BELL SYSTEM PRACTICES
Plant Series

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SECTION 215-259-906PT
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SUBSCRIBER SENDER TEST FRAME SD-21026-011 TESTS PANEL OFFICES

1. GENERAL

1.01 This section describes a method of testing the subscriber decoder type sender test frame per SD-21026-011, which is used in connection with subscriber senders in panel offices. A check of equipment for condition and the measurement of certain resistance paths which involve current flow features are also described.

1.02 The information in this section is under the following headings:

1.03 The purpose of these tests and inspection is to insure that the subscriber sender test frame satisfactorily performs the functions for which it was designed, that wrong requirements are not applied, and that the mechanical features of the equipment and the appurtenances are in a satisfactory condition. It is important that the tests imposed by the test frame are made as intended, for if they are more severe than required, maintenance may become unnecessarily difficult, and if not severe enough, the equipment and service may suffer.

2. APPARATUS

2.01 No. 184 Plugs, as required.

2.02 No. 267B Tools, as required.

2.03 No. 136B Tools, as required.

2.04 No. 32A Test Set.

2.05 Portable Wheatstone Bridge, with connecting cords.

3. METHOD

(A) Check of Equipment for Condition

3.01 This inspection should cover the following items:

(a) A check for worn, broken, mutilated and missing parts.

(b) A check of the designation strips to see that they are in good condition.

(c) A check of the particular number chart to see that it is in good condition and that the tests applied are as outlined in Section 215-132-502.

(d) A check to determine that no unauthorized circuit changes, equipment modifications or adjustments exist in the test frame.

(e) A check of the precision type interrupter for condition and adjustment.

(B) Check of Certain Resistance Paths

3.02 This test may be made independently of the other tests and need not be done each time that the frame is inspected or its operation checked.

3.03 Before making any resistance measurements, open the battery supply to the test frame by removing the No. 35 type fuses at the frame fuse panel. Stop the drive motor and the precision type interrupter.

3.04 The resistance paths shown in Table A should be measured, using the portable Wheatstone Bridge, and any defects noted should be corrected:

(C) Current Flow Test

3.05 A current flow test should be made on the call indicator pulsing relays.

TABLE A

Resistances and Relays Measured	Connect Bridge X 1	Connect Bridge X 2	Block Switch	Keys Operated	Relays Operated	Insulate	Resistance Values Rated	Min.	Max.
CJ res.	D.F. Post	F3 Cam	R3 pos. 6	SLA	-	-	700	665	735
TG res.	4T(1P1)	E4 Cam	R4 pos. 7	-	-	-	14500	14355	14645
TG res. parallel BE & BF res.	4T(1P1)	E4 Cam	R4 pos. 7	-	SL	1-2 & 3-4 B (SL)	2820	2800	2840
MTG,BA,BB res. & MTG relay	4T (BK)	1T (INT)	-	-	-	3-4T (BK)	11675	11478	11872
TTG res. & TTG relay	4T (BK)	1T (SLA)	-	-	-	3-4T (BK)	22500	21979	23025
TC relay & MT,BC res.	3T (BK)	2P (INT)	-	-	-	3-4T(BK) & SS1-J5	10435	10217	10651
AJ & AK res.	SS3-F3	SS3-N3	R3 pos. 2	-	-	SS3-F3 & SS3-N3	600	594	606
CE,CF,CG res. parallel TRY relay & CH res.	1B (RV1)	3B (RV2)	R1 pos. 5	-	-	2-3B (RV2) SS1 & 2 - E1	2666	2533	2799
BG res.	3B (OF2)	1T (P1)	-	-	-	2-3B (OF2)	37	35.15	38.85
CN2 relay & AB & AA res.	4B (CN4)	3B (CN3)	-	-	-	-	7000	6650	7350
CN2 relay & AB,AA,W,X, res.	4B (CN4)	3B (CN5)	-	-	-	2-3B (CN5)	8710	8274	9146
CN2 relay & AB,AA,W,X, Y,Z res.	4B (CN4)	3T (CN1)	-	-	-	1-3T (CN1)	10665	10131	11199
V res.	GBD.	2T (CN1)	-	SGT-NO	-	-	500	495	505
LK res.	N2 Cam	1T (AD)	-	-	MAX-LINE	3-5T (PU), A & D Int	10000	9500	10500
T res.	4T (PU)	1T (AD)	-	-	-	SS2-K2, 3-5T (PU)	500	495	505
R res.	L2 Cam	N2 Cam	R2 pos. 2	-	-	3-5T (PU), SS1, 3 & 4 - L2	500	495	505
AW & AX res.	SS2-V2	SS2-Y2	R2 pos. 4	-	FT or FR	-	800	792	808
Part of D res. (Fig. AD)	3T (C1)	V5 Cam	-	-	-	-	400	396	404
D & E res. (Fig. AD)	3T (C1)	V5 Cam	-	OFT	-	-	1600	1782	1818
AC res.	G3 Cam	E3 Cam	R3 pos. 4	-	OFF 300	-	300	297	303
AC & AD res.	G3 Cam	E3 Cam	R3 pos. 4	-	OFF 600	-	600	594	606
A & AH res.	G3 Cam	E3 Cam	R3 pos. 4	-	OFF 700	-	700	693	707
AC,AD & AE res.	G3 Cam	E3 Cam	R3 pos. 4	-	OFF 900	-	900	891	909
AC,AD & AH res.	G3 Cam	E3 Cam	R3 pos. 4	-	OFF 1000	-	1000	990	1010
AC,AD,AE & AH res.	G3 Cam	E3 Cam	R3 pos. 4	-	OFF 1300	-	1300	1287	1313
AC,AD,AE,AH & AF res.	G3 Cam	E3 Cam	R3 pos. 4	-	OFF 1600	-	1600	1584	1616
AC res.	G3 Cam	E3 Cam	R3 pos. 9	-	BOF 300	-	300	297	303
AC & AD res.	G3 Cam	E3 Cam	R3 pos. 9	-	BOF 600	-	600	594	606
AC & AU res.	G3 Cam	E3 Cam	R3 pos. 9	-	BOF 700	-	700	693	707
AC, AD & AE res.	G3 Cam	E3 Cam	R3 pos. 9	-	BOF 900	-	900	891	909
AC, AD & AU res.	G3 Cam	E3 Cam	R3 pos. 9	-	BOF 1000	-	1000	990	1010
AC,AD,AE & AU res.	G3 Cam	E3 Cam	R3 pos. 9	-	BOF 1300	-	1300	1287	1313
AC,AD,AE,AF & AU res.	G3 Cam	E3 Cam	R3 pos. 9	-	BOF 1600	-	1600	1584	1616
BL res.	G3 Cam	GRD.	R3 pos. 6	-	BOF 300	-	300	297	303
BL & BM res.	G3 Cam	GRD.	R3 pos. 6	-	BOF 600	-	600	594	606
BL,BM & BN res.	G3 Cam	GRD.	R3 pos. 6	-	BOF 900	-	900	891	909

The TEST values should be used in making this check. If the relays operate satisfactorily on these values, no steps should be taken to change the adjustment. If readjustments are made, however, the READJUST values should be used. The following relays should be checked: SN-, SN+ and MG.

(D) Test of Frame for Proper Operation

3.06 This test is made to determine that the sender test frame properly performs its major functions.

3.07 Reference should be made to Section 215-132-502 for instructions as to the operation of the test frame and to the Circuit Description per CD-21026-011, for a detailed description of the circuit operation.

3.08 In this test, a sender is used to check the operation of the test frame. A number of trouble conditions are simulated in the sender and the test frame is checked for the proper indication of failure. Before each trouble condition is checked, a test call should be run at least once to insure that no trouble has been introduced in the test frame or sender by the previous tests, and that the frame is set up correctly.

3.09 A sender should be selected for the test which can be easily observed from the test frame.

3.10 During the progress of the test, every precaution should be taken to keep the sender used for the test, out of service, so that it will not cause a service reaction.

3.11 In the following procedure, any tests that are described which do not apply to the particular frame under test should be disregarded.

3.12 Particular Circuit Feature. Operate the PC key. Set the test circuit on the sender selected for the test, by operating the M, M1 and S keys. Set up a full selector code on the test frame keys, which requires the use of the MTG relay and that skips office selections.

3.13 Operate the MTG, LP, REP and ST keys, and release the PC key. If a coin sender is used for the test, operate the FC key. Note that the test frame completes the call.

3.14 Busy Test, Time Alarm and SC Relay Test. Block the sender MB relay operated. In case the sender is wired so that the test frame can test over a make-busy plug, block the SB relay operated. Operate and release the CA key. The SB lamp should light. After an interval, the TA, aisle pilot and floor alarm lamps should light and the alarm bell should ring.

3.15 Operate the TA key. The TA, aisle pilot, and floor alarm lamps should be extinguished and the alarm bell should stop ringing.

3.16 Block the SC1 relay normal and remove the block from the MB relay. The SB lamp should be extinguished and the SC lamp should light. Remove the block from the SC1 relay and operate the CA key.

3.17 MTG Relay Non-Operate Test. Short circuit the test frame MTG resistance. Release the CA key. The sender MTG relay should operate during the non-operate test, causing the test frame to stop with the MTG-NO lamp lighted. Operate the CA key.

3.18 MTG Relay Operate Test. Release the CA key. Block the sender TG2 relay normal. The test frame should stop with the MTG-OPR lamp lighted.

3.19 Remove the block from the TG2 relay and operate the CA key.

3.20 Incoming Advance. Release the CA key. Block the sender AV1 relay normal. The test frame should stop in position 16 of the R3 switch with the OF lamp lighted.

3.21 Remove the block from the AV1 relay, then operate and release the CA key.

3.22 Block the sender 1A relay normal. The test frame should stop in position 16 of the R3 switch with the FG lamp lighted.

3.23 Remove the block from the 1A relay and operate the CA key.

3.24 Release the CA key. Insulate top spring contacts 3 and 4 of the sender

1A relay. The test frame should stop in position 15 of the R3 switch with the 1A lamp lighted.

3.25 Remove the insulator from the 1A relay contacts and operate the CA key.

3.26 Link Dismissal and Talk Selection. Release the CA key. After the test frame has started to test the sender, insulate the sender LR1 relay contacts through which the 270 ohm battery is connected to the TR lead. The test frame should stop in position 17 of the R3 switch with the LD lamp lighted.

3.27 Remove the insulator from the LR1 relay contacts, then operate and release the CA key.

3.28 Insulate the sender SS2-X2 cam spring after the frame has started to test the sender. The test circuit should stop in position 17 of the R3 switch with the TS, FR and LD lamps lighted.

3.29 Remove the insulation from SS2-X2 cam spring, then operate and release the CA key.

3.30 Step-By-Step Dialing. Operate the DSS key. Observe that the test circuit dials one digit for each operation and release of the AD key. Restore the DSS key.

3.31 Step-By-Step Checking. Operate the SS key. Observe that the sender completes one selection for each operation and release of the SA key. Restore the SS key.

3.32 Remote Control. Insert the No. 110 plug of the 32A test set into the remote control jack that is associated with the test frame. Operate and release the red button of the 32A test set and note that the test frame advances.

3.23 Operate the DSS key. Note that the operation of the white button of the 32A test set causes the test frame to dial one digit.

3.34 Disconnect the 32A test set and restore the DSS key to normal.

3.35 Special Pulse Feature. Operate the SP key. Observe that the sender stepper operates, after district selections, in response to the slow pulse interrupter. Operate the PL-LP key and observe the pulse lamps as selections are checked. Restore the SP key.

3.36 Dial Tone Test. Operate the DT key. As soon as the DT lamp lights, listen for dial tone with the receiver that is provided for this purpose. Operate and release the DTA key and the test frame should advance. Restore the DT key.

3.37 Synchronizing. After the sender has completed district selections, manually operate the register relays ahead of of the test frame. The test frame should stop with the S lamp lighted.

3.38 Preliminary Pulse. Observe the sender A1 relay during the dialing of the A digit to see that it operates twice, once for the preliminary pulse and once when the A register is dialed.

3.39 Operate the PP key. The preliminary pulse should be cancelled. Restore the PP key and operate the CA key.

3.40 Coin Test. Where coin senders are tested, set the frame on a coin sender then run several tests to insure that the frame and sender are operating satisfactorily. Operate the CA key.

3.41 Non-Operate Test of GT Relay. Operate the F1 and MAX-LINE keys and release the CA key. Observe the sender and as soon as it has reached coin test, manually operate the sender GT relay. The test frame should stop with the coin and S lamps lighted. Operate the CA key.

3.42 Operate Test of GT Relay. Release the CA key. Block the GT relay non-operated. The test frame should stop with the coin lamp lighted. Remove the block from the GT relay and operate the CA key.

3.43 Non-Operate Test of SGT Relay. Release the CA key and operate the SGT-NO key. Observe the sender and, as soon as it has reached coin test, manually operate the sender SGT relay. The test frame should stop with the coin lamp lighted. Operate the CA key.

3.44 Operate Test of the SGT relay. Operate the SGT-OPR key and release the SGT-NO and the CA keys. Block the sender SGT relay non-operated. The test frame should stop with the coin and S lamps lighted.

3.45 Remove the block from the SGT relay and operate the CA key.

3.46 TG Relay Test. Use an operator class code, requiring the use of the sender TG relay. Release the CA key. Block the sender TG2 relay normal during office brush or group selections, if office selections are made, or as soon as the test starts, if office selections are skipped. The test frame should stop with the TG lamp lighted.

3.47 Remove the block from the TG2 relay and operate the CA key.

3.48 TG Relay Test. Set up a call indicator code under ten thousand without stations that does not require office selections. Repeat several times to insure that the test frame is set and operating correctly. Block the TG2 relay normal. The test frame should stop with the STA and 1MP lamps lighted.

3.49 Remove the block from the TG2 relay, and operate the CA key.

3.50 Station Delay A. Set up a code for an office having numbers above 9,999 and a number between 10,000 and 10,499. Block the sender SD and SD1 relays normal. The call should be completed.

3.51 Change the code and number to a number below 10,000 with a party letter, where there are jack per line offices. The call should be completed.

3.52 Station Delay B. Set up a number above 9,999. Block the senders SD1 normal and the SD operated. Operate the SD key. The call should be completed.

3.53 Change the numerical digits to a number below 10,000 with STAT-O operated. Release the SD key. The test should be completed.

3.54 Station Delay C. Set up a number below 10,000 with STAT-O operated and SD key normal. Block the sender relays SD and SD1 operated. The test should be completed.

3.55 With the same set-up, block the sender relays SD normal and SD1 operated. The test should stop with the SD lamp lighted.

3.56 Station Delay D. Set up a number below 10,000 with a party letter. Block the sender relays SD and SD1 operated and operate the SD key. The call should be completed.

3.57 With the same set-up, dial stations digit 0, the test should be completed because the SD key is operated and the sender times for party letter.

3.58 With the same set-up, block the sender relay SD operated, in addition to the SD1. The test should stop with the SD lamp lighted.

3.59 Incoming to Overflow. Set up a full selector code. Operate class key 2. Start the frame and note that the call is completed. Block the sender relay OF1 non-operated. The test frame should stop with the LD lamp lighted.

3.60 Remove the block from the OF1 relay and operate the CA key.

3.61 Sender Normal. Release the CA key. After the test frame has started, block the SB relay operated. The test frame should stop with the SDR-NOR lamp lighted. Remove the block from the SB relay and operate the CA key.

3.62 Late Release. Use the same set-up as in the last test, with the exception that class key 7 should be operated. Block the sender relay LR non-operated and release the CA key. The test frame should stop with the MTG-OPR lamp lighted.

3.63 Register Control Test. Operate the MAX-LINE and DPLB, and class 8 keys. Use the same code as above but set all O's on the numerical keys. Block the sender relay UC normal, then operate and release the CA key.

3.64 Remove the block from the UC relay and operate the CA key.

3.65 Manual Pass Busy. Make the three next senders that the test frame has access to busy. Release the REP and CA keys. The SB lamp should light. Observe that the sender connector switch advances one step with the operation and release of the MPB key.

3.66 Automatic Pass Busy. Operate the APB key. After an interval, the sender selector switch should advance one step and stop on the next sender. After another interval, the selector switch should advance again. Restore the test frame to normal.

3.67 End of Cycle. Set the test frame on the next to the last sender to be tested in a normal cycle. After testing the last two senders, the EC lamp should light and the alarm bell should ring, indicating the end of the cycle.

3.68 Release the ST key and the frame should restore to normal.

4. REPORTS

4.01 The required record of these tests should be entered on the proper form.