

**CONNECTORS**  
**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 relay timing tests to B, C and E functional relays of local, toll, combination and test connectors.

**1.02** This section is reissued to delete testing information for test distributors and 8- and 10-party reverting call selectors. Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

**1.03** The tests covered are:

- A. *B Relay Release — Excluding Toll Level Hunting Connectors***
- B. *C Relay Release — Excluding Level Hunting Connectors***
- C. *E Relay Release — Excluding Level Hunting Connectors***

**1.04** Tests in this section are titled using the relay designation most commonly associated with its function in the circuit. For example, any relay which performs the function of a relay most commonly known as a B relay will be covered under the B relay test, even though in some cases it may be designated as G, L or

some other letter. It may be necessary to consult circuit descriptions or schematic diagrams to determine which relays perform the function to be tested.

**1.05** The timing requirements given on the circuit requirement table for the particular circuit under test shall be employed or, if not covered thereon, the timing requirements given in Section 040-013-711 shall be used.

**1.06** In Test C, it is necessary with certain types of toll rotary connectors to remove the switch cover in order to check that the E relay releases properly. In view of this, and considering the functions of the E relay in these connectors, it is not expected that Test C will be applied to these switches on a routine basis. The test is intended, however, for use in connection with clearing specific cases of trouble.

**1.07** Operation of the keys, dials and potentiometers, within the test set, which control the variable make and break periods required when performing the tests outlined in this section is covered in CD-90418-01.

**1.08** Failure of a relay to meet the release test may be due to the presence of some sticky substance between the armature and core, or it may indicate that the relay is out of timing adjustment, in which case it should be readjusted in accordance with timing requirements given on the circuit requirement tables or in Section 040-013-711.

**1.09** 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.

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

**2.02** Patching cord assembly connected as shown in Fig. 1, consisting of the following:

P3H cord, 10 feet long, equipped with a 310 plug and a 240H plug (3P35A cord).

893 cord, 3 feet long, equipped with two 360A tools (1W13A cord).

KS-6278 connecting clip or 365 tool.

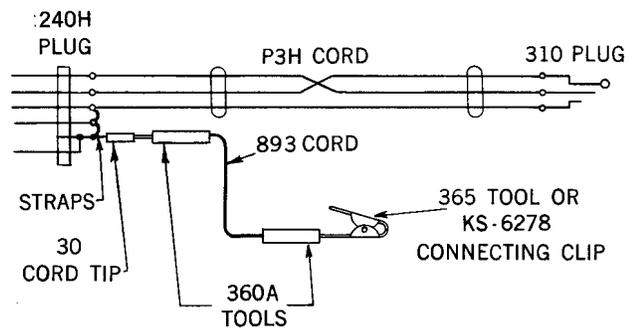
**Note 1:** If the test set is equipped with BAT, S and G terminals, the S and G terminals

may be strapped and the strap between terminals 3 and 4 of the 240H plug may be omitted.

**Note 2:** If 10-party terminal per station combination connectors are to be tested, the ground on the incoming sleeve must be removed during the test. This may be accomplished in one of two ways, as follows:

(a) If BAT, S and G terminals are provided on the test set (see Note 1), remove the strap between S and G.

(b) If terminals 3 and 4 of the 240H plug are strapped, (see Note 1), the 240H plug may be modified locally. This modification may be accomplished by removing approximately two thirds of the length of the No. 4 terminal. A hacksaw may be used to do this. When this method is used, the 240H plug is inserted only about halfway into the test jack during the test. Used in this manner, the 1, 2 and 3 terminals will make contact with the appropriate jack springs but the 4 terminal will not. By inserting the 240H plug all the way into the test jack, the ground on jack spring 4 will be placed on the incoming sleeve.



**Fig. 1**

**2.03** Patching cord, P2J cord, 9 feet long, equipped with two 310 plugs (2P9A cord), used where battery supply for test set is obtained from battery and ground jack.

**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 installed locally on the 59 cord tips, used where battery supply for test set is obtained from 35-type fuse (not to exceed 5 amperes) and frame ground or battery and ground block.

**2.05** One unattached 240A plug, required for use in the sleeve cutoff jack when testing level hunting connectors.

**2.06** One 32A or 32C test set, for remote control operation when required.

### 3. PREPARATION

STEP	ACTION	VERIFICATION
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#### All Tests

1 Connect battery and ground to BAT-G jack of test set.

**Note 1:** If using W2M 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 Operate B key (or B dial) to position corresponding to release requirement for relay under test.

3 Operate A-B key to B position.

Timing circuit in test set operates.

**Note:** Allow timing test set to operate for at least 15 minutes (to reach a constant temperature) before making tests.

#### Test A

4 Insert 310 plug of P3H cord into V-BR jack of test set.

#### Tests B and C

5 Restore A-B key to normal.

Timing circuit in test set stops.

6 Insert 310 plug of P3H cord into V-M jack of test set.

7a If using 32A remote control set —  
Insert plug into BR jack of test set.

8b If using 32C remote control set —  
Insert red shell plug into BR jack and gray shell plug into AW jack of timing test set.

## 4. METHOD

STEP	ACTION	VERIFICATION
<b>A. B Relay Release — Excluding Toll Level Hunting Connectors</b>		
<b>Nonlevel Hunting Switches</b>		
5a	If testing other than 10-party terminal per station connectors — Position auxiliary spring of 240H plug so it will make contact with sleeve wiper cord terminal when plug is inserted into switch test jack or connect test clip of 893 cord directly to sleeve wiper when testing switches not arranged for test jack termination of wiper cords.	
6a	Insert 240H plug of P3H cord into local test jack of switch under test.	Switch steps to first level and releases without cutting in, at least three times.
7b	If testing 10-party terminal per station connectors — Remove ground from incoming sleeve. (See 2.02.)	
8b	Insert 240H plug into local test jack. (See 2.02.)	Switch steps to first level and releases, at least three times. <i>Note:</i> Switch may take one rotary step before releasing.
9	Remove 240H plug from test jack.	
<b>Local Level Hunting Connectors</b>		
10	Insert unattached 240A plug into sleeve cutoff jack of connector under test.	
11	Insert 240H plug of P3H cord into test jack of connector under test. <i>Note:</i> Grounding of sleeve wiper is not necessary.	Note from audible sound of connector that recorder switch takes one step and releases, indicating that B relay releases properly. <i>Note:</i> Failure of B relay to release properly will be indicated by connector starting vertical stepping.
12	Remove 240H plug from test jack.	
13	Remove unattached 240A plug from sleeve cutoff jack.	
14	Unless further tests are to be made — Remove all cords and restore all keys.	

STEP	ACTION	VERIFICATION
<b>B. C Relay Release — Excluding Level Hunting Connectors</b>		
9	Position auxiliary spring of 240H plug so it will make contact with sleeve wiper cord terminal when plug is inserted into switch test jack or connect test clip of 893 cord directly to sleeve wiper when testing switches not arranged for test jack termination of wiper cords.	
10	Insert 240H plug into local test jack of switch under test.	
11	Operate test set A-B key to B position or depress red button of remote control set.	Switch steps to first level and cuts in. <i>Note:</i> In cases where connector continues to rotate, remove 240H plug from test jack to release the switch before it reaches last terminal.
12	Restore A-B key on test set or release red button of remote control set.	Switch releases.
13	Remove 240H plug from test jack.	
14	Unless further tests are to be made, remove all cords and restore all keys.	
<b>C. E Relay Release — Excluding Level Hunting Connectors</b>		
9	Position auxiliary spring of 240H plug so it will make contact with sleeve wiper cord terminal when plug is inserted into switch test jack or connect test clip of 893 cord directly to sleeve wiper when testing switches not arranged for test jack termination of wiper cords.	
10	Insert 240H plug of P3H cord into local test jack of switch under test.	

STEP	ACTION	VERIFICATION
11	Operate test set A-B key to B position or depress red button of remote control set.	Switch steps to first level, cuts in and stops. <i>Note:</i> On local rotary hunting connector groups, the switch may hunt after the first rotary step. On certain types of toll rotary connectors, the switch may continue to take rotary steps in response to pulses from the test set even though the E relay releases properly. If such switches are to be tested, it will be necessary to remove the cover and observe that the E relay is releasing after each rotary step. In cases where the switch continues to step or hunt, remove 240H plug from test jack before switch reaches last terminal.
12	Remove 240H plug from switch test jack.	Switch releases.
13	Restore A-B key on test set or release red button of remote control set.	
14	Unless further tests are to be made — Remove all cords and restore all keys.	