*TB 9-6625-2252-35

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR ELECTRONIC VOLTMETER ME-202C/U

Headquarters, Department of the Army, Washington, DC
7 June 2005

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, 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 supersedes TB 9-6625-2252-35, dated 29 March 1991.

SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Electronic Voltmeter ME-202C/U. TM 11-6625-2724-12 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. None.

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 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 specifications which pertain to this calibration are listed in table 1.

Table 1. Calibration Description

Test instrument parameters	Performance specifications[1]
Dc and ac volts (TVM)	Range: 0 to 1000 V Accuracy: ±3.0% of reading
Dc volts (differential mode)	Range: 0 to 1000 V Accuracy: ±0.05% of reading
Ac volts (differential mode)	Range: 0 to 1000 V, 200 Hz to 20 kHz Accuracy: ±0.2% of reading

[1]Derated to accuracy specified.

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. 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 specification listed in table 2. The accuracies listed in table 2 provide a four-to-one ratio between the standard and TI.

5. Accessories Required. The accessories required for this 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	Dc volts: Range: 1 to 100 V dc Accuracy: ±.0125% Ac volts: Range: 1 to 1000 V ac Frequency: 200 Hz to 20 kHz Accuracy: ±.05%	Fluke, Model 5720A (5700A/EP) (p/o MIS-35947) w/amplifier, Fluke, Model 5725A/AR (5725A/AR)
MULTIMETER	Range: -0.1 to 2.6 V dc Accuracy: ±1.0%	Fluke, Model 8840A/AF05 (AN/GSM-64D)

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 entire bulletin 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 TM 11-6625-2724-12 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 step within the performance check where applicable.

a. Remove TI protective cover as required for adjustments. Replace cover after completing the adjustments.

b. Connect shorting link between TI **INPUT LOW** and **GND**.

c. Set switches as listed in (1) through (3) below:

(1) **RANGE** to **1**.

(2) **MODE** to **DC+**.

(3) **NULL SENS** to **TVM**.

d. If TI does not indicate center scale (zero), adjust mechanical zero adjustment (located under meter) until TI indicates center scale (zero).

e. Connect TI to a 115 V ac source.

f. Set **POWER** switch to **ON** and allow at least 1 hour for equipment to warm-up and stabilize.

g. Short TI **INPUT HI** and **LOW**. If TI does not indicate center scale (zero), adjust A5R4 SHT CKT ZERO (fig. 1) until TI indicates center scale.

h. Remove short from TI **INPUT HI** and **LOW**. If TI does not indicate center scale (zero), adjust A5R6 OPEN CKT ZERO (fig. 1) until TI indicates center scale.

i. Connect multimeter **INPUT HI** and **LO** to TI rear panel **RECORDER OUTPUT** and **GND**. If multimeter does not indicate 0 ±0.1 V dc, adjust A4R2 REC ZERO (fig. 1) until multimeter indicates 0 ±0.1 V dc (R).

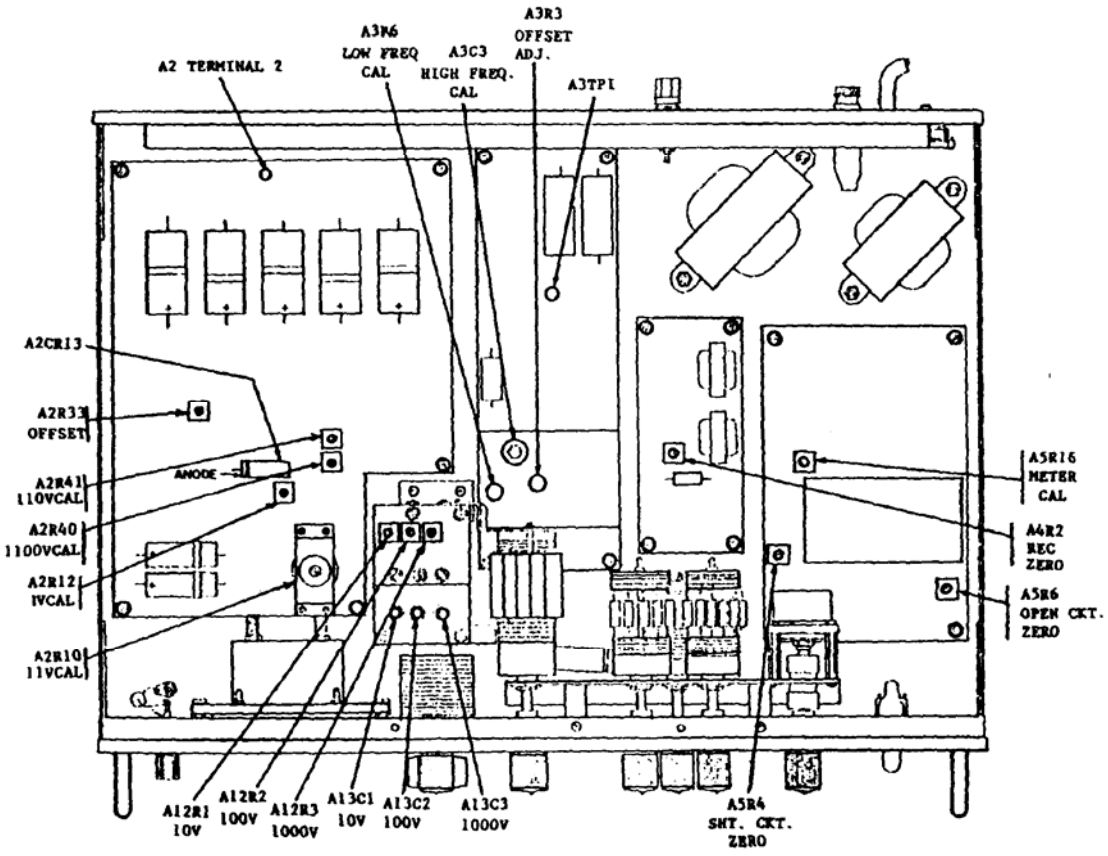

Figure 1. Differential voltmeter - adjustment locations.

8. TVM Accuracy

a. Performance Check

(1) Connect calibrator **OUTPUT HI** and **LO** to TI **INPUT HI** and **LOW**.

(2) Adjust calibrator output for a +1 indication on TI meter. Calibrator will indicate between .97 and 1.03 V dc, if not, perform **b** below.

(3) Adjust calibrator output for a -1 indication on TI meter. Calibrator will indicate between -.97 and -1.03 V dc.

(4) Repeat technique of (2) and (3) above for voltages and TI settings as listed in table 3; calibrator will indicate within limits specified.

Table 3. TVM Accuracy

Test instrument settings		Calibrator settings and indications		
MODE	**RANGE**	Frequency	Min	Max
DC+	10	+ and - dc	9.7 V	10.3 V
DC+	100	+ and - dc	97 V	103 V
DC+	1000	+ and - dc	970 V	1030 V
AC	1	1 kHz	0.97 V	1.03 V
AC	10	1 kHz	9.7 V	10.3 V
AC	100	1 kHz	97 V	103 V
AC	1000	1 kHz	970 V	1030 V

b. Adjustments. Set calibrator for a 1.0 V output. Adjust A5R16 METER CAL (fig. 1) until TI indicates +1 (R).

9. DC Voltage (Differential) Accuracy

a. Performance Check

(1) Position controls as listed in (a) through (d) below:

(a) **NULL SENS** switch to **TVM**.

(b) **MODE** switch to **DC+**.

(c) **RANGE** switch to **10**.

(d) Decade dials to **10.000**.

(2) Set calibrator for a 10 V dc output.

(3) Set **NULL SENS** switch to each successively more sensitive position while adjusting calibrator output until null is obtained on most sensitive position. If calibrator does not indicate between 9.995 and 10.005 V dc, perform **b** (l) below.

(4) Repeat technique of (1) through (3) above using settings listed in table 4. If calibrator does not indicate within limits specified, perform appropriate adjustment as listed.

Table 4. Dc Differential Accuracy

Test instrument		Calibrator indications		Adjustments
RANGE switch settings	Decade dial settings	Min	Max	
1	1.0000	0.9995 V	1.0005 V	b(2)
1	.99990	0.9994001 V	1.0003999 V	---
1	.88880	0.8883556 V	0.8892444 V	---
1	.77770	0.7773112 V	0.7780888 V	---
1	.66660	0.6662667 V	0.6669333 V	---
1	.55550	0.5552223 V	0.5557777 V	---
1	.44440	0.4441778 V	0.4446222 V	---
1	.33330	0.3331334 V	0.3334666 V	---
1	.22220	0.2220889 V	0.2223111 V	---
1	.11110	111.04445 mV	111.15555 mV	---
100	100.00	99.95 V	100.05 V	b(3) & (4)
1000	1000.0	999.5 V	1000.5 V	b(5)

b. Adjustments

(1) Set calibrator for a 10 V dc output. Adjust A2R10 11VCAL (fig. 1) until TI indicates null (R).

(2) Set calibrator for a 1 V dc output. Adjust A2R12 1VCAL (fig. 1) until TI indicates null (R).

(3) Set calibrator for a 100 V dc output. Connect multimeter **INPUT HI** and **LO** across A2CR13 (fig. 1) (**LO** to ANODE). Adjust A2R33 OFFSET (fig. 1) until multimeter indicates 0 ±0.005 V. Disconnect multimeter.

(4) Adjust A2R41 110VCAL (fig. 1) until TI indicates a null (R).

(5) Set calibrator for a 1000 V dc output. Adjust A2R40 1100VCAL (fig. 1) until TI indicates a null (R).

10. Ac Voltage (Differential) Accuracy

a. Performance Check

(1) Position controls as listed in (a) through (d) below:

(a) **NULL SENS** switch to **TVM**.

(b) **MODE** switch to **AC**.

(c) **RANGE** switch to **1**.

(d) Decade dials to **1.0000**.

(2) Set calibrator for a 1 V, 200 Hz output.

(3) Set **NULL SENS** switch to each successively more sensitive position while adjusting calibrator amplitude output until null is obtained on most sensitive position. If calibrator does not indicate between 0.998 and 1.002 V, perform **b** (l) through (6) below.

(4) Repeat technique of (1) through (3) above using settings listed in table 5. If calibrator does not indicate within limits specified, perform appropriate adjustment as listed.

Table 5. Ac Differential Accuracy

Test instrument		Calibrator settings and indications			
RANGE switch settings	Decade dial settings	Frequency	Min	Max	Adjustments
1	1.0000	20 kHz	0.998 V	1.002 V	b(7)
10	10.000	200 Hz	9.98 V	10.02 V	b(8)
10	10.000	20 kHz	9.98 V	10.02 V	b(9)
100	100.00	200 Hz	99.8 V	100.2 V	b(10)
100	100.00	20 kHz	99.8 V	100.2 V	b(11)
1000	1000.0	200 Hz	998 V	1002 V	b(12)
1000	1000.0	20 kHz	998 V	1002 V	b(13)

b. Adjustments

NOTE

Use insulated screwdriver when performing adjustments.

(1) Set **NULL SENS** switch to **TVM** and disconnect calibrator from TI.

(2) Short TI **INPUT HI** and **LOW**.

(3) Connect multimeter **INPUT HI** to A3TP1 (fig. 1) and **LO** to A2 terminal 2. Adjust A3R3 OFFSET ADJ. (fig. 1) until multimeter indicates between 2.4 and 2.6 V dc when adjustment tool is removed from A3R3 OFFSET ADJ. (fig. 1).

(4) Disconnect multimeter and remove short from TI **INPUT HI** and **LOW**.

(5) Connect calibrator **OUTPUT HI** and **LO** to TI **INPUT HI** and **LOW**.

(6) Set calibrator for a 1 V, 200 Hz output. Set **NULL SENS** switch to each successively more sensitive position and adjust A3R6 LOW FREQ CAL (fig. 1) until TI indicates a null (R). Repeat **a** l) through (3) above.

(7) Set calibrator for a 1 V, 20 kHz output. Adjust A3C3 HIGH FREQ. CAL (fig. 1) until TI indicates a null (R).

(8) Set calibrator for a 10 V, 200 Hz output. Adjust A12R1 10V (fig. 1) until TI indicates a null (R).

(9) Set calibrator for a 10 V, 20 kHz output. Adjust A13C1 10V (fig. 1) until TI indicates a null (R).

(10) Set calibrator for a 100, 200 Hz output. Adjust A12R2 100V (fig. 1) until TI indicates a null (R).

(11) Set calibrator for a 100, 20 kHz output. Adjust A13C2 100V (fig. 1) until TI indicates a null (R).

(12) Set calibrator for a 1000, 200 Hz output. Adjust A12R3 1000V (fig. 1) until TI indicates a null (R).

(13) Set calibrator for a 1000, 20 kHz output. Adjust A13C3 1000V (fig. 1) until TI indicates a null (R).

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:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official

SANDRA R. RILEY
Administrative Assistant to the
Secretary of the Army

0510306

Distribution:

To be distributed in accordance with the initial distribution number (IDN) 344362, requirements for calibration procedure TB 9-6625-2252-35.

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.