TESTING COIN RELAYS USING MODEL TS-501T TEST SET

CONTENTS PAGE

1. GENERAL

1.01 This section provides information pertaining to the description and use of Teltronics, Inc. Model TS-501T Coin Relay Test Set.

2. DESCRIPTION

2.01 The TS-501T (Figure 1) is a totally portable, self-contained, battery-powered test set that is used for testing and calibrating single-coil or two-coil prepay coin telephone set coin relays. The test set energizes the relay for proper current requirements for soak, operate, and nonoperate in both the collect and refund modes. The relay energization time can be monitored during the operation cycle of the single-coil relay, and the elapsed time for each relay operation may be digitally displayed at the option of the user. The test set can also be used for monitoring central office command collect or refund current and pulse duration.

2.02 Refer to Tables 1 and 2 for test set characteristics and a description of operating controls and indicators.

3. USE

3.01 The following paragraphs list procedures for performing various tests with the test set.

Central Office Battery Supply Test

3.02 Perform the central office battery supply test as follows:

(a) Remove the upper housing and routine the station as outlined in Section 476-202-700, Coin Telephone Set Maintenance.

(b) Jumper the terminals between the upper and lower housing using the appropriate test cord (P-60605 or P-60754-A).

(c) Open the station ground and remove the ground strap if it is in place.

(d) Connect the black test lead to the station ground terminal and connect the red test lead to the station ground wire; then, perform the following:

(1) Set the selector switch to CENTRAL OFFICE PULSE MONITOR.

(2) Depress the RESET pushbutton, lift the handset and, when dial tone is heard, trip the coin trigger.

(3) Depress and hold the DISPLAY pushbutton. Observe 000 on the digital readout and replace the handset.

(4) Monitor the amount of current flowing through the meter. There should be in excess of 60 milliamperes; if the flow is less than 60 milliamperes, check the station ground. The third wire (neutral) power ground should be bonded to the telephone booth and cross-connected with the local station ground.

3.03 On an installation where there is a booth that is not lighted or where there is no booth, the ground conditions should be as outlined in Section 435-600-100, Station Grounding Requirements. If these conditions do not exist, refer the installation to your supervisor.

3.04 If the ground conditions are correct, but the coin telephone set does not operate properly request the central office personnel to check the power supply. If the power supply is adequate, the station location is beyond the loop limits. Refer the installation to your supervisor immediately.

3.05 If the current reading is above 80 milliamperes, disconnect the red lead on the restoring coil contacts and tape and fold it back in a position that will not interfere with station operations.

3.06 If no current indication is observed on the meter, hold the connection under test and request central office personnel to check the coin repeater for correct collect or refund voltage value.

Single-Coil Relay Test

3.07 Perform the single-coil relay test as follows:

(a) Disconnect the wire from the coin relay.

(b) Connect the test leads from the test set, red to terminal 3 and black to terminal 4 on the relay; then, perform the following:

(1) Set the selector test set switch to RELAY TEST.

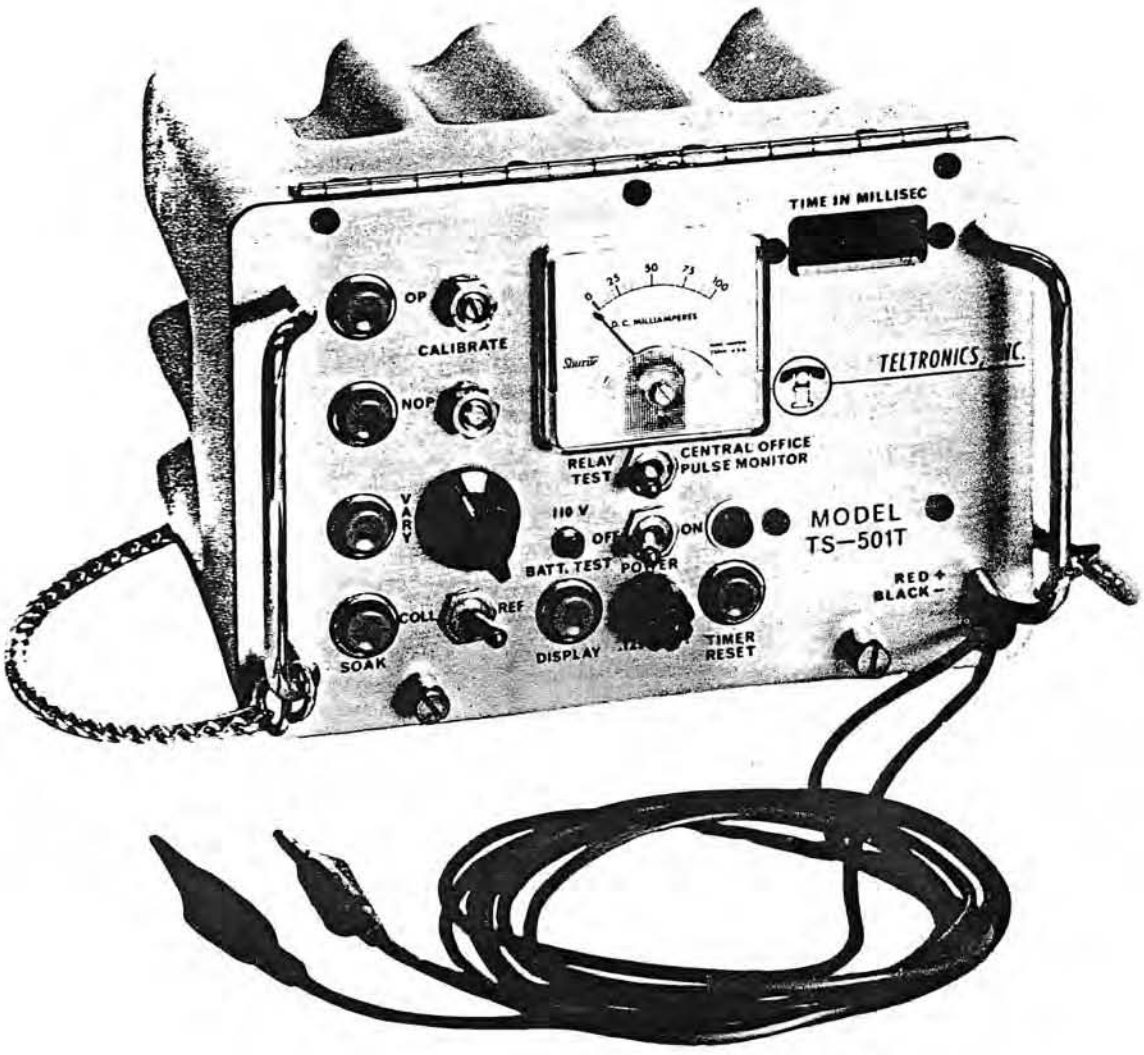

Figure 1. Coin Relay Test Set.

Table 1. Technical Characteristics.

CATEGORY	DESCRIPTION
Output	Soak, nonoperate, operate, and variable current. Output polarity can be programmed for collect or refund in all above modes. Output unaffected by short circuit, load resistance, or internal battery voltage.
Panel Indicators	Meter movement to indicate output current and central office command current. Digital display to indicate relay cycle time.
Input Power	Totally self-contained, battery-operated (standard dry cell batteries).
Mechanical	Dimensions - 6 inches high, 9 inches wide, 8 inches deep. Weight - 8 pounds.
Environmental Limits	Temperature - 0^{o} to 140^{o}F. Relative Humidity - 0 to 95%.

(2) Set the test set power switch to the ON position and trip the coin trigger.

(3) Depress the SOAK pushbutton and hold until the relay operates and times out.

(4) Trip the coin trigger and depress the NOP pushbutton. The relay should not operate. If the relay operates, increase the tension on the restoring spring until the relay does not operate.

(5) Depress the SOAK pushbutton. The relay should operate to the opposite position.

(6) Set the COLL-REF switch to the opposite position.

(7) Depress the SOAK pushbutton. The relay should operate to the opposite position.

(8) Depress the VARY pushbutton and adjust the rheostat until the meter indicates 40 milliamperes. Release the VARY pushbutton.

(9) Trip the coin trigger and depress the VARY pushbutton. The relay should not operate. If the relay operates, increase the tension on the restoring spring until the relay does not operate.

(10) Set the COLL-REF switch in the opposite position.

(11) Trip the coin trigger and depress the VARY pushbutton. The relay should not operate. If the relay operates, increase tension on the restoring spring until the relay does not operate.

(12) Depress the VARY pushbutton and adjust the VARY rheostat until the meter indicates 60 milliamperes. Release the VARY pushbutton.

(13) Trip the coin trigger and depress the VARY pushbutton. The relay should operate and the coin trigger should return to normal. If the relay does not operate, decrease tension on the restoring spring until the relay operates.

(14) Set the COLL-REF switch to the opposite position.

(15) Trip the coin trigger and depress the VARY pushbutton. The relay should operate to the opposite position and the coin trigger should return to normal. If the relay does not operate, decrease the tension on the restoring spring until the relay operates.

(16) Set the test set power switch to OFF.

If any adjustments are made in the collect or refund operate mode, recheck the nonoperate mode.

Table 2. Operating Controls and Indicators.

REFERENCE DESIGNATION	IDENTIFICATION	TYPE	FUNCTION
CONTROLS			
S1	OP	Momentary pushbutton	Supplies operate current to relay under test.
S2	NOP	Momentary pushbutton	Supplies nonoperate current to relay under test.
S3	VARY	Momentary pushbutton	Supplies variable current to relay under test (20 mA to 100 mA).
S4	SOAK	Momentary pushbutton	Supplies 100 mA to relay for coil soaking.
R13	OP CALIBRATE	Screwdriver adjusted potentiometer	Calibrates minimum operate current supplied to relay when S1 is depressed . (Locked in place after calibration).
R14	NOP CALIBRATE	Screwdriver adjusted potentiometer	Calibrates maximum nonoperate current supplied to relay when S2 is depressed (locked in place after calibration).
R15	VARY	Knob adjusted potentiometer	Varies current supplied to relay from 20 to 100 mA when S3 is depressed.
S5	COLL-REF	Toggle switch	Selects collect or refund polarity for preceding tests.
S8	RELAY TEST/ CENTRAL OFFICE PULSE MONITOR	Toggle switch	Selects relay test function or central office pulse current to be shown on meter movement when test leads are placed appropriately.
S6	110 Volts Battery	Momentary pushbutton	Directs 110 volts battery supply through 1,000-ohm resistor to read 100 mA or greater.
S9	POWER OFF/ON	Toggle switch	Battery power off or on.
S7	DISPLAY	Momentary pushbutton	Provides 4.5 volts display power to digital display.
S10	TIMER RESET	Momentary pushbutton.	Resets digital timer.

Table 2. Operating Controls and Indicators. (continued)

REFERENCE DESIGNATION	IDENTIFICATION	TYPE	FUNCTION
Indicators and Protection			
M1	DC MILIAMPERES	0 to 100 mA meter	Shows current passing through test leads.
DS-1, SD-2, DS-3	TIME IN MILLISEC	Digital readout	Displays time in milliseconds for relay tests when display switch is depressed.
DS-4	POWER ON	Neon lamp	Power ON DISPLAY.
F1		0.125-ampere fuse	Circuit protection.

Single-Slot Coin Telephone Set Single-Coil Relay Test

3.08 All electrical operating requirements shall be met with the unit mounted in an assembled coin telephone or its equivalent.

CAUTION: The armature of the coin relay should not be manually held nor be allowed to remain in the closed position while current is passing through the 1,000-ohm resistor for a period greater than 1 second because of potential damage to the resistor.

3.09 To perform the electrical tests, apply the voltage potential to terminals associated with springs 3 and 5 (wire lead colors are white and green, respectively).

3.10 All electrical operating requirements shall be met with the unit connected to a constant current power source limited to 60 Vdc unless otherwise specified.

3.11 If single-slot coin telephone set single-coil relays are to be adjusted, refer to paragraphs 3.12 through 3.14.

3.12 The unit shall not operate when connected to a dc source supplying a 0.039-ampere minimum current and when seven test slugs, part no. P-11772-D3 (quarter-type slugs, 0.083 inch thick by 0.961 inch in diameter) are deposited one at a time (at the approximate rate of one slug every 0.3 second) into the coin hopper while current is passing through the coil, and after the unit has been operated in the same direction by 120 Vdc (soak condition). The unit shall meet this requirement for both polarities.

3.13 The unit shall collect separetely a deposit of one test slug, part no. P-1172-D10, (dime-type slugs, 0.043 inch thick by 0.685 inch in diameter with square edges) and a deposit of seven test slugs, part no. P-11772-D3 (quarter-type slugs, 0-0.83 inch thick by 0.961 inch in diameter) when connected to a dc source (white lead positive, green lead negative) supplying a 0.048-ampere maximum current for a duration of 0.200 second maximum after the unit has been operated in the reverse direction by 120 Vdc (soak condition). The unit shall similarly refund the deposits when the battery polarity is reversed.

3.14 The relay shall fully operate and release, as determined by the opening of contact springs 4 and 5, 0.600 $\pm$ 0.050 second after a direct current of 0.052 ampere is applied for 0.200 second minimum.

NOTE: Adjust the timing screw as required.

Double-Coil Relay Test

3.15 Perform the double-coil relay test as follows:

(a) Disconnect the lead from the left coin terminal of the relay facing the station.

(b) Connect the leads from the test set to the two terminals on the coin relay with the two windings in series with the test set; then, perform the following steps:

(1) Set the selector switch to RELAY TEST.

(2) Set the test set power switch to ON.
(3) Depress the SOAK pushbutton. The relay should operate.
(4) Set the COLL-REF switch to the opposite position.
(5) Trip the coin trigger and depress the OP pushbutton. The relay should operate. If the relay does not operate, decrease tension on the restoring spring until the relay does operate. If an adjustment is made in this mode, recheck the nonoperate mode.
(6) Depress the TIMER RESET pushbutton, trip the coin trigger, depress the OP pushbutton, and hold until the relay operates and times out.
(7) Depress the DISPLAY pushbutton and chek the time display. The indication should be 600 milliseconds ± 50 milliseconds. If the relay is out of time, adjust the timing screw until the relay times out as near to 600 milliseconds as possible. Apply Glyptol cement to both sides of the timing residual screw.
(8) Set the test set power switch to OFF.

4. TEST SET MAINTENANCE

4.01 The test set has a solid state network, and all circuits are protected against shorts, grounds, and power surges. Field maintenance should be minimal and should be limited to replacement of batteries and checking for loose connections.

4.02 The operate and nonoperate potentiometers are preset to test the single-coil relay and should not be adjusted.

4.03 To check the power supply, turn the test set power switch to ON and depress the 100V pushbutton. The meter should indicate in excess of 95 milliamperes. If the meter does not indicate in excess of 95 milliamperes, change the following batteries:

(a) 3 to 45 volts, No. 738 Eveready batteries or equivalent (120-volt power supply).
(b) 1 to 9 volts, No. 216 Eveready battery or equivalent (operates timer).
(c) 1 to 4-1/2 volts, No. 714 Eveready battery or equivalent (operates digital display for single-coil millisecond timing).