LOCAL AND COMBINATION CONNECTORS
LOCAL OPERATION TESTS
USING TEST SET SD-90416-01 (J94704A) OR SD-90210-01 (J34704A)
AND TEST LINE SD-32198-01
STEP-BY-STEP SYSTEMS

1. GENERAL

1.01 This section describes a method of testing the operating features of local connectors and the local operating features of combination connectors of the 100 and 200 point type, by means of test set SD-90416-01 or SD-90210-01 and test line SD-32198-01. In No. 350A and 360A offices equipped with other test lines, the tests described in Section 226-415-507 apply.

1.02 This section is reissued to include testing of the 200-point local and combination connectors, to expand Test B to include a machine intercept test, and to bring the section generally up to date. Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 The tests covered are:

A. Busy Line Test — Leak: This test checks the stepping features of a connector under a leak condition. It also checks the ability of the connector to return busy tone and to release.

B. Nonlevel Hunting Connectors — Idle Line Test — Loop: This test checks the stepping features of a connector under a loop condition. It also checks the ringing, pretrip, trip, transmission, and release features.

C. Level Hunting Connectors — Idle Line Test — Loop: This test checks the trunk hunting features of a connector under a loop condition. It also checks the ringing, pretrip, trip, transmission, and release features.

D. 8-Party Connectors — Idle Line and Ringing Polarity Test — Loop: This test checks the stepping features of a connector under a loop condition. It also checks the ringing polarity, pretrip, trip, transmission, and release features.

E. 10-party Connectors — Reverting Call Test: This test checks the reverting call features of 10-party connectors arranged for the completion of reverting call.

1.04 When testing connectors arranged for 1400- or 1500-ohm maximum external loop, any ring-trip relays which fail on the pretrip or trip test (test line 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 requirements table. Repeat the test and, if the relay continues to fail, operate the test set keys as described in Part 4 Method to apply the test line readjust resistance values and change the tension in the No. 1 spring, as required.

1.05 *100-point Connectors:* The test line employed in making these tests is connected to terminal 99, except in the case of rotary hunting connectors. In rotary hunting groups, terminal 99 is made busy and the test line is connected to terminal 90. The hunting feature is checked by directing the switch to terminal 99 and noting that it steps to terminal 90.

1.06 *200-point Connectors:* The test line for nonrotary hunting connectors is connected to terminal 99 of the upper and lower banks. The test line for rotary hunting connectors is connected to terminal 99 of the upper banks and to terminal 90 of the lower banks, terminal 99

of the lower banks being made busy. The rotary hunting feature of the switch is tested, with the test set LO-UP key in its normal position, by directing the switch to terminal 99 and having it step to 90.

Caution: If the connector stops on any other terminal, immediately release the connector so as to avoid ringing on a subscriber line.

1.07 In the case of level hunting connectors, terminal 91 is ordinarily used as the test line number. In order to reach this terminal, it is necessary to dial the digit which will direct the switch to the ninth level plus an additional digit, if the connector is wired to start hunting after dialing the units digit. When the connectors are wired so as to hunt over a group of 100 trunks regardless of the digit dialed, terminal 11 is used as the test number. In order to reach this terminal, it is necessary to ground the commutator of the lowest level and dial any one or two digits, as required.

1.08 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.

1.09 ***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.

2. APPARATUS

All Tests

2.01 Test set, J94704A (SD-90416-01) or J34704A (SD-90210-01).

2.02 Head telephone set (associated with test set).

2.03 No. 1011G dial hand test set (handset), or equivalent, connected to a W2CL cord 4 feet long, equipped with a No. 471A jack and a No. 240A plug (No. 2W39A cord).

2.04 Patching cord, P3H cord, 10 feet long, equipped with a No. 310 plug and a No. 240A plug (No. 3P2A cord) (for use when testing 100-point connectors).

2.05 Patching cord, two P3H cords, 10 feet long, each equipped with two No. 310 plugs, one red shell and one black shell, both cords attached to a No. 240B plug (No. 5P3B cord) (for use with 200-point connectors).

2.06 Patching cord, P3E cord, 10 feet long, equipped with two No. 310 plugs (No. 3P6F cord).

2.07 Patching cord, P3K cord, 12 feet long, equipped with two No. 310 plugs (No. 3P15B cord) (for connecting battery and ground to test set when 48-volt jack is provided).

2.08 Testing cord, W2M cord, 9 feet long, equipped with one No. 310 plug and two No. 59 cord tips (No. 2W12A cord) (for connecting battery and ground to test set when 48-volt battery jack is not provided).

Test A

2.09 No. 240A plug (for testing level hunting connectors).

Tests B, C, D, and E

2.10 Patching cord, P3E cord, 10 feet long, equipped with No. 310 plugs (No. 3P6F cord).

Test C

When Connector Test Line Terminal Is 11

2.11 Testing cord, No. 893 cord, 6 feet long, equipped with two No. 360A tools (No. 1W13B cord) and two KS-6278 clips.

3. PREPARATION

STEP	ACTION	VERIFICATION
All Tests		
1a	If battery supply jack is available — Connect test set BAT G jack to 48-volt battery supply jack on connector frame, using P3K cord. *Note:* To avoid possible grounding of battery supply lead, connect cord to test set first and, when disconnecting, remove cord from test set last.	
2b	If battery supply jack is not available — Insert No. 310 plug of W2M cord into BAT G jack of test set.	
3b	Connect red (sleeve) conductor of cord to frame ground, white (tip) conductor to equipment side of convenient 48-volt battery fuse (not to exceed 5 amperes in any case).	
4	With test set SD-90416-01, connect head telephone set or handset as follows: Headset — Connect to test set TEL jack. To talk on line, operate TRS key. Handset—Connect to test set HS jack. Operate HS key. Operate handset switch to TALK position. Use handset dial when dialing.	
5	With test set SD-90210-01, connect head telephone set or handset as follows: Headset — Connect to test set TEL jack. To talk on line, operate TRS key. Operate SD key. Handset—Connect to test set HS jack. Operate TRS key. Operate SD key. Operate handset switch to TALK position. Use handset dial when dialing.	

STEP	ACTION	VERIFICATION
6	Using P3E cord, connect test set TL jack to connector test line jack as follows: TL2 — For connectors using superimposed ringing with 66- to 75-volt silent interval battery, except level hunting. TL1 — For level hunting connectors. TL — For all other connectors.	
7c	If testing 100-point connectors — Insert No. 310 plug of P3H cord into test set T jack.	
8d	If testing 200-point connectors — Using No. 5P3B cord, connect red shell plug to test set T jack, black shell plug to test set FR jack.	
Tests B, C, D, E		
9	Using P3E cord, connect test set C jack (SD-90416-01) or C2 jack (SD-90210-01) to test line jack C, C1, or 10P as follows: 10P — For 10-party connectors arranged for reverting calls. C1 — For 8-party connectors and one-ring connectors using superimposed ringing. C — For all other connectors.	

4. METHOD

STEP	ACTION	VERIFICATION
	A. Busy Line Test — Leak	
100-point Connectors		
9	With connector in normal position, insert No. 240A plug of P3H cord into connector test jack.	BSY lamp does not light. *Note:* If BSY lamp lights, remove plug from test jack and proceed with other tests.
10	Operate LK key.	BSY lamp lighted.
11e	If testing connectors other than level hunting type — 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, dial an extra digit following the test number.	Connector steps to ninth level, rotates smoothly to test line terminal. Busy tone heard in receiver.

STEP	ACTION	VERIFICATION
12f	If testing level hunting connectors — Insert No. 240A plug into sleeve cutoff jack.	
13f	Dial any digit (plus an additional digit, if required) which will cause connector to hunt over at least two levels.	Connector steps smoothly to tenth terminal of last level in group of trunks selected. Busy tone heard in receiver.
14	Restore LK key.	Connector releases. BSY lamp extinguished.
15f	If testing level hunting connectors — Remove plug from sleeve cutoff jack.	
16	Unless other tests are to be made on this switch — Remove No. 240A plug from connector test jack.	
200-point Connectors		
17	Operate LO-UP key to UP position. *Note:* On alternate testing cycles, leave LO-UP key normal.	
18	With connector in normal position, insert No. 240B plug of No. 5P3B cord into connector test jack.	BSY lamp does not light.
19	Operate LK key.	BSY lamp lighted.
20	Dial 99.	Connector steps to ninth level, steps smoothly to test line terminal. Busy tone heard. REV lamp flashes at busy back rate, if flash is provided.
21	Restore LK key.	Connector releases. BSY lamp extinguished. REV lamp extinguished, if lighted.
22	Restore LO-UP key, if operated.	
23	Unless other tests are to be made, remove No. 240B plug from connector test jack.	
	B. Nonlevel Hunting Connectors — Idle Line Test — Loop	
10c	If testing 100-point connectors — With connector in normal position, insert No. 240A plug of P3H cord into connector test jack.	

STEP	ACTION	VERIFICATION
11d	If testing 200-point connectors — With connector in normal position, insert No. 240B plug of No. 5P3B cord into connector test jack.	
12d	Operate LO-UP key to UP position. *Note:* Leave LO-UP key in normal position on alternate testing cycles.	
13	Operate ID, LP keys.	BSY lamp lighted.
14e	If testing 10-party terminal-per-line connectors — Dial 99, then code for ringing two or more rings over tip.	Connector steps to ninth level, rotates smoothly to test line terminal. R+ lamp lighted, follows ringing code. Audible ring heard in receiver. First audible ring is full code ring.
15e	Release LP key.	BSY lamp extinguished. R+ lamp extinguished. Audible ring silenced. Connector releases.
16e	Operate LP key.	BSY lamp lighted.
17e	Dial 99, then code for ringing one ring over ring.	Connector steps to ninth level, rotates smoothly to test line terminal. R- lamp lighted, follows ringing code. Audible ring heard in receiver. First audible ring is full code ring.
18f	If testing other than 10-party terminal-per-line connectors — Dial 99.	Connector steps to ninth level, steps smoothly to test line terminal. R- lamp lighted, follows ringing code. Audible ring heard in receiver. First ring is full code ring.
19g	If readjust values are to be applied to ring-trip relays — Restore ID key.	
20g	Operate, restore T key.	
21g	Operate ID key.	
22	During silent interval, restore, reoperate ID key.	R- lamp continues to follow ringing code. Audible ring continues to be heard in receiver.

STEP	ACTION	VERIFICATION
23	During silent interval, operate ID-TP key to TP position, then return it to ID position.	R- lamp extinguished. Audible ring silenced. REV lamp lighted while TP key is operated. *Note:* On connectors using 66- to 75-volt silent interval battery, REV lamp may not be lighted. On connectors arranged for free service, REV lamp does not light.
24	Operate T key.	***100-point Connectors*** Proper transmission tone heard in receiver. REV lamp lighted. ***200-point Connectors*** With LO-UP key operated — High tone heard. With LO-UP key normal — Low tone heard. REV lamp lighted. *Note:* On connectors aranged for free service, REV lamp does not light.
25	Restore LP key.	Connector releases. BSY lamp extinguished. REV lamp extinguished, if lighted. Tone silenced.
26	Restore ID, T keys, LO-UP key, if operated.	
Machine Intercept Test (200-point Connectors Only)		
27	Operate MI, ID, LP keys, LO-UP key to UP position. *Note:* On alternate testing cycles, leave LO-UP key in normal position.	BSY lamp lighted.
28	Dial 99. Listen in head receiver.	Connector steps to ninth level, rotates smoothly to test line terminal. Recorded message heard in receiver.
29	Restore LP key.	Connector releases. BSY lamp extinguished.
30	Restore MI, ID keys, LO-UP key, if operated.	
All Connectors		
31	Unless other tests are to be made on this switch — Remove plug from connector test jack.	

STEP	ACTION	VERIFICATION
	C. Level Hunting Connectors — Idle Line Test — Loop	
10	With connector to be tested in normal position, insert No. 240A plug of P3H cord into connector test jack.	BSY lamp does not light. *Note:* If BSY lamp lights, remove plug from test jack and proceed with other tests.
11	Operate ID key.	
12	Operate LP key.	BSY lamp lighted.
Line Seizure and Ringing Test		
13e	If using test line No. 91 — Dial digit which will direct connector to ninth level and an additional (units) digit, if required.	Connector steps smoothly, stops on test line terminal. R- lamp lighted, follows ringing code. Audible ring heard in receiver.
14f	If using test line No. 11 — Using No. 893 cord, connect ground to commutator terminal for level No. 1. Dial any one or two digits, as required by the particular circuit wiring.	Connector steps smoothly, stops on test line terminal. R- lamp lighted, follows ringing code. Audible ring heard in receiver.
15g	If readjust values are to be applied to ring-trip relays — Restore ID key.	
16g	Operate, restore T key.	
17g	Operate ID key.	
Pretrip Test		
18	During silent interval, restore, reoperate ID key.	R- lamp continues to follow ringing code. Audible ringing continues to be heard in receiver.
Tripping Test		
19	During silent interval, operate ID-TP key to TP position, then return it to ID position.	R- lamp extinguished. Audible ring silenced. REV lamp lighted while TP key operated. *Note:* On connectors using 66- to 75-volt silent interval battery, REV lamp may not light. On connectors arranged for free service, REV lamp does not light.

STEP	ACTION	VERIFICATION
Transmission Test		
20	Operate T key.	Proper transmission tone heard in receiver. REV lamp lighted. *Note:* On connectors arranged for free service, REV lamp does not light.
21f	If using test line No. 11 — Remove ground from commutator terminal for level No. 1.	
22	Restore LP key.	Connector releases. BSY lamp extinguished. REV lamp extinguished. Tone silenced.
23	Restore ID, T keys.	
24	Unless other tests are to be made on this switch — Remove all test connections.	
	D. 8-party Connectors — Idle Line and Ringing Polarity Test — Loop	
10	Operate NO-J OP-J OP-H key to OP-H position or J-NO J-O H-O key to H-O position.	
11	Operate ID key.	
12	Operate LP key.	BSY lamp lighted.
13d	If testing 200-point connectors — Operate LO-UP key to UP position. *Note:* On alternate testing cycles, the LO-UP key should be left in the normal position.	
14	Dial 99.	Connector steps to ninth level, rotates smoothly to test line terminal. R- lamp lighted, follows ringing code. Audible ring heard in receiver.
15	During silent interval, operate NO-J OP-J OP-H key to NO-J position or J-NO J-O H-O key to J-NO position.	
16	During silent interval, operate NO-J OP-J OP-H key to OP-J position, or J-NO J-O H-O key to J-O position.	R- lamp extinguished. R+ lamp lighted, follows ringing code.

STEP	ACTION	VERIFICATION
17e	If readjust values are to be applied to ring-trip relays — Restore ID key.	
18e	Operate, restore T key.	
19e	Operate ID key.	
Pretrip Test		
20	During silent interval, restore, reoperate ID key.	R+ lamp continues to follow ringing code. Audible ring continues to be heard in receiver.
Trip Test		
21	During silent interval, operate ID-TP key to TP position, then return it to ID position.	R+ lamp extinguished. Audible ring no longer heard. REV lamp lighted when TP key operated. ***Note:*** On connectors using 66- to 75-volt silent interval battery, REV lamp may not light.
Transmission Test		
22	Operate T key.	***100-point Connectors*** Proper transmission tone heard in receiver. REV lamp lighted. ***200-point Connectors*** With LO-UP key operated — High tone heard in receiver. REV lamp lighted. With LO-UP key normal, low tone heard in receiver. REV lamp lighted.
23	Restore LP key.	Connector releases. BSY lamp extinguished. REV lamp extinguished. Tone silenced.
24	Restore ID, T keys, LO-UP key, if operated.	
25	Unless other tests are to be made on this switch — Remove plug from connector test jack.	

E. 10-party Connectors — Reverting Call Test

For 100-point Connectors

10	With connector in normal position, insert No. 240A plug of P3H cord into connector test jack.	

STEP	ACTION	VERIFICATION
For 200-point Connectors		
11	With connector in normal position, insert No. 240B plug of No. 5P3B cord into connector test jack. Operate LO-UP key. *Note:* Leave LO-UP key in normal position on alternate testing cycles.	
For 100- and 200-point Connectors		
12	Operate ID key.	
13	Operate LP key.	BSY lamp lighted.
14	Operate, restore T key.	
15	Dial 99.	Connector steps smoothly to test line terminal. Busy tone heard in receiver.
16	Restore LP key.	BSY lamp extinguished momentarily. Busy tone no longer heard. R- lamp lights, follows ringing code. R+ lamp lights, follows revertive call code.
17	Restore ID key, operate TP key.	R- and R+ lamps extinguished.
18	Restore TP key, operate ID key.	Connector releases.
19	Unless other tests are to be made on this switch — Remove all test connections, restore all keys.	