TB 9-5120-207-35

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR TORQUE WRENCH RAYMOND ENGINEERING, INC. MODEL PD 730

Headquarters, Department of the Army, Washington, DC
4 February 1992

REPORTING OF ERRORS

You can help improve this publication by calling attention to errors and by recommending improvements and stating your reasons for the recommendations. Your letter or DA Form 2028, Recommended Changes to Publications, should be mailed directly to Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-TMD-EP, Redstone Arsenal, AL 35898-5000. FAX to DSN 788-2313 (commercial 256-842-2313). A reply will be furnished directly to you.

SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Torque Wrench, Raymond Engineering, Inc., Model PD 730. 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
Torque	Range: 0 to 300 ft-lbs Accuracy: ±2% of reading

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. 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 four-to-one accuracy will be listed and the actual accuracy of the equipment selected 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: Holding plate, APN 13335453; and socket wrench adapter, 1/2-inch to 3/4-inch, PN 11655788-3.

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
LOAD CELL INDICATOR	Range: 0 to 12,000 counts Accuracy: ±0.5% of indication	BLH, Model 8200B (MIS-23155)
TORQUE CELL	Range: 0 to 306 ft-lbs Accuracy: ± 0.5% of applied torque (±.5% of 20% FS below 20% FS)	Lebow Associates, Model 2133-126 (MIS-26485, Type 1, CL4)

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 controls and control settings refer to the TI.

7. Equipment Setup

a. Verify that TI is clean and free from defects that would impair its operation.

b. Ensure that equipment has been allowed to stabilize at ambient temperature.

c. Install holding plate, PN 13335453, on torque calibration fixture.

d. Install threaded extension handle on TI.

e. Insert torque cell square drive into 3/4-inch hole in calibration fixture.

f. Using 1/2-inch to 3/4-inch socket wrench adapter, P/N 11655788-3, connect TI to torque cell with extension handle protruding through elongated slot in holding plate.

g. Connect torque cell to load cell indicator, using cable supplied with load cell indicator.

h. Connect load cell indicator to appropriate power source. Set power switch to **ON** and allow units to warm up for 15 minutes.

i. Position controls on load cell indicator as listed in (1) through (5) below:

(1) **MULTIPLIER** switch to **1**.

(2) **SIG-REV** switch to + (positive).

(3) **INPUT MV/V** pushbutton to **3.6.**

(4) **NORMAL-PEAK** switch to **NORMAL.**

(5) Set **PERCENT/POUNDS** switch to **PERCENT** (located on rear panel).

j. Refer to cal factor and lin number settings and position load cell indicator controls as listed in (1) through (4) below:

(1) Set **MODE** switch to **ZERO** and adjust **BRIDGE ZERO** to **00000**.

(2) Set **MODE** switch to **CAL** and adjust **AMPL SPAN** to read proper cal factor.

(3) Set **MODE** switch to **LIN** and adjust **LINEARITY** to read proper lin number.

(4) Set **MODE** switch to **OPR** and adjust **BRIDGE ZERO** for **00000** indication.

NOTE

Set cal factor and lin number (note algebraic sign) with decimal point in place. If decimal point is not in the proper place during operation, it may be removed with a switch on the rear panel.

8. Torque

a. Performance Check

(1) Exercise TI as follows:

(a) Insert small ratchet (part of TI) into multiplier drive.

(b) Set ratchet on main drive to drive in nut-on direction (cw).

(c) Rotate TI hand crank in nut-on direction (cw) until TI indicates approximately 300 ft-lbs. After 30 seconds, reverse small ratchet and turn multiplier drive in opposite direction until TI indicates 0.

(d) Repeat (a) through (c) above two times.

NOTE

The calibration points must be approached in the direction of increasing torque. If calibration point is passed, reduce torque and approach calibration point again.

(2) Rotate TI hand crank in nut-on (cw) direction to obtain indications listed in table 3. Record load cell indicator indications.

NOTE

Whenever direction of torque is changed (cw or ccw), TI must be exercised three times.

(3) Repeat (1) and (2) above in nut-off (ccw) direction.

(4) If indications are not within the limits specified and indication errors are same in both cw and ccw directions, perform **b**(1) through (3) below.

(5) If indications are not within the limits specified and indication errors are not the same in both cw and ccw directions, perform **b**(4) below.

b. Adjustments

NOTE

Whenever direction of torque is changed (cw or ccw), TI must be exercised three times.

Table 3. Calibration

Test instrument indications (ft-lb)	Load cell indicator indication	
	Min	Max
50	49	51
100	98	102
150	147	153
200	196	204
250	245	255
300	294	306

(1) Remove lens retaining ring and lens from TI indicator (tape may aid in removing lens).

(2) Slip dial face for best in-tolerance compromise indications on all calibration points (R).

(3) Install lens and retaining ring.

(4) If TI indication error is not the same in both cw and ccw directions, adjust TI as indicated in (a) through (h) below.

(a) Remove TI from multiplier drive.

(b) Back off setscrews A and B until they are flush with the housing wall (fig. 1).

(c) Adjust setscrew A until a very slight indication of one or two ft-lbs is indicated on TI (indicator pointer just moves).

(d) Adjust setscrew B until a very slight indication of one or two ft-lbs is indicated on Ti (indicator pointer just moves).

(e) Back off setscrew A until flush with the side of the housing.

(f) Tighten setscrew B (count the turns) until a very slight pressure indication of one or two ft-lbs is indicated on TI (indicator pointer just moves).

(g) Back off setscrew B one half the turns counted in (f) above (R).

(h) Tighten setscrew A until a very slight indication of one or two ft-lbs is indicated on TI indicator (pointer just moves) (R).

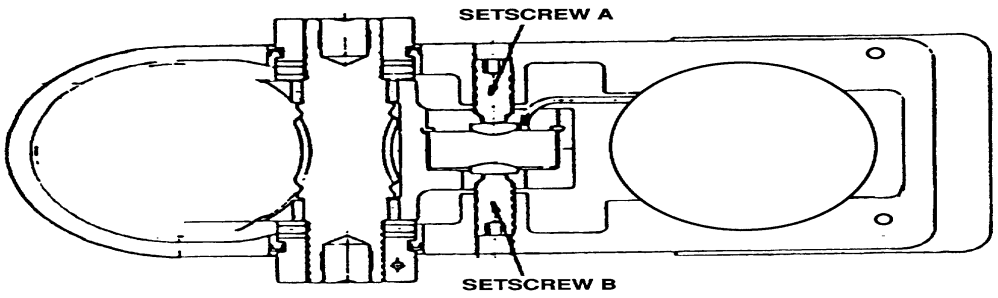

Figure 1. Calibration adjustments.

9. Final Procedure

a. Deenergize and disconnect all equipment.

b. Annotate and affix DA Label/Form in accordance with TB 750-25.

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By Order of the Secretary of the Army:

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