SUBSCRIBER COMMON BATTERY CORD CIRCUITS AND ASSOCIATED OPERATOR'S TELEPHONE CIRCUITS

1. GENERAL

1.01 This section covers the detailed methods to be followed in making transmission tests on the various types of subscriber common battery cord circuits and associated operator's telephone circuits and replaces the information given in 3A (a), (b), (c), and (d) of Section K21.01.

1.02 Information covered in this section of practices is outlined as follows:

1.03 Reference should be made to Section K20.01 for general testing instructions and to Section K20.11 for general testing apparatus requirements.

2. KEY LISTENING—NO SPECIAL FEATURES

(A) Cord Circuits

2.01 Obtain the proper sleeve condition for the cord circuit to be tested.

Note: This is accomplished by connecting the sleeve conductors of two switchboard cords having the same type of plug as the cord circuit under test, respectively to the S_1 and S_2 terminals of the transmission measuring set. The plugs of these cords are inserted in spare switchboard jacks of the proper type to establish the cord circuit condition.

2.02 Insert the answering and calling cords of a cord circuit to be tested in the sending and receiving jacks of the transmission measuring set.

2.03 Figure 1 shows schematically the connections for the test.

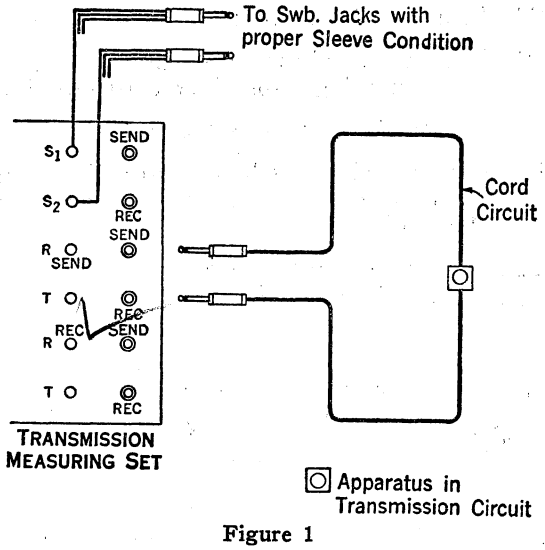


Figure 1

2.04 Restore to normal any keys associated with the cord circuits of the position under test.

2.05 With the transmission measuring set in the measuring condition perform the operations outlined in paragraphs 2.06 and 2.07.

Note: If A.C. continuity tests are regularly made on the cord circuits, these operations may be omitted.

2.06 Manipulate the cords and plugs in the following manner to detect possible cutouts or faulty connections: Pull on each 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 four 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.

2.07 Test all keys associated with the cord circuit for cutouts in the normal and operated position (except ringing and splitting keys in the operated position) by tapping the key top lightly using the rubber eraser end of a pencil.
For lever type keys, move the levers slightly forward and backward, while exerting a slight pressure to the left and right to take up any play or side lash.
For plunger type keys, directly connected in the transmission circuit, move the plungers with a circular motion and test for plunger-spring clearance by depressing the plungers slightly.

2.08 Measure the transmission loss of the cord circuit with the keys normal.

2.09 Measure the current supply of each cord.

2.10 Repeat the above procedure for each of the remaining subscriber cord circuits.

(B) Operator's Telephone Circuits

2.11 Figure 2 shows schematically the connections for the tests of the operator's telephone circuits.

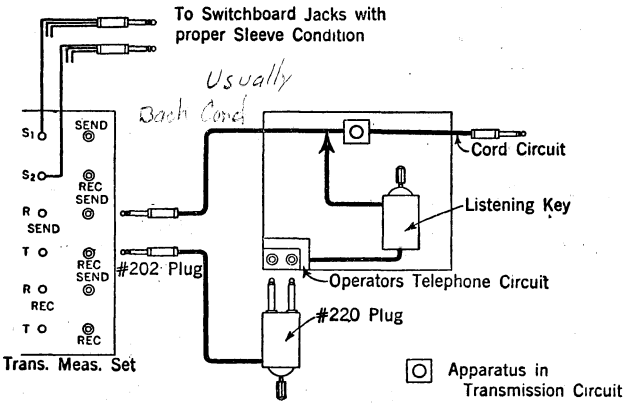


Figure 2

2.12 Insert the No. 220 plug in the telephone set jack associated with the position under test, with the key of the plug in the normal position.

2.13 On the transmission measuring set connect the sending T and R terminals respectively to the receiving T and R terminals.

Note: When a transmission measuring set of the No. 3 type is used, these connections are made through the jack contacts of the set when a dummy plug is removed from a jack other than the one to be used in this test.

2.14 From the results of tests on the cord circuits of the position, choose a cord circuit which shows no transmission troubles and use it to make the following tests of the operator's telephone circuit:

2.15 Insert the plug (answering or calling as the case may be) of the cord circuit to which the operator's telephone circuit is connected when in the talking condition, in the sending jack of the transmission measuring set.

Note: When the listening key of a cord circuit is operated, the telephone circuit is bridged on either the answering or calling end of the cord circuit, depending on the wiring arrangement of the latter circuit. Transmission measurements of the telephone circuit wiring should be made using the cord adjacent to the telephone circuit bridge.

2.16 Measure the transmission loss with all keys of the cord circuit normal.

2.17 Operate the listening key associated with the cord circuit so that the operator's telephone circuit is connected across the cord circuit in the talking condition.

2.18 Measure the transmission loss.

Note: The difference between the measurements made in paragraphs 2.16 and 2.18 will be the loss of the operator's telephone circuit in the bridged talking condition.

2.19 Remove the strapping between the sending and receiving T and R terminals of the transmission measuring set.

2.20 Insert the No. 202 plug associated with the No. 220 plug in the receiving jack of the transmission measuring set.

2.21 Operate the key of the No. 220 plug to the T position.

2.22 Measure the transmission loss.

Note: The difference between the measurements made in paragraphs 2.16 and 2.22 will be the loss of the operator's telephone circuit in the transmitting condition.

3. KEY LISTENING—INCLUDING SPECIAL FEATURES

(C) Cord Circuits

3.01 The procedure for testing cord circuits arranged for audible or audible flashing recall, and having no busy test relay, is the

the same as outlined in paragraphs 2.02 to 2.10 inclusive.

3.02 Cord circuits equipped with busy test relays in addition to the recall feature require a sleeve connection on the calling cord to close the tip circuit.

Note: This may be obtained by connecting to the S_1 or S_2 terminal of the transmission measuring set, as the case may be, the sleeve of a cord, the plug end of which is inserted in a switchboard jack having the proper sleeve condition.

3.03 The procedure for testing cord circuits arranged as mentioned in paragraph 3.02 is the same as outlined in paragraphs 2.02 to 2.11 inclusive.

(D) Operator's Telephone Circuits

3.04 The procedure for testing these circuits is the same as outlined in paragraphs 2.11 to 2.22 inclusive.

4. KEYLESS LISTENING

(E) Cord Circuits

4.01 The procedure for testing these circuits is the same as outlined in paragraphs 2.02 to 2.10 inclusive.

Note: After inserting the plugs of the cord circuit in the transmission measuring set jacks, operate the TRK key of the position.

(F) Operator's Telephone Circuits

4.02 Figure 2 shows schematically the connections for the tests of the operator's telephone circuits.

4.03 Insert the No. 220 plug in the telephone set jack associated with the position under test, with the key of the plug in the normal position.

4.04 On the transmission measuring set connect the sending T and R terminals respectively to the receiving T and R terminals.

Note: When a transmission measuring set of the No. 3 type is used, these connections are made through the jack contacts of the set when a dummy plug is removed from a jack other than the one to be used in this test.

4.05 From the results of tests on the cord circuits of the position, choose a cord circuit which shows no transmission troubles and use it to make the following tests of the operator's telephone circuit:

4.06 Insert the plug of the calling cord in the sending jack of the transmission measuring set.

4.07 Obtain a sleeve connection for the calling cord.

Note: This is accomplished by connecting the sleeve conductor of a cord, the plug end of which is inserted in a switchboard jack having the proper sleeve condition, to the S_1 terminal of the transmission measuring set.

4.08 Measure the transmission loss.

4.09 Remove the sleeve connection from the S_1 terminal of the transmission measuring set.

Note: This procedure will bridge the operator's telephone circuit across the cord circuit.

4.10 Measure the transmission loss.

Note: The difference between the measurements made in paragraphs 4.08 and 4.10 will be the loss of the operator's telephone circuit in the bridged talking condition.

4.11 Remove the strapping between the sending and receiving T and R terminals of the transmission measuring set.

4.12 Insert the No. 202 plug associated with the No. 220 plug in the receiving jack of the transmission measuring set.

4.13 Operate the key of the No. 220 plug to the T position.

4.14 Measure the transmission loss.

Note: The difference between the measurements made in paragraphs 4.08 and 4.14 will be the loss of the operator's telephone circuit in the transmitting condition.

Caution: It may be necessary in this case to provide a holding coil (one-half of a No. 44-B retardation coil or its equivalent) across the receiving T and R terminals of the transmission measuring set. This may be provided by the use of an auxiliary test unit where this unit is available, as outlined in the following:
Connect the receiving jack of the transmission measuring set to the TMR jack of the auxiliary test unit. Insert the No. 202 plug in the LR jack of the auxiliary test unit, and operate keys as follows:
Key 2 to HOLD
Key 4 to MET
All other keys normal.
Should the transmission circuit appear to be open for this

measurement, an inspection should be made of the relay in the transmitter battery supply circuit.

5. KEYLESS LISTENING AND NON-INTERFERING ANSWERING (FLASHING RECALL)

(G) Cord Circuits

5.01 These circuits are tested in the same manner as outlined in paragraphs 2.02 to 2.10 inclusive.

(H) Operator's Telephone Circuits

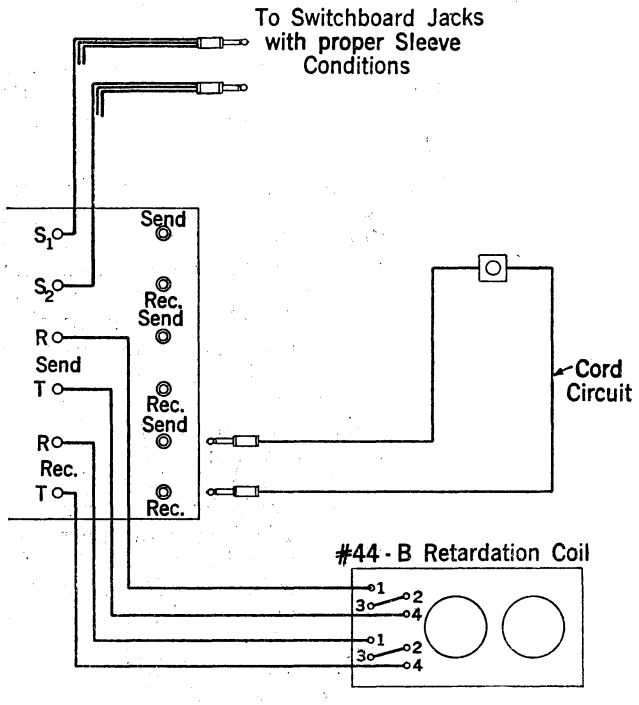
5.02 These circuits are tested in the same manner as outlined in paragraphs 4.02 to 4.14 inclusive.

6. KEYLESS LISTENING AND NON-INTERFERING ANSWERING (LINE LAMP RECALL)

(I) Cord Circuits

6.01 In measuring this type of cord circuit, a holding bridge should be maintained across the tip and ring conductors of the answering cord, as a momentary interruption in its direct current circuit will open the transmission circuit at the back sleeve relay.

6.02 Figure 3 shows schematically the connections for the test.



Apparatus in Transmission Circuit

Figure 3

6.03 Connect one-half of a No. 44-B retardation coil or its equivalent across the sending T and R terminals and a similar coil across the receiving T and R terminals of the transmission measuring set.

Note: Where an auxiliary test unit is available it may be used for this purpose as follows:

Connect the sending and receiving jacks of the transmission measuring set respectively to the TMS and TMR jacks of the auxiliary test unit. Connect one plug of the cord circuit to the LR jack and the other plug to the LS jack of the auxiliary test unit. Operate keys of the auxiliary test unit as follows:

Keys 1 and 2 to HOLD
Keys 3 and 4 to MET
All other keys normal.

6.04 Obtain the proper sleeve connections for the cord circuit to be tested.

Note: This is accomplished by connecting the sleeve conductors of two switchboard cords, the plugs of which are inserted in the proper switchboard jacks, respectively, to the S_1 and S_2 terminals of the transmission measuring set.

6.05 Insert the answering and calling cords respectively in the sending and receiving jacks of the transmission measuring set, or where the auxiliary test unit is used, in the LS and LR jacks, respectively.

Note: Care should be taken to insert the cords in the order just mentioned, as otherwise the transmission circuit may not be complete.

6.06 Depress the trunk TRK key of the position to release the operator's telephone circuit and ringing equipment.

6.07 Proceed with the tests as outlined in paragraphs 2.04 to 2.10 inclusive.

Note: When measuring the current supply on the answering cord, the holding bridge of paragraph 6.03 above should be opened after the keys of the transmission measuring set have been operated to the position for measuring current supply, in order to obtain the proper reading and to prevent losing the circuit due to an interruption of the direct current circuit as mentioned in paragraph 6.01.

(J) Operator's Telephone Circuits

6.08 Figure 2 shows schematically the connections for the tests of the operator's telephone circuit.

6.09 Insert the No. 220 plug in the telephone set jack associated with the position under test with the key of the plug in the normal position.

6.10 On the transmission measuring set connect the sending T and R terminals respectively to the receiving T and R terminals.

Note: When a transmission measuring set of the No. 3 type is used, these connections are made through the jack contacts of the set when a dummy plug is removed from a jack other than the one to be used in this test.

6.11 From the results of tests on the cord circuits of the position, choose a cord circuit which shows no transmission troubles and use it to make the following tests of the operator's telephone circuit.

6.12 Insert the plug of the calling cord in the sending jack of the transmission measuring set.

6.13 Operate the trunk TRK key of the position, to release the operator's telephone circuit and ringing equipment.

6.14 Measure the transmission loss.

6.15 Remove the plug of the calling cord from the sending jack of the transmission measuring set and immediately reinsert it.

Note: This operation will connect the operator's telephone circuit across the cord circuit.

6.16 Measure the transmission loss.

Note: The difference between the measurements made in paragraphs 6.14 and 6.16 will be the loss of the operator's telephone circuit in the bridged talking condition.

6.17 Remove the strapping between the sending and receiving T and R terminals of the transmission measuring set.

6.18 Insert the No. 202 plug associated with the No. 220 plug in the proper type receiving jack of the transmission measuring set.

6.19 Operate the key of the No. 220 plug to the T position.

6.20 Measure the transmission loss.

Note: The difference between the measurements made in paragraphs 6.14 and 6.20 will be the loss of the operator's telephone circuit in the transmitting condition.

Caution: Should the transmission circuit appear to be open for this measurement, an inspection should be made of the relay in the transmitter battery supply circuit.