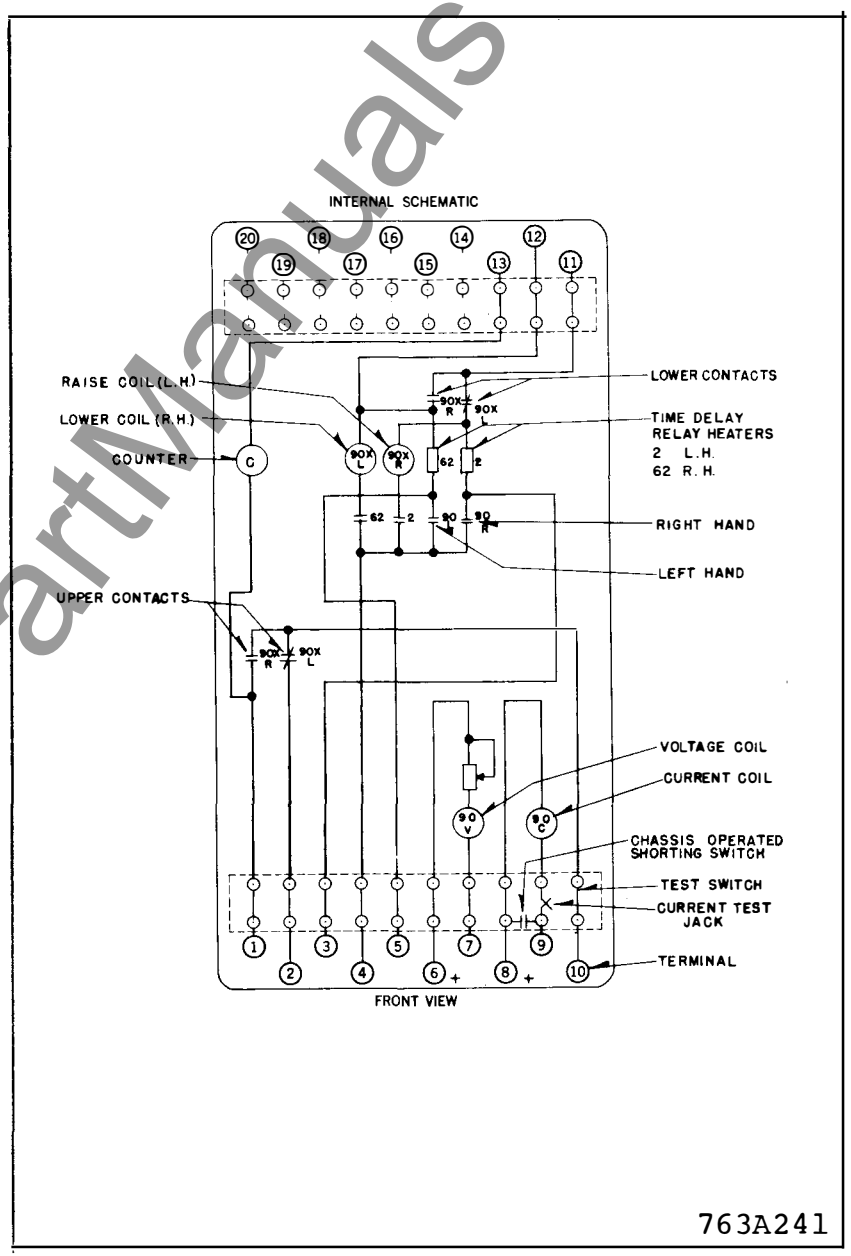

Fig. 10 Internal Schematic CJ-7

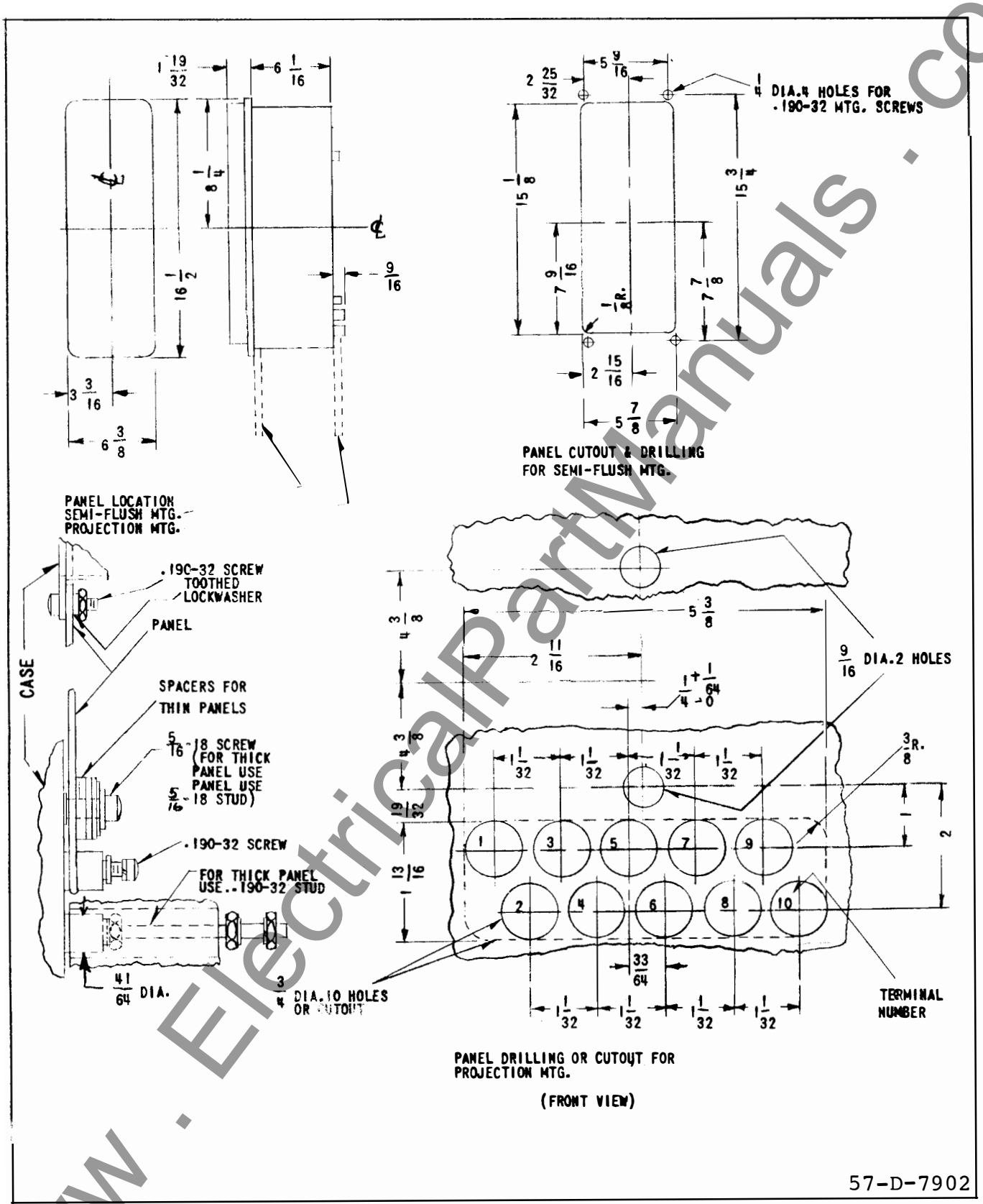

Fig. 11 Outline and Drilling Plan (FT-32 Case)

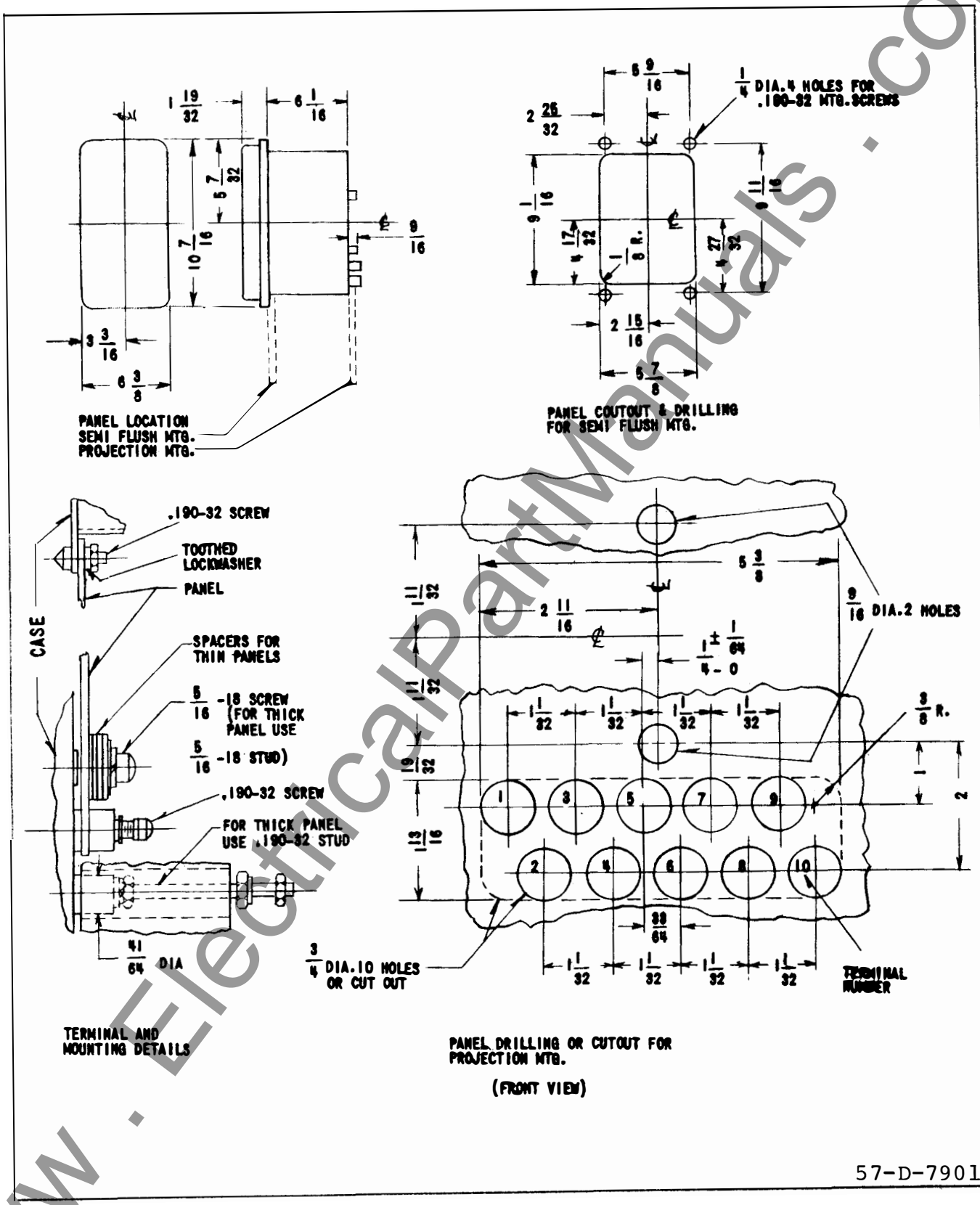

Fig. 12 Outline and Drilling Plan (FT-21 Case

WESTINGHOUSE ELECTRIC CORPORATION

RELAY-INSTRUMENT DIVISION **NEWARK, N. J.**

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