

PANEL CALL INDICATOR TRUNK CIRCUITS

NO. 1 OFFICE

1. GENERAL:

- 1.1 This section describes a method of testing panel call indicator trunk circuits.
- 1.2 The tests are made by means of a call indicator trunk and position test set (box type), from the trunk relay rack. The test set is arranged to send call indicator pulses, by means of numerical keys and a spring driven sequence switch, or by operating certain pulse keys.
- 1.3 Any trunk circuit on which a failure is encountered when making this routine, should be kept out of service until the trouble is cleared.

2. APPARATUS:

Test (a):

- 2.1 Call Indicator Trunk and Position Test Set—ES-226503 (or its equivalent).
- 2.2 Six No. 740 Cords equipped with No. 110 Plugs on one end and No. 109 Plugs on the other end.
- 2.3 No. 32-A Test Set (with 10 foot cord).
- 2.4 Operator's Telephone Set.

Test (b):

- 2.5 No. 528 Receiver equipped with No. 712 Cord terminating in a No. 109 Plug, for use with switchboards equipped with No. 92 Jacks.
- 2.6 No. 528 Receiver equipped with No. W2J Cord terminating in a No. 110 Plug, for use with switchboards equipped with No. 49 Jacks.

3. PREPARATION:

Preliminary Operations:

- 3.1 Before starting the test, have the trunks to be tested made busy. This may be accomplished by having each trunk made busy at the outgoing trunk test board in the originating office. When all of the trunks of one or more subgroups are to be tested and can be made busy without interfering with service, operate the proper group make-busy keys, at the call indicator position.

- 3.2 Advise the "B" supervisor that tests are to be made, and that all irregularities observed by the operator on the test calls should be reported to the tester. When the trunks to be tested are equipped with team display keys, advise the "B" supervisor whether the home or team display keys are to be operated on the test calls. When traffic conditions permit, it is advisable to alternate the use of these keys on successive cycles of tests. If traffic conditions permit, also arrange with the "B" supervisor to have the operator at the call indicator position, disregard the disconnect lamp on the first test call on each trunk, until the assignment lamp appears for the second test call.

- 3.3 It is advisable, when traffic conditions permit, to make the trunk test occasionally, with the emergency control circuit in service, to check the continuity of the emergency control circuit key contacts. When the emergency control circuit is to be used, connect the emergency indicator to the call indicator position and operate the emergency control circuit key, at a time when a number is not being displayed.

Note: It is advisable to test the emergency control circuit (see Section 230.405) before removing a regular control circuit from service for test purposes.

Test Set Connections:

- 3.4 Connect jacks B, C, D and E of the test set to jacks B, C, D and E, respectively, of the test line and battery jack circuit, at the trunk relay rack.

Note: Connect the cords to the test set first, and when disconnecting remove the cords from the test set last.

- 3.5 Connect jack F of the test set to jack F of the telephone circuit (if provided).
- 3.6 Connect an operator's telephone set to the TEL jacks of the telephone circuit (if provided) at the trunk relay rack.
- 3.7 Operate the TRK key.
- 3.8 UP Key: Operate the UP key (if provided) when the control circuit associated with the trunks under test is arranged for the universal pulsing feature.

- 3.9 **NO+ Key:** Operate the NO+ key (if provided) when the control circuit associated with the trunks under test is not arranged to function with a final heavy positive pulse.
- 3.10 **NO Key in Test Line:** When tests are to be made on trunks arranged for sleeve selection ringing, set the NO key (if provided) of the test line and battery jack circuit in position to introduce proper resistance into the sleeve circuit.
- 3.11 **SK Key:** Operate the SK key (if provided) of the test line and battery jack circuit, when testing trunks wired for 48 volt transmission.
- 3.12 **SW Key:** Operate the SW key if the test line and battery jack circuit is arranged for testing both call indicator trunks and the trip relays of manual machine ringing trunks.

4. METHOD:

(a) Operation Test:

- 4.1 The following table indicates the number of test calls to be made and the test call numbers to be used when testing trunks of the various types of offices.

Type of Office	Test Calls			
	1st	2nd	3rd	4th
Individual line)				
Two-Party Jack-per-Sta.)	00000	00000	—	—
Four-Party Jack-per-Line)	0000W	0000R	0000J	0000M
Two-Party Jack-per-Line)	0000W	0000J	—	—
Four-Party Jack-per-Sta.)	*	*	—	—

* For sleeve selection circuits, use 0000 on each of the test calls. For circuits not arranged for sleeve selection, use numbers which will impose positive and negative ringing current on the test line circuit when testing full-selective trunks, and one-ring and two-ring ringing current when testing semi-selective trunks.

Note: In this table, W and R represent the first and second stations, respectively, on the ring side of a line, and J and M represent the first and second stations on the tip side of a line.

- 4.2 Connect jack A of the test set to the test jack of the trunk to be tested at the trunk relay rack.

First Test Call:

- 4.3 Operate the proper group key to introduce maximum resistance into the pulsing leads.

Note: If compensating resistance is wired in the control circuit being used for the test, operate the proper group key to introduce zero resistance into the pulsing leads.

- 4.4 Set up the test call number on the numerical keys (see table, paragraph 4.1).
- 4.5 Wind up the sequence switch spring.
- 4.6 Operate the ST-K key.

Display, Wipe-out and Ringing Tests:

- 4.7 The assignment lamp of the trunk under test should light at the call indicator position. When the operator or assistant depresses the associated display key, the assignment lamp should flash. The sequence switch of the test set is released and makes one revolution, transmitting to the control circuit the impulses for displaying the test call number.
- 4.8 If the circuits function correctly, the test call number is displayed on the indicator. Observe that the SUPV and TC lamps of the test set are lighted.
- 4.9 When the operator or assistant inserts the plug of the trunk into the test line jack, the display should disappear and the assignment lamp should be extinguished. Note that lamp FM-SLV of the test set is lighted and that the proper bell of the test line rings correctly (in accordance with the test call number).

Note: Some test line circuits are equipped with two sets of jacks, one set for use with test call displays which indicate ring side ringing and the other for tip side ringing displays on test calls.

- 4.10 Operate the TEL key (if provided) and listen for the audible ringing signal.

Pre-trip and Trip Tests:

- 4.11 **Await the beginning of a ringing interval** and then immediately operate and release the NO (or PTT) key of the test set. A non-operate test is thus made of the trip relay of the trunk under test.

Note 1: If the test line in an A.C. or A.C.-D.C. ringing office is not arranged for testing on a particular part of the wave, operate and release the NO (or PTT) key during each of three successive ringing intervals. Release the key on each test before the silent interval starts.

Note 2: If no pre-trip test key is provided, allow the bell to ring for three ringing intervals before applying the trip test (paragraph 4.12).

Note 3: With some test line and battery jack circuits, the bell of the test line stops ringing when the NO (or PTT) key is operated, and rings again after the release of the key. A lamp NO is

provided with some test line and battery jack circuits which is lighted with each operation of the NO key.

- 4.12 **Await the beginning of a ringing interval** and then immediately operate and release the TRIP key. Note that the bell of the test line stops ringing, indicating that the trip relay of the trunk under test operated.

Note: With some test line and battery jack circuits, the lamp SUPV of the test set is extinguished while the TRIP key is operated, and is lighted when the key is released.

Supervisory Relay Tests:

- 4.13 Operate the TEST key. The MTCH lamp is lighted.
- 4.14 Operate key OPER and move the OPERATE arms of the rheostat circuit, until a current value equal to the specified operate test requirement for the supervisory relay of the trunk under test, is indicated on the milammeter.
- 4.15 Release the OPER key and move the RELEASE arms of the rheostat circuit, until a current value equal to the release test requirement for the supervisory relay, is indicated on the milammeter.

Note: The rheostat settings of paragraphs 4.13 and 4.14 may be used for testing several trunk supervisory relays of the same type but the current values should be checked occasionally, to make sure that they have not changed due to voltage variation.

- 4.16 Operate the SOAK and OPER keys at the same time. After one second, release the SOAK and OPER keys in succession and then operate and release the OPER key three times, at a rate of approximately three times per second. The period relation of "make" to "break" or "on" to "off" should be an approximate ratio of 2 to 1. The SUPV lamp should flash with each operation of the OPER key. If more flashes of the SUPV lamp are desired, the SOAK key should be operated for each three applications of the operate current.

Note 1: The No. 32-A test set may be used in making tests of supervisory relays, by removing the plug from the B jack of the test line and battery jack circuit and inserting the plug of the No. 32-A test set into the B jack. The white and red keys of this test set perform the functions of the SOAK and OPER keys, respectively, of the call indicator test set.

- 4.17 Restore the TEST key. The MTCH lamp is extinguished.

- 4.18 Momentarily operate the DIS-HO key. The TC and SUPV lamps are extinguished and the disconnect lamp of the trunk under test is lighted at the call indicator position. If the operator or assistant removes the plug of the trunk from the test line jack, the FM-SLV lamp is extinguished.

Second Test Call:

- 4.19 Operate the proper group key to introduce minimum resistance into the pulsing leads.
- 4.20 Set up the test call number on the numerical keys (see table, paragraph 4.1).
- 4.21 Wind up the sequence switch spring.
- 4.22 Operate the ST-K key.
- 4.23 The assignment lamp of the trunk under test should light. (If the plug of the trunk was not removed from the jack of the test line circuit on the previous test call, the disconnect lamp is lighted also. In this case, the operator or assistant removes the plug from the test line jack, before depressing the associated display key.)
- 4.24 The test call proceeds as described in paragraphs 4.7 to 4.9.

Test for Quick Release of A Relay:

- 4.25 Momentarily operate the DIS-HO key during a ringing interval and note that the bell of the test line stops ringing. The TC and SUPV lamps are extinguished and the disconnect lamp of the trunk under test is lighted, at the call indicator position. When the operator or assistant removes the plug of the trunk from the test line jack, the FM-SLV lamp is extinguished.

Third Test Call, if Required:

- 4.26 Repeat the operations described in paragraphs 4.3 to 4.9 and 4.18, using the proper test call number. (See paragraph 4.1).

Fourth Test Call, if Required:

- 4.27 Proceed as described in paragraphs 4.3 to 4.9 and 4.18, using the proper test call number. (See paragraph 4.1).

Note: If the trip relay of the trunk under test has two windings, perform operations of paragraphs 4.11 and 4.12 also, before operation of paragraph 4.18.

- 4.28 Restore all trunks to service which satisfactorily meet the tests.

(b) **A. C. Continuity Test:**

4.29 Before making an A.C. continuity test, the operation of the tone interrupter should be checked. This may be done by inserting the plug of the cord attached to the receiver into the REC jack of the test circuit. Insert the plug of a trunk cord in the CON jack so that the tip of the cord makes contact with the ring spring of the jack and the sleeve of the cord makes contact with the sleeve of the jack. If tone is received, it is an indication that the interrupter is functioning properly. If tone is not heard, make sure that sleeve connection is made as indicated by lighting of the trunk disconnect lamp.

4.30 Insert the plug of the trunk to be tested into the test jack designated CON. It is probable that a slight tone will be heard in the receiver. This slight tone is permissible and is not an indication of trouble. After testing several trunks, the tester should become familiar with the volume of the tone which is heard on normal trunks. Trunks on which this volume is increased appreciably should be considered in trouble.

4.31 Manipulate the cord and plug in the following manner to detect possible cutouts or faulty connections: Pull on the cord directly downward and downward at an angle to the right and to the left and shake the cord. Hold the plug in the jack with one hand and grasp the cord with the other hand approximately 4 inches from the plug. Move the cord about the plug with a cranking motion. Turn the plug around in the jack so as to cause the jack springs to make contact at all possible points of the tip and ring of the plug. Listen in the receiver during the above

operations for clicks or any changes in the volume of the tone, indicating a cutout or other trouble condition.

5. CHECK OF SLEEVE RELAY:

5.1 A feature is provided in some types of test line and battery jack circuits for checking the RP relay in the sleeve circuit of a call indicator trunk, arranged for sleeve selection ringing. When checking a trunk of this type, if the bell rings improperly for the class of test call being used, proceed as follows:

5.2 Operate the sleeve test key of the test line and battery jack circuit.

Note: During the check of the RP relay, keys TEST, SOAK and OPER of the test set should be in normal positions.

5.3 Adjust the rheostat circuits until the specified test operate and non-operate current values for the sleeve relay are indicated on the millimeter, operating the proper key in the test set (or test line) for changing the conditions applied to the relay.

5.4 Disconnect by operating the DIS-HO key.

5.5 Repeat the tests outlined in paragraphs 4.4 to 4.9, using the high sleeve condition. Note that the OP relay does not operate.

5.6 Operate the proper key to change the sleeve condition for low sleeve, and observe that the RP relay operates.

5.7 Disconnect by operating the DIS-HO key.

6. REPORTS:

6.1 The required record of this routine should be entered on the proper form.