*TB 9-4920-453-24

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR VIBRATION MONITORING KIT CONSOLIDATED ELECTRODYNAMICS TYPE 1-117

Headquarters, Department of the Army, Washington, DC
5 September 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 9-4920-453-35, dated 27 April 1987, including all changes.

SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Vibration Monitoring Kit, Consolidated Electrodynamics, Type 1-117. The manufacturer's manual and TM 55-4920-243-15 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. None

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. Forms, records, and reports required for calibration personnel at all levels are prescribed by TB 750-25.

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 requirement	115 V ±10%; 50, 60 or 400 Hz; 30 W
Displacement measurement normal sensitivity range (DX1) frequency response	Range: 50 to 1000 Hz Accuracy: ±4% (without filter input)
Sensitivity	0.005-in. p-p displacement for FS indication (maximum attenuation)
Displacement measurement high sensitivity range (DX0.1) frequency response	Range: 50 to 100 Hz Accuracy: ± 4% (without filter input)
Sensitivity	0.0005-in. p-p displacement for FS indication (unattenuated)
Velocity measurement, high sensitivity range (VX0.1) frequency response	Range: 5 to 5000 Hz Accuracy: ± 3% (without filter input)
Sensitivity	FS indication for any input from 25 to 180 mV
Linearity	± 3% of FS at all frequencies
Input line-voltage change	Maximum input line voltage change will cause less than 2% change in amplifier gain

NOTE

Calibration of vibration transducers cannot be accomplished at the transfer level. Transducers are calibrated in accordance with instructions provided in TB 43-180.

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.

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
AUTOTRANSFORMER	Range: 105 to 125 V ac Accuracy: ± 1%	Ridge, Model 9020A (9020A)
CALIBRATOR	Range: 50 to 1000 Hz 0 to 800 mV ac Accuracy: ±1%	Fluke, Model 5720A (5720A) (p/o MIS-35947)

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 manufacturer's manual and TM 55-4920-243-15 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. Connect TI to autotransformer and connect autotransformer to 115 V ac source.

b. If necessary, turn adjusting screw, located below meter face, for a 0 indication on meter.

c. Position controls as listed in (1) through (5) below:

(1) **CALIBRATE SIGNAL** control fully ccw.

(2) **SENSITIVITY** controls 1, 2, 3, and 4 fully ccw.

(3) **CHANNEL** switch to 1.

(4) **INPUT NETWORK** switch to **OUT**.

(5) **RANGE** switch to **OFF**.

d. Set power switch to on (upper) position and allow approximately 15 minutes for equipment to warm-up and stabilize.

8. Velocity Displacement and Stability

a. Performance Check

(1) Connect calibrator to TI **INPUT CHANNEL 1** pins 1 (–) and 2 (+) (located on rear of TI) using appropriate electrical leads.

(2) Set **OPERATION** switch to **C** position and **RANGE** switch to 5.

(3) Press and adjust **CALIBRATE SIGNAL** control for a full-scale meter indication and release.

(4) Set **SENSITIVITY** control, for channel being tested, to obtain full-scale indication on meter.

(5) Set **OPERATION** switch to **VX1.0**.

(6) Adjust calibrator for output of 500 Hz.

(7) Adjust calibrator output level for full-scale indication on TI meter. Calibrator output will be between 799.7 and 866.3 mV.

(8) Vary autotransformer between 105 and 125 V. The TI indication remains within 2% of full-scale.

(9) Adjust autotransformer to 115 V.

(10) Set calibrator output to minimum.

(11) Set **OPERATION** switch to **VX0.1** and adjust calibrator output for a full-scale indication on TI meter. Calibrator output will be between 79.97 and 86.63 mV.

(12) Set **OPERATION** switch to **DX1.0** and adjust calibrator output for full-scale indication to TI meter. Calibrator output will be between 799.7 and 866.3 mV.

(13) Adjust calibrator output to minimum.

(14) Set **OPERATION** switch to **DX0.1** and adjust calibrator output for full-scale indication on TI meter. Calibrator output will be between 79.97 and 86.63 mV.

(15) Repeat steps (1) through (14) above for remaining three channels of TI.

b. Adjustments. No adjustments can be made.

9. Integrator Network Calibration

a. Performance Check

(1) Set **OPERATION** switch to **DX1.0**.

(2) Adjust calibrator for a frequency of 1000 Hz and output amplitude for full-scale indication on TI meter.

(3) Record indication on calibrator.

(4) Set **RANGE** switch to **15**.

(5) Adjust calibrator for frequency of 500 Hz, and output amplitude for an indication of 10 on TI meter. Calibrator will indicate within ±4 percent of value recorded in (3) above.

(6) Set **RANGE** switch to **50**.

(7) Adjust calibrator for frequency of 250 Hz, and output amplitude for an indication of 20 on TI meter. Calibrator will indicate within ±4% of value recorded in (3) above.

(8) Adjust calibrator for frequency of 100 Hz, and output amplitude for an indication of 50 on TI meter. Calibrator will indicate within ±4 percent of value recorded in (3) above.

(9) Set **RANGE** switch to **150**.

(10) Adjust calibrator for frequency of 50 Hz, and output amplitude for an indication of 100 on TI meter. Calibrator will indicate within ±4 percent of value recorded in (3) above.

(11) Set **RANGE** switch to **500**.

(12) Adjust calibrator output amplitude for an indication of 3 on upper scale of TI meter. Calibrator will indicate 3 times value recorded in (3) above, ±4 percent.

(13) Set **RANGE** switch to **1500**.

(14) Adjust calibrator output amplitude for an indication of 10 on lower scale of TI meter. Calibrator will indicate 10 times value recorded in (3) above, ±4 percent.

b. Adjustments. No adjustments can be made.

10. Amplifier Noise Check

a. Performance Check

(1) Disconnect **INPUT** signal.

(2) Set **RANGE** switch to **OFF** and set **SENSITIVITY** control for channel being tested fully cw.

(3) Set **OPERATION** switch to each velocity and displacement position and note meter indications.

(4) Meter will not indicate more than 1 division on 0 to 5 scale (±2 percent of full scale).

b. Adjustments. No adjustments can be made.

11. Final Procedure

a. Deenergize and disconnect all equipment and reinstall protective cover on 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.
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0819107

Distribution:

To be distributed in accordance with the initial distribution number (IDN) 342055, requirements for calibration procedure TB 9-4920-453-24.

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.