

ALARMS  
OPERATION TESTS  
740E PBX

1. GENERAL

1.01 This section is reissued for the following reasons:

(a) To include coverage for externally mounted alarm circuit. (b) To include coverage for TOUCH-TONE alarms. (c) To bring this section up to date. Since this reissue covers a general revision, arrows ordinarily used to indicate changes have been omitted.

1.02 The tests covered are:

**A. Central Office Alarms:** This test checks the operation of alarms at the PBX resulting from troubles at the PBX and their extension to the central office.

**B. Battery Cutoff Fuse Alarm:** This test checks the operation of visual and audible alarms at the PBX caused by an operated fuse on the battery cutoff fuse panel.

**C. 15A Fuse Block Alarm:** This test checks the operation of visual and audible alarms at the PBX caused by an operated fuse on a 15A fuse block.

**D. Permanent Signal Alarm:** This test checks the operation of visual and audible alarms resulting from an off-hook condition at the PBX.

**E. Call Blocked Alarm:** This test checks that a visual and audible alarm will occur at the PBX if a line finder or TOUCH-TONE trunk finder fails to find a calling line.

**F. Power Charge and Discharge Circuit Alarm:** This test checks that a visual and audible alarm will occur at the PBX resulting from ringing supply or power failure.

**G. Start Lead Ground Alarm:** This test checks that a visual and audible alarm will occur at the PBX if a line finder or TOUCH-TONE trunk finder becomes grounded.

**H. Release Magnet Alarm:** This test checks that a visual and audible alarm will occur at the PBX if a line finder, selector, selector-connector, TOUCH-TONE trunk finder, or connector switch fails to restore to normal for any reason.

**I. Switchboard Fuse Alarm — 552A PBX:** This test checks the visual and audible alarms at the 552A switchboard.

**J. All-Trunk-Finders-Busy Alarm:** This test checks that a visual and audible alarm will occur when all TOUCH-TONE trunk finders are busy.

1.03 Test A is to be performed when the PBX alarms are arranged for extension to the central office.

1.04 Performing the tests in this section will cause either a major or minor alarm; therefore, all persons concerned should be notified prior to starting the tests and again at their completion. If while performing these tests a regular alarm should occur, the tests should be immediately discontinued so that the alarm will occur in the normal manner and the proper persons notified that a regular alarm is occurring.

1.05 When testing at or connecting to a wire-spring relay contact terminal, the work is to be performed on the wiring side of the relay. Care shall be taken when connecting to terminals with solderless wrapped connections so that the wires will not be disturbed.

1.06 Tests A through I require action and verification at the unit under test, PBX equipment, attendant positions (consoles, switchboards, key sets), external alarm position, and the central office.

1.07 When performing Test H a peg count register will score. Local instructions should be followed for reporting and recording this register operation.

**SECTION 546-404-501**

**1.08** When performing Tests D, E, G, and H a different switch in each switch group should be used each time the test is made so that eventually each switch in each group will be tested.

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

**2. APPARATUS**

**Test A**

**2.01** 1011G handset (dial hand test set) equipped with a 2W39A cord assembly, consisting of a W2CL cord, 471A jack, and 240A plug, or equivalent.

**2.02** Testing cord, 893 cord, 6 feet long, equipped with two 360A tools, one KS-6278 connecting clip, and one 509A tool.

**Tests A, B, C, F, I**

**2.03** Testing cord, W1U cord, 1 foot 8 inches long.

**Tests A, D**

**2.04** 477A or 375A make-busy tools, as required.

**Test E**

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

**Test F**

**2.06** Test receiver, 716C receiver attached to a W2AB cord equipped with two 360A tools (2W21A cord) or equivalent; one KS-6278 connecting clip; and one 411A (test pick) tool for use in checking the presence or absence of battery or ground.

**Test G**

**2.07** Testing cord, W2W cord, 6 feet long, equipped with one 310 plug, one 360B tool, one 360C tool (2W17A cord); and one KS-6278 connecting clip.

**Test H**

**2.08** Two KS-6320 orange sticks.

**2.09** 258C, D, or E dummy plugs, as required.

**3. PREPARATION**

**All Tests**

**3.01** Before starting an individual test, check that no alarm lamps are lighted on the PBX alarm panel and/or associated equipment.

**3.02** Observe that the PWR-AL, FR-AL, and PS-ALM keys are set to normal operating position.

**Test A**

**3.03** Request central office to have class A (major) and class B (minor) alarms observed.

**4. METHOD****STEP****ACTION****VERIFICATION****A. Central Office Alarms****Class A Alarms**

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|---|--|---|
| 1 | At power supply fuse panel —<br>Using W1U cord, connect the equipment end of an alarm type fuse in service to alarm bus bar. | At power plant —<br>ALM lamp lighted.<br>At attendant switchboard, if provided —<br>PWR-ALM lamp lighted.<br>Audible alarm sounded.<br>At external alarm circuit, if provided —<br>PWR-ALM lamp lighted.<br>Audible alarm sounded.<br>At 5- or 6-type console, if provided —<br>ALM lamp lighted.<br>At attendant key equipment, if provided —<br>PWR-ALM lamp lighted.<br>At central office —<br>Class A alarm operated.                           |
| 2 | At attendant switchboard, if provided —<br>Momentarily operate PWR-AL key.   | Audible alarm silences while PWR-AL key is operated.  |
| 3 | At external alarm circuit, if provided —<br>Momentarily operate PWR-AL key.  | Audible alarm silences while PWR-AL key is operated.  |
| 4 | At power supply fuse panel —<br>Remove testing cord.   | At power plant —<br>ALM lamp extinguished.<br>At attendant switchboard, if provided —<br>PWR-ALM lamp extinguished.<br>Audible alarm silenced.<br>At external alarm circuit, if provided —<br>PWR-ALM lamp extinguished.<br>Audible alarm silenced.<br>At 5- or 6-type console, if provided —<br>ALM lamp extinguished.<br>At attendant key equipment, if provided —<br>PWR-ALM lamp extinguished.<br>At central office —<br>Class A alarm retired. |

**Class B Alarm Followed By a Class A Alarm**

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|---|--|--|
| 5 | At idle selector or selector-connector —<br>Insert make-busy tool between tip and ring springs of test jack. |  |
| 6 | At common alarm unit —<br>Using 893 cord, connect ground to top winding terminal of PS relay.                | At external alarm circuit, if provided —<br>PS-ALM lamp lighted.<br>Audible alarm sounded.<br>At attendant switchboard, if provided —<br>PS-ALM lamp lighted.<br>Audible alarm sounded.<br>At attendant key equipment, if provided —<br>PS-ALM lamp lighted.<br>At central office —<br>Class B alarm operated. |

**SECTION 546-404-501**

<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
7	At external alarm circuit, if provided — Momentarily operate PS-ALM key.	Audible alarm silences while PS-ALM key is operated.
8	At attendant switchboard, if provided — Momentarily operate PS-ALM key.	Audible alarm silences while PS-ALM key is operated.
9	At line frame number one fuse panel — Using W1U cord, connect equipment end of an alarm type fuse to alarm bus bar.	At line frame — FA lamp lighted. At attendant switchboard, if provided — FR-AL lamp lighted. Audible alarm sounded. At external alarm circuit, if provided — FR-AL lamp lighted. Audible alarm sounded. At 5- or 6-type console, if provided — ALM lamp lighted. At attendant key equipment, if provided — FR-AL lamp lighted. At central office — Class B alarm retired. Class A alarm operated.
10	At line frame number one fuse panel — Remove testing cord.	At line frame — FA lamp extinguished. At attendant switchboard, if provided — FR-AL lamp extinguished. Audible alarm silenced. At external alarm circuit, if provided — FR-AL lamp extinguished. Audible alarm silenced. At 5- or 6-type console, if provided — ALM lamp extinguished. At attendant key equipment, if provided — FR-AL lamp extinguished. At central office — Class A alarm retired. Class B alarm operated.
11	At selector or selector-connector — Remove make-busy tool from test jack.	At external alarm circuit, if provided — PS-ALM lamp extinguished. Audible alarm silenced. At attendant switchboard, if provided — PS-ALM lamp extinguished. Audible alarm silenced. At attendant key equipment, if provided — PS-ALM lamp extinguished.
12	At common alarm unit — Remove testing cord from PS relay.	At central office — Class B alarm retired.

STEP	ACTION	VERIFICATION
<b>B. Battery Cutoff Fuse Alarm</b>		
1	At battery cutoff fuse panel — Using testing cord, connect equipment end of an alarm type fuse to alarm bus.	At power cabinet alarm panel — FA lamp lighted. At external alarm circuit, if provided — FR-AL lamp lighted. Audible alarm sounded. At attendant switchboard, if provided — FR-AL lamp lighted. Audible alarm sounded. At 5- or 6-type console, if provided — ALM lamp lighted. At attendant key equipment, if provided — FR-AL lamp lighted.
2	At battery cutoff fuse panel — Remove testing cord.	At power cabinet alarm panel — FA lamp extinguished. At external alarm circuit, if provided — FR-AL lamp extinguished. Audible alarm silenced. At attendant switchboard, if provided — FR-AL lamp extinguished. Audible alarm silenced. At 5- or 6-type console, if provided — ALM lamp extinguished. At attendant key equipment, if provided — FR-AL lamp extinguished.
<b>C. 15A Fuse Block Alarm</b>		
1	At common alarm unit — Using testing cord, connect grounded end of alarm type fuse on 15A fuse block to alarm stud of block.	At external alarm circuit, if provided — FR-AL lamp lighted. Audible alarm sounded. At attendant switchboard, if provided — FR-AL lamp lighted. Audible alarm sounded. At attendant key equipment, if provided — FR-AL lamp lighted.
2	At common alarm unit — Remove testing cord.	At external alarm circuit, if provided — FR-AL lamp extinguished. Audible alarm silenced. At attendant switchboard, if provided — FR-AL lamp extinguished. Audible alarm silenced. At attendant key equipment, if provided — FR-AL lamp extinguished.

STEP	ACTION	VERIFICATION
<b>D. Permanent Signal Alarm</b>		
1	At idle selector or selector-connector in first group — Insert make-busy tool between tip and ring springs of test jack.	After a period of 20 to 30 minutes — PS lamp associated with selector or selector-connector under test lighted. At external alarm circuit, if provided — PS-AL lamp lighted. Audible alarm sounded. At attendant switchboard, if provided — PS-AL lamp lighted. Audible alarm sounded. At attendant key equipment, if provided — PS-AL lamp lighted.
2	At idle selector or selector-connector in second group — Insert make-busy tool between tip and ring springs of test jack.	
3	At idle selector or selector-connector in first group — Remove make-busy tool from test jack used in Step 1.	PS lamp associated with selector or selector-connector under test lighted. At external alarm circuit, if provided — PS-AL lamp steadily lighted. Audible alarm continues to sound. At attendant switchboard, if provided — PS-AL lamp steadily lighted. Audible alarm continues to sound. At attendant key equipment, if provided — PS-AL lamp steadily lighted.
4	Repeat Steps 2 and 3 for each group of selector or selector-connector switches provided.	Same as Step 3.
5	At selector or selector-connector under test — Remove make-busy tool from test jack.	PS lamp associated with selector or selector-connector under test extinguished. At external alarm circuit, if provided — PS-AL lamp extinguished. Audible alarm silenced. At attendant switchboard, if provided — PS-AL lamp extinguished. Audible alarm silenced. At attendant key equipment, if provided — PS-AL lamp extinguished.

#### E. Call Blocked Alarm

##### Line Finders

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|---|---|
| 1 | At line frame —<br>Remove cover from an idle line finder switch in first group. |
| 2 | Block nonoperated A relay.  |

STEP	ACTION	VERIFICATION
3	At line frame jack and lamp panel — Operate TST key.	After a period of 2 to 4 minutes — C-BLK lamp lighted. At external alarm circuit, if provided — FR-AL lamp lighted. Audible alarm sounded. At attendant switchboard, if provided — FR-AL lamp lighted. Audible alarm sounded. At attendant key equipment, if provided — FR-AL lamp lighted.
4	At line frame — Remove blocking tool from A relay.	
5	At line frame jack and lamp panel — Restore TST key.	C-BLK lamp extinguished At external alarm circuit, if provided — FR-AL lamp extinguished. Audible alarm silenced. At attendant switchboard, if provided — FR-AL lamp extinguished. Audible alarm silenced. At attendant key equipment, if provided — FR-AL lamp extinguished.
6	At line frame — Replace cover on line finder switch.	

#### TOUCH-TONE Trunk Finders

7	At TOUCH-TONE relay rack — At common group and subgroup circuit — Block operated G relay associated with idle trunk finder to be tested.	After a period of 2 to 4 minutes — CB lamp lighted. At attendant switchboard, if provided — FR-AL lamp lighted. Audible alarm sounded. At external alarm circuit, if provided — FR-AL lamp lighted. Audible alarm sounded. At attendant key equipment, if provided — FR-AL lamp lighted.
8	At common group and subgroup circuit — Remove blocking tool from G relay.	CB lamp extinguished. At attendant switchboard, if provided — FR-AL lamp extinguished. Audible alarm silenced. At external alarm circuit, if provided — FR-AL lamp extinguished. Audible alarm silenced. At attendant key equipment, if provided — FR-AL lamp extinguished.

SECTION 546-404-501

STEP	ACTION	VERIFICATION
<b>F. Power Charge and Discharge Circuit Alarm</b>		
1	At common alarm unit — Using testing cord, connect battery to terminal 18.	At attendant switchboard, if provided — PWR-ALM lamp lighted. Audible alarm sounded. At external alarm circuit, if provided — PWR-ALM lamp lighted. Audible alarm sounded. At 5- or 6-type console, if provided — ALM lamp lighted. At attendant key equipment, if provided — PWR-ALM lamp lighted.
2	At common alarm unit — Remove testing cord from terminal 18.	At attendant switchboard, if provided — PWR-ALM lamp extinguished. Audible alarm silenced. At external alarm circuit, if provided — PWR-ALM lamp extinguished. Audible alarm silenced. At 5- or 6-type console, if provided — ALM lamp extinguished. At attendant key equipment, if provided — PWR-ALM lamp extinguished.
3	At common alarm unit — Using testing cord, connect ground to terminal 19.	At attendant switchboard, if provided — PWR-ALM lamp lighted. Audible alarm sounded. At external alarm circuit, if provided — PWR-ALM lamp lighted. Audible alarm sounded. At 5- or 6-type console, if provided — ALM lamp lighted. At attendant key equipment, if provided — PWR-ALM lamp lighted.
4	At common alarm unit — Remove testing cord from terminal 19.	At attendant switchboard, if provided — PWR-ALM lamp extinguished. Audible alarm silenced. At external alarm circuit, if provided — PWR-ALM lamp extinguished. Audible alarm silenced. At 5- or 6-type console, if provided — ALM lamp extinguished. At attendant key equipment, if provided — PWR-ALM lamp extinguished.
5	At common alarm unit — Check for battery at terminal 17.	Battery present.

STEP	ACTION	VERIFICATION
<b>G. Start Lead Ground Alarm</b>		
<b>Line Finders</b>		
1	At line frame — Using testing cord, connect tip of test cord to ground.	
2	At first idle line finder in group under test — Insert plug in test jack just far enough for tip of plug to touch ring of jack.	At line frame — Each line finder in group steps to tenth level, rotates to tenth terminal, and releases.
3	After last finder has released and second cycle has begun — Remove testing cord from ring of jack and ground.	At line frame — Finders stop hunting. At group alarm and test key circuit associated with finders under test — S lamp lighted. At attendant switchboard, if provided — FR-AL lamp lighted. Audible alarm sounded. At external alarm circuit, if provided — FR-AL lamp lighted. Audible alarm sounded. At attendant key equipment, if provided — FR-AL lamp lighted.
4	At group alarm and test key circuit associated with finders under test — Momentarily operate AR key.	S lamp extinguished. At attendant switchboard, if provided — FR-AL lamp extinguished. Audible alarm silenced. At external alarm circuit, if provided — FR-AL lamp extinguished. Audible alarm silenced. At attendant key equipment, if provided — FR-AL lamp extinguished.
<b>TOUCH-TONE Trunk Finders</b>		
5	At TOUCH-TONE relay rack — At common group and subgroup circuit — Using testing cord, connect ground to terminal 3T of G relay associated with idle trunk finder to be tested.	Each trunk finder in group steps to tenth level, rotates to eleventh terminal, and releases.
6	After last finder has released and second cycle has begun — Remove testing cord from terminal 3T and ground.	Finders stop hunting. At common group and subgroup circuit associated with finder under test — S lamp lighted. At attendant switchboard, if provided — FR-AL lamp lighted. Audible alarm sounded. At external alarm circuit, if provided — FR-AL lamp lighted. Audible alarm sounded. At attendant key equipment, if provided — FR-AL lamp lighted.

**SECTION 546-404-501**

<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
7	At common group and subgroup circuit associated with finder under test — Momentarily operate AR key.	S lamp extinguished. At attendant switchboard, if provided — FR-AL lamp extinguished. Audible alarm silenced. At external alarm circuit, if provided — FR-AL lamp extinguished. Audible alarm silenced. At attendant key equipment, if provided — FR-AL lamp extinguished.
8	At alarm panel — Momentarily operate AR key.	At alarm panel — S lamp extinguished. At attendant switchboard, if provided — FR-AL lamp extinguished. Audible alarm silenced. At external alarm circuit, if provided — FR-AL lamp extinguished. Audible alarm silenced. At attendant key equipment, if provided — FR-AL lamp extinguished.

**TOUCH-TONE Trunk Finders**

- 9 Repeat Steps 5 through 8.

**H. Release Magnet Alarm**

**Line Finders**

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|---|---|--|
| 1 | At line frame —<br>Insert 258-type plug into test jack of an idle line finder switch in first group.                        |  |
| 2 | At line frame —<br>Insert 258-type plug into test jack of an idle line finder switch in second group.                       |  |
| 3 | At line finder switch under test in first group —<br>Manually raise shaft far enough to allow off-normal springs to close.  | After a period of 2 to 4 minutes —<br>At line finder frame —<br>R-MAG, FR-AL lamps lighted.<br>At attendant switchboard, if provided —<br>FR-AL lamp lighted.<br>Audible alarm sounded.<br>At external alarm circuit, if provided —<br>FR-AL lamp lighted.<br>Audible alarm sounded.<br>At attendant key equipment, if provided —<br>FR-AL lamp lighted. |
| 4 | At line finder switch under test in second group —<br>Manually raise shaft far enough to allow off-normal springs to close. |  |

STEP	ACTION	VERIFICATION
5	At line finder switch under test in first group — Release shaft.	At line finder frame — R-MAG, FR-AL lamps steadily lighted. At attendant switchboard, if provided — FR-AL lamp steadily lighted. Audible alarm continues to sound. At external alarm circuit, if provided — FR-AL lamp steadily lighted. Audible alarm continues to sound. At attendant key equipment, if provided — FR-AL lamp steadily lighted.
6	At line finder switch under test in second group — Insert orange stick between hub of sleeve wiper and upper sleeve plates.	Switch held off-normal.
7	At selector or selector-connector associated with first line finder under test — Insert orange stick between hub of sleeve wiper and upper sleeve plate.	
8	Remove orange stick from line finder under test in Step 6.	At line finder frame — R-MAG, FR-AL lamps steadily lighted. At attendant switchboard, if provided — FR-AL lamp steadily lighted. Audible alarm continues to sound. At external alarm circuit, if provided — FR-AL lamp steadily lighted. Audible alarm continues to sound. At attendant key equipment, if provided — FR-AL lamp steadily lighted.
9	At selector or selector-connector associated with second line finder under test — Raise shaft.	
10	Remove orange stick from line finder under test in Step 7.	At line finder frame — R-MAG, FR-AL lamps steadily lighted. At attendant switchboard, if provided — FR-AL lamp steadily lighted. Audible alarm continues to sound. At external alarm circuit, if provided — FR-AL lamp steadily lighted. Audible alarm continues to sound. At attendant key equipment, if provided — FR-AL lamp steadily lighted.

**SECTION 546-404-501**

<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
11	At selector or selector-connector associated with second line finder under test — Release shaft.	At line finder frame — R-MAG, FR-AL lamps extinguished. At attendant switchboard, if provided — FR-AL lamp extinguished. Audible alarm silenced. At external alarm circuit, if provided — FR-AL lamp extinguished. Audible alarm silenced. At attendant key equipment, if provided — FR-AL lamp extinguished.

**Connectors**

12	At an idle connector — Insert make-busy tool between springs 3 and 4 of test jack.	
13	Manually raise shaft of connector far enough to allow off-normal springs to close.	At line finder frame — R-MAG, FR-AL lamps lighted. At attendant switchboard, if provided — FR-AL lamp lighted. Audible alarm sounded. At external alarm circuit, if provided — FR-AL lamp lighted. Audible alarm sounded. At attendant key equipment, if provided — FR-AL lamp lighted.
14	At connector under test — Insert orange stick between hub of sleeve wiper and upper sleeve bank plates to hold raised shaft in position.	
15a	If selector-connectors are used as connectors — Repeat Steps 13 and 14 using selector-connectors.	
16	At unit under test — Remove orange stick from switch.	At line finder frame — R-MAG, FR-AL lamps steadily lighted. At attendant switchboard, if provided — FR-AL lamp steadily lighted. Audible alarm continues to sound. At external alarm circuit, if provided — FR-AL lamp steadily lighted. Audible alarm continues to sound. At attendant key equipment, if provided — FR-AL lamp steadily lighted.
17	At line finder switch under test — Remove 258-type plugs from test jack.	

STEP	ACTION	VERIFICATION
18	Repeat Steps 13 through 17 on a switch in each connector group. Remove make-busy tool each time a switch is released.	
19	At last switch tested — Remove make-busy tool and orange stick and allow shaft to return to normal.	At line finder frame — R-MAG, FR-AL lamps extinguished. At attendant switchboard, if provided — FR-AL lamp extinguished. Audible alarm silenced. At external alarm circuit, if provided — FR-AL lamp extinguished. Audible alarm silenced. At attendant key equipment, if provided — FR-AL lamp extinguished.
20	At line finder switches — Remove 258-type plugs from test jack.	

#### TOUCH-TONE Trunk Finders

21	At an idle TOUCH-TONE trunk finder — Manually raise shaft far enough to allow off-normal springs to close.	After a period of 2 to 4 minutes — At TOUCH-TONE trunk shelf — RM lamp lighted. At attendant switchboard, if provided — FR-AL lamp lighted. Audible alarm sounded. At external alarm circuit, if provided — FR-AL lamp lighted. Audible alarm sounded. At attendant key equipment, if provided — FR-AL lamp lighted.
22	At TOUCH-TONE trunk finder under test — Release shaft.	At TOUCH-TONE trunk shelf — RM lamp extinguished. At attendant switchboard, if provided — FR-AL lamp extinguished. Audible alarm silenced. At external alarm circuit, if provided — FR-AL lamp extinguished. Audible alarm silenced. At attendant key equipment, if provided — FR-AL lamp extinguished.

#### I. Switchboard Fuse Alarm — 552A PBX

1	At fuse panel in back of PBX switchboard position to be tested — Using testing cord, connect equipment end of one of battery fuses with alarm bus bar.	At switchboard panel — FA, FR-AL lamps lighted. Audible alarm sounded.
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**SECTION 546-404-501**

<b>STEP</b>	<b>ACTION</b>	<b>VERIFICATION</b>
2	At switchboard — Momentarily operate FR-AL key.	Audible alarm silences while key is operated.
3	Remove testing cord from fuse panel.	FA, FR-AL lamps extinguished. Audible alarm silenced.
4	Repeat Steps 1 through 3 to test other positions.	

**J. All Trunk Finders Busy Alarm**

1	At common group and subgroup circuit — Block nonoperated CH, S, AL relays.	After a period of 2 to 4 minutes — AFB lamp lighted. At attendant switchboard, if provided — FR-AL lamp lighted. Audible alarm sounded. At external alarm circuit, if provided — FR-AL lamp lighted. Audible alarm sounded. At attendant key equipment, if provided — FR-AL lamp lighted.
2	At common group and subgroup circuit — Remove blocking tools from CH, S, AL relays.	AFB lamp extinguished. At attendant switchboard, if provided — FR-AL lamp extinguished. Audible alarm silenced. At external alarm circuit, if provided — FR-AL lamp extinguished. Audible alarm silenced. At attendant key equipment, if provided — FR-AL lamp extinguished.