# TB 9-5210-214-35

**DEPARTMENT OF THE ARMY TECHNICAL BULLETIN**

# CALIBRATION PROCEDURE FOR DIAL INDICATORS TRANSFER LEVEL

Headquarters, Department of the Army, Washington, DC
29 July 2002

**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

You can help 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 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. You may also complete a digital DA Form 2028 appearing at: https://amcom2028.redstone.army.mil.

## SECTION I
## IDENTIFICATION AND DESCRIPTION

**1. Test Instrument Identification**. This bulletin provides instructions for the calibration of Dial Indicators Transfer Level. The manufacturer's instruction manual was used as the prime data source in compiling these instructions. The dial indicators will be referred to as the TI (test instrument) throughout this bulletin.

**a. Model Variations**. Variations among models are described in text.

**b. Time and Technique**. The time required for this calibration is approximately 0.5 hour for each TI 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 |
|---|---|
| Style[1]<br>A<br>Dovetail | <br>Spindle, parallel to dial<br>Mounting ridge perpendicular to dial |
| Type[1]<br>1<br>2<br>3<br>4 | <br>1/10000 (0.0001) inch graduations<br>5/10000 (0.0005) inch graduations<br>1/1000 (0.001) inch graduations<br>5/100000 (0.00005) inch graduations |
| Accuracy | ±1 graduation at any point within the range of the indicator except type 1 long range indicators (more than 2 1/3 revolutions) shall be ±1 graduation within the first 2 1/3 revolutions and ±5 graduations at any point beyond 2 1/3 revolutions |

[1]This specification is for information only and is not verified in this bulletin.

## SECTION II
## EQUIPMENT REQUIREMENT

**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 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.

**5. Accessories Required.** The accessories used in this calibration procedure are furnished with dial indicator calibrator (table 2).

Table 2. Minimum Specifications of Equipment Required.

| Common name | Minimum use specifications | Manufacturer, model and part number |
|---|---|---|
| DIAL INDICATOR CALIBRATOR | Range: 0.0 to 1 in.<br>Accuracy: ±0.000021 in. | ITALL Model 700 (13534036) |

Table 3. Accessories Required.

| Common name | Description (part number) |
|---|---|
| Dial indicator mounting fixture | Model 1[1] (590-001-00) for style A |
| Dial indicator mounting fixture | Model 2[1] (590-002-00) for dovetail style |

[1]See figure 1 below.

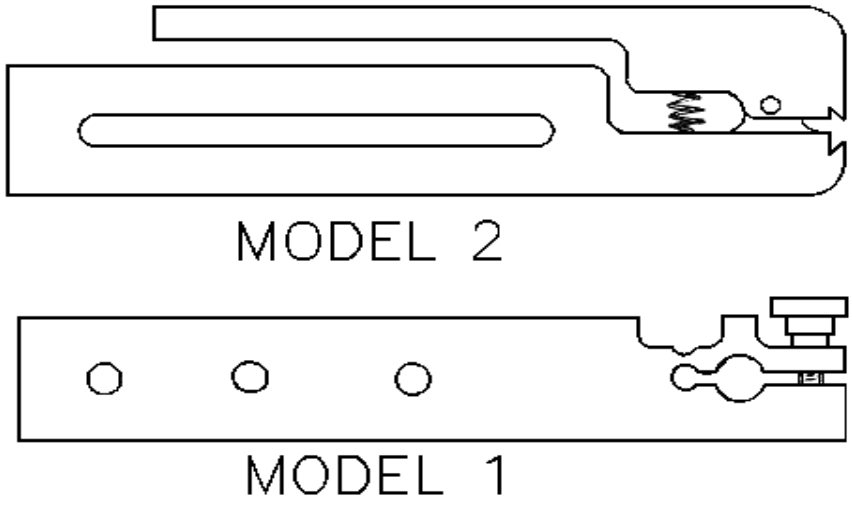


Figure 1. Mounting fixtures.

## SECTION III
## CALIBRATION PROCESS

### 6. Preliminary Instructions

**a.** The instructions outlined in this paragraph 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 and 3.

**c.** Unless otherwise specified, verify the results 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.

**a.** Loosen bezel locking screw (fig. 2) and rotate bezel 360°.

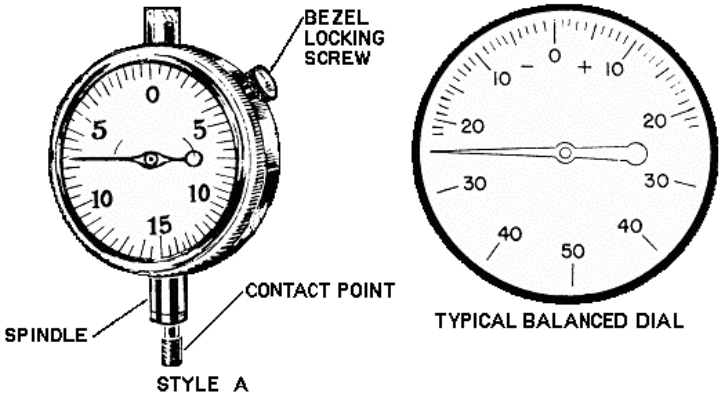


Figure 2. Dial indicator – typical views.

**b.** Verify that there is no interference between the hands, dial face, and crystal and that the contact point is tight on TI spindle.

**c.** Depress spindle or contact end to internal stop and release. Spindle or contact end should return to extended position freely and without hesitation.

**d.** Allow dial indicator calibrator and TI to stabilize to room temperature.

**e.** Connect equipment as shown in figure 3.

**WARNING**

Ensure that the dial indicator calibrator readout is connected to the sensor before performing the next step.

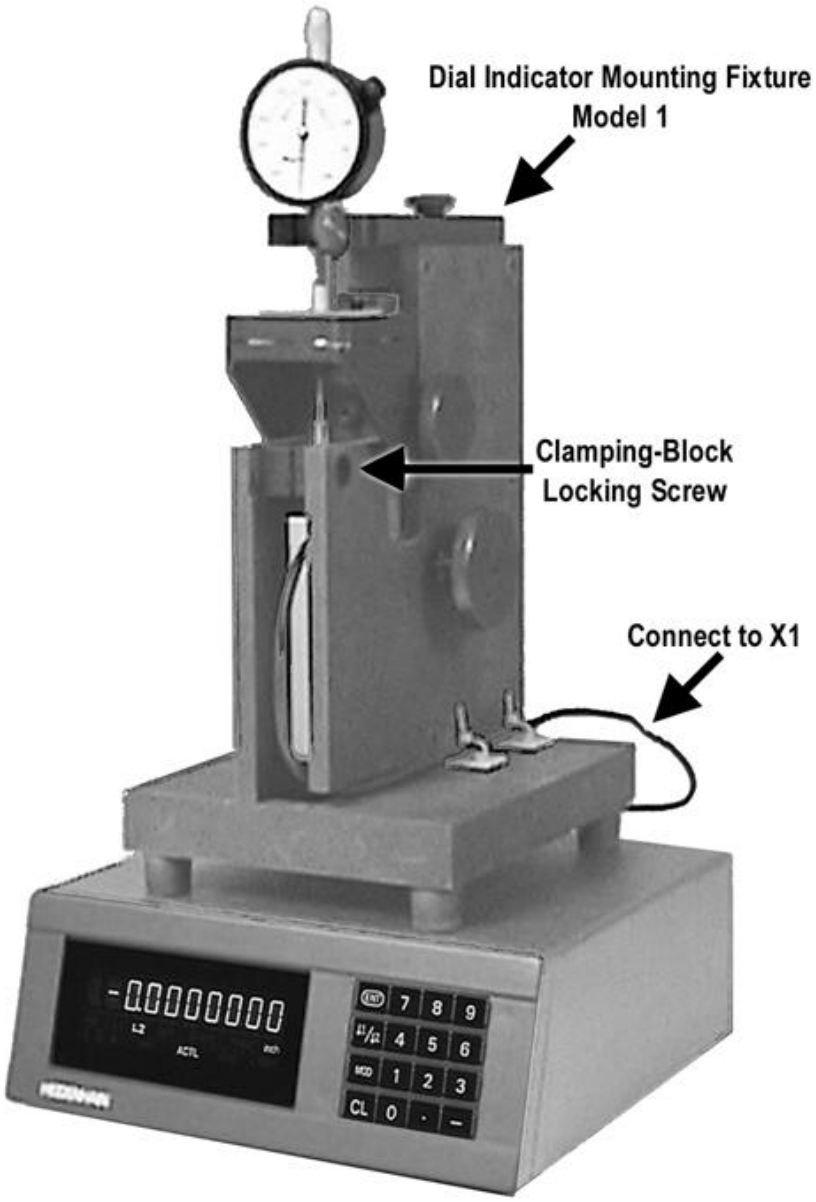


Figure 3. Dial indicator calibrator – equipment setup.

**f.** Connect indicator to 115 V ac power source. Turn power switch to on and allow dial indicator calibrator to warm up for 15 minutes.

**g.** Dial indicator calibrator readout will indicate **ENT...CL**; press **CL** twice. The indicator should indicate 0.0000000. The last three digits on the readout may continually fluctuate depending on the environmental conditions and the warm-up time allowed. The **ACTL** and **INCH** LEDs should be activated.

**NOTE**

If **ACTL** is not activated on the display then continue pressing **MOD** until **ACTL** flashes on display, then press **ENT** and **CL**. If any other indications are incorrect then see page 7, paragraph 4.6, of the dial indicator calibrator manual for proper programming.

**NOTE**

If the TI is graduated in millimeter steps rather than inches, see page 7, paragraph 4.6.2, of the dial indicator calibrator manual for proper programming.

**h**. Fasten TI to dial indicator calibrator, as shown in figure 3, using dial indicator mounting fixture supplied with TI and/or dial indicator calibrator.

**NOTE**

Ensure that the dial indicator calibrator contact surface remains in contact with the transducers contact point and the TI contact point is across the full range of the TI. This will allow use of the full 1 inch range of the transducer. If it is necessary to adjust the position of the transducer see note below.

**WARNING**

Do not loosen any screws on the left side of the clamping block. Loosening these screws will misalign the transducer and cause unwanted errors. Be careful not to pinch the cable.

**NOTE**

Adjustment procedure follows: Place the dial indicator calibrator (without indicator) in a horizontal (back down) position. Loosen the clamping-block locking screw (right-hand side - fig. 3) one-quarter turn counter clockwise, using a 3/16 inch Allen wrench. Position transducer as necessary; turn the clamping-block locking screw (fig. 3) one-quarter of a turn clockwise, using a 3/16 inch Allen wrench.

## 8. Accuracy

### a. Performance Check

(1) Ensure that the TI contact point is fully extended and that it is in contact with the contact surface of the dial indicator calibrator.

(2) Set the TI to the closest major division for a zero reference point by rotating the bezel. Press **CL** to zero the dial indicator calibrator.

(3) Adjust dial indicator calibrator until the first-numbered division (inward deflection) on the TI is obtained.

**CAUTION**

Any movement or vibration of the dial indicator stand, transducer, or TI may cause erroneous readings.

(4) The dial indicator calibrator readout should indicate the equivalent change within the limits specified in table 1.

(5) Repeat (3) and (4) above at 10 or more numbered divisions across the range of the TI.

(6) Adjust the dial indicator calibrator contact surface so that the TI contact point is fully compressed. Press **CL** to zero the dial indicator calibrator.

(7) Repeat (3) and (4) above at 10 or more numbered divisions across the range of the TI in an outward deflection.

(8) Check repeatability by adjusting dial indicator calibrator until TI reaches approximately mid range. Press the **CL** key to zero dial indicator calibrator readout.

(9) Adjust dial indicator calibrator to lowest limit then, readjust for zero indication on dial indicator calibrator readout. TI should read ±1 graduation. Repeat twice.

**b. Adjustments**. No adjustment 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:

ERIC K. SHINSEKI
*General, United States Army*
*Chief of Staff*

**OFFICIAL:**

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Distribution:

To be distributed in accordance with IDN 344784 requirements for calibration procedure TB 9-6625-2240-35.

**TB 9-6625-2282-35**

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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@avma27.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**: TB 9-6625-xxxx-35
9. **Pub Title**: Calibration Procedure for …
10. **Publication Date**:
11. Change Number:
12. **Submitted Rank**: MSG
13. **Sumitter 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.

PIN:  080012-000