

*TB 9-4935-214-40

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR VOLTAGE DIVIDER, ELECTRO SCIENTIFIC INDUSTRIES, MODEL RV722; AND GENERAL RESISTANCE, MODEL DV4107C

Headquarters, Department of the Army, Washington, DC
7 June 2007

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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, 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>.

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*This bulletin supersedes TB 9-4935-214-35, dated 30 May 1980.

**SECTION I
IDENTIFICATION AND DESCRIPTION**

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Voltage Divider, Electro Scientific Industries Model RV722; and General Resistance, Model DV4107C. 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. Variations among models are described in text.

b. Time and Technique. The time required for this calibration is approximately 4 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. 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
Input resistance	Range: 100 kΩ Accuracy: ±0.005%
Linearity	Accuracy: ±1 ppm

**SECTION II
EQUIPMENT REQUIREMENTS**

4. Equipment Required. Table 2 identifies the specific equipment used in this calibration procedure. This equipment is issued with Secondary Reference Standards Calibration Set NSN 4931-00-621-7878, and is to be used in performing this procedure. 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 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 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 accessories are also required for this calibration: Lead compensator, Electro Scientific, Model 875B (7910539-2).

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
DC GENERATOR DETECTOR	Sensitivity: 3 μ V Accuracy: $\pm(5\% + 0.1 \mu\text{V})$	Electro Scientific, Model 801MOD (7912151-2)
MULTIMETER	Range: 0 to 20 V dc Accuracy: $\pm 1\%$	Hewlett-Packard, Model 3458A (3458A)
RESISTANCE MEASURING SYSTEM	Range: 10 and 100 k Ω Accuracy: $\pm 0.00125\%$	Electro Scientific, Model SP2980 (MIS-10281)
VOLTAGE DIVIDER	Linearity: ± 0.25 ppm	Electro Scientific, Model RV726 (MIS-10295)

**SECTION III
CALIBRATION PROCESS FOR MODELS DV4107C AND RV722**

6. Preliminary Instructions

a. Personnel should become familiar with the entire bulletin before beginning this 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.

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.

7. Input Resistance

a. Performance Check

(1) Connect resistance measuring system to TI input HI and LO terminal, using leads supplied with resistance measuring system.

(2) Measured resistance will be within $\pm 0.005\%$ of nominal value.

b. Adjustments. No adjustments can be made.

8. Decade Linearity

a. Performance Check

(1) Connect equipment as shown in figure 1, connection A.

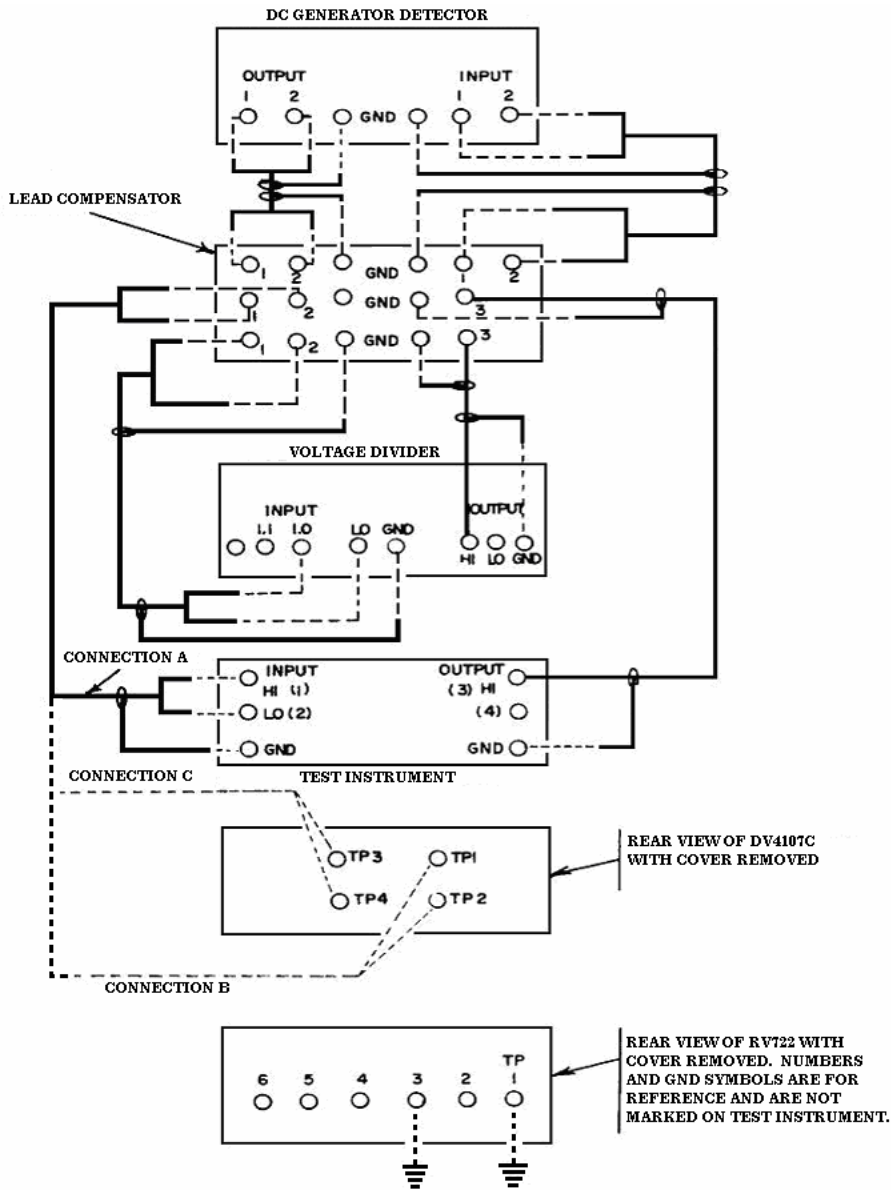


Figure 1. Decade linearity - equipment setup.

(2) Turn TI decade dials to **.999999X** and voltage divider decade dials to **.999999 TEN**.

(3) Energize dc generator detector and adjust output for +20 V dc, using multimeter.

(4) Adjusted lead compensator BALANCE 1 control for a null indication on dc generator detector meter.

CAUTION

Prior to changing TI or voltage divider decade dials set dc generator detector GENERATOR OUTPUT +/-OFF/- switch to OFF. After decade dials have been changed, set generator detector GENERATOR OUTPUT +/-OFF/- switch to + (positive).

- (5) Turn TI decade dials to **.0000000** and voltage divider decade dials to .0000000.
- (6) Adjust lead compensator BALANCE 2 control for a null indication on dc generator detector meter.
- (7) Repeat (2) through (6) above until no further adjustment of lead compensator is required.
- (8) Turn TI decade dials to **.9000000** and voltage divider decade dials to .9000000.
- (9) Adjust voltage divider decade dials for a null indication on dc generator detector meter. Voltage divider decade dials will indicate between .8999990 and .9000010.
- (10) Repeat technique of (8) and (9) above, using settings listed in table 3. Voltage divider decade dials will indicate within limits specified.

Table 3. Most Significant Decade Switch Linearity Check

Test instrument decade dial settings	Voltage divider decade dial indications	
	Min	Max
.8000000	.7999990	.8000010
.7000000	.6999990	.7000010
.6000000	.5999990	.6000010
.5000000	.4999990	.5000010
.4000000	.3999990	.4000010
.3000000	.2999990	.3000010
.2000000	.1999990	.2000010
.1000000	.0999990	.1000010
.899999X	.8999990	.9000010
.799999X	.7999990	.8000010
.699999X	.6999990	.7000010
.599999X	.5999990	.6000010
.499999X	.4999990	.5000010
.399999X	.3999990	.4000010
.299999X	.2999990	.3000010
.199999X	.1999990	.2000010

NOTE

Initially adjust voltage divider decade dials for same indication as TI.

- (11) Connect equipment as shown in figure 1, connection B.
- (12) Adjust dc generator detector controls for a 10 V dc output, using multimeter.

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(13) Turn TI decade dials to **.099999X** and voltage divider decade dials to .999999 TEN.

(14) Adjust lead compensator BALANCE 1 control for a null indication on dc generator detector meter.

(15) Repeat (5) through (7) above.

(16) Turn TI decade dials to **.0900000** and voltage divider decade dials to .9000000.

(17) Adjust voltage divider decade dials for a null indication on dc generator detector meter. Voltage divider decade dials will indicate between .8999900 and .9000100.

(18) Repeat technique of (16) and (17) above, using settings listed in table 4. Voltage divider decade dials will indicate within limits specified.

Table 4. Second Most Significant Decade Switch Linearity Check

Test instrument decade dial settings	Voltage divider decade dial initial settings	Voltage divider decade dial indications	
		Min	Max
.0800000	.8000000	.7999900	.8000100
.0700000	.7000000	.6999900	.7000100
.0600000	.6000000	.5999900	.6000100
.0500000	.5000000	.4999900	.5000100
.0400000	.4000000	.3999900	.4000100
.0300000	.3000000	.2999900	.3000100
.0200000	.2000000	.1999900	.2000100
.0100000	.1000000	.0999900	.1000100

(19) Connect equipment as shown in figure 1, connection C.

(20) Turn TI decade dials to **.009999X** and voltage divider decade dials to .999999 TEN.

(21) Adjust lead compensator BALANCE 1 control for null on dc generator detector meter.

(22) Repeat (5) through (7) above.

(23) Turn TI decade dials to **.0099999** and voltage divider decade dials to .9999900.

(24) Adjust voltage divider decade dials for a null indication on dc generator detector meter. Voltage divider decade dials will indicate between .9998900 and 1.0000900.

(25) Repeat technique of (23) and (24) above, using settings listed in table 5. Voltage divider decade dials will indicate within limits specified.

b. Adjustments. No adjustments can be made.

Table 5. Lower Decade Switches Linearity Check

Test instrument decade dial settings	Voltage divider decade dial initial settings	Voltage divider decade dial indications	
		Min	Max
.0088888	.8888800	.8887800	.8889800
.0077777	.7777700	.7776700	.7778700
.0066666	.6666600	.6665600	.6667600

Table 5. Lower Decade Switches Linearity Check - Continued

Test instrument decade dial settings	Voltage divider decade dial initial settings	Voltage divider decade dial indications	
		Min	Max
.0055555	.5555500	.5554500	.5556500
.0044444	.4444400	.4443400	.4445400
.0033333	.3333300	.3332300	.3334300
.0022222	.2222200	.2221200	.2223200
.0011111	.1111100	.1110100	.1112100

9. 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

0710901

Distribution:

To be distributed in accordance with STD IDS No. RLC-1500, 2 January 2003, requirements for calibration procedure TB 9-4935-214-40.

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.

