

LOOP DIALING TOLL TRANSMISSION SELECTORS
OPERATION TESTS
USING TEST SET ES-30007-01 (X61341)
STEP-BY-STEP SYSTEMS

1. GENERAL

1.01 This section describes a method of testing loop dialing toll transmission selectors arranged for line seizure signal, 20-cycle ac ringing over the trunk, and wet-dry supervision using test set ES-30007-01.

1.02 This section is reissued to incorporate material from the addendum in its proper location. In this process marginal arrows have been omitted.

1.03 The tests and features tested are:

(A) Busy Line - Loop with Leak - Coin and Noncoin Selectors: This test checks the ability of a toll transmission selector to follow and repeat pulses and to return an indication of a busy line condition.

(B) Idle Line Test - Loop - Coin and Noncoin Selectors: This test checks pulsing and ringing, for noisy and reversed wiper cords and called party hold feature.

(C) All Paths Busy - Loop - Coin and Noncoin Selectors: This test checks the ability of a toll transmission selector to return an indication of an all-paths-busy condition.

(D) Digit-Absorbing and Blocking Tests: This test checks the ability of toll transmission selectors to absorb digits once only or repeatedly and to block digits when these features are provided.

1.04 Wherever the action in the method calls for the operation of the STP (STEP), or RLS (RELEASE) key, or of the dial, it is understood that either the STP, or RLS key, or the dial, of the wagon-type test set, or the STP (No. 1), or RLS (No. 3) keys, or the dial, of the remote control test set (No. 40A or No. 40B) is meant, depending upon whether or not the remote control test set is being used.

1.05 The progress lamps on the test set indicate the particular test which is being applied at the time the lamp is lighted. These progress lamps are designated as follows: BUSY LINE, PTR (PULSE CUT THRU AND RING), PRETRIP, RING, TRIP, TONE CO (TONE CUT OFF) PEX RR (PEX RERING), COIN TRK (COIN TRUNK), AND CLD HLD (CALLED PARTY HOLD).

1.06 Other miscellaneous lamps on the test set are designated GUARD, SUPV (SUPERVISORY), BUSY, REV CORD (REVERSE CORD), COIN COL (COIN COLLECT), and COIN RET (COIN RETURN).

1.07 Tests (A) and (B) are based upon the use of a connector test line (99) terminal. The particular test line terminal selector shall be one which can be reached by dialing from the test jacks of the selector being tested.

1.08 Lettered Steps: The letters a, b, c, etc, are added to a step number to indicate that the step covers an action which may or may not be required, depending on local conditions. The conditions under which a lettered step or series of steps should be made are given in the ACTION column and all steps governed by the same condition are designated by the same letter. When a condition does not apply, the associated steps should be omitted.

1.09 When testing selectors arranged to absorb the first digit on the level under test, or arranged to block on any or all levels until after a digit is absorbed, it will be necessary to dial an extra digit and then proceed with the tests when the switch restores.

1.10 Test (D) should be made on those levels of a selector that absorb digits repeatedly or block and send back an all-paths-busy tone, in order to make a complete test of the selector.

1.11 A different level should be used each time the tests are performed so that eventually every selector will have been tested on each working level.

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1.12 This section does not include tests to levels serving level hunting connectors.

1.13 Local instructions should be followed with reference to recording any traffic register operations caused by performing these tests.

1.14 Tests (C) and (D) should preferably be made during periods of light traffic.

1.15 These selectors are connected directly to trunks and while conducting these tests, the trunks shall be made busy in the approved manner. They shall be restored to service when tests have been completed, except those on which "out of service" failures have been encountered on the transmission selectors.

1.16 The test equipment specified in this section is designed to apply proper marginal tests (simulated critical circuit conditions) when the circuit under test and the test equipment have an applied voltage of 48.5 to 50. In those offices where power plants are normally operated at more than 50 volts, the battery voltage should be reduced and maintained within the required limits while the tests are being made.

2. APPARATUS

2.01 The apparatus required for each test is shown in the following list. The details for each item are covered in the indicated paragraphs.

3. PREPARATION

| <u>STEP</u> | <u>ACTION</u> | <u>VERIFICATION</u> |
|------------------|--|---------------------|
| <u>All Tests</u> | | |
| 1 | Connect test set jacks 2, 3, and 4 to correspondingly numbered test line jacks on selector frame using three P3E cords. | |
| | <u>Note:</u> When more than one set of test line jacks 3 and 4 is available, set selected shall be one which is multiplied to same connector group in which the test line number to be dialed appears. | |
| 2 | Connect head telephone set to test set jacks TEL. | |
| 3a | If the remote control set is used - Insert remote control set plugs, red, gray, and black into test set EXT jacks R, G, and B respectively. | |

| <u>Apparatus</u> | <u>No. Required for Tests</u> | | | |
|----------------------|-------------------------------|------------|------------|------------|
| | <u>(A)</u> | <u>(B)</u> | <u>(C)</u> | <u>(D)</u> |
| Test Set (2.02) | 1 | 1 | 1 | 1 |
| Test Set (2.03) | * | * | * | * |
| Head Telephone Set | 1 | 1 | 1 | 1 |
| Patching Cord (2.04) | 3 | 3 | 3 | 3 |
| Patching Cord (2.05) | 1 | 1 | 1 | 1 |
| Testing Cord (2.06) | - | - | 1 | - |

* As required

2.02 Toll Train and Coin Box Trunk Test Set, X61341 (ES-30007-01).

2.03 No. 4OB (or 4OA) Test Set (remote control) (optional).

2.04 P3E Cord, 10 feet long, equipped with two No. 310 Plugs (3P6F Cord).

2.05 P4K Cord, 12 feet long, equipped with one No. 24OB Plug and one No. 289B Plug (4P4A Cord).

2.06 WIAF Cord, 8 feet 6 inches long, equipped with two No. 360A Tools, one No. 411A Tool (test pick) and one KS-6278 Connecting Clip. (Where the wiper cords are not arranged for test jack termination, a KS-6278 Connecting Clip is used in place of the No. 411A Tool.)

| <u>STEP</u> | <u>ACTION</u> | <u>VERIFICATION</u> |
|-----------------|--|--|
| 4 | Insert the No. 289B plug of P4K cord into test set jacks TST. | |
| 5 | Restore all keys on test set to normal. | |
| 6 | Operate TS-OUT (Toll Transmission Selector - Out) key. | |
| 7b | If test set circuit is not normal (a progress lamp on test set is lighted) - Operate and hold RLS key long enough to restore circuit to normal or, if necessary, advance test set selector by operating and releasing STP key required number of times. | No progress lamps lighted on test set. |
| | <u>Note:</u> From all positions except BUSY LINE through PRETRIP positions, test circuit can be returned to normal by operating and holding RLS key until no progress lamp is lighted. If test circuit is in, or between, above mentioned positions, it is necessary to advance test circuit beyond PRETRIP position by means of STP key, where RLS key may be used. | |
| 8 | Insert maximum allowable loop resistance in dialing circuit by means of dials on No. 509A resistance panel of test set. | |
| | <u>Note 1:</u> In those cases where compensating resistance in selector is in circuit when connection is made to test jack, proper test set resistance value to be used is one which is most nearly equal to maximum working limits shown on circuit drawing covering selector under test, minus 50 ohms normally in test set and compensating resistance in selector circuit. | |
| | <u>Note 2:</u> In those cases where compensating resistance in selector is not in circuit when connection is made to test jack, proper test set resistance value to be used is one which is most nearly equal to maximum working limits shown on circuit drawing covering selector under test, minus 50 ohms normally in test set. | |
| 9 | Operate T-LK (Transmission - Leak) key to connect leak resistance (30,000 ohms) across dialing circuit. | |
| <u>Test (B)</u> | | |
| 10c | If transmission selector supervisory relay is adjusted for 1000-ohm subscriber loop - Operate 1000A key (if provided). | |

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| <u>STEP</u> | <u>ACTION</u> | <u>VERIFICATION</u> |
|-------------|---|---------------------|
| 11d | If transmission selector supervisory relay is adjusted for 1400-to 1500-ohm subscriber loop - Operate 1400A key. | |

Test (C)

| | | |
|----|---|--|
| 12 | Connect KS-6278 connecting clip of WLAF cord to ground. | |
|----|---|--|

4. METHOD

| <u>STEP</u> | <u>ACTION</u> | <u>VERIFICATION</u> |
|--|---|--|
| <u>(A) Busy Line - Loop with Leak - Coin and Noncoin Selectors</u> | | |
| 10 | With selector to be tested normal - Operate and hold RLS key. Insert No. 240B plug of P4K cord into selector test jack. | GUARD lamp does not light. <u>Note:</u> If selector is busy, GUARD lamp lights, in which case disconnect from selector. |
| 11 | Restore RLS key. | GUARD lamp lights. |
| 12 | Operate and release STP key to advance test set circuit to BUSY LINE position. | BUSY LINE lamp lights. |
| 13e | If testing selector arranged to absorb first digit on level dialed - Dial absorbed digit. | Selector steps to level and restores. |
| 14 | Dial connector test line (99 terminal). | Selector steps to level dialed and cuts in on first idle terminal. BUSY lamp lights. SUPV lamp flashes at all-paths-busy rate. Busy tone may or may not be heard in receiver. <u>Note:</u> Extinguishing of GUARD lamp during pulsing indicates a failure of "B" relay of selector under test, to hold up. |
| 15 | Operate and hold RLS key. | Selector restores. BUSY, SUPV, and GUARD lamps extinguished. |
| 16 | Restore RLS key. | GUARD lamp lights. |
| 17 | Remove No. 240B plug from selector test jack. | GUARD lamp extinguished. |
| 18f | If this test is to be applied to additional toll transmission selectors - Repeat Steps 10 through 17, as required. | |
| 19 | Remove all test connections. | |

(B) Idle Line Test - Loop - Coin and Noncoin Selectors

| | | |
|----|---|--|
| 12 | With selector to be tested normal - Operate and hold RLS key. Insert No. 240B plug of P4K cord into selector test jack. | GUARD lamp does not light. <u>Note:</u> If selector is busy, GUARD lamp lights, in which case disconnect from selector. |
|----|---|--|

| <u>STEP</u> | <u>ACTION</u> | <u>VERIFICATION</u> |
|-------------|--|--|
| 13 | Restore RLS key. | GUARD lamp lights. |
| 14 | Operate and release STP key to advance test set circuit to PTR position. | PTR lamp lights. |
| 15e | If testing selector arranged to absorb first digit on level dialed - Dial absorbed digit. | Selector steps to level dialed and restores. |
| 16 | Dial connector test line (99 terminal). <u>Note:</u> If test number dialed is in a terminal-per-line code ringing group, dial an extra digit following test number to set ringing code. | Selector steps to level dialed and cuts in on first idle terminal. BUSY and SUPV lamps light. Audible ringing signal heard in receiver. |
| 17 | Operate and release STP key to advance test set circuit to TRIP position. | Audible ringing signal stops. SUPV lamp extinguished. Transmission tone heard in receiver. <u>Note:</u> This tone increases in volume after first instant or so, indicating that supervisory relay in transmission selector has released properly, and talking circuit is satisfactory. If REV CORD lamp is lighted, it indicates a reversal in line wiper cords. |
| 18 | Operate and release STP key to advance test set circuit to TONE CO position. | Transmission tone is removed. |
| 19 | Move wiper cords slightly on selector under test. | No noise in receiver. No flashing of BUSY lamp. <u>Note:</u> Any noise heard in receiver while cords are moved is either a defective line wiper cord or cord connection. A slight noise may be bank noise. A defective sleeve wiper cord or cord connection may be indicated by flashing of BUSY lamp. |
| 20 | Operate and release STP key to advance test set circuit to PBX RR position. | Bell in test set rings. REV CORD lamp flashes rapidly. <u>Note:</u> This indicates that the PBX rering feature is functioning properly. |
| 21 | Operate and release STP key twice to advance test set circuit to CLD HLD position. | Selector does not release. Bell in test set stops ringing. REV CORD lamp extinguished. |
| 22 | Operate and hold RLS key. | Test set circuit restores to normal. Selector restores. GUARD and BUSY lamps extinguished. |
| 23 | Restore RLS key. | GUARD lamp lights. |
| 24 | Remove No. 240B plug from toll transmission selector test jack. | GUARD lamp extinguished. |

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| <u>STEP</u> | <u>ACTION</u> | <u>VERIFICATION</u> |
|---|---|--|
| 25f | If this test is to be applied to additional toll transmission selectors - Repeat Steps 12 through 24, as required. | |
| 26 | Remove all test connections. | |
| <u>(C) All Paths Busy - Loop - Coin and Noncoin Selectors</u> | | |
| <u>Note:</u> Do not make Test (C) on levels arranged for repeatedly absorbing digits. | | |
| 13 | With selector to be tested normal - Operate and hold RLS key. Insert No. 240B plug of P4K cord into selector test jack. | GUARD lamp does not light. <u>Note:</u> If selector is busy, GUARD lamp lights, in which case disconnect from selector. |
| 14 | Restore RLS key. | GUARD lamp lights. |
| 15 | Operate and release STP key to advance test set circuit to PTR position. | PTR lamp lights. |
| 16e | If testing selector arranged to absorb first digit on level dialed - Dial absorbed digit. | Selector steps to level dialed and restores. |
| 17f | If selector under test is arranged for test jack termination of wiper cords - Hold No. 411A tool of WIAF cord against sleeve wiper cord terminal on test jack assembly of selector under test. | |
| 18g | If selector under test is not arranged for test jack termination of wiper cords - Connect KS-6278 connecting clip of WIAF cord directly to sleeve wiper soldering lug of selector under test. | |
| 19 | Dial level under test and when selector reaches eleventh rotary position remove sleeve connection in order to stop vibration of rotary armature. | Selector steps to level dialed and rotates to eleventh rotary position. SUPV lamp flashes at all-paths-busy rate. Busy tone may or may not be heard in receiver. |
| 20 | Operate and hold RLS key. | Selector restores. GUARD and SUPV lamps extinguished. |
| 21 | Restore RLS key. | GUARD lamp lights. |
| 22 | Remove No. 240B plug from selector test jack. | GUARD lamp extinguished. |
| 23h | If this test is to be applied to additional toll transmission selectors - Repeat Steps 13 through 22, as required. | |
| 24 | Operate and release STP key to advance test circuit beyond PRETRIP position. | PTR lamp extinguished. |

| <u>STEP</u> | <u>ACTION</u> | <u>VERIFICATION</u> |
|---|--|--|
| 25 | Operate and hold RLS key. | Test set circuit restores to normal. |
| 26 | Restore RLS key. | |
| 27 | Remove all test connections. | |
| <u>(D) Digit-Absorbing and Blocking Tests</u> | | |
| 13 | With selector to be tested normal - Operate and hold RLS key. Insert No. 240B plug of P4K cord into selector test jack | GUARD lamp does not light. <u>Note:</u> If selector is busy, GUARD lamp lights, in which case disconnect from selector. |
| 14 | Restore RLS key. | GUARD lamp lights. |
| 15 | Operate and release STP key to advance test set circuit to PTR position. | PTR lamp lights. |
| 16e | If selector is arranged for blocking - Dial level so arranged. | Selector steps to level dialed and rotates to eleventh rotary position. SUPV lamp flashes at all-paths-busy rate. Tone may or may not be heard in receiver. |
| 17e | Operate and hold RLS key. | Selector restores. GUARD lamp extinguished. No tone in receiver. |
| 18e | Restore RLS key. | GUARD lamp lights. |
| 19e | Repeat Steps 16e through 18e once. <u>Note:</u> This checks that blocking has not been unlocked. | |
| 20 | Dial level arranged for digit absorption. | Selector steps to level dialed and restores. |
| 21 | Dial same level again. | If Selectors arranged for once-only digit absorption - Selector steps to level dialed and cuts in on first idle terminal. BUSY lamp lights. If Selectors arranged for repeated digit absorption - Selector steps to level dialed and restores. |
| 22 | Operate and hold RLS key. | GUARD lamp extinguished. If Selector arranged for once-only digit absorption - Selector restores. BUSY lamp extinguished. |
| 23 | Restore RLS key. | GUARD lamp lights. |
| 24e | If selector is arranged for blocking - Dial level arranged for absorption. | Selector steps to level dialed and restores. |

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| <u>STEP</u> | <u>ACTION</u> | <u>VERIFICATION</u> |
|-------------|--|---|
| 25e | Dial level arranged for blocking. | Selector steps to level dialed and cuts in on first idle terminal. BUSY lamp lights. |
| 26e | Operate and hold RLS key. | Selector restores. GUARD and BUSY lamps extinguished. |
| 27e | Restore RLS key. | GUARD lamp lights. |
| 28 | Remove No. 24OB plug from selector test jack. | GUARD lamp extinguished. |
| 29 | Unless other tests are to be made restore all keys and remove all cords. | PTR lamp extinguished. |