

***TB 9-6680-286-35**

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR CENTRIFUGAL HAND-HELD MECHANICAL TACHOMETER (GENERAL)

Headquarters, Department of the Army, Washington, DC
24 July 1985

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		Paragraph	Page	
SECTION	I.	IDENTIFICATION AND DESCRIPTION		
		Test instrument identification.....	1	2
		DA Form 2416 (Calibration Data Card)	2	2
		Calibration description.....	3	2
	II.	EQUIPMENT REQUIREMENTS		
		Equipment required	4	2
		Accessories required	5	3
	III.	CALIBRATION PROCESS		
		Preliminary instructions	6	3
		Equipment Setup.....	7	4
	Rpm.....	8	5	
	Final procedure.....	9	6	

*This bulletin supersedes TB 9-6680-286-50, 19 July 1974, including all changes.

**SECTION I
IDENTIFICATION AND DESCRIPTION**

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Centrifugal Hand-Held Mechanical Tachometer (General). The manufacturer's manual and MIL-T-16049B 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 1 hour, using the physical technique.

2. DA Form 2416 (Calibration Data Card)

a. Forms, records, and reports required for calibration personnel at all levels are prescribed by TB 750-25. DA Form 2416 must be annotated in accordance with TB 750-25 for each calibration performed.

b. Adjustments to be reported on DA Form 2416 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
Rpm	Low range: 50 to 500 rpm (increments of 2) Medium range: 500 to 5000 rpm (increments of 20) High range: 5000 to 50,000 rpm Accuracy: $\pm 2\%$ of FS

**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. 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. The accessories listed in table 3 are issued as indicated in paragraph 4 above and are used in this calibration procedure. When necessary, these items may be substituted by equivalent items, unless specifically prohibited.

Table 2. Minimum Specifications of Equipment Required

Item	Common name	Minimum use specifications	Manufacturer and model (part number)
A1	FREQUENCY COUNTER	Range: 11.765 to 150 ms Accuracy: ± 0.5%	Hewlett-Packard Model 5345A (MIS-28754/1 Type 1) w/5355A and K87-59992A

Table 3. Accessories Required

Item	Common name	Description (part number)
B1	MOTIONAL PICKUP TRANSDUCER	(7913463)
B2	TACHOMETER CALIBRATOR	Stewart-Warner, Model ST1-650H-1, 650A or 650H (7910009)

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 tables 2 and 3. For the identification of equipment referenced by item numbers prefixed with A, see table 2, and for prefix B, see table 3.

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.

NOTE

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 MIL-T-16049B for this TI.

NOTE

Unless otherwise specified, all controls and control settings refer to the TI.

7. Equipment Setup

- a. Remove rear cover of tachometer calibrator (B2).
- b. Remove light bulb from tachometer calibrator.
- c. Ascertain that flywheel of tachometer calibrator, model 650A (or drive shaft of model 650H) is divided into two equal parts and that one part is painted white and the other black.
- d. Connect equipment as shown in figure 1.

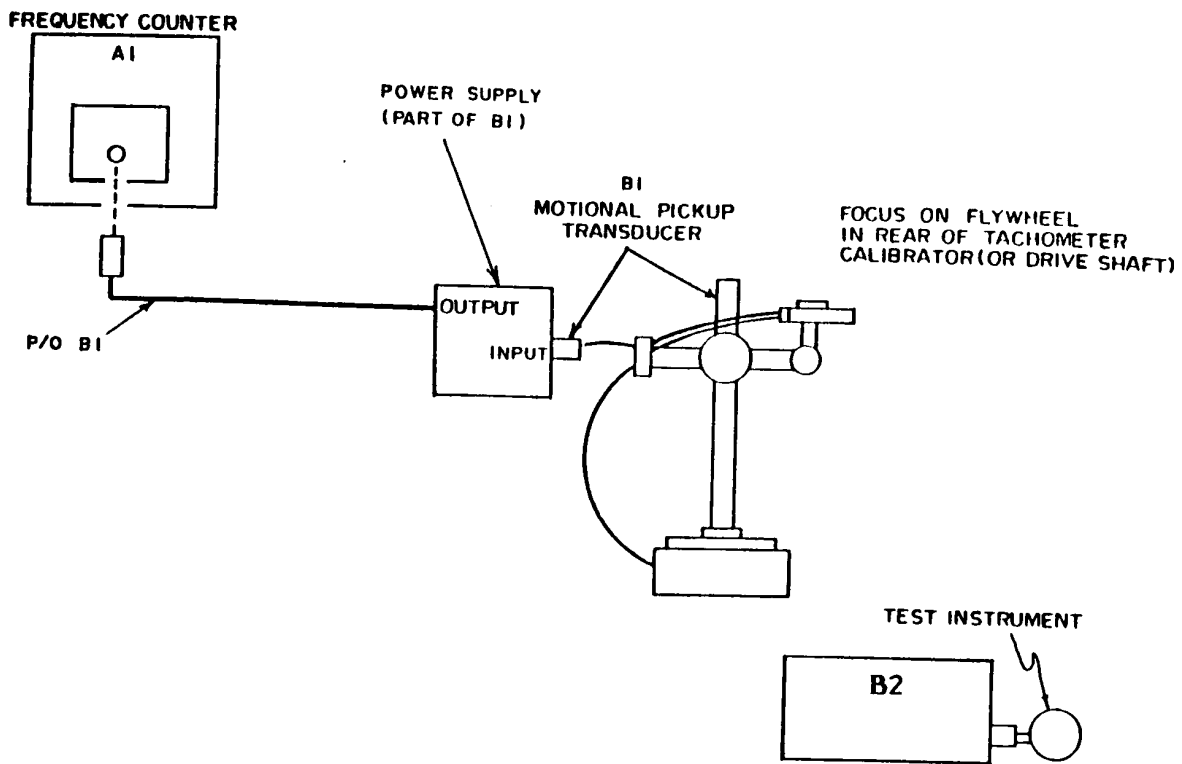


Figure 1. Tachometer - accuracy setup.

- e. Attach drive adapter, 1 to 1 ratio (component of tachometer calibrator), to drive of tachometer calibrator and set so that output is in a horizontal plane.

- f.** Connect frequency counter (A1) and power supply (part of (B1)) to a 115-V ac source.
- g.** Energize equipment and allow approximately 30 minutes for warm-up and stabilization.
- h.** Remove TI and accessories from carrying case.
- i.** Rotate drive shaft of TI by hand to insure that it turns freely.
- j.** Attach small conical rubber tip on drive shaft of TI.
- k.** Visually inspect TI wheel for excessive wear, nicks, or abrasions.

8. Rpm

a. Performance Check

- (1) Set RANGE switch on TI to L.
- (2) Holding TI in a horizontal position, insert conical tip into drive of tachometer calibrator (B2), applying just enough pressure to rotate tip without slippage.
- (3) Adjust tachometer calibrator slow-fast control until TI reads 500 rpm (white scale). Frequency counter (A1) will indicate between 117.65 and 122.45 ms.
- (4) Set RANGE switch on TI to M.
- (5) Repeat technique of (2) above and adjust tachometer calibrator and take readings as indicated in table 4 which are applicable to range switch setting M.

CAUTION

Approach full-scale output of tachometer calibrator cautiously to avoid pegging self-contained tachometer.

Table 4. Rpm Accuracy Check

Test instrument indications (Rpm)	Frequency counter indications (mS)	
	Min	Max
1000	54.545	66.667
2000	28.571	31.579
2500	23.077	25.000
3000	19.355	20.690
3500	16.667	17.647
4000	14.634	15.385
4500	13.044	13.636
5000	11.765	12.245

TB 9-6680-286-35

(6) Turn drive adapter of tachometer calibrator 90 degrees so that output is in a vertical plane.

(7) Repeat (1) through (5) above, holding TI in a vertical position.

b. Adjustments. No adjustments can be made.

9. Final Procedure

a. Deenergize and disconnect all equipment.

b. When all parameters are within tolerance, annotate and affix DA Label 80 (US Army Calibrated Instrument). When the TI receives limited or special calibration, annotate and affix DA Label 163 (US Army Limited or Special Calibration). When the TI cannot be adjusted within tolerance, repair the TI in accordance with the maintenance manual. When repair is delayed for any reason or the TI cannot be repaired with local resources, annotate and affix DA Form 2417 (US Army Calibration System Rejected Instrument) and inform the owner/user accordingly in accordance with TB 750-25.

TB 9-6680-286-35

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief Of Staff

Official:

DON J. DELANDRO
Brigadier General, United States Army
The Adjutant General

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