

TOLL TRANSMISSION SELECTORS
OPERATION TESTS
USING TEST SET SD-31858-01 (J34701A)
STEP-BY-STEP SYSTEMS

1. GENERAL

1.01 This section describes a method of testing toll transmission selectors using trunk test set SD-31858-01. Toll transmission selectors and associated coin control trunks using the in-band method of coin control and ringing are also tested without using the trunk test set.

1.02 This section is reissued to include in Test D a method of testing the in-band coin-control feature in selectors, such as toll transmission selectors SD-31841-01 and the associated coin control trunk SD-32289-01, and to bring the section generally up to date.

1.03 The tests covered are:

A. Idle Line Test Loop — Coin and Noncoin Selectors — Using Connector Multiple Test Line SD-31263-01, SD-31932-01, or SD-31642-01: This test checks the pulsing, ringing, supervision, and cut-through of coin and noncoin toll transmission selectors.

B. Idle Line Test Loop — Noncoin Selectors — Using Connector Test Line (Terminal 99) — Connector Test Line Jacks Available at Selector Frame: This test checks the pulsing and ringing of toll transmission selectors.

C. Idle Line Test Loop — Noncoin Selectors — Using Nearby Station — Connector Test Line Jacks Not Available at Selector Frame: This test checks the pulsing, ringing, supervision, and rering features of noncoin selectors.

D. Idle Line Test Loop — Coin Selectors — Using Nearby Station: This test checks the pulsing, ringing, supervision, and rering features, and in addition, checks the coin re-

turn and collect features of coin selectors, including the in-band method of coin control.

E. Busy Line Test — Loop With Leak — Coin and Noncoin Selectors: This test checks that the selector responds to dial pulses and repeats dial pulses with a resistance leak across the line.

F. All-Paths-Busy Test — Loop With Leak — Coin and Noncoin Selectors: This test checks the ability of a toll transmission selector to return an indication of an all-paths-busy condition.

G. Digit-Absorbing and Blocking Tests: This test checks the ability of the toll transmission selectors to absorb repeatedly or block digits on selectors arranged for these features.

1.04 If Test G is made on selectors arranged for blocking, Test F may be omitted.

1.05 Where pulse repeating tests are made on these selectors, Test E may be omitted.

1.06 Test A is intended for noncoin toll transmission selectors in offices equipped with connector multiple test line SD-31263-01, SD-31932-01, or SD-31642-01 and for coin toll transmission selectors where it is not desired to test the coin features. Test A, however, does not provide for checking all of the features of either the noncoin or coin selectors. Test B or C should be used instead for noncoin selectors. Test D, except as covered in the note below, should be used for coin selectors if it is desired to test the rering or the coin control feature where the connector multiple test line circuit SD-31263-01 or SD-31932-01 is not provided.

Note: Test D does not apply in the case of toll offices arranged for the 110-volt position circuit method of coin control. Instead, use Test A, B, or C and check the coin control

feature from the toll office in accordance with sections covering tests of toll switching trunks to step-by-step offices.

↑ **1.07** Test D requires action and verification at the toll office and calls for the use of a local coin station in addition to a noncoin station, the latter to be used as a talking line when desired. If either the talking line or the coin station is not available, check the coin control feature from the toll office in accordance with sections covering the tests of toll switching trunks to step-by-step offices.

1.08 Test D requires that the toll office be called from position where coin is to be controlled and requires action and verification at the distant switchboard and at the test position. In performing these tests, office records should be consulted to determine which digits will direct the call to the coin station or test lines.

1.09 Resistances provided in the test set are used for compensating the various loop conditions and are inserted in the dialing circuit by operating the keys indicated.

KEYS OPERATED	COMPENSATING RESISTANCE — OHMS
300	300
600	600
300 and 600	900
1200	1200

The proper resistance value to be used is one which most nearly represents the external pulsing loop over which the switch operates in service.

1.10 While conducting tests, the trunks should be made busy in the approved manner. Restore the trunks to service when the tests are completed.

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.

1.12 When testing selectors arranged to absorb the first digit on the level under test, or arranged to deny access on 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.

1.13 Levels on which a digit is absorbed repeatedly and levels that block and send back an all-paths-busy tone should be made using Test G in order to make a complete test of the selectors.

1.14 The timed ringing circuit per SD-32196-01, for testing toll transmission selectors arranged for ac start of ringing, is used where provided to give a controlled 0.3-second spurt of 20-cycle alternating current to start ringing.

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

1.16 All lamps, keys, and jacks referred to are located in the test set unless otherwise specified.

1.17 Precautions should be taken in performing these tests to avoid affecting service calls adversely.

1.18 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.

1.19 *Lettered Steps:* A letter a, b, c, etc, added to a step number in Part 3 or 4 of this section, indicates an action which may or may not be required depending on local conditions. The condition under which a lettered step or a series of lettered steps should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

1.20 Local instructions should be followed for recording and reporting any register operations caused by performing these tests.

2. APPARATUS

All Tests

- 2.01** Test set, J34701A (SD-31858-01).
- 2.02** Head telephone set (part of J34701A test set).
- 2.03** Patching cord, P3H cord, 10 feet long, equipped with one 310 plug and one 240A plug (3P2A cord) (for use in connecting the trunk test set to the selector test jack if the timed ringing circuit is not provided. Where circuit is provided, use cord to connect the timed ringing circuit to the selector test jack).
- 2.04** Two patching cords, P3E cords, 6 feet long, equipped with 310 red shell plugs (3P7A cords) (for use in patching to either the frame battery supply, the trunk test set to the connector test line, the GEN jack to the $\pm$ jack on the selector frame, or to the timed ringing circuit, if provided).
- Note:** Only one cord required for Tests E, F, and G.
- 2.05** Testing cord, W2M cord, 9 feet long, equipped with 310 plug, tip and sleeve connections, two 59 cord tips (2W12A cord) and two 108 cord tips (for use where a battery supply jack is not available).

Tests A, B, C, and D

- 2.06** Timed ringing circuit, SD-32196-01. (Not required for selectors arranged for simplex start of ringing.)
- 2.07** Testing cord, W2AS cord, 8 feet long, equipped with one 522A key and one 310 plug (2W22A cord) (for connecting to the timed ringing circuit TL jack).

Test B

- 2.08** Patching cord, P3E cord, 6 feet long, equipped with 310 black shell plugs (3P6D cord) (for use in patching the test set to the connector test line).

Test D

- 2.09** One local noncoin station and one local coin station preferably located near the transmission selectors (see 1.07).

Test F

- 2.10** Testing cord, W2W cord, 6 feet long, equipped with one 310 plug, one 360B tool, and one 360C tool (2W17A cord). In addition, one 411A tool should be connected to the 360C tool (for use in connecting the trunk test set to the selector test jack).

3. PREPARATION

STEP	ACTION	VERIFICATION
All Tests		
1	Connect head telephone set to test set TEL jacks.	
2	Insert proper resistance in dialing circuit, as indicated in 1.09.	
3a	If timed ringing circuit not provided — Insert 310 plug of P3H cord into test set T jack.	
4b	If timed ringing circuit provided — Connect 310 plug of P3H cord to timed ringing circuit SEL jack.	

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STEP	ACTION	VERIFICATION
5b	Connect test set T jack to timed ringing circuit T jack using P3E cord.	
6b	Insert 310 plug of W2AS cord into timed ringing circuit TL jack.	
7	Connect GEN jack to $\pm$ jack on selector frame using P3E cord. <i>Note:</i> Omit this connection when testing selectors arranged for simplex start of ringing, such as SD-31841-01.	

Tests A, C, D, E, F, and G

- 8 Connect BAT G jack to frame battery supply jack using P3E cord.
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.
- 9 Connect BAT G jack to equipment side of spare fuse (not to exceed 5 amperes) using W2M cord (see note, Step 8).
Note: Connect white (tip) conductor to fuse and red (sleeve) conductor to ground.

Test B

- 10 Connect R jack to connector test line R jack using P3E cord with red shells.
Note: To avoid grounding of the battery supply, connect to the test set first and, when disconnecting, remove the plug from the test set last.
- 11 Connect B jack to connector test line B jack using P3E cord with black shells.

Test F

- 12 Insert 310 plug of P3H cord into test set T jack.
- 13 Insert 310 plug of W2W cord into B jack, then operate BY key.

Test G

- 14 Insert 310 plug of P3H cord into test set T jack.

4. METHOD

STEP	ACTION	VERIFICATION
A. Idle Line Test Loop — Coin and Noncoin Selectors — Using Connector Multiple Test Line SD-31263-01, SD-31932-01, or SD-31642-01		
10	Check that selector under test is normal, then insert 240A plug of P3H cord into selector test jack.	BSY lamp does not light.
11	Operate, restore DL ST key.	SL lamp lighted.
12c	When testing other than reverse battery supervision selectors — Dial connector multiple test line number.	REV lamp lighted.
13d	When testing reverse battery supervision selectors, such as SD-31841-01 — Operate REV key.	
14d	Dial connector multiple test line number.	REV lamp lighted.
15a	If timed ringing circuit not provided — Operate test set RING key momentarily.	Ringinduction heard in receiver. REV lamp extinguished while RING key operated.
16b	If timed ringing circuit provided — Operate 522A key for at least 2 seconds.	Ringinduction heard in receiver for one or two short periods. REV lamp extinguished for short interval after 522A key released.
17	Ringinduction tripped by connector test line. <i>Note:</i> If tripping does not occur during the first or second ringinduction interval (indicated by ringinduction), the indication is that the connector is ringinduction on another terminal. In this case, remain on the terminal for a short time, and if a customer or operator answers, operate the TRS key and advise that a test is being made.	REV lamp flashes.
18	Operate, hold operated FL key.	Selector releases. SL, REV lamps extinguished.
19	Release FL key, restore REV key, if used.	
20	Remove plug from selector test jack.	
21	Remove all remaining cords unless other tests are to be made on selector.	
B. Idle Line Test Loop — Noncoin Selectors — Using Connector Test Line (Terminal 99) — Connector Test Line Jacks Available at Selector Frame		
12	Check that selector under test is normal, then insert 240A plug of P3H cord into selector test jack.	BSY lamp does not light.
13	Operate TOLL key, operate, restore DL ST key.	SL lamp lighted.

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STEP	ACTION	VERIFICATION
14c	When testing other than reverse battery supervision selectors — Dial connector multiple test line number.	REV lamp lighted.
15d	When testing reverse battery supervision selectors, such as SD-31841-01 — Operate REV key.	
16d	Dial connector test line terminal. <i>Note:</i> Use ring-side code if connectors are terminal-per-line type.	REV lamp lighted.
17a	If timed ringing circuit not provided — Operate test set RING key momentarily.	Test set buzzer relay sounds. Audible ringing heard in receiver. REV lamp extinguished while RING key operated, lights again when RING key restored to normal.
18b	If timed ringing circuit provided — Operate 522A key for at least 2 seconds.	Ringing induction heard in receiver for one or two short periods. REV lamp extinguished for a short interval after 522A key released.
19	Operate, restore ANS key three times at slow flashing rate.	REV lamp lights in unison. Buzzer relay operates while lamp extinguished.
20	Reoperate ANS key.	REV lamp extinguished. Steady tone heard in receiver. Buzzer relay operates continuously.
21	Restore TOLL key.	Buzzer relay silenced.
22	Operate RING key.	Buzzer relay sounds.
23	Restore RING key.	Buzzer relay silenced.
24	Restore ANS key.	REV lamp lighted.
25	Operate, hold operated FL key.	Selector releases. SL, REV lamps extinguished.
26	Release FL key, restore REV key, if used.	
27	Remove cord from selector test jack.	
28	Remove remaining test connections unless other tests are to be made on other selectors.	

C. Idle Line Test Loop — Noncoin Selectors — Using Nearby Station — Connector Test Line Jacks Not Available at Selector Frame

10	Check that selector under test is normal, then insert 240A plug of P3H cord into selector test jack.	BSY lamp does not light.
11	Operate, restore DL ST key.	SL lamp lighted.

STEP	ACTION	VERIFICATION
12c	When testing other than reverse battery supervision selectors — Dial connector terminal of local station number used for test.	REV lamp lighted.
13d	When testing reverse battery supervision selectors, such as SD-31841-01 — Operate REV key.	
14d	Dial connector terminal of local station used for test.	REV lamp lighted.
15a	If timed ringing circuit not provided — Operate test set RING key momentarily.	Station bell rings. Audible ringing heard in receiver. REV lamp extinguished while RING key operated, lights again when key restored.
16b	If timed ringing circuit provided — Operate 522A key for at least 2 seconds.	Ringing induction heard in receiver. REV lamp extinguished for short interval after 522A key released.
17	Remove receiver at station.	REV lamp extinguished. Ringing induction ceases.
18	Operate RING key.	Continuous ringing heard in station receiver.
19	Release RING key.	Ringing ceases.
20	Restore receiver at station.	REV lamp lighted.
21	Operate, hold operated FL key.	Selector releases. SL, REV lamps extinguished.
22	Release FL key, restore REV key, if used.	
23	Remove plug from selector test jack unless further tests are to be made on selector.	

D. Idle Line Test Loop — Coin Selectors — Using Nearby Station

10c	If office is arranged for associated jack method of coin control — At toll office — Connect coin control cord to coin control jack associated with trunk connected to selector under test.
11d	If office is arranged for coin control selector method of coin control — At toll office — Connect coin control cord to idle coin control trunk and dial toll switching trunk number associated with selector under test.

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STEP	ACTION	VERIFICATION
→ 12e	If office is not arranged for in-band coin control — Check that selector under test is normal, then insert 240A plug of P3H cord into selector test jack.	BSY lamp does not light.
13	At test set — Operate, restore DL ST key.	SL lamp lighted.
14f	When testing other than reverse battery supervision selectors — Dial connector terminal number of nearby coin station used for test.	REV lamp lighted.
15g	When testing reverse battery supervision selectors, such as SD-31841-01 — Operate REV key.	
16g	Dial connector terminal number of nearby coin station used for test.	REV lamp lighted.
17a	If timed ringing circuit not provided — Operate RING key momentarily.	Station bell rings. Audible ringing heard in headset receiver. REV lamp extinguished while RING key operated, lights again when key restored.
18b	If timed ringing circuit provided — Operate 522A key for at least 2 seconds.	Ringing induction heard in receiver. REV lamp extinguished for a short interval after 522A key released.
Γ 19e	If office is not arranged for in-band coin control — At coin station — Remove station receiver.	REV lamp extinguished. Ringing induction ceases.
20e	At test set — Operate RING key.	Continuous ringing heard in station receiver.
21e	Release RING key.	Ringing silenced in station receiver.
22e	Deposit coin in coin box, leave receiver off hook.	
23e	At switchboard — Operate CR (coin return) key.	At coin station — Coin returned. Note: In coin control selector method offices, high (coin return) tone will be heard as coin is returned.
24e	Restore station receiver.	REV lamp lighted.
25e	Insert coin in coin box again.	
↳ 26e	At switchboard — Operate CC (coin collect) key.	At coin station — Coin collected. Note: In coin control selector method offices, low (coin collect) tone will be heard as coin is collected.

STEP	ACTION	VERIFICATION
↗ 27e	At test set — Operate, hold operated FL key.	Selector releases. SL, REV lamps extinguished.
28e	Release FL key, restore REV key, if used.	
29e	Remove plug from selector test jack.	
30e	Advise switchboard and disconnect from talking line when tests are completed.	
31h	If office is arranged for in-band coin control — Establish talking circuit to switchboard (see 1.07, 1.08).	
32h	At switchboard — Originate call to local coin station (see 1.08).	At coin station — Station bell rings. Ringing silenced when receiver lifted from hook.
33h	At coin station — Leave receiver off hook, deposit coin in coin box.	
34h	At switchboard — Operate CR (coin return) key momentarily.	At coin station — Coin returned.
35h	At coin station — Insert coin in coin box again.	
36h	At switchboard — Operate CC (coin collect) key momentarily.	At coin station — Coin collected.
37h	At coin station — Restore station receiver.	
38h	Insert coin in coin box.	
39h	At switchboard — Operate CR key momentarily.	At coin station — Coin returned.
40h	At coin station — Insert coin in coin box again.	
41h	At switchboard — Operate CC key momentarily.	At coin station — Coin collected.
42h	Ring coin station momentarily.	At coin station — Station bell rings from machine ringing.
43h	Lift receiver.	Station bell silenced.
44h	At switchboard — Ring coin station.	At coin station — Station bell operated from continuous ringing.
45h	Restore ringing key.	At coin station — Station bell silenced. Return receiver to switchhook.
↘ 46h	Advise switchboard and disconnect from talking line when tests are completed.	

STEP	ACTION	VERIFICATION
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→ 47h	Remove remaining test connections unless other tests are to be made on this switch.	
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E. Busy Line Test — Loop With Leak — Coin and Noncoin Selectors

10	Check that selector under test is normal, then insert 240A plug of P3H cord into selector test jack.	BSY lamp does not light.
11	Operate LK key, operate, restore DL ST key.	SL lamp lighted.
12c	When testing reverse battery supervision selectors, such as SD-31841-01 — Operate REV key.	REV lamp lighted.
13	Dial connector test line (99 terminal).	REV lamp flashes at busy rate.
14	Operate, hold operated FL key.	Switch releases. SL, REV lamps extinguished.
15	Release FL, LK keys.	
16	Restore REV key, if used.	
17	Remove 240A plug from selector test jack.	
18	Remove all test connections unless other tests are to be made on this switch.	

F. All-Paths-Busy Test — Loop With Leak — Coin and Noncoin Selectors

14	Check that selector under test is normal, then insert 240A plug of P3H cord into selector test jack.	BSY lamp does not light.
15	Operate LK key, operate, restore DL ST key.	SL lamp lighted.
16	With BY key operated — Hold 411A tool against sleeve wiper cord terminal on selector test jack assembly.	
17	Dial any level not arranged to absorb repeatedly or to block.	Selector rotates to eleventh rotary position. REV lamp flashes at all-paths-busy rate. Tone may or may not be heard.
18	Remove 411A tool from test jack when selector reaches eleventh rotary position to stop undue vibration of rotary magnet.	
19	Operate, hold operated FL key.	Selector releases. SL, REV lamps extinguished.
20	Restore FL key.	
21	Remove 240A plug from selector test jack.	
22	Remove all test connections unless other tests are to be made on this switch.	
23	Restore remaining keys.	

STEP	ACTION	VERIFICATION
G. Digit-Absorbing and Blocking Tests		
15	Check that selector under test is normal, then insert 240A plug of P3H cord into selector test jack.	BSY lamp does not light.
16	Operate, restore DL ST key.	SL lamp lighted.
17c	If selector arranged for once-only digit absorbing — Dial level so arranged.	Selector steps to level, releases.
18c	Dial same level again.	Selector steps to level, cuts in.
19c	Operate FL key momentarily.	Selector releases.
20d	If selector arranged for blocking — Dial level arranged for blocking.	Selector steps to level, rotates to eleventh rotary position. REV lamp flashes at all-paths-busy rate. Tone may or may not be heard.
21d	Operate FL key momentarily.	Selector releases.
22e	If level to be tested arranged to repeatedly absorb — Dial level several times.	Selector steps to level dialed, restores each time.
23e	Operate FL key momentarily.	Selector releases.
24	Remove 240A plug from selector test jack when all levels have been checked.	
25	Remove remaining cords unless other tests are to be made on this switch.	