

LINE FINDERS — WITHOUT CONTROL CIRCUIT OPERATION TESTS USING TRUNK TEST SET SD-90469-01 (J94710A) STEP-BY-STEP SYSTEMS

1. GENERAL

1.01 This section describes methods of testing the operating features of 50, 100 and 200 point 3-wire and 4-wire line finders using test set SD-90469-01. It is intended for use in offices where the so-called line finder operation and rapid operation test sets are not available. The tests covered are as follows:

- (A) Line Finder Operation Test - Coin and Non-Coin
- (B) Rapid Operation Test - Coin and Non-Coin
- (C) Make Busy from Circuit Beyond
- (D) Line Finder Operation and B, C, and F Relay Test - Coin and Non-Coin - 1200-ohm Sleeve Condition
- (E) Test of E Relay of Line Finders in Position 2, 12 or 22

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 Tests (A), (B) and (D) are made from the test line jacks, provided for each group of 50, 100 or 200 lines. In the case of 50 or 100 point line finders, the T, R and S leads of bank terminal 19 or 10 are permanently wired to jack A and, in the case of 4-wire line finders, the fourth lead, A or TR, of bank terminal 10 is permanently wired to jack B on the line finder frame. In the case of 200 point line finders, the T, R and S leads of 3-wire line finders or the T, R, S and A or TR leads of 4-wire line finders of bank terminals 10 and 110 are permanently wired to jacks B and A, respectively, on the line finder frame.

1.04 Test (B) is intended as a means for checking the fundamental operating features of the line finders at frequent intervals, where desired, to supplement the complete operation test covered by Test (A) or (D).

1.05 Test (C) is made from the monitor jack of the line finder.

1.06 Test (D) assumes that the test set has the BFNO key. This test requires the use of the C jack of the test set and a spare

or non-busy line circuit on the same level and bank as the test line terminals. When Test (D) is specified it is not necessary to make Test (A) on the same testing cycle.

1.07 Test (D) is intended for use in those cases where the line circuit sleeve condition is 1200 ohms such as the combination of the 2800-ohm winding of the cutoff relay in parallel with the 2100-ohm non-inductive winding of the line relay. Sections based upon the use of other test sets, cover tests which apply where the sleeve condition is other than 1200 ohms. Such a condition is encountered where the EA6 relay is used as a cutoff relay. This condition also exists where the line circuit condition is 1200 ohms but the sleeve lead is used to operate a message register.

1.08 Test (E) is intended to supplement Test (A) for line finders in position 2, 12 or 22 and provides a means of testing the operation of the E relay of these line finders on a marginal basis.

1.09 Any line finder on which an "out of service" failure is encountered shall be made busy in the approved manner until the trouble is cleared.

1.10 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

Tests (A), (B), (D), and (E)

2.01 Trunk Test Set J94710A (SD-90469-01).

2.02 One P2J Cord equipped with No. 310 (or No. 110) Plugs (2P9A).

Tests (A) and (D)

2.03 Operator's Telephone Set

200 Point 3-Wire Line Finders

2.04 Three P3E Cords equipped with No. 310 (or No. 110) Plugs (3P7A or 3P6B).

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50 or 100 Point 3-Wire Line Finders

2.05 Two P3E Cords equipped with No. 310 (or No. 110) Plugs (3P7A or 3P6B).

200 Point 4-Wire Line Finders

2.06 One P3E Cord equipped with No. 310 (or No. 110) Plugs (3P7A or 3P6B).

2.07 One P6B Cord equipped with one No. 310 (or No. 110) Plug with red shell and one No. 310 (or No. 110) Plug with black shell and two No. 240B Plugs (6P6A).

50 or 100 Point 4-Wire Line Finders

2.08 Three P3E Cords equipped with No. 310 (or No. 110) Plugs (3P7A or 3P6B).

Test (B)

200 Point 3-Wire or 50 or 100 Point 3 or 4-Wire Line Finders

2.09 Two P3E Cords equipped with No. 310 (or No. 110) Plugs (3P7A or 3P6B).

200 Point 4-Wire Line Finders

2.10 One P3E Cord equipped with No. 310 (or No. 110) Plugs (3P7A or 3P6B).

2.11 One P3C Cord equipped with one No. 310 (or No. 110) Plug and one No. 240B Plug (3P33C).

Test (C)

2.12 One No. 477A (or No. 375A) Make Busy Tool.

Test (D)

2.13 One W1B Cord equipped with one No. 310 (or No. 110) Plug and one No. 59 Cord Tip with one No. 108 Cord Tip and one No. 77 Cord Tip (1W5A).

Test (E)

2.14 One W3M Cord equipped with three No. 360 Tools at one end and a No. 310 (or No. 110) Plug at the other end (3W4A). One W2W Cord equipped with two No. 360 Tools at one end and a No. 310 (or No. 110) Plug at the other end (2W17A). One No. 893 Cord six feet long equipped with one No. 360 Tool at each end (1W13B). One No. 419A Tool. Three No. 141 Cord Tips. Make connections as shown in Fig. 1.

3. PREPARATION

Tests (A), (B), (D), and (E)

3.01 Connect the BAT-G jack of the test set to the 48-volt battery supply jack located on the line finder frame, using the P2J cord.

Note: To avoid possible grounding of the battery supply lead, connect the cord to the test set first and when disconnecting, remove the cord from the test set last.

Tests (A) and (D)

3.02 Connect the operator's telephone set to the TEL jacks of the test set.

Note: The TRS key shall be left in the normal position except when it may be found necessary to talk on a connection.

3.03 Make the following connections between the test set and test line jacks located on the line finder frame in the particular group to be tested.

(a) For 50 or 100 point 3-wire line finders, connect jack T of the test set to the test line jack A, using a P3E cord.

(b) For 50 or 100 point 4-wire line finders, connect jacks T and TL of the test set to the test line jacks A and B,

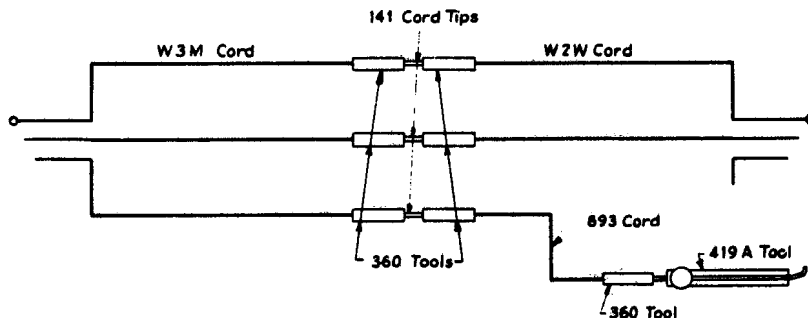


Fig. 1

respectively, using P3E cords. The cord used in connecting the test set to the test line jack B, by the operation of the TP or TP BT keys, grounds the sleeve or fourth lead, A or TR, of 50 point 4-wire line finders and, by the operation of the T key, grounds the ring or fourth lead, A or TR, of 100 point 4-wire line finders, for the purpose of checking the fourth lead for class of service indication, identification or restriction.

(c) For 200 point 3-wire line finders connect jacks T and TL of the test set to the test line jacks A and B, respectively, using P3E cords. The cord used in connecting the test set to the test line jack B, by the operation of the TP or TP BT keys, grounds the sleeve of this test line for the purpose of checking the operation of the C relay in the line finder under the most severe service condition. Connections to the test line jacks A and B shall be reversed on each alternate testing cycle, unless otherwise specified, in order to make a complete test of the line finder B and F relays. When testing a line finder in connection with clearing a specific case of trouble, test first with the connection one way and then the other.

(d) For 200 point 4-wire line finders, connect the red shell and black shell plugs of the P6B cord to the test set T and TL, respectively, and connect the No. 240B plugs of the red and black cords to the test line jacks A and B, respectively. The cord used in connecting the test set to the test line jack B, by the operation of the T key, grounds the ring of this cord for the purpose of checking the fourth lead, A or TR, for class of service indication, identification or restriction. Connections to the A and B test line jacks shall be reversed on each alternate testing cycle, unless otherwise specified, in order to make a complete test of the line finder B and F relays. When testing a line finder in connection with clearing a specific case of trouble, test first with the connection one way and then the other.

Test (B)

3.04 Connect the T jack of the test set to the test line jack A located on the line finder frame in the particular group to be tested, using a P3E cord, or a P3C cord in the case of 4-wire 200 point line finders. (For 200 point line finders connect to the B jack of the frame on alternate testing cycles.)

Test (D)

3.05 Insert the plug of the W1B cord into the C jack of the test set.

4. METHOD

(A) Line Finder Operation Test - Coin and Non-Coin

4.01 This test checks the operating features of the line finder and the continuity and polarity of the trunk to the selector or trunk circuit beyond.

4.02 Insert one plug of a P3E cord into the LF jack of the test set. Operate the DL ST, REV and TP or TP BT keys. In coin groups also operate the CBT LP key.

4.03 Note that the line finder to be tested is normal. Insert the free plug of the P3E cord into the line finder test jack. Note that the line finder operates smoothly and stops on the test line terminal.

4.04 Disconnect immediately from the line finder test jack in order to remove the ground from the commutator.

4.05 Dial tone should be heard and the REV lamp should light.

Note 1: In coin line groups, restore the TP or TP BT key. Operate the CN key momentarily. Dial tone may or may not be heard before operating the CN key depending on whether the coin trunks are arranged to establish the dial tone circuit before or after the deposit of a coin. However, dial tone should always be heard after operating the CN key.

Note 2: If the line finder is used for concentrating manual lines, ringing induction should be heard unless the operator answers in less than four seconds. When the operator answers, advise that a test is being made and request her to disconnect when she receives the disconnect signal. Proceed as in 4.07.

Note 3: If the REV lamp does not light, it usually indicates that the tip and ring conductors are reversed.

4.06 Proceed as in (a) or (b) depending on whether 3-wire or 4-wire line finders are being tested. The REV lamp may flash during dialing but shall be disregarded.

3-Wire Line Finders or 4-Wire Line Finders Where the Fourth Lead Is Used to Operate a Message Register

(a) Dial a digit () leading to a second selector and note that dial tone is removed.

4-Wire Line Finders Where the Fourth Lead Is Used for Class of Service Indication, Identification or Restriction

(b) Dial the code () which will direct the selector or selectors to the proper level or trunk which will simulate the service condition. Note that the proper indication is received. In some cases it may be necessary to check with the operator as the indication is not always received by the tester.

4.07 Operate the REV-FL key to the FL position and restore the T key if operated. Note that the REV lamp is extinguished and that the line finder releases.

4.08 Restore all keys to normal unless this test is to be conducted on other switches in the group.

(B) Rapid Operation Test - Coin and Non-Coin

Non-Coin

4.09 This test checks the fundamental operating features of the line finders and supplements the complete line finder operation Test (A).

4.10 Insert one plug of a P3E cord into the LF jack of the test set. Operate the LK and REV keys.

4.11 Note that the line finder to be tested is normal. Insert the free plug of the P3E cord into the line finder test jack. Note that the line finder operates smoothly and stops on the test line terminals.

4.12 After the test line has been seized, note that the REV lamp lights for a short interval until the line finder A relay releases. The line finder should then release and the REV lamp should be extinguished.

Note: If the REV lamp does not light it usually indicates that the line finder is not associated with the test line, that the circuit to the battery supply

relay in the first selector or trunk circuit beyond is not continuous, or that the tip and ring conductors of the trunk are reversed. If the lamp remains lighted for an unusually long interval, it may be an indication of a slow release condition on the line finder A relay.

4.13 As soon as the line finder releases, disconnect the test cord from the line finder test jack in order to remove the ground from the commutator.

Coin

4.14 Insert one plug of a P3E cord into the LF jack of the test set. Operate the DL ST and REV keys.

4.15 Proceed as in 4.11.

4.16 After the test line has been seized, note that the REV lamp lights.

Note: If the REV lamp does not light it usually indicates that the line finder is not associated with the test line, that the circuit to the battery supply relay in the trunk circuit beyond is not continuous, or that the tip and ring conductors of the trunk are reversed.

4.17 Disconnect immediately from the line finder test jack in order to remove the ground from the commutator.

4.18 Remove the plug from the test line jack A (or B). Note that the REV lamp is extinguished and that after a short interval the line finder releases.

4.19 If other switches in the group are to be tested, reinsert the plug in the A (or B) jack.

(C) Make Busy from Circuit Beyond

4.20 This test is intended principally to check the sleeve circuit through the line finder, in the normal position, to the line finder D relay.

4.21 Insert the No. 477A (or No. 375A) tool into the monitor jack of the line finder two or three times in slow succession and note by sound that the D relay operates and releases with each insertion and removal.

Caution: Do not insert the No. 477A (or No. 375A) tool into the monitor jack of any line finder that is off normal. If the line finder starts to operate at the instant the tool is inserted, immediately remove the tool.

(D) Line Finder Operation and B, C, and F
Relay Test - Coin and Ncn-Coin - 1200-Ohm
Sleeve Condition

4.22 This test checks the operating features of the line finder, the continuity and polarity of the trunk to the selector or trunk circuit beyond, and also checks the B and F relay of the line finder for their non-operate requirement and the C relay for its hold and release requirement.

4.23 At the line finder bank terminal strip, touch the No. 59 clip of the WLB cord connected to the C jack of the test set, to the sleeve terminal of a line in the same bank and level as the test line to which jack T of the test set is connected. If the BSY lamp does not light, indicating that this line is idle, connect the No. 59 clip to this terminal.

Note: Use the sleeve of a vacant line terminal where available, otherwise use the sleeve of a line terminal near the center of the level, such as 15 or 115.

4.24 Operate the DL ST, REV and TP or TP BT keys. In coin groups also operate the CBT LP key.

4.25 Insert one plug of a P3E cord into the LF jack of the test set. Operate the BFNO key.

4.26 Note that the line finder to be tested is idle. Insert the free plug of the P3E cord into the line finder test jack. Note that the line finder operates smoothly and stops on the terminal connected to the test set C jack.

Note: Failure of the line finder to stop indicates that the C relay failed to meet its hold requirement or that the line connected to the C jack became busy before being seized by the line finder under test. In this event disconnect immediately from the line finder test jack in order to remove the ground from the commutator. Disconnect the cord from the LF jack of the test set and restore all keys to normal. The line finder should release. The BSY lamp should light if

the terminal is still busy, in which case it will be necessary to proceed as in 4.23, selecting another terminal.

4.27 Momentarily operate the C key. The line finder should resume rotary stepping and stop on the test line terminals.

Note: Failure of the line finder to resume rotary stepping indicates that the B or F relay operated falsely when the line finder stopped on the terminal used for test, or that the C relay failed to release when the C key was operated.

4.28 Restore the BFNO key.

4.29 Proceed as in 4.04 to 4.08.

(E) Test of E Relay of Line Finders in Position 2, 12 or 22

4.30 This test checks the operation of the E relay of line finders in position 2, 12 or 22 on a marginal basis.

4.31 Insert the No. 310 (or No. 110) plug of the W2W cord, connected as shown in Fig. 1, into the test jack of the line finder to be tested. Connect the No. 419A tool of the No. 893 cord, connected as shown in Fig. 1 to the commutator segment of some level other than the tenth level of the line finder to be tested.

4.32 Insert the No. 310 (or No. 110) plug of the W3M cord, connected as shown in Fig. 1, into the LF jack of the test set. The line finder should step vertically to the level of the commutator on which the No. 419A tool is connected, cut in and rotate to the eleventh rotary step and then restore to normal.

Note: Failure of the line finder to cut in on the level selected indicates that the E relay failed to meet its operate requirement.

4.33 Immediately disconnect the P3E cord from the LF jack of the test set in order to remove the ground from the commutator.

5. REPORTS

5.01 The required record of these tests should be entered on the proper form.