

# \*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  
5 May 2004

*Distribution Statement A: Approved for public release; distribution is unlimited.*

### 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, 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](mailto: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 9-6680-286-35 dated 24 July 1985.

**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 was 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 1 hour, using the physical 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. 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 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. The following peculiar accessories are also required for this calibration: Motional Pickup Transducer, P/N 7913463 (6695-00-302-6923); and Tachometer Calibrator, P/N 7910009 (4931-00-071-5351).

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
FREQUENCY COUNTER	Range: 11.765 to 150 ms Accuracy: ± 0.5%	Fluke, Model PM6681/656 (PM6681/656)

### 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 tables 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.

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. Remove rear cover of tachometer calibrator.
- b. Remove light bulb from tachometer calibrator.
- c. Ascertain that flywheel or drive shaft of tachometer calibrator 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.

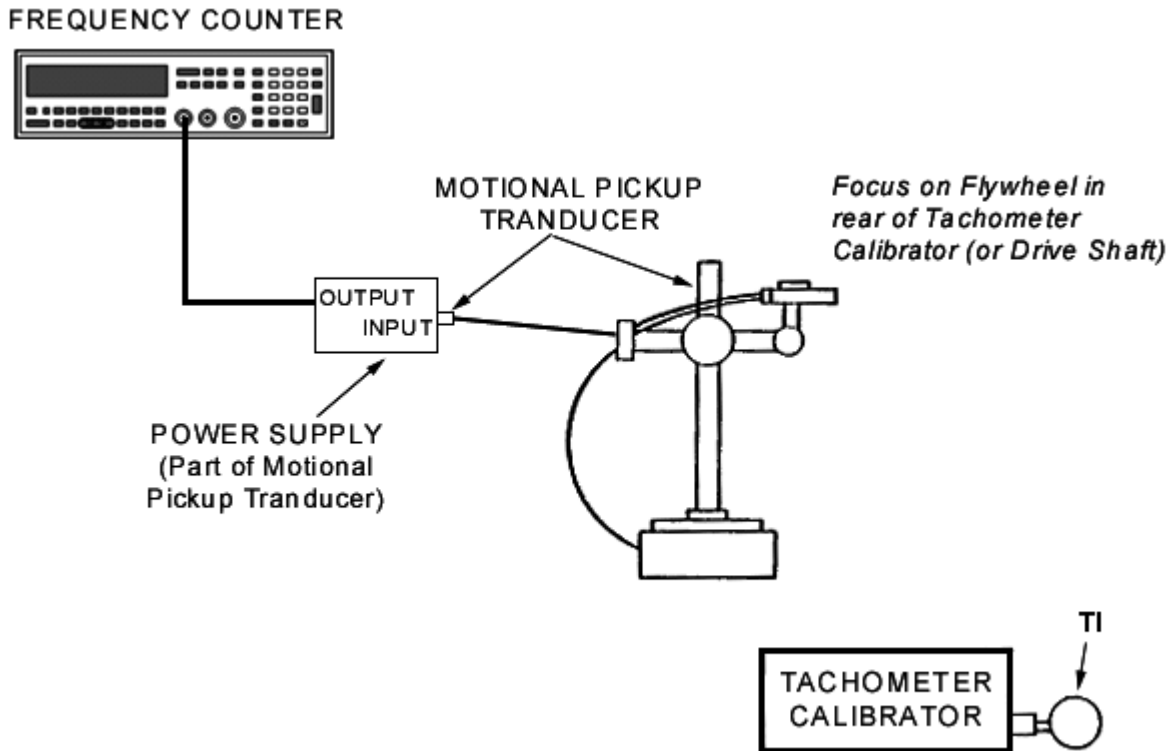


Figure 1. Tachometer - accuracy setup.

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 and power supply (part of motional pickup transducer) 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, 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 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 3 which are applicable to range switch setting M.

**CAUTION**

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

Table 3. 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

(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.** Annotate and affix DA label/form in accordance with TB 750-25.



By Order of the Secretary of the Army:

Official:

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Distribution:

To be distributed in accordance with the initial distribution number (IDN) 343100, requirements for calibration procedure TB 9-6680-286-35.





## 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](mailto: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.

