INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

TYPE TR-1 AUXILIARY TRIPPING RELAY

CAUTION Before putting protective 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

The TR-1 relay is an auxiliary relay energized by protective relays to trip two circuit breakers. Sufficient contacts are provided to seal in both trip circuits until the breaker auxiliary switches operate.

CONSTRUCTION

The TR-1 relay consists of two contactor switches mounted in a projection or semi-flush SG type case. The contactor switches are small solenoid-type d.c. operated elements. A cylindrical plunger with a silver disc mounted on its lower end moves in the core of the solenoid. As the plunger travels upward, the disc bridges three silver stationary contacts.

OPERATION

The coils of the contactor switches are energized through the trip contacts of the protective relays. The contacts of one switch seals in the trip circuit and trips one breaker. The contacts of the other switch are for tripping a second breaker.

It is necessary to add resistance in the CS1 and CS2 coil circuits to limit the current in these coils. This is done with separate external resistors, 22 ohms for a 125-volt trip circuit and 44 ohms for a 250-volt trip circuit. With these resistance values, the relay operating time is approximately one-half cycle (60-cycle basis).

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 semi-flush type relay vertically by means of the two mounting screws. Mount the projection type relay by first removing and discarding the screw in the middle of the rear side, then secure the relay to the panel using the mounting screw in the hardware bag. 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 instructions below should be followed.

All contacts should be periodically cleaned with a fine file. Style 1002110 file 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.

Contactor Switch

Adjust the stationary core of the switch for clearance between the stationary core and the moving core of 1/64 inch when the switch is picked up.. This can be done by disconnecting the switch, turning it up-side down and screwing up the core screw until the contact just * separates. Then back off the core screws approximately one turn and lock in place. This prevents the moving coil striking and sticking to the stationary core because of residual magnetism. Adjust the contact clearance for 3/32 inch by means of the two small nuts on either side of the Micarta disc. The switch should pick up at two ampere d.c. Test for sticking after 30 amperes.d.c. are passed thru the coil. The resistance of the coil circuit is approximately 1/2 ohm.

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.

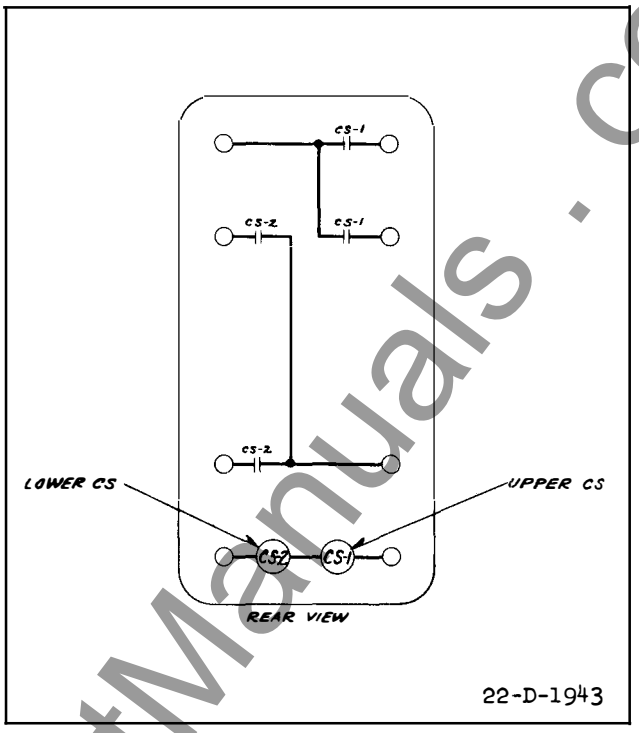

Fig. 1—Internal Schematic of the Type TR-1 Auxiliary Tripping Relay.

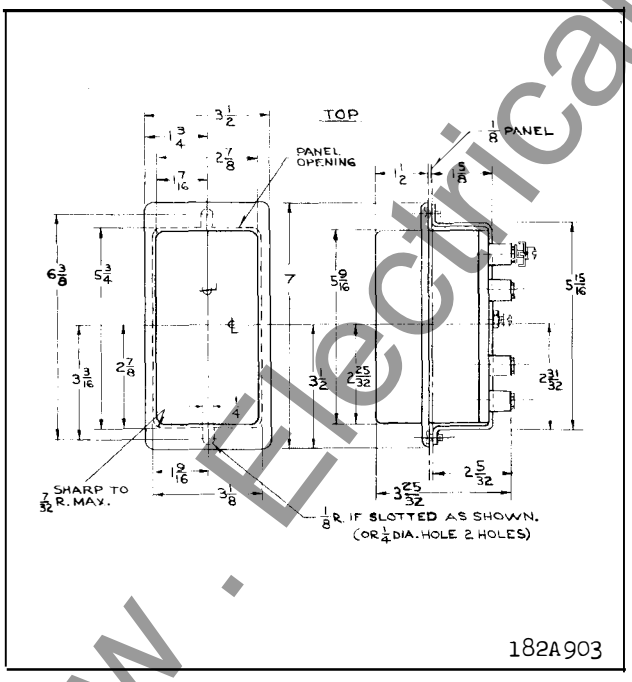

Fig. 2—Outline and Drilling Plan for the Type TR-1 Auxiliary Tripping Relay in the Semi-flush Case. For Reference Only.

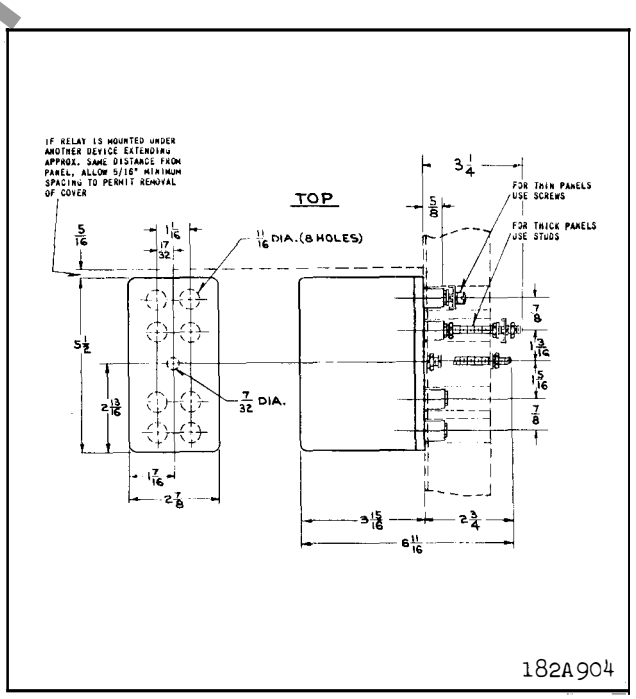

Fig. 3—Outline and Drilling Plan for the Type TR-1 Auxiliary Tripping Relay in the Projection Case. For Reference Only.

WESTINGHOUSE ELECTRIC CORPORATION
METER DIVISION • NEWARK, N.J.
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INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

TYPE TR-1 AUXILIARY TRIPPING AND INDICATING RELAY

CAUTION: Before putting protective 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 TR-1 relay is an auxiliary relay energized by protective relays to trip two circuit breakers. Sufficient contacts are provided to seal in both trip circuits until the breaker auxiliary switches operate. Indication is provided by targets which drop whenever the switch units within the relay operate.

CONSTRUCTION

The type TR-1 relay consists of two direct current, doubletrip indicating contactor switch units (ICS). The ICS is a small clapper type device. A magnetic armature, to which leafspring mounted contacts are attached, is attracted to the magnetic core upon energization of the switch. When the switch closes, the moving contacts bridge two stationary contacts, completing the trip circuit. Also during this operation two fingers on the armature deflect a spring located on the front of the switch, which allows the operation indicator target to drop. The target is reset from the outside of the case by a push rod located at the bottom of the cover.

The front spring, in addition to holding the target, provides restraint for the armature and thus controls the pickup value of the switch.

OPERATION

The coils of the ICS units are normally connected in series and energized through the trip contacts of the protective relays. The contacts of one unit seal in the trip circuit and trip one breaker. The contacts of the other switch are for tripping a second breaker.

It is necessary to add resistance in the ICS unit coil circuit to limit current in these coils. Normally these coils are connected in series with an external resistance. (See Fig. 3). For the 1 ampere ICS unit relay 22 ohms are used for a 125 volt d-c trip circuit and 44 ohms for a 250 volt d-c trip circuit. These values of resistance are obtained by using one or two 22 ohm resistors. For the 0.2/2.0 ampere ICS unit relay a 100 ohm mid-tap resistor is used for 0-125 volt d-c trip circuit and a 200 ohm mid-tap resistor for a 250 volt d-c trip circuit. With these resistance values, the relay operating time is approximately ¾ cycle (60 cycle basis).

CHARACTERISTICS

The ICS will trip at a current value between 1.0 and 1.2 amperes d.c. for the 1 ampere ICS unit. The current should not be greater than the particular ICS top setting being used for the 0.2/2.0 ampere ICS unit. The operation indicator target should drop freely. The trip circuit should draw at least 2½ times rated value in order to keep the time of operation of the switch to a minimum and provide positive operation.

Trip Circuit Constants

1 ampere rating: 0.1 ohms d.c. resistance
0.2/2.0 ampere rating: 0.2 tap — 6.5 ohms
2 2 tap — 0.15 ohms

Coil Ratings

Tap Rating	Coil rating in amperes d.c.	
	1 second	continuous
1	140	5
0.2	11.5	0.4
2.0	88.0	3.2

Supersedes I.L. 41-758.1
Complete Revision

EFFECTIVE OCTOBER 1960

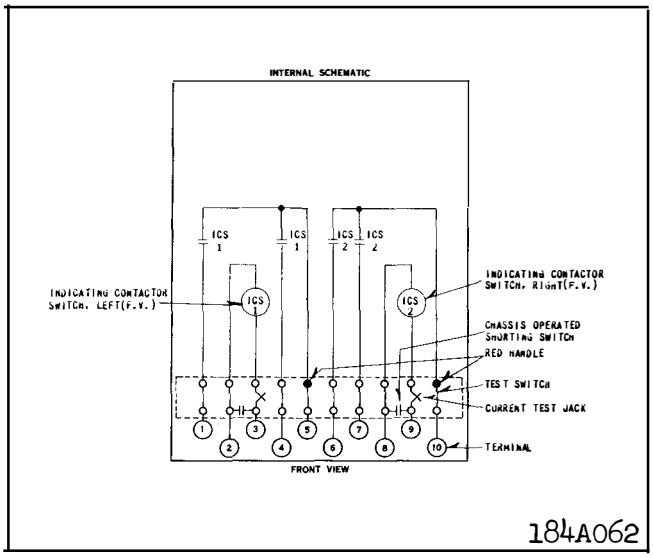


Fig. 1 Internal Schematic of Type TR-1 Relay with 1 ampere I.C.S. in Type FT 11 case.

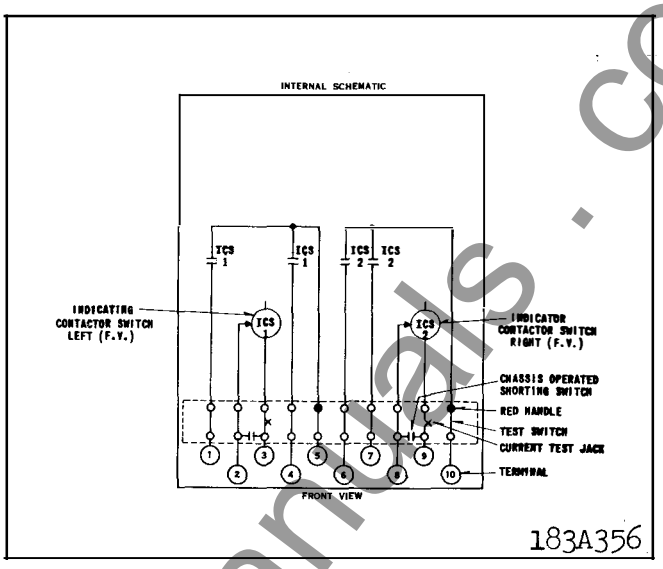


Fig. 2. Internal Schematic of Type TR-1 Relay with 0.2/2.0 ampere I.C.S. in Type FT 11 case.

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 distrubed after receipt by the customer.

1. Acceptance Tests

These tests are to be used for checking the prime characteristics to demonstrate that the relay received meets specifications and is in serviceable condition.

Pass sufficient direct current through the ICS coils to operate the ICS unit. For the 1 ampere ICS unit the value should be between 1.0 and 1.2 amperes d.c. The current should not be greater than the particular ICS tap setting being used for the 0.2/2.0 ampere ICS unit.

2. Routine Maintenance

The relays should be inspected periodically, at such time intervals as may be dictated by experience, to insure that the relays have retained their calibration and are in proper operating condition.

All contacts should be cleaned periodically. 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.

3. Calibration

Pass sufficient d-c current through the trip circuit to close the contacts of the ICS. This value of current should be not less than 1.0 ampere nor greater than 1.2 amperes for the 1.0 ampere ICS. The current should not be greater than the particular ICS tap

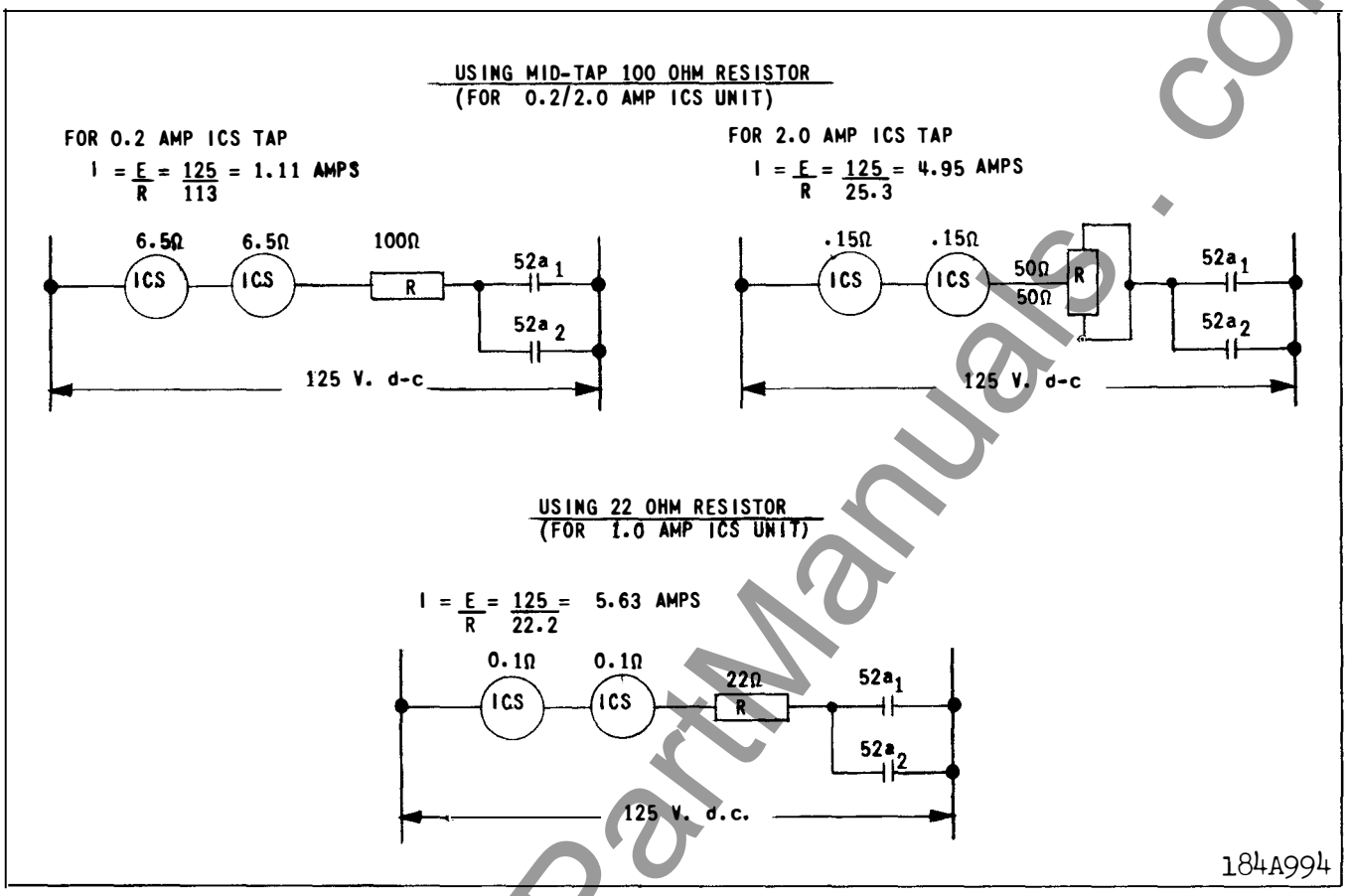
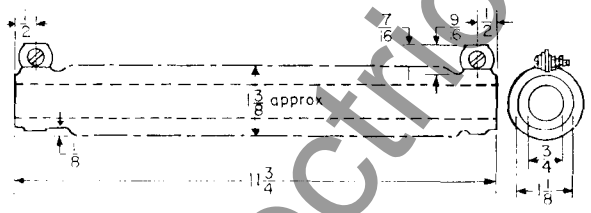


Fig. 3. Typical Schematic Diagrams for Type TR-1 Relay

style number 1164 990 (22 ohms)



style number 1955 870 (100 ohms) for 125 v d-c
style number 1955 871 (200 ohms) for 250 v d-c

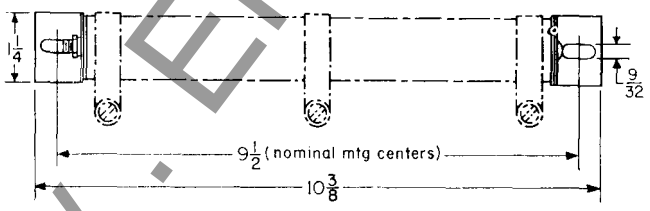


Fig. 4. Outlines of External Resistors used with Type TR-1 Relays

setting being used for the 0.2-2.0 ampere ICS. The operation indicator target should drop freely.

The contact gap should be approximately 0.047" for the 0.2/2.0 ampere unit and 0.070" for the 1.0 ampere unit, 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.

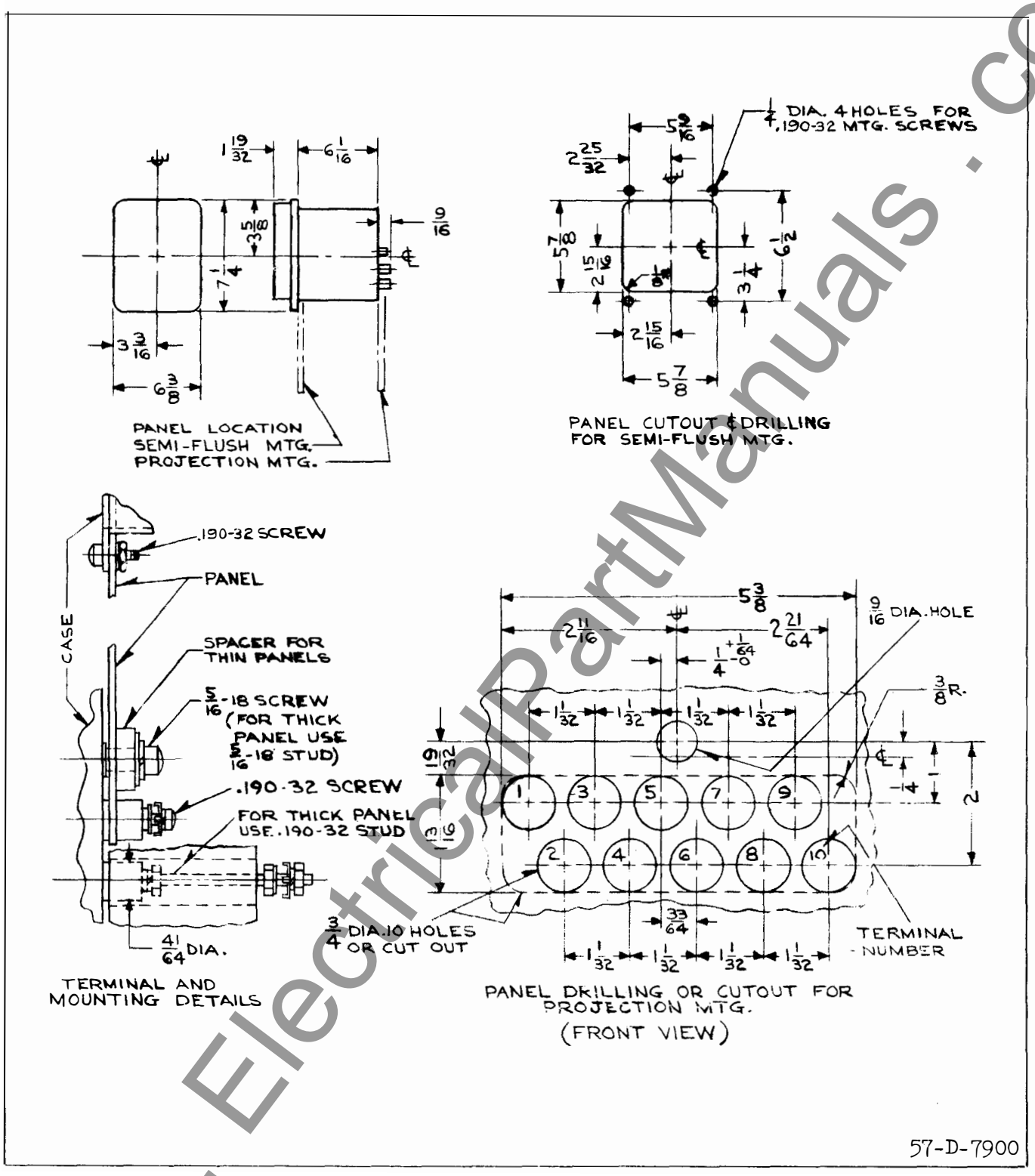


Fig. 5. Outline and Drilling Plan for the Type TR-1 Relay in the Type FT 11 case

INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

TYPE TR-1 AUXILIARY TRIPPING AND INDICATING RELAY

CAUTION: Before putting protective 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 TR-1 relay is an auxiliary relay energized by protective relays to trip two circuit breakers. Sufficient contacts are provided to seal in both trip circuits until the breaker auxiliary switches operate. Indication is provided by targets which drop whenever the switch units within the relay operate.

CONSTRUCTION

The type TR-1 relay consists of two direct current, doubletrip indicating contactor switch units (ICS). The ICS is a small clapper type device. A magnetic armature, to which leafspring mounted contacts are attached, is attracted to the magnetic core upon energization of the switch. When the switch closes, the moving contacts bridge two stationary contacts, completing the trip circuit. Also during this operation two fingers on the armature deflect a spring located on the front of the switch, which allows the operation indicator target to drop. The target is reset from the outside of the case by a push rod located at the bottom of the cover.

The front spring, in addition to holding the target, provides restraint for the armature and thus controls the pickup value of the switch.

OPERATION

The coils of the ICS units are normally connected in series and energized through the trip contacts of the protective relays. The contacts of one unit seal in the trip circuit and trip one breaker. The contacts of the other switch are for tripping a second breaker.

It is necessary to add resistance in the ICS unit coil circuit to limit current in these coils. Normally these coils are connected in series with an external resistance. (See Fig. 3). For the 1 ampere ICS unit relay 22 ohms are used for a 125 volt d-c trip circuit and 44 ohms for a 250 volt d-c trip circuit. These values of resistance are obtained by using one or two 22 ohm resistors. For the 0.2/2.0 ampere ICS unit relay a 100 ohm mid-tap resistor is used for 0-125 volt d-c trip circuit and a 200 ohm mid-tap resistor for a 250 volt d-c trip circuit. With these resistance values, the relay operating time is approximately ¾ cycle (60 cycle basis).

CHARACTERISTICS

The ICS will trip at a current value between 1.0 and 1.2 amperes d.c. for the 1 ampere ICS unit. The current should not be greater than the particular ICS top setting being used for the 0.2/2.0 ampere ICS unit. The operation indicator target should drop freely. The trip circuit should draw at least 2½ times rated value in order to keep the time of operation of the switch to a minimum and provide positive operation.

Trip Circuit Constants

1 ampere rating: 0.1 ohms d.c. resistance
0.2/2.0 ampere rating: 0.2 tap — 6.5 ohms
2 tap — 0.15 ohms

Coil Ratings

Tap Rating	Coil rating in amperes d.c.	
	1 second	continuous
1	140	5
0.2	11.5	0.4
2.0	88.0	3.2

Supersedes I.L. 41-758.1
Complete Revision

EFFECTIVE OCTOBER 1960

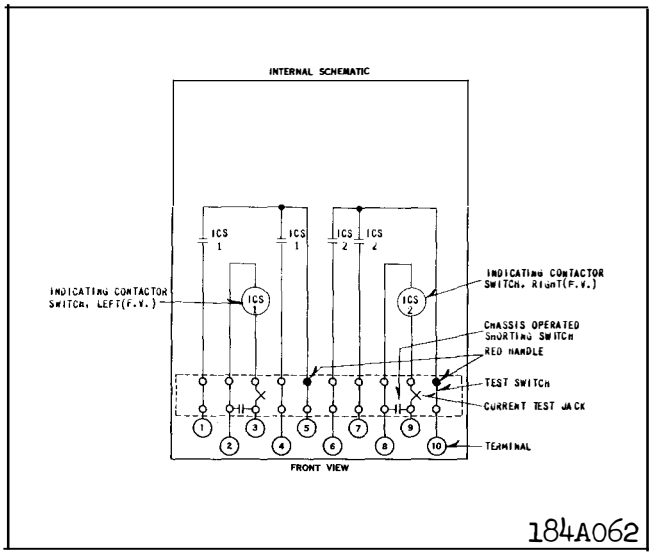


Fig. 1 Internal Schematic of Type TR-1 Relay with 1 ampere I.C.S. in Type FT 11 case.

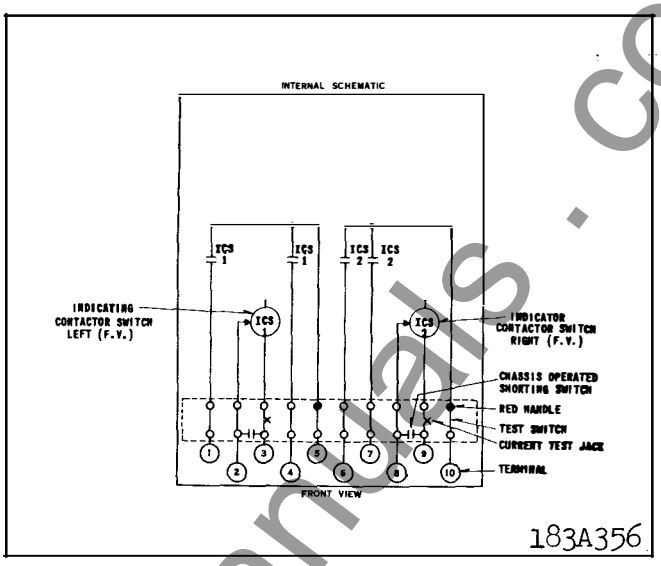


Fig. 2. Internal Schematic of Type TR-1 Relay with 0.2/2.0 ampere I.C.S. in Type FT 11 case.

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 distrubed after receipt by the customer.

1. Acceptance Tests

These tests are to be used for checking the prime characteristics to demonstrate that the relay received meets specifications and is in serviceable condition.

Pass sufficient direct current through the ICS coils to operate the ICS unit. For the 1 ampere ICS unit the value should be between 1.0 and 1.2 amperes d.c. The current should not be greater than the particular ICS tap setting being used for the 0.2/2.0 ampere ICS unit.

2. Routine Maintenance

The relays should be inspected periodically, at such time intervals as may be dictated by experience, to insure that the relays have retained their calibration and are in proper operating condition.

All contacts should be cleaned periodically. 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.

3. Calibration

Pass sufficient d-c current through the trip circuit to close the contacts of the ICS. This value of current should be not less than 1.0 ampere nor greater than 1.2 amperes for the 1.0 ampere ICS. The current should not be greater than the particular ICS tap

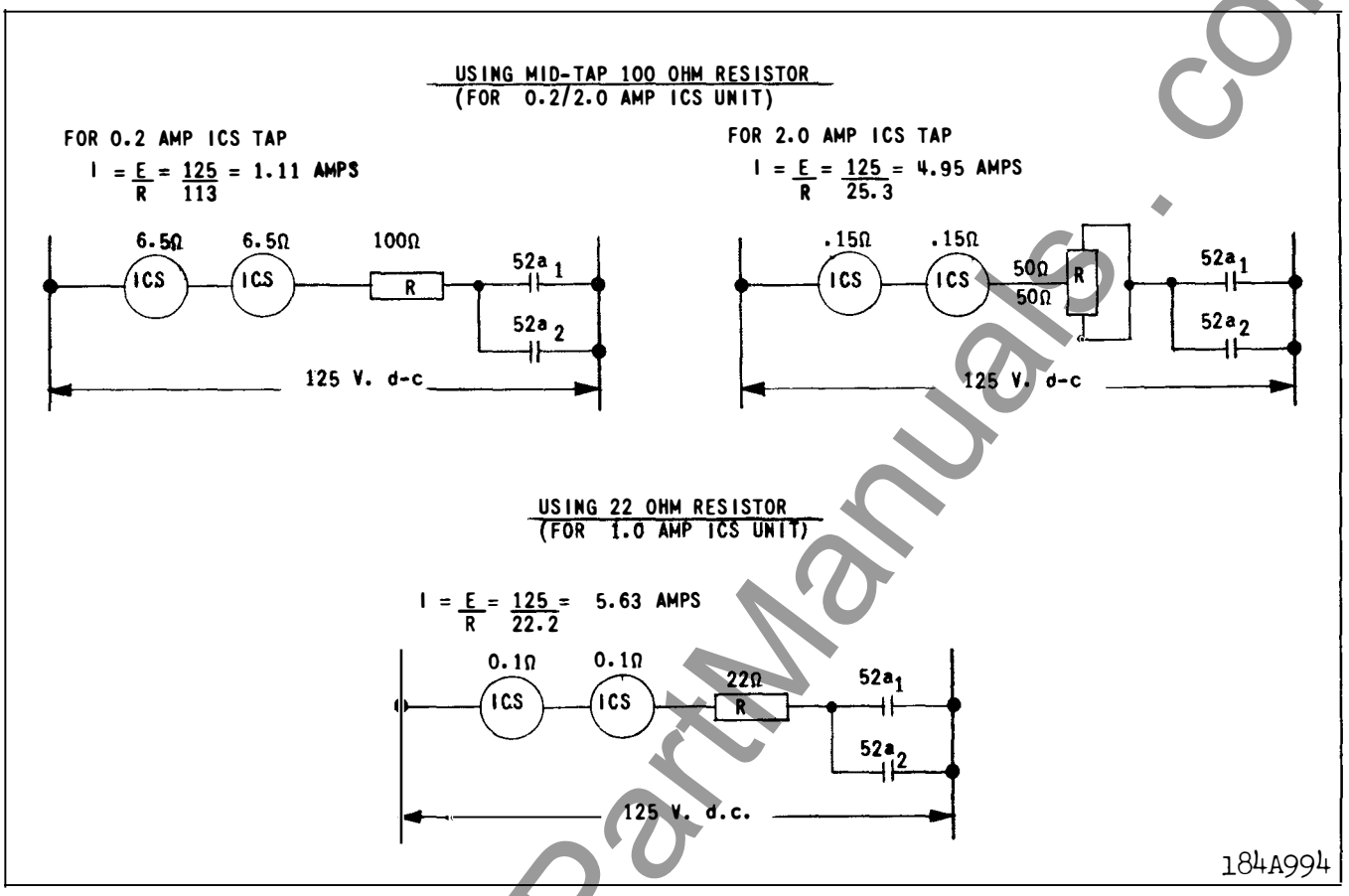
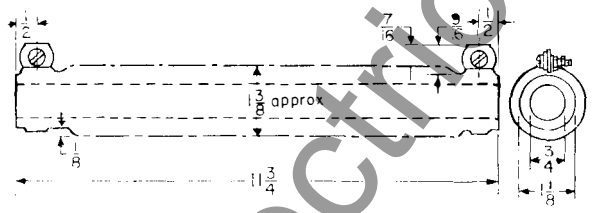


Fig. 3. Typical Schematic Diagrams for Type TR-1 Relay

style number 1164 990 (22 ohms)



style number 1955 870 (100 ohms) for 125 v d-c
style number 1955 871 (200 ohms) for 250 v d-c

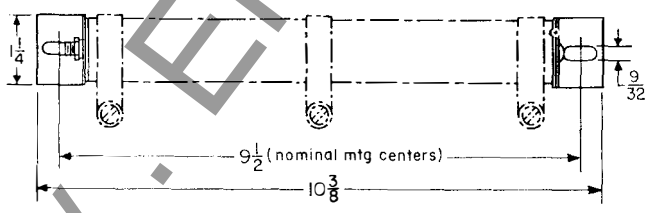


Fig. 4. Outlines of External Resistors used with Type TR-1 Relays

setting being used for the 0.2-2.0 ampere ICS. The operation indicator target should drop freely.

The contact gap should be approximately 0.047" for the 0.2/2.0 ampere unit and 0.070" for the 1.0 ampere unit, 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.

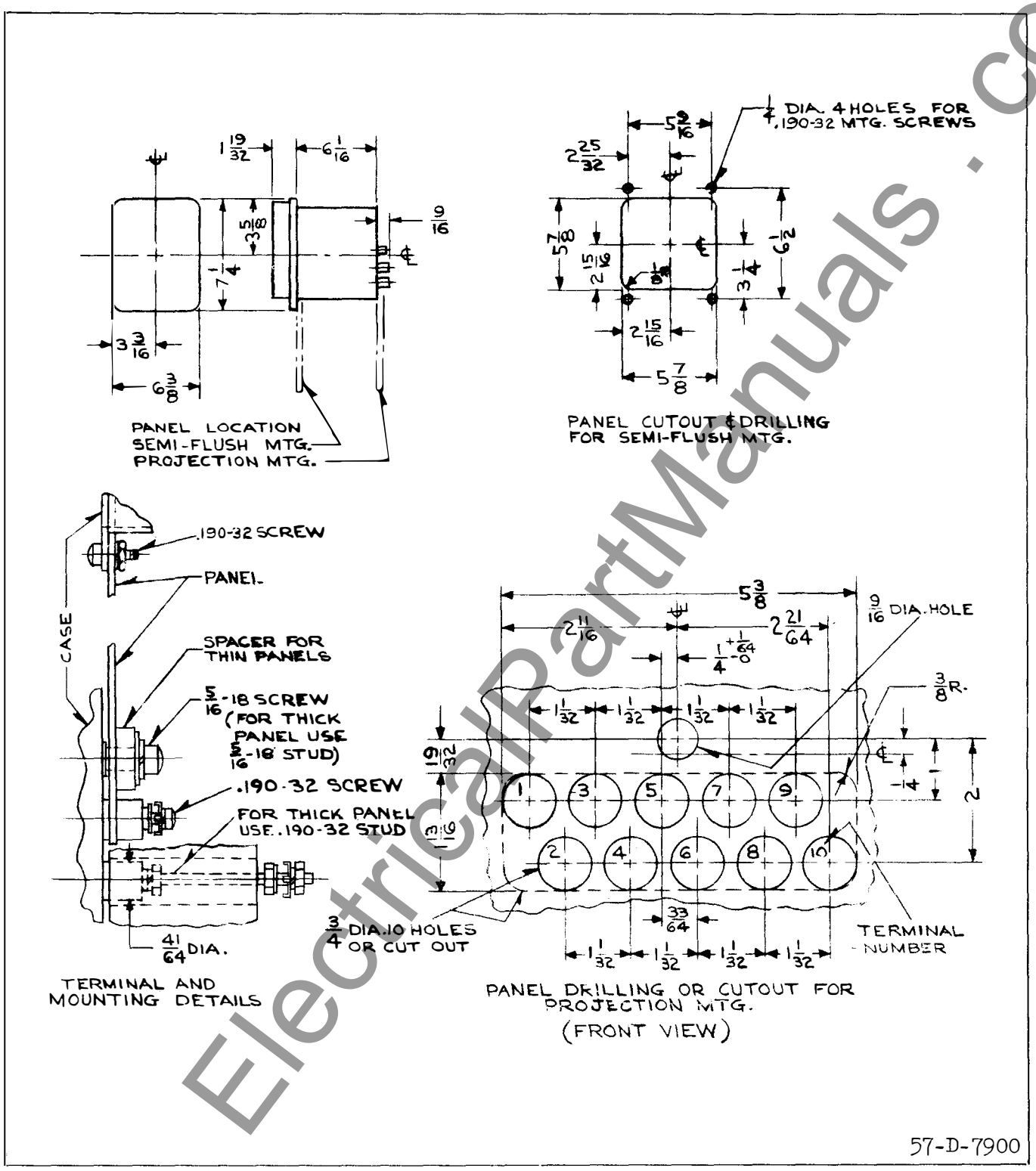


Fig. 5. Outline and Drilling Plan for the Type TR-1 Relay in the Type FT 11 case

INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

TYPE TR-1 AUXILIARY TRIPPING AND INDICATING RELAY

CAUTION: Before putting protective 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 TR-1 relay is an auxiliary relay energized by protective relays to trip two circuit breakers. Sufficient contacts are provided to seal in both trip circuits until the breaker auxiliary switches operate. Indication is provided by targets which drop whenever the switch units within the relay operate.

CONSTRUCTION

The type TR-1 relay consists of two direct current, doubletrip indicating contactor switch units (ICS). The ICS is a small clapper type device. A magnetic armature, to which leafspring mounted contacts are attached, is attracted to the magnetic core upon energization of the switch. When the switch closes, the moving contacts bridge two stationary contacts, completing the trip circuit. Also during this operation two fingers on the armature deflect a spring located on the front of the switch, which allows the operation indicator target to drop. The target is reset from the outside of the case by a push rod located at the bottom of the cover.

The front spring, in addition to holding the target, provides restraint for the armature and thus controls the pickup value of the switch.

OPERATION

The coils of the ICS units are normally connected in series and energized through the trip contacts of the protective relays. The contacts of one unit seal in the trip circuit and trip one breaker. The contacts of the other switch are for tripping a second breaker.

It is necessary to add resistance in the ICS unit coil circuit to limit current in these coils. Normally these coils are connected in series with an external * resistance. (See Fig. 5). For the 1 ampere ICS unit relay 22 ohms are used for a 125 volt d-c trip circuit and 44 ohms for a 250 volt d-c trip circuit. These values of resistance are obtained by using one or two 22 ohm resistors. For the 0.2/2.0 ampere ICS unit relay a 100 ohm mid-tap resistor is used for 0-125 volt d-c trip circuit and a 200 ohm mid-tap resistor for a 250 volt d-c trip circuit. With these resistance values, the relay operating time is approximately ¾ cycle (60 cycle basis).

CHARACTERISTICS

The ICS will trip at a current value between 1.0 and 1.2 amperes d.c. for the 1 ampere ICS unit. The current should not be greater than the particular ICS top setting being used for the 0.2/2.0 ampere ICS unit. The operation indicator target should drop freely. The trip circuit should draw at least 2½ times rated value in order to keep the time of operation of the switch to a minimum and provide positive operation.

Trip Circuit Constants

1 ampere rating: 0.1 ohms d.c. resistance
0.2/2.0 ampere rating: 0.2 tap — 6.5 ohms
2 2 tap — 0.15 ohms

Coil Ratings

Tap Rating	Coil rating in amperes d.c.	
	1 second	continuous
1	140	5
0.2	11.5	0.4
2.0	88.0	3.2

Supersedes I.L. 41-758.1A
*Denotes change from superseded issue

EFFECTIVE FEBRUARY 1966

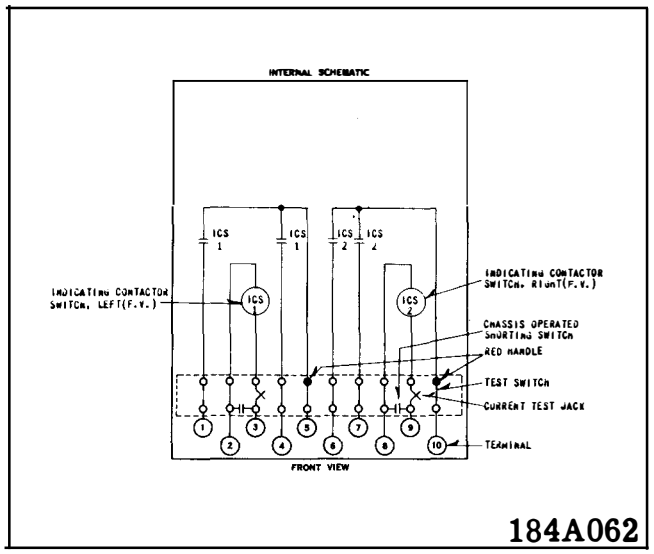


Fig. 1 Internal Schematic of Type TR-1 Relay with 1 ampere I.C.S. in Type FT 11 case.

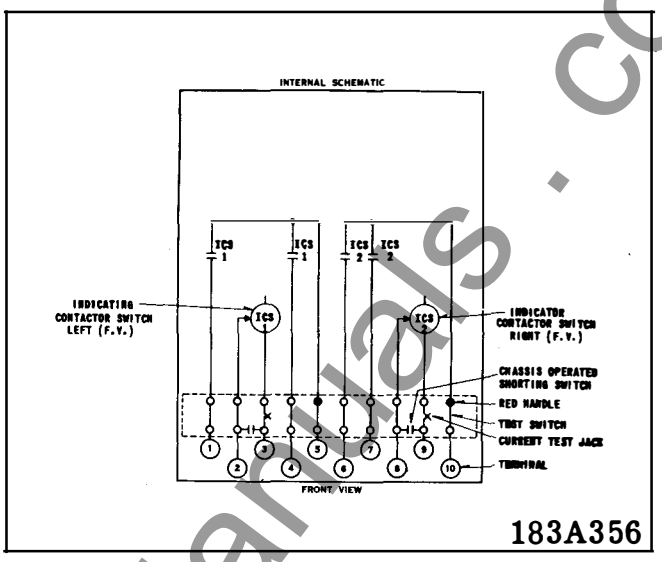
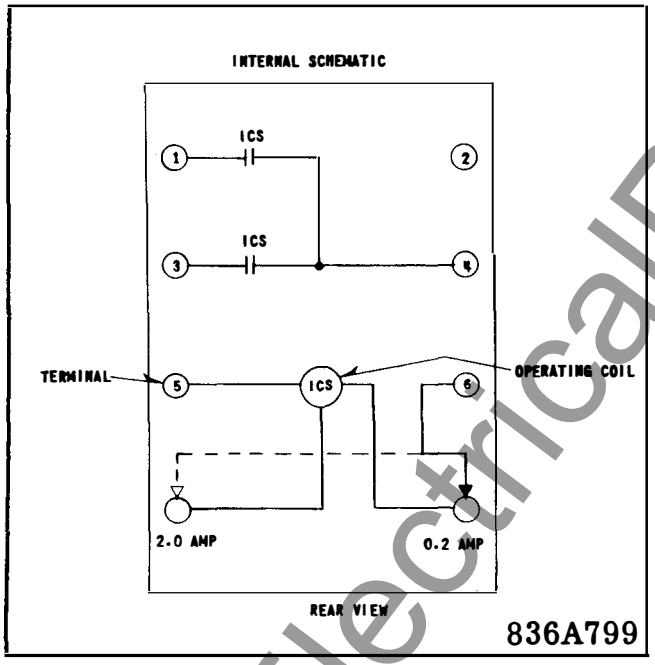
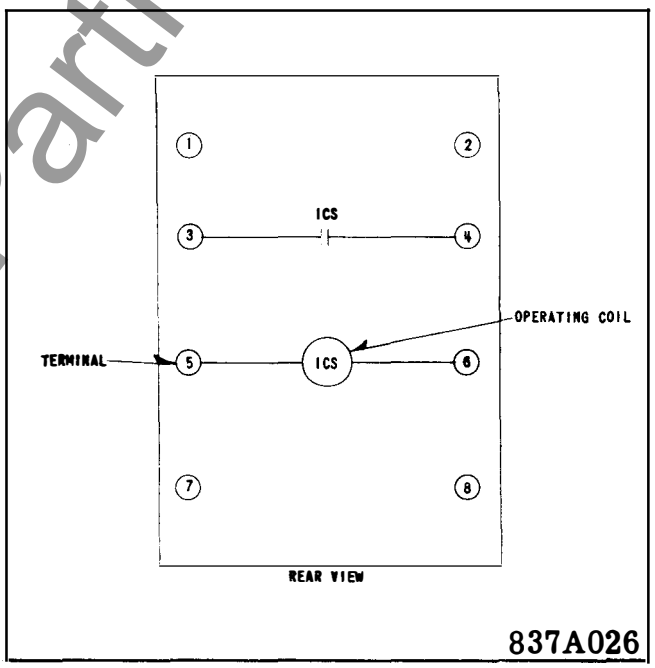


Fig. 2. Internal Schematic of Type TR-1 Relay with 0.2/2.0 ampere I.C.S. in Type FT 11 case.



** Fig. 3 Internal Schematic of Type TR-1 Relay with .2-2 ampere ICS in Semi-Flush Molded Case*

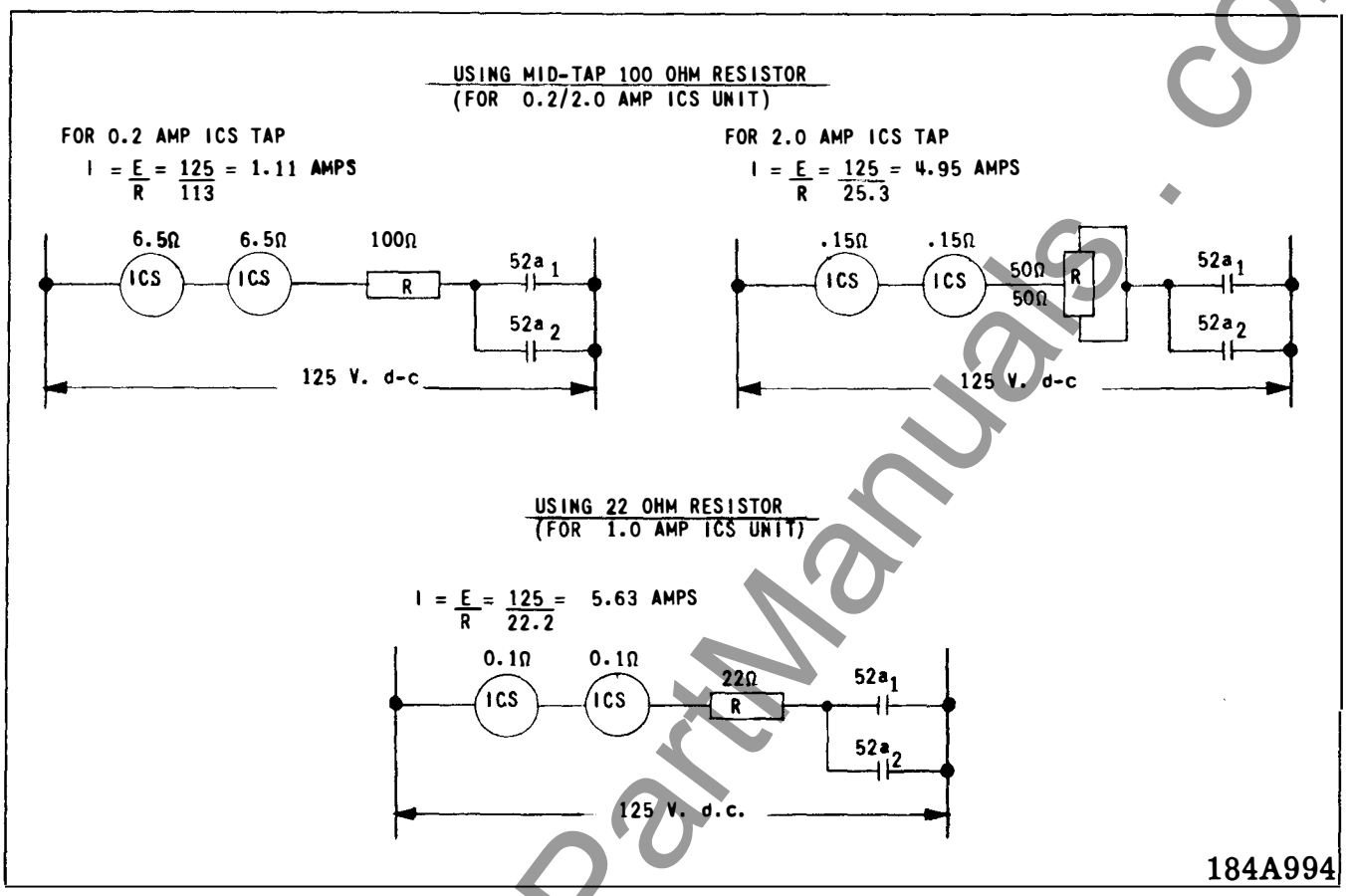


** Fig. 4 Internal Schematic of Type TR-1 Relay with 1 ampere ICS in Projection Molded Case*

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.



* *Fig. 5 Typical Schematic Diagrams for Type TR-1 Relay*

ADJUSTMENTS AND MAINTENANCE

The proper adjustments to insure correct operation of this relay have been made at the factory and should not be distrubed after receipt by the customer.

1. Acceptance Tests

These tests are to be used for checking the prime characteristics to demonstrate that the relay received meets specifications and is in serviceable condition.

Pass sufficient direct current through the ICS coils to operate the ICS unit. For the 1 ampere ICS unit the value should be between 1.0 and 1.2 amperes d.c. The current should not be greater than the particular ICS tap setting being used for the 0.2/2.0 ampere ICS unit.

2. Routine Maintenance

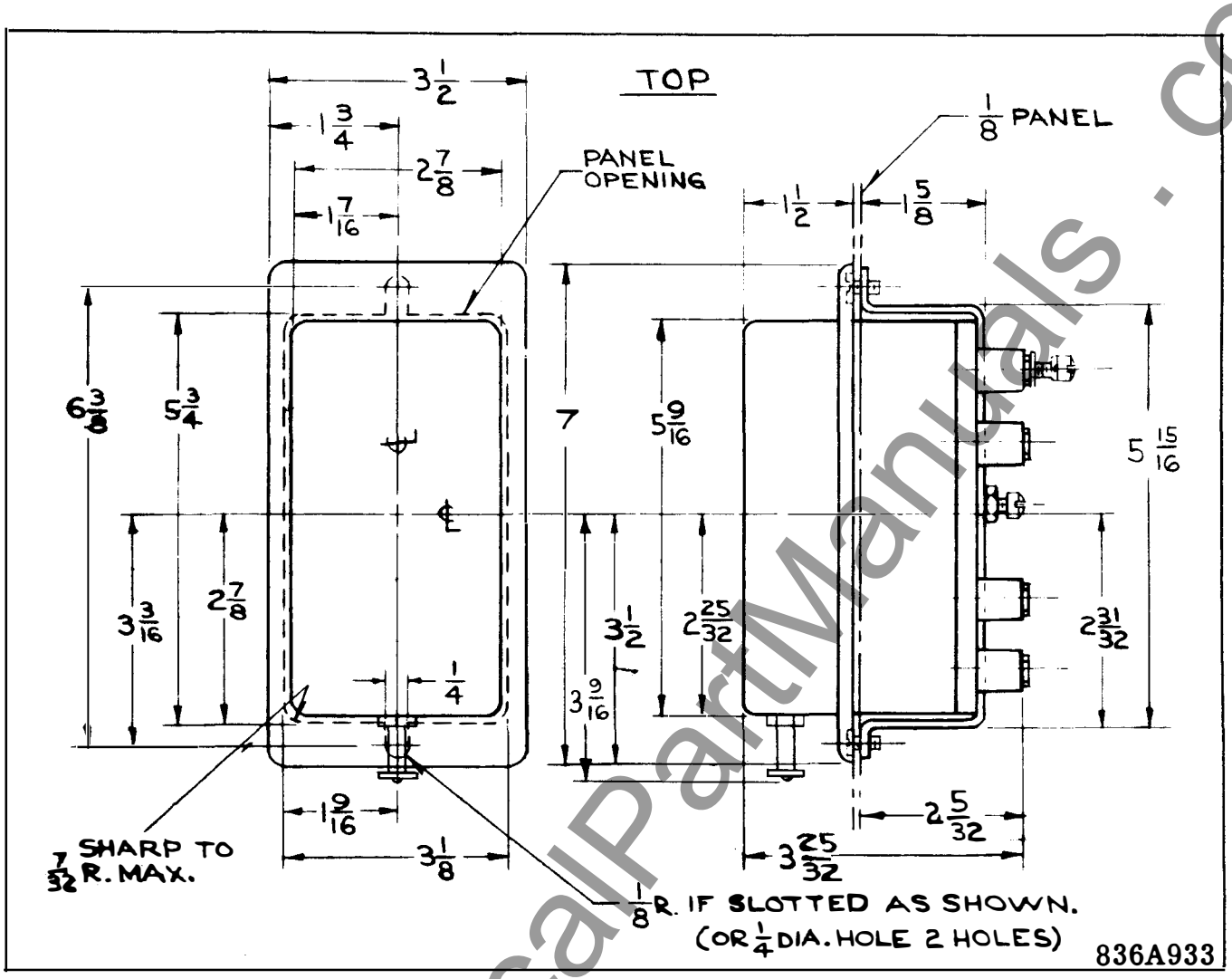
The relays should be inspected periodically, at such time intervals as may be dictated by experience, to insure that the relays have retained their calibration and are in proper operating condition.

All contacts should be cleaned periodically. 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.

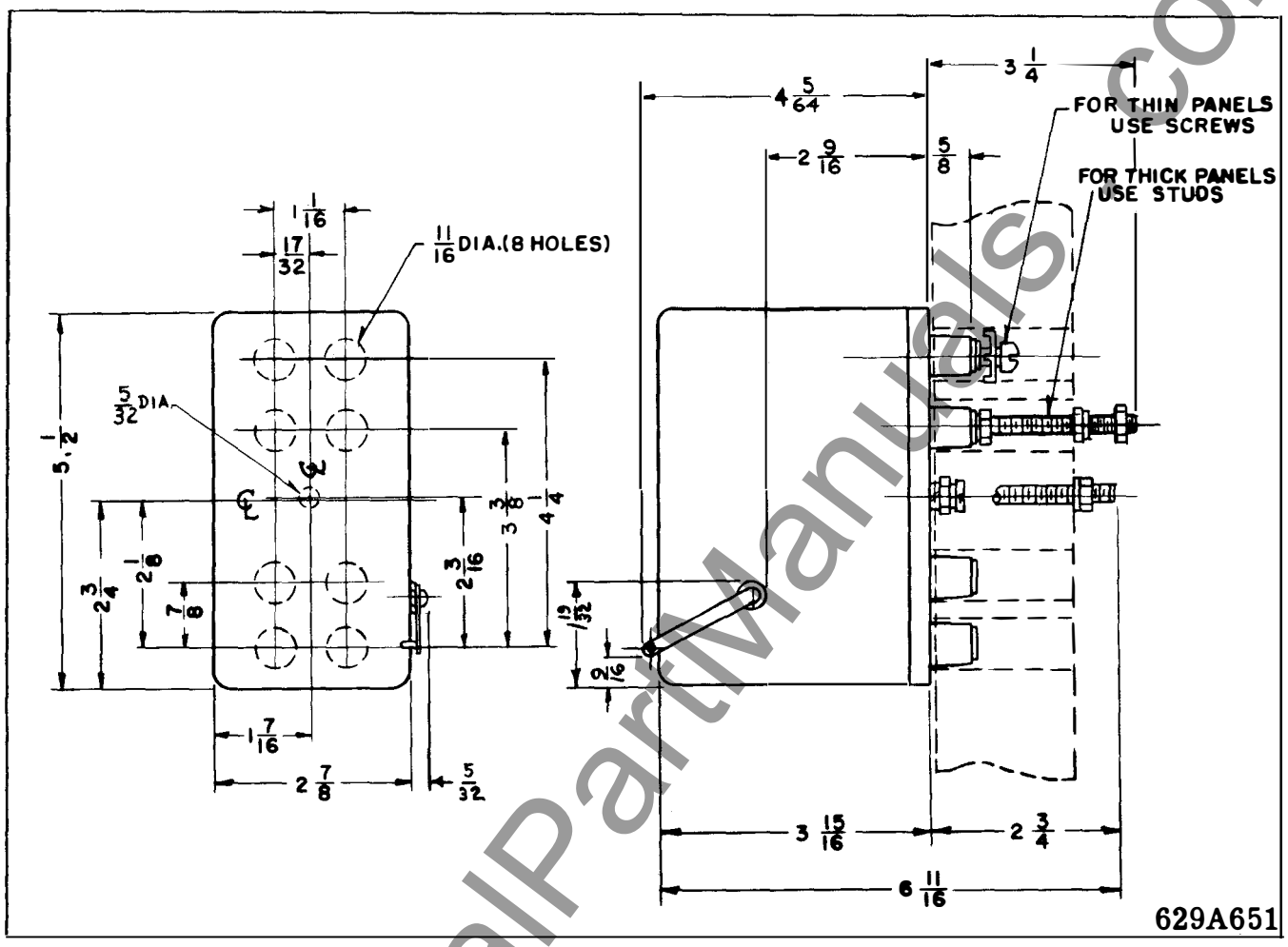
3. Calibration

Pass sufficient d-c current through the trip circuit to close the contacts of the ICS. This value of current should be not less than 1.0 ampere nor greater than 1.2 amperes for the 1.0 ampere ICS. The current should not be greater than the particular ICS tap setting being used for the 0.2-2.0 ampere ICS. The operation indicator target should drop freely.

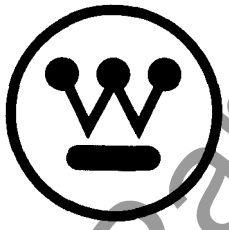
The contact gap should be approximately 0.047" for the 0.2/2.0 ampere unit and 0.070" for the 1.0 ampere unit, between the bridging moving contact



* *Fig. 8 Outline and Drilling Plan for the Type TR-1 in Semi-Flush Molded Case.*



* *Fig. 9 Outline and Drilling Plan for the Type TR-1 in Projection Molded Case*



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