



INSTALLATION • OPERATION • MAINTENANCE I N S T R U C T I O N S

TYPE CW POWER RELAY SINGLE PHASE APPLICATION

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 CW relay is a single phase induction type relay providing over power or reverse power protection for electrical equipment or circuits. It is not intended for use as a fault protective relay.

CONSTRUCTION

The relay consists of a product operated unit, a phase shifter and an indicating contactor switch (ICS).

Product Type Unit

The electromagnet for the main element has a tapped current coil located on the center leg of an "E" type laminated structure and two potential coils on the outer legs. Operating torque is obtained by energizing the tapped coil with line current and the two outer coils with line potential from the line potential transformers. Out of phase air gap fluxes necessary for operating torques are produced by a phase shifting network in conjunction with the potential coils. Maximum torque occurs when the current and voltage are in phase. The voltage is independent of the direction of power flow. This provides a reference so that the disc can rotate in either direction depending upon direction of the line current. The combination of voltage and current produces an operating torque proportional to power.

Phase Shifter The phase shifter network consists of a capacitor in parallel with the potential coils and a reactor in series with the above combination.

Indicating Contractor Switch Unit (ICS)

The d-c indicating contactor switch is a small

clapper type device. A magnetic armature, to which leaf-spring 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.

CHARACTERISTICS

The type CW relays are available in the following ranges and taps:

SINGLE PHASE WATT RANGE	POTENTIAL COIL	TAPS
20 - 120	120	20-30-40-60- 80-100-120
100 - 600	120	100-150-200-300- 400-500-600

Typical 60 cycle Time-Power Curves are shown in Figs. 3 & 4. The curves are taken at maximum torque which occurs with the current and voltage in phase (within $\pm 4^\circ$).

Trip Circuit

The main contacts will safely close 30 amperes at 250 volts d-c and the seal-in contacts of the indicating contactor switch will safely carry this current long enough to trip a circuit breaker.

The indicating contactor switch has two taps that provide pickup setting of 0.2 or 2 amperes. To change taps requires connecting the lead located in front of the tap block to the desired setting by means of a screw connection.

SUPERSEDES I.L. 41-241.2

*Denotes change from superseded issue

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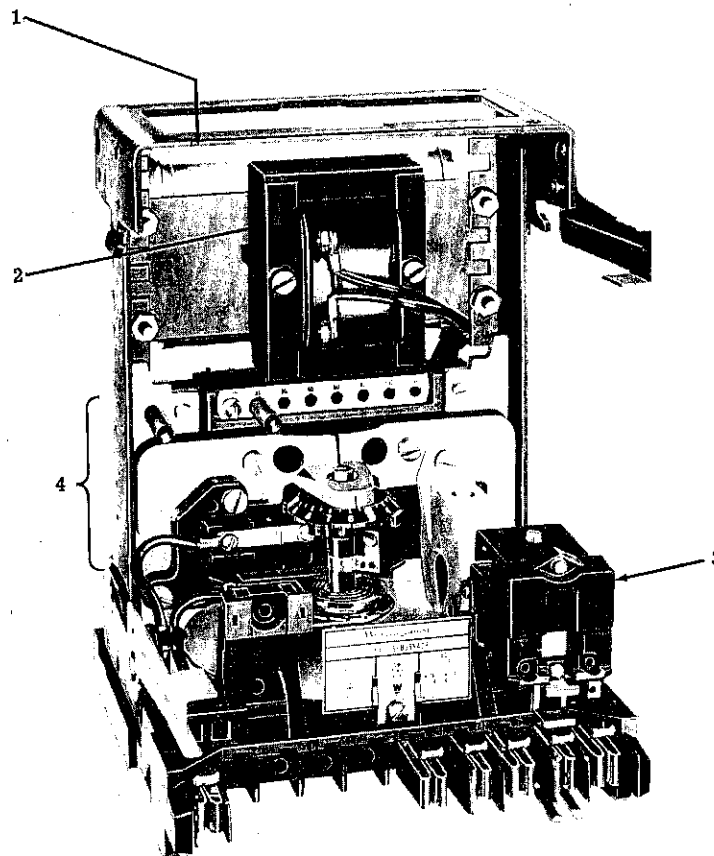


Fig. 1 Type CW Relay Without Case. 1 - Capacitor. 2 - Reactor. 3 - Indicating Contactor Switch (ICS). 4 - Time-Power Unit.

Trip Circuit Constant

Indicating Contactor Switch (ICS)

0.2 ampere tap 6.5 ohms d-c resistance

2.0 ampere tap 0.15 ohms d-c resistance

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 re-

moved 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.

SETTINGS

Product Unit

There are two settings to be made. One is the current tap setting, and the second, the time dial setting.

The power to operate the relay equals the primary power divided by the current and potential transformer ratios. This relay power expressed as multiples of the chosen tap locates a value on the abscissa of the Time-Power Curves of Fig. 3 and 4. The relay operating time for various time dial settings then is observed on the ordinate. By changing taps or time dial, the required operating time can be selected for a specific power value.

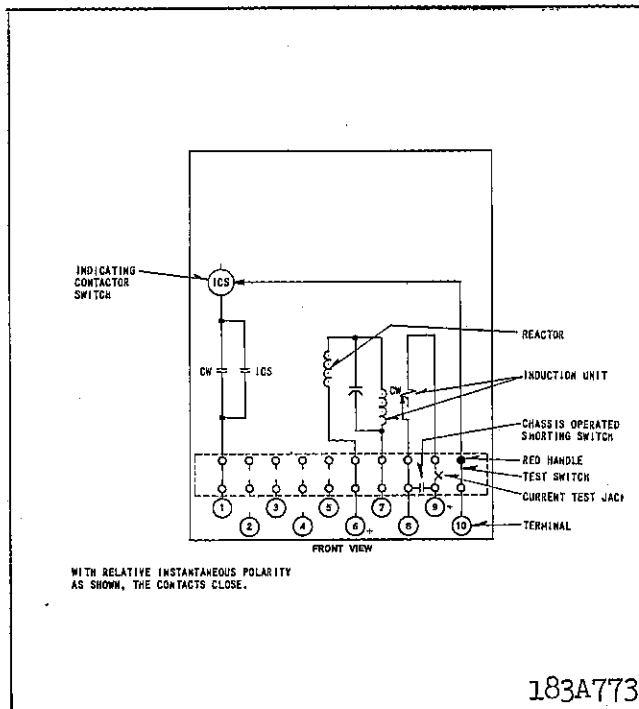


Fig. 2 Internal Schematic of the Type CW Relay in the Type FT 21 Case.

CAUTION

When changing taps with the relay in service, screw the extra tap screw in the new tap hole before removing the old tap screw. This prevents open-circuiting the current transformers.

Indicating Contactor Switch (ICS)

No setting is required on the ICS unit except the selection of the 0.2 or 2.0 ampere tap setting. This selection is made by connecting the lead located in front of the tap block to the desired setting by means of the connecting screw.

ADJUSTMENT AND MAINTENANCE

The proper adjustments to insure correct operating 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 cleaned periodically. A contact burnisher S#182A836H01 is recommended for this purpose. The use of abrasive material for clean-

ing contacts is not recommended, because of the danger of embedding small particles in the face of the soft silver and thus impairing the contact.

Product Unit

Contacts — The index mark on the movement frame will coincide with the "O" mark on the time dial when the stationary contact has moved through approximately one-half of its normal deflection. Therefore, with the stationary contact resting against the backstop, the index mark is offset to the right of the "O" mark by approximately .020". The placement of the various time dial positions in line with the index mark will give operating times as shown on the respective time-current curves.

- * **Minimum Trip Watts** — Set the time dial to position 6. Using the lowest tap setting, alternately apply tap value watts plus 3% and tap value watts minus 3%. The moving contact should leave the backstop at tap value watts plus 3% and should return to the backstop at tap value watts minus 3%. The relay should be calibrated with 10 times tap value watts at the number six time dial position. Check several points on the typical time curves. Time curve calibration is effected by adjusting the position of the permanent magnet keeper.

Indicating Contactor Switch (ICS)

Close the main relay contacts and pass sufficient d-c current through the trip circuit to close the contacts of the ICS. This value of current should not be greater than the particular ICS tap setting being used. The indicator target should drop freely.

ENERGY REQUIREMENTS

The 60 cycle burdens of the type CW Relay Single Phase Application are as follows:

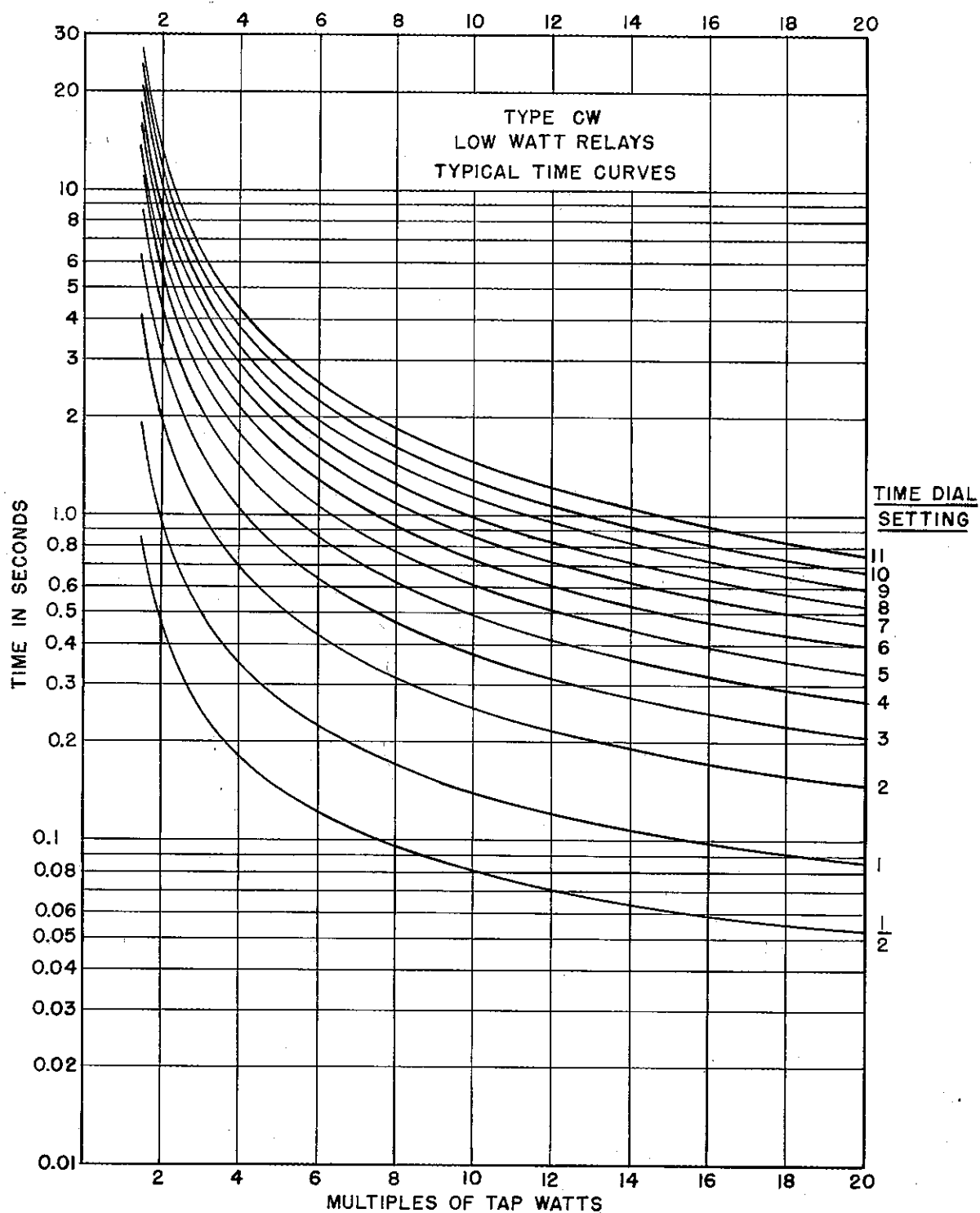
1. The 20-120 Watt, 120 Volt Relay

A. Potential Circuit Burden at Rated Voltage

Current Lags By	Volt Amperes
26.5°	5.4

B. Current Coil at 5 Amperes

TAP	CURRENT LAGS BY	VOLT AMPERES
20	78°	16.2



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Fig. 3 Typical 60 cycle Time Curves of the 20-120 watt Type CW Relay.

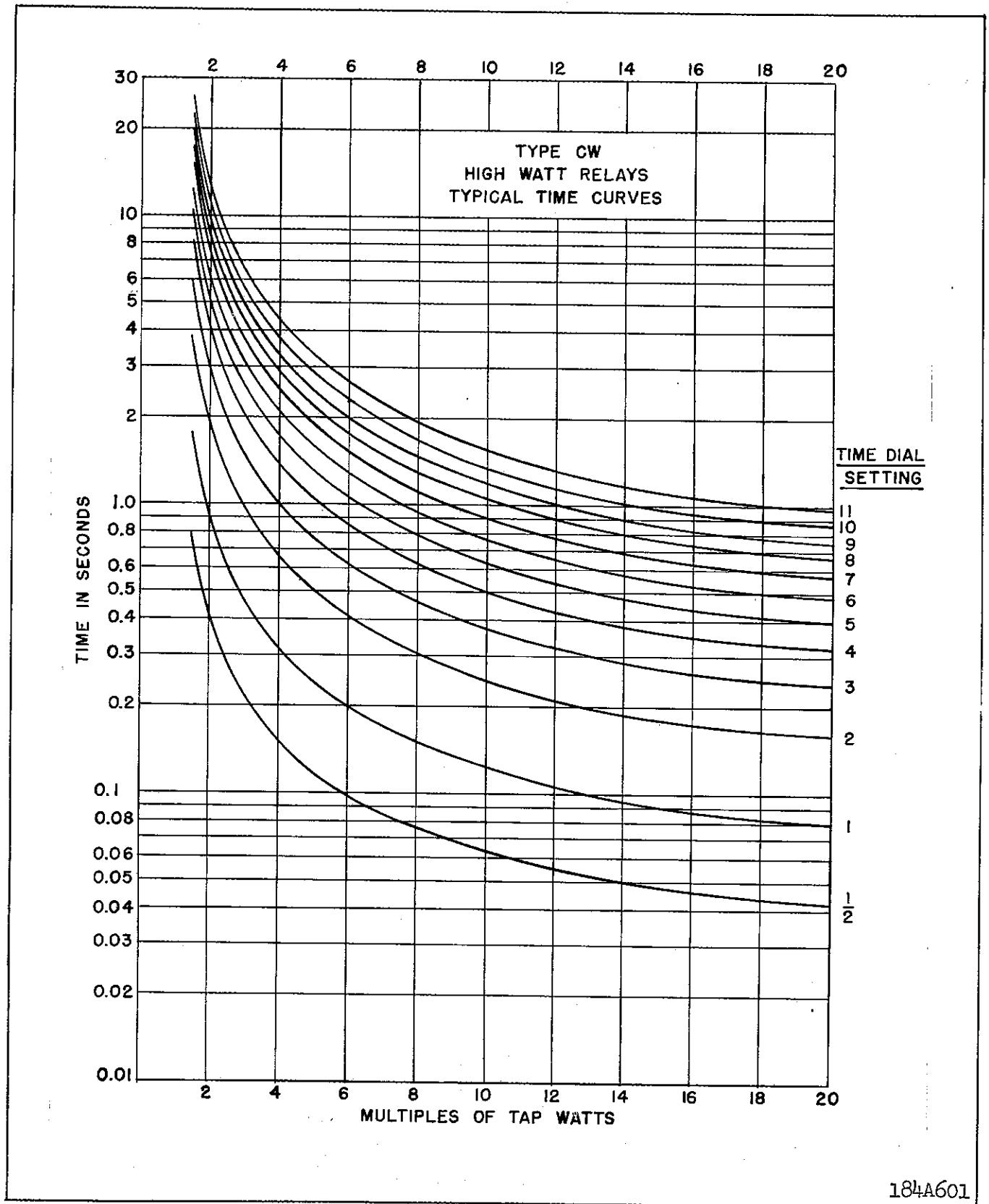


Fig. 4 Typical 60 cycle Time Curves of the 100-600 watt Type CW Relay.

TYPE CW POWER RELAY

2. The 100-600 Watt, 120 Volt Relay

A. Potential Circuit Burden at Rated Voltage

Current Lags by	Volt Amperes
20°	5.9

B. Current Coil Burden at 5 Amperes

TAP	CURRENT LAGS BY	VOLT AMPERES
100	67°	5.4

Current Coil Ratings

	Continuous	1 Sec.
A. 20-120 Watt Range	5 Amperes	230 Amperes
B. 100-600 Watt Range	8 Amperes	370 Amperes

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.

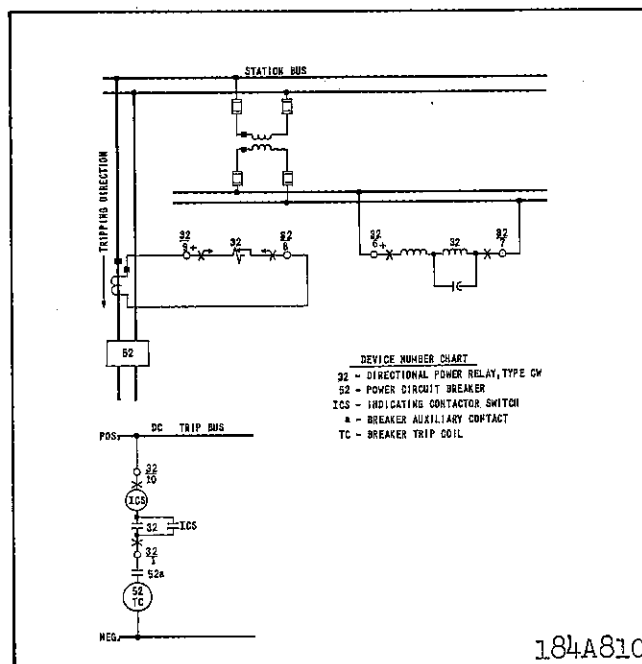
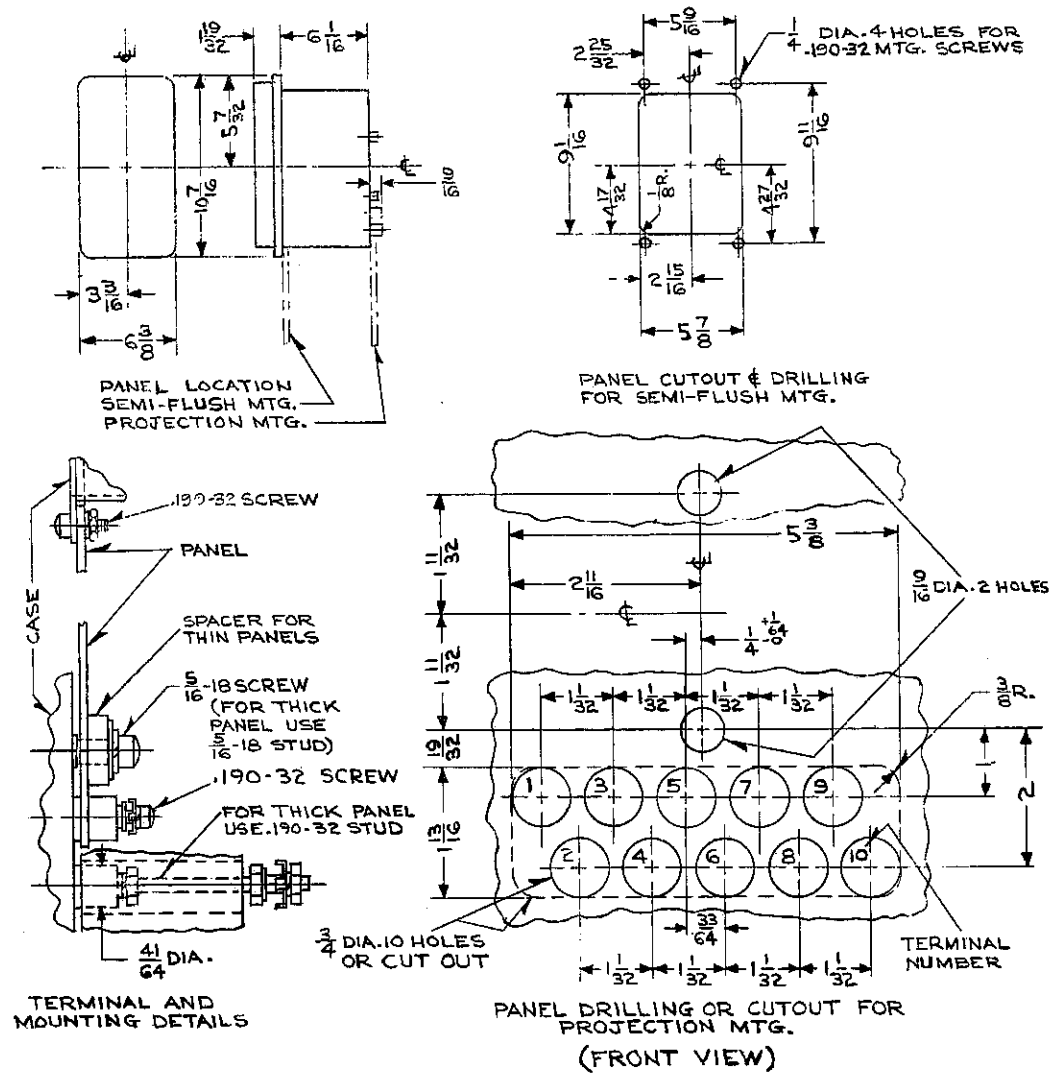


Fig. 5 External Schematic of One Type CW Relay on a Single Phase System.



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Fig. 6 Outline and Drilling Plan for the Type CW Relay in the Type FT 21 Case.