*TB 9-4940-250-35

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DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR HYDRAULIC ACTUATOR TEST STAND, BARKLEY AND DEXTER, MODEL BDL 812121

Headquarters, Department of the Army, Washington, DC
1 May 1987

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*This bulletin supersedes TB 9-4940-250-50, 19 October 1973, including all changes.

SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Hydraulic Actuator Test Stand, Barkley and Dexter, Model BDL 812121. TM 9-4940-403-14 &P 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 3 hours, using the dc and low frequency and physical technique.

2. Forms, Records, and Reports. Forms, records, and reports required for calibration personnel at all levels are prescribed by TB 750-25.

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
Power requirement	120 V ac, ± 10%; 60 Hz; 10 A
Current	Range: 0 to 1 A Accuracy: ± 3% of FS
Pressure	Range: 0 to 400 psi Accuracy: ± 3% FS
Flow	Range: 0 to 1.7 gpm approximately Accuracy: ± 3% FS
Voltage	Range: 0 to 60 V ac Accuracy: ± 3% 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-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 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	AC CALIBRATOR	Range: 0 to 61.8 V ac Accuracy: ± 0.75%	Hewlett-Packard, Model 745AOPTC93 (745AOPTC93) w/HV Amplifier C90-746A (C90-746A)
A2	DC CURRENT SHUNT	Range: 0 to 1.0 A Accuracy: [1]	Guildline, Model 9711 (7912323)
A3	DC POWER SUPPLY	Range: 0 to 1.0 A	NJE, Model CS36CR30D2 (7916707)
A4	DIGITAL VOLTMETER	Range: 0 to 1.0 V dc Accuracy: [1]	Hewlett-Packard, Model 3490AOPT060(3490AOPT060) Dana Model 5000 w/641
A5	FLOW TRANSFER KIT	Range: 0 to 1.7 gpm Accuracy: ±0.013 gpm	Flow Technology, Model FT-AFS-4-CF (MIS-10391)
A6	PRESSURE GAGE	Range: 0 to 400 psi Accuracy: ± 3 psi	Mansfield and Green, Model T417-2 (part of 8598963)

[1]Combined accuracy of A2 and A4 is ± 0.75%.

Table 3. Accessories Required

Item	Common name	Description (part number)
B1	HYDRAULIC FITTINGS	As required (part of 7913310)
B2	LEAD[1]	18-in., spade lug terminations (red) (7911292-14)
B3	LEAD[2]	18-in., spade lug terminations (black) (7911292-13)

[1]Three required.

[2]Two required.

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.

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. Additional maintenance information is contained in TM 9-4940-403-14 &P 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. Place TI near a 120 V-60 Hz power outlet.

b. Release the Dzus fasteners which retain the top cover and control drawer.

c. Raise the top cover and fasten it securely in place with the knurled fasteners.

d. Open control drawer until latches, which retain drawer at half-open position, engage.

e. Remove hold-down brackets and level TI, using leveling screws located at each bottom corner of TI.

f. Check hydraulic fluid level and fill, as required, by releasing the Dzus fasteners at the front edge of the work area and raising the perforated work-surface plate.

NOTE

Use MIL-H-5606 hydraulic fluid only. Capacity is approximately 9 quarts. The fluid level should be to the fluid level plates.

g. Open needle valves VI, V2, V3, V4 and V6.

h. Remove drawer by disconnecting cable

8. Voltmeter M1

a. Performance Check

(1) Remove wires from M1 and as shown in figure 1.

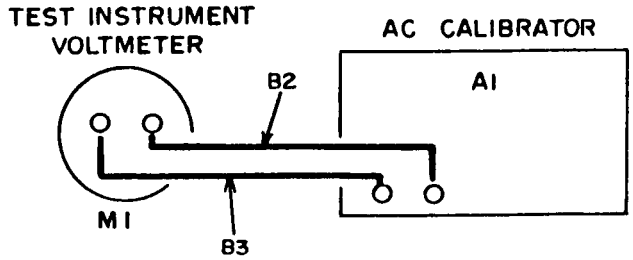

Figure 1. Voltage setup.

(2) Adjust ac calibrator (A1) for 60 Hz output and 60-V ac indication on M1. The ac calibrator will indicate between 58.2 and 61.8 V ac.

(3) Repeat (2) above for indications listed in table 4.

(4) Connect wires removed in (1) above.

b. Adjustments. No adjustments can be made.

Table 4. Voltage Accuracy

Test instrument voltmeter M1 indications (V Ac)	Ac calibrator indications (V ac)	
	Min	Max
50	48.2	51.8
40	38.2	41.8
20	18.2	21.8
10	8.2	11.8
5	3.2	6.8

9. Ammeter M2, M3

a. Performance Check

(1) Remove wires from M2 and connect as shown in figure 2.

(2) Prepare dc current shunt (A2) and digital voltmeter (A4) for measuring current of 1 A.

(3) Adjust dc power supply (A3) for full-scale indication on M2. Digital voltmeter (A4) will indicate between 97 and 103 mV.

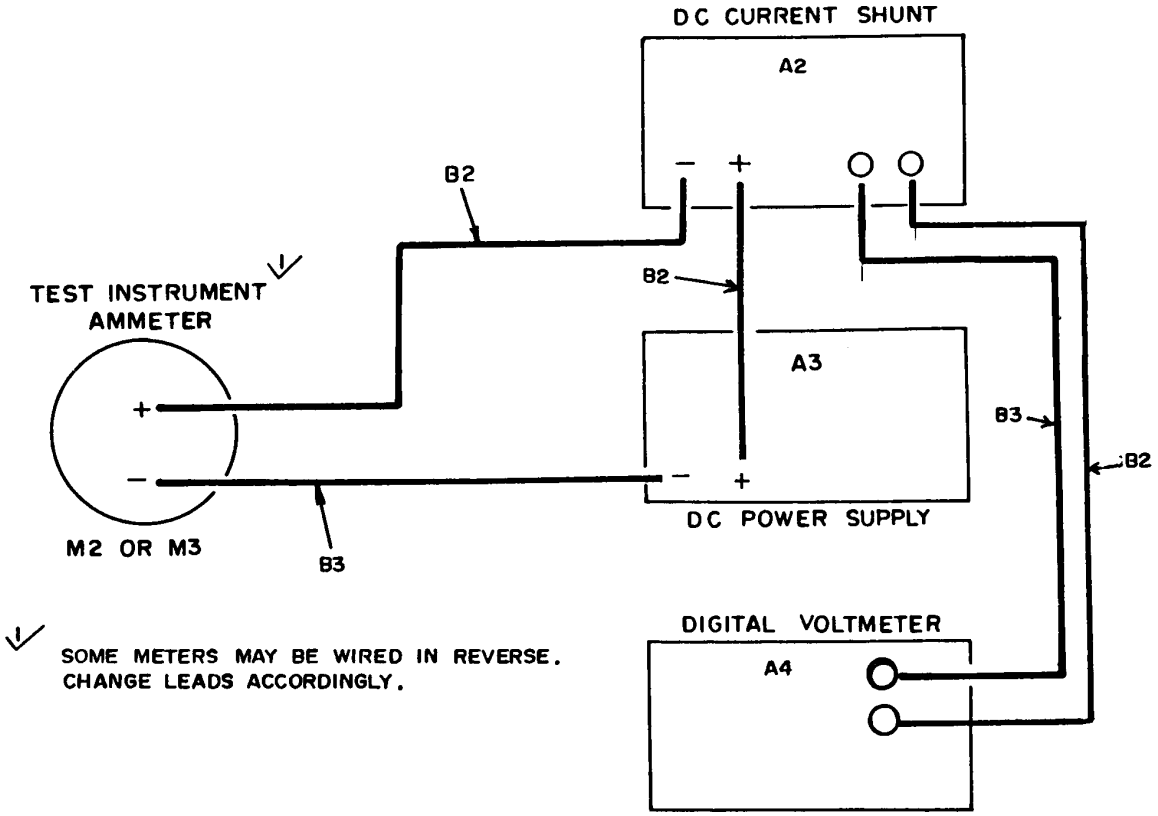

Figure 2. Ammeter setup.

(4) Repeat (3) above f o r indications listed in table 5.

(5) Replace wires removed in (1) above.

(6) Repeat (1) through (5) above for M3.

b. Adjustments. No adjustments can be made.

Table 5. Current Accuracy

Test instrument ammeter M2, M3 indications (A)	Digital voltmeter indications (mV)	
	Min	Max
0.8	77	83
0.6	57	63
0.4	37	43
0.2	17	23

10. Pressure Gage and Flowmeter

a. Performance Check

(1) Connect gages to calibrating manifold: G1 to A1 on manifold, G2 to A2 on manifold, G3 to A3 on manifold and connect equipment as shown in figure 3.

(2) Connect P3, cable W3 to J3 and P4, cable W4 to J4.

(3) Set DC VOLT ADJ T2 dial to approximately 70.

(4) Set TI flowmeter switch to VOLT ADJ position.

(5) Set TI switches S1 and S2 to OFF and S3 switch to START.

(6) Connect TI to 120-V, 60-Hz power source.

(7) Set TI switch S1 to ON and S3 switch to 1. Turn flowmeter VOLT ADJ until needle on GPM meter coincides with V. ADJ line, then set flowmeter switch to FM1.

(8) Set TI switch S3 to 2, adjust DC VOLT ADJ T2 until M2 and M3 read approximately 0.35 A. M1 should read between 8.2 and 11.8 V.

(9) Set TI switch S3 to 3, adjust R2 dial until M2 reads 0.70 A.

(10) Set TI switch S3 to 4, adjust R3 dial until M3 reads 0.70 A.

(11) Set TI switch S3 to 1.

(12) Set TI switch S2 (pump switch) to ON.

(13) Adjust needle valve V5 until pressure gage (A6) reads 50 psi. G1, C2, and G3 will indicate between 38 and 62 psi.

NOTE

Adjust needle valves V1, V2, and V3 for steady readings of G1, G2, and G3.

(14) Repeat technique of (13) above for indications listed in table 6.

(15) Adjust needle valve V5 until TI pressure gage G2 indicates 320 psi. Flowmeter (part of A5) will indicate 1.7 gpm ±3 percent when TI reads in green area.

(16) Set switches S1 and S2 to OFF.

b. Adjustments. No adjustments can be made.

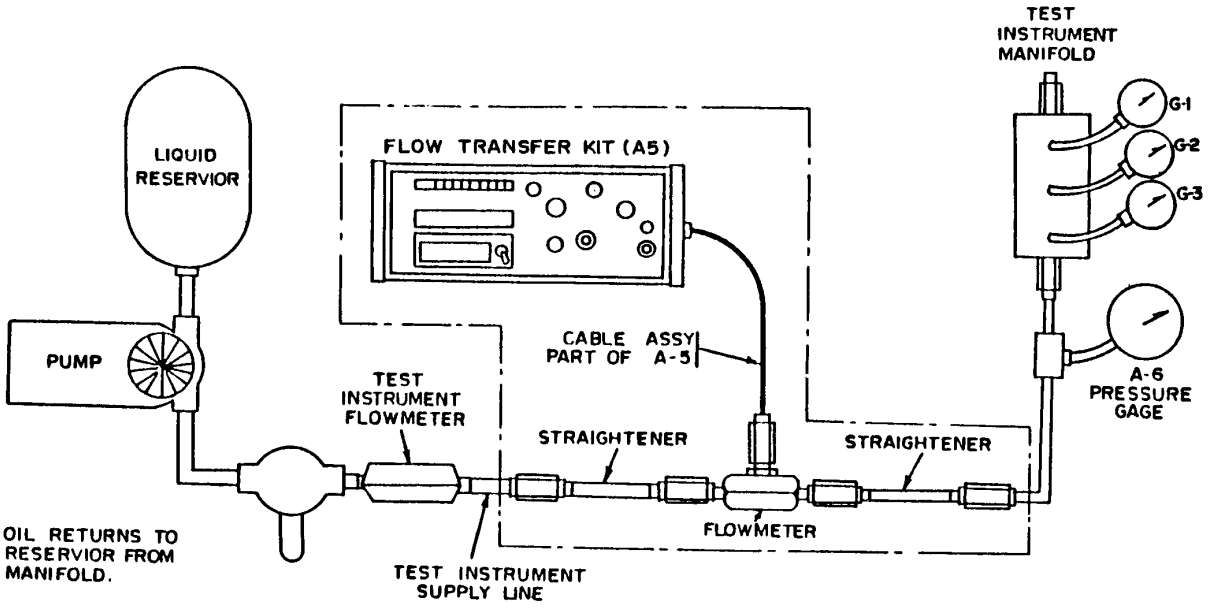

Figure 3. Flow setup.

Table 6. Pressure Accuracy

Pressure gages (psi)	Test instrument gage indications (G1, G2, G3)	
	Min	Max
100	88	112
150	138	162
200	188	212
250	238	262
300	288	312
350	338	362

11. 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

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