*TB 9-6625-2066-24

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR ELECTRONIC VOLTMETER ME-260( )/U (HEWLETT-PACKARD, MODEL 403B)

Headquarters, Department of the Army, Washington, DC
10 August 2007

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can improve this manual. If you find any mistakes or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Commander, US Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5000. A reply will be furnished to you. You may also provide DA Form 2028 information to AMCOM via e-mail, fax, or the World Wide Web. Our FAX number is: DSN 788-6546 or Commercial 256-842-6546. Our e-mail address is: 2028@redstone.army.mil. Instructions for sending an electronic 2028 may be found at the back of this manual. For the World Wide Web, use: https://amcom2028.redstone.army.mil.

*This bulletin superseded TB 9-6625-2066-35, dated 8 February 1995.

SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Electronic Voltmeter, ME-260( )/U (Hewlett-Packard, Model 403B). The manufacturer's manual, was used as the prime data source in compiling these instructions. The equipment being calibrated will be referred to as the TI (test instrument) throughout this bulletin.

a. Model Variations. The ME-260( )/U is the military version of Hewlett-Packard, Model 403B.

b. Time and Technique. The time required for this calibration is approximately 1 hour, 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 a sentence in which they appear. Report only those adjustments made and designated with (R).

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

Table 1. Calibration Description

Test instrument parameters	Performance specifications
Ac voltage[1]	Range: 0.001 to 300 V rms in 12 ranges; 5 Hz to 2 MHz Accuracy: ±2% (10 Hz to 1 MHz) ±5% (5 to 10 Hz and 1 to 2 MHz)

[1]Not calibrated below 10 Hz.

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 Sets AN/GSM-286, AN/GSM-287, or 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 ratio cannot be met, the actual accuracy of the equipment selected is shown in parenthesis.

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

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
CALIBRATOR	Range: 0 to 306 V at 400 Hz to 300 kHz Accuracy: ±.5% Wideband voltage: Voltage: 1 mV to 3 V Frequency: 10 Hz to 2 MHz Amplitude flatness: ±% output Frequency: 10 Hz to 1 MHz .5% 1 MHz to 2 MHz 1.25%	Fluke, Model 5720A (5720A) (p/o MIS-35947); w amplifier, Fluke 5725A/AR (5725A/AR); w/ac divider, Fluke, Model 7405A-4207 (7405A-4207)

SECTION III
CALIBRATION PROCESS

6. Preliminary Instructions

a. The instructions outlined in paragraphs **6** and **7** are preparatory to the calibration process. Personnel should become familiar with the applicable sections before beginning the calibration.

b. Items of equipment used in this procedure are referenced within the text by common name as listed in table 2.

c. Unless otherwise specified, verify the result of each test and, whenever the test requirement is not met, take corrective action before continuing with the calibration. Adjustments required to calibrate the TI are included in this procedure. Additional maintenance information is contained in the manufacturer's manual for this TI.

d. Unless otherwise specified, all controls and control settings refer to the TI.

7. Equipment Setup

WARNING

HIGH VOLTAGE is used or exposed during the performance of this calibration. DEATH ON CONTACT may result if personnel fail to observe safety precautions. REDUCE OUTPUT(S) to minimum after each set within the performance check where applicable.

CAUTION

Do not apply 115 V ac to TI if batteries are removed.

a. Remove protective cover as required for adjustments.

b. Assure **115 - 230** switch (rear panel) is set to **115**.

c. Connect TI to a 115 V ac source.

d. Set **FUNCTION** switch to **ON** and **RANGE VOLTS DB** switch to **1**. Allow at least a 20 minute warm-up.

e. Set **FUNCTION** switch to **OFF**. If TI meter does not indicate **0** on a **0-to-1** scale, adjust screw located below meter face until meter indicates **0**.

f. Set **FUNCTION** switch to **BATT TEST**. If TI meter does not indicate at least **2.4** on **0-to-3** scale, perform (1) and (2) below:

(1) Set **FUNCTION** switch to **ON**.

(2) Allow 20 minutes for charging.

g. Repeat **f** above.

8. Range Accuracy

a. Performance Check

(1) Set TI **RANGE VOLTS DB** switch to **.001**.

(2) Connect ac divider, supplied with calibrator, to the calibrator output and to the TI input.

(3) Set calibrator for 400 Hz and 1 V output.

(4) Adjust calibrator for an indication of **1** on **0-to-1** scale. If the calibrator does not indicate between 0.980 and 1.020 V, perform **b** (1) and (2) below.

(5) Set TI **RANGE VOLTS DB** switch to **.003**.

(6) Adjust calibrator for an indication of **3** on **0-to-3** scale. The calibrator will read between 2.94 and 3.06 V.

(7) Set TI **RANGE VOLTS DB** switch to **.01**.

(8) Adjust calibrator for an indication of **1** on **0-to-1** scale. The calibrator will read between 9.8 and 10.2 V.

(9) Remove ac divider and connect calibrator output to TI input.

(10) Repeat technique of (2) and (3) above at **RANGE** switch and meter indications listed in table 3. If the calibrator does not indicate within limits specified, perform indicated adjustments.

Table 3. Meter Range Accuracy

Test instrument			Calibrator indication limits		
RANGE switch settings (outer scale)	Meter indications				Adjustments
	0-to-1 scale	**0-to-3** scale	Min	Max	
.1	1	- - -	0.098	0.102	**b**(3) and (4)
.3	- - -	3	0.294	0.306	- - -
1	1	- - -	0.98	1.02	- - -
1	.8	- - -	0.78	0.82	- - -

Table 3. Meter Range Accuracy - Continued

Test instrument			Calibrator indication limits		
RANGE switch settings (outer scale)	Meter indications				Adjustments
	0-to-1 scale	**0-to-3** scale	Min	Max	
1	.6	- - -	0.58	0.62	- - -
1	.4	- - -	0.38	0.42	- - -
1	.2	- - -	0.18	0.22	- - -
3	- - -	3	2.94	3.06	- - -
10	1	- - -	9.8	10.2	- - -
30	- - -	3	29.4	30.6	**b**(5) and (6)
100	1	- - -	98.0	102.0	- - -
300	- - -	3	294.0	306.0	- - -

b. Adjustments

(1) Connect the divider to the calibrator output and TI input. Adjust calibrator output for 1.000 V, 400 Hz.

(2) Adjust R29 METER CAL 1MV RANGE (fig. 1) until TI meter indicates **1** on **0-to-1** scale (R).

(3) Adjust calibrator output for 100 mV, 400 Hz.

(4) Adjust R3 (fig. 2) until TI meter indicates **1** on **0-to-1** scale (R).

(5) Adjust calibrator output for 30 V, 400 Hz.

(6) Adjust R4 (fig. 2) until meter indicates **3** on **0-to-3** scale (R).

9. Frequency Response

a. Performance Check

(1) Connect calibrator wideband to TI input, using calibrator cable and 50 Ω load.

(2) Set TI **RANGE VOLTS DB** switch to **.001**.

(3) Adjust calibrator for 1 kHz and output for an indication of **1** on TI meter **0-to-1** scale.

(4) Press calibrator **NEW REF** pushbutton.

(5) Adjust calibrator frequency between 10 Hz and 2 MHz while maintaining a full scale indication on TI meter. If calibrator does not indicate between ±2% from 10 Hz to 1 MHz and between ±5% from 1 MHz to 2 MHz, perform **b**(1) and (2) below.

(6) Repeat technique of (2) through (5) above for **RANGE VOLTS DB** switch settings of **.1** and **3**. If an out-of-tolerance condition exists, perform **b** (3) through (7) below.

b. Adjustments

(1) Adjust C16 CAL 1MV 2MC (fig. 1) and calibrator until calibrator **Error =** indicates within ±2 percent at 1 MHz and within ±5 percent at 2 MHz (R).

(2) Adjust R33 LOOP GAIN ADJ (fig. 1) and calibrator until calibrator **Error =** indicates within ±2 percent between 300 kHz and 1 MHz (R).

NOTE

If R33 was adjusted in (2) above, repeat paragraphs **8 a** and **9 a**.

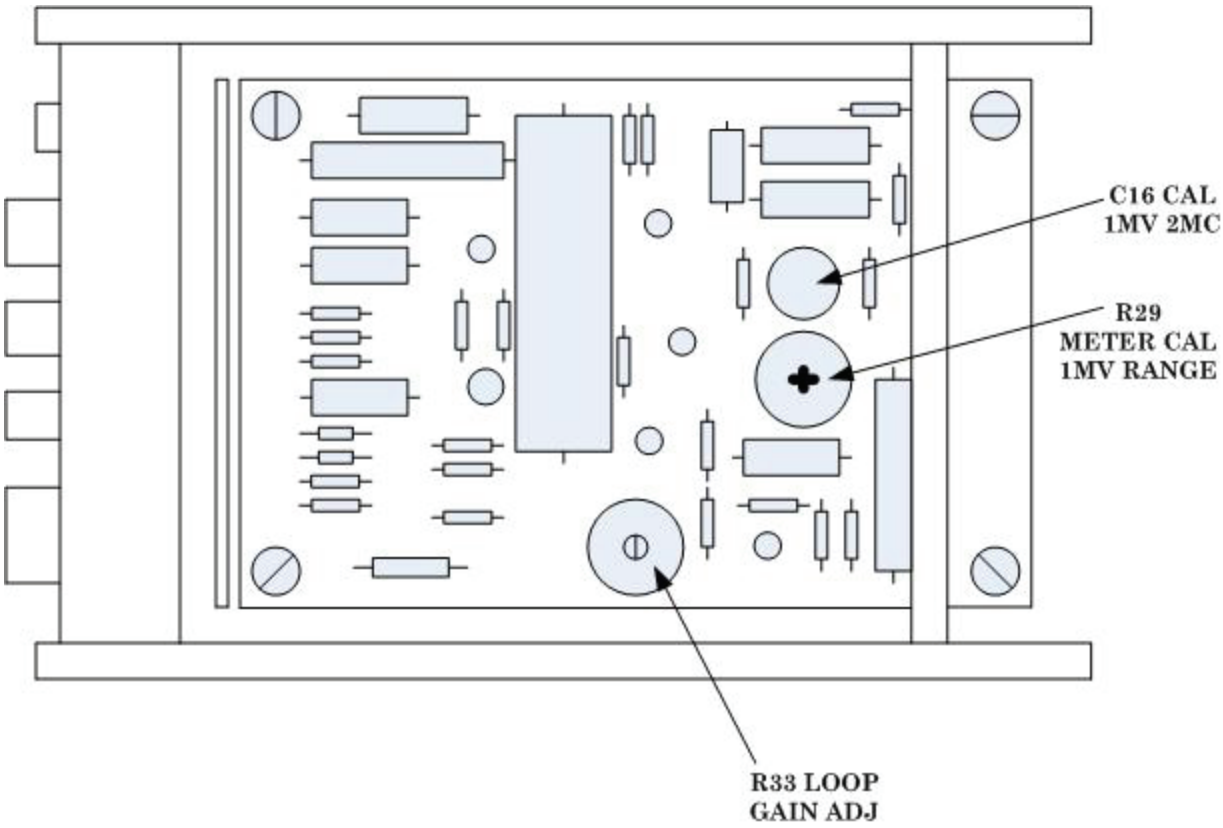

Figure 1. Voltmeter - top view

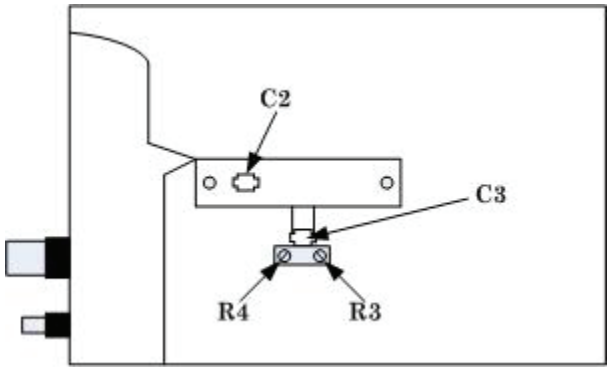

Figure 2. Voltmeter - right side view.

(3) Set **RANGE VOLTS DB** switch to **.1**.

(4) Adjust calibrator frequency for 400 Hz and output for an indication of **1** on TI meter **0-to-1** scale.

(5) Press **NEW REF** pushbutton on calibrator.

(6) Increase frequency to 300 kHz.

(7) Adjust C2 (fig. 2) until TI indicates **1** on **0-to-1** scale (R).

10. 10 Volt Range Response

a. Performance Check

(1) Connect calibrator output to TI input.

(2) Set **RANGE VOLTS DB** switch to **10**.

(3) Adjust calibrator for 400 Hz and a 9.4 V indication on TI.

(4) Press calibrator **NEW REF** pushbutton.

(5) Adjust frequency to 300 kHz; if TI does not indicate between 9.2 and 9.6 V, perform **b** below.

b. Adjustments

(1) Set calibrator to 9.4 V and 300 kHz.

(2) Adjust C3 (fig. 2) for a 9.4 V indication on TI (R).

NOTE

If C3 was adjusted in (2) above, repeat paragraphs **9** and **10** above.

11. Final Procedure

a. Deenergize and disconnect all equipment.

b. Annotate and affix DA label/form in accordance with TB 750-25.

By Order of the Secretary of the Army:

GEORGE W. CASEY, JR.
General, United States Army
Chief of Staff

Official:

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army
0716504

Distribution:

To be distributed in accordance with the initial distribution number (IDN) 342210 requirements for calibration procedure TB 9-6625-2066-24.

Instructions for Submitting an Electronic 2028

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however, only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" whomever@redstone.army.mil
To: <2028@redstone.army.mil

Subject: DA Form 2028
1. **From**: Joe Smith
2. Unit: home
3. **Address**: 4300 Park
4. **City**: Hometown
5. **St**: MO
6. **Zip**: 77777
7. **Date Sent**: 19-OCT –93
8. **Pub no:** 55-2840-229-23
9. **Pub Title**: TM
10. **Publication Date**: 04-JUL-85
11. Change Number: 7
12. Submitter Rank: MSG
13. **Submitter FName**: Joe
14. Submitter MName: T
15. **Submitter LName**: Smith
16. **Submitter Phone**: 123-123-1234
17. **Problem**: 1
18. Page: 2
19. Paragraph: 3
20. Line: 4
21. NSN: 5
22. Reference: 6
23. Figure: 7
24. Table: 8
25. Item: 9
26. Total: 123
27. **Text**

This is the text for the problem below line 27.