# 100A TELETYPEWRITER TEST DISTRIBUTOR

## TEST METHODS

### 1. GENERAL

1.01 This section covers the test methods to be employed in the general use of the 100A teletypewriter test distributor.

1.02 Since the 100A teletypewriter test distributor is equipped with a synchronous motor, a commercial 115- to 120-volt, 60-cycle power supply is required.

1.03 A 1/10-ampere, 250-volt fusetron is mounted inside the case to protect the motor. If the power is known to be connected and the motor will not operate, the fusetron in the set should be examined.

1.04 Connection to the local power supply is made with the power cord supplied as part of the set, while connection to the circuit or teletypewriter set under test is made by means of a double-ended patch cord plugged into the output test jack.

1.05 Signals may be applied to the circuit under test using electrical connections as follows:

(a) Subscriber Station: At subscriber stations the same electrical connections should be used as are normally employed for the station keyboard.

(b) Central Offices: At central offices the same electrical connections should be used as are normally employed for multiple senders and 14 tape-type transmitter-distributors. Bell System Practices covering the 164C type, or equivalent, telegraph transmission measuring sets are of interest in this connection.

1.06 Since the amount of distortion in the signals depends upon the adjustment of the brushes, it is well to measure the signals locally before using the set. This may be done with a 164C-type set, a 118-type set, or other suitable telegraph transmission measuring device. The signal distortion thus determined should be taken into account when measurements are made.

1.07 Care should be taken that the circuits are tested in such a way that the signals will not be distorted before they are transmitted to the line. To avoid this, it is best to remove the loops from the telegraph line terminal circuit. When testing toward a line from the loop side of a repeater and a telegraph line terminal circuit containing a fairly long loop which cannot be removed, the 100A set should be connected between the loop and the repeater which is sending to the line under test in order to avoid excessive bias. Even with this connection, an amount of marking bias sufficient to be objectionable may be introduced by the loop when measuring small values of distortion as is necessary in equalization testing.

### 2. TEST METHODS

2.01 With the switch panel of the 100A teletypewriter test distributor facing the operator, the first three switches from left to right will be referred to as A, B, and C; and the remainder as 1, 2, 3, 4, 5, and STOP as inscribed on the panel. The position of the switch handles, forward or rearward, will be referred to as Front, Rear, and Center. The functions of the switches in the positions indicated are as follows:

| Switch | | |
|---|---|---|
| A | Front | - (RS) Telegraph reversals |
| | Rear | - (TTY SIGS) Teletypewriter signals |
| B | Front | - Signals with 20 per cent end-distortion |
| | Center | - In this position a closed-loop condition is produced regardless of the other keys, so that no signals are transmitted from the test distributor. |
| | Rear | - Signals with 20 per cent bias |
| C | Front | - Spacing signal distortion |
| | Center | - Zero signal distortion |
| | Rear | - Marking signal distortion |

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Switch

| | | |
|---|---|---|
| 1 | Front | - Spacing for first signal element |
| | Rear | - Marking for first signal element |
| 2 | Front | - Spacing for second signal element |
| | Rear | - Marking for second signal element |
| 3 | Front | - Spacing for third signal element |
| | Rear | - Marking for third signal element |
| 4 | Front | - Spacing for fourth signal element |
| | Rear | - Marking for fourth signal element |
| 5 | Front | - Spacing for fifth signal element |
| | Rear | - Marking for fifth signal element |
| STOP | Front | - Disconnects stop element |
| | Rear | - Connects stop element |

2.02 Using the same designations as in 2.01, the various types of signals may be obtained by positioning the switches as indicated in Table A.

2.03 Figure 1 shows the connections to the segments of the concentric rings and the resulting teletypewriter signal for zero distortion, 20 per cent marking and spacing bias, and 20 per cent marking and spacing end-distortion, respectively. For these examples it is assumed that switches A, B, and C are operated as indicated in Table A for the particular type of distortion to be produced, that the toggle switches controlling the STOP element and the No. 1 control switch are operated to ON so that these are marking elements, and control switches 2, 3, 4, and 5 are operated to OFF and are spacing as in the code for the character E. The T and R connections at the right of the figures are the tip and ring, respectively, of the output jack. Since the 100A sends only open and close signals, current flows in the output circuit only while the commutator brushes close the circuit between T and R. The three brushes are strapped together electrically by the mounting arrangement of the brush arm, and move together from left to right in the figures. It is assumed that the brushes of rings 1 and 2 cross the vertical lines of the figures simultaneously, as this must be the case in order to produce the desired distortion. (See Figure 1.)

(a) Figure 1A shows how undistorted signals are produced using rings 2 and 3. Current

TABLE A

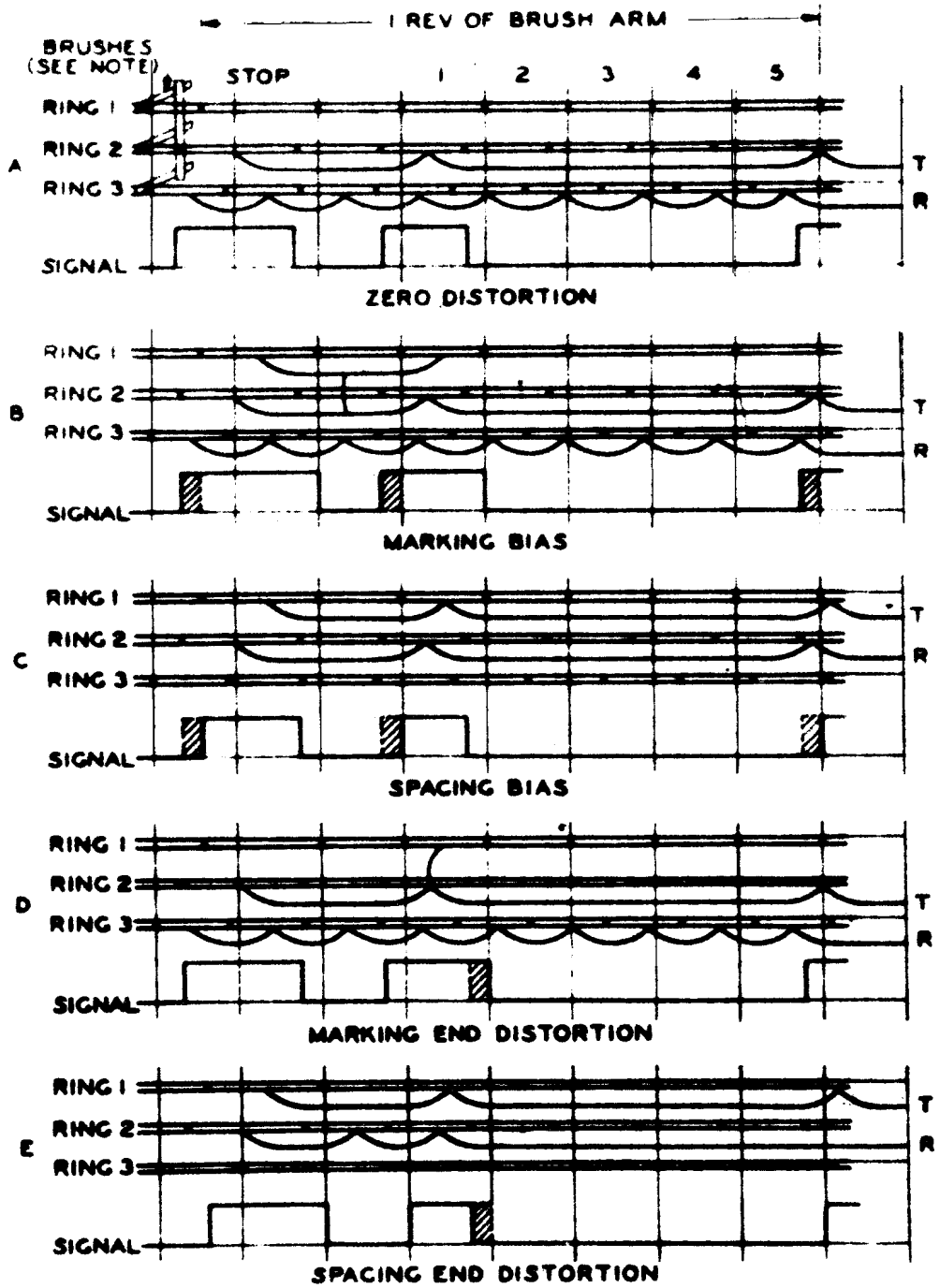
| Signals | Switches | | | | |
|---|---|---|---|---|---|
| | A | B | C | 1 through 5 | STOP |
| Reversals | Front | Front* | Center | Rear | Rear |
| Undistorted | Rear | Rear* | Center | Any** | Rear |
| Marking Bias | Rear | Rear | Rear | Any** | Rear |
| Spacing Bias | Rear | Rear | Front | Any** | Rear |
| Marking End-distortion | Rear | Front | Rear | Any** | Rear |
| Spacing End-distortion | Rear | Front | Front | Any** | Rear |
| Repeated Blanks | Rear | Rear* | Center | Front | Rear |
| †Unit Signal Element | Rear | Rear* | Center | *** | Front |

*Any position except center. See 2.01, Switch B.

**Any position to form the desired 7.42-unit teletypewriter test character.

***One of the control switches 1 through 5 to Rear (marking) and the STOP switch to Front (spacing).

†This permits transmission of a single marking signal element of unit length, as required for certain tests of equalization.




NOTE: THE THREE BRUSHES ARE STRAPPED TOGETHER AND TRAVERSE RINGS 1, 2 AND 3 SIMULTANEOUSLY, FORMING OPEN AND CLOSE SIGNALS.

Figure 1

flows in the T and R circuit only during the time the brush of ring 2 is passing over the STOP segment and the No. 1 selecting segment.

(b) Figure 1B shows how marking bias is produced using all three rings. Current flows in the T and R circuit during the time the brushes of rings 1 and 2 are passing over the STOP and No. 1 selecting segments of these rings. Due to the 20 per cent displacement between rings 1 and 2, 20 per cent of a unit element is added to the beginning of each marking element as indicated by the shaded portions of the signal.

(c) As shown by Figure 1C, spacing bias is produced by using rings 1 and 2 only. Current flows in the T and R circuit only during the time the brushes of rings 1 and 2 effectively strap together the corresponding marking segments of the two rings, in this case the STOP and No. 1 selecting segments of these rings. This results in 20 per cent of the unit element being subtracted at the beginning of each marking element as indicated by the shaded portions of the signal.

(d) In Figure 1D all three rings are used for marking end-distortion. Current flows in the T and R circuit during the time the brush is passing over the stop segment of ring 2 and during the time the brushes of rings 1 and 2 are passing over the No. 1 segment of these rings. This results in an undistorted stop element and adds 20 per cent of a unit element to the end of the No. 1 selecting element as indicated by the shaded portion of the signal.

(e) In Figure 1E, spacing end-distortion, only rings 1 and 2 are used. Current flows in the T and R circuit during the time the brushes of rings 1 and 2 are both on the STOP segments of these rings and during the time the start segment of ring 2 overlaps the STOP segment of ring 1, thus forming an undistorted stop element. Current also flows during the time the brushes of rings 1 and 2 are both on the No. 1 selecting segment of these rings. This results in subtracting 20 per cent of a unit element at the end of the No. 1 selecting segment as indicated by the shaded portion of the signal.

2.04 With the control switches operated as in line one of Table A (to produce reversals), alternate segments of the inner concentric ring are strapped together and a common ring is formed by strapping together all the segments of the middle and outer rings. Operation of the set under this arrangement will produce a repetition of undistorted open and close signals. No provision is made for distorted reversals.