

*TB 9-6685-328-24

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR PYROMETER, INDICATING ALNOR INSTRUMENT CO., MODELS 4000 AND 4000A

Headquarters, Department of the Army, Washington, DC
21 October 2008

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, 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.

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*This technical bulletin supersedes TB 9-6685-328-35, 21 November 1985, including all changes.

SECTION I IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Pyrometer, Indicating, Alnor Instrument Co., Models 4000 and 4000A. 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. Scale ranges vary (see table 1).

b. Time and Technique. The time required for this calibration is approximately 1 hour, using the dc and low frequency and 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
Temperature: Model 4000	Range: 0 to 1200°F Accuracy: ±1% FS
Model 4000A	Range: 0 to 300°F Accuracy: ±2% 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, 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 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 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)
CALIBRATOR	Range: 0 to 50 mV dc Accuracy: $\pm 0.25\%$	Fluke, Model 5720A (5720A) (p/o MIS-35947)
RESISTANCE STANDARD	Range: 0 to 5 ohms Accuracy: $\pm 0.25\%$	Biddle-Gray, Model 71-631 (7910328)
THERMOMETER	Range: 68 to 104°F Accuracy: $\pm 0.2^\circ$	Azonix, Model A1012 (MIS 38958) w/Temperature Probe Instrulab, Model 4101- 10X

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 for this TI.

d. Unless otherwise specified, all control 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 TI from protective cover.
- b. Set in a horizontal position on a level bench.

- c. Place thermometer near TI and allow to stabilize at room temperature.
- d. Adjust TI to indicate temperature of thermometer by adjusting screw on face of meter.
- e. Connect test equipment to 115 V ac power source.
- f. Turn equipment power on and allow to warm-up for 15 minutes.

8. Temperature Indicator

a. Performance Check

- (1) Connect equipment as shown in figure 1.

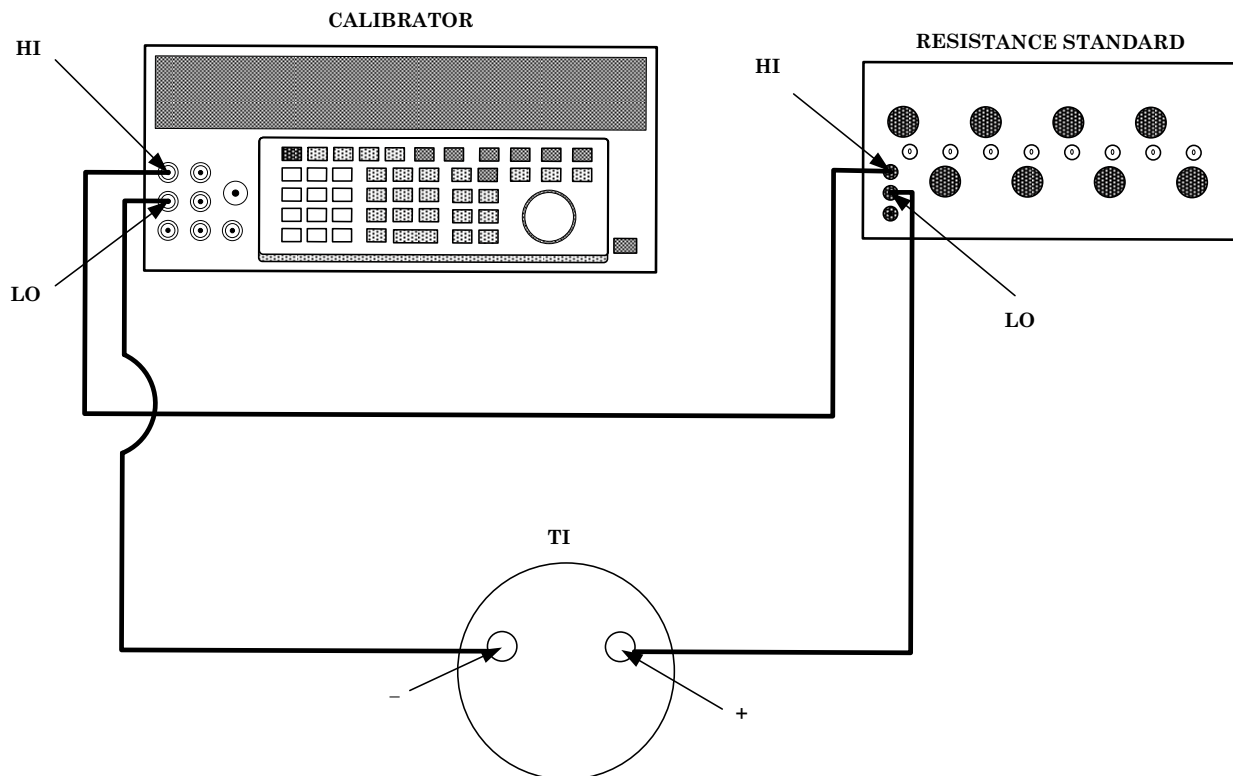


Figure 1. Pyrometer electrical test - equipment setup.

NOTE
Observe polarity.

- (2) Set resistance standard to the resistance value marked on the lower portion of the TI meter scale.

- (3) Adjust output of calibrator to produce the temperature reading on the first line of table 3 for model 4000 or the first line of table 4 for model 4000A. Calibrator will indicate within limits specified in table for that model.

(4) Repeat technique of (3) above for remaining indications listed in table 3 for model 4000, or table 4 for model 4000A. Dc voltage values will be within limits specified.

Table 3. Temperature Indicator Check (Model 4000 200 to 1200°F Range)

Test instrument indications (°F)	Calibrator (applied voltage in mV)	
	Min	Max
200	4.083	5.071
400	12.238	13.226
600	21.024	22.012
800	30.274	31.262
1000	39.591	40.579
1200	48.891	49.879

Table 4. Temperature Indicator Check (Model 4000A – 100 to 300°F Range)

Test instrument indications (°F)	Calibrator (applied voltage in mV)	
	Min	Max
100	0.701	1.043
150	2.507	2.849
200	4.406	4.748
250	6.384	6.726
300	8.386	8.728

b. Adjustments. None

9. 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:

Official:



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*Administrative Assistant to the
Secretary of the Army*

0823907

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Distribution:

To be distributed in accordance with the initial distribution number (IDN) 343114, requirements for calibration procedure TB 9-6685-328-24.

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

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