MANUAL TEST

HIGH IMPEDANCE AND CONDENSER TYPE CORD CIRCUITS

USING TEST SETS J68602AJ, 35 TYPE AND CIRCUIT SD-61423-01

NO. 1 TOLL OFFICE

1. GENERAL

1.01 This section describes tests of a-c and d-c supervisory relays in high impedance and condenser type cord circuits in No. 1 toll offices using the a-c relay and signaling test set J68602AJ (SD-63674-01) and a 35 type test set. It also describes an a-c continuity test, a test of talking and monitoring key straps and a test of the lockout feature using continuity test circuit SD-61423-01. The tests are as follows:

(A) Test of A-C Supervisory Relays
(B) Test of D-C Supervisory Relays
(C) A-C Continuity Test
(D) Talking and Monitoring Key Strap Test
(E) Test of Lockout Feature

1.02 This section is reissued to add test (E) for type "A" cord circuits.

1.03 The tests apply to through, through and terminating and terminating cord circuits equipped with B43, B203, or 190F d-c supervisory relays and No. 190E or No. 196A a-c supervisory relays.

1.04 The a-c voltage requirements are covered in the circuit requirement table on the circuit drawing or in a section of the A460 subdivision applying to the particular relay. When the a-c voltage requirements appear in the circuit requirement table as well as in a BSP Section, the requirements on the drawing should be used. The proper shunt values to be used are covered in a section of the A490 subdivision covering the test set.

1.05 Test (D) does not apply to type A cord circuits and test (E) applies only to type "A" cords.

2. APPARATUS

Test (A)

2.01 Portable Test Set J68602AJ.

2.02 One P2J Cord equipped with No. 110 Plugs (2P9B).

2.03 One P3E Cord equipped with No. 110 Plugs, (3P6B). Two required when testing cord circuits arranged for d-c supervision on both cords.

2.04 Jacks per SD-63674-01, Figs. 4 and 8.

Test (B)

2.05 No. 35 type test set.

2.06 One P2P cord equipped with a No. 110 plug and a No. 109 Plug (2P10A).

Tests (C) and (D)

2.07 Continuity Test Circuit SD-61423-01.

2.08 Portable Control Box J64703A.

2.09 One P3E Cord equipped with No. 110 Plugs (3P6B).

Test (E)

2.10 Continuity Test Circuit SD-61423-01.

2.11 Telephone Set.

3. PREPARATION

Test (A)

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

3.02 If an appreciable number of relays are to be tested, it is desirable to check the meter settings, in the portable test set, from time to time to insure that they remain at the established values.

3.03 Before setting up the test voltage values for the a-c supervisory relays, see that all slides of the potentiometer are at the extreme front and so avoid possible damage to the meter.

3.04 By means of the P2J cord connect the BAT G jack of the test set to the BAT G jack at the position.

Note: To avoid grounding of the battery supply lead, connect the cord to the test set first and when disconnecting remove the cord from the test set last.

3.05 By means of a P3E cord, connect the 20 cycle jack of the test set to the 20 cycle jack at the position.

3.06 The voltage values given for the a-c relays depend on the type of relay and whether its windings are connected in series

or parallel. Both the "operate" and "non-operate" voltage values for only one arrangement of a-c supervisory relays may be set up on the test circuit at one time.

3.07 The VSH key, which selects one or two shunts, should be operated or left unoperated depending upon the particular shunt value required. If a shunt is used for setting up a voltage value, it must remain in use while testing.

Note: The shunts are provided for convenience in stabilizing the settings of the potentiometer when testing a large group of relays at one time, and thus eliminate the necessity of readjusting the voltage value for each relay. When the signaling current is supplied from a source such as an 84 type interrupter, unsatisfactory meter readings may be obtained with the shunt value specified. In such cases, select the larger shunt value or remove the shunt, as required. When no shunt is used, the voltage value must be reestablished for each relay tested.

3.08 Select one cord of the group to be tested and proceed as follows:

(a) When the circuit is arranged for d-c supervision on both cords, insert the plug of the front cord at an outward position or the rear cord at an inward position into test jack A at the front of the switchboard. Insert the plug of the other cord into test jack B. Connect test jack C with the TST jack of the test set, using a P3E cord.

(b) When the circuit is not arranged for d-c supervision on both cords, insert the plug of the front cord at an outward position or the rear cord at an inward position into the TST jack of the test set. The S lamp in the test set should light, indicating continuity of the sleeve of the cord circuit. When a condenser type cord circuit using 89 type relays is to be tested, insert the plug of the other cord into the SH CKT jack of the test set.

3.09 At the test set the TST key should be in the OPR position. Operate the CON key to the TST position. Operate the V or 40 key to the best range for reading the voltage requirement and move the 20 OPR slider of the potentiometer to the rear until the a-c voltmeter registers the specified "operate" voltage for the a-c relay to be tested. Release the V or 40 key.

3.10 Operate the TST key to the NO position. Operate the V or 40 key to the best range for reading the voltage requirement and move the 20 NO slider of the potentiometer to the rear until the a-c voltmeter registers specified "non-operate" voltage for the a-c relay to be tested. Release the V or 40 key and restore the TST key to normal.

3.11 Restore the CON key to normal.

Test (B)

3.12 Before setting up the test current values, see that all slides of the adjustable resistance of the 35 type test set are at the extreme right and so avoid possible damage to the meter.

3.13 Strap binding posts GRD and L1 of the 35 type test set with a piece of insulated wire.

3.14 Operate the REV key of the 35 type test set and connect the TEST BAT & GRD jack to the BAT G jack at the front of the switchboard, using a P2P cord.

4. METHOD

(A) Test of A-C Supervisory Relays

4.01 Connect the cord circuit to be tested to the test set as covered in 3.08.

4.02 When the plug of the cord is in the TST jack of the test set, operate the S key in the test set to the 60 position.

4.03 Operate the CON key in the test set to the TST position. The cord supervisory lamp associated with the front cord in an outward position or the rear cord in an inward position should light.

4.04 Operate the CON key in the test set to the RLS position and operate the talking key in the cord circuit. The cord supervisory lamp should be extinguished. Restore the talking key to normal.

4.05 Operate the TST key to the NO position and operate the CON key to the TST position. The cord supervisory lamp associated with the cord under test should not light.

4.06 Remove all connections set up for this test and restore all keys to normal.

(B) Test of D-C Supervisory Relays

4.07 Insert the plug of the cord, associated with the relay to be tested, into the T & R jack of the 35 type test set.

4.08 Depress key 3 of the 35 type test set and move the associated sliders until the meter registers the specified test "release" current value for the relay to be tested.

4.09 With key 3 held operated, depress key 2 and move the associated sliders until the meter registers the specified test "soak" current value for the relay to be tested. Release keys 2 and 3.

4.10 Depress key 1 and move the associated sliders until the meter registers the specified test "operate" current value for the relay to be tested. Release key 1.

4.11 Flashing Test: With key 3 held depressed, depress key 2 two times at the rate of one interruption per second and with a ratio of make to break of 1 to 1. The cord supervisory lamp should flash twice. Immediately release key 3 and approximately one-half second thereafter depress and release key 1 three times at the rate of two interruptions per second and with a ratio of make to break of approximately three to two. The cord supervisory lamp should flash three times indicating that the relay meets its specified flashing requirement "B".

Note: The rate of interruption is in accordance with the exact requirements set up for the relay but it is recognized that under the method covered these requirements can be applied only approximately.

4.12 Remove all connections set up for this test.

(C) A-C Continuity Test

4.13 Insert the plug of the rear cord, at an outward position, or the front cord, at an inward position, into the TRK jack. Insert the plug of the other cord into the TOLL jack.

4.14 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.

Note: A check should occasionally be made to see that the interrupter is functioning properly. This may be done by listening in the receiver and turning the knob of the potentiometer until a maximum tone is heard. If appreciable tone is heard proceed with the test.

4.15 Turn the knob of the potentiometer until the 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 unbalanced 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.

Note: When T and R keys are provided in the control test set and an unbalanced condition exists, which is caused by an open circuit, the operation of the T and R keys successively will determine which conductor is in trouble. The open circuit is in the conductor associated with the key which, when depressed, produces no change in tone.

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

4.17 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.

4.18 Operate the talking and monitoring keys successively. A slight click may be heard when the key is operated to the talking position. On cords arranged for use with a position circuit (type A cords) it is possible to obtain a loud tone while operating or restoring the talking key. However, no loud tone should be heard after the key has been operated or restored.

4.19 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 on 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 the contact follow should be checked by slight movement of the ringing and splitting keys in the direction of normal operation.

4.20 Operate the talking key to the talking position and perform the operation described in 4.19 on the splitting and ringing keys.

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

(D) Talking and Monitoring Key Strap Tests

4.22 This test applies only to cord circuits not arranged for use with a position circuit.

4.23 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.

4.24 Insert the plug of the rear cord of cord circuit No.1 when an outward position is being tested or the front cord of cord circuit No. 1, when an inward position is being tested, into the TRK jack of the test circuit.

4.25 Insert the plug of the rear cord of the last cord circuit, when an outward position is being tested or the front cord of the last cord circuit, when an inward position is being tested, into the TOLL jack of the test circuit.

4.26 Operate the talking keys of both cord circuits under test.

4.27 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 unbalanced condition is indicated. Experience will determine the degree of unbalance which should be investigated.

Note: When T and R keys are provided in the control test set and an unbalanced condition exists, which is caused by an open circuit, the operation of the T and R keys successively will determine which conductor is in trouble. The open circuit is in the conductor associated with the key which, when depressed, produces no change in tone.

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

4.29 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.

4.30 Restore the talking key of cord No. 1 to normal. Apply slight pressure from each side of the key lever.

4.31 Operate both talking keys to the monitoring position and repeat the test.

4.32 Remove the plug of cord No.1 from the TRK jack and repeat the test 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.

4.33 Remove both cords from the TRK and TOLL jacks.

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

(E) Test of Lockout Feature

4.35 This test applies only to type "A" cord circuits.

4.36 Insert the plug of an operator's telephone set into the telephone set jacks at the position under test.

4.37 Insert the front plug of an outward position or the rear plug of an inward position into the TOLL jack of the test circuit.

4.38 Operate the talking key associated with the cord circuit under test. Tone should be heard in the telephone set receiver. Restore the talking key to normal. Tone should not be heard in the receiver.

4.39 Operate the talking key associated with another idle cord circuit in the same position. Tone should not be heard in the receiver. Again operate the talking key associated with the cord in the TOLL jack. No tone should be heard in the operator's receiver indicating that the lockout feature is functioning satisfactorily.

4.40 Operate the monitoring key associated with the cord in the TOLL jack. Tone should be heard in the operator's receiver.

4.41 Again operate the talking key associated with the cord in the TOLL jack. No tone should be heard in the operator's receiver.

4.42 Restore the talking key of the idle cord circuit to normal. Tone should be heard in the operator's receiver.

4.43 Reoperate the talking key of the idle cord circuit. Tone should still be heard in the operator's receiver. Restore all keys and test connections to normal.

5. REPORTS

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