SELECTORS
ROTARY AND C RELAY TIMING TESTS
USING RELAY TIMING TEST SET SD-90418-01 (J94713A)
STEP-BY-STEP SYSTEMS

1. GENERAL

1.01 This section describes a method of applying timing tests for rotary hunting and C relay release of local, incoming, toll and toll transmission selectors including those in the A-B toll train.

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. Rotary Speed and C Relay Release Test: This test checks that the selector C relay has released and that the selector has rotated nine or more steps within 0.375 (or 0.380) second.

B. C Relay Release Test: This test checks that the selector C relay releases within the prescribed interval.

1.04 Where Test A is performed on a routine basis, it should not be necessary to schedule a separate timing test for release of the selector C relay. Test B is intended primarily for use in clearing specific cases of trouble encountered on Test A.

1.05 For timing requirements, reference shall be made to the timing requirements given on the circuit requirement table for the particular circuit under test. If the timing requirements are not covered on the circuit requirement table, the values given in Section 040-013-711 shall be used.

1.06 When these tests are being performed, the variable make period of the 0.375 setting of the timing test set should be within the limits of 0.365 second minimum and 0.385 second maximum. Where the test set is equipped with the VA and VB potentiometers, which permit adjustments to ± 0.005 second, the make period shall be within 0.375 to 0.385 second. This is accomplished by using the V position of the B dial and calibrating the make period to 0.380 second. The method of calibrating the test set is described in Section 100-137-501.

1.07 When testing selectors that absorb the digit 1 once or twice only, proceed in the same manner as for a regular selector except that the first pulse or pulses will be absorbed.

1.08 When testing an incoming selector, the trunk shall be made busy in the approved manner during the test.

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

1.10 The tests described in this section should be made with the switch covers on insofar as practical.

1.11 *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

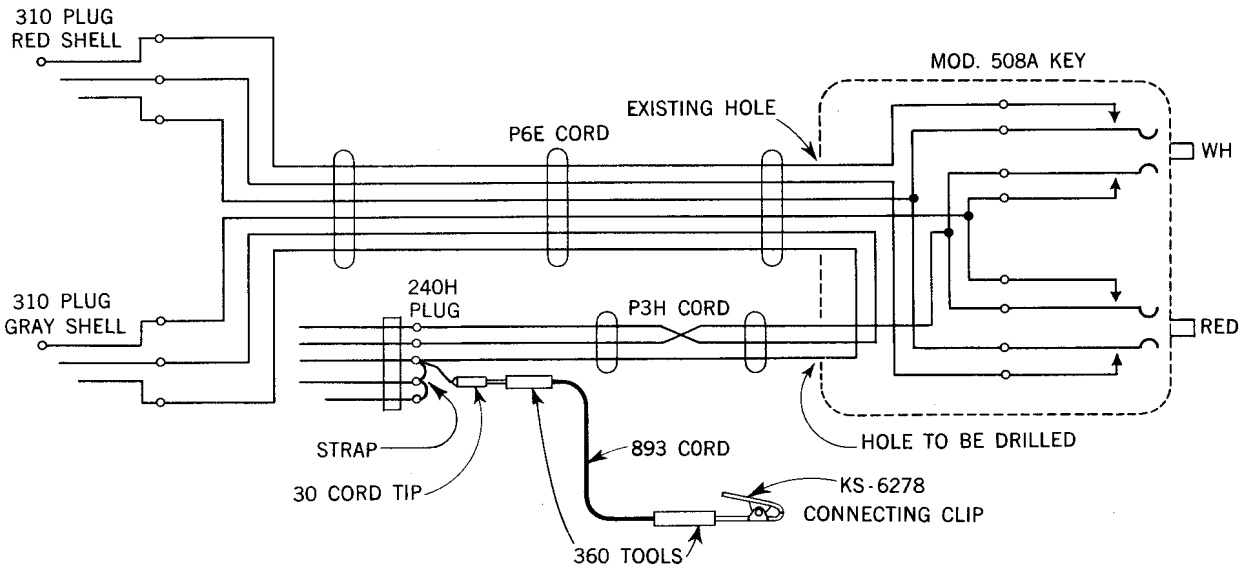

Fig. 1

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.

1.12 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.

2. APPARATUS

Tests A and B

2.01 Relay timing test set J94713A (SD-90418-01).

2.02 Patching cord, P2J cord, 9 feet long, equipped with two 310 plugs (2P9A cord), used to supply battery and ground to test set when battery and ground jack is available.

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

2.04 Remote control set to be assembled locally as per Fig. 1, consisting of the following:

(a) Testing cord, 893 cord, 3 feet long, equipped with two 360A tools (1W13A cord) and a KS-6278 connecting clip, used in offices where wiper cords are not terminated at switch test jack.

(b) Patching cord, P6E cord, 10 feet long, equipped with one red shell 310 plug and one gray shell 310 plug.

(c) Patching cord, P3H cord, 10 feet long, equipped with a 240H plug.

(d) 508A key modified by drilling a 3/8-inch hole in bottom of key frame. The cord passing through the hole shall be protected by a covering of tape.

2.05 136B (relay blocking) tools (or W1U cords), as required, used to disable digit-absorbing feature of selector.

2.06 Hardwood toothpicks, as required.

2.07 477A (or 375A) (make-busy) tools, as required.

3. PREPARATION

STEP	ACTION	VERIFICATION
Tests A and B		
1	Connect battery and ground to test set. *Note 1:* When using 2W12A cord assembly, connect battery to tip (white) conductor and ground to sleeve (red) conductor. *Note 2:* To avoid possible grounding of battery lead, connect cord to test set first and, when disconnecting, remove cord from test set last.	
2	Insert red shell 310 plug of P6E cord into BR jack of test set.	
3	Insert gray shell 310 plug of P6E cord into V-M jack of test set.	
4a	If using test set not equipped with VA and VB potentiometers — Set A dial to time release requirement for C relay (see 1.05). Set B dial to .375.	
5b	If using test set equipped with VA and VB potentiometers — Set A dial to V position and calibrate to time release requirement for C relay (see 1.05). Set B dial to V position and calibrate to .380 second.	
6	Operate test set start key to A position.	Test set pulses. *Note:* Allow test set to operate for at least 15 minutes (to reach a constant temperature) before making tests.
7	Restore test set start key to normal.	Test set pulsing stops.
8c	If testing digit-absorbing selectors that repeatedly absorb the digit 1, the digit-absorbing feature may be disabled in one of the following methods: (a) For selectors such as SD-31915-01, SD-30869-01 and SD-31933-01, first insulate contacts 2L and 3L of normal post springs (use toothpick or equivalent), then short-circuit contacts 1L and 2L (use 136B tool inserted between springs or strap spring terminals with W1U cord).	

STEP	ACTION	VERIFICATION
	(b) For selectors such as SD-30976-01, proceed as in (a) above and, in addition, insulate 3R and 2R and short-circuit 1R and 2R. (c) For selectors such as SD-30997-01, proceed as in (a) above and, in addition, insulate contacts 1R and 2R and short-circuit contacts 2R and 3R. (d) On selectors SD-31522-01, using Fig. J, and SD-31723-01, using Fig. B, insulate contacts 1L and 2L of normal post springs. (e) On selector SD-31723-01, using Fig. K, insulate contacts 1L and 2L and 1R and 2R of normal post springs. *Note:* After disabling the digit-absorbing feature, the selector may be tested in the same manner as a regular selector.	
9d	If testing selectors that restrict service to first level such as SD-31783-01 or SD-31841-01, insulate make contacts 1 and 2 of normal post springs, or, in case of selector SD-32183-01, insulate 2LF and 3LF and short-circuit 1LF and 2LF, insulate 2RF and 3RF and short-circuit 1RF and 2RF. The selector may then be tested in same manner as regular selector.	

4. METHOD

STEP	ACTION	VERIFICATION
	A. Rotary Speed and C Relay Release Test	
10	Insert 240H plug of P3H cord into switch test jack. *Note 1:* On those selectors on which wiper cords terminate at test jack assembly, make sure that auxiliary spring of plug makes firm contact with sleeve wiper cord terminal. *Note 2:* On those selectors on which wiper cords do not terminate at test jack assembly, connect KS-6278 clip of 893 cord directly to sleeve wiper. Support the cord in such a way as to minimize retarding effect of cord on rotary action of selector.	

STEP	ACTION	VERIFICATION
11	Depress and hold red key of remote control set.	Selector steps to first level and rotates to at least the ninth terminal before next pulse from test set. *Note 1:* Next pulse from test set is indicated by momentary hesitation of rotary action and vertical kick of shaft. *Note 2:* If selector fails to meet this requirement, apply Test B to determine whether C relay is releasing within the required interval. *Note 3:* When performing this test after readjustment of C relay, selector should rotate to at least the tenth terminal before next pulse from test set.
12	After second pulse of test set (or when selector reaches eleventh rotary position) — Release red key of remote control set.	Selector releases.
13	Unless further tests are to be made, remove all cords and restore all keys.	
	B. C Relay Release Test	
10	Insert 240H plug of P3H cord into switch test jack. *Note 1:* On those selectors on which wiper cords terminate at test jack assembly, make sure that auxiliary spring of plug makes firm contact with sleeve wiper cord terminal. *Note 2:* On those selectors on which wiper cords do not terminate at test jack assembly, connect KS-6278 clip of 893 cord directly to sleeve wiper. Support the cord in such a way as to minimize retarding effect of cord on rotary action of selector.	
11	Depress and hold white key of remote control set.	Selector steps to first level and rotates at least to the second terminal before next pulse from test set. *Note 1:* Next pulse from test set is indicated by a momentary hesitation of rotary action and a vertical kick of shaft.

STEP	ACTION	VERIFICATION
		Note 2: If switch meets this test, it indicates that releasing time of C relay is satisfactory. If switch meets the test, but has previously failed on Test A, it indicates that rotary speed is too slow, due to E relay not being within requirements or switch not being within its mechanical requirements with respect to rotary stepping action. *Note 3:* If switch fails to meet this test, it indicates that C relay is not releasing fast enough, which may be due to improper adjustment or presence of a sticky substance between armature and core. *Note 4:* If necessary to readjust C relay, most favorable operation will be obtained by adjusting it to release on a timing value approaching minimum interval consistent with meeting its hold requirements. After readjusting C relay or rotary action of selector, repeat Test A.
12	Unless further tests are to be made — Remove all cords and restore all keys.	