TB 9-5120-206-35

Change 1

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR TORQUE WRENCY POWER-DYNE, MODEL PD-602

Headquarters, Department of the Army, Washington, DC
23 October 1986

TB 9-5120-206-35, 17 October 1985, is changed as follows:

1. Remove old pages and insert new pages as indicated below. New or changed material is indicated by a vertical bar in the margin of the page.

Remove pages	Insert pages
1 and 2	1 and 2
5 and 6	5 and 6

2. File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

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

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

Distribution:
To be distributed in accordance with DA Form 12-34C, Block No. 319, requirements for calibration procedures publications.

PIN NO: 058760-001

REPRINT INCLUDES CHANGE 1

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17 October 1985

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, Power-Dyne, Model PD-602. 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. 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
Torque	Range: 0 to 600 ft-lb. Accuracy: ±3% 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-287. 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	LOAD CELL INDICATOR	Range: 0 to 12,000 counts Accuracy: ±0.05%[1]	BLH, Model 8200B (MIS-23155)
A2	TORQUE CELL	Range: 0 to 300 ft-lb. Accuracy: ±0.5% of applied torque from 20% FS to FS	Lebow, Model 2133-126 Type 1 (MIS-26485)
A3	TORQUE CELL	Range: 400 to 610 ft-lb. Accuracy: ±0.5% of applied torque from 20% FS to FS	Lebow, Model 2133-127 Type 1 (MIS-26485)

[1]Accuracy required when used as a system with torque cell (A2).

Table 3. Accessories Required

Item	Common name	Description (part number)
B1	ALLEN WRENCH	Key, socket head screw 0.035 in. (5120-00-198-5400)
B2	DRIVE BAR	3/4-in x 6-in. (p/o TI)
B3	MOUNTING PLATE	High capacity torque (7915876)
B4	SOCKET ADAPTER	1-in. male x 3/4-in. female (GGG-W-660 Type 111)
B5	TORQUE MOUNTING ASSEMBLY	600 ft-lb. (7916848)

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.

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 for this TI.

NOTE

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. Insure that equipment has been allowed to stabilize at ambient temperature.

c. Position mounting plate (B3) on a stable and rigid work surface and secure with bolts or clamps

d. Assemble equipment as shown in figure 1.

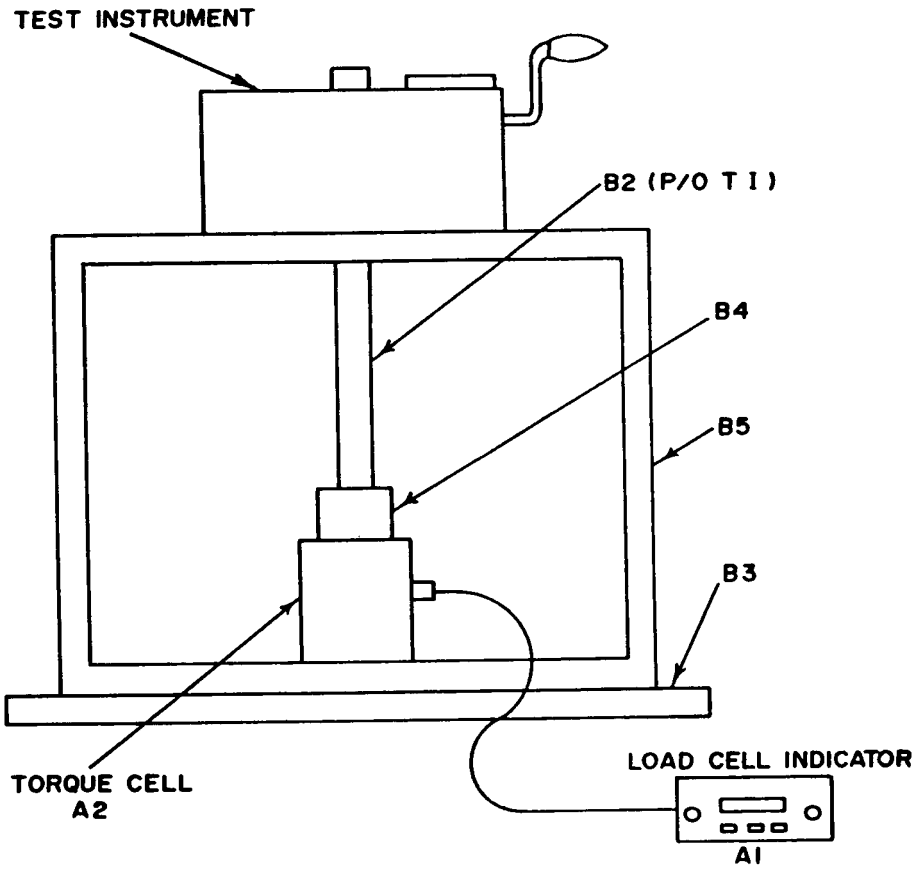

Figure 1. Torque - equipment setup.

e. Connect torque cell (A2) to load cell indicator (A1), using cable supplied with load cell indicator.

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

g. 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).

h. 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 in the back.

8. Torque

a. Performance Check

(1) Set TI indicator to zero with no torque applied.

(2) Exercise TI as follows:

(a) Turn crank handle cw to obtain an approximate full-scale indication on TI indicator. Load cell indicator (A1) will indicate ccw reaction torque.

(b) After 30 seconds, turn crank handle ccw to obtain a zero indication on TI indicator.

(c) Repeat (a) and (b) above two times, and check zero adjustment of load cell indicator.

(3) Operate TI cw to obtain indications listed in table 4. If load cell indications are not within limits specified, perform **b** below.

Table 4. Calibration Points

Test Instrument Indications (Ft-Lb.)	Load Cell Indicator Indications	
	Min	Max
100	97	103
200	194	206
300	291	309
400[1]	388	412
500	485	515
600	582	618

[1]Replace torque cell (A2) with torque cell (A3) and repeat paragraph 7h through 8a(2).

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.

(4) Repeat **a**(1) through (3) above, except turn crank handle ccw.

(5) Turn TI crank handle cw to obtain a zero indication.

b. Adjustments

NOTE

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

(1) Apply torque in cw direction for TI indication of 100 ft-lb. and record indication.

(2) Repeat (1) above at 300 ft-lb.

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

(4) If TI indication error is the same in both cw and ccw directions, perform (a) through (d) below.

(a) Remove retaining ring from gage housing using Allen wrench (B1).

(b) Remove lens (adhesive may be used for removing lens).

(c) Apply torque for 300 ft-lb. indication on load cell indicator.

(d) Rotate TI meter dial to indicate 300 (R).

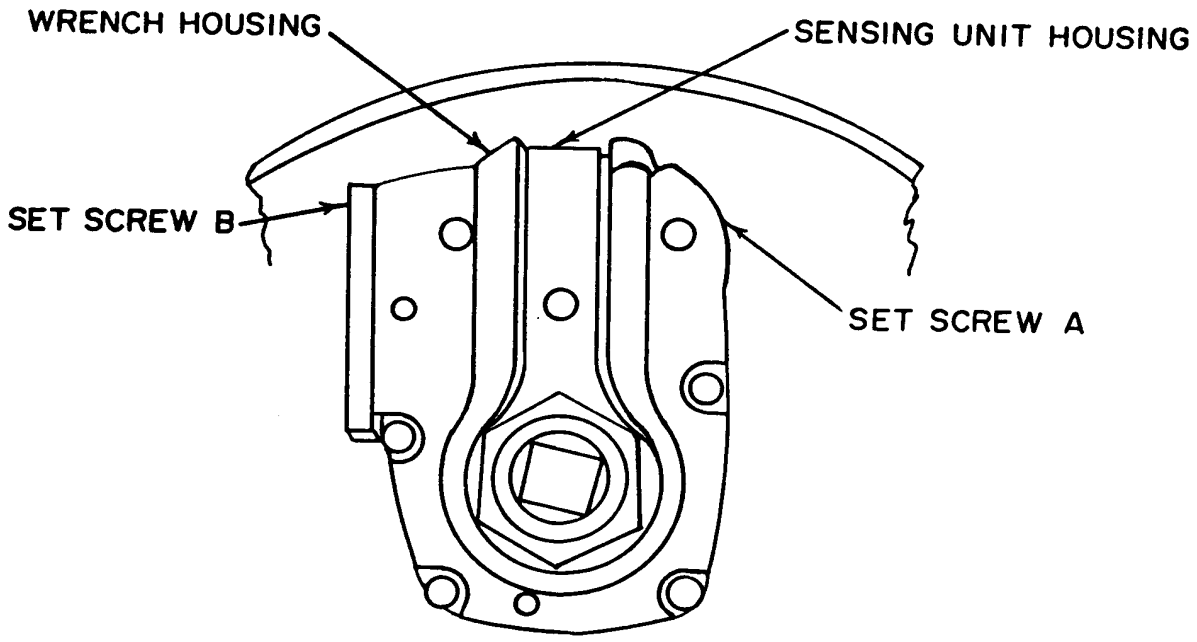

Figure 2. Calibration adjustments.

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

(a) Decrease torque for zero indication on TI meter.

(b) Remove TI from equipment setup.

(c) Back of f set screws A and B (fig. 2) at least three turns each.

(d) Tighten set screw A until meter indicates 10 ft-lbs.

(e) Adjust set screw B until meter indicates 20 ft-lb.

(f) Back of f set screw A approximately four turns.

(g) Tighten set screw B (counting turns) for 10 ft-lb. indication on meter. Record number of turns.

(h) Back off set screw B half the number of turns recorded in (g) above.

(i) Tighten set screw A for 10 ft lb. indication on meter.

(j) Check spacing between sensing unit housing on reaction adapter and wrench housing (fig. 2). Sensing unit housing should be approximately centered in wrench housing.

(k) Connect equipment and repeat (1) through (3) above. If TI meter indication is not within ±3 percent of load cell indicator indication, repeat (4) above (R).

(l) Repeat paragraph **8a** above.

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 f or 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.

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US GOVERNMENT PRINTING OFFICE: 1985 - 544-007/20212

PIN NO: 058760-000