SELECTORS
ROTARY TEST USING NO. 40C TEST SET
STEP-BY-STEP SYSTEMS

1. GENERAL

1.01 This section describes a method of testing the rotary action of local and toll selectors, using the No. 40C test set.

1.02 This section is reissued to incorporate material from the addendum in its proper location. In this process marginal arrows have been omitted.

1.03 The tests covered are:

(A) Rotary Action Test: This test checks the ability of a selector to pass a busy trunk, applying an operate test to the E relay and a nonoperate test to the cut through relay by means of a resistance ground shunt instead of a direct ground. A test to detect faulty contact adjustment of the cut through relay is also made.

(B) Stop on Idle Trunk Test: This test checks the ability of the selector to stop on an idle trunk, applying an operate test to the cut through relay and a nonoperate test to the E relay by means of a battery and ground resistance network. An additional digit is dialed to detect certain faulty cut through relay operations.

(C) Rotary Action and Eleventh Rotary Step Spring Test: This test is intended to be performed occasionally in place of Test (A) to check for all-paths-busy tone on the eleventh rotary position of the selector. This verifies the operation of the eleventh rotary step springs.

1.04 Vacant levels, levels to out-trunk switches, levels on which a digit is repeatedly absorbed or blocked, levels with "no-such-number-tone," and restricted service levels should be omitted when performing these tests.

1.05 A different level should be used each time the tests are performed, so that eventually every selector will have been tested on each working level.

1.06 When testing a first selector in a line switch office the master switch having direct access to it should be rotated to pick up any disengaged plungers.

1.07 When testing an incoming selector, the trunk should be made busy in the approved manner and be restored to service when tests have been completed, except those on which "out-of-service" failures have been encountered.

1.08 These tests should preferably be made during periods of light traffic.

1.09 When testing with a receiver other than the No. 716E, the receiver should not be held directly over the ear in order to avoid objectionable clicks. See Section 100-102-101 for latest receiver arrangement on the No. 40C test set for reduction of objectionable clicks while making tests.

1.10 With key 1 normal the test set is in a monitoring condition. Connecting the set to a selector does not make it busy and the selector may be seized for a call before the tests are started.

1.11 Lettered Steps: A letter a, b, c, etc, added to a step number in Parts 3 or 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.

1.12 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

2.01 No. 40C Test Set with a No. 240H Plug, using a No. 30 Cord Tip, a M1R Wiper Cord, a No. 132 Cord Tip and a No. 360B Tool modified per Fig. 1.

Note: Transfer the brown lead from terminal No. 4 to No. 3 of the No. 240H Plug (on the modified No. 40C Test Set using the No. 716E Receiver, this will not be necessary). Solder the No. 30 Cord Tip to the No. 4 Terminal. Remove the No. 107 Cord Tip from one end of the M1R Wiper Cord and attach a No. 132 Cord Tip in the approved manner. Attach a No. 360B Tool to the No. 132 Cord Tip and solder the other end of the wiper cord to the No. 3 Terminal of the plug.

2.02 No. 377A Dialing Knob, if desired (for use as a stop on the No. 40C Test Set dial for repeated dialing of same digit during testing operations).

2.03 KS-6278 Connecting Clip (for use where the wiper cords do not terminate at the switch test jack assembly. Connect clip to No. 360B Tool associated with black conductor of No. 40C Test Set).

3. PREPARATION

STEP	ACTION	VERIFICATION
All Tests		
1	Connect No. 360B tool associated with black conductor of No. 40C test set cord to W terminal of No. 240H plug.	
2a	If testing local selectors - Disconnect No. 360B tool of M1R cord from No. 4 terminal of modified No. 240H plug shown in Fig. 1.	

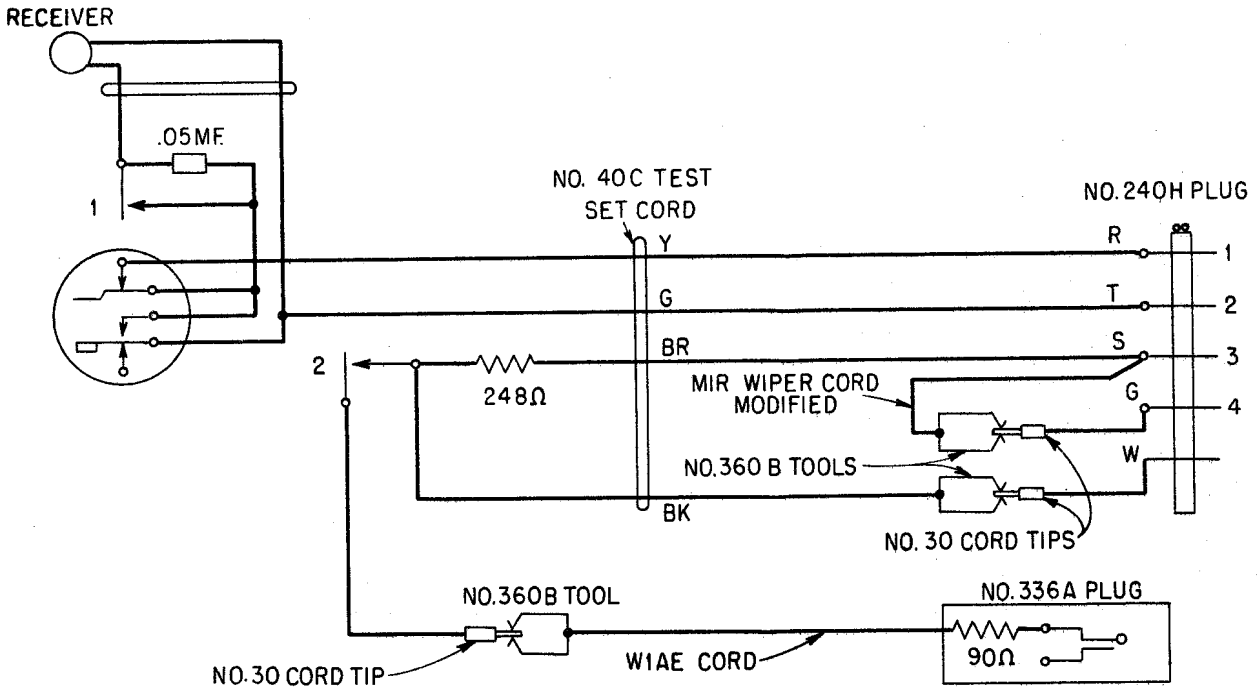

Fig. 1 - Schematic of No. 40C Test Set and Showing Modification of Leads at No. 240H Plug

STEP	ACTION	VERIFICATION
3b	If testing toll selectors - Connect No. 360B tool of M1R cord to No. 4 terminal of modified No. 240H plug shown in Fig. 1.	
4	Place No. 377A dialing knob on dial of No. 40C test set for level to be tested, if desired.	
Tests (B) and (C)		
5	Connect No. 336A plug of No. 40C test set to a 48V battery supply jack located on selector frame under test. Connect cord of No. 336A plug to No. 40C test set by means of a No. 360B tool and an associated No. 30 cord tip as shown in Fig. 1. Caution: Do not connect No. 336A plug to an adjacent frame battery supply jack because of proximity of an exposed battery bus bar on some types of frames.	

4. METHOD

STEP	ACTION	VERIFICATION
	(A) Rotary Action Test	
5	With selector to be tested normal - Insert No. 240H plug of No. 40C test set into test jack of selector, and monitor.	If there is an indication that selector has been seized by another call, remove No. 240H plug, otherwise proceed with test.
6c	If testing selector arranged for once-only digit absorption on level under test - Position adjustable spring W of No. 240H plug so that it does not make contact with sleeve wiper cord terminal on switch test jack. Note: If selector is not arranged for wiper cord termination at switch test jack assembly, disconnect No. 360B tool on BK cord of No. 40C test set from No. 30 cord tip of W terminal of No. 240H plug. Connect KS-6278 connecting clip to No. 360B tool of BK cord and arrange so connecting clip does not make any metallic contact.	
7c	Operate No. 1 key of test set.	
8c	Dial absorbed digit.	Selector steps to level dialed and restores. Note: Some selectors arranged for digit absorption may not step vertically on absorbed digit.

STEP	ACTION	VERIFICATION
9d	If testing selector arranged for absorbing first two digits on level under test - Position adjustable spring W of No. 240H plug so that it does not make contact with sleeve wiper cord terminal on switch test jack. Note: If selector is not arranged for wiper cord termination at switch test jack assembly, disconnect No. 360B tool on BK cord of No. 40C test set from No. 30 cord tip of W terminal of No. 240H plug. Connect KS-6278 connecting clip to No. 360B tool of BK cord and arrange so connecting clip does not make any metallic contact.	
10d	Operate No. 1 key of test set.	
11d	Dial two absorbed digits on level under test.	Selector steps to level dialed each time and restores.
12e	If testing selector arranged to block on level under test until after a digit has been absorbed - Position adjustable spring W of No. 240H plug so that it does not make contact with sleeve wiper cord terminal on switch test jack. Note: If selector is not arranged for wiper cord termination at switch test jack assembly, disconnect No. 360B tool on BK cord of No. 40C test set from No. 30 cord tip of W terminal of No. 240H plug. Connect KS-6278 connecting clip to No. 360B tool of BK cord and arrange so connecting clip does not make any metallic contact.	
13e	Operate No. 1 key of test set.	
14e	Dial a level arranged for digit absorption.	Selector steps to level dialed and restores.
15	Position adjustable spring, associated with W terminal of No. 240H plug so that it makes firm contact with sleeve wiper cord terminal on switch test jack. Note: If selector is not arranged for wiper cord termination at switch test jack assembly, connect KS-6278 connecting clip of BK cord of No. 40C test set direct to sleeve wiper of selector under test.	

STEP	ACTION	VERIFICATION
16	Dial level under test.	Selector steps to level dialed and rotates with positive and smooth action at uniform speed to eleventh rotary position. No clicking noise heard in receiver during rotary action. Note: Rotary speed may be slower than when in service. A clicking noise usually indicates faulty eleventh rotary step spring adjustment or faulty back contact spring pressure on cut through relay.
17	Release No. 1 key as soon as selector reaches eleventh rotary position. Note: This is to avoid excessive vibration of the rotary armature. On some digit absorbing selectors the rotary action ceases when the switch reaches the eleventh rotary position.	Selector restores.
18	Remove No. 240H plug from test set jack of switch. Note: If selector is not arranged for wiper cord termination, remove KS-6278 connecting clip from sleeve wiper.	
19f	If this test is to be repeated on either same selector or another selector - Repeat Steps 5 through 18, as required.	

(B) Stop on Idle Trunk Test

6	With selector to be tested normal - Insert No. 240H plug of No. 40C test set into test jack of selector, and monitor.	If there is an indication that selector has been seized by another call, remove No. 240H plug, otherwise proceed with test.
7c	If testing selectors arranged for once-only digit absorption on level under test - Position adjustable spring W of No. 240H plug so that it does not make contact with sleeve wiper cord terminal on switch test jack. Note: If selector is not arranged for wiper cord termination at switch test jack assembly, disconnect No. 360B tool on BK cord of No. 40C test set from No. 30 cord tip of W terminal of No. 240H plug. Connect KS-6278 connecting clip to No. 360B tool of BK cord and arrange so connecting clip does not make any metallic contact.	
8c	Operate No. 1 key of test set.	

STEP	ACTION	VERIFICATION
9c	Dial absorbed digit.	Selector steps to level dialed and restores. Note: Some selectors arranged for digit absorption may not step vertically on absorbed digit.
10d	If testing selector arranged for absorbing first two digits on level under test - Position adjustable spring W of No. 240H plug so that it does not make contact with sleeve wiper cord terminal on switch test jack. Note: If selector is not arranged for wiper cord termination at switch test jack assembly, disconnect No. 360B tool on BK cord of No. 40C test set from No. 30 cord tip of W terminal of No. 240H plug. Connect KS-6278 connecting clip to No. 360B tool of BK cord and arrange so connecting clip does not make any metallic contact.	
11d	Operate No. 1 key of test set.	
12d	Dial two absorbed digits on level under test.	Selector steps to level dialed each time and restores.
13e	If testing selector arranged to block on level under test until after a digit has been absorbed - Position adjustable spring W of No. 240H plug so that it does not make contact with sleeve wiper cord terminal on switch test jack. Note: If selector is not arranged for wiper cord termination at switch test jack assembly, disconnect No. 360B tool on BK cord of No. 40C test set from No. 30 cord tip of W terminal of No. 240H plug. Connect KS-6278 connecting clip to No. 360B tool of BK cord and arrange so connecting clip does not make any metallic contact.	
14e	Operate No. 1 key of test set.	
15e	Dial a level arranged for digit absorption.	Selector steps to level dialed and restores.

STEP	ACTION	VERIFICATION
16	Position adjustable spring, associated with W terminal of No. 240H plug so that it makes firm contact with sleeve wiper cord terminal on switch test jack. Note: If selector is not arranged for wiper cord termination at switch test jack assembly, connect KS-6278 connecting clip of BK cord of No. 40C test set direct to sleeve wiper of selector under test.	
17	Dial level under test. While selector is rotary hunting and before selector has reached the 8th rotary position, operate No. 2 key.	Selector steps to level dialed and rotates. Selector stops on an idle terminal after key is operated.
18	Release No. 2 key.	
19	Dial a digit. Note: On selectors immediately preceding level hunting connectors arranged for hunting after dialing the first digit, dial a connector level which is not assigned to subscriber's service, if available. Otherwise omit dialing this additional digit unless it has been determined locally that the resultant ringing on the trunk is not objectionable at the time the test is being conducted.	Selector has no vertical kick. No relay within switch chatters. Note: A vertical kick of the shaft or a relay chattering indicates the selector cut through relay is not operating properly.
20f	If testing local selectors - Release No. 1 key.	Switch restores. Note: Switch not restoring may be an indication that switch stopped falsely on a busy terminal.
21f	Remove No. 240H plug from test jack of switch. Note: If selector is not arranged for wiper cord termination, remove KS-6278 connecting clip from sleeve wiper.	
22g	If testing toll selectors - Release No. 1 key.	
23g	Remove No. 240H plug from test jack of switch. Note: If selector is not arranged for wiper cord termination, remove KS-6278 connecting clip from sleeve wiper.	Switch restores. Note: Switch not restoring may be an indication that switch stopped falsely on a busy terminal.
24h	If this test is to be repeated on either same selector or another selector - Repeat Steps 6 through 23g, as required.	
25	Remove all test connections.	

STEP	ACTION	VERIFICATION
	(C) Rotary Action and Eleventh Rotary Step Spring Test	
6	With selector to be tested normal - Insert No. 240H plug of No. 40C test set into test jack of selector, and monitor.	If there is an indication that selector has been seized by another call, remove No. 240H plug, otherwise proceed with test.
7c	If testing selector arranged for once-only digit absorption on level under test - Position adjustable spring W of No. 240H plug so that it does not make contact with sleeve wiper cord terminal on switch test jack. Note: If selector is not arranged for wiper cord termination at switch test jack assembly, disconnect No. 360B tool on BK cord of No. 40C test set from No. 30 cord tip of W terminal of No. 240H plug. Connect KS-6278 connecting clip to No. 360B tool of BK cord and arrange so connecting clip does not make any metallic contact.	
8c	Operate No. 1 key of test set.	
9c	Dial absorbed digit.	Selector steps to level dialed and restores. Note: Some selectors arranged for digit absorption may not step vertically on absorbed digit.
10d	If testing selector arranged for absorbing first two digits on level under test - Position adjustable spring W of No. 240H plug so that it does not make contact with sleeve wiper cord terminal on switch test jack. Note: If selector is not arranged for wiper cord termination at switch test jack assembly, disconnect No. 360B tool on BK cord of No. 40C test set from No. 30 cord tip of W terminal of No. 240H plug. Connect KS-6278 connecting clip to No. 360B tool of BK cord and arrange so connecting clip does not make any metallic contact.	
11d	Operate No. 1 key of test set.	
12d	Dial two absorbed digits on level under test.	Selector steps to level dialed each time and restores.

STEP	ACTION	VERIFICATION
13e	If testing selector arranged to block on level under test until after a digit has been absorbed - Position adjustable spring W of No. 240H plug so that it does not make contact with sleeve wiper cord terminal on switch test jack. Note: If selector is not arranged for wiper cord termination at switch test jack assembly, disconnect No. 360B tool on BK cord of No. 40C test set from No. 30 cord tip of W terminal of No. 240H plug. Connect KS-6278 connecting clip to No. 360B tool of BK cord and arrange so connecting clip does not make any metallic contact.	
14e	Operate No. 1 key of test set.	
15e	Dial a level arranged for digit absorption.	Selector steps to level dialed and restores.
16	Position adjustable spring, associated with W terminal of No. 240H plug so that it makes firm contact with sleeve wiper cord terminal on switch test jack. Note: If selector is not arranged for wiper cord termination at switch test jack assembly, connect KS-6278 connecting clip of BK cord of No. 40C test set direct to sleeve wiper of selector under test.	
17	Dial level under test.	Selector steps to level dialed and rotates with positive and smooth action at uniform speed to eleventh rotary position. No clicking noise heard in receiver during rotary action. Note: Rotary speed may be slower than when in service. A clicking noise usually indicates faulty eleventh rotary step spring adjustment or faulty back contact spring pressure on cut through relay.
18	Operate No. 2 key as soon as selector reaches eleventh rotary position, if rotary action continues. Note: This is to avoid excessive vibration of the rotary armature. On some digit absorbing selectors the rotary action ceases when the switch reaches the eleventh rotary position and the No. 2 key need not be operated.	Selector rotary action stops. All-paths-busy tone heard in receiver.

STEP	ACTION	VERIFICATION
19	Release test set key No. 1 and key No. 2, if operated in Step 18.	Selector restores.
20	Remove No. 240H plug from test set jack of switch. Note: If selector is not arranged for wiper cord termination, remove KS-6278 connecting clip from sleeve wiper.	
21f	If this test is to be repeated on either same selector or another selector - Repeat Steps 6 through 20, as required.	