SELECTORS
PULSING TESTS
USING PULSING TEST SET SD-31481-01 (J34717A)
STEP-BY-STEP SYSTEMS

1. GENERAL

1.01 This section describes a method of applying pulsing tests to selectors.

1.02 This section is reissued to expand the section to include 355A and 35-E-97 community dial offices and to generally revise the section. Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 The tests covered are:

A. Over-all Pulsing Test: This test checks switch vertical stepping under simulated loop and leak conditions.

B. Over-all Pulsing and C Relay Release Test: This test checks switch vertical stepping under simulated loop and leak conditions and also checks for proper release of the C relay.

C. Magnet Pulsing Test: This test checks switch vertical stepping mechanism by applying marginal pulses directly to vertical magnet.

1.04 This section is not applicable to reverting call selectors and selectors having loop compensating resistances, such as toll and A-B toll transmission selectors which are covered in other sections.

1.05 When testing selectors arranged to absorb digits repeatedly on the ninth level, the digit should be pulsed several times. Observe that the switch steps to the proper level and restores properly.

1.06 When testing selectors arranged to absorb the first two digits and cut in on the third digit, observe that the switch steps to the proper level on the initial digits and releases properly.

1.07 When testing selectors arranged to absorb the first digit and block on the second digit, or to block on the first digit, observe that the switch steps to the proper level. When the switch is pulsed on the blocked digit, release the switch in the usual manner with the RLS key of the 36B test set.

1.08 When testing selectors arranged to absorb the initial digit on the ninth level, an extra digit must be pulsed.

1.09 When testing a first selector in a line switch office, rotate the master switch having direct access to it to pick up any disengaged plungers.

1.10 When testing an incoming selector, the trunk should be made busy in the approved manner for the duration of the test.

1.11 Tests A and B are alternative methods. Test B is intended for use when it is desired to include an approximate check of the releasing time of the C relay, in offices where the relay timing test set is not available. 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 troubles involving adjustment of the C relay.

1.12 Test C is not required on a routine basis, but should be performed as part of the trouble procedure under the leak condition in

Test A or B, in order to determine if the trouble indicated by these tests is due to the switch mechanism.

1.13 For convenience, incoming selectors are tested with the incoming trunks connected. However, a failure under this condition may be due to some trouble on the trunk, or perhaps to the capacity of the trunk. Therefore, if a failure is encountered with the trunk connected, the trunk should be opened at the main frame in the terminating office and the selector retested.

1.14 If a failure is encountered on a selector which is preceded by and directly connected to a trunk having a resistance and capacity network connected to the trunk conductors during the test, such as coin trunk circuits ES-241760, SD-31592-01 and SD-31592-02, the trunk should be opened at its outgoing test jack, if provided, or the network should be opened in the trunk at the most convenient location in the approved manner. The selector should be retested and any required readjustments made while the network is open.

1.15 Unless otherwise covered by local instructions, the pulsing tests should be made with a 1400-ohm loop with a leak A condition in offices where all the selector B functional relays are of the 248- or 222-type, modified with a 1:1 ratio armature. Otherwise, the pulsing tests should be made with a 1200-ohm loop with a leak A condition. Local instructions, however, may specify the use of other loop and leak conditions.

1.16 The 200, 400 and 800 keys, and the LKA key are ineffective when making the magnet pulsing test. The LKB key, however, is effective. This key should be in the normal position if the leak A requirement is to be met on Test A or B. It should be operated to the LKB position if the leak B requirement is to be met on Test A or B. By having the keys operated as in the over-all pulsing test, while conducting the magnet pulsing test, it is convenient to switch from one test to the other in the process of clearing trouble. This switching is accomplished by the release or operation of the MAG key, as required.

1.17 The general procedure for the analysis and correction of pulsing failures encountered in making pulsing tests of selectors is covered in Section 226-170-700.

1.18 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.

1.19 ***Lettered Steps:*** A letter a, b, c, etc, added to a step number in Parts 3 and 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.

2. APPARATUS

All Tests

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

2.02 36B (remote control) test set.

2.03 Patching cord, P2J cord, 6 feet long, equipped with two 310 plugs (2P9B cord), for use in connecting battery and ground to test set when battery and ground jack is available.

2.04 Testing cord, W2M cord, 9 feet long, equipped with a 310 plug, two 59 cord tips (2W12A cord) and two 108 cord tips, for use in connecting battery and ground to test set when a 35-type fuse (not to exceed 5 amperes) and frame ground or battery and ground block is used.

2.05 Patching cord, P3H cord, 10 feet long, equipped with a 310 plug and a 240A plug (3P2A cord).

2.06 477A (or 375A) (make-busy) tools, as required.

2.07 Toothpicks, as required, used to insulate auxiliary test jack springs on SD-32183-01 selectors.

Test C

2.08 Testing cord, W1H cord, 10 feet long, equipped with a 347B plug, a 360B tool (1W8A cord) and a 419A (test connector) tool.

3. PREPARATION

STEP	ACTION	VERIFICATION
All Tests		
1	Connect battery and ground to BAT-G jack of test set. *Note 1:* If using 2W12A cord, connect white (tip) conductor to battery and red (sleeve) conductor to ground. *Note 2:* To avoid possible grounding of battery supply lead, connect cord to test set first and, when disconnecting, remove cord from test set last.	
2	Insert 289A plug of 36B test set into A and B jacks of pulsing test set.	
3	Insert 310 plug of P3H cord into SW jack of pulsing test set. *Note:* When testing selectors designed to receive a ground forward over the sleeve, such as toll intermediate selectors, insert plug into TL jack instead.	
4a	If testing SD-32183-01 selectors — Place toothpick between auxiliary test jack springs 5 and 6 so that when test plug is inserted into test jack these springs will remain open.	
5	Operate keys 200, 400 and 800 (see 1.15).	
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 constant temperature) before making tests.
9	After 15 minutes — Depress remote control RLS key momentarily.	Test set stops pulsing.
10	Restore PR key.	
Test C		
11	Insert 347B plug of W1H cord into test set MAG jack.	
12	Operate test set MAG key.	

4. METHOD

STEP	ACTION	VERIFICATION
	A. Over-all Pulsing Test	
11	Insert 240A plug into selector test jack.	BY lamp does not light. ***Note:*** If BY lamp lights, proceed to next idle selector.
12	Depress LP key of remote control set momentarily.	Switch under test steps smoothly to ninth level and cuts in.
13	Depress RLS key of remote control set momentarily.	Switch releases. BY lamp may flash, but disregard.
14	Depress LK key of remote control set momentarily.	Switch under test steps smoothly to ninth level and cuts in.
15	Depress RLS key of remote control set momentarily.	Switch releases. BY lamp may flash, but disregard.
16a	If testing SD-32183-01 selectors — Remove toothpick from auxiliary test jack springs.	
17	Unless further tests are to be made — Remove all cords and restore all keys.	
	B. Over-all Pulsing and C Relay Release Test	
11	Insert 240A plug into selector test jack.	BY lamp does not light. ***Note:*** If BY lamp lights, proceed to next idle selector.
12	Depress and hold LP key of remote control set long enough to start a second series of pulses.	Switch under test steps to ninth level and cuts in. No vertical kick of shaft after switch cuts in. ***Note:*** A vertical kick of shaft, or vertical stepping, on second series of pulses may be due to C relay being too slow in its release. If switch rotates more than 4 or 5 steps, a vertical kick on second series of pulses would not necessarily be an indication of trouble.
13b	If testing selector, the ninth level of which does not have access to reverting call equipment — After selector in pulsing test set has taken 5 or 6 steps on second pulse cycle, as determined by sound of this selector operating — Release LP key of remote control set. Operate RLS key of remote control set momentarily.	Switch releases. BY lamp may flash, but disregard.

STEP	ACTION	VERIFICATION
14c	If testing selector, the ninth level of which has access to reverting call equipment — After selector in pulsing test set has taken 5 or 6 steps on second pulse cycle, as determined by sound of this selector operating — Release LP key of remote control set. Operate RLS key of remote control set momentarily.	Switch may or may not release. *Note:* If switch does not release, remove 240A plug from test jack and short-circuit springs 1 and 2 of test jack momentarily. After short circuit is removed, switch should release. Reinsert 240A plug. ***Caution: In order to avoid personal contact with ringing current, avoid touching the test jack springs when tripping the ring.***
15	Operate LK key of remote control set momentarily.	Switch under test steps smoothly to ninth level and cuts in.
16	Operate RLS key of remote control set momentarily.	Switch releases.
17a	If testing SD-32183-01 selectors — Remove toothpick from auxiliary test jack springs.	
18	Unless further tests are to be made — Remove all cords and restore all keys.	

C. Magnet Pulsing Test

13	Insert 240A plug into selector test jack.	BY lamp does not light. *Note:* If BY lamp lights, proceed to next idle selector.
14	Remove selector switch cover and connect 419A tool of W1H cord to back contact spring of pulsing springs of A relay.	
15	Depress LK key of remote control set momentarily.	Switch under test steps smoothly to ninth level and cuts in. *Note 1:* It is not a requirement that the C relay hold during the magnet test. If the C relay releases during this test, hold it operated manually to check the vertical magnet pulsing. *Note 2:* In the case of digit-absorbing selectors, failure of the C relay to hold during pulsing may have the effect of splitting the preliminary digit, the first pulses being absorbed and the remainder of the pulses causing the switch to step and cut in on one of the lower levels.
16	Depress RLS key of remote control set momentarily.	Switch releases.

STEP	ACTION	VERIFICATION
17a	If testing SD-32183-01 selectors — Remove toothpick from auxiliary test jack springs.	
18	Unless further tests are to be made — Remove all cords, replace switch cover and restore all keys.	