INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

TYPE TD-1 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 Westinghouse type TD-1 relay is an a-c. relay suitable for applications which require a time-delay between the closing of an a-c. circuit and the closing of a second circuit either a-c. or d-c., through the contacts of the relay.

CONSTRUCTION AND OPERATION

The type TD-1 relay consists of a small 600 r.p.m. self-starting synchronous motor, which drives a moving contact arm through a gear train. The contact on the moving arm is a cylindrical silver sleeve, loosely fitted on the moving arm. In making contact, this sleeve strikes two vertically projecting stationary butt contacts to bridge the gap between them. The loose fit of the sleeve permits a positive alignment in bridging these contacts, and, therefore, correct contact action is not greatly dependent on their adjustment. The stationary contact is mounted on a molded insulating block which is adjustable around a semicircular calibrated guide.

When the motor is de-energized the rotor rests in a position somewhat lower than the pole pieces of the stator. In this position the pinion on the rotor shaft is out of mesh with the gear on the countershaft which is mounted in the motor frame. When the motor is energized, the rotor is lifted by magnetic attraction and the pinion is brought into mesh with the gear. The pinion on the motor countershaft drives a train of reduction gears. An arm pressed on the shaft of the last gear is used to operate the contacts. When the motor has operated to close the relay contacts, the arm on the last shaft stops and the motor stalls. However, the motor can remain connected to the line without injury when stalled, and the locked rotor torque provides very good pressure on the closed contacts.

A spiral spring fastened to the shaft of the last gear causes the arm to reset to its initial position when the motor is de-energized. Since the pinion on the rotor shaft drops out of mesh when the motor is de-energized, the gear train ratio is reduced and the control spring will reset the arm very quickly. Because of the inertia of the gear train the resetting time is not directly proportional to the operating time. Consequently, with a time-delay setting of about one major scale division the resetting time may be about 20% of the closing time.

CHARACTERISTICS

The standard time delay is two seconds but can also be supplied in 3 and 5 second ranges. For longer time delays the type TD or TK relay should be considered. The type TD-5 relay is used for operation on d-c.

The standard TD-1 relay may be set from 5 to 120 cycles. The setting accuracy is better than 5% of the setting above 10 cycles. The recycling or repeat accuracy is better than 5% of the setting at 30 cycles or above. This increases to 20% at ten cycles and approximately 25% at 5 cycles.

The timer will operate at 80% of rated voltage with less than 5% of reduction in accuracy.

All possible contingencies which may arise during installation, operation, or maintenance, and all details and variations of this equipment do not purport to be covered by these instructions. If further information is desired by purchaser regarding his particular installation, operation or maintenance of his equipment, the local Westinghouse Electric Corporation representative should be contacted.

SUPERSEDES I.L. 41-572.2
*Denotes change from superseded issue.

EFFECTIVE NOVEMBER 1968

The timer is designed for sine wave operation of electric utility quality. Severe harmonic distortion will introduce errors in accuracy.

The contacts of the type TD-1 relay can be used to close circuits carrying as much as 5 amperes at 125 volts, either a-c. or d-c. They will open such a circuit satisfactorily if a-c., but should not be used to open a d-c. circuir carrying more than 0.5 amperes at 125 volts.

SETTINGS

The stationary contact is mounted in a molded insulating block which is adjustable around a semicircular marked scale. The relay setting is obtained by lining up the white slot in the center of the block with the number of cycles time delay desired.

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 Test

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

Utilizing an electronic laboratory readout timer and a DPST switch, set the timer at 30 cycles and energize the timer motor and laboratory timer simultaneously. When energized at rated voltage the timer accuracy should be within the values listed under characteristics. Both poles of the DPST switch should close within a few milliseconds of each other without appreciable contact bounce.

Routine Maintenance

All relays should be inspected periodically and the operation should be checked at least once a 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 burnished 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 rest position of the contact arm may be changed by carefully loosening the clamp on the gear shaft.

The roller contact on the moving arm should be a minimum of 1/16" above the horizontal portion of the stationary contact. It may be adjusted by loosening the clamp as above.

INSTALLATION

The relay should be mounted so that the gear shafts are vertical and the motor terminals are the top. It will not operate properly if mounted in any other position.

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.

ENERGY REQUIREMENTS

The motor current is approximately .025 amperes at 120 volts and 60 cycles for a burden of 3.0 VA.

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.

In case the synchronous motor should be damaged, the relay should be returned to our Works for repair, or a complete replacement motor should be installed.

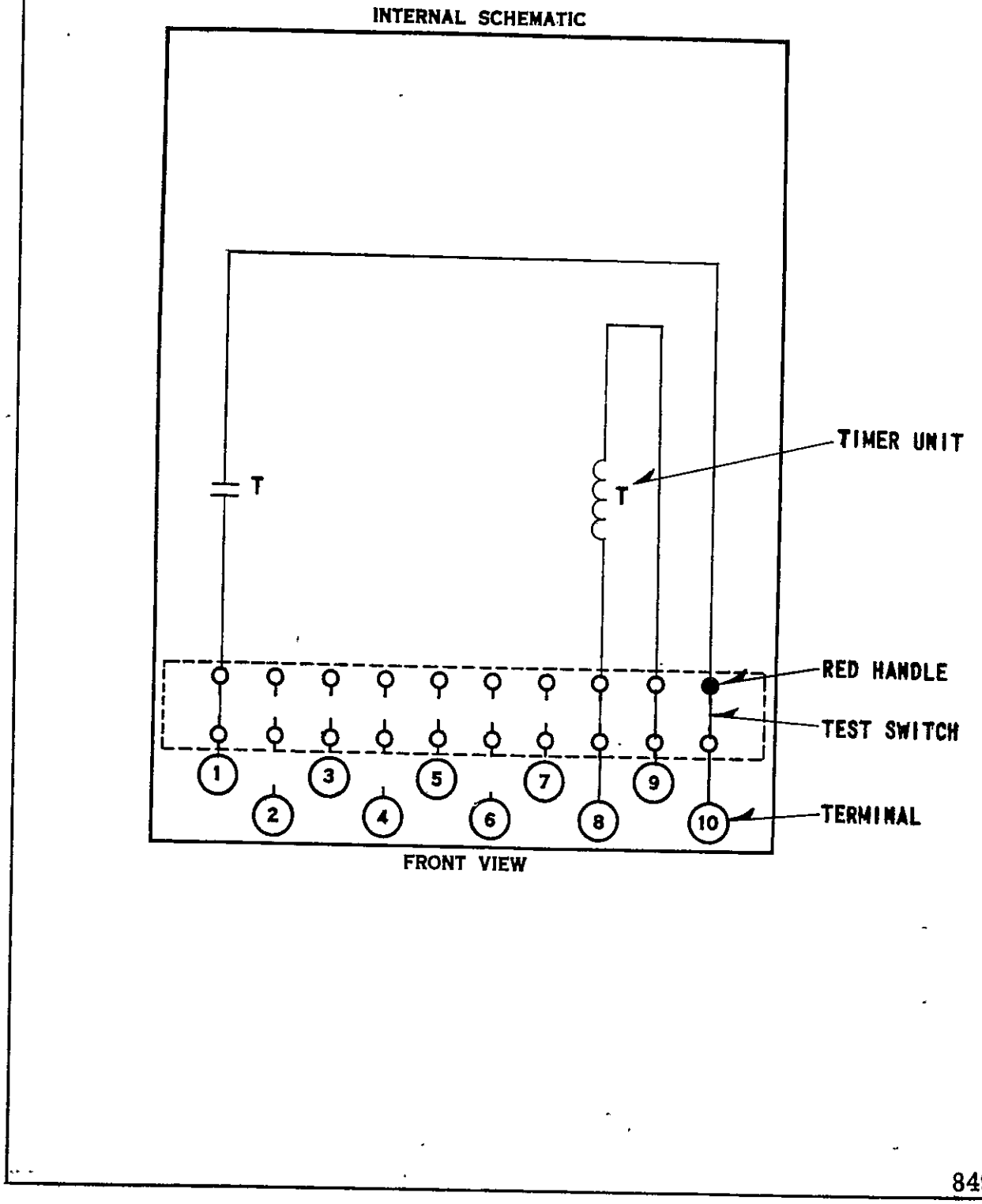

Fig. 1. Internal Schematic for the Type TD-1 Relay.

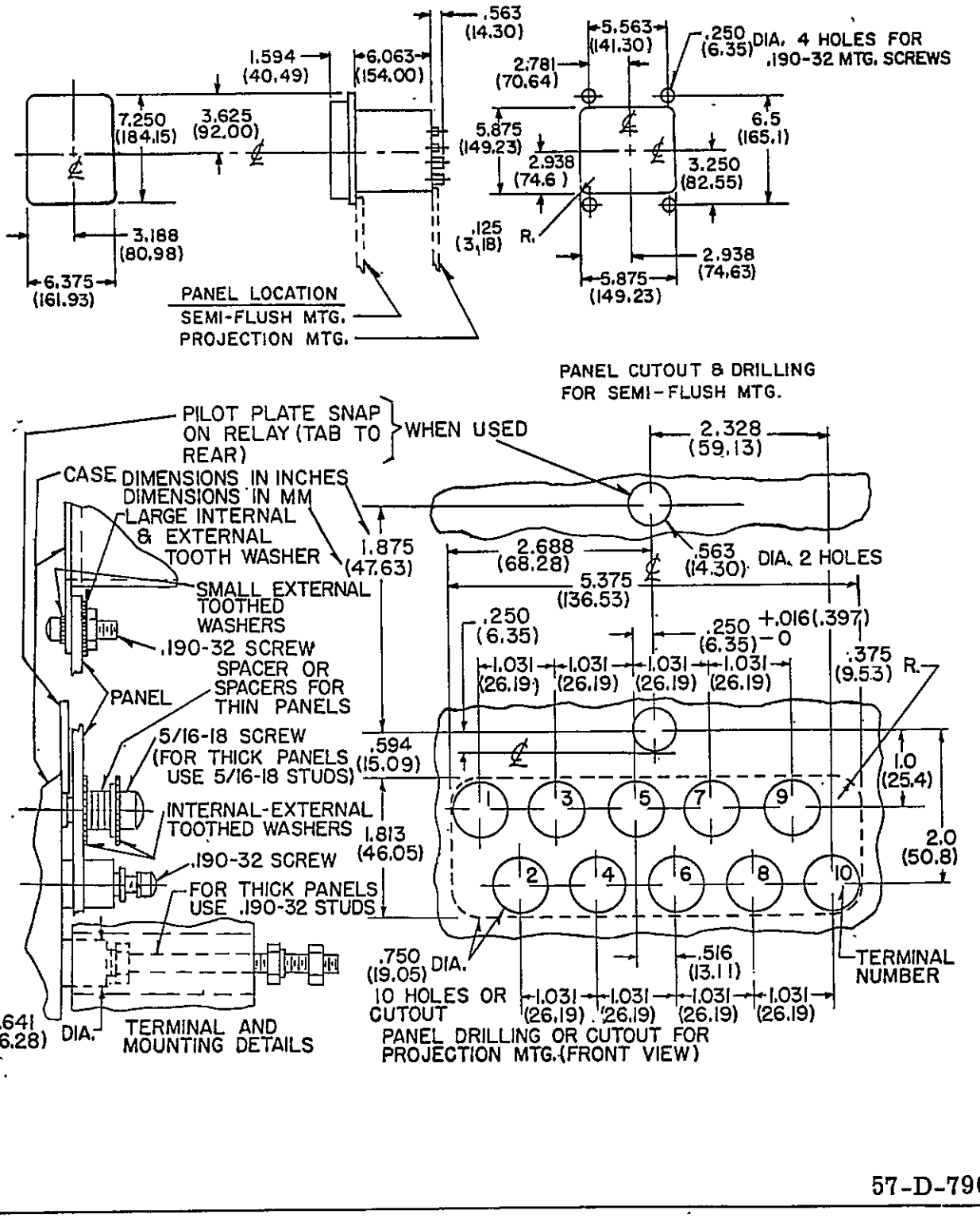

Fig. 2. Outline and Drilling Plan for the Type TD-1 Relay in an FT-11 Case.