INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

TYPE TT-9 AUXILIARY 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 TT-9 relay is an auxiliary relay used in transfer trip relaying, such as would be used to trip a remote breaker for a transformer fault at a station where no high voltage breaker is used. It can be used in conjunction with single channel or dual channel equipment.

CONSTRUCTION

The type TT-9 relay consists of one lockout unit, two blocking diodes, and one indicating contactor switch.

Lockout Unit - LO

The lockout unit LO is a telephone type relay. In this relay, an electromagnet attracts a right-angle iron bracket which in turn operates a set of make and break contacts.

The lockout unit is of slow release type. The delay in release is obtained by a copper slug located at the end opposite from the armature. When the coil becomes de-energized, the change in flux through the slug results in an electromotive force and associated current in it. This current produces a flux which aids the main flux and delays the release of the armature. When the coil is energized, the operation of the relay is not appreciably delayed because the armature is operated by flux not linking the slug.

Blocking Diodes

Blocking diodes are zener type silicon rectifiers.

Indicating Contactor Switch (ICS)

The indicator is a small d-c operated clapper type device. A magnetic armature is attracted to the magnetic core upon energization of the switch. During this operation two fingers on the armature deflect a spring located on the front of the switch, which allows the operation indicator to drop. Also during this operation, moving contacts bridge two stationary contacts completing trip circuit. The target is reset from outside the case by pushrod located at the bottom of the cover.

OPERATION

Lockout Unit - LO

The lockout unit is energized by a 94G contact. One contact of LO-unit is in trip circuit, a second contact is in alarm circuit and a third one is in series with the trip relay contact (94T).

Blocking Diode

The diode in series with the lockout relay coil is used to block an undesirable path to the indicating lamp under normal system conditions. Without the diode, a path would be present from the station battery positive through 94G and LO-contacts to energize the indicating light. The diode is a zener type diode rated at one watt, 200 volts (J.E.D.E.C. No. IN3051).

CHARACTERISTICS

The various characteristics of the various units of the relay are as follows:

	48V Ohms	125V Ohms	250V Ohms
LO Unit Coil	1300	1300	1300
LO-Series Resistor	- -	5000 †	15000 †

LO unit pickup time — less than 1.5 cycles.
LO unit dropout time — 4 cycles.
† Adjustable

SUPERSEDES I.L. 41-959.1C
*Denotes changes from superseded issue.

EFFECTIVE OCTOBER 1974

SETTINGS

Lockout Unit

The telephone relay requires correct setting for the correct control voltage. For 48V d-c, the series resistor is bypassed by connecting the lead to the rear terminal of the resistor. For 125V d-c or 250V d-c rated relays the connection is made to the adjust terminal of the series resistor.

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 information, refer to IL.41-076.

ADJUSTMENTS AND MAINTENANCE

The proper adjustments to insure correct operation of this relay have been made at the factory. Upon receipt of the relay, no customer adjustments other than those covered under "SETTINGS" should be required.

Acceptance Check

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

A. Indicating Contactor Switch

Apply direct current to the relay terminals. The indicating switch should pick up and drop the indicator target between 1 - 1.2 amp.

B. Lockout Unit - LO

Apply rated voltage to the lockout unit and observe contact action. If desired, the timing of the operation can be checked as outlined under calibration procedure.

Routine Maintenance

All relays should be inspected periodically and the 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 S#182A836HO1 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.

NOTE When making a dielectric test on the relay, the high voltage may be applied at the relay terminals, from all circuits to ground, between coil and contact circuits, and between isolated coil circuits. However, the test voltage should not be applied across relay contacts and rectifier circuits.

Use the following procedure for calibrating the relay if the relay has been taken apart for repairs or the adjustments have been disturbed. This procedure should not be used unless it is apparent that the relay is not in proper working order.

Calibration Procedure

A. Lockout Unit - LO

The operating time of LO should be checked with an electronic timer.

For 125V d-c or 250V d-c control voltage, the coil of the relay should be connected in series with the internal resistor. This resistance should be set initially for:

3500 ohms ± 10% for 125V d-c
12000 ohms ± 10% for 250V d-c

With the armature closed, adjust the air gap to be .002" - .003". Contact gaps should measure from .020" to .035". The coil is energized across terminals 6 and 9.

Check for the specified 4 cycles dropout time across terminals 4 and 5. If necessary, the dropout time can be adjusted by changing the air gap. After final adjustment, the air gap should be a minimum of .002". Check pickup. It should be below 1.5 cps. If necessary, adjust series resistor.

B. Zener Blocking Diode (For 48, 125, and 250 Volts Relays)

The zener type blocking diodes have a one watt, 200 volt rating (JEDEC No. IN3051, two diodes in series used on 250 volt relays).

1. Reverse Characteristics:

Breakdown voltage is the value of voltage at which the current just exceeds 0.25 milliamperes and should be between 160 to 240 volts for each diode. The breakdown voltage is determined by slowly increasing voltage until reverse current exceeds 0.25 milliamperes and starts to increase rapidly. Do not exceed 3 milliamperes reverse current.

2. Forward Characteristic:

With 200 milliamperes flowing in forward direction, the forward voltage across each diode should not exceed 1.5 volts.

C. Indicating Contactor Switch

Pass sufficient d-c current through the trip circuit to close the contacts of the ICS. This value of current should be between 1.0 - 1.2 amp. The operation indicator target should drop freely. The contact gap should be approximately .047" between the bridging moving contact and the adjustable stationary contacts. The bridging moving contact should touch both stationary contacts simultaneously.

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.

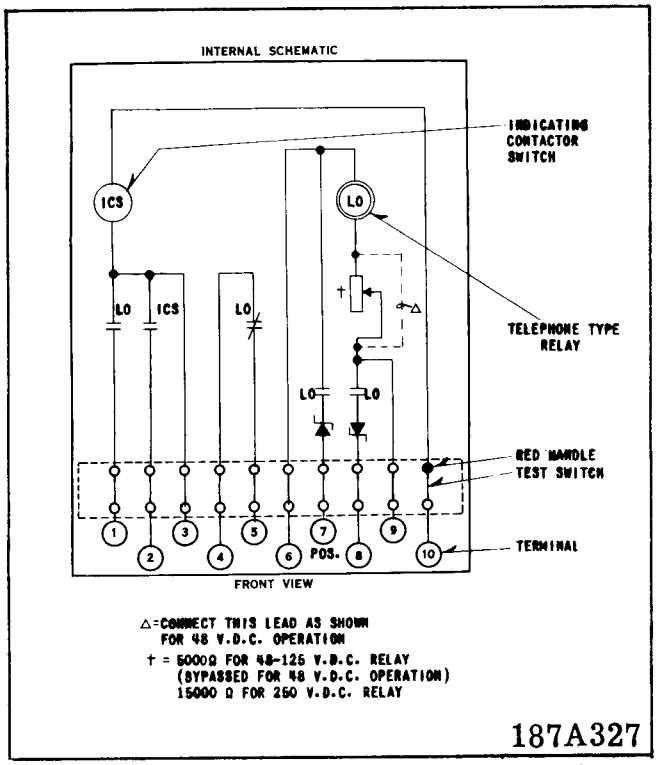
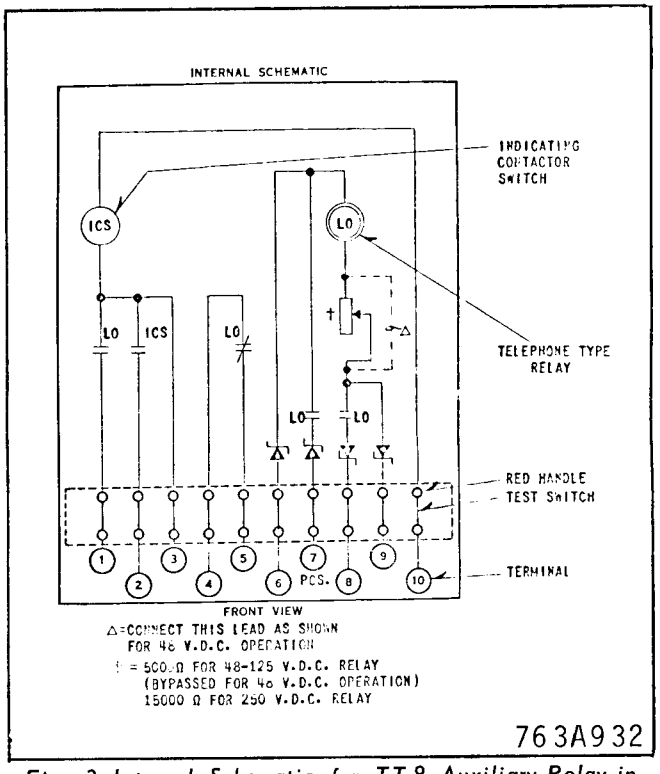


Fig. 1 Internal Schematic for TT-9 Auxiliary Relay in FT-11 case.



* *Fig. 2 Internal Schematic for TT-9 Auxiliary Relay in FT-11 Case.*

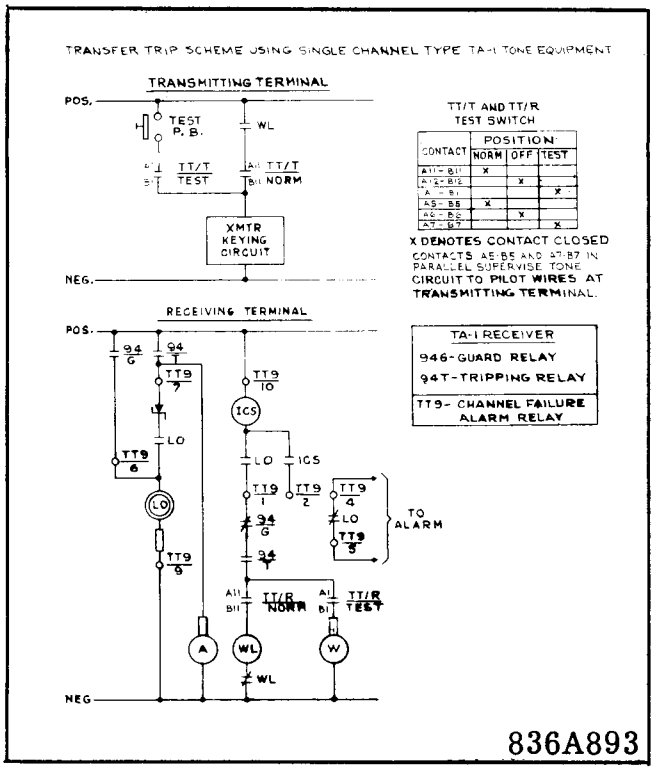
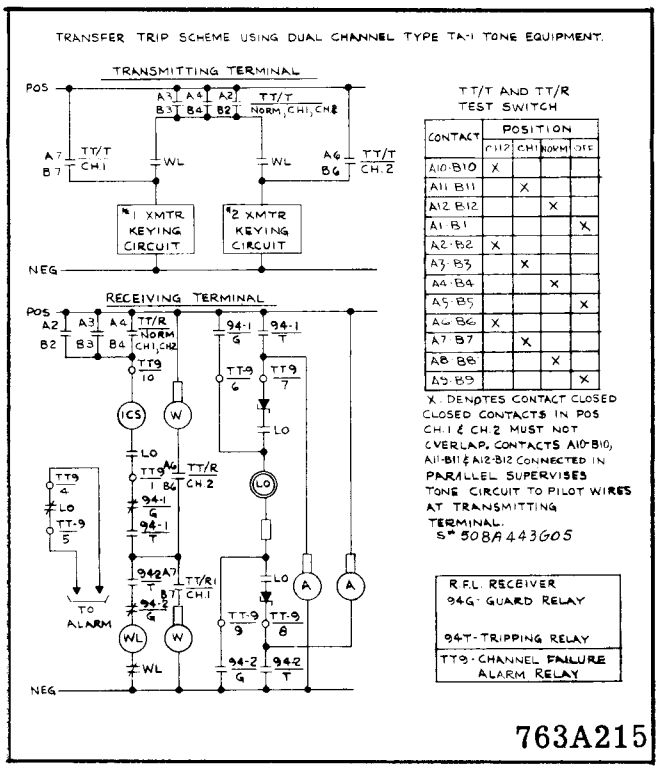


Fig. 3 Transfer Trip Scheme using single channel with TT-9 Relay.



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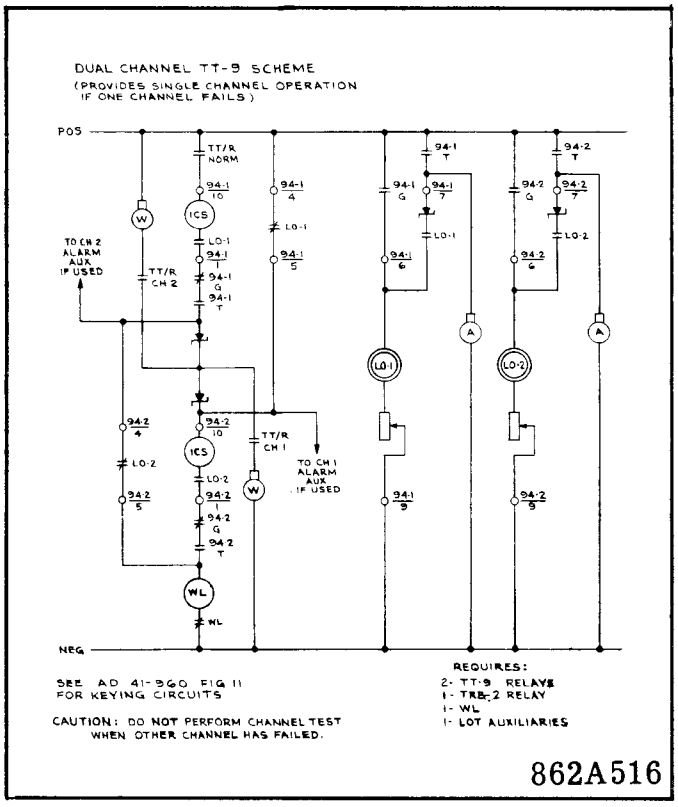

Fig. 5 Transfer trip scheme using dual channel, with a single channel operation if one channel fails, with TT9 Relay.

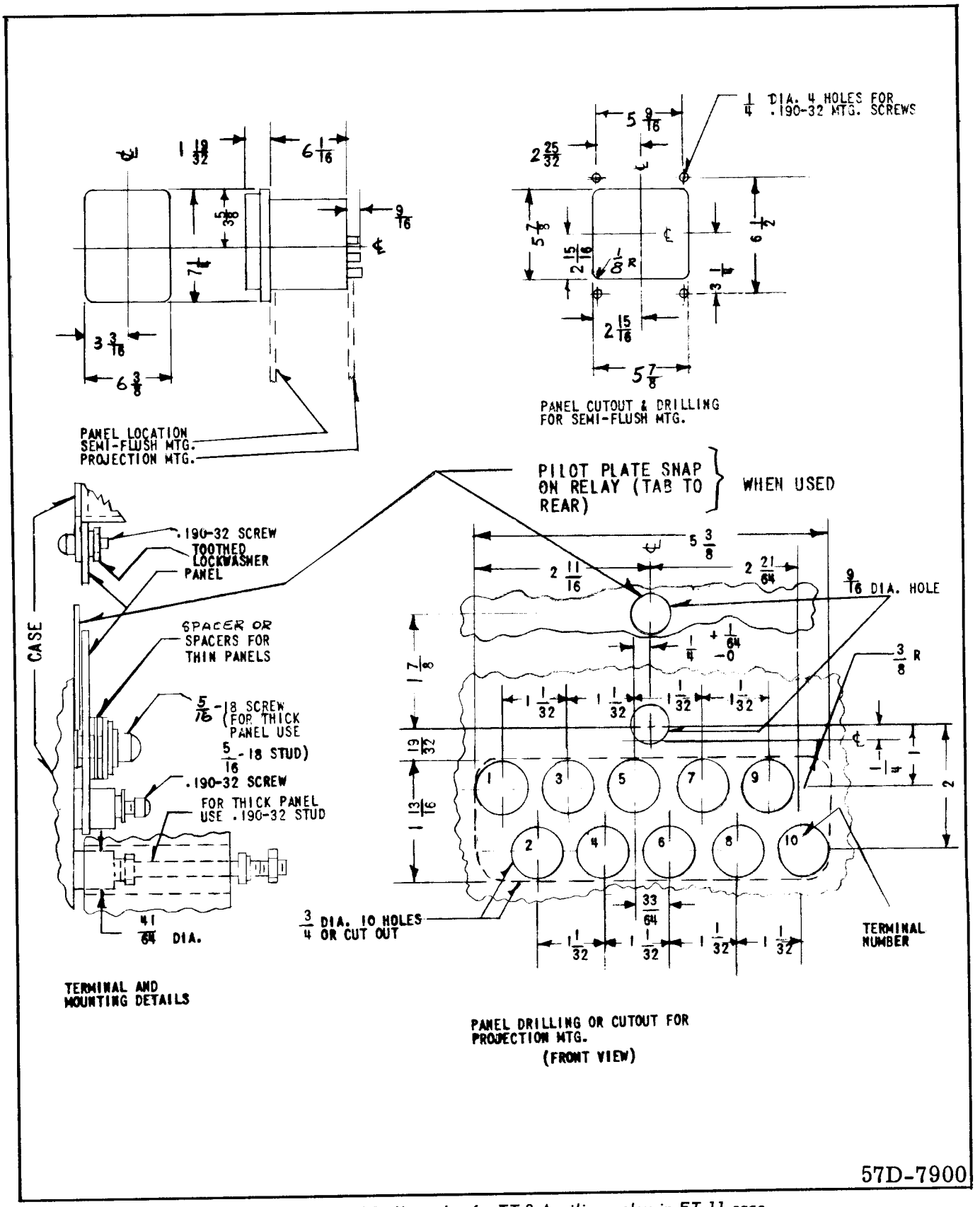

Fig. 6 Outline and Drilling plan for TT-9 Auxiliary relay in FT-11 case.

WESTINGHOUSE ELECTRIC CORPORATION

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

Printed in U.S.A.

INSTALLATION • OPERATION • MAINTENANCE

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SUPERSEDES I.L. 41-959.1B
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EFFECTIVE DECEMBER 1968

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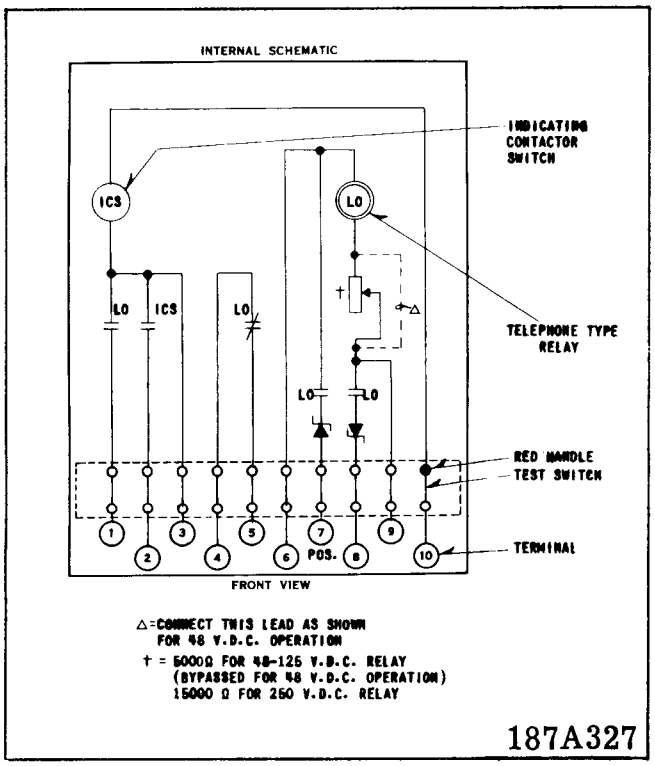

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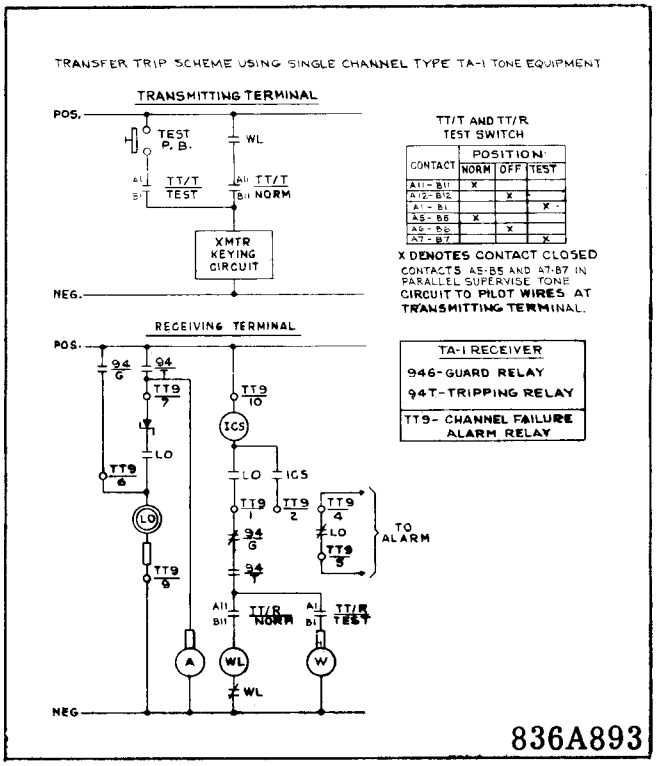

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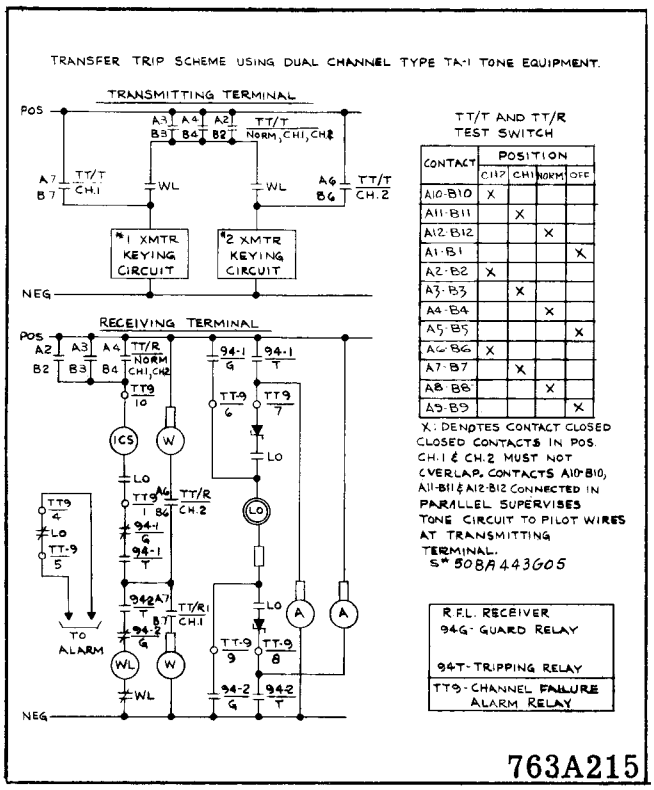

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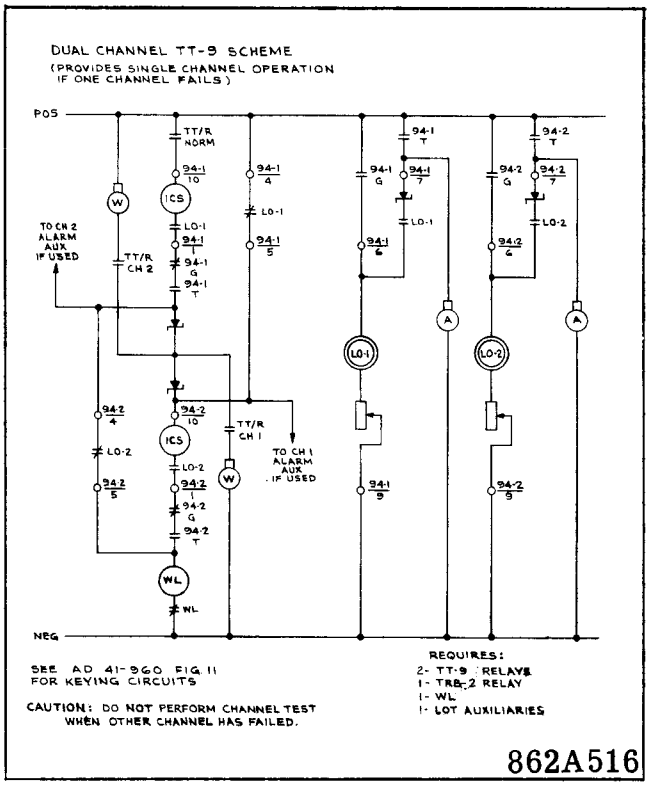

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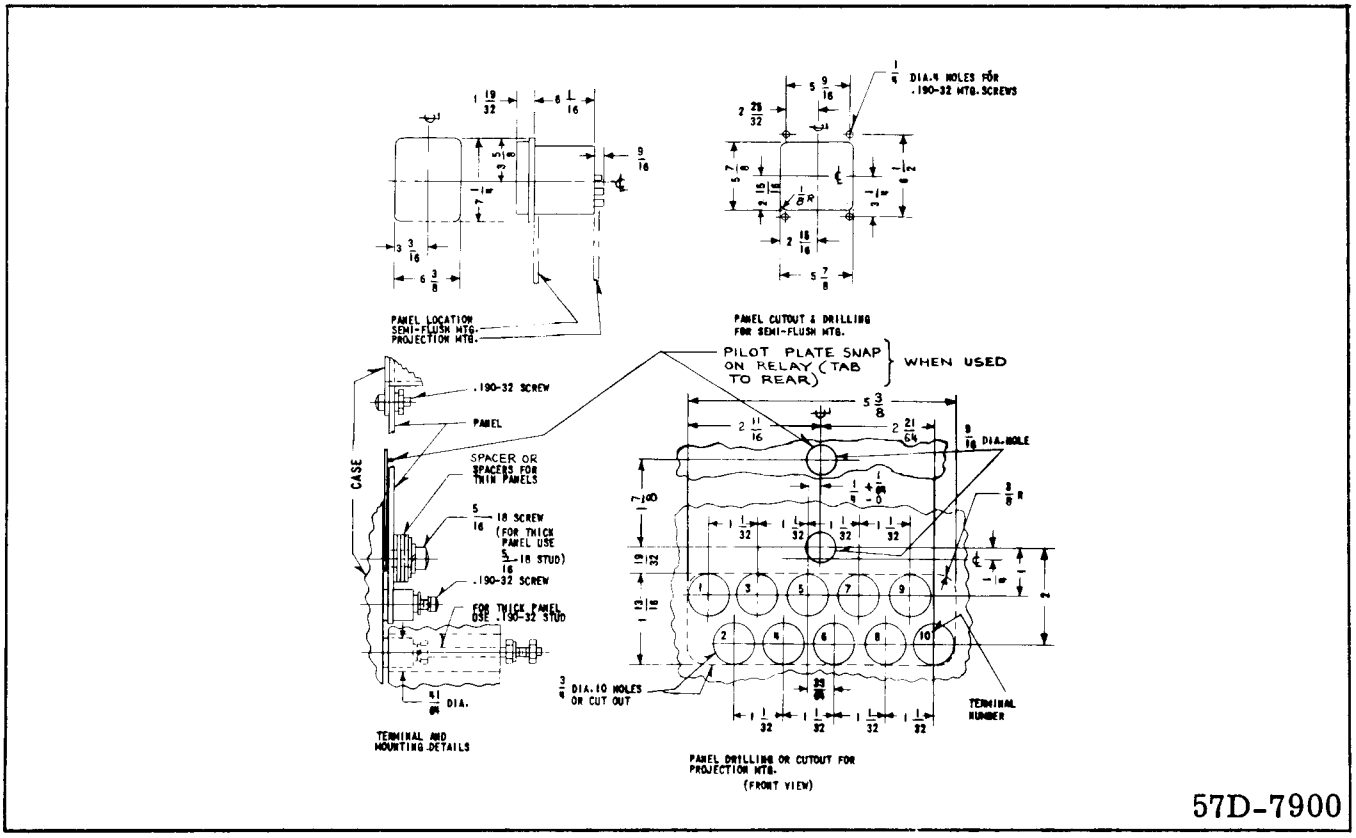

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