INCOMING REGISTER LINK CIRCUITS
NONWIRE-SPRING-RELAY-TYPE
TEST
NO. 5 CROSSBAR OFFICES

1. GENERAL

1.01 This section describes the method of testing nonwire-spring-relay type incoming register link circuits in No. 5 crossbar offices.

1.02 This section is reissued to revise Test D to cover the testing of the RP relay chain when both wire-spring-type and nonwire-spring-type relays are included in the chain. Since this is a general revision, the arrows ordinarily used to indicate changes are omitted.

1.03 The tests covered are:

A. **TP Relay Chain:** The following features are checked. (1) Incoming trunk preference and lockout. (2) Access to incoming register circuits from all incoming trunks.

B. **AP Relay Chain:** This test checks the auxiliary trunk preference chain.

C. **RB Relay Chain:** The following features are checked. (1) Incoming register preference and lockout. (2) Access to all incoming register circuits from one horizontal group of trunks

D. **RP Relay Chain:** This test checks RP relay chains containing only nonwire-spring-type relays and RP relay chains containing both nonwire-spring-type and wire-spring-type relays. The following features are checked. (1) Horizontal group preference and lockout. (2) Access to one incoming register circuit from all horizontal groups of trunks.

1.04 All tests should preferably be made during periods of light traffic.

1.05 Local instructions should be followed with reference to any register operations caused by making these tests.

1.06 **Lettered Steps:** The letters a, b, c, etc., are added to a step number to indicate that the step covers an action which may or may not be required, depending on office conditions. The conditions under which a lettered step should be made are given in the action column, and all steps governed by the same condition are designated by the same letter. Where a condition does not apply, the associated steps should be omitted.

2. APPARATUS

2.01 The apparatus required for each test is shown in the following list. The details for each item are covered in the indicated paragraphs.

Apparatus	No. Required for Test			
	A	B	C	D
No. 651A Tool (2.02)	-	-	-	1
Test Receiver (2.03)	-	-	-	1
Test Receiver (2.04)	1	1	1	-
Test Cord (2.05)	1	-	-	2
Test Cord (2.06)	3	-	-	1
Make-busy Plug (2.07)	1	-	-	1

2.02 No. 651A tool (to facilitate connection to wire-spring-relay contacts).

2.03 No. 509 test receiver, or equivalent, attached to a W2AB cord equipped with two No. 360A tools (2W21A cord), one No. 411A tool, and one KS-6278 tool (for checking the presence of battery or ground on relay contacts).

2.04 No. 716C test receiver, or equivalent, attached to a W2AB cord equipped with two No. 360A tools (2W21A cord), one No. 411A tool, and one KS-6278 tool (for checking the presence of battery or ground on relay contacts).

2.05 Test cord - No. 893 cord, 6 feet long, equipped with two No. 360A tools (1W13B cord), one KS-6278 tool, and one No. 607A tool (for nonwire-spring relays) or one No. 624A tool (for wire-spring relays). This test cord is used for making test connections to relay winding terminals.

2.06 Test cord - No. 893 cord, 6 feet long, equipped with two No. 360A tools (1W13B cord), one KS-6278 tool, and one No. 419A tool (for nonwire-spring relays) or one No. 639A tool (for wire-spring relays). This test cord is used for making test connections to relay contacts.

2.07 No. 322A (make busy) plug.

3. METHOD

STEP	ACTION	VERIFICATION

A. TP Relay Chain

1   Select incoming register that has first
seizure preference by horizontal group
being tested

2   Remove from service trunks in hori-
zontal group

3   At incoming register link frame -
In horizontal group -
Block nonoperated RP, RB relays
associated with incoming register
selected in Step 1

4   At master test frame -
Insert make-busy plug into IRMB- jack
of selected incoming register

5   At incoming register link frame -
Connect ground to contacts 8T, 8B
and battery to contact 5B of last TP
relay in horizontal group

6   Manually operate first TP relay in
horizontal group momentarily

   Note: Do not test relay TP00 on
basic frame, since this TP relay is
associated with the automatic monitor
or incoming register test circuit.

                                                     First TP relay holds operated
              Associated hold magnet operated
              Associated AP relay (if provided)
              operated
              Blocked RP relay energized
              Ground on contacts 2T, 4T, 7T of
              operated TP relay
              Battery on contact 10B of last TP relay

7   Connect battery to B winding terminal
of second TP relay

              Second TP relay not operated

8   Momentarily remove battery from con-
tact 5B of last TP relay

              First TP relay released
              Second TP relay operated
               No ground on contacts 1T, 5T, 8T of
              first TP relay

9   Remove battery from winding of second
TP relay

              Second TP relay remains operated

10   Manually operate first TP relay
momentarily

              First TP relay does not hold
              Second TP relay remains operated

11   Momentarily remove battery from con-
tact 5B of last TP relay

              Second TP relay released

12   Repeat Steps 6 through 11 applying
reference to first and second TP relays
to the two consecutive TP relays (sec-
ond and third, third and fourth, etc.)
until last TP relay has been referred
to as second TP relay

13   Repeat Step 6 for last TP relay

14   Remove test connections from last TP
relay

              Last TP relay released

15   Remove blocking tools from RP and RB
relays

STEP	ACTION	VERIFICATION
16	Remove make-busy plug from IRMB- Ja of register selected in Step 1	
17	Restore trunks to service	
18	Repeat Steps 1 through 17 until all horizontal groups of incoming register link group have been tested	

B. AP Relay Chain

1	Remove from service trunks in horizontal group being tested	
2	At incoming register link frame - Block operated first AP relay in group being tested	Ground on contacts 1T, 4T, 1B, 4B of blocked AP relay
3	Remove blocking tool from first AP relay	
4	Block operated second AP relay in group	Ground on contacts 1T, 4T, 1B, 4B of blocked AP relay. No ground on contacts 2T, 5T, 2B, 5B of first AP relay
5	Remove blocking tool from first AP relay	
6	Repeat Steps 4 and 5 for all AP relays in group, applying reference to first and second AP relays to the two consecutive AP relays (second and third, third and fourth, etc.)	
7	Restore trunks to service	
8	Repeat Steps 1 through 7 until all AP relays in each horizontal group on incoming register link group have been tested	

C. RB Relay Chain

Note: The RP relays referred to in this test are only those in the horizontal group being tested. The first to last RP relays are determined by the reverse order of preference in which the associated incoming registers may be seized by the horizontal group. The RB relays referred to in this test are those associated with the first to last RP relays.

1	Remove from service trunks in horizontal group being tested	
2	At incoming register link frame - Block nonoperated all RP, RB relays in horizontal group	
3	Block operated last TP relay in horizontal group	First RP relay energized
4	Remove blocking tool from first RB relay	

STEP	ACTION	VERIFICATION
5	Manually operate first RB relay momentarily	First RB relay holds operated Second RP relay energized
6	Repeat Steps 4 and 5 applying reference to first RB and second RP relays to second RB and third RP relays, third RB and fourth RP relays, etc., respectively, until last RB relay is about to be manually operated	
7	Manually operate last RB relay momentarily	Last RB relay holds operated All other RB relays (associated with idle incoming registers) released
8	Remove blocking tools from last TP relay and then RP relays	Last RB relay released
9	Restore trunks to service	
10	Repeat Steps 1 through 9 until all horizontal groups of incoming register link group have been tested	

D. RP Relay Chain

Note: The RP relays referred to in this test are only those associated with the incoming register made busy.

1	At master test frame - Insert make-busy plug into IRMB- jack of first (lowest numbered) incoming register serving incoming register link group	At incoming register link frame - All RB relays (associated with incoming register made busy) operated

Note: The first to last incoming registers are determined by their position on the switch levels of the incoming register link.

2	At incoming register link frame - Block operated all RB relays associated with incoming register made busy	
3	Block nonoperated the following relays associated with incoming register made busy: Nonwire-spring type - all CL, TF, and, if provided, TN relays Wire-spring type - all C- and, if provided, CA- relays	
4	At incoming register frame - Block nonoperated ON relay; block operated H relay	
5	Insulate contacts of all RP relays as follows: Nonwire-spring type - 4B, 7B Wire-spring type - 4 make, 2 make	
6a	Where auxiliary frames are provided - Select frame on which RP relay operating battery chain begins (for particular register made busy) and determine sequence of chain for remaining frames from Table A	

Table A - Frame Sequence of Operating Battery Chain

Basic (Nonwire-spring-relay Type) and First Auxiliary (Nonwire-spring-relay Type or Wire-spring-relay Type) Frames Provided:

Incoming Registers 0, 2, 4, 6, and 8 - First Auxiliary, Basic
Incoming Registers 1, 3, 5, 7, and 9 - Basic, First Auxiliary

Basic, First Auxiliary, and Second Auxiliary Frames (All Nonwire-spring-relay Type) Provided:

Incoming Registers 0, 3, 6, and 9 - Second Auxiliary, First Auxiliary, Basic
Incoming Registers 1, 4, and 7 - Basic, Second Auxiliary, First Auxiliary
Incoming Registers 2, 5, and 8 - First Auxiliary, Basic, Second Auxiliary

Basic (Nonwire-spring-relay Type), First Auxiliary (Nonwire-spring-relay Type or Wire-spring-relay Type), and Second Auxiliary (Wire-spring-relay Type) Frame Provided:

Incoming Registers 0, 2, 4, and 6 - Second Auxiliary, First Auxiliary, Basic
Incoming Registers 1, 3, and 5 - Second Auxiliary, Basic, First Auxiliary
Incoming Registers 7, 8, and 9 - First Auxiliary, Basic, Second Auxiliary

STEP	ACTION	VERIFICATION
7	Select first RP and last RP relays in operating battery chain from Table B	

Table B - RP Relay Sequence of Operating Battery Chain

Nonwire-spring-relay Type Frame

Incoming Registers 0 and 5	RP Relay	0, 4, 3, 2, 1
Incoming Registers 1 and 6	RP Relay	1, 0, 4, 3, 2
Incoming Registers 2 and 7	RP Relay	2, 1, 0, 4, 3
Incoming Registers 3 and 8	RP Relay	3, 2, 1, 0, 4
Incoming Registers 4 and 9	RP Relay	4, 3, 2, 1, 0

Wire-spring-relay Type Frame

Incoming Registers 0, 4, and 8	RP Relay	0, 3, 2, 1
Incoming Registers 1, 5, and 9	RP Relay	1, 0, 3, 2
Incoming Registers 2 and 6	RP Relay	2, 1, 0, 3
Incoming Registers 3 and 7	RP Relay	3, 2, 1, 0

STEP	ACTION	VERIFICATION
8	At incoming register link frame - Connect battery to contact of last RP relay as follows: Nonwire-spring type - 5B Wire-spring type - fixed contact 4	Battery on contacts of first RP relay as follows: Nonwire-spring type - 5B, 8B Wire-spring type - fixed contact 4, 2
9	Connect ground to winding terminal of first RP relay as follows: Nonwire-spring type - Top terminal Wire-spring type - Upper terminal	First RP relay operated RB relay associated with first RP relay is not energized

Relays associated with operated RP relay are energized as follows: Nonwire-spring-type RP relay - CL, TF, TN relays Wire-spring-type RP relay - C-, CA- relays

Ground on contacts of last RP relay as follows: Nonwire-spring type - 5T, 11T, 10B Wire-spring type - fixed contacts 1, 3, 9, 10, 11 |

STEP	ACTION	VERIFICATION
10	Connect ground to winding terminal of second RP relay as follows: Nonwire-spring type - Top terminal Wire-spring type - Upper terminal	Second RP relay not operated
11	Disconnect ground from winding terminal of first RP relay	Second RP relay operated
12	Connect ground to winding terminal of first RP relay as follows: Nonwire-spring type - Top terminal Wire-spring type - Upper terminal	First RP relay operated Second RP relay remains operated RB relay associated with first RP relay is energized No battery on contacts of first RP relay as follows: Nonwire-spring type - 5B, 8B Wire-spring type - fixed contacts 4, 2 Battery on contacts of second RP relay as follows: Nonwire-spring type - 5B, 8B Wire-spring type - fixed contacts 4, 2
13	Disconnect ground from winding terminal of first RP relay	First RP relay released Second RP relay remains operated RB relay associated with operated RP relay is not energized Relays associated with operated RP relay are energized as follows: Nonwire-spring-type RP relay - CL, TF, TN relays Wire-spring-type RP relay - C-, CA- relays Relays associated with first RP relay are not energized as follows: Nonwire-spring-type RP relay - CL, TF, TN relays Wire-spring-type RP relay - C-, CA- relays Ground on contacts of last RP relay as follows: Nonwire-spring type - 5T, 11T, 10B Wire-spring type - fixed contacts 1, 3, 9, 10, 11 No ground on contacts of first RP relay as follows: Nonwire-spring type - 5T Wire-spring type - fixed contact 10
14	Repeat Steps 10 through 13 applying reference to first and second RP relays to the two consecutive relays (second and third, third and fourth, etc.) until last RP relay has been referred to as second relay	
15	Disconnect ground from winding terminal of last RP relay	Last RP relay released
16	Disconnect battery from contact of last RP relay	
17	Remove insulators from contacts of all RP relays	

STEP	ACTION	VERIFICATION
18	Remove blocking tools from relays as follows: Nonwire-spring type - all RB, CL, TF, TN relays Wire-spring type - all RB, C-, CA- relays	
19	At incoming register frames - Remove blocking tools from ON, H relays	
20	At master test frame - Remove make-busy plug from IRMB- jack	
21	Repeat Steps 1 through 20 making busy second, then third, etc., incoming registers until all RP relay chains have been tested	