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# TELETYPE

PRINTING TELEGRAPH SYSTEMS

## DESCRIPTION AND ADJUSTMENTS

PORTABLE SIGNAL DISTORTION TEST SET  
(REPEATED CHARACTERS SET BY TOGGLE SWITCHES)

TELETYPE PORTABLE SIGNAL DISTORTION TEST SET  
(INCLUDING CARRYING CASE)

ED51DT (with 60 cycle syn. motor — 368 OPM)  
ED51DS (with 60 cycle syn. motor — 460 OPM)  
ED51EH (with 50 cycle syn. motor — 368 OPM)  
ED51EG (with 50 cycle syn. motor — 460 OPM)

**TELETYPE**

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(B-182)



X Y Z

FIGURE I

## DESCRIPTION

### GENERAL

The Teletype Portable Signal Distortion Test Set described herein is a motor driven unit arranged to transmit signals for testing Teletype circuits and checking the efficiency of start-stop selectors on Teletype apparatus. These signals may be a repetition of Teletype signal combinations or telegraph reversals. The transmitted signals may be normal (undistorted), or they may be controlled to have 20% bias or end distortion, either marking or spacing.

The test set is enclosed in a metal case equipped with a carrying handle. The entire set weighs approximately 12 lbs. with overall dimensions of 5" x 7" x 8-3/4". It is equipped with control switches for setting up signal combinations or telegraph reversals, and for selecting the kind of distortion to be transmitted. An output jack is located next to the switches and the power cord has a switch for starting and stopping the motor.

### TRANSMISSION

#### (A) DISTRIBUTOR

The distributor completes electrical connections between the control switches and the signal line in the correct sequence and at the required speed. This is accomplished by three brushes which are mounted on a brush arm attached to the distributor shaft. The brushes are drawn over three concentric segmented rings. The outer ring and the middle ring each have seven segments which are used in connection with the transmission of the test characters. The segments of these two rings are offset 20% of a unit impulse with respect to each other in order to transmit 20% bias or end distortion. The inner ring has eight segments of equal length for transmission of telegraph reversals.

#### (B) CONTROL SWITCHES (Figure 1)

There are 9 control switches which are mounted on a panel extending across the width of the test set. With the switch panel facing the operator, the first three switches from left to right will be referred to as X, Y, and Z; the remainder as 1, 2, 3, 4, 5, and STOP, as inscribed on the panel. The position of the switches, forward or rearward, will be referred to as Front, Rear, or Center. The functions of the switches in the positions indicated are as follows:

- X Front - telegraph reversals (RS)  
Rear - Teletype signals (TTY SIGS)
  
- Front - 20% End Distortion signals
- Y Center - closed loop condition (regardless of other keys)  
Rear - 20% Bias signals
  
- Front - Spacing signal distortion
- Z Center - zero signal distortion  
Rear - Marking signal distortion

- 1 Front - SPACING for first signal impulse  
Rear - MARKING " " " "
  - 2 Front - SPACING for second signal impulse  
Rear - MARKING " " " "
  - 3 Front - SPACING for third signal impulse  
Rear - MARKING " " " "
  - 4 Front - SPACING for fourth signal impulse  
Rear - MARKING " " " "
  - 5 Front - SPACING for fifth signal impulse  
Rear - MARKING " " " "
- STOP Front - disconnects STOP impulse  
Rear - connects STOP impulse

Using the same designations as above, the seven types of signals may be obtained by positioning the switches as follows:

(A) REVERSALS

- X - Front
- Y - any position except center
- Z - Center
- 1 through 5 - Rear
- STOP - Rear

(B) NORMAL UNDISTORTED SIGNALS

- X - Rear
- Y - Rear
- Z - Center
- 1 through 5 - any position
- STOP - Rear

(C) MARKING BIAS

- X - Rear
- Y - Rear
- Z - Rear
- 1 through 5 - any position
- STOP - Rear

(D) SPACING BIAS

- X - Rear
- Y - Rear
- Z - Front
- 1 through 5 - any position
- STOP - Rear

(E) MARKING END DISTORTION

- X - Rear
- Y - Front
- Z - Rear
- 1 through 5 - any position
- STOP - Rear

- (F) SPACING END DISTORTION  
X - Rear  
Y - Front  
Z - Front  
1 through 5 - any position  
STOP - Rear

- (G) SHORT CIRCUIT LINE  
X - any position  
Y - Center  
Z - any position  
1 through 5 - any position  
STOP - any position

For illustration, suppose that the switches are set up for transmission of repeated R's with a marking bias of 20%. The switches will be positioned and the connections through them will be as follows:

SWITCH	POSITION	CONNECTION
X	TTY SIGS	Connects all segments of the inner ring together.
Y	BIAS	Connects the stop segments of outer ring to switch No. 3.
Z	M	Connects the segments of the inner ring and the stop segment of the outer ring to the line.
1	OFF	Open.
2	ON	Connects the No. 2 segment of the two outer rings together and to the line.
3	OFF	Open.
4	ON	Connects the No. 4 segment of the two outer rings together and to the line.
5	OFF	Open.
STOP	ON	Connects the stop segment of the outer ring to switch No. 2

#### TESTING OR CHECKING OPERATION BY MEANS OF A SIGNAL DISTORTION TEST SET WITH STROBOSCOPE

Select the letter R on the switches (1, 3, and 5 OFF, and 2 and 4 ON) and set up and transmit the various types of signal distortion indicated in the foregoing list, to a DXD Distortion Test Set equipped with Stroboscope. The observed distortions should be 20%, plus or minus 2%, and all types of

distortion should be of equal magnitude within these limits.

#### ADJUSTMENTS

##### MOTOR FAN ADJUSTMENT

The motor fan should be positioned laterally on the motor shaft so that it will turn freely when the motor is running. Adjust by means of the fan set screw.

##### MOTOR POSITION ADJUSTMENT

There should be a minimum amount of backlash between the motor pinion and the main shaft gear throughout a complete revolution of the main shaft. To adjust, position the motor by means of its mounting screws.

##### COMMUTATOR BRUSH ADJUSTMENT (Figure 1)

NOTE: Before proceeding with this adjustment, see that the ends of the brushes are trimmed off squarely so that the entire width will rest on the commutator rings.

###### (A) BRUSH ALIGNMENT

With a 95368 screwdriver inserted in the hole provided in the commutator disc, and the trailing edge of the brush counter balance arm against the screwdriver, the brush holder should be parallel to the inscribed line on the commutator disc, and the ends of the brushes should line up with the inscribed line. All the brushes should touch the discs at the same time when the brush holder is rotated first away from, and then toward the disc. To adjust, position the brushes and brush holder by means of their clamping screws.

###### (B) BRUSH PRESSURE

With the brush holder arm rotated so that the brushes just touch their respective commutator rings, turn the eccentric stop so that there is .025" to .030" between the brush holder stop post and the eccentric stop. Secure the eccentric stop in this position by means of its screw. Then rotate the brush holder arm so that the brush holder stop post rests against the eccentric stop, and tighten the brush holder arm clamping screw.

##### LUBRICATION

Oil lower shaft bearing  
Main shaft gear - grease  
Motor pinion - grease