

This Practice Released on:.....

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B.S.P.M. #..... O. & E. List #.....

**FINAL SELECTOR TEST FRAME SD-20043-011  
TESTS  
BATTERY CUTOFF PANEL OFFICES**

**1. GENERAL**

1.01 This section describes the method of testing the final selector test frame per SD-20043-011, which is used in connection with final selectors in battery cutoff relay type panel offices. A check of the equipment for condition and the measurement of certain resistance paths involving current flow features are also described.

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

1. GENERAL
2. APPARATUS
3. METHOD
  - (A) Check of Equipment for Condition
  - (B) Check of Certain Resistance Paths
  - (C) Test of Frame for Proper Operation
4. REPORTS

1.03 The purpose of these tests and inspection is to insure that the final selector 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 extremely important that the tests imposed 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. 235B Tools, as required.
- 2.05 No. 357 Tools, as required.

2.06 Portable Wheatstone Bridge, with 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 and the particular circuit locating chart, to determine that they are in good condition and are correct.
- (c) Check to determine that no unauthorized circuit changes, equipment modifications or adjustments exist in the frame.

**(B) Check of Certain Resistance Paths:**

3.02 The check of resistance paths 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.

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) Test of the Frame for Proper Operation:**

3.05 This test is to determine that the final selector test frame properly performs its major functions.

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3.06 Reference should be made to Section 215-532-501, for instructions as to the operation of the test frame and to Circuit Description per CD-20043-01, for the detailed description of the circuit operation.

3.07 This test is made by checking the test frame against a final selector which is made to simulate a number of trouble conditions. Before making the test, a multi-test should be run on the final selector circuit used for the test, to insure that it is in working order. In selecting a circuit for the test, it is desirable that it be so located that it may be easily observed from the test frame. From the particular circuit chart, determine the three final selectors which are tested before the one selected. Make all four of these final selectors busy. Note the incoming selector used to gain access to them.

3.08 Busy Test Line. Make busy the incoming test selector, associated with the finals to be tested, by inserting a plug in the MB jack at the OGT board. Make terminal 99 in bank 0 of the final frame

busy by blocking a final selector in position 13 and setting it manually on the terminal.

3.09 Set up the particular circuit for the first of the four final selectors used in the test. Operate the HT-IDLE key and then release the PC key. The TL lamp should light.

3.10 Busy Incoming Test Selector. Release the blocked final selector. The TL lamp should be extinguished and the B1 lamp should light.

3.11 Time Alarm - Manual and Automatic Pass Busy. Remove the make-busy plug from the make-busy jack of the incoming test selector. The B1 lamp should be extinguished and the BF lamp should light. After an interval, the BF, floor alarm and aisle pilot lamps should light and the alarm bell should ring.

3.12 Operate and release the TA key. The BY, aisle pilot and floor alarm lights should be extinguished and the alarm bell should stop ringing.

TABLE A

Resistances and Relays Measured	Connect Bridge		Sw.Pos.		Relays Operated	Keys Operated	Resistance Values		
	X 1	X 2	R 3	R 4			Rated	Min.	Max.
<u>Hunt Busy Line Sleeve Condition</u>									
N & AH res.	1B(T2) rel.	SS4-H3	1	1	-	-	243	241	245
N,AJ res. & CO relay	1B(T2) rel.	"C" bat. fuse post	3	1	See Note	-	615	599	631
Note: - Insulate SS4-H3 and connect C & E bat. fuse panel.									
<u>Idle Line Sleeve Condition</u>									
N.U & V res.	1B(T2) rel.	"C" bat. fuse post	1	1	-	-	2885	2816	2954
<u>Direct Busy Line Sleeve Condition</u>									
N res. & CO relay	1B(T2) rel.	"C" bat. fuse post	2	1	-	-	1115	1064	1166
N & R res.	1B(T2) rel.	SS3-G4	2	1	-	-	285	282	288
<u>Check Final 112 Ohm Resistance</u>									
AE,AF res. & SS relay	1B(T2) rel.	SS3-G4	4	1	NT	-	135	130	140
<u>C Relay Hold Test</u>									
CE & CF res.	Ground	SS3-T4	1	9	SB1 & SB2	-	1580	1564	1596

TABLE A (Cont'd)

Resistances and Relays Measured	Connect Bridge		Sw.Pos.		Relays Operated	Keys Operated	Resistance Values		
	X 1	X 2	R 3	R 4			Rated	Min.	Max.
<u>C Relay Release Test</u> CA, CB, CC, CD, CE & CF resistances	Ground	SS3-T4	1	9	SB2	-	9848	9750	9946
<u>S Relay Operate Test</u> SC resistance	Ground	SS1-P4	1	6	NC & NT	-	1700	1683	1717
<u>S Relay Non-Operate Test</u> SE res. & S relay	Ground	SS1-P4	1	6	NC	-	1250	1234	1266
SD res. & S relay	SS2-V3	SS1-P4	2	6	NC	-	980	967	993
<u>C Relay Operate Test</u> D,AK res. & T relay in parallel	"C" bat. fuse post	SS1-P4	1	2	L1	-	615	597	633
<u>Check of 400 Ohm Winding of T</u> AC, AD res. & BG2 relay	"C" bat. fuse post	SS3-S3	1	1	-	-	2095	2062	2128
<u>Check of 25 Ohm Winding of C</u> B res. & SL relay	"C" bat. fuse post	SS2-J2	1	10	SL	-	852.2	810	895
<u>S Relay Operate Test - No Test Release</u> B,AA res. & SL relay in parallel	"C" bat. fuse post	SS2-J2	4	10	SL	-	360.5	343	378
<u>PBX Busy Sleeve Condition</u> W,X,Y res. & NE relay	"C" bat. fuse post	S1 Termi- nal at T.S.	1	1	-	-	4580	4662	4698
<u>T Relay Test</u> TA,TB,TC,TD & TE resistances	"C" bat. fuse post	S1 Termi- nal at T.S.	8	1	-	T-RY	11950	11830	12070

3.13 Momentarily operate the MPB key and note that the incoming test selector advances one terminal. Remove the make-busy plug from the final selector used for the test and operate the APB key. The incoming test selector should advance over the two busy final terminals and should start to test the fourth of the final selectors used for the test. Operate the CA key.

3.14 Trouble Alarm. Block the final selector C relay normal and release the CA key. After an interval, the TBL, TF and floor alarm lamps should light and the alarm

bell should ring. Operate and release the TA key. Operate the REP and CA keys, then release the APB key. Remove the block from the C relay.

3.15 Open in Line 98 Sleeve. Block the test frame NE relay non-operated. Release the CA key. The test switch should stop in position 9. Operate the CA key.

3.16 Continuity Test Check. Remove the block from the NE relay. Insert a 184 plug in the J jack of the final frame. Release the CA key. The test switch

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should stop in position 9. Operate the CA key.

3.17 Block the test frame NE relay non-operated. Release the CA key. Short-circuit the tip and ring elements of the final brush after the test frame has blocked and the final selector has reached terminal 99. Place the short-circuit on the tip and ring by placing No. 357 tools on the tip and ring and connect the tools with a cord. Manually operate the NE relay. The test switch should stop in position 10. Remove the short-circuit from the tip and ring. Operate the CA key.

3.18 Block the NE relay normal. Release the CA key. The test frame should stop in position 9. Place a ground on the tip brush spring of the final selector. Manually operate the NE relay. The test switch should remain in position 9. Remove the ground from the tip brush spring. Operate the CA key.

3.19 Block the NE relay normal. Release the CA key. Note that the test switch stops in position 9. Place 48-volt battery on the tip brush spring at the final selector. Manually operate the NE relay. Note that the test switch remains in position 9. Remove battery from the tip brush spring. Operate the CA key.

3.20 Open in 25 Ohm Winding of Final C Relay. Insulate the SS3-Q cam of the final selector. Release the CA key. The test switch should stop in position 11. Operate the CA key.

3.21 Remove the insulator from the SS3-Q cam. Insulate top spring contacts 2 and 3 of the final selector TK relay. Release the CA key. The test switch should stop in either position 10 or 11. Operate the CA key. Remove the insulator from the TK relay.

3.22 Final C Relay Hold Test. Block the test frame H relay normal. Release the CA key. Manually release the final selector C relay. Remove the block from test frame H relay. The test sequence switch should remain in position 11. Operate the CA key.

3.23 C Relay Release Test. Operate the CR key. Block the test frame H

relay normal and release the CA key. The test switch should stop in position 11. Block the final C relay operated. The test switch should stop in position 14. Remove the block from the H relay. The test switch should remain in position 14. Operate the CA key. Remove the block from the final selector C relay. Release the CR and HT-IDLE keys.

3.24 Short in the 1000 Ohm Winding of the TK Relay. Operate the DIR-BY key. Shunt the 1000 ohm winding of the final selector TK relay by placing 48-volt battery on the SS2-K cam of the final selector sequence switch. Release the CA key. The test switch should stop in position 9. Operate the CA key.

3.25 Short in 400 Ohm Winding of TK Relay. Remove the shunt from the 1000 ohm winding of the TK relay. Short circuit the 400 ohm winding of the TK relay. This should be done by connecting sequence switch cam springs SS1-J to SS2-N of the final selector with No. 357 tools and a cord. Release the CA key. If the final selector stops in position 13, manually advance it to position 14. The test switch should stop in position 9. Operate the CA key, and remove the short circuit from the 400 ohm winding of the TK relay. Release the DIR-BY key.

3.26 Final S Relay Operate Test. Operate the NT key. Insulate bottom contacts 5 and 6 of the test frame NT relay. Release the CA key. The test switch should stop in position 9. Operate the CA key.

3.27 Short in Final 112 Ohm Resistance. Remove the insulator from the contacts of NT relay. Short circuit the 112 ohm A resistance and release the CA key. The test switch should stop in position 9. Operate the CA key.

3.28 Final S Relay Operate Test. Remove the short circuit from the final selector A resistance. Block the test frame SB1 relay normal and release the CA key. Block the final selector S relay normal. Remove the block from SB1 relay. The test switch should stop in position 11 and, after an interval, it should move to position 12 and stop. Operate the CA key.

3.29 Open Final Sleeve - Busy Condition. Remove the block from final selector S relay. Block the SB1 relay normal. Release

the CA key. Insulate the SS2-R cam spring of final selector switch. Remove the block from SB1 relay. The test switch should stop in position 11. Operate the CA key.

3.30 Open in Final 112 Ohm Resistance.

Operate and release the TA key then release the NT keys. Operate the TMR key. Remove the insulator from SS2-R cam spring. Insulate cam spring SS1-M of the final selector switch and release the CA key. The test switch should stop in position 6 or 9. Operate the CA key.

3.31 False Final Advance on TM Release.

Remove the insulator from cam spring SS1-M. Release the CA key. When the final switch advances to position 16, manually advance it to position 17. The test switch should stop in position 12. Operate the CA key.

3.32 False Release of Final C Relay.

Release the CA key. When the final switch reaches position 16, manually release the final selector C relay. The test switch should stop in position 12.

3.33 Open T.O. Interrupter Circuit.

Insulate cam spring SS2-P of the final sequence switch. Operate and release the CA key. The test switch should stop in position 12. Operate the CA key.

3.34 Open X Commutator.

Remove the insulator from cam spring SS2-P. Insulate cam spring SS3-B of the final switch. Release the TMR key and operate the TT key. Release the CA key. The test switch should stop in position 6. Operate the CA key.

3.35 Open in Final Sleeve Busy Condition.

Remove the insulator from cam spring SS3-B. Insulate top contacts 2 and 3 of the final selector TK relay. Release the TT key and operate the ER key. Release the CA key. The test switch should stop in position 4. Operate the CA key.

3.36 Brush Continuity Check.

Remove the insulator from the TK relay. Release

the ER key, operate the BC key, and the required FB, FT and FU keys to direct the final selector to a busy line. Release the CA key. Observe that the final selector is directed to the line and returns to normal. Observe that as the BC switch advances, the final selector challenges the busy line in accordance with the strapping on the 1 and 3 arcs of the BC switch. When the BC switch reaches position 22, note that the BL lamp lights.

3.37 Operate the FB, FT and FU keys so as to direct the final selector to an intercepted line. Operate and release the CA key. The test switch should stop in position 11, 12 or 13 and the 10 lamp should light.

NOTE: If the intercepting operator does not challenge the call, this test may be completed.

3.38 Operate the FB, FT and FU keys so as to direct the selector to a subscriber line. Operate and release the CA key. Observe that the final selector is directed to the proper terminal and that the test frame completes the test and stops. Restore all operated keys.

3.39 Check of Final Selectors to Insure that They Are in Operating Condition After Test.

Inspect the final selectors used in the test to determine that they are normal. Remove all busy plugs. Operate the keys on the test frame for a multi-test. Release the CA key. Make several multi-tests on the final selectors used during this test to insure that they are in an operating condition.

3.40 Restore to Normal. Restore all keys to normal. Operate the RN key. Check to see that the test frame restores to normal.

## 4. REPORTS

4.01 The required record of this routine should be entered on the proper form.