*TB 9-6625-1185-24

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR MEGOHMMETER FREED TRANSFORMER MODELS 1620, 1620B, AND 1620D

Headquarters, Department of the Army, Washington, DC
10 September 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, 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 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.

*This bulletin supersedes TB 9-6625-1185-35, dated 23 August 1988.

SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Megohmmeter, Freed Transformer, Models 1620, 1620B, and 1620D. The manufacturers' manuals were 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. Variations among models are noted in tables and text.

b. Time and Technique. The time required for this calibration is approximately 2 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 specifications which pertain to this calibration are listed in table 1.

Table 1. Calibration Description

Test instrument parameters	Performance specifications
Dc voltage	
Model 1620	Range: 50 to 1000 V dc Accuracy: ±2% FS
Model 1620B	Range: 250 to 2500 V dc Accuracy: ±2% FS
Model 1620D	Range: 5 to 1000 V dc Accuracy: ±2% FS
Ohmmeter	
Model 1620[1]	Range: 0.1 to 4,000,000 megohms Accuracy: ±5%
Model 1620B[1]	Range: 1 to 2,000,000 megohms Accuracy: ±5%
Model 1620D[1 2]	Range: 0.01 to 40,000,000 megohms Accuracy: ±5%

[1]Not calibrated above 10,000 megohms.
[2]Not calibrated below 0.1 megohms.

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/GMS-286, AN/GSM-287 or AN/GSM-705. Alternate items may be used

by the calibrating activity when the equipment listed in table 2 is not available. 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.

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
AUTOTRANSFORMER	Range: 115 V ac Accuracy: ± 1%	Ridge, Model 9020A (9020A)
MULTIMETER	Range: 23 to 1000 V dc Accuracy: .5%	Hewlett-Packard, Model 3458A (3458A)
RESISTANCE STANDARD NO. 1	Range: 10,000 megohms Accuracy: ± 1.25%	Penn Airborne (MIS 10412-4)
RESISTANCE STANDARD NO. 2	Range: .095 to 1 megohms Accuracy: ± 1.25%[1]	Biddle-Gray, Model 71-631 (7910328)
RESISTANCE STANDARD NO. 3	Range: 1 to 10 megohms Accuracy: [1]	Beckman, Model CR10M (8598965)
RESISTANCE STANDARD NO. 4	Range: 100 megohms Accuracy: ± 1.25%	Beckman, Model CR100M (8598966)
RESISTANCE STANDARD NO. 5	Range: 1000 megohms Accuracy: ± 1.25%	Beckman, Model CR1000M (8579478)
VOLTAGE DIVIDER	Range: 1000 to 2550 V dc Accuracy: .5%	Fluke, Model 80E10

[1]Combined accuracy of resistance standards no. 2 and resistance standards no. 3 is ± 1.25%.

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 and item identification number 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 these TI's.

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 OUTPUTS to minimum after each step within the performance check where applicable.

a. Remove protective cover and shorting strap from TI. Shorting strap is located between **GND** and **GUARD** terminals.

b. Mechanically adjust TI zero-adjust (**INF**) screw for 0 indication on **VOLTS** meter and for ∞ (INFINITY) on **MEGOHMS** meter.

c. Connect TI to autotransformer.

d. Connect autotransformer to a 115 V ac source and adjust for 115 V output.

e. Turn **DC ADJUST** control fully ccw.

f. Set **POWER** switch to **ON** and allow at least 10 minutes to warm-up and stabilize.

g. Turn **TI ZERO ADJ** (∞ **ADJ**) control to midrange and **MULTIPLIER** switch to **ZERO ADJ** (**CHK**).

h. On model 1620D, set **TEST VOLTAGE MULTIPLIER** switch to X1 position.

i. Press and hold **TEST VOLTAGE** switch and adjust internal ZERO ADJ (INF) control (fig. 1) for **INFINITY** indication on **MEGOHMS** meter. Release **TEST VOLTAGE** switch.

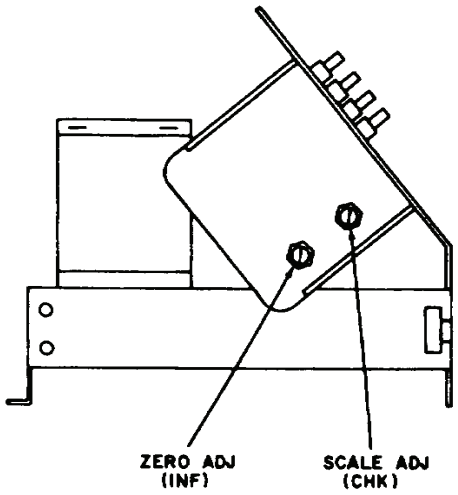

Figure 1. Megohmmeter - left view.

8. Dc Output Voltage and VOLTS Meter

a. Performance Check

(1) Connect multimeter (and voltage divider as required), positive lead to TI **GUARD** terminal and negative lead to TI - (negative) **RX** terminal. Set **MULTIPLIER** switch to **X1** position.

(2) Press and hold **TEST VOLTAGE** switch and adjust **DC ADJUST** control for TI indications listed in table 3. Multimeter/voltage divider will indicate within limits specified.

Table 3. Output Voltage and Volts Meter

Test instrument meter indications		Multimeter indication (V dc)			
Models 1620 and 1620D	Model 1620B	Models 1620 and 1620D		Model 1620B	
		Min	Max	Min	Max
1000[1]	2500[1]	0.980	1.020	2.450	2.550
750	2000[1]	730	770	1.950	2.050
500	1500[1]	480	520	1.450	1.550
250	1250[1]	230	270	1.200	1.300
100[2]	750	98	102	700	800
75[2]	500	73	77	450	550
50[2]	250	48	52	200	300
25[2]	- - -	23	27	- - -	- - -

[1]Voltage divider used.
[2]Check model 1620D only. Set **VOLTAGE MULTIPLIER** switch to **X.1**.

b. Adjustments.

No adjustments can be made.

9. Megohms Meter

a. Performance Check

NOTE

It is not necessary to hold down **TEST VOLTAGE** switch on model 1620B.

(1) Turn TI **DC ADJUST** control fully ccw.

(2) Press and hold **TEST VOLTAGE** switch and adjust **ZERO ADJ (∞ ADJ)** control for a **∞ (INFINITY)** indication on **MEGOHMS** meter.

(3) Release **TEST VOLTAGE** switch.

(4) Turn TI **MULTIPLIER** switch to **CHK (CAL)**.

(5) Press and hold **TEST VOLTAGE** switch and adjust **DC ADJUST** control for a 500 volt indication on **VOLTS** meter. TI **MEGOHMS** meter pointer will deflect to **2 (CHK)** red line. If not, perform **b** below.

(6) Release **TEST VOLTAGE** switch.

(7) Turn TI **MULTIPLIER** switch to **X1**.

(8) Using appropriate leads connect resistance standard no .2 to TI terminals as listed in (a) through (d) below:

(a) High to TI **RX** + (plus).
(b) Low to TI **RX** - (minus).
(c) **GND** to TI **GUARD**.
(d) TI **GND** terminal to earth ground.

NOTE
DO NOT REMOVE EARTH GROUND FROM TI THROUGHOUT ENTIRE PROCEDURE.

NOTE
Disconnect strap on resistance standard.

(9) Adjust TI **ZERO ADJ (∞ ADJ)** for **∞ (INFINITY)** indication on TI **MEGOHMS** meter.

(10) Adjust resistance standard to 500,000 ohms.

(11) Press and hold **TEST VOLTAGE** switch and adjust **DC ADJUST** control until **VOLTS** meter indicates 0.5 on upper **(MULTIPLY MEGOHMS BY)** scale.

(12) Readjust resistance standard until TI **MEGOHMS** meter indicates **1**.

(13) Repeat (11) and (12) above until TI **VOLTS** meter indicates **0.5** and **MEGOHMS** meter indicates **1**.

(14) Release **TEST VOLTAGE** switch.

(15) Resistance standard will indicate between 475,000 and 525,000 ohms.

(16) Repeat technique of (10) through (14) above at values listed in table 4. Resistance standard will indicate within limits specified.

Table 4. Megohms Meter Check

Resistance standard setting (ohms)	Test instrument			Resistance standard final indication (Ohms)	
	TEST VOLTAGE MULTIPLIER switch 1620D only	VOLTS meter indication	MEGOHMS meter indication	Min	Max
100K[1]	0.1	0.5	2.0	95K	105K
200K[1]	0.1	0.5	4.0	190K	210K
400K[1]	0.1	0.5	8.0	380K	420K
600K	1.0	0.5	1.2	570K	630K
800K	1.0	0.5	1.6	760K	840K

See footnotes at end of table.

Table 4. Megohms Meter Check - Continued

Resistance standard setting (ohms)	Test instrument			Resistance standard final indication (Ohms)	
	TEST VOLTAGE MULTIPLIER switch 1620D only	VOLTS meter indication	MEGOHMS meter indication	Min	Max
1.0M	1.0	0.5	2.0	.95M	1.05M
1.5M[2]	1.0	0.5	3.0	1.425M	1.575M
2.5M	1.0	0.5	5.0	2.375M	2.625M
5.0M	1.0	0.5	10.0	4.75M	5.25M
10.0M	1.0	0.5	20.0	9.5M	10.5M
10.0M[3]	1.0	0.5	2.0	9.5M	10.5M

[1]Perform check on model 1620D only.
[2]Connect additional resistance standard no. 3 in series with resistance standard no. 2. Include certified value of additional resistance to final indication.
[3]Before performing check, turn TI **RESISTANCE MULTIPLIER** switch to **X10** and repeat 9 **a** (9).

(17) Turn TI **MULTIPLIER** switch to **X100**.

(18) Remove all resistance standards from equipment setup and connect resistance standard no. 4 for 100 MΩ to TI, using three appropriate leads.

(19) Repeat (9) above.

(20) Press and hold **TEST VOLTAGE** switch and adjust **DC ADJUST** control until **VOLT** meter indicates 0.5 on upper **(MULTIPLY MEGOHMS BY)** scale. TI **MEGOHMS** meter scale will indicate between 1.9 and 2.1.

(21) Repeat (17) through (20) above, except use **MULTIPLIER X1K** switch position and resistance standard no. 5 connected for 1000 MΩ. TI **MEGOHMS** meter scale will indicate between 1.9 and 2.1.

(22) Turn TI **MULTIPLIER** switch to **X10K** and remove resistance standard no. 5 from setup.

(23) Connect resistance standard no. 1 to TI **RX +** (plus) and **RX -** (minus) terminals using appropriate cable and adapter. Connect TI **GUARD** terminal to resistance standard case.

(24) Repeat (9) and (20) above. TI **MEGOHMS** meter scale will indicate between 1.9 and 2.1.

b. Adjustments. Adjust **SCALE ADJ** (**CHK**) control (fig. 1) until TI **MEGOHMS** meter pointer deflects to 2 (**CHK**) red line.

10. Final Procedure

a. Deenergize and disconnect all equipment. Reinstall shorting strap and protective cover to TI.

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
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0719007

Distribution:

To be distributed in accordance with the initial distribution number (IDN) 342121, requirements for calibration procedure TB 9-6625-1185-24.

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.