*TB 9-6625-1878-40

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR RATIO TRANSFORMER GERTSCH, MODELS RT2, RT5, RT7R, TF515/U (RT 60), TF384/U (RT 7), AND NORTH ATLANTIC, MODEL RB503/10S1702 AND DECADE TRANSFORMER ESI, MODEL DT72A

Headquarters, Department of the Army, Washington, DC
9 April 2008

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 9-6625-1878-50, dated 20 January 1992.

SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Ratio Transformer Gertsch, Models RT2, RT5, RT7R, TF515/U (RT 60), TF384/U (RT 7), and North Atlantic Model RB503/10S1702 and Decade Transformer ESI, Model DT72A. 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 the text.

b. Time and Technique. The time required for this calibration is approximately 2 hours, using the dc and low frequency.

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
Ratio: Gertsch, Models RT2, RT5, RT7R, RT11R, RT12R, TF515/U (RT60), TF384/U (RT7), and North Atlantic, Model RB503/10S1702	Range: 0.0 to 1.0 Ratio accuracy: 50 Hz to3 kHz[1] ±(0.001% + 0.0001% / ratio) 3 kHz to 10 kHz[1] ±(0.01% + 0.001% / ratio)
ESI, Model DT72A	Range: 0.0100000 to 1.0000000 Terminal linearity[1, 2]: 50 Hz and 1 kHz Settings: 0.1 to 1.1111110 ± 0.5 ppm Settings: 0.0111111 to 0.1 ±(0.5 (10 x setting)[1, 2] + 0.01) ppm

[1]Procedure limitations: calibrated at 50 Hz to 1 kHz only.
[2]Terminal linearity derated to ± 0.001% by Engineering Directorate, USATA.

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 Calibration Standards Set SSN 4931-621-7878 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 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 accessories are also required for this calibration: Null Detector General Radio, Model 1232A (8616466-1) and Phase Compensator ESI, Model PC874 (MIS-10242).

Table 2. Minimum Specification of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
DECADE TRANSFORMER	Range: 0.0099900 to 1.0000099 Accuracy: ± 2.5 ppm	ESI, Model DT72A (7915908)
OSCILLATOR	Range: 10 V, 50 Hz and 1 kHz	General Radio, Model 1311A (7910432)

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 the manufacturers' 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 step within the performance checks where applicable.

a. Connect equipment as shown in figure 1 (for ESI, Model DT72A) or figure 2 (for all other models).

b. Energize equipment and allow sufficient time for temperature stabilization.

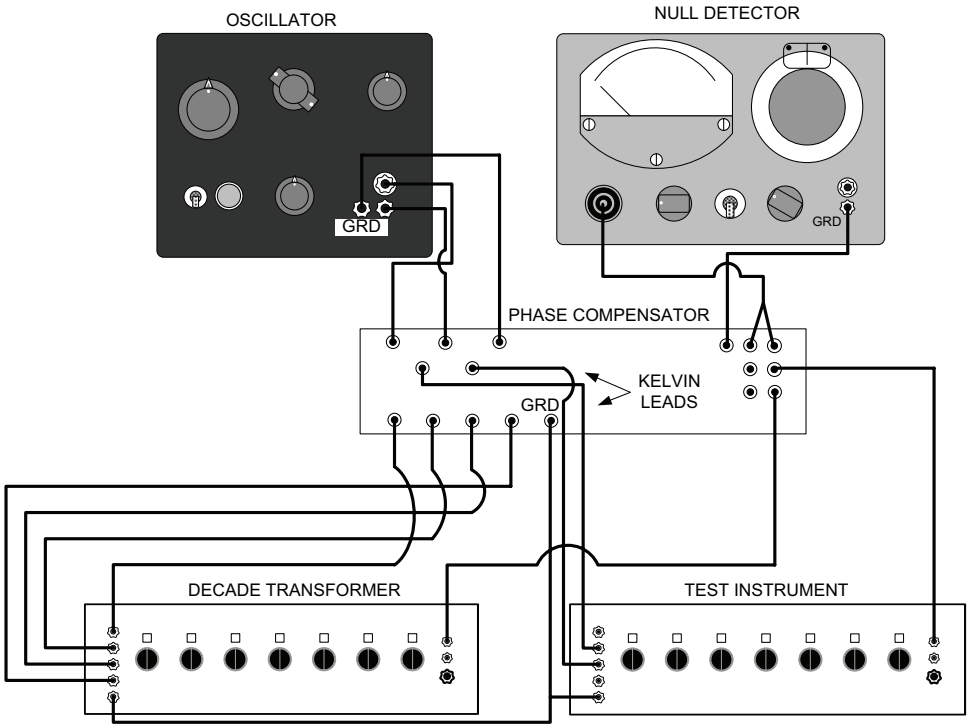

Figure 1. Terminal linearity – equipment setup.

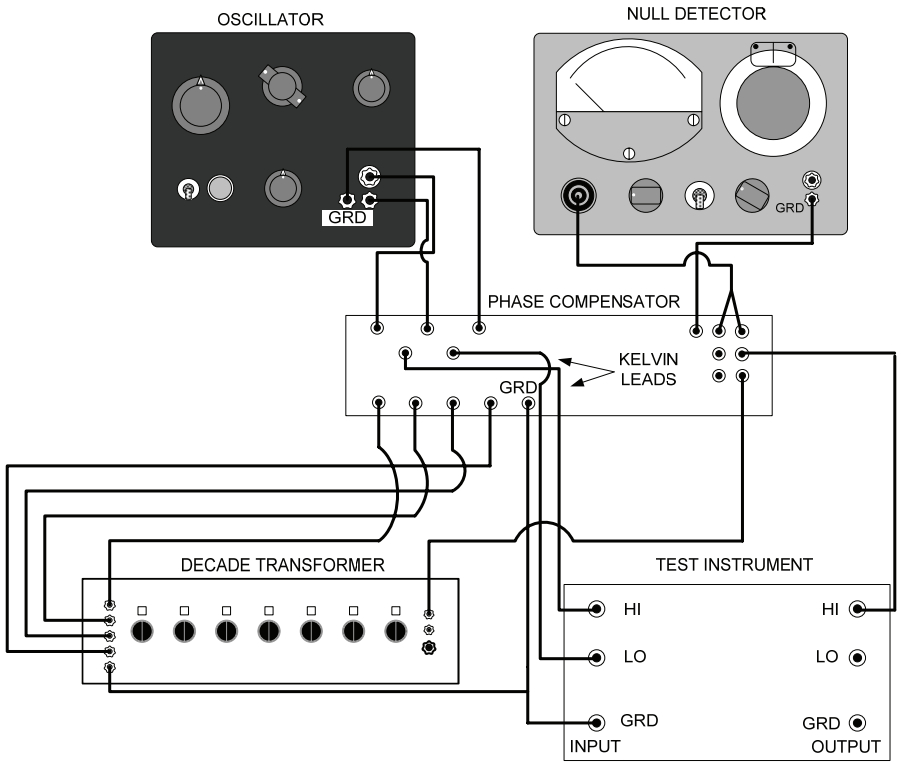

Figure 2. Ratio accuracy – equipment setup.

8. Terminal Linearity (ESI, Model DT72A Only)

a. Performance Check

(1) Adjust oscillator and null detector for 1 kHz operation with approximately 10 V output.

(2) Set TI dials to 0.9000000 and set decade transformer to 0.9000000.

(3) Adjust decade transformer and phase compensator for best null on null detector. Decade transformer will indicate between 0.8999900 and 0.9000100.

NOTE

Refer to decade transformer calibration test report for corrections.

(4) Repeat technique of (2) and (3) above for each setting listed in table 3. Decade transformer indication will be within limits specified.

(5) Repeat technique of (1) through (4) above with oscillator set at 50 Hz.

b. Adjustments. No adjustments can be made.

Table 3. Terminal Linearity (ESI, Model DT72A)

Test instrument settings	Decade transformer indications	
	Min	Max
0.8000000	0.7999900	0.8000100
0.7000000	0.6999900	0.7000100
0.6000000	0.5999900	0.6000100
0.5000000	0.4999900	0.5000100
0.4000000	0.3999900	0.4000100
0.3000000	0.2999900	0.5000100
0.2000000	0.1999900	0.2000100
0.1000000	0.0999900	0.1000100
0.0900000	0.0899900	0.0900100
0.0800000	0.0799900	0.0800100
0.0700000	0.0699900	0.0700100
0.0600000	0.0599900	0.0600100
0.0500000	0.0499900	0.0500100
0.0400000	0.0399900	0.0400100
0.0300000	0.0299900	0.0300100
0.0200000	0.0199900	0.0200100
0.0100000	0.0099900	0.0100100
0.1111111	0.1111011	0.1111211
0.2222222	0.2222122	0.2222322
0.3333333	0.3333233	0.3333433
0.4444444	0.4444344	0.4444544
0.5555555	0.5555455	0.5555655
0.6666666	0.6666566	0.6666766
0.7777777	0.7777677	0.7777877
0.8888888	0.8888788	0.8888988
0.9999999	0.9999899	1.0000099

9. Ratio Accuracy

a. Performance Check

(1) Adjust oscillator and null detector for 1 kHz operation with approximately 10 V output.

(2) Set TI dials to 0.900000 (Gertsch, Models RT2 and TF515/U (RT60) only have five dials) and set decade transformer to 0.9000000.

(3) Adjust decade transformer and phase compensator for best null on null detector. Decade transformer will indicate between 0.8999900 and 0.9000100.

NOTE

Refer to decade transformer calibration test report for corrections.

(4) Repeat technique of (2) and (3) above for each setting listed in table 4. Decade transformer indication will be within limits specified.

(5) Repeat technique of (1) through (4) above with oscillator set at 50 Hz.

b. Adjustments. No adjustments can be made.

Table 4. Ratio Accuracy'[1]

Test instrument settings	Min	Max
0.800000	0.7999910	0.8000090
0.700000	0.6999920	0.7000080
0.600000	0.5999930	0.6000070
0.500000	0.4999940	0.5000060
0.400000	0.3999950	0.4000050
0.300000	0.2999960	0.5000040
0.200000	0.1999970	0.2000030
0.100000	0.0999980	0.1000020
0.090000	0.0899981	0.0900019
0.080000	0.0799982	0.0800018
0.070000	0.0699983	0.0700017
0.060000	0.0599984	0.0600016
0.050000	0.0499985	0.0500015
0.040000	0.0399986	0.0400014
0.030000	0.0299987	0.0300013
0.020000	0.0199988	0.0200012
0.010000	0.0099989	0.0100011
0.111111 (0.11111)	0.1111089 (0.1111079)	0.1111131 (0.1111121)
0.222222 (0.22222)	0.2222188 (0.2222168)	0.2222252 (0.2222232)
0.333333 (0.33333)	0.3333287 (0.3333257)	0.3333373 (0.3333343)
0.444444 (0.44444)	0.4444386 (0.4444346)	0.4444494 (0.4444454)
0.555555 (0.55555)	0.5555484 (0.5555434)	0.5555616 (0.5555566)
0.666666 0(.66666)	0.6666583 (0.6666523)	0.6666737 (0.6666677)
0.777777 (0.77777)	0.7777682 (0.7777612)	0.7777858 (0.7777788)
0.888888 (0.88888)	0.8888781 (0.8888701)	0.8888979 (0.8888899)
0.999999 (0.99999)	0.9999880 (0.9999790)	1.0000100 (1.0000010)

'Settings and indications in parenthesis are for Gertsch, Models RT2 and TF51 51U (RT60).

10. 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

0804605

Distribution:

To be distributed in accordance with STD IDS No. RLC-1500, 2 January 2003, requirements for calibration procedure TB 9-6625-1878-40.

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.