COMBINED TESTS OF CONNECTORS USING THE AUXILIARY TEST SET S4GS-393

1. GENERAL

1.01 This section describes the methods of applying relay-timing, pulsing, and transmission tests on connectors.

1.02 These tests do not apply to level-hunting connectors.

1.03 The tests described are based on the use of the J94713A (SD-90418-01) relay-timing test set as modified by Drawing HS-1602 or DS-90022-01, and the J34717A (SD-31481-01) pulsing test set when controlled by the S4GS-393 auxiliary test set.

1.04 The timing requirements given in the circuit-requirement table for the particular feature under test shall be employed, or, if not covered therein, the requirements given in the Bell System Practices covering timing requirements shall be used.

1.05 The test covers:

(A) Combined Tests of Connectors

1.06 If an "out-of-service" failure is encountered on any switch, that switch shall be made busy in the approved manner until the trouble is cleared.

1.07 Before any switch on which a failure was encountered is returned to service, it shall be given a complete retest as outlined under Test (A). Any items detected on the retest shall be cleared in the approved manner.

2. APPARATUS

2.01 Auxiliary test set, S4GS-393.

2.02 Relay-timing test set, J94713A (SD-90418-01), modified per Drawing HS-1602 or DS-90022-01.

2.03 Pulsing test set, J34717A (SD-31481-01).

2.04 One cord, M24B, equipped with two P321CCE Jones plugs.

2.05 One test set, 32A.

2.06 One cord, P5B, equipped with one black-shelled No. 310 plug, one gray-shelled No. 310 plug, and one No. 240H plug.

2.07 Three cords, P3K, equipped with No. 310 plugs.

2.08 Three battery-supply cords, P2J (only two required where battery and ground jacks are not available).

2.09 One cord, W2M, equipped with one No. 310 plug and two No. 59 cord tips (not required where battery and ground jacks are available).

2.10 One plug, No. 258D.

2.11 Two KS-6320 orange sticks.

2.12 One cord, W1U.

2.13 No. 12-type transmission-measuring set.

2.14 One cord, P3F, equipped with one No. 309 plug and one No. 310 plug. (Required when calibrating the transmission-measuring set at a switchboard, at a message-ticketer trunk frame, or at special calibrating jacks.)

2.15 One cord, P3K, equipped with two No. 310 plugs.

2.16 One plug, No. 184B (or No. 310 plug with ring and sleeve strapped). (Required as indicated in Paragraph 3.20.)

3. PREPARATION

3.01 Connect 48-volt battery and ground to the BAT-GRD jack of the auxiliary test set, using a P2J cord. If a battery- and ground-supply jack is not available, use the W2M cord, connecting the No. 59 cord tip of the tip (white) conductor to a spare 48-volt battery fuse or to the equipment side of a fuse in service, and the sleeve (red) conductor to ground. The fuse selected shall not exceed 5 amperes, nor be less than 3 amperes.

NOTE: To avoid possible grounding of the battery supply, connect the cord to the test set first, and when disconnecting the set, remove the cord from the test set last.

3.02 Using the multiple BAT-GRD jacks on the test sets, connect the battery and ground to the relay-timing test set first and then to the pulsing test set with the two P2J cords.

3.03 Connect the A, B, and SW jacks of the auxiliary test set to the similarly designated jacks of the pulsing test set, using three P3K cords.

3.04 Insert the 258D plug into the V-M jack of the relay-timing test set.

3.05 Insert the No. 310 plug of the 32A test set into the ADV jack of the auxiliary test set.

3.06 Insert the black-shelled No. 310 plug of the P5B cord into the BK jack of the auxiliary test set and the gray-shelled No. 310 plug into the GR jack.

3.07 Connect the auxiliary test set to the relay-timing test set by inserting the Jones plugs of the M24B cord into the Jones sockets of these sets.

3.08 Operate the B key of the relay-timing test set to the position corresponding to the release timing requirement for the B-position relay of the equipment under test. Set the A and B dial indicators of the relay-timing test set opposite a blank position on the dial. Operate the NOR-AUX KEY of the relay-timing test set, if provided, to the AUX position.

3.09 Operate the LP and LK keys of the pulsing test set to the values specified in the Bell System Practice covering pulsing tests. Check that the 6PPS and PR keys are normal.

3.10 Observe that all of the 498AJ(red) keys of the auxiliary test set are in the nonoperated position. The key is in the nonoperated position when the arrow points length-wise to the set. Operate the A, BR, CH, LPP, and LKP keys of the auxiliary test set.

3.11 Operate the one BH key that corresponds to the hold timing requirement for the B-position relay of the equipment under test. All other BH keys shall be in the nonoperated position.

3.12 Operate the one CR key that corresponds to the release timing requirement for the C-position relay of the equipment under test. All other CR keys shall be in the nonoperated position.

3.13 Operate the SEL-CONN key to the CONN position.

3.14 Operate the one EH key and the one ER key that correspond to the hold and release timing requirement, respectively, for the E-position relay of the equipment under test. All other EH and ER keys shall be in the nonoperated position.

3.15 Operate the TR key of the auxiliary test set.

3.16 Connect the 1MW testing power to the connector test-line (99) terminal for the shelf under test and calibrate the 12-type transmission-measuring set as outlined in the Bell System Practice.

NOTE: In offices where one-milliwatt testing power is supplied by temporary connections at the IDF, insert the 184B (or equivalent) plug into the No. 4 jack of the connector test line in order to clear the tip and ring from the intercept trunk. Remove this plug when the tests are completed.

3.17 Connect the MEAS jack of the 12-type transmission-measuring set to the T jack of the auxiliary test set using the P3K cord.

4. METHOD

Test A

4.01 Depress and hold the white key of the 32A test set until the NORM lamp of the auxiliary test set lights. Immediately release the white key.

4.02 Insert the 240H plug into the test jacks of the switch under test. Adjust the sleeve-wiper contact of the 240H plug to make positive contact with sleeve-wiper terminal. If the BSY lamp of the auxiliary test set lights at this time or at any time during the tests, remove the plug from the test jacks until the equipment is again idle. Momentary flashes of the BSY lamp while tests are in progress should be disregarded.

4.03 If the switch is idle, momentarily depress the white key of the 32A test set.

4.04 The test set should advance automatically through the various tests. Lamps on the test set will light to indicate the test being performed. Observe the connector for the operations shown in Table A.

4.05 Upon completion of the test operations shown in Table A, momentarily depress the white key of the 32A test set. The connector should release and the test set restore to normal. The test-set NORM lamp should light. Remove the 240H plug from the connector test jacks. If no further tests are to be made, disconnect the test set cords and

return the test sets to their regular storage locations.

CAUTION: TO AVOID DAMAGE TO THE JONES PLUG AND SOCKET, REMOVE PLUG ONLY BY DIRECT PULL AT RIGHT ANGLES TO THE MOUNTING SURFACE.

5. REPORTS

5.01 The required record of this test shall be entered on Form P 2295 Routine Test Record (Using auxiliary test set per S4GS-393). Sample forms are shown in Figures 1 and 2.

TABLE A

Test-Set Lamp	Switch Operation
A	When the connector is seized, the A relay should operate and the test set immediately advance to the next test. Failure of the set to advance indicates that a sleeve ground was not received from the connector. This generally is the result of an improperly adjusted A relay.
BH	The connector should step up one level and cut in. Failure to cut in indicates that the B relay did not meet the hold timing requirement.
BR	The connector should step to the first level three times and release each time. If the selector should step to the first level and cut in, the B relay did not meet the release timing requirements.
CH	The connector should step up three levels and release. If the connector cuts in on the first or second level, the C relay failed to meet the hold timing requirements.
CR	The connector should step to the first level and cut in. If the connector does not cut in, the C relay did not meet the release timing requirement.
EH	The connector should step to the first level, cut in, and step to at least the fourth contact. If it stops on one of the first three contacts, a failure of the E relay to hold is indicated. NOTE: In the case of local rotary-hunting connectors, release of the E relay on one of the first three steps may be immediately followed by automatic rotary action. Therefore, a high degree of alertness on the part of the tester and repeated test may be necessary to recognize the point at which the E relay released.
ER	The connector should step to the first level, cut in, and stop on the first contact. If it continues to step beyond the first contact, under control of the test set pulses, a failure of the E relay to release is indicated. NOTE: In case of local rotary-hunting connectors, automatic rotary action may follow a normal release of the E relay. Therefore, a high degree of alertness on the part of the tester and repeated tests may be necessary to recognize the point at which the E relay released.
LPP	The connector should step smoothly to the ninth level and then rotate smoothly to terminal 99 (or 90 in the case of rotary-hunting connectors). Failure to reach terminal 99 (or 90) indicates a pulsing failure. If the connector should stop on any terminal other than the test terminal, remove the 240H plug from the switch jacks immediately to prevent ringing a subscriber.
LKP	The connector should step smoothly to the ninth level and then rotate smoothly to terminal 99 (or 90 in the case of rotary-hunting connectors). Failure to reach terminal 99 (or 90) indicates a pulsing failure. If the connector should stop on any terminal other than the test terminal, remove the 240H plug from the switch jacks immediately to prevent ringing a subscriber.
TR	At the end of the LKP test the transmission test set is connected to the connector. The connector transmission loss, as indicated on the 12-type transmission-measuring set, shall be within the limits specified on the connector drawings. When the requirements are not shown on the drawing, the maximum allowable loss shall be obtained from Bell System Practice covering transmission-test requirements. When testing the older-type connectors having the line capacitor mounted on the shelf and wired through connector-shelf jacks, apply a slight pull on the connector bank rod while observing the meter for changes in transmission level. If the transmission level is not within the specified limits, or the level varied beyond the limits when the bank rods of the older connectors were moved, a transmission failure is indicated.

BSP 226-405-900PT
BSP 226-300-900PT

ROUTINE TEST RECORD

(Using Auxiliary Test Set Per S4GS-393)

P-2295 (7-63)

PAGE NO. 1

OFFICE	SELECTOR TEST A	✓	ASSIGNED TO	SHIFT
Inglewood	CONNECTOR TEST B		A.F. Fitt	Day

FROM BAY	FROM SW	TO BAY	TO SW	TOTAL UNITS	TO BE STARTED	TO BE COMPLETED
502	1	502	160	148	6-12-63	6-16-63

EQUIPMENT		TROUBLE APPEARANCE												
BAY	SW	A OPR	B HOLD	B RLS	C HOLD	C RLS	E HOLD	E RLS	ROT	LPP	LKP	REV WIPER	TR	OTHER
502	1								✓					
	4				✓									
	6								✓					
	9				✓									
	11				✓									
	18								✓					
	22	✓												
	38								✓					
	43								✓					
	60		✓											
	62								✓					
	67			✓										
	68		✓											
	71								✓					
	76										✓			
	109								✓					
	128								✓					
				Retest Failures										
502	1								✓					
	9								✓					
TOTAL		1	2	1	3				11		1			

Actual Size
8-1/2" by 11"

PROGRESS REPORT

DATE	FROM BAY	FROM SW	TO BAY	TO SW	TEST TIME MINUTES	TESTER	DATE	FROM BAY	FROM SW	TO BAY	TO SW	TEST TIME MINUTES	TESTER
6-14	502	1	502	160	180	F							

TROUBLE FOUND OR DISPOSITION

EQUIPMENT BAY	EQUIPMENT SW	STEPS TAKEN TO CLEAR TROUBLE (Give Details of Procedures Followed)	TROUBLE CODE	RETEST	CLEARED BY	TROUBLE CLEARING TIME	DATE
502	1	Milli and Adj "E" Relay	AR	Fails	F		6-15
	1	Adj Rot Int Spring	AOSA	OK	"		"
	4	Milli and Adj "C" Relay	AR	OK	"		"
	6	Adj Rot Int Spring Tension	AOSA	OK	"		"
	9	Milli and Adj "C" Relay	AR	Fails	"		"
	9	Adj Int Spring	AOSA	OK	"		"
	11	Milli and Adj "C" Relay	AR	OK	"		"
	18	Adj Rotary Magnets	AOSA	OK	"		"
	28	Milli and Adj A Relay	AR	OK	"		"
	38	Adj Rot Mag Ret Spring	AOSA	OK	"		"
	43	Milli and Adj E Relay	AR	OK	"		"
	60	Milli and Adj B Relay	AR	OK	"		"
	62	Adj Rot Pawl Guide	AOSA	OK	"		"
	67	Milli and Adj B Relay	AR	OK	"		"
	68	Milli and Adj B Relay	AR	OK	"		"
	71	Adj Rot Int Spring	AOSA	OK	"		"
	76	Milli and Adj A Relay	AR	OK	"		"
	109	Adj Rot Int Spring	AOSA	OK	"		"
	128	Milli and Adj E Relay	AR	OK	"		"
		Total Trouble Clearing Time =		185	Min		

Actual Size
8-1/2" by 11"