

LOOP DIALING TOLL CONNECTORS
OPERATION TESTS
USING TEST SET SD-30387-01 (J34713A) OR ES-30007-01 (X61341)
STEP-BY-STEP SYSTEMS

1. GENERAL

1.01 This section describes a method of performing operation tests on toll connectors (except the level hunting type) and on combination connectors (toll side only) using the wagon type toll train and coin box trunk test set SD-30387-01 or ES-30007-01. It also indicates the key operation required in order to apply the readjust values of resistance to the ring-trip relays.

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 the features tested are:

(A) Busy Line Test: This test checks the stepping features of the connector, its ability to return a busy signal, and to release.

(B) Idle Line Test - Other Than 10-Party Terminal per Line Connectors: This test checks the stepping, ringing, pretrip, trip, transmission, and release features of the connector. 8-party semiselective connector ringing is indicated either by test line bells or visual signals on the test set.

(C) Idle Line Test - 10-Party Terminal per Line Connectors: This test checks the stepping, ringing, pretrip, trip, transmission, and release features of the connector.

(D) Ringing Polarity Test - 8-Party Semiselective Ringing Connectors: This test makes a complete check of toll connector H and J relays, or combination connector K and N relays, and is intended for use only when testing a connector in connection with clearing a specific case of trouble. On a routine basis, 8-party connectors should be tested as outlined under Tests (A) and (B).

1.04 Lettered Steps: The letters a, b, c, etc, are added to a step to indicate that the step covers an action which may or may not be required, depending upon 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.

1.05 The dial on the connector test set, or the dial on the remote control set may be used to direct the connector to the test line terminal.

Caution: When dialing the test line number, if the connector stops on any other terminal, immediately release the connector so as to avoid ringing on a subscriber line.

1.06 The test line employed in making these tests is connected to terminal 99 except in the case of rotary hunting connectors where terminal 99 is made busy and the test line is connected to terminal 90. The hunting feature of the rotary connector is tested by directing the switch to terminal 99 and having it step to terminal 90.

1.07 Wherever the preparation or method calls for the operation of the STP, or RLS 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) key, or the dial, of the remote control test set is meant, depending upon whether or not the remote control test set is being used.

1.08 The testing method requires that the test circuit be advanced through the various positions in which the proper conditions for the tests are applied. This is accomplished by momentarily operating the STP key. The progress lamps designated BL or BUSY-LINE, PTR, ST-R or ST-RING, WR or WAIT-RING, PT or PRE-TRIP, RJNG, TRIP, AND T-CO or TONE CO indicate the particular test which is applied at the time the lamp is lighted.

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1.09 From all positions, except the BL (BUSY-LINE) through the PT (PRE-TRIP) position, the test circuit can be returned to normal by operating the RLS key until none of the progress lamps is lighted. If the test circuit is in any of the above positions it is necessary to advance the test circuit, by means of the STP key, to a position where the RLS key may be used.

1.10 The parentheses in Test (B) Steps 22 and 24, and in Test (C) Steps 22 and 24, provide space for writing in the interval during which the pretrip and trip tests are to be made, as indicated in Table 1 or 2.

1.11 Toll Connectors: When testing toll connectors arranged for 1400-ohm or 1500-ohm maximum external subscriber loop, any ring-trip relay which fails on the pretrip or trip test (test set test resistance values) shall be readjusted mechanically and electrically to meet the requirements specified in Sections 040-803-701 and 040-236-701, and in the circuit requirement table. Repeat the tests. If the relay continues to fail, operate the test set keys as indicated for READJ in Table 2 to apply the test set readjust resistance values and again repeat the tests, changing the tension in No. 1 spring, as required.

1.12 Combination Connectors: There is magnetic interference between the ring-trip relay and the operated H relay of combination connectors. Due to this interference, when testing these connectors arranged for 1400-ohm or 1500-ohm maximum external subscriber loop:

Pretrip: Any ring-trip relay which fails on the pretrip test shall be readjusted mechanically and electrically to meet the requirements specified in Sections 040-803-701 and 040-236-701, and in the circuit requirement table. The connector shall then be tested from the local side, and the ring-trip relay further readjusted, if necessary, to meet the pretrip and trip tests as covered in the section describing a method of performing operation tests on the local side of combination connectors. Make the trip test from the toll side.

Trip: Any connectors which fail on the trip test shall be tested from the local side, and the ring-trip relay readjusted, if necessary, to meet the pretrip and trip tests as covered in the section describing a method of performing operation tests on the local side of combination connectors. When the trip test is met from the local side, failure to trip during the silent period from the toll side is due to magnetic interference. In this case, tripping during the ringing period shall be considered sufficient.

Note: If the ring-trip relay was readjusted, and the connector tested from the local side following pretrip failure, it is not necessary to test the connector from the local side following trip failure.

1.13 When testing connectors arranged for 1000-ohm or 1115-ohm maximum external subscriber loop, which have a 60- to 75-volt silent interval tripping battery, and for which ac requirements are specified, any ring-trip relay which fails on the pretrip or trip test (test set test resistance values) shall be readjusted to meet the requirements specified in Sections 040-803-701 and 040-236-701 and the readjust ringing current values provided by the test set. These values are obtained by operating the test set keys as indicated for READJ in Table 1 or 2.

1.14 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

ALL TESTS

- 2.01 Toll Train and Coin Box Trunk Test
Set - J34713A (SD-30387-01) or X61341 (ES-30007-01).
- 2.02 No. 4OB Test Set (Remote Control) (Optional).
- 2.03 Operator Telephone Set.
- 2.04 Three P3E Cords, 6 feet long, each equipped with two No. 310 Plugs (3P7A).
- 2.05 Toll Connectors: P4K Cord equipped with one No. 24OB Plug and one No. 289B Plug (4P4A).
- 2.06 Combination Connectors: P4K Cord equipped with one No. 24OC Plug and one No. 289B Plug (4P5A).

TEST (B) FOR 8-PARTY SEMISELECTIVE RINGING CONNECTORS AND TEST (D)

When Audible Ringing Signal Is Provided

- 2.07 No. 310 Plug designated "A" with tip, ring, and sleeve open.
- 2.08 No. 184B Plug designated "B".
- 2.09 No. 310 Plug designated "C" with tip and ring strapped.

Note: The designations "A", "B", or "C", as required, should be stamped locally on the shells of the above plugs.

When Visual Ringing Signal Is Provided

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

3. PREPARATION

ALL TESTS

<u>STEP</u>	<u>ACTION</u>	<u>VERIFICATION</u>
1	Connect test set jacks 2, 3, and 4 to the correspondingly numbered test line jacks on the connector frame, using three 6-foot P3E cords.	
2a	If remote control set is used - Insert red, gray, and black plugs of remote control set into test set EXT jacks R, G, and B, respectively.	
3	Connect operator telephone set to test set jack TEL.	
4	Insert No. 289B plug of P4K cord into TST jack of test set.	
5	Operate and hold RLS key long enough to extinguish any progress lamps that may be lighted or, if necessary, operate and release STP key required number of times.	All lamps extinguished.
6	Operate PBX-OUT key.	
7	Holding RLS key operated, insert No. 240B, or No. 240C, plug of P4K cord into test jack of normal connector under test.	GRD or GUARD lamp does not light.
8	Restore RLS key.	GRD or GUARD lamp lights.
TEST (B) FOR 8-PARTY CONNECTORS AND TEST (D)		
9b	If audible ringing signal is provided - Insert the "A", "B", or "C" plug into 8-PTY jack of test line, using a different plug on each routine test cycle. When performing Test (D), use plugs as outlined thereunder. Note: By using "A" plug, an operate test of toll connector H relay or combination connector K relay is applied; by using "B" plug, an operate test of toll connector J relay or combination connector N relay is applied; by using "C" plug, a nonoperate test of J or N relay is applied.	
10c	If visual ringing signal is provided - Connect 8-PTY jack of test set to 8-PTY jack of test line, using 10-foot P3E cord.	
11c	Operate H-OP, J-NO, J-O, (552E) key to one of the three positions when applying Test (B) to 8-party connectors, using a different position on each routine test cycle. When performing Test (D), operate keys as outlined thereunder.	

TABLE 2
TEST SET EQUIPPED TO TEST CONNECTORS ARRANGED FOR 1400-1500 OHM LOOP

KIND OF RING	MAX. EXT. SUB. LOOP (OHMS)	TRIP BATT. VOLTS	FOR		KEYS OPERATED					PRE TRIP	TRIP
			TEST	READJ.	1000A	1000B	1400A	1400B	ADJ		
AC - DC and/or	1000-1115	48.5-50	X		X					SILENT PERIOD	SILENT PERIOD
		60-75	X			X				RINGING PERIOD	RINGING PERIOD
SUPER-IMPOSED	1400-1500	48.5-50	X				X			SILENT PERIOD	SILENT PERIOD
				X			X		X		
		66-75	X					X			
				X				X	X		

<u>STEP</u>	<u>ACTION</u>	<u>VERIFICATION</u>
	<u>(A) Busy Line Test</u>	
9	Operate and release STP key to advance test circuit to BL or BUSY LINE position.	BL or BUSY LINE lamp lights.
10	Dial 99. Note: When testing 10-party terminal per line connectors arranged for busy test of the called line following the completion of code selector pulsing, it will be necessary to dial or pulse an extra digit following the test number.	Connector steps smoothly to ninth level and rotates smoothly to test line terminal. BSY or BUSY lamp lights. SUPV lamp flashes at busy back rate. Busy tone heard in receiver. Note: In some offices not arranged for intertoll dialing, busy tone may not be heard.
11	Operate RLS key momentarily.	BSY or BUSY lamp extinguished. Connector releases. Busy tone removed. SUPV lamp extinguished. GRD or GUARD lamp extinguished momentarily.
12d	Remove plug from connector test jack, unless other tests are to be made on this switch.	GRD or GUARD lamp extinguished.

(B) Idle Line Test - Other than 10-Party Terminal per Line Connectors

Line Seizure and Ringing Test

13e	When using test set per SD-30387-01 - Operate and release STP key to advance test circuit to ST-R (start-ring) position.	ST-R lamp lights.
14e	Dial 99	Connector steps smoothly to ninth level and rotates smoothly to test line terminal. BSY lamp lights. SUPV lamp lights. Audible ring not heard in receiver.

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<u>STEP</u>	<u>ACTION</u>	<u>VERIFICATION</u>
15e	Operate and release STP key.	WR (wait-ring) lamp lights. ST-R lamp extinguished. Audible ring heard in receiver. Test set bell rings. <u>Note:</u> When testing 2-ring or code ringing connectors, check that first audible ring is a full code ring in order to check pick-up feature.
16f	When using test set per ES-30007-01 - Operate and release step key to advance test circuit to PTR position.	PTR lamp lights.
17f	Dial 99.	Connector steps smoothly to ninth level and rotates smoothly to test line terminal. BUSY lamp lights. SUPV lamp lights. Audible ring heard in receiver. Test set bell rings. <u>Note:</u> When testing 2-ring or code ringing connectors, check that first audible ring is a full code ring in order to check pick-up feature.
18b	If testing 8-party connectors and audible ringing signal is provided -	R- bell rings when "A" or "C" plug is used. R+ bell rings when "B" plug is used.
19b	Remove "A", "B", or "C" plug from 8-PTY jack of test line before performing Step 22.	R- or R+ bell silenced.
20c	If testing 8-party connectors and visual ringing is provided -	CLD-HLD lamp flashes, follows ringing code, when H-O, J-NO, J-O (552E) key is in J-NO or H-O position. T-CO or TONE-CO lamp flashes, follows ringing code, when H-O, J-NO, J-O (552E) key is in J-O position.
21c	Remove P3E cord from 8-PTY jack of test line before performing Step 22.	CLD-HLD, T-CO, or TONE-CO lamp extinguished.
<u>Pretrip Test</u>		
22	At start of () interval, operate and release STP key. This test shall be completed within the same interval by performing Step 23.	PT or PRE-TRIP lamp lights. WR or PTR lamp extinguished.
23	Operate and release STP key.	RING lamp lights. PT or PRE-TRIP lamp extinguished. Audible ring continues to be heard in receiver. Test set bell rings.

<u>STEP</u>	<u>ACTION</u>	<u>VERIFICATION</u>
<u>Tripping Test</u>		
24	At start of () interval, operate and release STP key.	TRIP lamp lights. RING lamp extinguished. SUPV lamp extinguished. Test set bell silenced. If this test was applied in the silent interval, check that the audible ringing signal is not heard again in the receiver, or, if applied in the ringing interval, check that the audible ringing signal is immediately stopped upon the application of the test. The test set bell is disconnected when the trip test is applied and can not be considered as an indication that ringing has tripped.
25	Operate and release STP key.	T-CO or TONE-CO lamp lights. TRIP lamp extinguished. Transmission tone not heard in receiver.
26	Move wiper cords slightly while listening in receiver.	No noise heard in receiver. BSY or BUSY lamp does not flash.
27	Operate RLS key momentarily.	T-CO or TONE-CO lamp extinguished. Connector releases. BSY or BUSY lamp extinguished. GRD or GUARD lamp extinguished momentarily.
28d	Remove plug from connector test jack, unless other tests are to be made on this switch.	GRD or GUARD lamp extinguished.

(C) Idle Line Test - 10-Party Terminal per Line Connectors

Line Seizure and Ringing Test

10e	When using test set per SD-30387-01 - Operate and release STP key to advance test circuit to ST-R (start-ring) position.	ST-R lamp lights.
11e	Operate RT key.	
12e	Dial 99 and a code digit for ringing over the <u>tip</u> .	Connector steps smoothly to ninth level and rotates smoothly to test line terminal. BSY lamp lights. SUPV lamp lights.
13e	Operate and release STP key.	WR (wait-ring) lamp lights. ST-R lamp extinguished. Audible ring heard in receiver. Test set bell rings. Note: Check that first audible ring is a full code ring in order to check pickup feature.
14e	Operate and release STP key to advance test circuit beyond PT position.	WR lamp extinguished.

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<u>STEP</u>	<u>ACTION</u>	<u>VERIFICATION</u>
15e	Operate RLS key momentarily.	Connector releases. BSY lamp extinguished. SUPV lamp extinguished. GRD lamp extinguished momentarily.
16e	Operate and release STP key to advance test circuit to ST-R position.	ST-R lamp lights.
17e	Restore RT key and operate RR key.	
18e	Dial 99, and a code digit for ringing over the <u>ring</u> . <u>Note:</u> Different code digits should be used on each routine test cycle so that eventually all codes will have been tested on each switch.	Connector steps smoothly to ninth level and rotates smoothly to test line terminal. BSY lamp lights. SUPV lamp lights.
19e	Operate and release STP key.	WR (wait-ring) lamp lights. ST-R lamp extinguished. Audible ring heard in receiver. Test set bell rings.
20f	When using test set per ES-30007-01 - Operate and release STP key to advance test circuit to PTR position.	PTR lamp lights.
21f	Operate RT key.	
22f	Dial 99, and a code digit for ringing over the <u>tip</u> . <u>Note:</u> Check that first audible ring is a full code ring in order to check pickup feature.	Connector steps smoothly to ninth level and rotates smoothly to test line terminal. BUSY lamp lights. SUPV lamp lights. Audible ring heard in receiver. Test set bell rings.
23f	Operate and release STP key to advance test circuit beyond PTR position.	PTR lamp extinguished.
24f	Operate RLS key momentarily.	Connector releases. BUSY lamp extinguished. SUPV lamp extinguished. GUARD lamp extinguished momentarily.
25f	Operate and release STP key to advance test circuit to PTR position.	PTR lamp lights.
26f	Restore RT key and operate RR key.	
27f	Dial 99, and a code digit for ringing over the <u>ring</u> . <u>Note:</u> Different code digits should be used on each routine test cycle so that eventually all codes will have been tested on each switch.	Connector steps smoothly to ninth level and rotates smoothly to test line terminal. BUSY lamp lights. SUPV lamp lights. Audible ring heard in receiver. Test set bell rings.

<u>STEP</u>	<u>ACTION</u>	<u>VERIFICATION</u>
<u>Pretrip Test</u>		
28	At start of () interval, operate and release STP key. This step shall be completed within the same interval by performing Step 29.	PT or PRE-TRIP lamp lights. WR or PTR lamp extinguished.
29	Operate and release STP key.	RING lamp lights. PT or PRE-TRIP lamp extinguished. Audible ring continues to be heard in receiver. Test set bell rings.
<u>Tripping Test</u>		
30	At start of () interval, operate and release STP key.	TRIP lamp lights. RING lamp extinguished. SUPV lamp extinguished. Test set bell silenced. If this test was applied in the silent interval, check that the audible ringing signal is not heard again in the receiver, or if applied in the ringing interval, check that the audible ringing signal is immediately stopped upon the application of the test. The test set bell is disconnected when the trip test is applied and can not be considered as an indication that ringing has tripped. Proper transmission tone heard in receiver.
31	Operate and release STP key.	T-CO or TONE-CO lamp lights. TRIP lamp extinguished. Transmission tone not heard in receiver.
32	Move wiper cords slightly while listening in receiver.	No noise heard in receiver. BSY or BUSY lamp does not flash.
33	Restore RR key.	
34	Operate RLS key momentarily.	T-CO or TONE-CO lamp extinguished. Connector releases. BSY or BUSY lamp extinguished. GRD or GUARD lamp extinguished momentarily.
35d	Remove plug from connector test jack, unless other tests are to be made on this switch.	GRD or GUARD lamp extinguished.

(D) Ringing Polarity Test - 8-Party Semiselective Ringing Connectors

Test Set per SD-30387-01 - Audible Ringing Signal

12g	Insert "A" plug into 8-PTY jack of test line.	
13g	Operate and release STP key to advance test circuit to ST-R (start-ring) position.	ST-R lamp lights.

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<u>STEP</u>	<u>ACTION</u>	<u>VERIFICATION</u>
14g	Dial 99.	Connector steps smoothly to ninth level and rotates smoothly to test line terminal. BSY lamp lights. SUPV lamp lights.
15g	Operate and release STP key.	WR (wait-ring) lamp lights. ST-R lamp extinguished. Audible ring heard in receiver. R- bell rings.
16g	Remove "A" plug and insert "C" plug into 8-PTY jack.	R- bell continues to ring.
17g	Remove "C" plug and insert "B" plug into 8-PTY jack.	R- bell silenced. R+ bell rings.
18g	Operate RLS key momentarily.	R+ bell silenced. BSY lamp extinguished. SUPV lamp extinguished. Connector releases. GRD lamp extinguished momentarily.
19g	Remove "B" plug from 8-PTY jack.	
20d	Remove plug from connector test jack, unless other tests are to be made on this switch.	GRD lamp extinguished.
<u>Test Set per SD-30387-01 - Visual Ringing Signal</u>		
21h	Operate H-0, J-NO, J-0 (552E) key to H-0 position.	
22h	Operate and release STP key to advance test circuit to ST-R (start-ring) position.	ST-R lamp lights.
23h	Dial 99.	Connector steps smoothly to ninth level and rotates smoothly to test line terminal. BSY lamp lights. SUPV lamp lights.
24h	Operate and release STP key.	WR (wait-ring) lamp lights. ST-R lamp extinguished. Audible ring heard in receiver. CLD-HLD lamp flashes, follows ringing code.
25h	Operate H-0, J-NO, J-0 (552E) key to J-NO position.	CLD-HLD lamp continues to follow ringing code.
26h	Operate H-0, J-NO, J-0 (552E) key to J-0 position.	CLD-HLD lamp extinguished. T-CO lamp flashes, follows ringing code.
27h	Operate RLS key momentarily.	T-CO lamp extinguished. BSY lamp extinguished. SUPV lamp extinguished. Connector releases. GRD lamp extinguished momentarily.
28h	Remove P3E cord from 8-PTY jack of test line and test set.	

<u>STEP</u>	<u>ACTION</u>	<u>VERIFICATION</u>
29d	Remove plug from connector test jack, unless other tests are to be made on this switch.	GRD lamp extinguished.
<u>Test Set per ES-30007-01 - Audible Ringing Signal</u>		
30i	Insert "A" plug into 8-PTY jack of test line.	
31i	Operate and release STP key to advance test circuit to PTR position.	PTR lamp lights.
32i	Dial 99.	Connector steps smoothly to ninth level and rotates smoothly to test line terminal. BUSY lamp lights. SUPV lamp lights. Audible ring heard in receiver. R- bell rings.
33i	Remove "A" plug and insert "C" plug into 8-PTY jack.	R- bell continues to ring.
34i	Remove "C" plug and insert "B" plug into 8-PTY jack.	R- bell silenced. R+ bell rings.
35i	Operate RLS key momentarily.	R+ bell silenced. BUSY lamp extinguished. SUPV lamp extinguished. Connector releases. GUARD lamp extinguished momentarily.
36i	Remove "B" plug from 8-PTY jack.	
37d	Remove plug from connector test jack, unless other tests are to be made on this switch.	GUARD lamp extinguished.
<u>Test Set per ES-30007-01 - Visual Ringing Signal</u>		
38j	Operate H-0, J-N0, J-0 (552E) key to H-0 position.	
39j	Operate and release STP key to advance test circuit to PTR position.	PTR lamp lights.
40j	Dial 99.	Connector steps smoothly to ninth level and rotates smoothly to test line terminal. BUSY lamp lights. SUPV lamp lights. CLD-HLD lamp flashes, follows ringing code.
41j	Operate H-0, J-N0, J-0 (552E) key to J-N0 position.	CLD-HLD lamp continues to follow ringing code.
42j	Operate H-0, J-N0, J-0 (552E) key to J-0 position.	CLD-HLD lamp extinguished. TONE-CO lamp flashes, follows ringing code.

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<u>STEP</u>	<u>ACTION</u>	<u>VERIFICATION</u>
43j	Operate RLS key momentarily.	TONE-CO lamp extinguished. BUSY lamp extinguished. SUPV lamp extinguished. Connector releases. GUARD lamp extinguished momentarily.
44j	Remove P3E cord from 8-PTY jack of test line and test set.	
45d	Remove plug from connector test jack, unless other tests are to be made on the switch.	GUARD lamp extinguished.