LINE INSULATION TEST FRAME

MAINTENANCE AND CALIBRATION TESTS

NO. 1 AND NO. 5 CROSSBAR OFFICES

1. GENERAL

1.01 This section covers the method of performing the maintenance and calibration tests on the line insulation test frame in No. 1 and No. 5 crossbar offices.

1.02 This section replaces Sections A272.826 and A275.826. Test H, Traffic Count Registration Test, was not shown in the replaced sections.

1.03 The tests and the features tested are:

A. Short and Ring Ground Test

This test checks the ability of the test and control circuits to detect and register subscriber line insulation defects between the tip and ring conductors and between the ring conductor and ground.

B. Tip and Ring Ground Test

This test checks the ability of the test and control circuits to detect and register subscriber line insulation defects between the tip conductor and ground and between the ring conductor and ground.

C. Foreign EMF Test

This test checks the ability of the test and control circuits to detect and register subscriber line insulation defects between the tip conductor and battery and between the ring conductor and battery.

D. Off-Hook Test

This test checks the ability of the control circuit to recognize whether an off-hook condition exists and to record it as an OK line if the line is off-hook or as a trouble condition if the line is not off-hook.

E. Plug-Up Test

This test checks the ability of the control circuit to recognize a plugged-up line and to record it as an OK condition.

F. Calibration Check Test

This test checks that the test circuit is in calibration.

G. Calibration

This test provides the procedure for making calibration adjustments.

H. Traffic Count Registration Test

This test checks the ability of the control circuit to recognize and record busy line links and trunk links.

2. APPARATUS

Test G.

2.01 Screwdriver KS-2631, 4-1/2"

3. PREPARATION

STEP	ACTION	VERIFICATION
	Preparation Before Using Line Insulation Test Frame for Tests A. Through G.	
1	Operate all switches to position OFF	
2	Operate RN1 key momentarily	All lamps extinguished
3	Operate MT key momentarily	MT lamp lighted MT1 lamp lighted in approximately 60 seconds

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4. METHOD

STEP	ACTION	VERIFICATION
	A. Short and Ring Ground Test	
4	Operate S1 key momentarily	S1 lamp lighted
5	Refer to Table 1. Operate LR 1000Ω switch to lowest numbered position for which lamp indications are shown for the S1 key for the particular range limits used in the office	
6	Operate MTS key momentarily	MTS lamp lighted and lamps lighted as shown on Table 1
7	Operate MTR key momentarily	Lamps specified in step 6 extinguished
8	Repeat steps 5, 6 and 7 for the three remaining positions of the LR 1000Ω switch associated with the S1 key	
9	Operate RN key momentarily	S1 lamp extinguished
10	Repeat steps 4 to 9 inclusive using the S2 and S3 keys	S- lamp lights for the S- key operated
11	Operate LR 1000Ω switch to position OFF	
12	Repeat steps 4 to 10 inclusive using the LT 1000Ω switch	
13	Operate LT 1000Ω switch to position OFF	
14	Operate RN1 key momentarily if other tests are not to be made	All lamps extinguished
	B. Tip and Ring Ground Test	
4	Operate S4 key momentarily	S4 lamp lighted
5	Refer to Table 2. Operate LR 1000Ω switch to lowest numbered position for which lamp indications are shown for the S4 key for the particular range limits used in the office.	
6	Operate MTS key momentarily	MTS lamp lighted and lamps lighted as shown on Table 2
7	Operate MTR key momentarily	Lamps specified in step 6 extinguished
8	Repeat steps 5, 6 and 7 for the three remaining positions of the LR 1000Ω switch associated with the S4 key	
9	Operate RN key momentarily	S4 lamp extinguished
10	Repeat steps 4 to 9 inclusive using the S5 and S6 keys	S- lamp lights for the S- key operated
11	Operate LR 1000Ω switch to position OFF	
12	Repeat steps 4 to 10 inclusive using the LT 1000Ω switch	
13	Operate LT 1000Ω switch to position OFF	
14	Operate RN1 key momentarily if other tests are not to be made	All lamps extinguished

TABLE 1

Short and Ring Ground Test .32 1.25 MEG OHM 5.0 M								
		S1- S3 Keys (Range limits x 1000Ω)						
		S1 0-80	S1 0-160	S1 or S2 0-320	S2 0-640	S2 or S3 0-1250	S3 0-2500	S3 0-5000
Switch	Sw. Pos.	Lamp Indications						
LR 1000Ω	15	TO,RTK						
	30.1	T1,RTK	TO,RTK					
	59.7	T2,RTK	T1,RTK	TO,RTK RT2				
	120	OK	T2,RTK	T1,RTK RT2	TO,RTK			
	240		OK	T2,RTK	T1,RTK	TO,RTK RT1		
	481			OK	T2,RTK	T1,RTK RT2	TO,RTK	
	953				OK	T2,RTK RT2	T1,RTK	TO,RTK
	1870					OK	T2,RTK	T1,RTK
	3740						OK	T2,RTK
	7480							OK
	OFF							
LT 1000Ω	15	TO,RTO						
	30.1	T1,RT1	TO,RTO					
	59.7	T2,RT2	T1,RT1	TO,RTO				
	120	OK	T2,RT2	T1,RT1	TO,RTO			
	240		OK	T2,RT2	T1,RT1	TO,RTO		
	481			OK	T2,RT2	T1,RT1	TO,RTO	
	953				OK	T2,RT2	T1,RT1	TO,RTO
	1870					OK	T2,RT2	T1,RT1
	3740						OK	T2,RT2
	7480							OK
	OFF							

TABLE 2

Tip and Ring Ground Test								
		S4-S6 Keys (Range limits x 1000Ω)						
		S4 0-80	S4 0-160	S4 or S5 0-320	S5 0-640	S5 or S6 0-1250	S6 0-2500	S6 0-5000
Switch	Sw Pos.	Lamp Indications						
LR 1000Ω	15	TO,RTO						
	30.1	T1,RT1	TO,RTO					
	59.7	T2,RT2	T1,RT1	TO,RTO				
	120	OK	T2,RT2	T1,RT1	TO,RTO			
	240		OK	T2,RT2	T1,RT1	TO,RTO		
	481			OK	T2,RT2	T1,RT1	TO,RTO	
	953				OK	T2,RT2	T1,RT1	TO,RTO
	1870					OK	T2,RT2	T1,RT1
	3740						OK	T2,RT2
	7480							OK
	OFF							
LT 1000Ω	15	TO,RTK						
	30.1	T1,RTK	TO,RTK					
	59.7	T2,RTK	T1,RTK	TO,RTK				
	120	OK	T2,RTK	T1,RTK	TO,RTK			
	240		OK	T2,RTK	T1,RTK	TO,RTK		
	481			OK	T2,RTK	T1,RTK	TO,RTK	
	953				OK	T2,RTK	T1,RTK	TO,RTK
	1870					OK	T2,RTK	T1,RTK
	3740						OK	T2,RTK
	7480							OK
	OFF							

TABLE 3

Foreign EMF Test						
LR 1000Ω or LT 1000Ω Switch	S7-S9 Keys (Range limits x 1000Ω)					
	S7 0-320	S7 0-640	S7 or S8 0-1250	S8 or S9 0-2500	S8 or S9 0-5000	S9 0-10000
Sw. Pos.	Lamp Indications					
15						
30.1						
59.7	TO					
120	T1	TO				
240	T2	T1	TO			
481	OK	T2	T1	TO		
953		OK	T2	T1	TO	
1870			OK	T2	T1	TO
3740				OK	T2	T1
7480					OK	T2
OFF						OK

STEP	ACTION	VERIFICATION
	C. Foreign EMF Test	
4	Operate S7 key momentarily	S7 lamp lighted
5	Refer to Table 3. Operate LR 1000Ω switch to lowest numbered position for which a lamp indication is shown for the S7 key for the particular range limits used in the office	
6	Operate MTS key momentarily	MTS lamp lighted and lamp lighted as shown on Table 3
7	Operate MTR key momentarily	Lamps specified in step 6 extinguished
8	Repeat steps 5, 6 and 7 for the three remaining positions of the LR 1000Ω switch associated with the S7 key	
9	Operate RN key momentarily	S7 lamp extinguished
10	Repeat steps 4 to 9 inclusive using the S8 and S9 keys	S- lamp lights for the S- key operated
11	Operate LR 1000Ω switch to position OFF	
12	Repeat steps 4 to 10 inclusive using the LT 1000Ω switch	

STEP	ACTION	VERIFICATION
13	Operate LT 1000Ω switch to position OFF	
14	Operate RN1 key momentarily if other tests are not to be made	All lamps extinguished
	D. Off-Hook Test	
4	Operate S1 key momentarily	S1 lamp lighted
5	Operate OHO key momentarily	TO relay operated momentarily OHO, OK lamps lighted
6	Operate MTR key momentarily	OHO, OK lamps extinguished
7	Operate OHNO key momentarily	OHNO, TO, RTO lamps lighted
8	Operate MTR key momentarily	OHNO, TO, RTO lamps extinguished
9	Operate RN key momentarily	S1 lamp extinguished
10	Operate RN1 key momentarily if other tests are not to be made	All lamps extinguished
	E. Plug-Up Test	
4	Operate S6 key momentarily	S6 lamp lighted
5	Operate PU key momentarily	PU relay operated momentarily PU, OK lamps lighted
6	Operate MTR key momentarily	PU, OK lamps extinguished
7	~~Operate RN key momentarily~~	~~S6 lamp extinguished~~ NO
8	Operate RN1 key momentarily if other tests are not to be made	All lamps extinguished
	F. Calibration Check Test	
4	Allow a minimum of ten minutes before starting test	
5	Operate S5 key momentarily	S5 lamp lighted
6	Operate LR 1000Ω switch to position CAL	
7	Operate CAL 1000Ω switch to position 160-OP-TO	
8	Operate MTS key momentarily	MTS, TO lamps lighted. Disregard RT-, RTK lamps for this test. If T1 lamp is lighted, proceed to test G.
9	Operate MTR key momentarily	MTS, TO lamps extinguished
10	Operate CAL 1000Ω switch to position 160-NO-T1	
11	Operate MTS key momentarily	MTS, T1 lamps lighted. If TO lamp is lighted, proceed to test G.
12	Operate MTR key momentarily	MTS, T1 lamps extinguished
13	Operate CAL 1000Ω switch to position 320-OP-T1	

STEP	ACTION	VERIFICATION
14	Operate MTS key momentarily	MTS, T1 lamps lighted. If T2 lamp is lighted, proceed to test G.
15	Operate MTR key momentarily	MTS, T1 lamps extinguished
16	Operate CAL 1000Ω switch to position 320-NO-T2	
17	Operate MTS key momentarily	MTS, T2 lamps lighted. If T1 lamp is lighted, proceed to test G.
18	Operate MTR key momentarily	MTS, T2 lamps extinguished
19	Operate CAL 1000Ω switch to position 640-OP-T2	
20	Operate MTS key momentarily	MTS, T2 lamps lighted. If OK lamp is lighted, proceed to test G.
21	Operate MTR key momentarily	MTS, T2 lamps extinguished
22	Operate CAL 1000Ω switch to position 640-NO-OK	
23	Operate MTS key momentarily	MTS, OK lamps lighted. If T2 lamp is lighted, proceed to test G.
24	Operate MTR key momentarily	MTS, OK lamps extinguished
25	Operate LR 1000Ω switch to position OFF	
26	Operate LT 1000Ω switch to position CAL	
27	Repeat steps 7 to 24 inclusive	
28	Operate CAL 1000Ω switch to position OFF	
29	Operate LT 1000Ω switch to position OFF	
30	Operate RN key momentarily	S5 lamp extinguished
31	Operate RN1 key momentarily if other tests are not to be made	All lamps extinguished

G. Calibration

4	Allow a minimum of 10 minutes before starting test	
5	Operate S5 key momentarily	S5 lamp lighted
6	Operate LR 1000Ω switch to position CAL	
7	Operate CAL 1000Ω switch to position CAL-160	
8	Operate MTS key momentarily	MTS and either TO or T1 lamps lighted. Disreguard RT-, RTK lamps for this test
9	If TO lamp is lighted, rotate AGC potentiometer very slightly in a counter-clockwise direction. If T1 lamp is lighted, proceed to step 13	
10	Operate MTR key momentarily	MTS, TO lamps extinguished

STEP	ACTION	VERIFICATION
11	Repeat steps 8, 9 and 10 until a change from the TO to T1 lamp occurs. If the AGC potentiometer reaches the adjustment limit before the change occurs, it indicates a wiring change is required in the line insulation test circuit. In this case, remove N wiring, if provided, or change wiring from S to R option and then repeat test starting at step 8	
12	Operate MTS key momentarily	MTS, T1 lamps lighted
13	Rotate AGC potentiometer very slightly in a clockwise direction	
14	Operate MTR key momentarily	MTS, T1 lamps extinguished
15	Repeat steps 12, 13 and 14 until a change from the T1 to TO lamp occurs. If the AGC potentiometer reaches the adjustment limit before this change occurs, it indicates a wiring change is required in the line insulation test circuit. In this case, change R option to S option, if not already provided, or add N wiring and then repeat test starting at step 8	
16	Operate CAL 1000Ω switch to position CAL-320	
17	Operate MTS key momentarily	MTS and either T1 or T2 lamps lighted
18	If T1 lamp is lighted, rotate M potentiometer very slightly in a counterclockwise direction. If T2 lamp is lighted, proceed to step 22	
19	Operate MTR key momentarily	MTS, T1 lamps extinguished
20	Repeat steps 17, 18 and 19 until a change from the T1 to T2 lamp occurs	
21	Operate MTS key momentarily	MTS, T2 lamps lighted
22	Rotate M potentiometer very slightly in a clockwise direction	
23	Operate MTR key momentarily	MTS, T2 lamps extinguished
24	Repeat steps 21, 22 and 23 until a change from the T2 to T1 lamp occurs	
25	Operate CAL 1000Ω switch to position CAL-640	
26	Operate MTS key momentarily	MTS and either T2 or OK lamps lighted
27	If T2 lamp is lighted, rotate H potentiometer very slightly in a counterclockwise direction. If OK lamp is lighted, proceed to step 31	
28	Operate MTR key momentarily	MTS, T2 lamps extinguished
29	Repeat steps 26, 27 and 28 until a change from the T2 to OK lamp occurs	

STEP	ACTION	VERIFICATION
30	Operate MTS key momentarily	MTS, OK lamps lighted
31	Rotate H potentiometer very slightly in a clockwise direction	
32	Operate MTR key momentarily	MTS, OK lamps extinguished
33	Repeat steps 30, 31 and 32 until a change from the OK to T2 lamp occurs	
34	Perform Test F., Calibration Check Test. Start at step 7.	

H. Traffic Count Registration Test

1	Operate RN1 key momentarily	
2	Operate RGT key momentarily	RGT lamp lighted
3	Operate LL-TL key to position LL	
4	Operate LB0, LB2, LB4, LB6, LB8 keys	
5	Record reading of R register	
6	Operate RTS key momentarily	EG lamp lighted R register reads 5 higher than in step 5
7	Operate RTR key momentarily	EG lamp extinguished
8	Operate LB1, LB3, LB5, LB7, LB9 keys	
9	Operate RTS key momentarily	EG lamp lighted R register reads 10 higher than in step 6
10	Operate RTR key momentarily	EG lamp extinguished
11	Restore LB0, LB2, LB4, LB6, LB8 keys	
12	Operate RTS key momentarily	EG lamp lighted R register reads 5 higher than in step 9
13	Operate RTR key momentarily	EG lamp extinguished
14	Restore all LB- keys	
15	Operate RTS key momentarily	EG lamp lighted R register reads same as in step 12
16	Operate RTR key momentarily	EG lamp extinguished
17	Operate LB0, LB1 keys	
18	Operate RTS key momentarily	EG lamp lighted R register reads 2 higher than in step 15
19	Operate RTR key momentarily	EG lamp extinguished
20	Restore LB1 key	
21	Repeat steps 17 to 20 inclusive using LB2 to LB9 key in succession instead of LB1 key	For each repeat tests, R register reads 2 higher than previous reading
22	Restore LB0, LB9 keys	

STEP	ACTION	VERIFICATION
23	Operate LL-TL key to position TL	
24	Operate LB0, LB2, LB4, LB6, LB8 keys	
25	Operate RTS key momentarily	EG lamp lighted R register reads 5 higher than in step 21
26	Operate RTR key momentarily	EG lamp extinguished
27	Restore all LB- keys	
28	Operate LB1, LB3, LB5, LB7, LB9 keys	
29	Operate RTS key momentarily	EG lamp lighted R register reads 5 higher than in step 25
30	Operate RTR key momentarily	EG lamp extinguished
31	Restore all LB- keys	
32	Operate RN1 key momentarily	RGT lamp extinguished