

**LOCAL LEVEL HUNTING CONNECTORS**  
**OPERATION TESTS**  
**USING CONNECTOR TEST SET SD-30502-01 (J34711A)**  
**STEP-BY-STEP SYSTEMS**

**1. GENERAL**

**1.01** This section describes a method of performing operation tests on local level hunting connectors by means of the wagon-type connector test set SD-30502-01. 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 add information covering the testing of level hunting connectors arranged to wait for the units digit before starting level hunting. Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

**1.03** The tests and the features tested are:

**A. *Busy Line and Level Hunting Test —***

***Leak:*** This test checks the hunting 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 hunting features of a connector, under a loop condition. It also checks the ringing, pretrip, trip, transmission, supervisory, and release features.

**C. *Marginal Test of Connector Supervisory Relay, Using Test Set Not Equipped for Testing Connectors Arranged for 1400-Ohm or 1500-Ohm Maximum External Subscriber***

***Loop:*** This test provides a method for testing connector supervisory relays in offices arranged for 1000-ohm or 1115-ohm maximum external subscriber loop and 60- to 75-volt silent interval tripping battery. As the tripping resistance of the test set does not provide an adequate test of the relay under these conditions, this test provides a method for making an occasional test independently of the tripping relay test.

**1.04** The test line employed in making Tests B and C is ordinarily connected to terminal 91. When the connectors are wired so as to hunt over a single group of 100 trunks, terminal 11 is used as the test line number.

**1.05** The P-1 (PERM No. 1) lamp is connected to a common alarm circuit serving a group of connectors and may flash occasionally due to normal operation of other connectors in the group, or may be lighted steadily if a permanent signal condition exists in one or more of the connectors in the group. The lighting of this lamp may be disregarded, except when supervisory tests are being made, in which case it will be necessary to retire any permanent signal conditions of other connectors in the group before it can be determined that the connector under test is functioning properly with respect to the P-1 lamp indication. If the test set is equipped with a P-2 (PERM No. 2) lamp, this lamp will give the same indication as the P-1 lamp.

**1.06** Whenever the preparation or method calls for the operation of the STP or RLS key, or the dial, it is understood that either the STP or RLS key, or the dial, of the connector 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.

**1.07** 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 BSY-L or BUSY LINE, WT-R or WAIT RING, PRE-TRIP, RING, T-TRIP or TONE TRIP, T-CO or TONE CO, and CLD-HLD indicate the particular test which is applied at the time the lamp is lighted.

1.08 From all positions except the BSY-L, WT-R, and PRE-TRIP, the test circuit can be returned to normal by holding the RLS key operated 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 beyond these positions by means of the STP key, where the RLS key may be used.

1.09 The parentheses in Test B, Steps 19, 21, and 22, provide spaces for writing in the interval during which the pretrip and trip tests are to be made, as indicated in Table A or B.

1.10 When testing connectors arranged for 1400-ohm or 1500-ohm maximum external subscriber loop, any ring-trip relay which fails on the pre-trip 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 B to apply the test set readjust resistance values and again repeat the tests, changing the tension in the No. 1 spring, as required.

1.11 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 A or B.

1.12 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.

1.13 **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. Where a condition does not apply, the associated steps should be omitted.

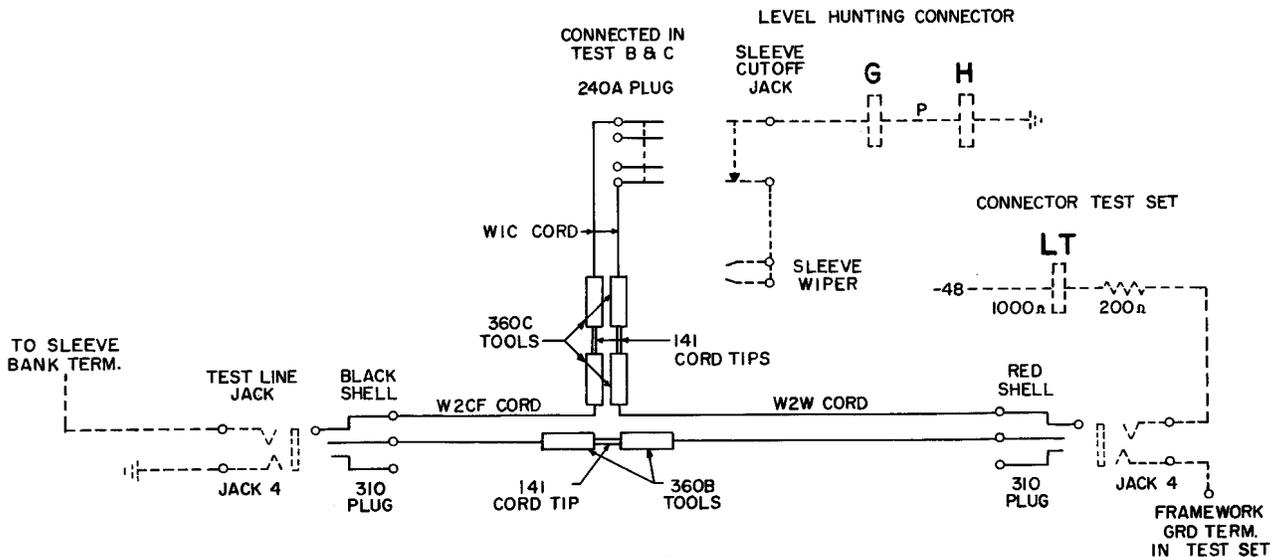


Fig. 1 - Testing Cord

**2. APPARATUS****All Tests**

- 2.01** Connector test set J34711A (SD-30502-01).
- 2.02** One 40B test set (remote control) (optional).
- 2.03** One 723A receiver attached to an R2DB cord equipped with a 347A (or 47A) plug.
- 2.04** P3H (or P3C) cord, equipped with one 240A plug and one 310 plug (3P2A cord).
- 2.05** P3E cord, 6 feet long, equipped with two 310 plugs (3P7A cord).
- 2.06** P3E cord, 10 feet long, equipped with two 310 plugs (3P6F cord).

**2.07** Testing cord, W2W, equipped with 310 plug, 360B tool, and 360C tool (2W17A cord); W2CF cord equipped with 310 plug (replace red shell with black shell), 360B tool, 360C tool (2W17D cord); two W1C cords, each 12 feet long; two 360C tools; 240A plug; three 141 cord tips. Connect to form special cord as shown in Fig. 1.

**Test A**

**2.08** One 240A plug.

**Tests B and C**

**2.09** Special insulator 1/2 inch by 2-1/2 inches. (The KS-7187 bell seal bond No. 20 relay cleaning paper may be used.)

**When Connector Test Line Terminal Is 11**

**2.10** One 893 cord, equipped with two 360A tools (1W13B cord) and two 365 tools.

**3. PREPARATION****All Tests**

STEP	ACTION	VERIFICATION
1a	If remote control set is used — Insert remote control set plugs red, gray, and black into test set jacks R, G, and B, respectively.	
2	Connect receiver to test set TEL jack.	
3	Connect test set jack 3 to correspondingly numbered test line jack (level hunting) on connector frame using 6-foot P3E cord.	
4	Insert black shelled 310 plug of special test cord (Fig. 1) into jack 4 of test line (level hunting) on connector frame, and insert red shelled 310 plug of special test cord (Fig. 1) into jack 4 of test set.	
5b	In offices equipped with permanent signal testing equipment — Connect PS or PERM-T jack on connector frame to P jack of test set, using 10-foot P3E cord.	
6	Operate and hold RLS key long enough to extinguish any progress lamps that may be lit, or if necessary, operate and release STP key required number of times.	All lamps extinguished.

- | STEP | ACTION   | VERIFICATION  |
|------|--|---|
| 7    | Holding RLS key operated, connect TST jack of test set to test jack of normal connector under test, using P3H cord.  | GD lamp does not light.                             |
| 8    | Restore RLS key.   | GD lamp lighted.                                    |
| 9c   | Where test set is arranged for monitoring —<br>If it is desired to monitor on an off-normal connector, hold RLS key operated and insert 240A plug of P3H cord into test jack of off-normal connector and listen in receiver. | GD lamp lighted.<br>Conversation heard in receiver. |
| 10   | Operate LH key.  |   |

**Test B**

- 11 Operate test set keys as indicated for TEST in Table A or B to provide proper pretrip and trip condition in test set.
- Note:* For tests during silent interval, the tripping battery shall be within the voltage limits shown in Tables A or B.
- 12d If testing connectors arranged for free service, with 1400-B key provided — Operate NON-REV key.

**Test C**

- 11 Operate test set keys as indicated for SUPV RELAY TEST in Table A.
- Note:* Check that silent interval tripping battery is at least 67 volts.

**TABLE A**

**TEST SET NOT EQUIPPED TO TEST CONNECTORS ARRANGED FOR 1400- OR 1500-OHM LOOP**

KIND OF RING	MAX EXT SUB LOOP	TRIP BAT.	FOR			KEYS OPERATED				PRETRIP	TRIP
			TEST	READJ	SUPV RELAY TEST	NOT USING FIG. G	USING FIG. G				
	OHMS	VOLTS				ADJ	SS	TST	ADJ		
AC-DC	1000-1115	46-50	X				X	X		Ringing Period	Silent Period
Super-imposed	1000-1115	46-50	X			X		X			Ringing Period
		60-75	X								
					X			X		X	

TABLE B

## TEST SET EQUIPPED TO TEST CONNECTORS ARRANGED FOR 1400- OR 1500-OHM LOOP

KIND OF RING	MAX EXT SUB LOOP	TRIP BAT.	FOR		KEYS OPERATED					PRETRIP	TRIP	
	OHMS	VOLTS	TEST	READJ	1000A	1000B	1400A	1400B	ADJ			
AC-DC and/or Super-imposed	1000-1115	48.5-50	X		X					X	Silent Period	Silent Period
		60-75	X			X						Ringing Period
			X			X				X		
	1400-1500	48.5-50	X					X			Silent Period	Silent Period
				X			X			X		
		66-75	X						X			
	X			X				X	X			

## 4. METHOD

## STEP

## ACTION

## VERIFICATION

## A. Busy Line and Level Hunting Test — Leak

- |     |   |  |
|-----|---|--|
| 11  | Operate and release STP key to advance test circuit to BSY-L position.  | BSY-L lamp lighted.  |
| 12  | Insert 240A plug into sleeve cutoff jack of connector.  |  |
| 13  | Dial any digit which will cause the connector to hunt over at least two levels.<br><br><i>Note:</i> It will be necessary to dial an additional digit if the connector is arranged to start hunting after the units digit is received. | Connector hunts smoothly, stops on tenth terminal of last level in group of trunks selected.<br>Busy tone heard in receiver. |
| 14  | Operate RLS key momentarily.  | Connector releases.<br>GD lamp extinguished momentarily.<br>Busy tone removed.   |
| 15  | Remove 240A plug from sleeve cutoff jack of connector.  |  |
| 16e | Remove plug from connector test jack, unless other tests are to be made on this switch.   | GD lamp extinguished.  |

## B. Idle Line Test — Loop

- |    |  |                    |
|----|--|--------------------|
| 13 | Operate, release STP key to advance test circuit to WT-R position. | WT-R lamp lighted. |
|----|--|--------------------|

STEP	ACTION	VERIFICATION
14	Insert 240A plug (stay cord to the right) of special test cord (Fig. 1) into sleeve cutoff jack of connector.  <i>Note:</i> If sleeve cutoff jack wiring is reversed, reverse 240A plug of special test cord.	
15	Insert special insulator between sleeve cutoff jack guard plate and front end of 240A plug flanges.	
<b>Line Seizure and Ringing Test</b>		
16f	When connector test line terminal is 91 — Dial digit which will direct the connector to ninth level.  <i>Note:</i> It will be necessary to dial an additional digit if the connector is arranged to start hunting after the units digit is received.	Connector hunts smoothly, stops on test line terminal. BSY lamp lighted. Audible ring heard in receiver. Test set bell rings if test set is equipped to test connectors arranged for 1400- or 1500-ohm maximum external subscriber loop.
17g	When connector test line terminal is 11 — Connect ground to commutator terminal for level 1, using 893 cord.	
18g	Dial any digit.  <i>Note:</i> It will be necessary to dial an additional digit if the connector is arranged to start hunting after the units digit is received.	Connector hunts smoothly, stops on test line terminal. BSY lamp lighted. Audible ring heard in receiver.
<b>Pretrip Test</b>		
19	Operate and restore STP key at start of ( ) interval. This test shall be completed within the same interval by performing Step 20.	PRE-TRIP lamp lighted. WT-R lamp extinguished.
20	Operate, restore STP key.	RING lamp lighted. PRE-TRIP lamp extinguished. Test set bell rings (or continues to ring). Audible ring continues to be heard in receiver.
<b>Trip Test</b>		
21h	If testing connectors arranged to reverse battery, with 1400-B key normal, or not provided — Operate and restore STP key at start of ( ) interval.	T-TRIP lamp lighted. RING lamp extinguished. If this test was applied in silent interval, check that audible ring is not heard again in receiver; or, if applied in ringing interval, check that audible ring is immediately stopped upon application of test. The test set bell is disconnected when trip test is applied and cannot be considered as an indication that ringing has tripped. Proper transmission tone heard in receiver.

STEP	ACTION	VERIFICATION
22i	In testing connectors arranged for free service, with 1400-B key not provided — Operate and restore STP key at start of ( ) interval.	T-TRIP lamp lighted. RING lamp extinguished. If this test was applied in silent interval, check that audible ring is not heard again in receiver; or, if applied in ringing interval, check that audible ring is immediately stopped upon application of test. The test set bell is disconnected when trip test is applied and cannot be considered as an indication that ringing has tripped. Transmission tone not heard in receiver.
23i	Operate, restore NON-REV key.	Proper transmission tone heard in receiver.
24j	If testing connectors arranged to reverse battery, with 1400-B key operated — Operate, restore STP key at start of silent interval.	T-TRIP lamp lighted. RING lamp extinguished. Audible ring not heard again in receiver. Proper transmission tone heard in receiver. <i>Note:</i> If transmission tone is not heard, perform Step 25j.
25j	If transmission tone is not heard in receiver — Operate PLS key momentarily.	Proper transmission tone heard in receiver.
26d	If testing connectors arranged for free service, with 1400-B key provided — Operate, restore STP key at start of silent interval.	T-TRIP lamp lighted. RING lamp extinguished. Audible ring not heard again in receiver. Transmission tone not heard in receiver.
27d	Operate PLS key momentarily.	Proper transmission tone heard in receiver.
<b>Supervisory Tests</b>		
28k	If test set is arranged to test SUPV-1 permanent signal alarm — Operate, release STP key.	T-CO lamp lighted. T-TRIP lamp extinguished. Transmission tone removed. P-1 lamp lights if connection was made in Step 5.
29m	If test set is arranged to test wiper cords — Operate, release STP key.	T-CO lamp lighted. T-TRIP lamp extinguished. Transmission tone removed.
30m	Move wiper cords slightly while listening in receiver.	No noise heard in receiver. BSY lamp does not flash.
31f	When connector test line terminal is 11 — Remove the ground from commutator terminal for level 1.	
32n	If testing connector arranged for calling party control — Operate, restore STP key.	CLD-HLD lamp lighted. T-CO lamp extinguished. Connector releases. BSY lamp extinguished. GD lamp extinguished. P-1 (PERM No. 1) lamp extinguished if lighted in Step 28k.

STEP	ACTION	VERIFICATION
33n	Immediately operate, restore STP key to restore test circuit to normal position.	CLD-HLD lamp extinguished. GD lamp lighted.
34o	If testing connectors arranged for joint control — Operate, restore STP key.	CLD-HLD lamp lighted. T-CO lamp extinguished. Connector does not release. BSY lamp remains lighted. GD lamp flashes once. P-1 lamp lights if connection was made in Step 5.
35o	Operate RLS key momentarily.	CLD-HLD lamp extinguished. Connector releases. P-1 lamp extinguished if lighted in Step 34o. BSY lamp extinguished. GD lamp extinguished momentarily.
36	Immediately remove 240A plug and special insulator from sleeve cutoff jack of connector.	
37e	Remove plug from connector test jack, unless other tests are to be made on this switch.	GD lamp extinguished.

**C. Marginal Test of Connector Supervisory Relay, Using Test Set Not Equipped for Testing Connectors Arranged for 1400-Ohm or 1500-Ohm Maximum External Subscriber Loop**

12	Operate, restore STP key to advance test circuit to RING position.	RING lamp lighted.
13	Insert 240 plug (stay cord to the right) of special test cord (Fig. 1) into sleeve cutoff jack of connector.  <i>Note:</i> If the sleeve cutoff jack wiring is reversed, reverse the 240A plug of the special test cord.	
14	Insert special insulator between sleeve cutoff jack guard plate and front end of 240A plug flanges.	
<b>Line Seizure and Ringing Test</b>		
15f	When connector test line terminal is 91 — Dial digit which will direct the connector to the ninth level.  <i>Note:</i> It will be necessary to dial an additional digit if the connector is wired to hunt after the units digit is received.	Connector hunts smoothly, stops on test line terminal. BSY lamp lighted. Audible ring heard in receiver. Test set bell rings.
16g	When connector test line terminal is 11 — Using 893 cord, connect ground to commutator terminal for level 1.	

STEP	ACTION	VERIFICATION
17g	Dial any digit. <i>Note:</i> It will be necessary to dial an additional digit if the connector is wired to hunt after the units digit is received.	Connector hunts smoothly, stops on test line terminal. BSY lamp lighted. Audible ring heard in receiver. Test set bell rings.
<b>Tripping Test</b>		
18p	If testing connectors arranged to reverse battery — Operate, restore STP key at start of silent interval.	T-TRIP lamp lighted. RING lamp extinguished. Proper transmission tone immediately heard in receiver.
19q	If testing connectors arranged for free service — Operate, restore STP key at start of silent interval.	T-TRIP lamp lighted. RING lamp extinguished. Transmission tone not heard in receiver. P-1 lamp does not light.
20q	Operate, restore NON-REV key.	Proper transmission tone heard in receiver.
21	Operate RLS key momentarily.	T-TRIP lamp extinguished. Connector releases. BSY lamp extinguished. GD lamp extinguished momentarily.
22g	When connector test line terminal is 11 — Remove ground from commutator terminal for level 1.	
23	Immediately remove 240A plug and special insulator from sleeve cutoff jack of connector.	
24e	Remove plug from connector test jack, unless other tests are to be made on this switch.	GD lamp extinguished.