

911F DISTORTION MEASURING SET

TESTS

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1. GENERAL

1.01 This section presents test procedures for the 911F Distortion Measuring Set (DMS). The tests outlined in this section should be performed whenever test indications show equipment performance to be questionable. For a description of the DMS, refer to Section 103-813-103.

1.02 This section is reissued:

- To add information on the locking and nonlocking BSY-CONN switch (options M and N, respectively)
- To reflect the newly added single-character (SCH) distortion measurement capability
- To show the response value of the new transients filter.

1.03 The 911F DMS is one of a series of serial data test sets that provide greater testing flexibility in hub-type telegraph serviceboards. Complementary test sets that usually appear in a test installation with the 911F DMS are as follows:

- (a) 911G Test Sentence Generator (TSG)
- (b) 911J Data Signal Distorting Set.

1.04 The 911F DMS provides a means for measuring the distortion of received serial data signals. The set will measure distortion ranging from 0 to

49 percent in 1-percent increments. The readings are displayed as follows:

- (a) The PEAK or PIP distortion is displayed on two Nixie* tubes on the left side of the control panel (DISTORTION).

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- (b) The type of bias or end distortion is displayed on the Nixie tube in the center of the control panel (M/S).

- (c) The average bias or end distortion is displayed on two Nixie tubes on the right side of the control panel (BIAS/ED).

Although the distortion readings may range from 0 to 49 percent, the average bias or end distortion readings range from only 0 to 38 percent. The accuracy of display is shown in 3.01 for various amounts of distortion in 5-percent steps.

1.05 The 911F DMS will accept and measure distortion present on serial data signals with 5, 6, 7, 8, or 9 information elements, with speeds up to 200 baud, and having any of the electrical characteristics shown in Table A.

1.06 Additional functions of the 911F DMS are as follows:

- (a) Provides a Nixie tube readout controlled by the DISPLAY and ED (end distortion) switches to give the information listed in Table B.

- (b) Provides a 23-position BAUDS switch that may be utilized for selection of up to 17 internal or 22 external clock rates. Position 23 is reserved for future use.

- (c) Provides a SIGS lamp to indicate when signals are present at the input. The lamp will light when marking signals are present at the input and will extinguish when the signals are spacing.

TABLE A

SIGNALS MEASURED WITH 911F DISTORTION MEASURING SET

911F INPUT SWITCH POSITION	MARK	SPACE
POL N POL R	+1 mA or more -1 mA or more	-1 mA or more +1 mA or more
20N 20R	+20 mA 0.0 mA	0.0 mA +20 mA
60N 60R	+62.5 mA 0.0 mA	0.0 mA +62.5 mA
HUB EIA	+60 volts -3 to -25 volts	-30 volts +3 to +25 volts
ELS ELR	-50 volts -50 volts	-130 volts +130 volts

TABLE B

DISTORTION DISPLAYED BY NIXIE TUBES

DISPLAY SWITCH POSITION	DISTORTION NIXIE DISPLAY	BIAS/ED (END DISTORTION) NIXIE DISPLAY
PIP	Maximum distortion per character and reset each character	Average bias or end distortion (ED switch operated) with M for marking and S for spacing. Reset every 2 seconds.
F	Peak distortion and reset every 2 seconds.	Average bias or end distortion (ED switch operated) with M for marking and S for spacing. Reset every 2 seconds.
S	Peak distortion and reset every 4 seconds	Average bias or end distortion (ED switch operated) with M for marking and S for spacing. Reset every 4 seconds.
PK	Highest percent distortion received. Manual reset.	Average bias or end distortion (ED switch operated) with M for marking and S for spacing. Reset every 2 seconds.
SCH	Highest percent distortion received. Manual reset by operating the DISPLAY switch to either F or S position.	Average bias or end distortion reads 0. Type of distortion is indicated on the M/S Nixie (ED switch operated) with M for marking and S for spacing. Manual reset.

(d) Provides a FILTER switch that when operated to IN prevents spurious or transient impulses shorter than approximately 1.5 ms at each transition (M to S or S to M), option K, or 100 μ s throughout the signal, option J, from being recognized as distortion.

(e) Provides a PARITY switch to check odd or even parity signals. An associated lamp will light when parity does not check and will remain lighted until the PARITY switch is turned OFF.

1.07 A 911F DMS installation may have a maximum of five control panel positions that utilize a single electronic unit. When two or more control panels are installed, a 911K Exclusion Unit (Section 103-813-106) must be installed to prevent more than one control position from obtaining access to the electronic unit simultaneously.

2. PREPARATION

2.01 A 911G or a 911B Test Sentence Generator is required for the test. The 911G TSG may be used for testing the 911F DMS when provided in the serviceboard installation. The 911B TSG may be substituted as required. The TSG should be tested prior to use to assure that it is functioning properly (Section 103-813-504).

2.02 If the 911B TSG is used for testing, it must be equipped with a J79911BG 5-element matrix board (CP58) for initial test operations.



Assure that the power switch on the 911B TSG is OFF prior to removal or insertion of printed wiring boards.

2.03 Set the control switches of the TSG to the positions shown in Table C.

Note: When the 911B TSG is used, the control switch settings shown in parentheses apply. All other switch settings are the same for both the 911G and 911B TSGs.

2.04 Set the control switches of the 911F DMS to the positions shown in Table D.

2.05 Make connections from the 911G or 911B TSG to the 911F DMS as shown in Fig. 1.

TABLE C

SWITCH SETTINGS FOR 911B AND 911G
TEST SENTENCE GENERATOR

SWITCH	SETTING
AUTO-STEP	AUTO
REPEAT	OFF
OUTPUT	HD (REL)
BAUDS	1 (45.5)
BIAS	0
DIST 1%	0
DIST 5%	0
RY or U*	OFF
CODE	5/7.42

TABLE D

SWITCH SETTINGS FOR
911F DISTORTION MEASURING SET

SWITCH	SETTING
INPUT	HUB
BAUDS	1
CODE	5
PARITY	OFF
FILTER	OUT
DISPLAY	F

2.06 If a 911K Exclusion Unit is used and the BSY-CONN lamp is *not* lighted, depress the BSY-CONN switch on both the 911G and the 911F.

Note: The BSY-CONN switch may be either locking (option M) or nonlocking (option N). If the switch is nonlocking, hold the switch depressed during test. If the switch is the locking type, depress the switch again after tests are complete to release the switch and disconnect from the 911K Exclusion Unit.

Observe that the SIGS(M) lamp is flashing on both the 911G and 911F. Observe that the 911F DISTORTION Nixie tubes read 00 to 03, the bias-indicating Nixie tube is flashing "M", and the BIAS/ED Nixie tubes read 00 to 02.

3. TESTS

3.01 Perform the following tests.

SECTION 103-813-503

STEP	ACTION	VERIFICATION
1	911G: Set BIAS control to MB. Set DIST 5% switch to 5.	911F: DISTORTION Nixie tubes read 03-06; bias-indicating Nixie tube reads "M"; BIAS/ED Nixie tubes read 02-08.
2	911G: Set DIST 5% switch to 10.	911F: DISTORTION Nixie tubes read 08-11; BIAS/ED Nixie tubes read 05-13.
3	911G: Set DIST 5% switch to 15.	911F: DISTORTION Nixie tubes read 13-16; BIAS/ED Nixie tubes read 09-19.
4	911G: Set DIST 5% switch to 20.	911F: DISTORTION Nixie tubes read 18-21; BIAS/ED Nixie tubes read 13-24.
5	911G: Set DIST 5% switch to 25.	911F: DISTORTION Nixie tubes read 23-26; BIAS/ED Nixie tubes read 18-30.
6	911G: Set DIST 5% switch to 30.	911F: DISTORTION Nixie tubes read 28-31; BIAS/ED Nixie tubes read 23-35.
7	911G: Set DIST 5% switch to 35.	911F: DISTORTION Nixie tubes read 33-36; BIAS/ED Nixie tubes read 23-38.
8	911G: Set DIST 5% switch to 40.	911F: DISTORTION Nixie tubes read 38-41; BIAS/ED Nixie tubes read 23-38.
9	911G: Set DIST 5% switch to 45.	911F: DISTORTION Nixie tubes read 43-46; BIAS/ED Nixie tubes read 30-38.
10	911G: Set BIAS switch to SB. Repeat Steps 1 through 9.	911F: Same as for Steps 1 through 9 except the bias-indicating Nixie tube shall display the letter "S".
11	911G: Set DIST 5% switch to 40. Depress and hold ED (end distortion) pushbutton while rotating DIST 1% switch from 0 to 4.	911F: Observe that DISTORTION Nixie tubes read 38-46 and that BIAS/ED Nixie tubes read 00-01, and make corresponding change for each step DIST 1% switch is advanced.

3.02 With the CODE and BAUDS switches of the 911G and 911F set to matching positions, repeat Steps 1 through 11 for each code and speed provided in the installation being tested.

Note: If the 911B TSG is used for testing the J79911BG, a 5-element matrix board may be used for 5/7.0, 5/7.42, 5/7.5, and 6/8 codes. The J79911BF 8-element matrix board must be used for the 7/9, 8/10, 8/11M, and 8/11 codes.

3.03 Follow local procedures for disposition of test equipment that does not meet the test requirements.

4. REFERENCES

4.01 The following documents provide additional information on the test sets discussed herein.

SECTION	TITLE	SECTION	TITLE
103-813-100	911A, B, and C Data Test Sets—Description, Operation, and Maintenance	103-813-104	911G Test Sentence Generator—Description and Operation
103-813-103	Distortion Measuring Set 911F—Description and Operation	103-813-105	Data Signal Distorting Set 911J—Description and Operation

