

SWITCH TROUBLE AND FUSE ALARMS OPERATION TESTS STEP-BY-STEP SYSTEMS

1. GENERAL

1.01 This section describes the methods of testing the visual and audible alarms (other than permanents) associated with the various types of step-by-step switches.

1.02 This section is reissued for the following reasons:

- (a) To delete former Test D and Tests J through N which applied to the obsolete DSB switchboard.
- (b) To reletter former Test E to Test D.
- (c) To separate former Test F into two Tests E and F, in order to provide a separate test for all finders busy and call block alarms.
- (d) To reletter Test O to Test J.

Since this reissue covers a general reissue, arrows ordinarily used to indicate changes have been omitted.

1.03 The tests covered are:

A. Switch Frame Fuse Alarm: This test checks that the alarm circuit functions properly on either battery actuated or ground actuated fuse alarms associated with switch frames.

B. Line Finder or Trunk Finder, Selector, Coin Control Selector, 8-Party and 10-Party Reverting Call Selector, Test Distributor, and Connector Release Alarm: This test checks the operation of the alarms when a line finder, trunk finder, selector, distributor, or a connector fails to restore to normal.

C. 2-Party and 4-Party Reverting Call Selector Release Alarm: This test checks the operation of the alarms when a reverting call selector fails to restore to normal.

D. Line or Trunk Finder Multiple Chain Circuit Trouble Alarm: This test checks the operation of the alarms when the chain circuit becomes crossed with battery or ground.

E. Line or Trunk Finder Start Lead Ground Alarm: This test checks the operation of the alarms when the start lead becomes falsely grounded.

F. Line or Trunk Finder Call Block Alarm: This test checks the operation of the alarms resulting from an all finders busy condition or a call blocked condition due to failure of the finder to find a calling line.

G. Primary Line Switch Supervisory Alarm: This test checks the operation of the alarms associated with the supervisory relay in primary line switches.

H. Secondary Line Switch Supervisory Alarm: This test checks the operation of the alarms associated with the supervisory relay in secondary line switches.

I. Out Trunk Switch Supervisory Alarm (Plunger Type Switches): This test checks the operation of the alarms associated with the supervisory relay in plunger type out trunk switches.

J. Shelf Cutoff Keys BF, BF1, BT, BY, C1 through C5, LT2, PKU, PU, ±, and 60 ipm: This test checks the alarms associated with shelf cutoff keys.

1.04 A timed delay interval, between application of the test condition and receipt of audible and visual alarm indications, will be encountered in a majority of the tests covered in this section. Reference to a specified time interval in receiving these individual alarm indications is omitted, as the intervals will vary

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depending on circuit options used, alarm speed-up features, etc. Accordingly, it will be necessary for the tester to familiarize himself with the particular time intervals applicable in his office on the various tests.

1.05 In the various tests where it is necessary to dial a connector terminal or communicate with an operator or another craftsman either the office telephone or dial hand test set may be used for this purpose.

1.06 *Caution: If during these tests a regular alarm should originate, the tests should immediately be discontinued so that the alarm will sound in the normal manner. Notify the proper persons that a regular alarm is sounding.*

1.07 Tests of trouble and fuse alarms for miscellaneous circuits and a means of verifying that alarms can be transferred to a distant office or switchboard are covered in Section 226-801-500.

1.08 Local instructions should be followed for recording and reporting any register operations caused by performing these tests.

1.09 *Lettered Steps:* A letter a, b, c, etc, added to a step number in Part 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.

2. APPARATUS

Test A

2.01 Test receiver, 509 receiver, attached to a W2AB cord equipped with two 360A tools (2W21A cord), one 411B (test pick) tool and one 365A (connecting clip) tool or KS-6278 connecting clip (for use in applying ground to 35R (0.180 amp) fuse).

Note: This high resistance receiver (1100 ohms) is used to limit the current flow through the 35R fuse.

2.02 Testing cord, W1AF cord, 8 feet 6 inches long, equipped with two 360A tools, one KS-6278 connecting clip and one 411B (test pick) tool (for use in applying battery to fuse stud of 35R fuse) or with two 411B (test pick) tools (for use in applying battery to alarm stud or where 70-type fuses are used in circuits of 52 volts maximum).

Tests D and E

2.03 Testing cord, W2W cord, 10 feet long, equipped with one 310 plug, one 360B tool, one 360C tool (2W17C cord), and one KS-6278 connecting clip (for use in applying battery or ground).

Tests D, E, F, H, and J

2.04 Test receiver, 716C receiver, attached to a W2AB cord equipped with two 360A tools (2W21A cord), one KS-6278 connecting clip and one 411A (test pick) tool (for use in applying battery and ground).

Test H

2.05 136B (relay blocking) tool (for use with allotter equipment only).

2.06 324 (relay blocking) tool (for use in blocking pull-down armature of secondary line switch).

Tests H and I

2.07 Two 240A plugs with springs 3 and 4 strapped (used to short-circuit test jacks in line switch offices).

Test J

2.08 Blocking tools, as required. Use tools and apply, as covered in Section 069-020-801.

2.09 1011G handset (dial hand test set) equipped with a 2W39A cord assembly consisting of W2CL cord, 471A jack, and a 240A plug.

3. PREPARATION**All Tests**

STEP	ACTION	VERIFICATION
1a	If office is equipped with keys to prevent signaling distant office — Operate LO, EXT CO, TR, TRNS, AUD ALM, SW, SWBD, or MULT keys to a position in which alarms are not transmitted to a distant office, switchboard, or other alarm location.	Guard lamp, if provided, lights when alarms are not extended.
2b	If office is not equipped with key to prevent signaling distant office — Follow local instructions relative to disabling signaling features.	

Tests B, C, G, H, and I

- 3 In offices where equipment has been provided to speed up common timing circuit, when desired for testing purposes, short interval timing shall be used. Whenever this feature is used, it shall be restored to normal at conclusion of tests.

4. METHOD

STEP	ACTION	VERIFICATION
A. Switch Frame Fuse Alarm		
<i>Caution: The battery supply provided by a 35R (0.180 amp) fuse should not be used for making any of the fuse alarm tests.</i>		
<i>Note: If the fuse alarm circuit being tested is associated with 70-type fuses in dc circuits of 52 volts maximum, to test the alarm feature of the fuse block, establish the test connection by inserting the tip of the 411B tool (attached to the W1AF cord) into the aperture of the fuse block cap and touch the alarm lead ring, thus causing a plant alarm.</i>		
3c	If testing battery supply fuse alarm — Connect battery, using W1AF cord, to alarm stud.	FA, floor alarm board lamps light. Audible alarm sounds. Aisle pilot lamps light.
4c	Disconnect battery.	All alarm lamps extinguished. Audible alarm silenced.
5d	<i>If testing ringing fuse alarm which has a 35R (0.180 amp) fuse associated with it —</i> Using 509 receiver, apply ground momentarily to alarm stud of ringing fuse.	Click heard in receiver.

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STEP	ACTION	VERIFICATION
6d	Apply battery, using W1AF cord, to alarm stud of 35R fuse.	FA, floor alarm board lamps light. Audible alarm sounds. Aisle pilot lamps light.
7d	Disconnect battery.	All alarm lamps extinguished. Audible alarm silenced.
8e	<i>If testing ringing fuse alarm which does not have a 35R (0.180 amp) fuse associated with it —</i> Apply battery, using W1AF cord, to alarm stud of ringing supply fuse.	FA, floor alarm board lamps light. Audible alarm sounds. Aisle pilot lamps light.
9e	Disconnect battery.	All alarm lamps extinguished. Audible alarm silenced.
10a	If office is equipped with keys to prevent signaling distant office — Restore alarm transfer keys.	
11b	If office is not equipped with key to prevent signaling distant office — Restore alarm disabling feature to normal.	
B. Line Finder or Trunk Finder, Selector, Coin Control Selector, 8-Party and 10-Party Reverting Call Selector, Test Distributor, and Connector Release Alarm		
4c	If shelves are equipped with one release relay — Manually raise, hold shaft of idle switch on top shelf of group to be tested.	Off-normal springs operate. Within proper time — Audible alarm sounds. RLS, aisle pilot lamps light.
5c	Raise, hold shaft of idle switch on next lower shelf.	RLS lamp lights. Audible alarm continues to sound.
6c	Restore first switch to normal.	RLS lamp associated with shelf previously tested extinguished. Audible alarm continues to sound. RLS, aisle pilot lamps remain lighted.
7c	Repeat Steps 4c through 6c on each succeeding shelf in alarm group.	RLS lamp associated with shelf previously tested extinguished. RLS lamp on next shelf lights. Audible alarm continues to sound.
8c	When last shelf has been tested — Restore switch to normal.	RLS, aisle pilot lamps extinguished. Audible alarm silenced.
9d	If shelves are equipped with more than one release relay — Manually raise, hold shaft of idle switch in group associated with first release relay on shelf.	Off-normal springs operate. Within proper time — Audible alarm sounds. RLS, aisle pilot lamps light.
10d	Raise, hold shaft of idle switch in group associated with second release relay on shelf.	Audible alarm continues to sound. RLS, aisle pilot lamps remain lighted.

STEP	ACTION	VERIFICATION
11d	Restore first switch to normal.	Audible alarm continues to sound. RLS, aisle pilot lamps remain lighted.
12d	Repeat Steps 10d and 11d on each succeeding release relay and shelf in alarm group.	RLS lamp associated with shelf previously tested extinguished. RLS lamp on next shelf lights. Audible alarm continues to sound.
13d	When last shelf has been tested — Restore switch to normal.	RLS, aisle pilot lamps extinguished. Audible alarm silenced.
14	Restore common timing circuit to normal.	
15a	If office is equipped with keys to prevent signaling distant office — Restore alarm transfer keys.	
16b	If office is not equipped with key to prevent signaling distant office — Restore alarm disabling feature to normal.	

C. 2-Party and 4-Party Reverting Call Selector Release Alarm

4	Manually rotate shaft of idle switch.	Off-normal springs operate. Within proper time — Audible alarm sounds. RLS, aisle pilot lamps light.
5	Restore switch to normal.	RLS, aisle pilot lamps extinguished. Audible alarm silenced.
6	Repeat Steps 4 and 5 on succeeding shelves.	Same as Steps 4 and 5.
7	Restore common timing circuit to normal.	
8a	If office is equipped with keys to prevent signaling distant office — Restore alarm transfer keys.	
9b	If office is not equipped with key to prevent signaling distant office — Restore alarm disabling feature to normal.	

D. Line or Trunk Finder Multiple Chain Circuit Trouble Alarm

Test and Make-Busy Jacks Located on External Panel

3	Connect battery to tip of test cord.	
4	Insert 310 plug of test cord into test jack of idle finder in group being tested.	C lamp lights. Audible alarm sounds.
5	Remove battery connection.	C lamp extinguished. Audible alarm silenced.
6	Connect ground to tip of test cord.	C lamp lights. Audible alarm sounds.
7	Remove ground connection.	C lamp extinguished. Audible alarm silenced.

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STEP	ACTION	VERIFICATION
8	Remove plug from test jack.	
9a	If office is equipped with keys to prevent signaling distant office — Restore alarm transfer keys.	
10b	If office is not equipped with key to prevent signaling distant office — Restore alarm disabling feature to normal.	

Test and Make-Busy Switch Located on Finder

11	At finder make-busy switch — Apply battery to spring 6 of idle finder in group being tested.	C lamp lights. Audible alarm sounds.
12	Remove battery.	C lamp extinguished. Audible alarm silenced.
13	Apply ground to spring 6 of idle finder.	C lamp lights. Audible alarm sounds.
14	Remove ground.	C lamp extinguished. Audible alarm silenced.
15a	If office is equipped with keys to prevent signaling distant office — Restore alarm transfer keys.	
16b	If office is not equipped with key to prevent signaling distant office — Restore alarm disabling feature to normal.	

E. Line or Trunk Finder Start Lead Ground Alarm

Test and Make-Busy Jacks Located on External Panel

3	Connect ground to tip of test cord.	
4	Insert 310 plug of test cord into test jack of first idle finder in group just far enough for tip of plug to touch ring of jack.	Each finder in turn steps, rotates to eleventh step, releases.
5	When last finder has released and second cycle begins — Remove plug from test jack.	S lamp lights. Audible alarm sounds.
6	Remove ground connection.	
7	Momentarily operate AR key.	S lamp extinguished. Audible alarm silenced.
8a	If office is equipped with keys to prevent signaling distant office — Restore alarm transfer keys.	
9b	If office is not equipped with key to prevent signaling distant office — Restore alarm disabling feature to normal.	

STEP	ACTION	VERIFICATION
Test Jack and Make-Busy Switch Located on Finder		
10	At first idle finder in group — Apply ground to spring 3 of test jack.	Each finder in turn steps, rotates to eleventh step, releases.
11	When last finder has released and second cycle begins — Remove ground.	S lamp lights. Audible alarm sounds.
12	Momentarily operate AR key.	S lamp extinguished. Audible alarm silenced.
13a	If office is equipped with keys to prevent signaling distant office — Restore alarm transfer keys.	
14b	If office is not equipped with key to prevent signaling distant office — Restore alarm disabling feature to normal.	

F. Line or Trunk Finder Call Block Alarm

Circuit Arranged for Major Alarm Only

3	Operate TST key of group under test.	Line finders start hunting. Within proper time — CB or C BLK, aisle pilot lamps light. Audible alarm sounds.
4	Operate TST key of next group under test, restore TST key of first group.	CB or C BLK lamp of first group extinguished. CB or C BLK of second group lights. Aisle pilot lamp remains lighted. Audible alarm continues to sound.
5	Repeat Step 4 for each succeeding group.	Same as Step 4.
6	When last group has been tested — Restore TST key.	CB or C BLK, aisle pilot lamps extinguished. Audible alarm silenced.
7a	If office is equipped with keys to prevent signaling distant office — Restore alarm transfer keys.	
8b	If office is not equipped with key to prevent signaling distant office — Restore alarm disabling feature to normal.	

Circuit Arranged for Major and Minor Alarms

9	Operate TST key of group under test.	Each idle finder in turn operates, releases. After last finder releases, first finder re-operates.
10	After first finder reoperates — Restore TST key to normal.	Line finders cease test operation.
11c	If R1380 OB relay is provided — Connect ground to 3B of OB relay.	Within proper time — AFB lamp lights. Audible alarm sounds.

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STEP	ACTION	VERIFICATION
12d	If U463 OB relay is provided — Connect ground to 1T of OB relay.	Within proper time — AFB lamp lights. Audible alarm sounds.
13	Remove ground from OB relay.	AFB lamp extinguished. Audible alarm silenced.
14c	If R1380 OB relay is provided — Connect ground to 4B of OB relay.	Within proper time — CB or C BLK lamp lights. Audible alarm sounds.
15d	If U463 OB relay is provided — Connect ground to 2T of OB relay.	Within proper time — CB or C BLK lamp lights. Audible alarm sounds.
16	Remove ground from OB relay.	CB or C BLK lamp extinguished. Audible alarm silenced.
17a	If office is equipped with keys to prevent signaling distant office — Restore alarm transfer keys.	
18b	If office is not equipped with key to prevent signaling distant office — Restore alarm disabling feature to normal.	
G. Primary Line Switch Supervisory Alarm		
4	Operate, hold line relay of any primary line switch in master switch section under test.	At line switch bay — Within proper time — SUPY GRD lamp lights. Audible alarm sounds.
5	Operate, hold starting relay of primary master switch under test.	
6	Release line relay of line switch.	Master switch oscillates. SUPY GRD lamp remains lighted. Audible alarm continues to sound.
7	While master switch is swinging from trunk 10 to 1 — Hold locking segment in position where locking arm, when released, rests on seg- ment midway between two notches.	Switch stops oscillating.
8	Release master switch starting relay.	SUPY GRD lamp remains lighted. Audible alarm continues to sound.
9	Release locking segment.	SUPY GRD lamp extinguished. Audible alarm silenced.
10	Restore common timing circuit to normal.	
11a	If office is equipped with keys to prevent signaling distant office — Restore alarm transfer keys.	
12b	If office is not equipped with key to prevent signaling distant office — Restore alarm disabling feature to normal.	

STEP	ACTION	VERIFICATION
H. Secondary Line Switch Supervisory Alarm		
Line Switches Without Allotters		
4	Block nonoperated, using 324 tool, pull-down armature of any secondary line switch of master switch section under test.	Line switch does not operate.
5	Insert 240A plug into line switch test jack.	At line switch bay — Within proper time — SUPY GRD lamp lights. Audible alarm sounds.
6	At relay equipment associated with master switch under test — Momentarily short-circuit springs 1 and 2 of test jack.	Primary master switches pick up plungers standing in front of trunks to particular section under test.
7	At associated relay equipment — Insert 240A plug into test jack.	Secondary master switch oscillates.
8	Remove 324 tool from armature of secondary line switch.	
9	Remove 240A plug from line switch test jack inserted in Step 5.	SUPY GRD lamp remains lighted. Audible alarm continues to sound.
10	While master switch is swinging from trunk 10 to 1 — Hold locking segment in position where locking arm, when released, rests on segment midway between two notches.	Switch stops oscillating.
11	Remove 240A plug from associated relay equipment test jack.	SUPY GRD lamp remains lighted. Audible alarm continues to sound.
12	Release locking segment.	SUPY GRD lamp extinguished. Audible alarm silenced.
13	Restore common timing circuit to normal.	
14a	If office is equipped with keys to prevent signaling distant office — Restore alarm transfer keys.	
15b	If office is not equipped with key to prevent signaling distant office — Restore alarm disabling feature to normal.	
Line Switches With Allotters		
16	At secondary master switch under test — Insert 136B tool between springs 1 and 2 of B relay (locking magnet).	At line switch bay — Within proper time — SUPY GRD lamp lights. Audible alarm sounds.
17	Connect battery to battery winding terminal of B relay.	

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STEP	ACTION	VERIFICATION
18	At relay equipment associated with secondary master switch under test — Momentarily short-circuit springs 1 and 2 of test jack.	
19	When allotter is standing on working terminal — Remove 136B tool from B relay.	SUPY GRD lamp remains lighted. Audible alarm continues to sound.
20	Reinsert 136B tool between springs 1 and 2 of B relay.	
21	Remove battery connection from B relay.	
22	At associated master switch relay equipment — Insert 240A plug into test jack.	Master switch oscillates. If primary line switch selects trunk to group under test — Selector switch of associated allotter spins continuously.
23c	If selector switch spins continuously — Remove 240A plug from test jack.	Line switch plunges.
24c	Reinsert 240A plug into test jack.	
25	While master switch is swinging from trunk 10 to 1 — Hold locking segment in position where locking arm, when released, rests on segment midway between two notches.	Switch stops oscillating.
26	Remove 240A plug from test jack.	SUPY GRD lamp remains lighted. Audible alarm continues to sound.
27	Release locking segment.	SUPY GRD lamp extinguished. Audible alarm silenced.
28	Restore common timing circuit to normal.	
29a	If office is equipped with keys to prevent signaling distant office — Restore alarm transfer keys.	
30b	If office is not equipped with key to prevent signaling distant office — Restore alarm disabling feature to normal.	

I. Out Trunk Switch Supervisory Alarm (Plunger Type Switches)

4c	If D relay is provided — Manually hold pull-down armature of any out trunk switch of master switch section under test.	Switch does not operate.
5c	Insert 240A plug into switch test jack.	Within proper time — SUPY GRD lamp lights. Audible alarm sounds.

STEP	ACTION	VERIFICATION
6c	Release armature of out trunk switch.	
7c	Remove 240A plug from switch test jack.	SUPY GRD lamp extinguished. Audible alarm silenced.
8	At associated master switch relay equipment — Insert 240A plug into test jack.	Master switch oscillates. Within proper time — SUPY GRD lamp lights. Audible alarm sounds.
9	While master switch is swinging from trunk 10 to 1 — Hold locking segment in position where locking arm, when released, rests on segment midway between two notches.	Switch stops oscillating.
10	Remove 240A plug from test jack.	SUPY GRD lamp remains lighted. Audible alarm continues to sound.
11	Release locking segment.	SUPY GRD lamp extinguished. Audible alarm silenced.
12	Restore common timing circuit to normal.	
13a	If office is equipped with keys to prevent signaling distant office — Restore alarm transfer keys.	
14b	If office is not equipped with key to prevent signaling distant office — Restore alarm disabling feature to normal.	
J. Shelf Cutoff Keys BF, BF1, BT, BY, C1 through C5, LT2, PKU, PU, ±, and 60 ipm		
3c	If testing shelf cutoff keys associated with 8-party connectors, reverting call selectors — Block operated ST relay of ringing interrupter and alarm circuit connected to office load.	Ringling interrupter starts.
4	Operate shelf cutoff key. <i>Caution: If switch in group operates, restore key immediately.</i>	Shelf guard lamp lights, if provided.
5d	If testing BT, C1 through C5, PU, ± keys — Apply ground to inner contact springs of key.	Tone or interruption absent.
6d	Remove ground.	
7e	If testing BF, BF1, BY, LT2, PKU, 60 ipm keys — Apply battery to inner contact springs of key.	Tone or interruption absent.

STEP	ACTION	VERIFICATION
8e	Remove battery.	
9	Restore shelf cutoff key.	Guard lamp extinguished.
10	Repeat Steps 5d through 8e, as required.	Tone or interruption present in Steps 5d or 7e.
11c	If testing shelf cutoff keys associated with 8-party connectors, reverting call selectors — Remove blocking tool from ST relay.	Ringing interrupter stops.
12a	If office is equipped with keys to prevent signaling distant office — Restore alarm transfer keys.	
13b	If office is not equipped with key to prevent signaling distant office — Restore alarm disabling feature to normal.	