

LOCAL OFFICE SELECTOR CIRCUITS

TESTS USING TEST SET ES-20150-01 OR ES-239844

GROUND CUTOFF RELAY PANEL OFFICES

1. GENERAL

1.01 This section describes a method of testing local (three-wire) office circuits at the office frames in ground cutoff relay panel offices. These tests are made by means of the manually operated office, incoming and final selector test set (wagon type) per ES-20150-01 or ES-239844. The tests described are as follows:

- (A) Test Line Test
- (B) Brush Continuity Test
- (C) Overflow Test
- (D) Telltale Test
- (E) Test for Off-Normal Ground on Sleeve.

1.02 This section has been revised to cover the arrangement of the test sets to function with both old and new office test lines, and to include the checking of sleeve continuity during brush continuity tests. Also, more detailed information regarding the operation and functions of the various circuits involved in the tests is covered in this issue. Tests (D) and (E) have been added.

1.03 The tests are intended for use in testing on a routine basis those office circuits which are not tested by an office test frame. They may also be used to supplement the test frame tests and to check trouble conditions.

1.04 The tests are made at the office frames and the test set is connected to the proper jacks by means of patching cords.

1.05 Test (A) is a test line test and is intended to check the operation of the office circuit. A check of the trunk hunting feature and of the brush continuity of one brush is also made. During this test the office selector is directed to a group of office test lines which are located in one or both upper groups of one of the banks on each office frame. The first test line of the group is wired so as to be permanently busy.

1.06 Test (B) is intended for testing the continuity of those brushes not checked by test (A). For this test the office selector is directed to a working trunk group preferably located near the center of the bank.

1.07 During test (D) brush chatter conditions may be detected by observing the tripped brush during the up-drive.

1.08 Any office circuit on which a failure is encountered when making a test, should be made busy or left busy until the trouble has been cleared.

2. APPARATUS

- 2.01 Office, Incoming and Final Selector Test Set per ES-20150-01 or ES-239844.
- 2.02 Two P3E Cords equipped with No. 110 Plugs.
- 2.03 No. 32A Test Set.
- 2.04 No. 184 Plugs, as required.
- 2.05 No. 253B Tools (sequence switch brake plate), if required (Test C).
- 2.06 No. 253B Tool (Test E).

3. PREPARATION

All Tests

3.01 All covers of relays in the office circuit should be in place during the period the test is in progress.

3.02 When testing circuits equipped with separate test and make-busy jacks, make the circuits to be tested busy by inserting No. 184 plugs into the MB jacks.

Note: Do not insert a make-busy plug into the MB jack of a circuit which is off-normal.

3.03 With all test set keys except the numerical keys normal, connect jack B-GRD of the test set to jack A on the office frame jack panel.

Note: To avoid possible 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.

All Tests Except Test (E)

3.04 Operate the OFF (office) key.

3.05 Operate the proper compensating resistance keys to provide a resistance of 1200 ohms without capacity in the test set. Where this value can not be provided use a value of 1100 ohms.

Test (A)

- 3.06 Operate the REV key if the test line is arranged to provide ground on the ring and interrupted battery on the tip.
- 3.07 The office selector test frame, if in use, must be stopped during the interval this test is in progress.

Test (C)

- 3.08 Operate the OFL-W or OFL (overflow) key at the office selector test frame or office frame to make all the office test lines busy.

Note: If the test line circuit is not provided with such a key, the test lines may be made busy by directing an office selector to each test line of the group, except the overflow terminal, and blocking the sequence switch of each circuit in the talking position with a No. 253B tool.

- 3.09 The office selector test frame, if in use, must be stopped during the interval this test is in progress.

4. METHODAll Tests

- 4.01 Connect jack TST of the test set to the TMB (or T) jack of the office circuit to be tested.

Note: To avoid releasing a service connection, do not connect to a TMB jack if the associated selector is off-normal.

(A) Test Line Test

- 4.02 Depress keys in the OB and OG rows of numerical keys to direct the office selector to the office test line group.
- 4.03 Momentarily operate the ST (start) key to start the test. The TST lamp lights as an indication that the test is in progress.
- 4.04 Observe the office selector during the test and note any irregular operations, such as sluggish up-drive, slipping sequence switch drive disc, chattering multiple brushes, etc.
- 4.05 Office brush and group selections are made in accordance with the operated test set keys to select the office test line group. As the first terminal in the group is permanently busy the office selector terminal hunts to select an idle test line. An operate test of the office L relay is made during selections.
- 4.06 After selections have been completed, the office circuit advances to the

talking position. The test set checks that either direct ground with the office circuit in the awaiting relay position, or battery through the winding of the L relay in the talking position, is connected to the sleeve at the district end of the circuit.

- 4.07 With the office circuit in the talking position a check is made for continuity of the tip, ring and sleeve conductors and for brush continuity of the office circuit. At the same time a test is made for a grounded tip or ring or a cross between tip, ring and sleeve conductors. A polarity check of the test line battery is also made. The IO-OK lamp flashes as an indication that the test was completed satisfactorily. A steadily lighted lamp or the failure of the lamp to light indicates a trouble condition.

Note 1: When using test set ES-20150-01 not equipped with a REV key, a polarity test is not made.

Note 2: The earlier test lines arranged to provide interrupted battery on the tip and ground on the ring do not check for sleeve continuity or crosses. This check is made earlier in the test when the office selector terminal hunts on encountering the first test line which is busy.

- 4.08 Momentarily operate the DISC key. The test set and the office circuit restore to normal. The IO-OK and TST lamps are extinguished. The BY lamp lights during the return to normal of the office circuit indicating that the circuit has connected a busy condition to the sleeve during this interval.

Repeat Test

- 4.09 To repeat this test, momentarily operate the A-ST (automatic start) key as the office circuit restores to normal or momentarily operate the ST key after the circuit is normal. The test then proceeds as described in 4.04 to 4.08.

Disconnection

- 4.10 If any of the other tests are to be made on the office circuit under test, restore any keys not required to be operated for the next test.
- 4.11 If no further tests are to be made on the circuit under test and the same test is to be made on other circuits on the same side of the frame, disconnect the plug from the TMB (or T) jack and reconnect it to the corresponding jack of the next circuit to be tested.

Note: Before disconnecting the test set from an office circuit, observe that the circuit is normal.

4.12 When testing is completed on the last circuit, restore all operated keys to normal and disconnect all cords. Then remove the No. 184 plugs from the MB jacks, if provided.

(B) Brush Continuity Test

4.13 This test is for the purpose of checking for continuity and freedom from crosses of the tip, ring and sleeve springs of the brush under test. It is used to test brushes not checked by test line test (A).

4.14 Operate the OBC (or BC) (office brush continuity) key.

4.15 Depress keys in the OB and OG rows of numerical keys that will cause the office selector to make the required brush and group selections for tripping the brush under test and for directing the selector to a working group of trunks.

Note 1: Trunk groups connected to regular interoffice incoming circuits or to special service or vacant code trunks should be used in preference to call indicator trunks, in so far as practicable, to avoid possible flashing of the assignment lamps at call indicator positions. Trunk groups connected to repeating incoming circuits should not be used in making this test.

Note 2: To test the continuity of the sleeve springs of the brushes, make busy at the outgoing trunk testboard, the first two or three trunks in the trunk group used for the test.

4.16 The test proceeds in accordance with 4.03 to 4.06, except that office selections are made to select a working trunk group. Observe that the office circuit functions to select an idle trunk in the group.

Note: The continuity of the sleeve brush is checked by terminal hunting and the selection of an idle trunk.

4.17 As the office circuit advances to the talking position, a test is made for continuity of the tip and ring conductors through the office circuit. This includes the tip and ring springs of the commutator and selector rod brushes. This test also checks for crossed tip and ring, grounded tip and reversed tip and ring conductors. The BC-OK lamp lights, the TST lamp is extinguished and the office circuit restores to normal as an indication of a satisfactory test. A failure is indicated if the BC-OK lamp does not light and the office circuit does not restore to normal.

Note: When using test sets equipped with an OBC key an overflow condition will give a failure indication. Before investigating a trouble condition check that the selector is not at overflow. Test sets equipped with a BC instead of an OBC key do not make a check for reversed tip and ring and do not give a failure indication on an overflow condition or in case the office selector stops on a busy trunk due to an open sleeve.

4.18 Momentarily operate the DISC key to restore the test set to normal. The BC-OK lamp is extinguished.

4.19 To make a test on another brush of the same selector, proceed in accordance with 4.15 to 4.18 using a different brush selection or brush and group selection.

4.20 To repeat the test proceed as described in 4.09. To disconnect proceed in accordance with 4.10 to 4.12 and restore to service any trunks that have been made busy for the test.

(C) Overflow Test

4.21 This test is for the purpose of checking the ability of the office circuit to advance under control of the Z commutator when the circuit encounters an overflow condition.

4.22 With the REV key normal, proceed as described in 4.02 to 4.05. During this test, since all the office test lines are busy, the office selector terminal hunts to the overflow terminal. The office circuit advances to the talking position and the IO-OK lamp lights. The Z commutator then advances the switch to the overflow position. In this position reverse battery (ground on tip and battery on ring) is connected to the tip and ring conductors, the Z commutator connecting ground to the tip. The IO-OK lamp is extinguished as an indication that the circuit functioned satisfactorily.

Note: When using test set ES-239844 not equipped with a REV key the IO-OK lamp remains lighted until disconnection. In this case the advance of the office circuit to the overflow position should be taken as a satisfactory completion of the test.

4.23 Momentarily operate the DISC key to restore the test set and office circuit to normal. The TST lamp is extinguished.

4.24 To repeat the test proceed as described in 4.09. To disconnect proceed in accordance with 4.10 to 4.12 and

restore the OFL-W or OFL key to normal. If office circuits were used to make the test line terminals busy, restore them to service.

(D) Telltale Test

4.25 This test is for the purpose of testing the ability of the office circuit to advance under control of the X commutator in these cases where the office selector goes to telltale. This test may also be used to detect chatter of multiple brushes by observing the tripped brush during the up-drive.

4.26 To drive the selector to telltale on group selection depress a key in the OB row and restore any operated key in the OG row to normal.

4.27 Momentarily operate the ST key to start the test. The TST lamp lights as an indication that the test is in progress.

4.28 During office group selection observe that the office selector is driven to telltale. As the selector rod moves upward also observe whether the trip lever of the tripped brush has a tendency to chatter. Investigate any condition which causes excessive vibration of the trip lever in order to determine whether such chatter, which may be an indication of possible snagging, is due to a worn brush or to some other cause.

Note: To check another brush of the same selector for chatter conditions, repeat the test using a different brush selection.

4.29 As the selector reaches the telltale position, the X commutator should advance the office circuit to the awaiting relay position. The office circuit advances in local circuit to the talking position. The X commutator then advances the office circuit to the overflow position. In this position reverse battery (ground on tip and battery on ring) is connected to the tip and ring conductors, the X commutator connecting ground to the tip. The OF lamp lights as an indication that the circuit functioned satisfactorily.

Note: In the earlier office circuits the X commutator is not arranged to advance the circuit out of the talking position and the OF lamp does not light. The advance of the circuit to the talking position in this case should be taken as a satisfactory completion of the test.

4.30 Momentarily operate the DISC key to restore the test set and office circuit to normal. The TST and OF lamps are extinguished.

4.31 To repeat the test proceed as described in 4.09. To disconnect proceed in accordance with 4.10 to 4.12.

(E) Test for Off-Normal Ground on Sleeve

4.32 This test is for the purpose of checking that the office circuit maintains a ground on the sleeve during the interval the circuit is off-normal with no district connected.

4.33 Block the sequence switch of the circuit under test with a No. 253B tool and then manually advance the switch to the awaiting sender position. The BY lamp in the test set lights.

4.34 Manually advance the sequence switch to the talking position. The BY lamp remains lighted.

4.35 Remove the No. 253B tool from the sequence switch. The office circuit advances to normal and the BY lamp is extinguished.

4.36 To disconnect proceed in accordance with 4.10 to 4.12.

5. SPECIAL FEATURES

Trouble Restore

5.01 Momentarily operate the DISC key when it is desired to restore the test set to normal after the test set has blocked on a trouble condition.

Step-by-Step Advance

5.02 The step-by-step control feature permits canceling the automatic advance of the test set in those cases where it is desired to advance the test set by steps during the progress of a test in order to make observations on a particular test.

5.03 Operate the STP (step-by-step) key and then momentarily operate the ST key to start the test. The test set stops after each selection, consisting of office brush and group selections, has been completed.

5.04 To advance the test set under this condition, momentarily operate the ST key. After the desired selection has been checked, restore the STP key to normal and the test set proceeds with the remaining operations of the test.

Remote Control

5.05 This feature provides a convenient means of starting a test, of advancing the test set in steps and of restoring the test set to normal while observing the operation of the office circuit.

5.06 Operate the test set keys required for a particular test and insert the plug of a No. 32A test set into the EX-K (extension key) jack of the test set. If it is desired to control the test in steps, also operate the STP key.

5.07 To start the test or to advance the test set in steps where the STP key is operated, momentarily depress the WH (white) key of the No. 32A test set. This simulates the operation and release of the ST key of the selector test set.

5.08 To restore the test set to normal on a satisfactory test or if the test set blocks on a trouble condition, momenta-

rily depress the RED key of the No. 32A test set. The operation of this key simulates the operation and release of the DISC key of the selector test set. To repeat the test after the test set restores to normal, momentarily depress the WH key.

Note: The RED key is ineffective on the brush continuity test. To disconnect on this test momentarily operate the DISC key.

6. REPORTS

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