TB 9-4920-453-35

CHANGE 1

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

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

Headquarters, Department of the Army, Washington, DC
18 June 2001

Approved for public release; distribution is unlimited.

TB 9-4920-453-35, dated 27 April 1987 is changed as follows:

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page.

Remove pages	Insert pages
1 and 2	1 and 2
5 and 6	5 and 6

2. File this change sheet in front of the publication for reference purposes.

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Distribution:

To be distributed in accordance with IDN 343740, requirements for calibration procedure TB 9-4920-453-35.

*TB 9-4920-453-35

SUPERSEDED COPY DATED 23 AUGUST 1973

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REPORTING OF ERRORS

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedure, please let us know. Mail your letter or DA Form 2028 to: Commander, U. S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5230. 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 FAX 256-842-6546/DSN 788-6546.

CHANGE 1

*This bulletin supersedes TB 55-4920-246-50, 23 August 1973, 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 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 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-287. 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.

5. Accessories Required. Accessories required for this calibration are issued as indicated in paragraph 4, and must be selected by the calibrator.

Table 2. Minimum Specifications of Equipment Required

Item	Common name	Minimum use specifications	Manufacturer and model (part number)
A1	AC CALIBRATOR	Range: 50 to 1000 Hz 0 to 800 mV ac Accuracy: 1%	Hewlett-Packard, Model 745AOPTC93 (745AOPTC93) w/HV amplifier C90-746A (C90-746A)
A2	AUTOTRANSFORMER	Range: 105 to 125 V ac Accuracy: ± 1%	General Radio, Model W10MT3AS3 or Ridge, Model 9020F (7910809)

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 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.

a. Connect TI to autotransformer (A2) and connect autotransformer to 115-V ac source.

b. If necessary, turn adjusting screw, located below meter face, for 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 ac calibrator (A1) 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 ac calibrator for output of 500 Hz.

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

(8) Vary autotransformer (A2) between 105 and 125 V. The TI indication remains within 2% of full-scale.

(9) Adjust autotransformer to 115 V.

(10) Adjust ac calibrator output to minimum.

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

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

(13) Adjust ac calibrator output to minimum.

(14) Set **OPERATION** switch to **DX0.1** and adjust ac calibrator output for full-scale indication on TI meter. Ac 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 ac calibrator for a frequency of 1000 Hz and output amplitude for full-scale indication on TI meter.

(3) Record indication on ac calibrator.

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

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

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

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

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

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

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

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

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

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

(14) Adjust ac calibrator output amplitude for an indication of 10 on lower scale of TI meter. Ac 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.

TB 9-4920-453-35

By Order of the Secretary of the Army:

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Distribution:
To be distributed in accordance with DA Form 12-34C, Block No. 319, requirements for calibration procedures publications.

*U.S. GOVERNMENT PRINTING OFFICE: 1987-733-951/40609

PIN NO: 061839-001