

SEMI-AUTOMATIC TEST
HIGH IMPEDANCE CORD CIRCUITS
USING TEST CIRCUIT SD-62140-01 OR SD-62140-02
NO. 1 TOLL SWITCHBOARD

1. GENERAL

1.01 This section describes tests of high impedance cord circuits in No. 1 toll offices by means of the semi-automatic test circuit of the low shunt type. The tests are as follows:

- (A) Test of A-C. and D-C. Supervisory Relays.
- (B) Ringing Key Test.
- (C) Pad Control Feature Test.
- (D) A-C. Continuity Test.
- (E) Talking and Monitoring Key Strap Test.

1.02 This section has been revised to modify the time intervals covered in Figs. 1 and 2 and to cover minor changes.

1.03 The tests apply to through, through and terminating, and terminating cord circuits equipped with B43 or No. 190F d-c. supervisory relays and No. 190E or No. 196A a-c. supervisory relays.

1.04 Tests (A) and (B) or (A) and (C) or (A) and (D) may be combined and conducted consecutively.

1.05 In the case of a-c. supervisory relays the test electrical values to be used are shown in tabular form in the sections of the A460 subdivision applying to the particular type of relay involved. It will be noted from the tables that the meter readings are considerably in excess of the circuit requirement values since a shunt resistance is employed in the adjusting circuit. The a-c. milliammeter readings specified in the tables should be used instead of current flow values through the relays.

2. APPARATUS

Tests (A), (B), (D) and (E)

2.01 Test Circuit per SD-62140-01 or SD-62140-02.

Test (C)

2.02 Test Circuit per SD-62140-02.

2.03 Portable Pad Control Feature Test Set per D-97037 (SD-62140-02).

Tests (D) and (E)

2.04 Portable Control Set (Potentiometer and Receiver) per SD-62140-01 or SD-62140-02 (J64703A).

2.05 One P3E Cord equipped with No. 110 Plugs (J99213A-L6).

3. PREPARATION

3.01 The frequency of the ringing supply of the office should be checked often enough to insure that it remains within its specified limits.

A-C. and D-C. Supervisory Relays

3.02 With all keys normal, operate the TEST-ADJ key (DC meter key) to the TEST position.

3.03 Depress key TST-RLS, turn the dial switch TST-RLS and move the 1 slider on the TEST resistance until the meter registers the specified test "release" current value for the d-c. supervisory relay to be tested. Release the TST-RLS key.

3.04 Depress key TST-SOAK and move the 2 slider until the meter registers the specified test "soak" current value for the d-c. supervisory relay to be tested. Release the TST-SOAK key.

3.05 Depress key TST-OPR, turn the dial switch TST-OPR and move the 3 slider until the meter registers the specified test "operate" current value for the d-c. supervisory relay to be tested. Release the TST-OPR key.

3.06 Operate the TST-INT key. The motor interrupter starts and the lamp associated with the INT key flashes at a rate of 120 flashes per minute.

3.07 At this time check the test circuit by operating the TST-CKT key. Proper test circuit operation will be indicated by the d-c. milliammeter deflections. The "release" current value will be indicated upon depressing the TST-CKT key followed by two deflections, indicating the "soak" current at 60 pulses per minute with "release" current deflections between each "soak" current value. Following the "release" and "soak" current values, the "operate" current value will be indicated on the milliammeter at the rate of 120 pulses per min-

ute, with open circuit between each "operate" current value. After observing several deflections indicating the "operate" current, release the TST-CKT key and restore the TEST-ADJ (DC Meter) key.

3.08 Depress key TST-OPR-AC and move the OPERATE slider of the TEST potentiometer until the a-c. milliammeter registers the proper setting for supplying test "operate" current for the a-c. supervisory relay to be tested. Release the TST-OPR-AC key.

3.09 When two types of a-c. relays, or the same type relay with windings in series on some and windings in parallel on others, are to be tested, depress key TST-OPR-1-AC for the alternate condition and set the OPERATE-1 slider of the TEST potentiometer to the operate current value for the second type a-c. supervisory relay. Release the TST-OPR-1-AC key.

Note: For a-c. supervisory relays, the meter settings for "standard operation" should be used unless the line circuit conditions are such that the relays are adjusted to the "special operation" current values. Relays with series windings should be tested separately from relays with parallel windings as well as relays of different types. If there are more than two types of relays or circuit conditions, the additional current values specified should be set up on the TST-OPR-AC and the TST-OPR-1-AC keys following the tests on relays employing the initial settings of the keys and sliders.

Combined Tests - Supervisory Relays, Ringing Keys, Pad Control Feature and A-C. Continuity

3.10 The a-c. and d-c. supervisory relay test and the ringing key test, or the a-c. and d-c. supervisory relay test and the pad control test or the a-c. and d-c. supervisory relay test and the a-c. continuity test may be conducted consecutively by making the preparations given below.

3.11 Perform the operations described in 3.02 to 3.09 for current flow tests on the a-c. and d-c. supervisory relays.

3.12 If the ringing key test follows the supervisory relay test, the operations described in 3.02 to 3.09 should be made and the TST-NT and PC keys should be normal.

3.13 When the pad control feature test follows the a-c. and d-c. supervisory relay test, the TST-PC key must be operated in addition to performing the operations described in 3.02 to 3.09.

3.14 If the a-c. continuity test follows the supervisory relay test, perform the operations described in 3.02 to 3.09, after having operated the test circuit TST-NT key.

4. METHOD

(A) Test of A-C. and D-C. Supervisory Relays

4.01 After performing the operations covered in 3.02 to 3.09, insert the plug of the trunk cord of the cord circuit under test into the TRK jack. Note that the trunk cord supervisory lamp of the cord circuit flashes twice at a rate of 60 I.P.M., thus indicating the operation of the supervisory relay on the test "soak" current value. Following the two flashes, test "operate" current is automatically applied through an interrupter and the trunk cord supervisory lamp should flash at a rate of 120 I.P.M., indicating the operation and release of the d-c. supervisory relay. At least three flashes of the lamp at the rate of 120 flashes per minute should be observed.

4.02 After observing at least 3 flashes of the trunk cord supervisory lamp, insert the plug of the toll cord circuit under test into the TOLL jack (or TOLL-1 jack, depending on the arrangement of the a-c. relay being tested). Alternating current is applied to the a-c. supervisory relay for one second and the lighting of the toll cord supervisory lamp is an indication of the operation of the a-c. supervisory relay.

Note: If two types of a-c. relays, or the same type relay with windings in series on some and windings in parallel on others, are to be tested, the TOLL jack should be used for the test value set up on the TST-OPR-AC key and the OPERATE slider and the TOLL-1 jack should be used for the test value set up on the TST-OPR-1-AC key and OPERATE-1 slider.

4.03 The toll cord supervisory lamp should remain lighted. Momentarily operate the associated talking key to extinguish the toll cord supervisory lamp before proceeding with the next test.

4.04 If the pad control feature, ringing key or a-c. continuity tests are to follow this test do not remove the cord circuit cords from the test circuit. If these tests are not to be made remove the cords from the test circuits.

(B) Ringing Key Test

4.05 If this test is conducted individually, all test circuit keys should be normal. Insert the plugs of the trunk and toll cords of the cord circuit associated with the ringing keys under test into the

TRK and TOLL jacks, respectively, of the test circuit.

Note: If this test follows the supervisory relay test, the trunk and toll cords of the cord circuit will not have been disconnected from the TRK and TOLL jacks, respectively, of the test circuit and the TST-NT and PC keys in the test circuit should be normal as covered in 3.12.

4.06 Operate the trunk cord ringing key. Note that the toll cord supervisory lamp lights, indicating the application of ringing current through the ringing key under test.

4.07 Momentarily operate the associated cord circuit talking key to extinguish the toll cord supervisory lamp.

4.08 Operate the toll cord ringing key. The toll cord supervisory lamp should relight, indicating the application of ringing current through the ringing key under test.

4.09 Momentarily operate the associated cord circuit talking key to extinguish the toll cord supervisory lamp.

4.10 Remove the cords from the test circuit and restore all keys to normal.

(C) Pad Control Feature Test

When Made After the A-C. and D-C. Supervisory Relay Test

4.11 Note that the TST-PC key is operated, as mentioned in 3.13.

4.12 Insert the red plug of the W5A cord of the pad control feature test set into the B-G jack of the testing circuit.

4.13 Insert the black plug of the W5A cord of the pad control feature test set into the REC jack of the testing circuit.

4.14 Momentarily operate the talking key to extinguish the cord supervisory lamp and rotate the spring driven cam key in the portable pad control feature test set. The trunk cord lamp should light approximately 1/2 second after the spring driven cam key starts to restore to normal and remains lighted for about 3 seconds. The trunk lamp should then be extinguished and after approximately 1 second, the toll cord lamp should light steadily.

4.15 Momentarily operate the talking key of the cord circuit under test. The toll cord lamp should be extinguished.

Note: A retest can be made after this operation, if desired.

4.16 Disconnect the cords from the test circuit.

4.17 Restore all keys to normal.

4.18 The normal operation of the trunk and toll cord lamps and relays, together with the sequence of operations of the relays in the test circuit are shown in Fig. 1.

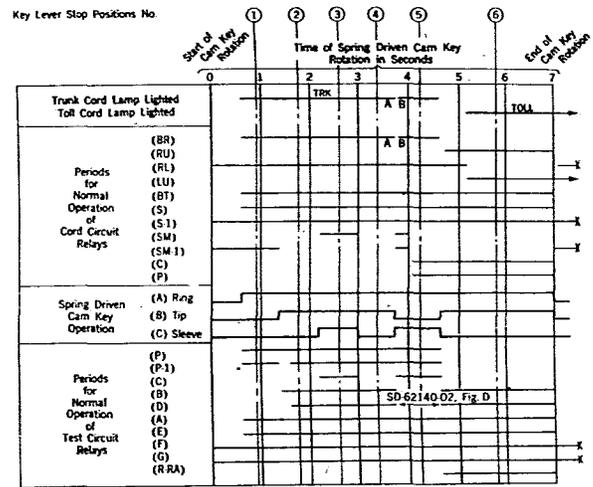


Fig. 1.

4.19 The normal operations of the trunk and toll cord supervisory lamps, as well as the troubles in the cord circuit which are indicated by other lamp operations are shown by Fig. 2.

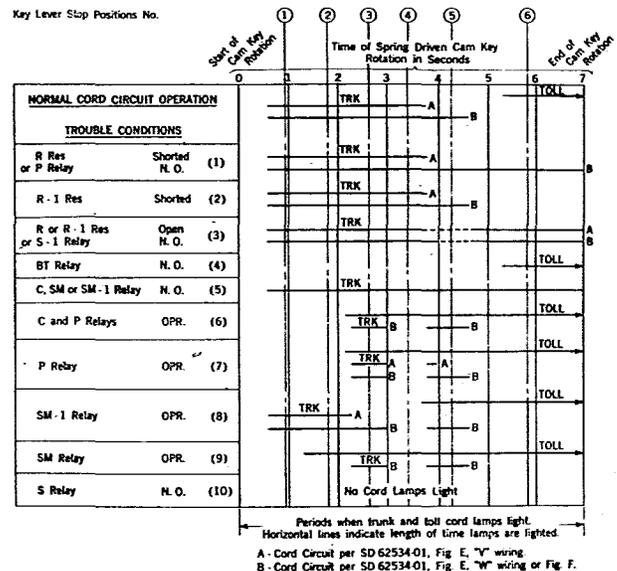


Fig. 2.

When Test is Conducted Individually

4.20 After performing the operations covered in 3.08 and 3.09, operate the TST-PCO key in the test circuit and note all other test keys are normal.

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4.21 Perform the operations covered by 4.12 to 4.17.

4.22 The normal operations of the trunk and toll cord supervisory lamps, as well as the troubles in the cord circuit which are indicated by other lamp operations are shown in Figs. 1 and 2.

(D) A-C. Continuity Test

4.23 If this test is conducted individually, all test circuit keys should be normal except the TST-NT0 key which should be operated at the control panel.

4.24 Insert the trunk and toll plugs of the cord circuit to be tested into the TRK and TOLL jacks, respectively, of the test circuit.

Note: If this test follows the supervisory relay test, perform the operations described in 3.14. The trunk and toll cords of the cord circuit will not have been disconnected from the TRK and TOLL (or TOLL-1) jacks, respectively, of the test circuit.

4.25 At the switchboard, connect the CKT jack of the portable control test set (potentiometer and receiver) to the REC jack of the test circuit, using a P3E cord.

Note: A check should occasionally be made to see that the interrupter is functioning properly. This may be done by partially withdrawing one of the cords so that the sleeve of the plug makes contact with the sleeve of the jack and the tip of the plug makes contact with the ring of the jack. A loud tone should be heard in the test receiver. If the tone is heard, fully insert the cord and proceed with the test.

4.26 Turn the knob of the potentiometer until a minimum tone is heard. This condition should exist when the pointer is approximately at "0". If a minimum tone is heard at some other point, an unbalance condition is indicated. The severity of the unbalance will be indicated by the departure of the pointer from "0". Experience will determine the degree of unbalance which should be investigated. However, if an appreciable tone is heard at all positions of the pointer, it is an indication of trouble.

4.27 Listen in the receiver during the following tests for any clicks or changes in the volume of tone which would indicate a cut-out or other trouble condition.

4.28 Manipulate the cords and plugs in the following manner: Hold the plug in the jack with one hand and shake the cord with the other hand. Turn the plug around

in the jack so as to cause the jack springs to make contact at all possible points of the tip and ring of the plug.

Note: Scratchy noises while the plug is being rotated should be disregarded.

4.29 Operate the talking and monitoring keys successively. A slight click will probably be heard when the key is operated to the talking position. Keys which cause an unusually loud click should be considered in trouble.

4.30 Apply slight pressure sidewise in each direction on all key levers. This checks the follow of the inner tip and ring springs to insure against momentary or prolonged breaks in the cord circuit through the keys, due to defective adjustments or excessive wear. With all keys on the cord pair under test in normal position, tap lightly on the associated key top to detect loose connections and defective key contacts in the talking circuit.

Note: With the later type of vertical keys (A type) side pressure on the key levers has no effect on the key contacts and with such keys contact follow should be checked by slight movement of the ringing and splitting keys in the direction of normal operation.

4.31 Operate the talking key to the talking position and perform the operation described in 4.30 on the splitting and ringing keys.

4.32 Remove all cords from the test circuit and restore all keys to normal.

(E) Talking and Monitoring Key Strap Test

4.33 Operate the TST-NT0 key at the control panel and note that all other test keys are normal.

4.34 At the switchboard, connect the CKT jack of the portable control set (potentiometer and receiver) to the REC jack of the test circuit, using a P3E cord.

4.35 Insert the plug of a trunk cord of cord circuit No. 1 on the position to be tested into the TRK jack of the test circuit.

4.36 Insert the plug of the trunk cord of the last cord circuit on the position into the TOLL jack of the test circuit.

4.37 Operate the talking key of both cord circuits under test.

4.38 Turn the knob of the potentiometer until a minimum tone is heard. This condition should exist when the pointer is approximately at "0". If a minimum tone is heard at some other position, an unbalance condition is indicated. Experience will

determine the degree of unbalance which should be investigated.

4.39 Listen in the receiver during the following tests for any clicks or changes in the volume of tone which would indicate a cutout or other trouble condition.

4.40 Apply slight pressure to both talking key levers from each side. Tap lightly on the associated key top to detect loose connections and defective key contacts.

4.41 Restore the talking key of cord No. 1 to normal and apply slight pressure from each side of the key lever.

4.42 Operate both talking keys to the monitoring position and repeat the tests.

4.43 Remove the plug of cord No. 1 from the TRK jack and repeat the tests using a different cord on the position in place of cord No. 1 each time until all talking and monitoring key straps on the position have been tested.

4.44 Remove both trunk cords from the TRK and TOLL jacks.

4.45 Restore all keys to normal and remove the portable test set.

5. REPORTS

5.01 The required record of these tests should be entered on the proper form.