INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

TYPE CO CONTACT MAKING AMMETER

CAUTION Before putting relays into service, remove all blocking 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

These relays are used to initiate switching or control operations when the line current rises above a preset value, or falls below a preset value. Thus the relay is a contact making ammeter with high and low current settings.

CONSTRUCTION AND OPERATION

The relay consists of a current operated induction disc unit, with adjustable front and back contacts to set the upper and lower tripping limits. There is no operation indicator, or contactor switch.

The operating unit is an induction disc type unit operating on current. The induction disc is a thin four-inch diameter conducting disc mounted on a vertical shaft. The shaft is supported on the lower end by a steel ball bearing riding between concave sapphire jewel surfaces, and on the upper end by a stainless steel pin.

The moving contact is a small silver rod hemispherically shaped at either end to form a double throw arrangement. It is fastened on the end of a conducting arm. The other end of this arm is clamped to an insulating tube on the disc shaft. The electrical connection is made from the moving contact thru the arm and a spiral spring. One end of the spring is fastened to the arm, and the other to a slotted spring adjuster disc which in turn fastens to the moulded insulation block mounted on the unit.

The front and back stationary contact assemblies are both adjustable. Each mounts on a lever which can be set anywhere about the periphery of a calibrated scale. The moulded brackets, upon which the stationary contact leaf springs are mounted, are each secured to their respective lever arms by two screws. These screws may be loosened and the moulded contact supports pivoted to the positions required for correct tracking of both contact assemblies on the calibrated scale.

The moving disc is rotated by an electromagnet in the rear and damped by a permanent magnet in the front. The operating torque is obtained by the circuit arrangement shown in Fig. 1. The main pole coil of the relay acts as a transformer and induces a voltage in a secondary coil. Current from this secondary coil flows through the upper pole coils and thus produces torque in the disc by the reaction between the fluxes of the upper and lower poles. When the current rises above the preset value the moving contact closes to the right (front view). When the current falls below a preset value the moving contact closes to the left (front view).

CHARACTERISTICS

The type CO contact making ammeter has adjustable high and low current contacts that can be set around an 180° arc which is calibrated in amperes. These values represent the tripping position of the moving contacts when that value of current is applied to the relay.

CO CONTACT MAKING RANGES

Continuous Amps	Range
10	0.5 to 2
16	1.5 to 6

The moving contacts will assume a position corresponding to the current applied to the relay and will stay in that position until the current changes. If the current changes either gradually or suddenly, the

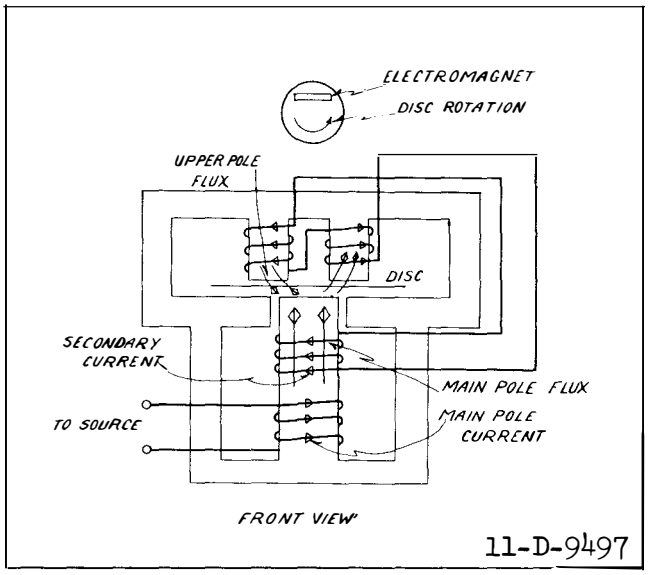

Fig. 1. Flux and Current Relations in the Introduction Type Unit.

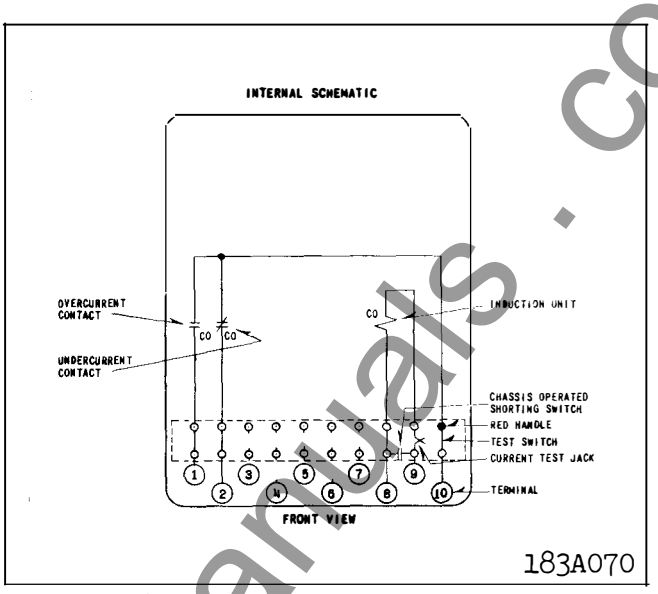

Fig. 2. Internal Schematic of the Type CO Contact Making Ammeter in the Type FT21 Case.

contact will assume a new position corresponding to the change unless the travel is limited by the setting of the adjustable contacts. If the contacts are set to close for a particular valve of current, and if a current of that exact amount is applied, then the relay is operating at its minimum trip point and the times on repeated operations are not repetitive within close tolerances. However, currents appreciably greater than the overcurrent setting, or appreciably less than the undercurrent setting, result in relay timing operations which are consistent for repeated trials.

The relay has inverse timing; that is, the greater the increase in current the faster the relay contact will travel.

The contacts will close 30 amperes at 250 volts d-c. It is recommended that auxiliary relays be used to seal in the control circuit to reduce the contact duty.

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.

All contacts should be periodically cleaned. A contact burnisher S#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.

The relay has front and back adjustable stationary contacts; to adjust these properly set the two levers so they both point to the same calibration point at approximately mid-scale. Then adjust the position of the front and back contacts so they both just touch on either side of the moving contact. This is done by

loosening the two screws at the top of each lever and rotating the adjustable contact assembly slightly until the desired contact positions are obtained. The screws should be tightened securely.

To calibrate the relay, it should be connected to a suitable 60 cycle current source. The trip circuit should be connected to suitable indicating lamps. Current corresponding to the various values marked on the semi-circular scale plate should be applied to the relay and the position of the adjustable contacts checked for the various values. Readjustments can be made by rotating the notched spring adjuster with a screw driver blade inserted in one of the notches.

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 of the Type CO Contact Making Ammeter are as follows:

0.5 to 2 Amp Range

Amps.	Volt-Amps.	Power Factor Angle			
0.5	0.22	65°	Current	Lagging	Voltage
2	3.5	65°	"	"	"
5	22	65°	"	"	"

1.5 to 6 Amp Range

1.5	0.22	65°	Current	Lagging	Voltage
6	3.5	65°	"	"	"
5	2.45	65°	"	"	"

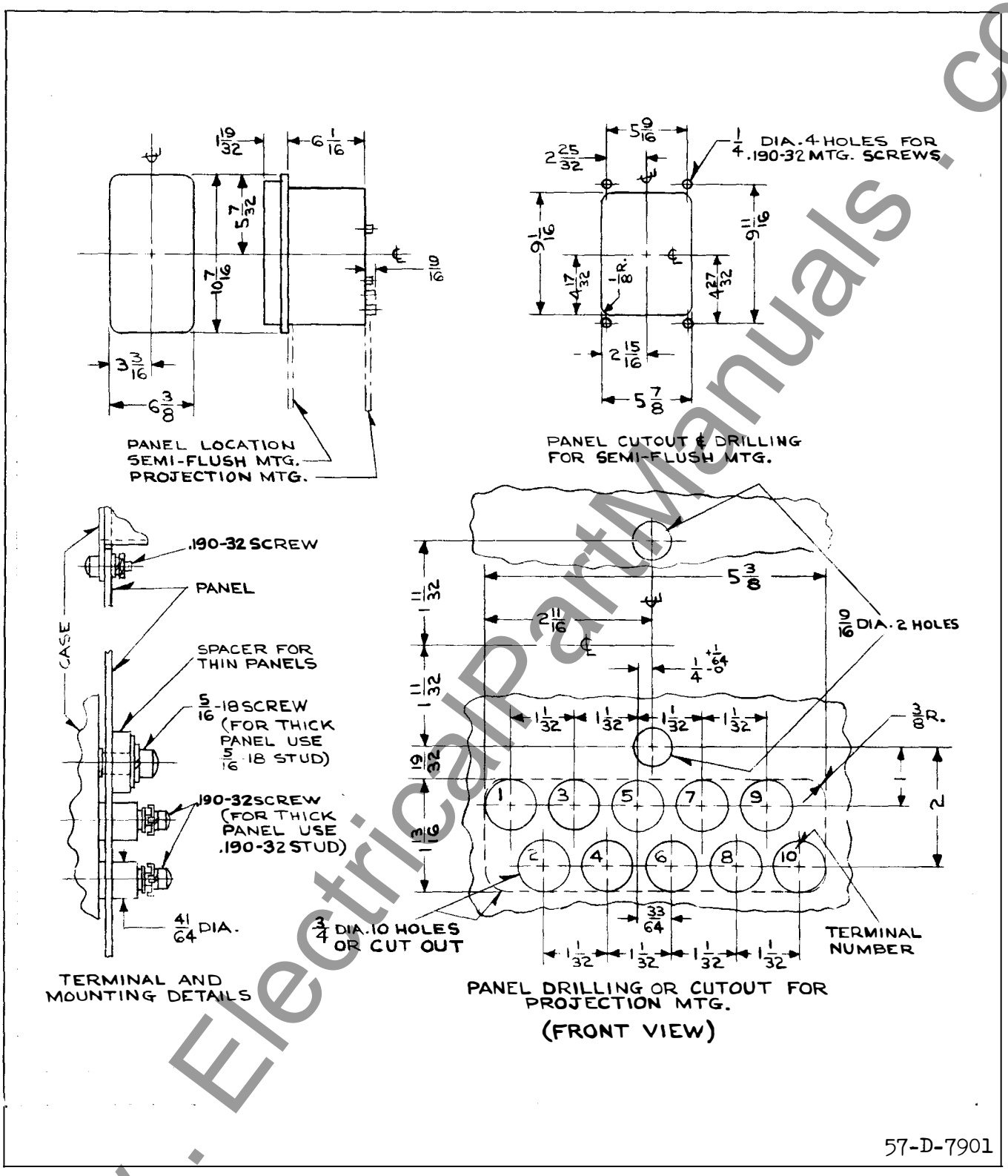

Fig. 3. Outline and Drilling Plan for the Type CO Contact Making Ammeter in the Type FT21 Case.

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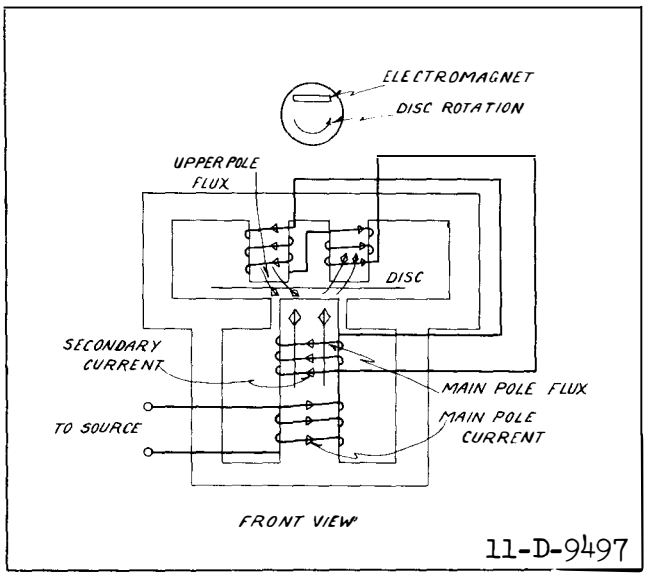

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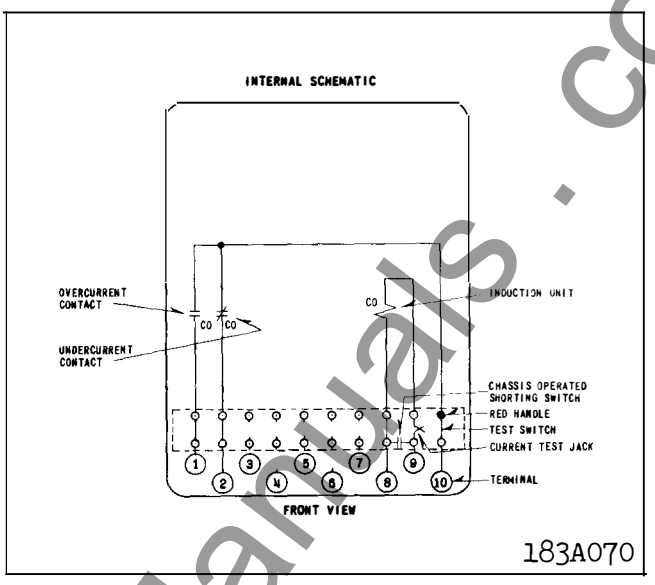

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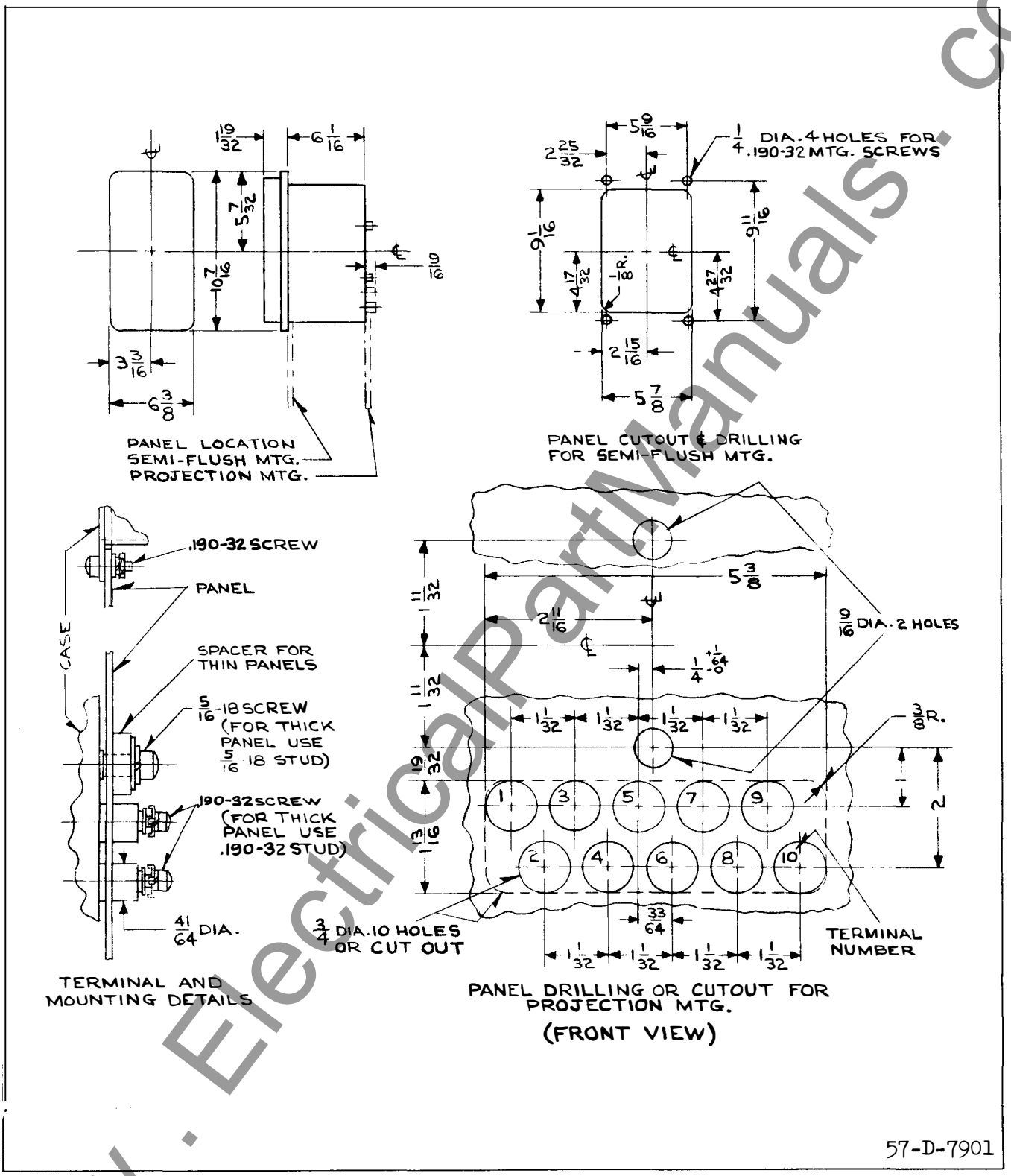

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