# TOLL AND COMBINATION CONNECTORS

# TOLL OPERATION TESTS

# USING TRUNK TEST SET SD-90469-01 OR SD-90469-02

# 350A COMMUNITY DIAL OFFICES

## 1. GENERAL

**1.01** This section describes the methods of testing operating features of toll connectors and toll operating features of combination connectors. Trunk test set SD-90469-01 or SD-90469-02 (J94710A) is used for these tests. It describes key operation required in superimposed ringing offices for using adjust values of resistance to test trip relays in connectors which serve lines equipped with relay type subscriber sets, or a mixture of relay and tube subscriber sets, or in 8-party semi-selective connectors in AC-DC ringing offices.

**1.02** This section is reissued to correct lamp designations in Test B, to combine Tests B and C, to change Test D to Test C, and to generally up date the section. Since this reissue covers a general revision, arrows odinarily used to indicate changes have been omitted.

**1.03** The tests covered are:

*A. **Busy Line Test — Leak:*** This test checks for presence of leakage paths in the relay coil circuitry.

*B. **Idle Line Test — Loop (Except in AC-DC Ringing Offices Equipped with Test Line SD-31261-01):*** This test checks (1) line seizure and ringing, (2) pretrip, (3) tripping during ringing interval, (4) tripping during silent interval, (5) transmission, (6) release, and (7) adjusting method.

This test also applies an operate test to the H relay and an operate and nonoperate test to the J relay where 8-party semi-selective connectors are used.

*C. **Idle Line Test — Loop (In AC-DC Ringing Offices Using Test Line SD-31261-01 Only):*** This test checks ringing and pretrip simultaneously. Checks are also made for (1) line seizure, (2) ringing and pretrip, (3) tripping, (4) transmission, and (5) release.

**1.04** The test line employed in making this test is connected to terminal 99 except when testing rotary hunting and level hunting connectors. In rotary hunting groups, terminal 99 is made busy and the test line is connected to terminal 90. The hunting feature of the connector is checked by directing the switch to terminal 99 and having it step to terminal 90. When testing level hunting connectors, terminal 91 is ordinarily used as the test line number. To reach terminal 91, it is necessary to dial the digit which will direct the switch to the ninth level. When the connectors are wired to hunt over a group of 100 trunks, regardless of the digit (or digits) dialed, terminal 11 is used as the test number. To reach this terminal, it is necessary to ground the commutator of the lowest level and dial one or two digits as required by the start hunting circuitry.

**1.05** When testing 10-party terminal-per-line connectors, it is necessary to dial an additional digit to set the ringing. A different digit should be dialed each time to test all codes. Also use alternate code ringing interrupters on each test cycle.

**1.06** 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.

**1.07** A letter a, b, c, etc, added to a step number in Parts 3 and 4 of this section indicate 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** Trunk test set J94710A (SD-90469-01 or SD-90469-02).

**2.02** Operator telephone set.

**2.03** One P4K cord, 10 feet long, equipped with a 289B plug and a 240B plug (4P4A) (for testing toll connectors).

**2.04** One P4K cord, 10 feet long, equipped with a 289B plug and a 240C plug (4P5A) (for testing combination connectors).

**2.05** One P3E cord, 6 feet long, equipped with two 310 plugs (3P7A).

**2.06** One P2J cord, 9 feet long, equipped with two 310 plugs (2P9A).

*Note:* If a P2J cord is not available, use a P3E cord as specified in 2.05.

**Test A Only**

**2.07** 240A plug (for testing level hunting connectors only).

## 3. PREPARATION

| STEP | ACTION | VERIFICATION |
|---|---|---|
| **All Tests** | | |
| 1 | Using P2J cord, connect BAT-G test set jack to 48-volt battery.<br><br>*Note:* To avoid possible grounding of battery supply lead, connect cord to test set first. When disconnecting, remove cord from test set last. | |
| 2 | Use P3E cord to connect test set TL jack to TL (or TL1) of connector frame. | |
| 3a | If testing toll connectors —<br>Using P4K cord equipped with 289B plug and 240B plug —<br>Connect 289B plug with stay cord on bottom into TT jacks of test set. | |
| 4b | If testing combination connectors —<br>Using P4K cord equipped with 289B plug and 240C plug, connect 289B plug with stay cord on bottom into TT jacks of test set. | |
| 5 | Connect operator telephone set to TEL jacks of test set. | |

**4. METHOD**

| STEP | ACTION | VERIFICATION |
|---|---|---|
| | **A. Busy Line Test — Leak** | |
| 6 | At test set —<br>Operate SL key. | |
| 7 | Insert 240B or 240C plug of P4K cord into test jack of connector. | If connector is busy —<br>BSY, C lamps lighted.<br><br>*Note:* If busy, plug may be removed to proceed with other tests or left in test jack and test deferred until lamps extinguished. |
| 8 | Restore SL key. | C lamp lighted. |
| 9 | Operate LK, DL-ST keys. | |
| 10c | If testing connectors other than level hunting type —<br>Dial test number (see 1.03). | At connector —<br>Switch step to test line terminal.<br>At test set —<br>C lamp extinguished.<br>Busy tone may or may not be heard. |
| 11d | If testing level hunting connectors —<br>Insert 240A plug in sleeve cutoff jack of connector switch. | |
| 12d | Dial one or two digits as required to start hunting. | At connector —<br>Connector hunts until completed.<br>At test set —<br>C lamp extinguished.<br>Busy tone may or may not be heard. |
| 13 | Operate CT key. | C lamp flashes.<br>Busy tone heard, if present in Step 10c or 12d. |
| 14 | Restore DL-ST, CT keys. | |
| 15 | Operate SL key momentarily. | At connector —<br>Switch released.<br>At test set —<br>C lamp lighted steadily when SL key is restored. |
| 16 | Restore LK key. | |
| 17d | If testing level hunting connectors —<br>Remove 240A plug from sleeve cutoff jack of connector. | |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 18 | Remove 240B or 240C plug from test jack of connector. | |
| | **B. Idle Line Test — Loop (Except in AC-DC Ringing Offices Equipped With Test Line SD-31261-01)** | |
| 6c | If READJ key is provided —<br>At test line —<br>Restore READJ key. | |
| 7d | If testing 8-party semiselective connectors —<br>Operate OP-H key. | |
| 8e | If office has superimposed ringing with 4-party selective and 8-party semiselective connectors serving lines equipped with relay subscriber sets or mixture of relay and tube subscriber sets —<br>Operate D REL TST key.<br><br>***Note:*** To ensure operation of tripping relay when making this test, the dc component of ringing voltage should be near maximum. | |
| 9 | At test set —<br>Operate SL key. | |
| 10 | Insert 240B or 240C plug into switch test jack. | If connector is busy —<br>BSY, C lamps lighted.<br><br>***Note:*** Plug may be removed to proceed with other tests or left in test jack and test deferred until lamps are extinguished. |
| 11 | Restore SL key. | C lamp lighted. |
| 12 | Operate SW key. | C lamp extinguished. |
| 13a | If testing toll connectors —<br>Operate LP key. | |
| 14 | Operate ID, DL-ST keys.<br><br>***Note:*** When testing level hunting connectors, proceed immediately with Step 15 to minimize possibility of test line being seized by another connector. | |
| 15 | At test set —<br>Dial test number. | At connector —<br>Switch steps to test line terminal. |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| | *Note:* First ring of 2-ring or code ringing connectors is full code ring to check pickup feature. | |
| 16f | If testing other than 8-party semiselective ringing connectors —<br>At test set —<br>Restore SW key. | Audible ringing heard.<br>At test line —<br>Bell rings. |
| 17d | If testing 8-party semiselective connectors —<br>At test set —<br>Restore SW key. | RR lamp lighted.<br>Audible ringing heard.<br>At test line —<br>Bell rings. |
| 18d | At test line —<br>Operate NO-J key and repeat Steps 8e through 15. | |
| 19d | At test set —<br>Restore SW key. | RR lamp lighted.<br>Audible ringing heard.<br>At test line —<br>Bell rings. |
| 20d | At test line —<br>Operate OP-J key and repeat Steps 8e through 15. | |
| 21d | At test set —<br>Restore SW key. | C lamp lighted.<br>Audible ringing heard.<br>At test line —<br>Bell rings. |
| 22 | At test set —<br>Operate CT key. | |
| 23 | Restore, reoperate ID key at least twice during ringing intervals. | At test line —<br>Bell rings when ID key is operated. |
| 24e | If office has superimposed ringing with 4-party selective and 8-party semiselective connectors serving lines equipped with relay subscriber sets or mixture of relay and tube subscriber sets —<br>During ringing interval —<br>At test set —<br>Momentarily operate TP-BT (or TP) key and reoperate to ID position. | C lamp lighted while TP-BT (or TP) key is operated.<br>At test line —<br>Bell does not ring indicating ringing was tripped. |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 25g | For all offices not covered in 24e including 4-party selective and 8-party semiselective connectors serving lines equipped with tube sets only —<br>During silent interval —<br>At test set —<br>Momentarily operate TP-BT (or TP) key and reoperate to ID position. | C lamp lighted while TP-BT (or TP) key is operated —<br>At test line —<br>Bell does not ring, indicating ringing was tripped. |
| 26 | At test set —<br>Operate T key.<br><br>*Note:* In superimposed offices equipped with test line SD-31261-01, restore ID key to normal position in addition to operating T key. | Tone heard.<br>C lamp lighted. |
| 27 | Restore T, DL-ST keys. | C lamp extinguished.<br>Tone silenced. |
| 28 | Restore CT key. | |
| 29 | Momentarily operate SL key. | Switch released.<br>C lamp lighted. |
| 30 | Remove plug from test jack of connector unless other tests are to be conducted on this switch. | C lamp extinguished. |
| 31 | Restore ID key. | |
| 32a | If testing toll connectors —<br>Restore LP key. | |
| 33 | Where necessary to apply trip and pretrip, adjust values of resistances to trip relay in superimposed ringing connectors serving lines as in Step 8e or 8-party semiselective connectors in AC-DC ringing offices —<br>Operate READJ key in connector test line and repeat Steps 6c through 24e. | |

**C. Idle Line Test — Loop (In AC-DC Ringing Offices Using Test Line SD-31261-01 Only)**

| | | |
|---|---|---|
| 6 | At test set —<br>Operate SL key. | |
| 7 | Insert 240B or 240C plug of P4K cord into switch test jack. | If connector is busy —<br>BSY, C lamps lighted.<br><br>***Note:*** **Remove plug and proceed with other tests, or leave plug in test jack and defer test until lamps are extinguished.** |

| STEP | ACTION | VERIFICATION |
|---|---|---|
| 8 | Restore SL key. | C lamp lighted. |
| 9 | Operate SW, ID keys. | C lamp extinguished when SW key is operated. |
| 10a | If testing toll connectors —<br>Operate LP key. | |
| 11 | Operate DL-ST key. | |
| | *Note:* If testing level hunting connectors, proceed immediately with Step 12 to minimize possibility of test line being seized by another connector. | |
| 12 | Dial test line number. | Connecor steps to test line terminal. |
| 13 | Restore SW key. | Audible ringing heard. |
| | *Note:* First ring of 2-ring or code connectors is full code ring. | |
| 14 | Operate CT key. | |
| 15 | Restore ID key during a ringing interval and do not reoperate. | At test line —<br>Bell rings for at least two intervals. |
| 16 | During a silent interval —<br>At test set —<br>Momentarily operate TP-BT (or TP) key. | C lamp lighted while TP-BT (or TP) key is operated.<br>At test line —<br>Bell silenced. |
| 17 | At test set —<br>Operate T key. | Tone heard.<br>C lamp lighted. |
| 18 | Restore T, DL-ST keys. | Tone silenced.<br>C lamp extinguished. |
| 19 | Restore CT key. | |
| 20 | Momentarily operate SL key. | C lamp lighted.<br>At connector —<br>Switch released. |
| 21 | Unless other tests are to be conducted on this switch —<br>Remove plug from connector test jack. | C lamp extinguished. |
| 22 | Restore LP key, if operated. | |