

# TB 9-6625-2403-24

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

## CALIBRATION PROCEDURE FOR DIGITAL MULTIMETER, GREENLEE MODEL DM-40

Headquarters, Department of the Army, Washington, DC  
29 December 2009

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### 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, U.S. 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 send in your comments electronically to our E-mail address: [2028@redstone.army.mil](mailto:2028@redstone.army.mil) or by fax 256-842-6546/DSN 788-6546. For the World Wide Web use: <https://amcom2028.redstone.army.mil>. Instructions for sending an electronic 2028 can be found at the back of this manual.

SECTION		Paragraph	Page
	I. IDENTIFICATION AND DESCRIPTION		
	Test instrument identification .....	1	2
	Forms, records and reports .....	2	2
	Calibration description .....	3	2
	II. EQUIPMENT REQUIREMENTS		
	Equipment required .....	4	3
	Accessories required .....	5	3
	III. CALIBRATION PROCESS		
	Preliminary instructions .....	6	3
	Equipment setup .....	7	4
	Dc voltage.....	8	4
	Ac voltage.....	9	4
	Resistance .....	10	5
	Dc current .....	11	5
	Temperature .....	12	6
	Final procedure.....	13	6

**SECTION I  
IDENTIFICATION AND DESCRIPTION**

**1. Test Instrument Identification.** This bulletin provides instructions for the calibration of Digital Multimeter, Greenlee Model DM-40. 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.** 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	
Dc voltage	Range: 199.9 mV 1999 mV 19.99 V 199.9 V 600 V	Accuracy: ±0.8% + 0.1 mV ±0.8% + 1 mV ±0.8% + 0.01 V ±0.8% + 0.1 V ±0.8% + 1 V
Ac voltage	Range: 199.9 V, 40 to 400 Hz 600 V, 40 to 400 Hz	Accuracy: ±1.2% + 0.5 V ±1.2% + 5 V
Resistance	Range: 199.9 Ω 19.99 kΩ 199.9 kΩ 19.99 MΩ	Accuracy: ±0.8% + 0.2 Ω ±1% + 0.02 kΩ ±1% + 0.2 kΩ ±1% + 0.02 MΩ
Dc current	Range: 19.99 mA 199.9 mA	Accuracy: ±1.5% + 0.01 mA ±1.5% + 0.1 mA
Temperature	Range: -40° C to 250° C -40° F to 392° F	Accuracy: ±2.5° C <sup>1</sup> ±4.5° F <sup>1</sup>

<sup>1</sup>Accuracies stated are used with TI K-type thermocouple probe.

## 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; 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 this calibration are common usage accessories issued as indicated in paragraph 4 above, and are not listed in this calibration procedure. The following peculiar accessory is required for this calibration: Cool/heat source, Thermacal Inc., model M28.

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
CALIBRATOR	Range: 180 mV to 540 V dc Accuracy: $\pm 0.2\%$ Range: 180 mV to 540 V ac (40 Hz to 400 Hz) Accuracy: $\pm 0.3\%$ Range: 18 mA to 180 mA Accuracy: $\pm 0.375\%$ Range: 190 $\Omega$ to 19 M $\Omega$ Accuracy: $\pm 0.2\%$	Fluke, Model 5720A (5720A) (p/o MIS-35947); w amplifier, Fluke 5725A/AR (5725A/AR)
THERMOMETER	Range: $-10^{\circ}\text{C}$ to $250^{\circ}\text{C}$ Accuracy: $\pm 0.625^{\circ}\text{C}$	Azonix, Model A1012 (MIS 38958) w/Temperature Probe Instrulab, Model 4101-10X

## 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. There are no published adjustments for this TI included in this procedure. Additional maintenance information is contained in the manufacturer's manual and/or technical manual for the 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. Ensure calibrator is set to STBY.
- b. Connect TI **VΩmA** and **COM** inputs to calibrator.

**8. Dc Voltage**

**a. Performance Check**

- (1) Set TI function/range switch to **200m V $\overline{=}$** .
- (2) Set calibrator output for 180 mV dc. TI will indicate within limits specified in first row of table 3.
- (3) Repeat technique of (1) and (2) above, using TI settings and calibrator outputs listed in table 3. TI will indicate within limits specified in table 3.

Table 3. Dc Volts

Test instrument V $\overline{=}$ range	Calibrator Output (V)	Test instrument Limits	
		Min	Max
200 m	0.18	178.5 m	181.5 m
2000 m	1.8	1785 m	1815 m
20	6	5.94	6.06
20	14	13.88	14.12
20	18	17.85	18.15
20	-18	-18.15	-17.85
200	180	178.5	181.5
600	540	535	545

- b. **Adjustments.** No adjustments can be made.

**9. Ac Voltage**

**a. Performance Check**

- (1) Set TI function/range switch to **200 V $\sim$** .
- (2) Set calibrator output for 180 V at 40 Hz. TI will indicate within limits specified in first row of table 4.
- (3) Repeat technique of (1) and (2) above, using TI settings and calibrator outputs listed in table 4. TI will indicate within limits specified in table 4.

Table 4. Ac Volts

Test instrument	Calibrator		Test instrument	
V~ range	Output		Limits	
	(V)	(Hz)	Min	Max
200	180	40	177.4	182.6
		400	177.4	182.6
600	540	40	528	552
		400	528	552

**b. Adjustments.** No adjustments can be made.

## 10. Resistance

### a. Performance Check

- (1) Set TI function/range switch to **200Ω**.
- (2) Set calibrator for a 0 Ω (2-wire Comp: ON) output. TI will indicate near 0 Ω.
- (3) Set calibrator for applied output of 190 Ω.
- (4) Rotate calibrator knob below EDIT FIELD pushbutton to adjust calibrator display indication to equal TI indication. Calibrator Err display will indicate within limits specified in first row of table 5.
- (5) Repeat technique of (1) through (4) above, using TI settings and calibrator outputs listed in table 5. Calibrator Err display will indicate within limits specified in table 5.

Table 5. Resistance

Test instrument	Calibrator	Test instrument
Ω range	Applied	Err limit (%)
200	190 Ω	±0.90526
2000	1.9 kΩ	±1.10526
20 k	19 kΩ	±1.10526
200 k	190 kΩ	±1.10526
20 M	19 MΩ	±1.10526

**b. Adjustments.** No adjustments can be made.

## 11. Dc Current

### a. Performance Check

- (1) Set TI function/range switch to **20m A $\overline{\text{---}}$** .
- (2) Set calibrator output for 18 mA dc. TI will indicate within limits specified in first row of table 6.
- (3) Repeat technique of (1) and (2) above, using TI settings and calibrator outputs listed in table 6. TI will indicate within limits specified in table 6.

Table 6. Dc Current

Test instrument	Calibrator	Test instrument	
		Limits	
Dc A range	Output (mA)	Min	Max
20 m	18	17.72	18.28
200 m	180	177.2	182.8

(5) Set calibrator to STBY and disconnect equipment setup.

**b. Adjustments.** No adjustments can be made.

**12. Temperature**

**a. Performance Check**

**NOTE**

K-type thermocouple probe must accompany TI in order to perform this check. Ensure that TI temperature probe and thermometer probe are inserted into cool/heat source wells to the same depth.

(1) Connect TI temperature probe to TI **V Ω mA** and **COM** inputs.

(2) Set TI function/range switch to °C.

(3) Set cool/heat source for thermometer reading of -10° C. Allow sufficient time for temperature stabilization prior to making measurement. TI will indicate within limits specified in first row of table 7.

(4) Repeat technique of (3) above, using TI settings and indications listed in table 7. TI will indicate within limits specified in table 7.

Table 7. Temperature Accuracy

Thermometer	Test instrument	
	Min	Max
Reading		
-10°C	-12.5 °C	-7.5 °C
0.0°C	-2.5 °C	2.5 °C
0.0°C / 32°F	27.2 °F <sup>1</sup>	36.5 °F
250°C	247.5 °C <sup>2</sup>	252.5 °C

<sup>1</sup>Set TI function/range switch to °F.

<sup>2</sup>Set TI function/range switch to °C.

**b. Adjustments.** No adjustments can be made.

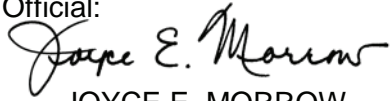
**13. Final Procedure**

**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:

Official:



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*Administrative Assistant to the  
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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**

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