

## CONNECTORS AND SELECTOR-CONNECTORS

### PULSING TESTS

#### USING PULSING TEST SET SD-31481-01 (J34717A)

#### 700C, 701A, 701B, 701PK, 702A, 710C, 711A, 711B, 711PK, 740A, 740AX, 740B, 740C, AND 740E PBX

#### 1. GENERAL

**1.01** This section is reissued to include the scope of the 701PK and 711PK PBX and to make other minor revisions to bring the section up to date.

**1.02** The tests covered are:

**A. Over-All Pulsing Test:** This test checks the stepping features of connectors and selector-connectors under loop and leak conditions.

**B. Over-All Pulsing and E Relay Hold Test for Switches Equipped with a G Relay:** This test checks the stepping features of hunting connectors and selector-connectors under loop and leak conditions. It also checks the E relay for hold and release during rotary stepping while it is under an opposing magnetic field from the operated G relay.

**C. Magnet Pulsing Test:** This test is for use on switches when a failure is encountered under a leak condition in Test A or B to determine if the trouble indicated by these tests is due to the switch mechanism.

**1.03** Tests A and B, as applicable, are alternative methods. Test B is intended for use when it is desired to include a check of the hold time of the E relay. Ordinarily Test B, if applied on a routine basis, would be made at less frequent intervals than Test A, either one or the other, but not both, being made on any one testing cycle. Test B should be applied as a final check after clearing any trouble involving adjustment of the E relay.

**1.04** To perform pulsing tests on a selector-connector, it will be necessary for the switch to operate as a connector on the ninth level. Table A lists the commonly used selector-connectors with the contacts of the normal post springs to be insulated or blocked when necessary. For switches other than those listed, consult SD drawing for contacts to be insulated.

**TABLE A — SELECTOR-CONNECTOR CONVERSION**

DRAWING NUMBER	NORMAL POST CONTACTS TO BE INSULATED
ES-65012-01	1 and 3
ES-65070-01	1 and 3 or 1L and 2L
ES-65071-01	1 and 3
ES-65166-01	1 and 3
ES-65168-01	1 and 3
ES-65197-01	1 and 3
ES-65537-01	1L and 2L
SD-65721-01	1R and 2R, 2L and 3L* or 2RF and 3RF, 2LF and 3LF**
SD-66002-01	1L and 2L
SD-66005-01	1L and 2L
SD-66083-01	1L and 2L
SD-66107-01	1L and 2L
SD-66127-01	2L and 3L*
SD-66142-01	1L and 2L

\*Block 1L and 2L operated.

\*\*Block 1LF and 2LF operated.

**1.05** If pulsing failures are encountered in making these tests, refer to Section 540-134-701.

**1.06** Tests A and B should be made with a 1400-ohm loop and with leak "A" condition in PBX where all the connector or selector-connector B functional relays are of the 248-type

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or 222-type modified with a 1:1 ratio armature. Otherwise, the pulsing tests should be made with a 1200-ohm loop and with leak "A" condition. Local instructions, however, may specify the use of other loop and leak conditions.

↳ **1.07** *In 700C or 710C PBX*, when tests are made from switches directly associated with line switches, the related master switch shall be rotated to pick up disengaged plungers.

**1.08** The test equipment specified in this section is designed to apply proper marginal tests (simulated critical circuit conditions) when the circuit under test and the test equipment have an applied voltage of 48.5 to 50. In those offices where power plants are normally operated at more than 50 volts, the battery voltage should be reduced and maintained within the required limits while the tests are being made.

**1.09** *Lettered Steps:* A letter a, b, c, etc, added to a step number in Part 4 of this section, indicates an action which may or may not be required depending on local conditions. The condition under which a lettered step or a series of lettered steps should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

**1.10** Local instructions should be followed for recording and reporting any register operations caused by performing these tests.

## 2. APPARATUS

### All Tests

**2.01** Pulsing test set J34717A (SD-31481-01).

**2.02** 36 B (remote control) test set.

**2.03** Patching cord, P3H cord, 10 feet long, equipped with one 310 plug and one 240A plug (3P2A cord) (for connecting test set to switch).

**2.04** Testing cord, W2M cord, 9 feet long, equipped with one 310 plug and two 59 cord tips (2W12A cord) and two 108 (rubber insulator) cord tips (install locally on 59 cord tips) (for battery and ground connections to test set when battery is picked up at 35-type fuse, not to exceed 3 amperes, and frame ground or test battery and ground block).

**2.05** Patching cord, P2J cord, 6 feet long, equipped with two 310 plugs (2P9B cord) (for connecting battery and ground to test set when test battery and ground jacks are provided).

**2.06** Blocking and insulating tools, as required. Use tools and apply as covered in Section 069-020-801.

### Tests B and C

**2.07** Testing cord, 893 cord, 6 feet long, equipped with two 360A tools (1W13B cord) one KS-6278 connecting clip, and one 419A (test connector) tool (for connecting ground to connector test jacks).

### Test C

**2.08** Testing cord, W1H cord, 10 feet long, equipped with one 347B plug and one 360A tool (1W8A cord) and one 419A (test connector) tool (for connecting test set to relay A contact of switch).

**3. PREPARATION**

STEP	ACTION	VERIFICATION
<b>All Tests</b>		
1	Insert 310 plug of P3H cord into SW jack of pulsing test set.	
2	Insert plug of 36B (remote control) test set into A, B jacks of pulsing test set.	
3	Insert 310 plug of battery cord into BAT-G jack of pulsing test set.	
4	Connect other end of battery cord to battery and ground supply.	
	<i>Note:</i> To avoid possible grounding of battery supply lead, connect cord to test set first and, when disconnecting, remove cord from test set last.	
5	Operate keys 200, 400, 800. (See 1.06.)	
6	Operate LKA key.	
7	Operate PR key.	
8	Depress remote control LP key momentarily.	Test set pulses continuously. Allow pulsing test set to operate for at least 15 minutes (to reach a constant temperature) before making tests.
9	After 15 minutes — Depress remote control RLS key momentarily.	Test set stops pulsing.
10	Restore PR key.	
<b>Tests B and C</b>		
11	Connect KS-6278 connecting clip of 893 cord to ground.	
<b>Test C</b>		
12	Insert 347B plug of W1H cord into MAG jack of pulsing test set.	
13	Operate MAG key.	

## 4. METHOD

STEP	ACTION	VERIFICATION
<b>A. Over-All Pulsing Test</b>		
11a	If testing incoming connector or selector-connector — Prepare switch for test as covered in Section 540-105-301.	
12	With switch to be tested normal — Insert 240A plug of P3H cord into switch test jack.	BY lamp does not light.  <i>Note:</i> If BY lamp lights, either remove plug to proceed with other switches, or delay test until BY lamp is extinguished.
13b	If testing selector-connector not arranged to operate as a connector on ninth level — Arrange normal post spring contacts in accordance with Table A. (See 1.04.)	
14	Depress, hold remote control LP key until switch starts to rotate.	Switch steps smoothly to ninth level, rotates smoothly to terminal 99 (or terminal 90 in rotary hunting switch).  <i>Caution:</i> When test line terminal is other than 99 or 90, or switch cuts in on wrong level or stops on wrong terminal, switch should be released immediately to avoid ringing a station or operating other equipment.  <i>Note:</i> Selector-connectors which only step vertically five steps will chatter at fifth step until end of first series of pulses.
15	Depress remote control RLS key momentarily.	Switch releases.  <i>Note:</i> Disregard any momentary lighting of BY lamp.
16	Depress, hold remote control LK key until switch starts to rotate.	Switch steps smoothly to ninth level, rotates smoothly to terminal 99 (or 90 in rotary hunting switch).
17	Depress remote control RLS key momentarily.	Switch releases.

STEP	ACTION	VERIFICATION
18b	If testing selector-connector not arranged to operate as a connector on ninth level — Restore to normal if no further tests are to be performed on switch.	
19c	If no further tests are to be performed on switch — Remove 240A plug from test jack.	
20a	If testing incoming connector or selector-connector — Restore associated trunk to service if no further tests are to be performed on switch.	
21d	If no further tests are to be performed — Restore all keys, remove all cords.	

#### B. Over-All Pulsing and E Relay Hold Test for Switches Equipped with a G Relay

12a	If testing incoming connector or selector-connector — Prepare switch for test as covered in Section 540-105-301.	
13	With switch to be tested normal — Insert 240A plug of P3H cord into switch test jack.	BY lamp does not light.  <i>Note:</i> If By lamp lights, either remove plug to proceed with other switches or delay test until BY lamp is extinguished.
14b	If testing selector-connector not arranged to operate as a connector on ninth level — Arrange normal post spring contacts in accordance with Table A. (See 1.04.)	
15	Depress, hold remote control LP key until switch starts to rotate.	Switch steps smoothly to ninth level, rotates smoothly to terminal 99 (or terminal 90 in case of rotary hunting switch).  <i>Caution:</i> When test line terminal is other than 99 or 90, or switch cuts in on wrong level or stops on wrong terminal, switch should be released immediately to avoid ringing a station or operating other equipment.  <i>Note:</i> Selector-connectors which only step vertically five steps will chatter at fifth step until end of first series of pulses.

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<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
16	Depress remote control RLS key momentarily.	Switch releases.  <i>Note:</i> Disregard any momentary lighting of BY lamp.
17	Depress remote control LK key momentarily.	Switch steps smoothly to ninth level.
18c	If wiper cords terminate at switch jack — Connect 419A tool of 893 cord to sleeve wiper cord terminal at test jack assembly.	
19d	If wiper cords do not terminate at switch jack — Connect 419A tool of 893 cord to sleeve wiper. Support cord to minimize retarding effect of cord on rotary action of switch.	
20	Depress remote control LK key momentarily.	Switch rotates smoothly to terminal 99 (or 90 for rotary hunting switch).  <i>Note:</i> If switch stops on one of the lower numbered terminals, it may be due to E relay releasing too fast. In the case of rotary hunting switches, the trouble may be indicated by the switch stopping on one of the lower numbered terminals and then starting to hunt instead of step.
21	Remove 419A tool on completion of rotary action.	
22	Depress remote control RLS key momentarily.	Switch releases.
23b	If testing selector-connector not arranged to operate as a connector on ninth level — Restore to normal if no further tests are to be performed on switch.	
24e	If no further tests are to be performed on switch — Remove 240A plug from test jack.	

STEP	ACTION	VERIFICATION
25a	If testing incoming connector or selector-connector — Restore associated trunk to service if no further tests are to be performed on switch.	
26f	If no further tests are to be performed — Restore all keys, remove all cords.	

### C. Magnet Pulsing Test

14a	If testing incoming connector or selector-connector — Prepare switch for test as covered in Section 540-105-301.	
15	With switch to be tested normal — Insert 240A plug of P3H cord into switch test jack.	BY lamp does not light.  <i>Note:</i> If BY lamp lights, either remove plug to proceed with other switches or delay test until BY lamp is extinguished.
16b	If testing selector-connector not arranged to operate as a connector ninth level — Arrange normal post spring contacts in accordance with Table A. (See 1.04.)	
17	Connect 419A tool of W1H cord to contact 1 of relay A.	
18	Hold C relay operated, then depress remote control LK key momentarily.	Switch steps smoothly to ninth level.  <i>Note:</i> Selector-connectors which only step vertically five steps will chatter at fifth step until end of first series of pulses.
19	Release C relay.	
20c	If wiper cords terminate at switch jack — Connect 419A tool of 893 cord to sleeve wiper cord terminal at test jack assembly.	
21d	If wiper cords do not terminate at switch jack — Connect 419A tool of 893 cord to sleeve wiper. Support cord to minimize retarding effect of cord on rotary action of switch.	

STEP	ACTION	VERIFICATION
22	Depress remote control LK key momentarily.	Switch rotates smoothly to terminal 99 (or 90 in case of rotary hunting switch).
		<i>Caution: When test line terminal is other than 99 or 90, or switch stops on wrong terminal, switch should be released immediately to avoid ringing a station or operating other equipment.</i>
		<i>Note: It is not a requirement that E relay hold during the magnet test. If E relay releases during the test, hold it operated manually to check the rotary magnet pulsing.</i>
23	Remove 419A tool from sleeve wiper cord terminal or sleeve wiper upon completion of rotary action.	
24	Depress remote control RLS key momentarily.	Switch releases.
25	Remove 419A tool from relay A contact spring and replace switch cover.	
26e	If no further tests are to be performed on switch — Remove 240A plug from test jack.	
27a	If testing incoming connector or selector-connector — Restore associated trunk to service if no further tests are to be performed on switch.	
28f	If no further tests are to be performed — Restore all keys, remove all cords.	