*TB 9-6625-1942-24

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR DIGITAL VOLTMETER HEWLETT-PACKARD, MODEL 3490A WITH PROBES K24-3490A AND K25-3490A

Headquarters, Department of the Army, Washington, DC
6 March 2008

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.

*This bulletin supersedes TB 9-6625-1942-35, dated 11 June 1996.

SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Digital Voltmeter, Hewlett-Packard, Model 3490A with probes K24-3490A and K25-3490A. 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. Variations among models are described in the text.

b. Time and Technique. The time required for this calibration is approximately 2 hours, using the dc and low frequency 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 applications which pertain to this calibration are in table 1.

Table 1. Calibration Description.

Test instrument parameters	Performance specifications
Dc voltage:	Range: 0 to ±1000 V in 5 ranges (probes 0 to 10,000 V) [1] Accuracy: 0.1 V range: ± (0.013% of reading + 0.005% of range) 1 V range and above: ± (0.013% of reading + 0.002% of range) (probes ± 0.5%)[2]
Ac voltage:	Range : 0 to 1000 V in 4 ranges, 20 Hz to 250 kHz Accuracy : 20 to 50 Hz, ±(0.4% of reading ±0.06% of range) (K25-3490A probe ±0.5% at 1000 V, 20 to 100 Hz) 50 Hz to 100 kHz, ±(0.1% of reading ±0.03% of range) (K25-3490A probe ±5.0% at 1000 V, 100 to 400 Hz) 100 to 250 kHz, ±(0.75% of reading ±0.07% of range (on 1 and 10 V ranges only)

See footnotes at end of table.

Table 1. Calibration Description - Continued

Test instrument parameters	Performance specifications								
Ratio (option 080) dc/dc measurement	Accuracy : ± (A% of reading + B% of input range) + [Ext ref range / Ext ref voltage] X C% of input range								
	Ext Ref Range	Input range								
		0.1V			1V, 10V			100V, 1000V		
		A	B	C	A	B	C	A	B	C
	10 V	0.007%	0.005%	0.002%	0.002%	0.003%	0.002%	0.007%	0.003%	0.002%
	1 V	0.008%	0.015%	0.003%	0.003%	0.012%	0.003%	0.008%	0.012%	0.003%
ac/dc measurement	Accuracy : 10 V ext ref range: same as ac voltage accuracy 1 V ext ref range : Add 0.01 to % of range ac voltage accuracy									
Ohms	Range : 0 to 10,000 kΩ in 6 ranges Accuracy : ± (% of reading + % of range) kΩ range: (0.015 + 0.005) 1, 10, 100 kΩ ranges: (0.015 + 0.002) 1000 kΩ range: (0.02 + 0.002) 10,000 kΩ range: (0.04 + 0.002)									

[1]Not calibrated above 1000 V dc.

[2]K25-3490A probe derated from 0.25%.

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 item 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 is 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 accessory is also required for this calibration: DC power supply, Elgar, model DCS40-30EM10.

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
CALIBRATOR	Range: 0 to 1050 V ac Frequency: 20 Hz to 250 kHz Accuracy: ±0.0325% Range: 0 to 1000 V dc Accuracy ±0.00375% Resistance: Range: 0 to 1 MΩ Accuracy: ±0.00425% 10 MΩ Accuracy: ±0.0105% (0.015%)	Fluke, Model 5720A (5720A) (p/o MIS-35947); w amplifier, Fluke 5725A/AR (5725A/AR)
DC VOLTAGE DIVIDER	Range: 10:1 Accuracy: ± 0.00175%	ESI Model, RV722 (RV722)
MULTIMETER	Range: 0 to 10 V dc Resolution: 1 μV	Agilent, Model 3458A (3458A)

SECTION III
CALIBRATION PROCESS

6. Preliminary Instructions

a. The instruction 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

WARNING

HIGH VOLTAGE is used or exposed during the performance 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 as required for adjustments.

b. Connect TI to a 115 V ac source.

c. Energize TI and allow at least 30 minutes for warm-up and stabilization.

d. Position TI controls as listed in (1) through (3) below:

(1) **FUNCTION** switch to **DC**.

(2) **RANGE** switch to **.1 V**.

(3) Connect shorting link between **GUARD** and **LOW INPUT**.

e. Short **INPUT** terminals. If necessary, adjust A1R429 (rear of TI) (fig. 1) for a 0 ±0.000002 indication. Remove short.

f. Set **RANGE** switch to **10 V**.

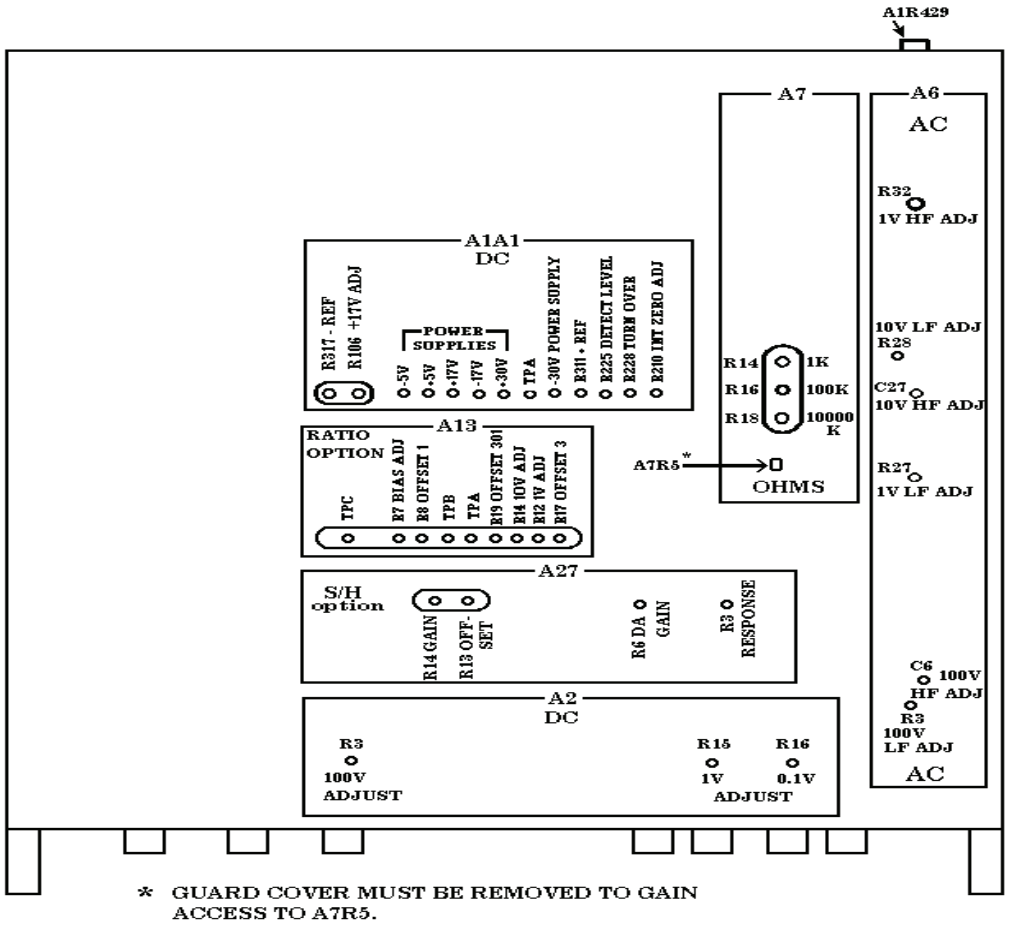

Figure 1. Top interior view - adjustment locations.

8. Dc Volts

a. Performance Check

CAUTION

Always reduce input voltage to TI to minimum before changing **RANGE** switch settings.

(1) Connect TI to calibrator.

(2) Set calibrator output for 10 V dc. If TI does not indicate between 09.9985 and 10.0015 V dc, perform **b** (1) through (13) below.

(3) Reverse leads at TI input and repeat (2) above for a negative indication on TI.

(4) Adjust calibrator output for a 1 V dc.

(5) Set TI **RANGE** switch to **1V**. If TI does not indicate between 0.99985 and 1.00015 V dc, perform **b** (14) below.

(6) Repeat technique of (4) and (5) above for settings and indications listed in table 3. TI will indicate within limits specified.

Table 3. Dc Voltage (0.1 V through 1000 V Ranges)

Calibrator output (V dc)	Test instrument			
	RANGE switch settings (V)	Indications (V dc)		
		Min	Max	Adjustments
0.1	0.11	0.099982	0.100018	See footnote 1
0.05	0.1	0.049989	0.050011	See footnote 1
0.01	0.1	0.009994	0.010006	See footnote 1
0.5	1	0.49992	0.50008	- - - -
0.1	1	0.09997	0.10003	- - - -
1.0	10	00.9997	01.0003	- - - -
5.0	10	04.9992	05.0008	- - - -
10.0	100	009.997	010.003	- - - -
50.0	100	049.992	050.008	- - - -
100.0	100	099.985	100.015	**b**(15) below
100.0	1000	0099.97	0100.03	- - - -
500.0	1000	0499.92	0500.08	- - - -
1000.0	1000	0999.85	1000.15	- - - -

[1]If TI indications are not within specifications for 0.1 V range, perform **8 a** (7) through (11) below.

(7) Disconnect all inputs from TI and short TI **INPUT** terminals.

(8) Set **FUNCTION** switch to **TEST** and **RANGE** switch to **6**.

(9) Record amount and polarity of offset indication on TI.

(10) Remove short and connect calibrator to TI **INPUT** terminals in reversed polarity and adjust calibrator output for -10 V dc.

(11) If TI does not indicate between -0999.65 and -1000.35 after algebraically subtracting the offset recorded in (9) above, perform **b** (16) below.

b. Adjustments

(1) Connect multimeter between A1A1TPA (fig. 1) and **INPUT LOW** terminal.

(2) Turn **SAMPLE RATE** control fully ccw to **HOLD** position.

(3) Adjust A1A1R210 INT ZERO ADJ (fig. 1) for a 0 ±150 μV dc indication on multimeter. Disconnect multimeter.

(4) Set **FUNCTION** switch to **DC**, **RANGE** switch to **10V**, and **SAMPLE RATE** control to **FAST**.

(5) Connect calibrator to TI **INPUT** terminals and adjust calibrator output for +1.0 mV dc.

(6) Adjust A1A1R225 DETECT LEVEL (fig. 1) for a maximum reading on TI display. Note reading.

(7) Reverse polarity of TI input and adjust A1A1R228 TURNOVER (fig. 1) for reading noted in (6) above. Continue reversing input polarity and adjusting A1A1R228 TURNOVER until both positive and negative readings are equal (R).

(8) With 1.0 mV dc applied to TI, adjust A1A1R225 DETECT LEVEL (fig. 1) for a TI display of + 00.0010 (R).

(9) Connect calibrator in reverse polarity to TI **INPUT**. Adjust calibrator output for a +10 V dc.

(10) Adjust A1A1R311 +REF (fig. 1) for a +10.0000 V indication on TI (R).

(11) Set **FUNCTION** switch to **TEST** and **RANGE** switch to **3**.

(12) Adjust A1A1R317 -REF (fig. 1) for equal plus and minus indications (0.99995 ±1 count). The last digit must be between 2 and 9 (R).

(13) Set **FUNCTION** switch to **DC**, **RANGE** switch to **10V**, and repeat (9) through (12) above until tolerances listed in (10) and (12) above are met.

(14) Adjust A2R15 1V ADJUST (fig. 1) for a 1.00000 V indication on TI (R).

(15) Adjust A2R3 100 V ADJUST (fig. 1) for a 100.000 V indication on TI (R).

(16) A2R16 0.1V ADJUST (fig. 1) for a -1000.00 indication on TI (plus or minus offset noted in **8 a** (17) above) (R).

9. Ac Volts

a. Performance Check

(1) Connect TI to calibrator.

(2) Set TI **FUNCTION** switch to **AC** and **RANGE** switch to **1V**.

(3) Set calibrator output to 1 V ac at 50 kHz. If TI indication is not between 0.99870 and 1.00130 V ac, perform **b** (1) below.

(4) Set calibrator output frequency to 100 Hz. If TI indication is not between 0.99870 and 1.00130 V ac, perform **b** (2) below.

(5) Set TI **RANGE** switch to **10 V** and set calibrator output amplitude to 10 V ac. If TI indication is not between 9.9870 and 10.0130 V ac, perform **b** (3) below.

(6) Set calibrator output to 10 V ac at 50 kHz. If TI indication is not between 9.9870 and 10.0130 V ac, perform **b** (4) below.

(7) Set TI **RANGE** switch to **100V** and set calibrator output amplitude to 100 V ac at 100 Hz. If TI indication is not between 99.870 and 100.130 V ac, perform **b** (5) below.

(8) Set calibrator output to 100 V ac at 50 kHz. If TI indication is not between 99.870 and 100.130 V ac, perform **b** (6) below.

(9) Repeat technique of (7) and (8) above for calibrator frequencies and **RANGE** switch settings and indications as listed in table 4.

Table 4. Ac Volts Accuracy

Calibrator		Test instrument		
Output frequency	Output voltage (V ac)	**RANGE** switch settings (V ac)	Indications	
			Min	Max
20 Hz	1.0	1	0.99540	1.00460
10 kHz	1.0	1	0.99870	1.00130
10 kHz	10.0	10	09.9870	10.0130
20 Hz	10.0	10	09.9540	10.0460
20 Hz	100.0	100	099.540	100.460
10 kHz	100.0	100	099.870	100.130
10 kHz	500.0	1000	0499.20	0500.80
100 Hz	500.0	1000	0499.20	0500.80
20 Hz	500.0	1000	0497.40	0502.60
250 kHz	1.0	1	0.99180	1.00820
250 kHz	10.0	10	9.918	10.082

b. Adjustments

(1) Adjust A6R32 1V HF ADJ (fig. 1) for 1.00000 indication on TI (R).

(2) Adjust A6R27 1V LF ADJ (fig. 1) for 1.00000 indication on TI. Repeat **a** (3) and (4) above until indications are correct (R).

(3) Adjust A6R28 10V LF ADJ (fig. 1) for 10.0000 indication on TI (R).

(4) Adjust A6C27 10V HF ADJ (fig. 1) for 10.0000 indication on TI. Repeat **a** (5) and (6) above until indications are correct (R).

(5) Adjust A6R3 100V LF ADJ (fig. 1) for 100.000 indication on TI (R).

(6) Adjust A6C6 100V HF ADJ (fig. 1) for 100.000 indication on TI. Repeat **a** (7) and (8) above until indications are correct (R).

10. Dc/dc Ratio (Option 080 Only)

a. Performance Check

(1) Position controls as listed in (a) through (c) below:

(a) **FUNCTION** switch to **TEST**.
(b) **RANGE** switch to **4**.
(c) **RATIO** switch to **EXT REF 10V**.

(2) Short TI **EXT REF HIGH** and **LOW** terminals together.

(3) Connect calibrator to TI **INPUT** terminals and set output to +10 V dc. TI will indicate 0 ±0.0001 V.

(4) Reverse polarity of calibrator output. TI will indicate 0 ±0.0001 V.

(5) If (3) and (4) above are not within specified limits, perform **b** (1) below.

(6) Set **RATIO** switch to **EXT REF 1V** and repeat (3) and (4) above. If TI does not indicate within specified limits, perform **b** (2) below, as necessary.

(7) Remove short from TI **EXT REF** terminals and connect calibrator to **EXT REF** terminals.

(8) Set calibrator to 1 MΩ.

(9) Connect calibrator to TI **INPUT** terminals, and adjust output for a positive and then negative 10 V to TI. If TI does not indicate 0 ± 0.0005 V, perform **b** (4) below.

(10) Remove calibrator from TI and position controls as listed in (a) through (c) below:

(a) **RATIO** switch to **INT REF**.
(b) **FUNCTION** switch to **DC**.
(c) **RANGE** switch to **10V**.

(11) Connect equipment as shown in figure 2.

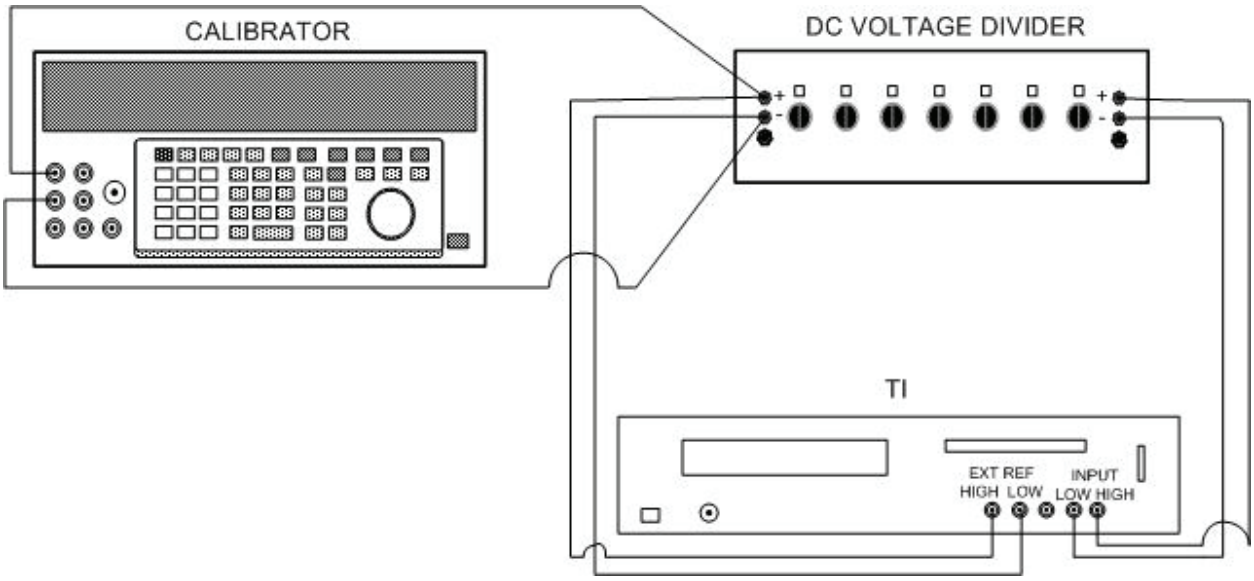

Figure 2. Dc/dc ratio - equipment setup.

(12) Adjust dc voltage divider to 1.000000

(13) Set calibrator output to +10 V dc.

(14) Set **RATIO** switch to **EXT REF 10V**. Record TI indication.

(15) Reverse polarity of both the **INPUT** and **EXT REF** terminals on TI. If TI indication is not within ±1 count of reading recorded in (14) above, perform **b** (5) below.

(16) Set calibrator output to 1.0 V and set **RATIO** switch to **EXT REF 1V**. Record TI indication.

(17) Reverse polarity of both the **INPUT** and **EXT REF** terminals on TI. If TI indication is not within ±1 count of reading recorded in (16) above, perform **b** (6) below.

(18) Repeat (15) through (17) as required.

(19) Set **RATIO** switch to **EXT REF 10V**.

(20) Adjust output of calibrator to 10 V dc.

(21) If TI does not indicate between 9.9993 and 10.0007, perform **b** (7) below.

(22) Adjust output of calibrator to 1.0 V dc.

(23) If TI does not indicate between 9.9982 and 10.0018, perform **b** (8) below.

(24) Position controls as listed in (a) through (c) below:

(a) **RATIO** switch to **INT REF**.
(b) **FUNCTION** switch to **TEST**.
(c) **RANGE** switch to **3**.

(25) The TI will alternately indicate a positive and negative reading between 0.99992 and 0.99999 ±1 count. Record both indications. If TI does not indicate within specifications, perform **b** (9) below.

(26) Set **RATIO** switch to **EXT REF 10V** and adjust calibrator output for a 10 V output. TI will indicate the same as recorded in (25) above. Record positive indication. If TI does not indicate as stated in (25) above, perform **b** (9) and (10) below.

b. Adjustments

(1) Adjust A13R17 OFFSET 3 (fig. 1) for 0 indication on TI. If the display goes into overload, reverse polarity of calibrator and adjust A13R17 OFFSET 3 in the opposite direction for a 0 indication on TI (R).

(2) Adjust A13R8 OFFSET 1 (fig. 1) for 0 indication on TI with positive and negative 10 V applied to **INPUT** terminals of TI (R).

(3) Repeat (1) and (2) above until TI indicates 0 ±0.0001 V for both positive and negative inputs on both **1 V** and **10 V EXT REF** ranges.

(4) Adjust A13R7 BIAS ADJ (fig. 1) for 0 indication on TI with both positive and negative 10 V input applied from calibrator (R).

(5) Adjust A13R17 OFFSET 3 (fig. 1) until TI indicates ±1 count of value recorded in **a** (15) above, while reversing polarity of the inputs at both the **INPUT** and **EXT REF** terminals on TI (R).

(6) Adjust A13R8 OFFSET 1 (fig. 1) until TI indicates ±1 count of value recorded in **a** (17) above, while reversing polarity of the inputs at both the **INPUT** and **EXT REF** terminals on TI (R).

(7) Adjust A13R14 10V ADJ (fig. 1) for +10.0000 indication on TI (R).

(8) Adjust A13R12 1V ADJ (fig. 1) for +10.0000 indication on TI (R).

(9) Adjust A1A1R317 -REF (fig. 1) until TI alternately indicates between ±0.99992 and ±0.99999. Positive and negative indications must be equal ±1 count. After adjustments, record indications (R).

(10) Adjust A13R19 OFFSET 301 (fig. 1) for an indication equal to the average of readings recorded in **a** (26) and (27) above (R).

(11) Adjust A1A1R317 -REF (fig. 1) for positive indication equal to positive indication recorded in **a** (26) above. Indication should be within ±1 count of indication recorded in **a** (17) above and between 0.99992 and 0.99999 (R).

11. Ac/dc Ratio (Option 080 Only)

a. Performance Check

(1) Connect equipment as shown in figure 3.

(2) Set **RATIO** switch to **EXT REF 1V** and adjust power supply for a 0.10000 V dc indication on multimeter.

(3) Set **FUNCTION** switch to **AC** and **RANGE** switch to **1V**.

(4) Adjust calibrator output to 100 mV at 100 Hz. TI will indicate between 0.99860 and 1.00140.

(5) Repeat technique of (3) and (4) above, using **RANGE** switch settings and indications listed in table 5.

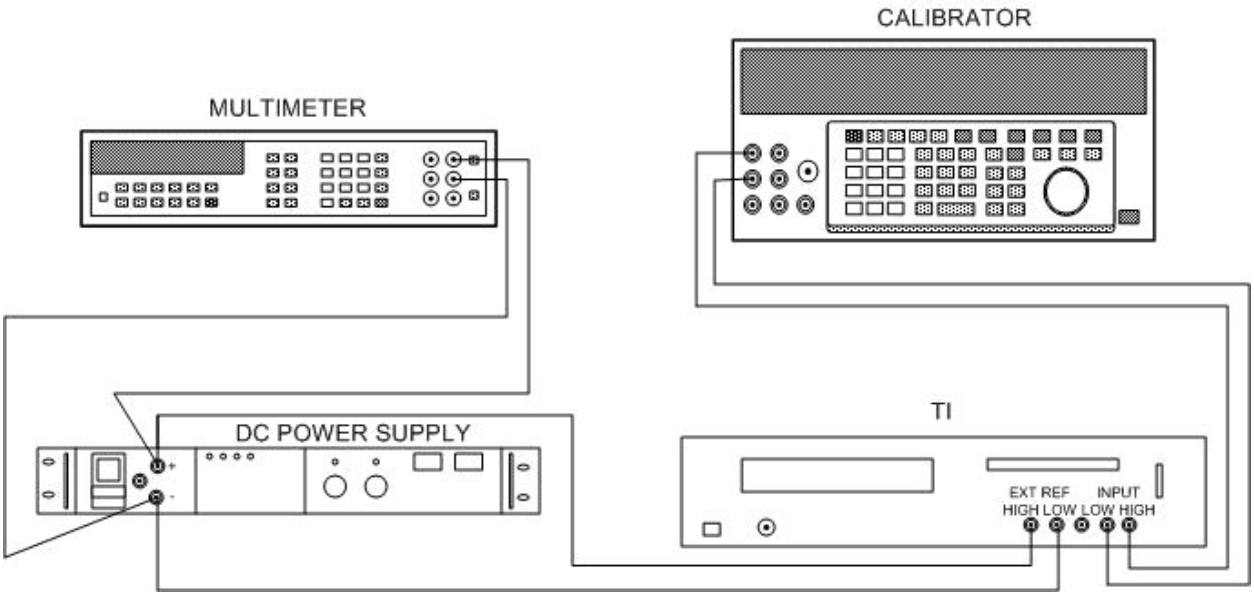

Figure 3. Ac/dc Ratio - equipment setup.

Table 5. Ac/dc Ratio Accuracy

Test instrument switch settings (V)		Applied voltage		Test instrument indications	
		ac Voltage	dc voltage		
RATIO	**RANGE**	(V)	(V)	Min	Max
EXT REF 1V	1	0.5	0.5	0.99860	1.00140
EXT REF 1V	1	1.0	1.0	0.99860	1.00140
EXT REF 1V	1	1.0	1.2	0.83210	.083456
EXT REF 10V	10	1.0	1.0	09.9870	10.0130
EXT REF 10V	10	5.0	5.0	09.9870	10.0130
EXT REF 10V	10	10.0	10.0	09.9870	10.0130
EXT REF 10V	10	10.0	12.0	0.83220	.083446

b. Adjustments. No adjustments can be made.

12. Ohms

a. Performance Check

(1) Set **FUNCTION** switch to **TEST** and **RANGE** switch to **7**.

(2) Short **Ω SIGNAL** terminals on TI. If TI does not indicate between -9000.0 and -10400.0 perform **b** (1) below.

(3) Set **FUNCTION** switch to **Ω** and **RANGE** switch to **1K**.

(4) Connect calibrator to TI **INPUT** terminals and **Ω SIGNAL** terminals in a four wire measurement configuration. Connect TI **GUARD** to **INPUT LOW** and calibrator **GUARD** to **LOW** terminal.

(5) Set calibrator to 1 kΩ. Set calibrator error control for a calibrator indication matching TI indication. If calibrator error display does not indicate within ±0.017%, perform **b** (2) below.

NOTE

Set calibrator to zero ohm and record TI indication. Subtract recorded indication from indication obtained in (6) below for final indication on .1 kΩ range.

(6) Set **RANGE** switch to **.1KΩ** and calibrator to 100 Ω. Set calibrator error control for a calibrator indication matching TI indication. If calibrator error display does not indicate within ±0.020%, if necessary, repeat **b** (2) for an intolerance condition on both ranges.

(7) Set **RANGE** switch to **10K** and calibrator to 10 kΩ. Set calibrator error control for a calibrator indication matching TI indication. Calibrator error display will indicate within ±0.017% or less.

(8) Set **RANGE** switch to **100K** and calibrator to 100 kΩ. Set calibrator error control for a calibrator indication matching TI indication. If calibrator error display does not indicate within ±0.017%, perform **b** (3) below.

(9) Set **RANGE** switch to **1000K** and calibrator to 1000 kΩ. Set calibrator error control for a calibrator indication matching TI indication. Calibrator error display will indicate ±0.022%.

(10) Set **RANGE** switch to **10000K** and calibrator to 10 M. Set calibrator error control for a calibrator indication matching TI indication. If calibrator error display does not indicate within ±0.042%, perform **b** (4) below.

b. Adjustments

(1) Adjust A7R5 OHMS (fig. 1) for an indication of -9700.0 on TI (R).

NOTE

TIs with serial numbers below 1211A00656 may not have adjustments.

(2) Adjust A7R14 1K (fig. 1) for an indication of the actual value of calibrator resistance (R).

(3) Adjust A7R16 100K (fig. 1) for an indication of the actual value of calibrator resistance (R).

(4) Adjust A7R18 10000K (fig. 1) for an indication of the actual value of calibrator resistance (R).

13. Probe Accuracy

a. Performance Check

NOTE

This paragraph to be performed only on TI models supplied with high voltage probe.

CAUTION

LOW and **GUARD** input terminals must be securely connected to TI chassis to prevent accidental damage to TI.

(1) Set **FUNCTION** switch to **DC** and **RANGE** switch to **10V**.

(2) Connect high voltage probe to TI.

(3) Connect high voltage probe tip and ground lead to calibrator.

(4) Set calibrator output for a nominal 1000.0 V dc output.

(5) Adjust calibrator error control for a 1.0000 V indication on TI. If indicated error is not within ±0.25% (±0.5% for K25-3490A probe), perform **b** below.

NOTE

Perform (5) through (9) below for K25-3490A probe only.

(6) Set calibrator output for a nominal 1000.0 V ac output at 20 Hz.

(7) Adjust calibrator error control for a 1.0000 V ac indication on TI. Calibrator error display will indicate ±0.5%.

(8) Repeat (7) above at 120 and 400 Hz. Calibrator error display will indicate ±0.5%.

b. Adjustments

(1) Adjust calibrator for 1000 V dc output.

(2) Adjust R4 (K24-3490A probe) or R5 (K25-3490A probe) for a 1.0000 V dc indication on TI (R)).

14. Final Procedure

a. Deenergize and disconnect all equipment and reinstall protective covers on TI.

b. Annotate and affix DA label/form in accordance with TB 750-25.

By Order of the Secretary of the Army:

GEORGE W. CASEY, JR.
General, United States Army
Chief of Staff

Official:

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army

0801602

Distribution:

To be distributed in accordance with the initial distribution number (IDN) 343040, requirements for calibration procedure TB 9-6625-1942-24.

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.

PIN NO: 084596-000