

***TB 9-6625-1957-35**

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR DIGITAL MULTIMETER, TEKTRONIX TYPES DM 501, DM 501A AND DM 501AOPT02 WITH DC HIGH VOLTAGE PROBE, BALLANTINE, MODEL 10800C; FLUKE, MODEL 80K-40; AND TEKTRONIX, TYPE 010-0277-00

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SECTION I IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Digital Multimeter, Tektronix Types DM 501, DM 501A and DM 501AOPT02 with DC High Voltage Probe, Ballantine, Model 10800C; Fluke, Model 80K-40; and Tektronix, Type 010-0277-00. The manufacturers' manuals were used as the prime data sources in compiling these instructions. The equipment being calibrated will be referred to as the TI (test instrument) throughout this bulletin.

a. Model Variations. The Fluke, Model 80K-40 is the same as the Tektronix, Type 010-0277-00 probe and is nonadjustable.

b. Time and Technique. The time required for this calibration is approximately 1.5 hours, using the dc and low frequency technique.

2. Forms, Records, and Reports

a. Forms, records, and reports required for calibration personnel at all levels are prescribed by TB 750-25.

b. Adjustments to be reported are designated (R) at the end of the sentence in which they appear. When adjustments are in tables, the (R) follows the designated adjustment. Report only those adjustments made and designated with (R).

3. Calibration Description. TI parameters and performance applications which pertain to this calibration are in table 1.

Table 1. Calibration Description

Test instrument parameters	Performance specifications
	Tektronix, Type DM 501
Dc voltage	Range: 0 to 1000 V (in 4 ranges) Accuracy: $\pm(0.1\% \text{ of reading} + 2 \text{ digits})$
Ac voltage	Range: 0 to 500 V (in 4 ranges) Frequency: 20 Hz to 20 kHz Accuracy: $\pm(\% \text{ of reading} + \text{digits})$ Range: 20 to 40 Hz 1.2 + 2 40 Hz to 10 kHz 0.7 + 2 10 to 20 kHz 1.2 + 2
Dc current	Range: 0 to 2000 mA (in 4 ranges) Accuracy: $\pm(0.2\% \text{ of reading} + 10 \text{ digits})$
Resistance	Range: 0 to 20 M Ω (in 5 ranges) Accuracy: $\pm(\% \text{ of reading} + \text{digits})$ Range: 2 k Ω through 2.0 M Ω 0.3 + 2 20 M Ω 0.5 + 2
	Tektronix, Types DM 501A & DM 501AOPT02
Dc voltage	Range: 0 to 1000 V (in 5 ranges) Accuracy: $\pm(\% \text{ of reading} + \% \text{ of FS})$ Range: 200 mV .05 + .015 2, 20, and 200 V .05 + .01 1000 V .05 + .02
Ac voltage	Range: 0 to 500 V (in 5 ranges) Frequency: 20 Hz to 20 kHz Accuracy: $\pm(\% \text{ of reading} + \% \text{ of FS})$ 200 mV through 200 V ranges: 20 to 40 Hz 1.0 + .05 40 Hz to 10 kHz 0.6 + .05 10 to 20 kHz 1.0 + .05 500 V range: 20 to 40 Hz 1.0 + 0.2 40 Hz to 10 kHz 0.6 + 0.2 10 to 20 kHz 1.0 + 0.2

Table 1. Calibration Description Continued

Test instrument parameters	Performance specifications
Ac dBm/dBV	Range: -40 to +40 dB (in 5 ranges) Frequency: 20 Hz to 10 kHz Accuracy: $\pm(\text{dB})^1$ +20 to -15 dB: 20 Hz to 20 kHz 0.5 -15 to -20 dB: 20 Hz to 2.0 kHz 0.5 2.0 to 10 kHz 1.5
Resistance	Range: 0 to 20 M Ω (in 5 ranges) Accuracy: $\pm(\%$ of reading + $\%$ of FS) Range: 200 Ω through 200 k Ω (LO Ω) 0.15 + .015 2 k Ω through 2000 k Ω (HI Ω) 0.15 + .015 2000 k Ω (LO Ω) 0.3 + .015 20 M Ω (HI Ω) 0.5 + .015
Dc current	Range: 0 to 2000 mA (in 5 ranges) Accuracy: $\pm(0.2\%$ of reading + .015% of FS)
	Dc High Voltage Probes (All Models)
Dc voltage	Range: 1 to 40 kV ² Accuracy: $\pm 4.00\%$ at 1 and 40 kV $\pm 3.0\%$ at 10 kV $\pm 2.0\%$ at 20 and 30 kV $\pm 1.0\%$ at 25 kV

¹Accuracy applies to TI display value. To obtain correct dB reading, algebraically add the range selected to the display reading. Dynamic range is -60 to +56.2 dBm.

²Verified at 1000 V only.

SECTION II EQUIPMENT REQUIREMENTS

4. Equipment Required. Table 2 identifies the specific equipment to be used in this calibration procedure. This equipment is issued with Secondary Transfer Calibration Standards Set AN/GSM-286, AN/GSM-287 and AN/GSM-705. Alternate items may be used by the calibrating activity. The items selected must be verified to perform satisfactorily prior to use and must bear evidence of current calibration. The equipment must meet or exceed the minimum use specifications listed in table 2. The accuracies listed in table 2 provide a four-to-one ratio between the standard and TI. Where the four-to-one ration cannot be met, the actual accuracy of the equipment selected is shown in parenthesis.

5. Accessories Required. The accessories required for this calibration are common usage accessories, issued as indicated in paragraph 4 above, and re not listed in this calibration procedure.