

**LOCAL AND COMBINATION CONNECTORS**  
**OPERATION TESTS**  
**USING TEST SET SD-90210-01 (J34704A) OR SD-90416-01 (J94704A)**  
**AND TEST LINE SD-32198-01, SD-32164-01 OR SD-31261-01**  
**STEP-BY-STEP SYSTEMS**

**1. GENERAL**

**1.01** This section describes a method of testing the operating features of local connectors and local operating features of combination connectors of the 100- and 200-point type, by means of test set SD-90210-01 or SD-90416-01.

**1.02** This section is reissued to add a method of testing the connector timed-release feature in Test B, where the connector releases automatically if the calling party fails to hang up after the called party disconnects; also a test is made to check that the timed-release feature is discontinued when the intercepting circuits are in use. 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. 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, including a method of testing the connector timed-release feature if the calling party fails to hang up after the called party disconnects. Also a false-ground test is made on the timed-release feature. On 200-point connectors, cut through to machine intercept is checked.

**C. Reverting-Call Test — 10-Party Terminal-per-Station Connectors:** This test checks the reverting-call features of 10-party terminal-per-station connectors.

**1.04 100-Point Connectors:** The test line for these connectors 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 having it step to 90 (see 1.06).

**1.05 200-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 bank 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 (see 1.06).

**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 customer line.*

**1.06** For regular connectors, the release time (timed-release feature) is 12 to 30 seconds, for rotary hunting connectors the release time is 25 to 37 seconds. For level-hunting connectors, the release time is 23 to 37 seconds.

**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 digit.

## SECTION 226-415-507

**1.08** When testing 10-party terminal-per-line connectors, it will be necessary to dial an additional digit to set the ringing. A different digit should be dialed each time the test is made so that eventually all codes will have been tested.

**1.09** When Test C is made, it is not necessary to make Test A on 10-party terminal-per-station connectors.

**1.10** 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.

**1.11** *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.

**1.12** Local instructions should be followed for recording and reporting any peg count register operations caused by performing these tests.

## 2. APPARATUS

### All Tests

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

**2.02** Connector test line, SD-32198-01, SD-32164-01, or SD-31261-01.

**2.03** Head telephone set (associated with test set).

**2.04** 1011G handset (dial hand test set) connected to a W2CL cord, 4 feet long, equipped with a 471A jack and a 240A plug (2W39A cord).

**2.05** Patching cord, P3H cord, 10 feet long, equipped with a 310 plug and a 240A plug (3P2A cord) (for use when testing 100-point connectors).

**2.06** Patching cord, consisting of two 10-foot P3H cords equipped with two 310 plugs, one with a red shell and one with a black shell, both cords attached to a 240B plug (5P3B cord) (for use with 200-point connectors).

**2.07** Patching cords, two P3E cords, 6 feet long, equipped with 310 plugs (3P7A cord) (three required for Test C).

**2.08** 477A (or 375A) (make busy) tools, as required.

### Test A

**2.09** 240A plug (for testing level hunting connectors).

### Test B

**2.10** 1011G handset (dial hand test set) connected to a W2CL cord, 4 feet long, equipped with a 471A jack and a 240A plug (2W39A cord).

### Tests B and C

**2.11** Patching cord, P3E cord, 6 feet long, equipped with 310 plugs (3P7A cord).

**3. PREPARATION**

STEP	ACTION	VERIFICATION
<b>All Tests</b>		
1	Using two P3E cords — Patch test set BAT G jack to 48-volt battery supply jack, test set TL jack to TL (or TL1) jack on connector frame.	
	<i>Note:</i> When connecting battery supply, to avoid possible grounding of battery supply lead, connect cord to test set first and, when disconnecting, remove cord from test set last.	
2a	If testing 100-point connectors — Insert 310 plug of P3H cord into test set T jack.	
3b	If testing 200-point connectors — Using 5P3B cord — Connect red shell plug to test set T jack, black shell plug to test set FR jack.	
4	Connect head telephone set to test set TEL jacks or handset to test set HS jack.	
	<i>Note 1:</i> When using the dial handset with SD-90210-01, operate TRS key or, if using SD-90416-01, operate HS key. Also keep the handset key in TALK position during tests and use the handset dial in making the tests.	
	<i>Note 2:</i> When using the associated head telephone set with SD-90210-01 or SD-90416-01, leave the TRS key in normal position except when necessary to talk on a connection.	
5c	If using test set, SD-90210-01 — Operate SD key, leave in operated position during all tests.	
<b>Test B</b>		
6d	If visual ringing signal is provided in test set — 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 shown on following page.	

SECTION 226-415-507

STEP	ACTION	VERIFICATION	
		CONNECTOR TEST LINE JACK	
		SD-32198-01	SD-32164-01
	10-party connector arranged to complete reverting calls	10P	10P
	10-party connector not arranged to complete reverting calls 1- and 2-ring connectors using ac-dc ringing	C	C
	8-party connectors 1-ring connectors using superimposed ringing	C1	C
7	Where a false ground test on the timed-disconnect lead is indicated — Determine from office records the proper connector and terminal to dial to seize an intercepting trunk which provides timed-release ground to connector under test.		

Test C

- 8 Connect test set C jack to test line 10P jack.

4. METHOD

STEP	ACTION	VERIFICATION
<b>A. Busy-Line Test — Leak</b>		
<b>100-Point Connectors</b>		
6	With connector in normal position — Insert 240A plug of P3H cord into local connector test jack or combination connector local test jack.	BSY lamp does not light.  <i>Note:</i> If BSY lamp lights, remove plug from test jack, proceed to another switch.
7	Operate LK key.	BSY lamp lighted.
8e	If testing connectors other than level hunting type — Dial 99.  <i>Caution: If connector stops on any other terminal, immediately release LK key to release connector to avoid ringing on customer line.</i>	Connector steps to ninth level, rotates smoothly to test line terminal. Busy tone heard.
9f	If testing level hunting connectors — Insert 240A plug into connector sleeve cut-off jack.	

STEP	ACTION	VERIFICATION
10f	Dial any digit. <i>Note:</i> It will be necessary to dial an additional digit if the connector is wired to start hunting after the units digit is dialed.	Connector steps, hunts. Busy tone heard at completion of hunting.
11	Restore LK key.	Connector releases. BSY lamp extinguished.
12f	If testing level hunting connectors — Remove 240A plug from sleeve cut-off jack.	
13	Remove 240A plug from connector test jack.	

**200-Point Connectors (350A Offices Only)**

14	Operate LO-UP key to UP position. <i>Note:</i> On alternate testing cycles, leave LO-UP key normal.	
15	With connector in normal position — Insert 240B plug of 5P3B cord into local connector test jack or combination connector local test jack.	BSY lamp does not light. <i>Note:</i> If BSY lamp lights, remove plug from test, proceed with another switch.
16	Operate LK key.	BSY lamp lighted.
17	Dial 99.	Connector steps to ninth level, rotates smoothly to test line terminal. Busy tone heard. REV lamp flashes.
18	Restore LK key.	Connector releases. BSY lamp extinguished.

**B. Idle-Line Test — Loop**

8	With connector in normal position —	BSY lamp does not light. <i>Note:</i> If BSY lamp lights, remove plug from test jack, proceed to another switch.
---	-------------------------------------	---

**For 100-Point Connectors**

Insert 240A plug of P3H cord into connector test jack.

**For 200-Point Connectors**

Insert 240B plug of 5P3B cord into connector test jack.

9	Operate LP, ID keys, LO-UP key to UP position. <i>Note 1:</i> Leave LO-UP key in normal position on alternate testing cycles. <i>Note 2:</i> With level hunting connectors, perform Step 10e at once to prevent seizure of test line by another connector.	BSY lamp lighted.
---	--	-------------------

STEP	ACTION	VERIFICATION
10e	<p>If testing other than 8-party semiselective connectors — Dial test number (see 1.04 and 1.07).</p>	<p>Connector steps to proper level, rotates smoothly to test line terminal. Test line bell rings (except in ac-dc offices equipped with test line SD-31261-01). Audible ringing heard in receiver.</p>
		<b>With Code Ringing</b>
		First audible ring is full code ring.
		<b>With Visual Ringing</b>
		<p>Test set (R-) lamp lighted indicates ringing on ring (SUP- ringing). (R+) lamp lighted indicates ringing on tip (SUP+ ringing).</p>
11f	<p>If testing 8-party semiselective ringing connectors — With ringing control key in one of its three positions — Dial test line number (see 1.04).</p>	<p>Connector steps to proper level, rotates smoothly to test terminal. Audible ringing heard in test receiver. First ring should be full ring.</p>
	<p><i>Note:</i> A different position of the ringing control key should be used on each succeeding testing cycle.</p>	<p><b>Test Set SD-90210-01 With Ringing Control Key in:</b></p>
		<b>J-NO or H-O Position</b>
		R- lamp lighted or R- bell rings.
		<b>J-O Position</b>
		R+ lamp lighted or R+ bell rings.
		<p><b>Test Set SD-90416-01 With Ringing Control Key in:</b></p>
		<b>NO-J or OP-H Position</b>
		R- lamp lighted or R- bell rings.
		<b>OP-J Position</b>
		R+ lamp lighted or R+ bell rings.
12	Restore, reoperate ID key at least twice during ringing intervals.	Test line bells ring or test set lamps re-light when key is reoperated.
13g	<p>If ac-dc offices are equipped with test line SD-31261-01 — Restore ID key during ringing interval but do not reoperate.</p>	Test line bell rings for at least two intervals.
14h	<p>If testing code ringing and semiselective ringing connectors — Operate TP key momentarily during silent interval, then operate ID key.</p>	<p>Visual or audible ringing signals cease. REV lamp lighted while TP key is operated, except with connectors not arranged to reverse battery.</p>
	<p><i>Note:</i> In ac-dc offices equipped with test line SD-31261-01, operate TP key momentarily, restore it to normal instead of ID position during a silent interval.</p>	

STEP	ACTION	VERIFICATION
15i	If testing full selective and 8-party semi-selective ringing connectors — Operate TP key momentarily, then reoperate to ID position during ringing interval. (See Note, Step 14h.)	Visual or audible ringing signals cease. REV lamp lighted while TP key is operated, except on connectors not arranged to reverse battery.
16	Operate T key. <i>Note:</i> Also restore ID key to normal in superimposed offices equipped with test line SD-31261-01.	Tone heard in receiver. REV lamp lighted, except on connectors not arranged to reverse battery. <i>Note:</i> With 200-point connectors, high tone will be heard if LO-UP key is in UP position.
17j	If testing connectors arranged for calling party control without timed-release feature — Restore LP key.	Connector releases. REV lamp extinguished. BSY lamp extinguished.
18k	If testing connectors arranged for joint control (100-point connectors only) — Restore LP key.	Connector does not release. BSY lamp extinguished momentarily. REV lamp extinguished.
19k	Operate ID key, if not operated, restore T key.	Connector releases. BSY lamp extinguished.
20	Restore ID key.	
21m	If testing connectors arranged for calling party control, with timed-release feature provided — Operate ID key, if not operated.	
22m	Restore T key. <i>Note:</i> When performing this test, proceed to Steps 24n through 29n and, if applicable, perform test on one connector per shelf.	Within timed interval, BSY lamp extinguished momentarily, indicating timed-release feature functioned.
23m	Restore LP key, ID key if operated.	Connector releases. REV, BSY lamps extinguished.
24n	If testing connectors arranged for timed-release feature under control of an intercepting trunk — Insert plug of handset into test jack of any connector having access to intercept trunk associated with connector to be tested.	
25n	Dial terminal connected to intercept trunk.	Connector stops on proper terminal. Audible ringing heard. At operator position — Call answered, ringing silenced.

**SECTION 226-415-507**

<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
26n	At operation position — Disconnect when disconnect signal is received.	
27n	Repeat Steps 21m, 22m.	Within timed interval, BSY lamp does not extinguish momentarily.
28n	Disconnect handset from connector used in test.	Connector releases.
29n	Restore test set LP key.	Connector under test releases. BSY, REV lamps extinguished.

**200-Point Connectors Only**

30	Operate MI, ID, LP keys, LO-UP key to UP position. <i>Note:</i> On alternate testing cycles, leave LO-UP key in normal position.	
31	Dial 99. Listen in receiver.	Connector steps to ninth level, rotates smoothly to test line terminal. Recorded message heard in receiver.
32	Restore LP key.	Connector releases. BSY lamp extinguished.
33	Restore MI, ID, LO-UP keys.	

**All Connectors**

34	Unless other tests are to be made on this switch — Remove 240 plug from connector test jack.
35	Remove all test connections; restore all test set keys.

**C. Reverting Call Test — 10-Party Terminal-per-Station Connectors**

9	With connector in normal position —  <b>100-Point Connectors</b> Insert 240A plug of P3H cord into connector test jack.  <b>200-Point Connectors</b> Insert 240B plug of 5P3B cord into connector test jack.	BSY lamp does not light. <i>Note:</i> If BSY lamp lights, remove plug and proceed to another switch, or leave plug in test jack until BSY lamp is lighted.
10	Operate LK, ID keys.	BSY lamp lighted.
11	Operate T key momentarily.	

STEP	ACTION	VERIFICATION
12	Dial 99.	<p>Connector steps to ninth level, then rotates smoothly to test line terminal.            Busy tone heard in receiver.</p> <p><i>Caution: If the connector stops on any other terminal, restore LK key immediately to normal to avoid ringing on customer line.</i></p>
13	Restore LK key to normal.	<p>Connector does not release.            Busy tone silenced.            BSY lamp extinguished momentarily.</p> <p><b>With Visual Signals</b>            R+, T- test set lamps lighted.</p> <p><b>With Audible Signals</b>            Test-line ring-side bell follows regular test-line ringing code.            Tip-side bell gives reverting call signal.</p>
14	Operate TP key momentarily, proceed to Step 15.	Audible or visual signals cease.
15	Operate ID key.	<p>Connector releases.            BSY lamp extinguished.</p>
16	Restore ID key.	
17	<p>Unless other tests are to be made on this switch —            Remove 240 plug from connector jack, remove all test connections.</p>	