

TERMINATING TROUBLE INDICATOR

Replaces: Section 226
 Dated 5-23-69

SD'S 25284-01 AND 25064-01

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1. GENERAL INFORMATION

- 1.1 The major operating features of the Terminating Trouble Indicator Circuit, SD-25284-01, are tested in connection with the tests on the Terminating Markers, Terminating Marker Appliques, Terminating Marker Connectors, and Incoming Link Frames.
- 1.2 This section describes a method of testing the features which are not checked by those tests but are shown on Terminating Trouble Indicator Circuit, SD-25284-01, and Miscellaneous Circuit for Terminating Trouble Indicator Circuit, SD-25064-01.

2. RECORDS AND REQUIREMENTS

- 2.1 Records: Forms SD-4-1313 and SD-4-1315 are required for recording the results of these tests.
- 2.2 Requirements: The tests of Section 226 must be applied to meet the equipment performance requirements per BSP 816-007-181.

3. TESTING EQUIPMENT

3.1 Test Sets Required

Amt	ITE	Description
1	4033B	Link Frame Test Set

3.2 Cords Required with ITE-4033B

Amt	ITE	Lgth	Cdrs	One End	Other End
1	9598	12'	2	310 Plug	310 Plug
2	9984	12'	10	Jones Socket 312 CCT	10 ITE-2461 Sockets

3.3 Accessories Required

Amt	Code or ITE	Description	With ITE
1	ITE-4442	Volt-Ohmmeter	
1	R-9572	Test Receiver	4023

4. RESISTANCE MEASUREMENTS

- 4.1 Using the ITE-4442 Volt-Ohmmeter as described in Section 0.2 of Handbook 61, check resistance paths in the trouble indicator and in each terminating marker as shown in Table A.

5. FUSE VERIFICATION

5.1 Test Procedure - General

CAUTION: TO ELIMINATE A FIRE HAZARD, VERIFY THAT DIRECT GROUND IS NOT PRESENT ON THE ALARM BAR OR STUD ON A FUSE PANEL BEFORE INSTALLING ITS FEEDER FUSE.

NOTE: Use ITE-4442 Volt-Ohmmeter. To avoid damaging the meter, first verify that battery is not present on the alarm bar by using the volt-meter portion of ITE-4442. If clear, switch to the ohmmeter portion for the resistance reading which should be either infinity or approximately 600 ohms.

- 5.11 Fuse verification is, ordinarily, only required on fuse panels wired by the installer.

- 5.12 On shop wired and fused fuse panels, inspect the panel for missing or operated fuses. If a fuse is missing or operated, test the fuse terminal for the absence of low resistance ground. Clear any grounded condition and install the proper fuse. At the completion of this test all fuse panels should be fully equipped with proper fuses. These may be either the proper specified type or a dummy.
- 5.13 The operation of relays in circuits when fuses or potentials are applied is normal in some circuits. Oscillation, chatter, and signs of overheating should be analyzed and cleared immediately.
- 5.14 ITE-4442 Volt-Ohmmeter should be used to verify all potentials at fused terminals to insure that polarity and voltages are correct. Many errors are caused by the use of the R-9572 Test Receiver on potentials other than -48 Volts. Handbook 100, TMO 4442, provides full instructions for the use of the volt-ohmmeter.
- 5.15 When the R-9572 Test Receiver is used, avoid placing it directly on the ear.
- 5.2 Fusing Tests
- 5.21 Using fuses of the correct type, as indicated by the circuit drawing and fuse panel designations, install the fuses listed in Table B one at a time. Verify that each fuse is associated with the correct circuit and is free from cross with other unfused posts on the panel.
6. PREFERENCE CHAIN LOCKOUT CIRCUIT
- 6.1 Connect 48V battery and ground to the A jack of the Link Frame Test Set, ITE-4033B, using an ITE-9598 cord.
- 6.2 Connect the Jones Plug of an ITE-9984 cord to the A connector of the set.
- 6.21 Connect leads 0, 1, 2, etc., of this cord to punchings 01, 11, 21, etc., respectively on terminal strip D. These punchings are the windings of relays DS0, DS1, DS2, etc.
- 6.3 Connect the Jones Plug of another ITE-9984 cord to the S connector of the set.
- 6.31 Connect leads 0, 1, 2, etc., of this cord to punchings 00, 10, 20, etc., respectively on terminal strip D. These punchings are the C1 leads associated with relays DS0, DS1, DS2, etc.
- 6.4 Operate keys AB and SB of the set and leave them operated.
- 6.5 Block non-operated all DR relays of the trouble indicator.
- 6.6 Operate key A0 to operate the DS relay in first position in the preference chain. Lamp S0 lights.
- 6.61 Connect battery to the windings of the other DS relays, one at a time, by operating and releasing keys A1, A2, etc. Observe that the S lamps associated with these DS relays do not light indicating these relays did not operate.
- 6.62 Release key A0 to release the first DS relay. Lamp S0 is extinguished.
- 6.63 Operate key A1 to operate the DS relay in second position in the preference chain. Lamp S1 lights.
- 6.64 Check that the DS relays in third, fourth, etc., positions do not operate when battery is applied to their windings by operating and releasing key A2, A3, etc.
- 6.65 Release key A1 to release the DS relay in second position.
- 6.66 Continuing in this manner, check that DS relays in higher positions will not operate when a DS relay in the lower position is operated.
- 6.7 Operate the DS relay in last position by operating the proper A key. The associated S lamp lights.
- 6.71 Operate key A0 to apply battery to the winding of the DS relay in first position.
- 6.72 Check that this relay operates; however, lamp S0 does not light.
- 6.73 Now check that all intermediate DS relays will operate when battery is applied to their windings but their associated S lamps do not light. The order in this case does not matter.

TABLE A

Resistance Path	Test Connections		Keys Operated & Relays Blocked Operated	Res. Measurement		
				Rated	Min.	Max.
FA, FB, & P wdg. FC	2B(GC)	2T(GC)	Key FCG	59000	58410	59590
S. wdg. CE, CF and 456 ohm wdg. CJ	2B(GC)	5T(GC)	Relays GC and GLH	60456	59851	61061
S. wdg. CD, CE, CF and 456 ohm wdg. CJ	2T(GC)	5T(GC)	Relays GC & GLH. Keys RV & TVT	100456	99451	101461
CB,CC,CD,CE,CF,P wdg. CG, & CH	2T(GC)	5T(GC)	Relays GC, GLH, TC1,TC2 TC3 & TC4. Keys RV & TVT	173000	171270	174730
CL and CK	1B(PU)	5B(PU)	None	4008	3968	4048
GA,GB,GC,GD and GE	2T(GC)	5T(GC)	Relays GC and CON	9990	9890	10090
GC,GC and GE	2T(GC)	5T(GC)	Relays GC & CON. Key GT	7570	7492	7648
GC,GD, and GE	2T(GC)	2B(GC)	Relays GC, CON & CN. Key GT	7570	7492	7648
14 ohm wdg. PA and PB	5BF(GLH)	2B(GC)	Relays GC & CON. Key PU	164	156	172
/ AJ, AQ and AR	1B(GT2)	6B(IK)	Relay MT & Insulate 6B-7B(IK)	7570	7494	7646
/ AJ	1B(GT2)	6B(IK)	Relay MT & Insulate 6B-7B(IK)	3200	3168	3232

- NOTES:** (1) / Designates resistances located on each terminating marker. They apply an operate test to the marker GT relay.
 (2) P Designates the Primary Winding.
 (3) S Designates the Secondary Winding.

TABLE B

SD	FUSE DESIGNATION	POTENTIAL	AMPERAGE	TEST LOCATION
25284-01	*ZA	-48V	1 1/3	7M & 8BM Relay LPA
	*ZB			2L Relay BR'-0
	*ZC			9M & 10M Relay LPA
	*ZD			11M Relay LPA
	*ZE			2L Relay DA-0
25284-01	*ZF	-48V	1 1/3	12M Relay LPA

- 6.8 With all DS relays operated ground is present on the CI lead associated with the DS relay in last position and is not present on any other CI lead.
- 6.81 Release the DS relay in last position and check that ground is present on the CI lead associated with the DS relay in next to last position but not on any other CI lead.
- 6.82 Continuing in this manner check that ground is present on only one CI lead at a time when two or more DS relays are operated and that the grounded lead is associated with the operated DS relay in the highest position.
- 6.9 Remove all test connections associated with this test.
7. MISCELLANEOUS CIRCUIT, SD-25064-01
- 7.1 Verify the below listed features of the Miscellaneous Circuit, not checked on other tests, as follows:
- 7.11 Test Battery Jack and Supply
- 7.111 Check 48V test battery terminals and tip of the A jack for presence of 48 Volts.
- 7.112 Check the G test terminals for direct ground.
- 7.113 Check the HRG test terminals for high resistance ground (12000 ohms).
- 7.114 Check for direct ground on the A jack sleeve.
- 7.12 Spare Jack B to MDF
- 7.121 Make a continuity test of Jack B to the MDF.
- 7.13 Frame Line Jacks
- 7.131 Make a continuity and cross test of the tip and sleeve leads of Jacks TEL (A and B) to all associated TEL jack appearances and to the MDF.
- 7.132 Make a continuity and cross test of the tip and sleeve leads of Jack D to all associated D jack appearances.
- 7.14 Remote Control Jacks
- 7.141 Make a continuity test of Remote Control Jack F to the Terminating Marker, Line Choice Connector, Incoming Link, Number Group Connector, Line Link and Block Relay Frames.
- 7.15 Fuse Alarm Test
- 7.151 Connect 48V through Test Receiver R-9572 to the frame fuse panel alarm bar. Observe that the major alarm sounds and that lamps FA and the associated Red Aisle Pilot light.
- 7.152 Remove the battery and observe that the alarm is silenced and lamps FA and Red Aisle Pilot are extinguished.
8. RELAYS (CF, CN, AND SF) AND (LC AND M) LOCKING GROUND
- 8.11 On the test of relays (CF, CN, and SF) and their associated leads, per Handbook 62, Section 224, and of relays (LC and M) and their associated leads, per Handbook 62, Section 211, the locking ground was not supplied so that a check for crosses could be made on these leads.
- 8.12 With relay GD operated to supply locking ground, check the locking path for each of these relays.
9. DOUBLE CONNECTION TEST
- 9.1 Block a terminating marker in the busy position (ground on the TM leads).
- 9.2 Set up and originate a test call to the busy marker. Observe that the trouble indicator will not connect to the busy marker and the test call is blocked. Remove the busy condition from the marker. Observe that the trouble indicator now connects to the marker and the call is completed satisfactorily.

10. MAKE BUSY

- 10.1 Operate the RM relay and check that the TTIB relay in each terminating marker is operated. Check that the RM relay operates when relays MT, DC, and HD are operated momentarily, one at a time.
- 10.2 Insert a make busy plug in the TIB jack associated with a terminating marker. Check that the TTIB relay of the marker operates. Make this test on each terminating marker.

11. MT KEY CHAIN CIRCUIT TEST

- 11.1 When making the terminating marker tests, check the chain circuit thru the MT keys by operating two or more MT keys to test calls and observing that in every case the lowest numbered operated key is effective.

No changes are indicated due to extensive revision

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Reason for Reissue:

- 1) Expand Paragraph 7
- 2) Revise Paragraph 8
- 3) Make a general revision to update to current engineering standards