TB 9-6625-2147-35

CHANGE 10

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR MULTIMETERS (GENERAL)

Headquarters, Department of the Army, Washington, DC
21 June 2001

Approved for public release; distribution is unlimited

TB 9-6625-2147-35, 3 April 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**
55 and 56	55 and 56

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By Order of the Secretary of State:

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

OFFICIAL:

JOEL B. HUDSON
Administrative Assistant to the Secretary of the Army
0120705

Distribution:
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TB 9-6625-2147-35

CHANGE 9

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR MULTIMETERS (GENERAL)

Headquarters, Department of the Army, Washington, DC
27 November 2000

TB 9-6625-2147-35, 3 April 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
11 and 12	11 and 12
47 and 48	47 and 48
55 and 56	55 and 56

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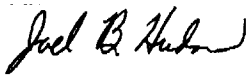

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0028403

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CHANGE 8

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Headquarters, Department of the Army, Washington, DC
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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**
3 and 4	3 and 4
9 through 12	9 through 12
29 through 38	29 through 38

2. File this change sheet in front of the publication for reference purposes. **This change incorporates DA Form(s) 2028 dated 22 Jan 1990, 23 Jan 1990, 17 Oct 1990, and 29 Nov 1990**.

By Order of the Secretary of the Army:

CARL E. VUONO
General, United States Army
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CHANGE 7

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CALIBRATION PROCEDURE FOR MULTIMETERS (GENERAL)

Headquarters, Department of the Army, Washington, DC
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Remove pages	**Insert pages**
9 through 16	9 through 16
33 through 36	33 through 36
65 and 66	65 and 66

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

By Order of the Secretary of the Army:

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Remove pages	**Insert pages**
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CARL E. VUONO
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R. L. DILWORTH
Brigadier General, United States Army
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CHANGE 5

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR MULTIMETERS (GENERAL)

Headquarters, Department of the Army, Washington, DC
10 September 1987

TB 9-6625-2147-35, 3 April 1985, is changed as follows:

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Remove pages	**Insert pages**
49 and 50	49 and 50

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CARL E. VUONO
General, United States Army
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CHANGE 4

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CALIBRATION PROCEDURE FOR MULTIMETERS (GENERAL)

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

TB 9-6625-2147-35, 3 April 1985, is changed as follows:

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Remove pages	Insert pages
13 and 14	13 and 14
31 and 32	31 and 32
37 and 38	37 and 38

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

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

Official:

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Brigadier General, United States Army
The Adjutant General

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CHANGE 3

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CALIBRATION PROCEDURE FOR MULTIMETERS (GENERAL)

Headquarters, Department of the Army, Washington, DC
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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.

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11 and 12	11 and 12
65 and 66	65 and 66

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Brigadier General, United States Army
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PIN NO: 057555-003

TB 9-6625-2147-35

CHANGE 2

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR MULTIMETERS (GENERAL)

Headquarters, Department of the Army, Washington, DC
2 June 1986

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9 through 12	9 through 12
47 and 48	47 and 48

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By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
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Brigadier General, United States Army
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TB 9-6625-2147-35

CHANGE 1

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR MULTIMETERS (GENERAL)

Headquarters, Department of the Army, Washington, DC
5 March 1986

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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 through 4	1 through 4
11 through 14	11 through 14
17 through 20	17 through 20
35 through 38	35 through 38
73	73

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.
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PIN: 057555-001

*TB 9-6625-2147-35

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR MULTIMETERS (GENERAL)

Headquarters, Department of the Army, Washington, DC
3 April 1985

REPORTING OF ERRORS AND RECOMMDENDED IMPROVEMENTS
You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedure, please let us know. Mail your letter or DA Form 2028 to: Commander, U. S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-LS-LP, Redstone Arsenal, AL 35898-5230. A reply will be furnished to you. You may also send in your comments electronically to our e-mail address: ls-lp@redstone.army.mil or by FAX (256) 842-6546/DSN 788-6546

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CHANGE 9

*This bulletin supersedes the technical bulletins listed below, including all changes:
TB 9-4933-205-50, 20 May 1974; TB 9-6625-755-50, 23 April 1970; TB 9-6625-961-35, 1 May 1979; TB 9-6625-990-35, 20 December 1974; TB 9-6625-1144-50, 3 June 1968; TB 9-6625-1187-35, 24 April 1981; TB 9-6625-1250-35, 22 March 1976; TB 9-6625-1337-50, 31 October 1978; TB 9-6625-1363-35, 23 February 1976; TB 9-6625-1408-35, 9 February 1976; TB 9-6625-2064-35, 11 December 1981; TB 9-6625-2100-35, 3 February 1983; TB 9-6625-2110-35, 24 July 1984; TB 11-6625-2448-35, 22 September 1975; TB 11-6625-2741-35, 9 January 1976.

SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of multimeters listed in table 1. The manufacturers' manuals or TMs were used as the prime data sources 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 tables.

b. Time and Technique. The time required for each calibration is approximately 2 hours, using the dc and low frequency 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. Table 1 lists the manufacturer's model number or the military designator for the TI's to be calibrated with this procedure. Table 1 also contains a reference to specific tables for the performance specifications and adjustments required for each TI to be calibrated.

Table 1. Test Instrument

Manufacturers	Models or military designators	Tables for specifications, calibration performance limits, and figures for adjustments	
		Tables	Figures
---	AN/PSM-45	3	3
---	AN/PSM-6( )/U	4	4
---	AN/USM-189	21	15
---	AN/USM-303	16	12
---	AN/USM-319	15	11
---	AN/USM-319A	15	11
---	ME-297/U	5	5
---	ME-77( )/U	6	N/A
---	TS-297( )/U	7	N/A
---	TS-352( )/U	8	6
Simpson	160	10	8
Simpson	255	9	7
Simpson	260	10	8
Simpson	260-3	10	8
Simpson	260-4/260-4M	11	9
Simpson	260-5/260-5M	11	9

Table 1. Test Instrument - Continued.

Manufacturers	Models or military designators	Tables for specifications, calibration performance limits, and figures for adjustments	
		Tables	Figures
Simpson	260-6/260-6M	11	9
Simpson	260-6P	11	9
Simpson	260-6XLP	10	8
Simpson	260-7, 260-7M, 260-7P, and 260-7PM	11	9
Simpson	261	12	10
Simpson	261-2	12	10
Simpson	262	13	N/A
Simpson	269	14	N/A
Simpson	269 Series I	14	N/A
Simpson	269 Series II	15	11
Simpson	269 Series III	15	11
Simpson	270	11	9
Simpson	270-3	12	10
Simpson	270-4	12	10
Western Reserve Electronics	300M	16	12
Simpson	303	17	13
Triplett	310	18	N/A
Triplett	310C	18	N/A
Simpson	313	19	14
Simpson	467	3	3
Triplett	630	20	N/A
Triplett	630A	21	15
Triplett	630NA	21	15
Triplett	630NS	21	15
Triplett	630PL	22	N/A
Triplett	630PLK	22	N/A
Triplett	666HH	23	N/A
Triplett	666R	23	N/A
Weston	785	24	N/A

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 or meet a 4 to 1 ratio with the specifications of the TI being checked. The accuracies listed in table 2 provide a four-to-one ratio between the standard and TI.

5. Accessories Required. The accessories needed for these calibrations must be selected by the calibration technician.

Table 2. Minimum Specifications of Equipment Required

Item	Common name	Minimum use specifications[1]	Manufacturer and model (part number)
A1	AC CALIBRATOR	Range: 0 to 1060 V, 30 Hz to 100 kHz Accuracy: ±0.125%	Hewlett-Packard, Model 745AOPTC93 (745AOPTC93) w/HV amplifier C90-746A (C90-746A)
A2	AMMETER CALIBRATOR	Range: 0 to 500 A 50 to 1000 Hz Accuracy:[2]	Holt, Model 250 (7912648)
A3	DC CURRENT SHUNT	Range: 0 to 51 A Accuracy:[3]	Guildline, Model 9711 (7912323)
A4	DC POWER SUPPLY	Range: 0 to 30 A	NJE, Model CS36CR30D2 (7907346-2)
A5	DC POWER SUPPLY	Range: 30 to 51 A	Sorenson, Model 20-250
A6	DC VOLTAGE DIVIDER	Range: .001 to .01 Accuracy:[4]	ESI, Model RV722 (RV722)
A7	DC VOLTAGE STANDARD	Range: 0 to 1040 V Accuracy: ±0.025%[4]	John Fluke, Model 332B/AF (332B/AF)
A8	DECADE RESISTOR	Range: 0 to 10 kΩ	Winslow, Model 336 (7907234) or Clarostat, Model 240C
A9	DIGITAL VOLTMETER	Range: Dc: 0 to 101 mV Ac: 0 to 1.05 V Accuracy:[2, 3]	Hewlett-Packard, Model 3490AOPT060 (3490AOPT060) Dana, Model 5000, or Dana, Model 5000 w/641
A10	POWER SUPPLY	Range: 0 to 6300 V dc Accuracy: ±0.25%	John Fluke, Model 410B (MIS-10230)
A11	PRECISION OSCILLATOR	Range: 0 to 125 V ac 50 to 1000 Hz	Krohn-Hite, Model 4100AR-8 (7915951) w/amplifier 7500 (7500)
A12	RESISTANCE STANDARD	Range: 0 to 1.1 MΩ Accuracy: ±0.062%[2 3]	Biddle-Gray, Model 601147-1 (7910328)
A13	RESISTANCE STANDARD	Range: 1 to 10 MΩ Accuracy: ±0.062%	ICC, Model CR10M (8598965)
A14	RESISTANCE STANDARD	Range: 10 to 20 MΩ Accuracy: ±0.25%	ICC, Model CR100M (8598966)

[1]The ranges and accuracies listed reflect the highest range required and the best accuracy required, respectively, in this technical bulletin.
[2]Combined accuracy of (A2) and (A9), ±0.125%.
[3]Combined accuracy of (A3) and (A9), ±0.062%.
[4]Combined accuracy of (A6) and (A7), ±0.062%.

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 table 2.

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.

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 manufacturers' manuals and/or technical manuals for the TI.

c. This is a general procedure which provides instructions for the calibration of a variety of multimeters.

NOTE

Unless otherwise specified, all controls and control settings refer to the TI.

7. Equipment Setup

a. If necessary, mechanically zero meter pointer, using adjustment screw on meter face.

b. Connect test leads to TI COM (GND) and VOA jacks.

8. Dc Current

a. Performance Check

(1) Set function switch to dc amps and range switch to the first dc current range listed in the calibration performance specifications and adjustments table for the TI being calibrated.

(2) Connect equipment as shown in figure 1.

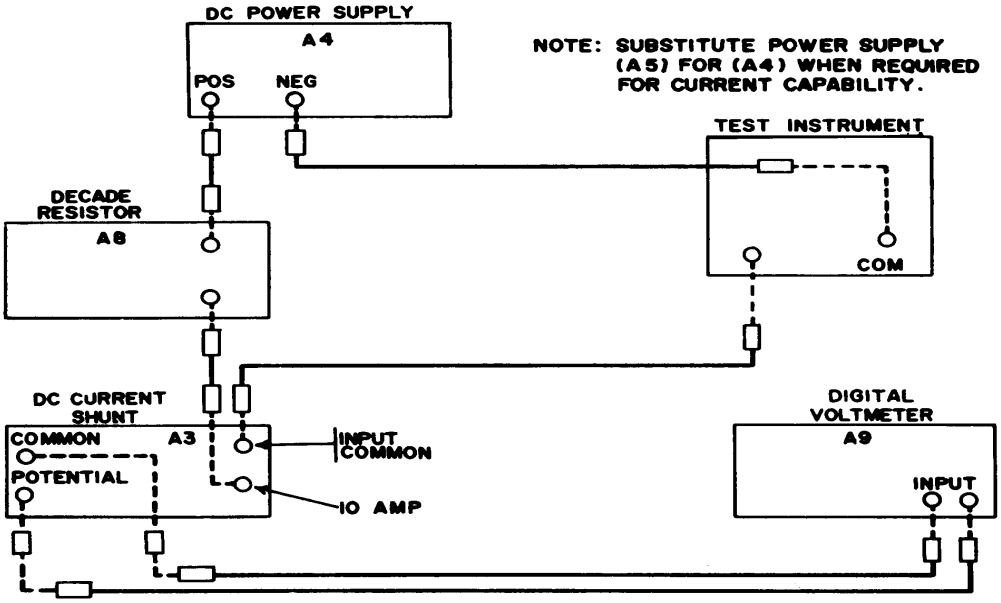


Figure 1. Dc current - equipment setup.

NOTE

Position dc current shunt (A3) range plugs as required for range being calibrated. Also set decade resistor (A8) controls as required for current limiting and remove when current exceeds decade resistor current capability.

(3) Adjust dc power supply (A4) and decade resistor as necessary for the required indication on TI. If digital voltmeter does not indicate within limits specified, and an adjustment is listed, adjust dc power supply until digital voltmeter indicates nominal value and then perform adjustment for required indication on TI.

(4) Repeat technique of (3) above for the remaining dc current ranges.

b. Adjustments. No further adjustments can be made.

9. Dc Voltage

a. Performance Check

(1) Set function switch to dc volts and range switch to first dc voltage range listed in calibration performance specifications and adjustments table for TI being calibrated.

(2) Connect TI to dc voltage standard (A7), observing polarity.

(3) Adjust dc voltage standard output for required indication on TI. If dc voltage standard does not indicate within limits specified, and an adjustment is listed, adjust dc voltage standard for nominal value and perform adjustment for required indication on TI.

NOTE

Substitute power supply (A10) for dc voltage standard as required.

(4) Repeat technique of (3) above for the remaining dc voltage ranges.

b. Adjustments. No further adjustments can be made.

10. Ac Voltage

a. Performance Check

(1) Set function switch to ac volts and range switch to first ac voltage range listed in calibration performance limits and adjustments table for TI being calibrated.

(2) Connect TI to ac calibrator (A1).

(3) Adjust ac calibrator frequency for 60 Hz and output for required indication on TI. If ac calibrator does not indicate within limits specified, and an adjustment is listed, adjust ac calibrator for nominal value and then perform adjustment for required indication on TI.

(4) Repeat (3) above for remaining frequencies listed for range.

(5) Repeat technique of (3) and (4) above for the remaining ac voltage ranges.

b. Adjustments. No further adjustments can be made.

11. Ac Current

a. Performance Check

(1) Set function switch to ac amps and range switch to first ac current range listed in calibration performance limits and adjustments table for TI being calibrated.

(2) Connect equipment as shown in figure 2A or B.

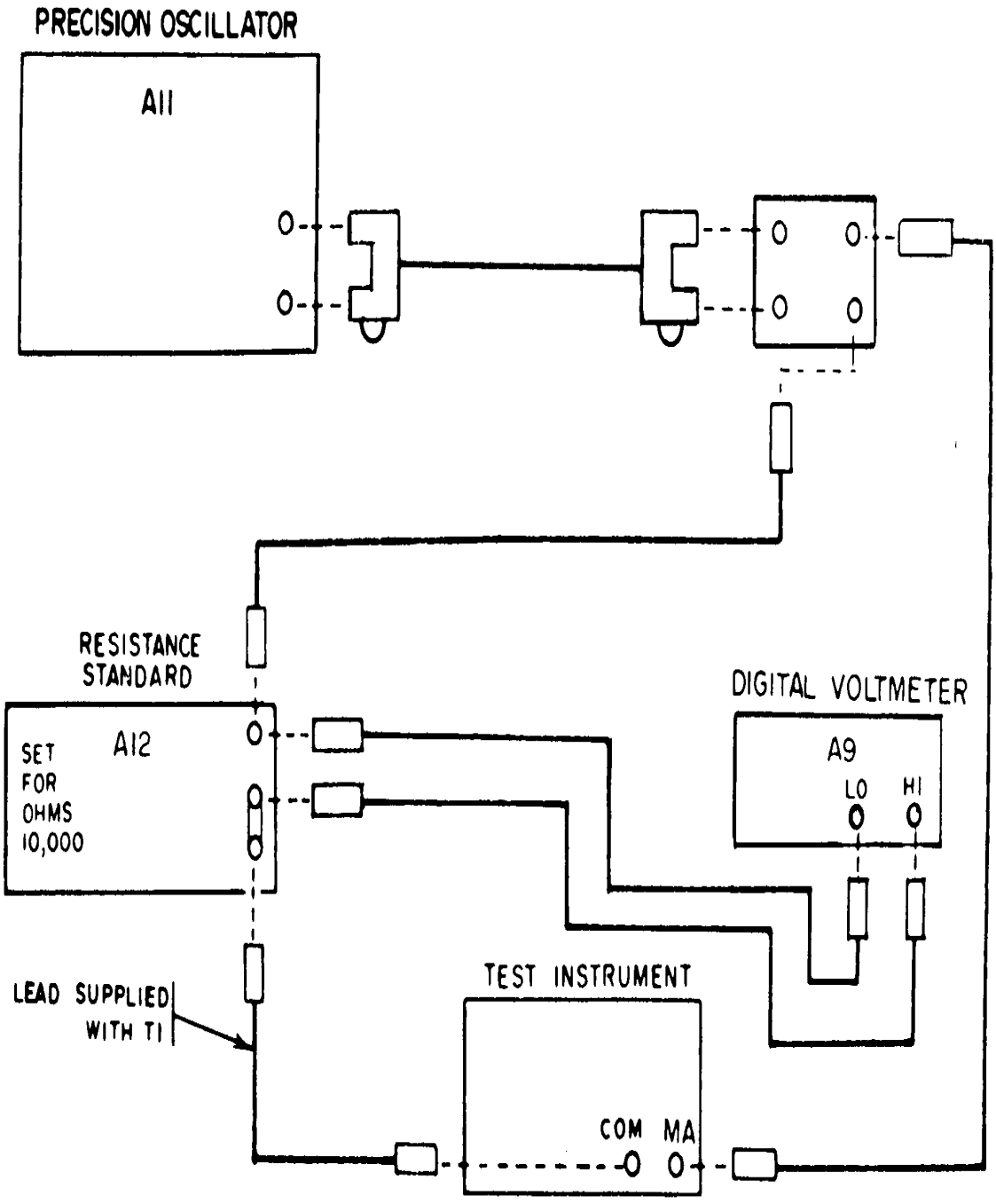


Figure 2A. Ac current - equipment setup.

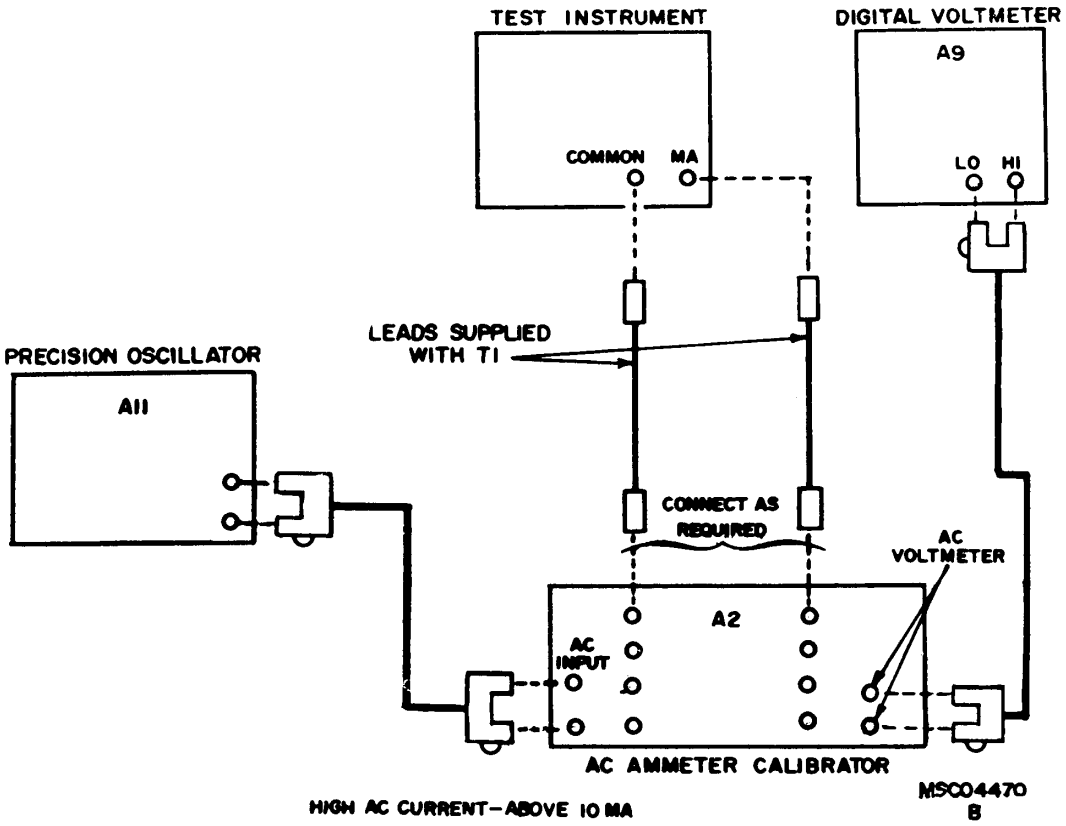


Figure 2B. Ac current - equipment setup.

(3) Adjust precision oscillator (A11) frequency for 60 Hz and output as needed to obtain required indication on TI. If digital voltmeter (A9) does not indicate within limits specified, and an adjustment is listed, adjust precision oscillator output until digital voltmeter indicates nominal value (1.000 V ac) and then perform adjustment for required indication on TI.

(4) Repeat (3) above at low (50 Hz) and high (as applicable) (1000 Hz maximum) frequency listed for TI.

(5) Repeat technique of (3) and (4) above for the remaining ac current ranges.

b. Adjustments. No further adjustments can be made.

12. Resistance

a. Performance Check

(1) Set function switch to OHMS and range switch to first ohms range listed in calibration performance limits and adjustments table for TI being calibrated.

(2) Short test leads together and adjust OHMS ADJUST for 0 indication on TI OHMS scale.

NOTE

Perform (2) above for each range prior to making resistance check on the range.

(3) Connect TI to resistance standard (A12).

(4) Adjust resistance standard for required indication on TI. If resistance standard does not indicate within limits specified, and an adjustment is listed, adjust resistance standard for nominal value and perform adjustment for required indication on TI.

(5) Repeat technique of (2) through (4) above for the remaining ohms ranges.

NOTE

Connect resistance standards (A12), (A13), and (A14) in series as needed to obtain required resistance values.

b. Adjustments. No further adjustments can be made.

Table 3. Calibration Description for AN/PSM-45 and Simpson, Model 467

Test instrument parameters	Performance specifications
Dc voltage	Range: 0 to ±1000 V in 5 ranges w/probe 5000 V Accuracy: ±(0.1% of input +1 count) probe ±5%
Dc current	Range: 0 to ±2000 mA in 5 ranges. 10 A w/shunt Accuracy: 200 µA, 2 and 20 mA ranges, ±(0.5% of input +1 count) 200 and 2000 mA ranges, 10 A w/shunt ±(0.75% of input +1 count) ±.25% for shunt
Ac voltage	Range: 0 to 750 V in 5 ranges w/probe 0-5000 V Accuracy: 200 mV, 2, 20, and 200 V ranges, 20 to 40 Hz, ±(1.5% of input +5 counts); 40 Hz to 1 kHz, ±(0.5% of input +5 counts); 1 to 5 kHz, ±(5% of input +5 counts) 750 V range, 20 to 40 Hz, ±(1.5% of input +5 counts); 40 to 400 Hz, ±(0.5% of input +5 counts) probe ±5%[1]
Deleted	Deleted
Resistance	Range: 0 to 20 MΩ in 6 ranges Accuracy: 200Ω, 2, 20, 200, and 2000 kΩ, ±(0.25% of input +1 count) 20 MΩ, ±(1% of input +1 count)

[1]Probe not calibrated on ac.

Table 3. Calibration Description for AN/PSM-45 and Simpson, Model 467 - Continued

Calibration Performance Limits and Adjustments Dc Voltage				
Test instrument		Dc voltage standard indications (V)		Test instrument adjustments (fig. 3)
Dc volts ranges	Indications (V)	Min	Max	
200	0 Bar segment	---	---	Short test leads and if necessary adjust R111.
200 mV	20 Bar segment	0.200	0.200	R126
200 mV	190.00 mV	0.18970	0.19030	R227 (R)
2	1.900	1.8970	1.9029	---
2	1.400	1.3976	1.4024	---
2	1.000	0.9980	1.0020	---
2	0.800	0.7982	0.8018	---
2	0.400	0.3986	0.4014	---
20	19.00	18.971	19.029	---
200	190.0	189.71	190.29	---
1000	1000	998.0	1002.0	---
200[1]	100	948.0	1052.0	---

[1]Use probe supplied with TI.

Dc current				
Test instrument		Digital voltmeter indications (mV dc)		Test instrument adjustments
Dc MA Ranges	Indications (MA)	Min	Max	
200 µA	190 µA	18.895	19.105	None
2	1.90	18.895	19.105	
20	19.00	18.895	19.105	
200	190.0	18.847	19.152	
2000	1900	18.847	19.152	
200 mV[1]	100 mV	99.64	100.36	

[1]External 10 A shunt supplied with TI. Set TI range switch to 200 mV dc. Disconnect decade resistor.

Ac Voltage					
Test Instrument		Ac Calibrator			Test instrument adjustments (fig. 3)
			Indications		
Ac volts ranges	Indications	Frequency	Min	Max	
200 mV	-00.5 to +00.5	---	---	---	Short leads and if necessary adjust R206
200 mV	190.0 mV	1 kHz	188.55 mV	191.45 mV	R203 (R)
2 V	1.900 V	5 kHz	1.8000 V	2.0000 V	C101 (R)

Table 3. Calibration Description for AN/PSM-45 and Simpson, Model 467 - Continued

Ac Voltage					
Test Instrument		Ac Calibrator			Test instrument adjustments (fig. 3)
Ac volts ranges	Indications	Frequency	Indications Min	Indications Max	
2 V	1.900 V	30 Hz[4]	1.8665 V (1.8855)	1.9335 V (1.9145)	---
2 V	1.900 V	100 Hz	1.8855 V	1.9145 V	
200 mV	190.0 mV	100 Hz	188.55 mV	191.45 mV	---
200 mV	190.0 mV	30 Hz[4]	186.65 mV (188.55)	193.35 mV (191.45)	---
200 mV	190.0 mV	5 kHz	180.00 mV	200.00 mV	---
20 V	19.00 V	5 kHz	18.00 V	20.00 V	---
20 V	19.00 V	100 Hz	18.855 V	19.145 V	---
20 V	19.00 V	30 Hz[4]	18.665 V (18.855)	19.335 V (19.145)	---
200 V	190.0 V	30 Hz[4]	186.65 V (188.55)	193.35 V (19.145)	---
200 V	190.0 V	100 Hz	188.55 mV	191.45 V	---
200 V	190.0 V	5 kHz	180.00 V	200.00 V	---
750 V	750 V	40 Hz[4]	733.75 V (745.75)	766.25 V (754.25)	---
750 V	750 V	400 Hz	741.25 V	758.75 V	---

[1] Deleted
[2] Deleted
[3] Deleted
[4]Check at 50 Hz and use values in parenthesis when substituting an ac calibrator not specified at 30 Hz.

Resistance

Test instrument		Resistance standard indications (Ω)		Test instrument adjustments
Ohms Ranges	Indications (Ω)	Min	Max	
200	190.0	189.4	190.6	None
2 k	1.900 k	1.894 k	1.906 k	
20 k	19.00 k	18.94 k	19.06 k	
200 k	190.0 k	189.4 k	190.6 k	
2000 k	1900 k	1894 k	1906 k	
20 M	19	18.8 M	19.2 M	

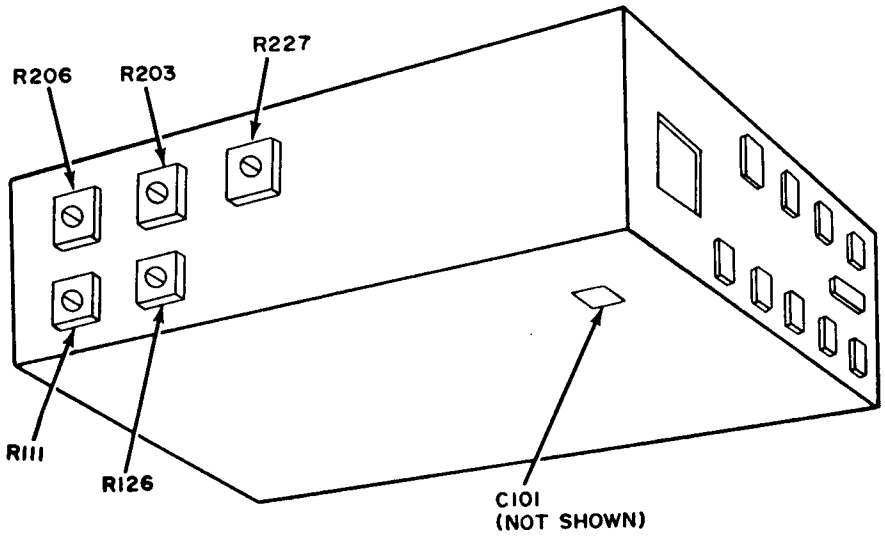


Figure 3. AN/PSM-45 and Simpson, Model 467.

Table 4. Calibration Description for AN/PSM-6 Series

Test instrument parameters	Performance specifications
Dc current	Range: 0 to 10 A Accuracy: ±3% of FS
Dc voltage	Range: 0 to 5000 V Accuracy: ±3% of FS
Ac voltage	Range: 0 to 1000 V Accuracy: ±4% of FS
Resistance	Range: 0 to 10 MΩ Accuracy: ±3% of arc length

Calibration Performance Limits and Adjustments

Dc current

Test instrument		Digital voltmeter indications (mV dc)		Test instrument adjustments
Dc MA ranges	Indications (0 to 2.5 dc scale)	Min	Max	
100 µA SPEC FUNC switch	2.5	97	103	None
.5	2.5	48.5	51.5	
2.5	2.5	24.25	25.75	
10	2.5	97	103	
50	2.5	48.5	51.5	
250	2.5	24.25	25.75	
500	2.5	48.5	51.5	

Table 4. Calibration Description for AN/PSM-6 Series

Calibration Performance Limits and Adjustments - Continued Dc current				
Test instrument		Digital voltmeter indications (mV dc)		Test instrument adjustments
Dc MA ranges	Indications (0 to 2.5 dc scale)	Min	Max	
1000	2.5	97	103	
1000	1.5	57	63	
1000	.5	17	23	
2.5[1]	2.5	24.25	25.75	
10[1]	2.5	97	103	

[1]Connect TI multirange shunt MX-1409/U into equipment setup, observing meter and load connections.

Dc Voltage

Test instrument	Test instrument	DC voltage standard indications (V)	DC voltage standard indications(V)	Test instrument adjustments
Dc volts ranges	Indications(0 to 2.5 dc scale)	Min	Max	
.5[1]	2.5	0.485	0.515	None
2.5	2.5	2.425	2.575	
10	2.5	9.7	10.3	
50	2.5	48.5	51.5	
250	2.5	242.5	257.5	
500	2.5	485	515	
1000	2.5	970	1030	
1000[2]	2.5	970	1030	
500[3]	2.5	4850	5150	

[1]Function switch to 20KΩ/V.
[2]Function switch 1K/V.
[3]Function switch to 20KΩ/V. Connect high voltage adapter MX-1410/U in circuit

Ac Voltage

Test Instrument		Ac calibrator indications (V)[1]		Test instrument adjustments (fig. 4)
Ac volts ranges	Indications (0 To 2.5 ac scale)	Min	Max	
50	2.5	48	52	R132 (R)
2.5	2.5	2.4	2.6	- - -
10	2.5	9.6	10.4	- - -
250	2.5	240	260	- - -
500	2.5	480	520	- - -
1000	2.5	960	1040	- - -

[1]Adjust frequency for 60 Hz.

Table 4. Calibration Description for AN/PSM-6 Series - Continued.

Resistance

Test instrument		Resistance standard indications (Ω)		Test instrument adjustments
Resistance ranges[1]	Indications (Ohms scale) (Ω)	Min	Max	
X1	25	22	28	None
X10	25	220	280	
X100	25	2200	2800	
X1000	25	22,000	28,000	
X10,000	25	220,000	280,000	

[1]Short leads and adjust OHMS ZERO control for 0 indication on TI ohms scale. Repeat for each range.

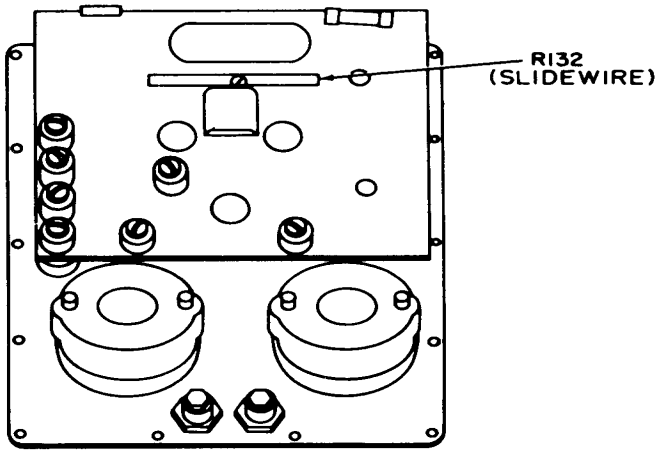


Figure 4. AN/PSM-6 Series - rear view

Table 5. Calibration Description for ME-297/U

Test instrument parameters	Performance specifications
Ac volts	Range: 0 to 2.5, 10, 50, 250, 500, 1000 V at 1000Ω per V 0 to 5000 V at 1000Ω per V Accuracy: FS ±4% from 0 to 500 V ±5% at 1000 V +7% at 5000 V
Dc volts	Range: 0 to 0.5, 2.5, 10, 50 250, 500, and 1000 V at 1000 or 20,000Ω per V 0 to 5000 V at 1000Ω and 20,000Ω per V Accuracy: FS ±3% from 0 to 500 V at 1000 and 20,000Ω per V ±3% at 1000 V at 1000Ω per V ±4% at 1000 V at 20,000Ω per V ±6% at 5000 V at 20,000Ω per V and 1 kΩ

Table 5. Calibration Description for ME-297/U - Continued.

Test instrument parameters	Performance specifications
Dc current	Range: 0 to 0.25, 1.0, 2.5, 50, 100, 500, and 2500 mA 0 to 10 A Accuracy: ±3% of FS
Resistance	Range: 0 to 10 MΩ in 5 ranges Accuracy: ±3% FS of meter arc length

Calibration Performance Limits and Adjustments

Dc Current

Test instrument		Digital voltmeter indications (mV dc)		Test instrument adjustments (fig. 5)
Dc MA ranges	Indications (MA)	Min	Max	
.25	.25	24.2	25.7	R50 (R)
2.5	2.5	24.2	25.7	- - -
10	10	97	103	- - -
50	50	48.5	51.5	- - -
100	100	97	103	- - -
500	500	48.5	51.5	- - -
2500	2500	24.2	25.7	- - -
10 A	10 A	97	103	- - -

Dc Voltage

Test instrument		Dc voltage standard indications (V)		Test instrument adjustments
Dc volts ranges	Indications (V)	Min	Max	
2.5[1]	2.5	2.425	2.575	None
10	10	9.7	10.3	
10	7	6.7	7.3	
10	3	2.7	3.3	
50	50	48.5	51.5	
250	250	242.5	257.5	
500	500	485	515	
1000	1000	970	1030	
5000[2]	5000 (700)	4700 (400)	5300 (1000)	
5000[2, 3]	5000 (700)	4700 (400)	5300 (1000)	
1000	1000	960	1040	
500	500	485	515	
250	250	242.5	257.5	
50	50	48.5	51.5	
10	10	9.7	10.3	
2.5	2.5	2.425	2.575	
.5	.5	.485	.515	

[1]Function switch to dc volts 1K/V.
[2]Calibrate at 700 V if item A10 is not available.
[3]Function switch to dc volts 20KΩ/V.

Table 5. Calibration Description for ME-297/U - Continued.

Ac Voltage

Test instrument		Ac calibrator indications (V)[1]		Test instrument adjustments (fig. 5)
Ac volts ranges	Indications (V)	Min	Max	
50	50	48	52	R42 (R)
2.5	2.5	2.4	2.6	R41 (R)[2]

[1]Adjust frequency for 400 Hz.

[2]Recheck 50-V range and, if necessary, readjust R42 and R41 for best in-tolerance compromise.

Resistance				
Test instrument		Resistance standard indications (Ω)		Test instrument adjustments
Resistance ranges[1]	Indications (Ω)	Min	Max	
X1	0[2]	- - -	- - -	Short leads together adjust OHMS ZERO for a 0 indication on TI
X1	25	22.0	28.0	
X10	25	220	280	
X100	25	2200	2800	
X1000	25	22,000	28,000	
X10,000	25	220,000	280,000	Open leads and adjust OHMS INF for infinity indication on TI.

[1]Adjust OHMS ZERO and OHMS INF controls for each range.

[2]If zero indication cannot be obtained, set ZERO OHMS control to midposition, short leads, and adjust R36 (fig. 5) for zero indication.

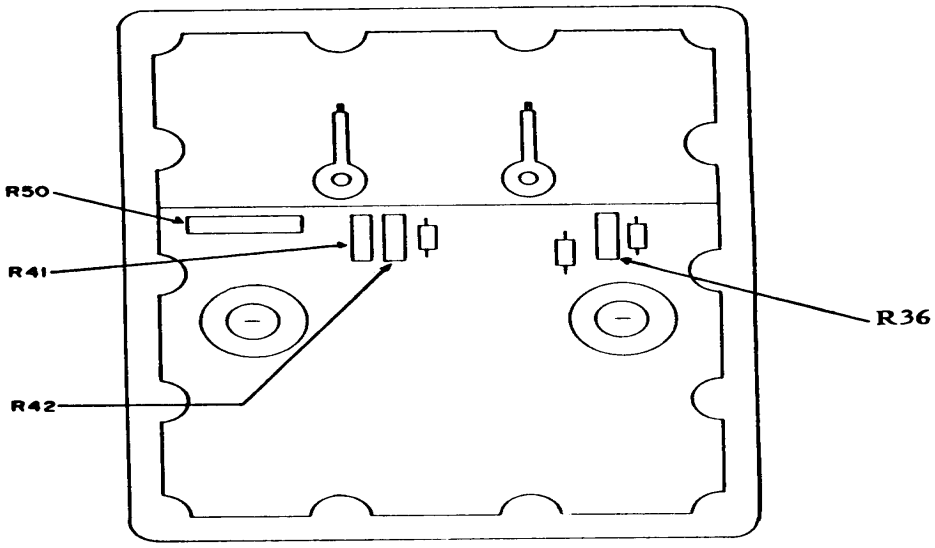


Figure 5. ME-297/U - rear view.

Table 6. Calibration Description for ME-77/U Series

Test instrument parameters	Performance specifications
Dc voltage	Range: 0 to 1000 V Accuracy: ±3% of FS
Ac voltage	Range: 0 to 1000 V Accuracy: ±4% of FS
Resistance	Range: 0 to 20 MΩ Accuracy: ±5% of reading

Calibration Performance Limits and Adjustments

Dc Voltage

Test instrument		Dc voltage standard indications (V)		Test instrument adjustments
Dc volts ranges	Indications (V)	Min	Max	
1	1	0.97	1.03	None
10	10	9.7	10.3	
10	6	5.7	6.3	
10	2	1.7	2.3	
100	100	97	103	
1000	1000	970	1030	

Ac voltage

Test Instrument		Ac Calibrator			Test instrument adjustments
Ac volts ranges	Indications (V)	Frequency (Hz)	Indications (V) Min	Indications (V) Max	
10	10	60	9.6	10.4	None
10	10	400	9.6	10.4	
100	100	60	96	104	
100	100	400	96	104	
1000	1000	60	960	1040	
1000	1000	400	960	1040	

Resistance

Test instrument		Resistance standard indications (Ω)		Test instrument adjustments
Resistance ranges[1]	Indications Ohms scale (Ω)	Min	Max	
X1	100	95	105	None
X10	100	950	1050	
X100	100	9.5 K	10.5 K	
X1K	100	95 K	105 K	
X10K	100	950 K	1050 K	

[1]Short leads and adjust OHMS ADJ for ZERO indication on ohms scale. Repeat for each range.

Table 7. Calibration Description for TS-297/U

Test instrument parameters	Performance specifications
Dc voltage	Range: 0 to 1000 V Accuracy: ±3% of FS
Ac voltage	Range: 0 to 1000 V Accuracy: ±5% of FS
Dc current	Range: 0 to 400 mA Accuracy: ±3% of FS
Resistance	Range: 0 to 100 kΩ Accuracy: ±5% of reading

Calibration Performance Limits and Adjustments

Dc Current

Test instrument		Digital voltmeter indications (mV dc)		Test instrument adjustments
Dc MA ranges	Indications (MA)	Min	Max	
4	4	38.8	41.2	None
40	40	38.8	41.2	
100	100	97	103	
400	400	38.8	41.2	

Dc Voltage

Test instrument		Dc voltage standard indications (V)		Test instrument adjustments
Dc volts ranges	Indications (V)	Min	Max	
4	4	3.88	4.12	None
10	10	9.7	10.3	
10	7.5	7.2	7.8	
10	2.5	2.2	2.8	
100	100	97	103	
400	400	388	412	
1000	1000	970	1030	

Ac Voltage

Test Instrument		Ac calibrator indications (V)[1]		Test instrument adjustments
Ac volts ranges	Indications (V)	Min	Max	
4	4	3.8	4.2	None
10	10	9.5	10.5	
10	7.5	7.0	8.0	
10	2.5	2.0	3.0	
100	100	95	105	
400	400	380	420	
1000	1000	950	1050	

[1]Adjust frequency for 60 Hz.

Table 7. Calibration Description for TS-297/U - Continued

Resistance				
Test Instrument		Resistance standard indications (Ω)		Test instrument adjustments
Resistance ranges	Indications (Ω)	Min	Max	
RX1	30	28.5	31.5	None
RX10	300	285	315	
RX100	3000	2850	3150	

[1]Short leads and adjust OHMS ZERO adjust for 0 on OHMS scale. Repeat for each range.

Table 8. Calibration Description for TS-352( )/U Series

Test instrument parameters	Performance specifications
Resistance	Range: 0 to 10,000,000Ω Accuracy: ±3% (percent values are in terms of meter arc length, not of Ω indicated by meter pointer)
Dc voltage	Range: 0 to 1000 V at 1000Ω per V Accuracy: ±3% of FS Range: 0 to 1000 V at 20,000Ω per V Accuracy: ±4% of FS Range: 0 to 5000 V at 20,000Ω per V Accuracy: ±6% of FS
Ac voltage	Range: 0 to 500 V at 1000Ω per V Accuracy: ±4% at 400 Hz, ±7% at 10 kHz of FS Range: 1000 V at 1000Ω per V Accuracy: ±5% at 400 Hz, ±8% at 10 kHz of FS
Dc current	Range: 0 to 10 A Accuracy: ±3% of FS

Calibration Performance and Adjustments Limits

Dc Voltage

Test instrument		Dc voltage standard indications (V)		Test instrument adjustments
Dc volts ranges	Indications (V)	Min	Max	
2.5[1]	2.5	2.40	2.60	None
10	10	9.60	10.40	
10	6	5.60	6.40	
10	2	1.60	2.40	
50	50	48.0	52.0	
250	250	240.0	260.0	
500	500	480.0	520.0	
1000	1000	960	1040	
5000[2]	5000 (700)	4700 (400)	5300 (1000)	
1000[3]	1000	970	1030	
500	500	485	515	
250	250	242.5	257.5	

See footnote at end of table.

Table 8. Calibration Description for TS-352( )/U Series - Continued.

Dc Voltage - Continued				
Test Instrument		Dc Voltage Standard Indications (V)		Test instrument adjustments
Dc volts ranges	Indications (V)	Min	Max	
50	50	48.5	51.5	None
10	10	9.7	10.3	
2.5	2.5	2.425	2.575	

[1]Set function switch to 20,000Ω/V.
[2]Connect lead between 2.5 V on multimeter and 2.5 V on high voltage divider. Calibrate at 700 V if item A10 is not available.
[3]Set function switch to 1000Ω/V. Remove lead connected above.

Ac Voltage					
Test instrument		Ac calibrator indications (V)			Test instrument adjustments (fig. 6)
Ac volts ranges	Indications (V)	Frequency	Min	Max	
2.5	2.5	400	2.40	2.60	Ac voltage adj. (R)
2.5	2.5	10 K	2.325	2.675	- - -
1000	1000	400	950	1050	- - -

Dc Current				
Test instrument		Digital voltmeter indications (MV dc)		Test instrument adjustments
Dc amps ranges	Indications	Min	Max	
250 µA	250 µA	24.25	25.75	None
2.5 MA	2.5 MA	24.25	25.75	
10 MA	10 MA	97	103	
50 MA	50 MA	48.5	51.5	
100 MA	100 MA	97	103	
500 MA	500 MA	48.5	51.5	
2.5 A	2.5 A	24.25	25.75	
10 A	10 A	97	103	

Resistance				
Test instrument		Resistance standard indications (Ω)		Test instrument adjustments
Resistance ranges[1]	Indications (Ω)	Min	Max	
RX1	25	22	28	None
RX10	250	220	280	
RX100	2.5 k	2200	2800	
RX1000	25 k	22,000	28,000	
RX10,000	250 k	220,000	280,000	

[1]Short leads and adjust OHMS ZERO ADJ control for 0 indication on ohms scale. Repeat for each range.

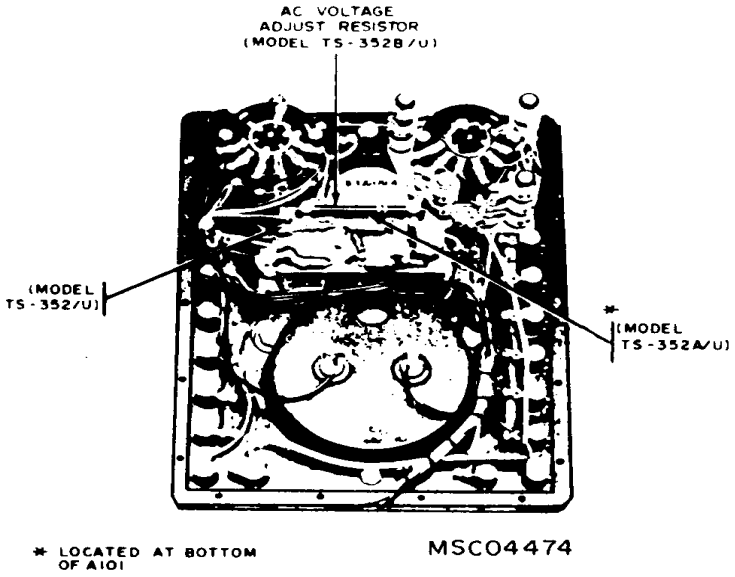


Figure 6. TS-352( )/U - rear view.

Table 9. Calibration Description for Simpson, Model 255

Test instrument parameters	Performance specifications
Dc voltage	Range: 0 to 1000 V Accuracy: ±2% of FS
Dc current	Range: 0 to 500 mA Accuracy: ±1% of FS for 50 µA range ±2% of FS for all other ranges
Ac voltage	Range: 0 to 1000 V Accuracy: ±3% of FS
Resistance	Range: 0 to 20 MΩ Accuracy: ±2.5° of arc, RX1 range ±2.0° of arc, all other ranges
Ac current	Range: 0 to 250 A Accuracy: ±5% of FS

Calibration Performance Limits and Adjustments

Dc Current

Test instrument		Digital voltmeter indications (mV dc)		Test instrument adjustments (fig. 7)
Dc MA ranges	Indications	Min	Max	
50 µA	50 µA	49.5	50.5	R29 (R)
1 mA	1 mA	98	102	- - -
10 mA	10 mA	98	102	- - -
100 mA	100 mA	98	102	- - -
500 mA	500 mA	49.0	51.0	R17 (R)

See footnote at end of table.

Table 9. Calibration Description for Simpson, Model 255 - Continued.

Dc Voltage				
Test instrument		Dc voltage standard indications (V)		Test instrument adjustments (fig. 7)
Dc volts ranges	Indications (V)	Min	Max	
50 mV	50 m	.049	.051	R27 (R)
250 mV	250 m	.245	.255	R27
1	1	.98	1.02	---
1	.6	.58	.62	---
1	.4	.38	.42	---
2.5	2.5	2.45	2.55	---
10	10	9.8	10.2	---
50	50	49	51	---
250	250	245	255	---
1000	1000	980	1020	---

Ac Voltage				
Test instrument		Ac calibrator indications (V)[1]		Test instrument adjustments (fig. 7)
Ac volts ranges	Indications (V)	Min	Max	
2.5	2.5	2.425	2.575	R28 (R)
10	10	9.7	10.3	---
50	50	48.5	51.5	---
250	250	242.5	257.5	R23 (R)
1000	1000	970	1030	---

[1]Adjust frequency for 400 Hz.

Resistance				
Test instrument		Resistance standard indications (Ω)		Test instrument adjustments
Resistance ranges[1]	Indications (Ohms scale) (Ω)	Min	Max	
RX1	12	11.2	12.5	None
RX100	1200	1140	1220	
RX10,000	120,000	114,000	122,000	

[1]Short leads and adjust ZERO OHMS control for 0 indication on ohms scale. Repeat for each range.

Ac Current[1]				
Test instrument		Digital voltmeter indications (V Ac)		Test instrument adjustments
Ac amps[2] ranges	Indications	Min	Max	
5	5	.95	1.05	None
25	25	.95	1.05	
100	100	.95	1.05	
250	250	.95	1.05	

[1]Perform if TI is supplied with ac clamp-on adapter.

[2]Set TI range switch to 2.5 V, ac amps. Calibrate at 60 Hz.

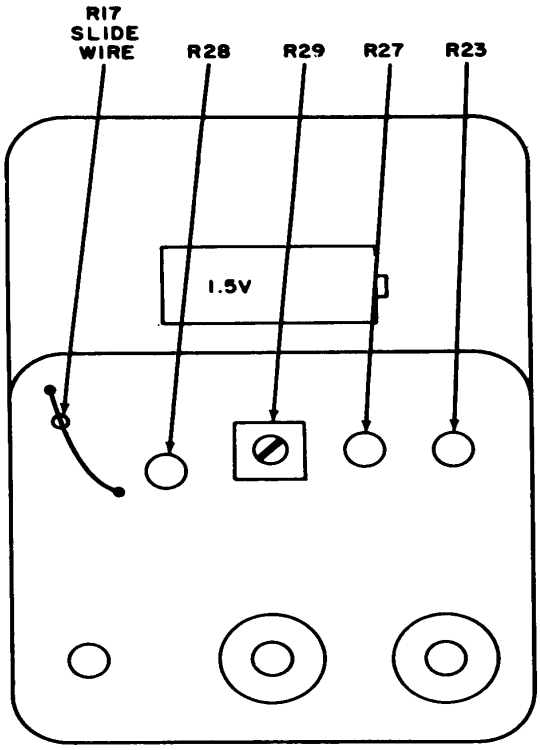


Figure 7. Simpson, Model 255 - rear view.

Table 10. Calibration Description for Simpson, Models 160, 260, 260-3, and 260-6XLP

Test instrument parameters	Performance specifications			
	Model 160	Model 260	Model 260-3	Model 260-XLP
Dc voltage Range: Accuracy:	 0 to 1000 V ±2% of FS	 0 to 5000 V ±3% of FS	 0 to 5000 V ±3% of FS	 0 to 1000 V ±2% of FS
Dc current Range: Accuracy:	 0 to 500 mA ±3% of FS	 0 to 10 A ±3% of FS	 0 to 10 A ±3% of FS	 0 to 5 A ±1% of FS, 50 µA ±2% of FS, all other ranges
Ac voltage Range: Accuracy:	 0 to 1000 V ±3% of FS	 0 to 5000 V ±5% of FS	 0 to 5000 V ±3% of FS	 0 to 1000 V ±3% of FS
Resistance Range: Accuracy:	 0 to 3 MΩ ±3° of arc	 0 to 20 MΩ ±3° of arc	 0 to 20 MΩ ±3° of arc	 0 to 20 MΩ ±2.5° of arc RX1 range ±2° of arc, all other ranges

Table 10. Calibration Description for Simpson, Models 160, 260, 260-3, and 260-6XLP - Continued.

Calibration Performance Limits and Adjustments Dc Current						
Test instrument [1, 6]		Digital voltmeter indications (mV dc)				Test instrument adjustments (fig. 8)
Dc amps ranges	Indications	Models 260, 160, and 260-3		Model 260-6XLP		
		Min	Max	Min	Max	
50 µA	50 µA	48.5	51.5	49.5	50.5	[2]
100 µA	100 µA	97	103	---	---	---
.5 mA	.5 mA	---	---	49	51	[3]
.5 mA	.3 mA	---	---	29	31	---
.5 mA	.1 mA	---	---	9	11	---
1 mA	1 mA	97	103	---	---	[4]
1 mA	.6 mA	57	63	---	---	---
1 mA	.2 mA	17	23	---	---	---
5 mA	5 mA	---	---	49	51	---
10 mA	10 mA	97	103	---	---	---
50 mA	50 mA	---	---	49	51	---
100 mA	100 mA	97	103	---	---	---
500 mA	500 mA	48.5	51.5	49	51	---
5 A	5 A	---	---	49	51	---
10 A	10 A	97	103	---	---	[5]

[1]Dc amps ranges vary with the TI. Set range switch as appropriate for TI being calibrate.
[2]R2 for model 160, R1 for model 260-XLP (R)
[3]R3 for model 260-6XLP (R)
[4]R27 for model 260-3, R1 for model 160 (R)
[5]R22 for model 260-3 (R)
[6]The TI must be calibrated in the horizontal position.

Dc Voltage						
Test instrument [1, 3]		Dc voltage standard indications (V)				Test instrument adjustments
Dc volts ranges	Indications (V)	Models 260, 260-3		Models 160 and 260-6XLP		
		Min	Max	Min	Max	
1	1	---	---	.98	1.02	None
2.5	2.5	2.425	2.575	2.45	2.55	
10	10	9.7	10.3	9.8	10.2	
25	25	---	---	24.5	25.5	
50	50	48.5	51.5	49	51	
100	100	---	---	98	102	
250	250	242.5	257.5	245	255	
500	500	---	---	490	510	
1000	1000	970	1030	980	1020	
5000[2]	5000 (900)	4850 (750)	5150 (1050)	---	---	

[1]Dc volts ranges vary with the TI. Set range switch as appropriate for TI being calibrated.
[2]Calibrate at 900 V if item A10 is not available.
[3]The TI must be calibrated in the horizontal position.

Table 10. Calibration Description for Simpson, Models 160, 260, 260-3, and 260-6XLP - Continued

Ac Voltage						
Test instrument[1, 5]		Ac calibrator indications (V)[2]				Test instrument adjustments (fig. 8)
		Model 260		Models 160, 260-3 and 260-6XLP		
Ac volts ranges	Indications (V)	Min	Max	Min	Max	
250	250	237.5	262.5	242.5	257.5	[3]
2.5	2.5	2.375	2.625	2.425	2.575	[4]
10	10	9.5	10.5	9.7	10.3	- - -
25	25	- - -	- - -	24.25	25.75	- - -
50	50	47.5	52.5	48.5	51.5	- - -
100	100	- - -	- - -	97	103	- - -
500	500	- - -	- - -	485	515	- - -
1000	1000	950	1050	970	1030	- - -
5000	800	550	1050	650	950	- - -

[1]Ac volts ranges vary with TI. Set range switch as appropriate for TI being calibrated.
[2]Adjust frequency for 60 Hz.
[3]R31 for model 260-3, R43 for model 260-6XLP, R3 for model 160 (R).
[4]R28 for model 260-3, R40 for model 260-6XLP, R4 for model 160 (R).
[5]The TI must be calibrated in the horizontal position.

Resistance, Models 260 and 260-3				
Test instrument[2]		Resistance standard indications (Ω)		
Resistance ranges[1]	Indications ohms scale (Ω)	Min	Max	Test instrument adjustments
RX1	12	10.5	13.7	None
RX100	12	1050	1370	
RX10,000	12	105,000	137,000	

[1]Short leads and adjust ZERO OHMS control for 0 indication on ohms scale. Repeat for each range.

Resistance, Model 160				
Test Instrument		Resistance standard indications (Ω)		
Resistance ranges	Indications Ohms scale (Ω)	Min	Max	Test instrument adjustments
RX1	30	27	35	None
RX10	30	270	350	
RX100	30	2.7 k	3.5 k	
RX1K	30	27 k	35 k	
RX10K	30	270 k	350 k	

[1]Short leads and adjust ZERO OHMS control for 0 indication on ohms scale. Repeat for each range.

Table 10. Calibration Description for Simpson, Models 160, 260, 260-3, and 260-6XLP - Continued

Resistance, Model 260-6XLP				
Test Instrument [3]		Resistance standard indications (Ω)		
Resistance ranges	Indications Ohms scale (Ω)	Min	Max	Test instrument adjustments
LP RX1	20	17.2	22.0	[1]
LP RX10	20	172	220	- - -
RX1 [2]	6	5.35	6.75	- - -
RX100	6	555	650	- - -
RX1K	6	5550	6500	- - -
RX10K	6	55,500	65,000	- - -

[1]Short leads together. If TI does not indicate 0, adjust R2. Then, with leads separated, rotate the OHMS ADJ control to set the instrument pointer at infinity, (∞) on the blue low power ohms arc. If pointer cannot be adjusted to infinity, replace the 1.5 V battery.

[2]Short leads and adjust ZERO OHMS control for 0 indication on ohms scale. Repeat for each range.

[3]The TI must be calibrated in the horizontal position.

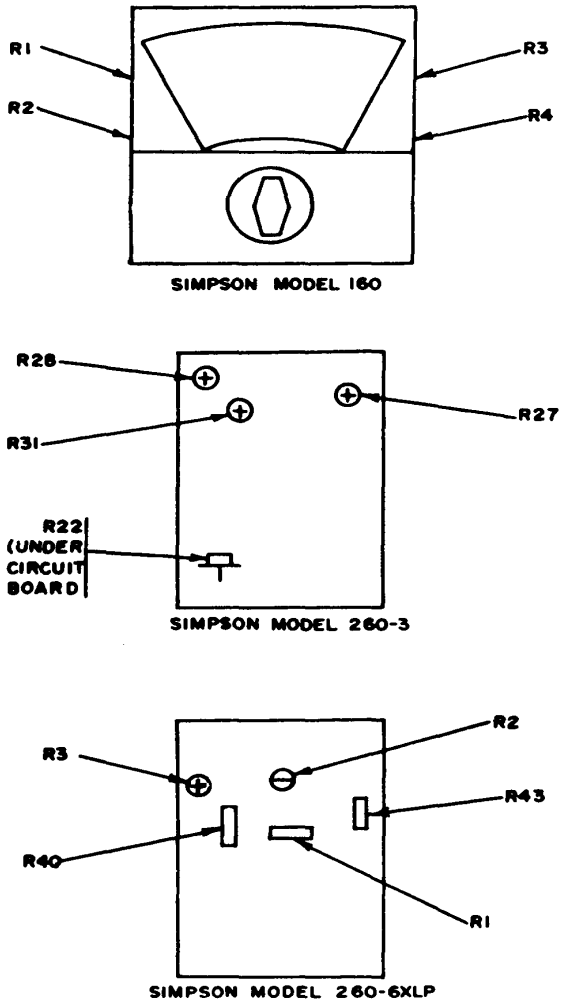


Figure 8. Simpson, Models 160, 260-3, and 260-XLP.

Table 11. Calibration Description for Simpson, Models 260-4, 260-5, 260-6, 260-6P, 260-7, 260-7M, 260-7P, 260-7PM,and 270[1]

Test instrument parameters	Performance specifications
Dc voltage	Range: 0 to 1000 V (5000 V for models 260-4, 260-5, and 270) Accuracy: (±2% of FS for 260-4), 260-5 and 270 (±3% of FS on 5000 V range)
Ac voltage	Range: 0 to 1000 V (5000 V for models 260-4, 260-5, and 270) Accuracy: ±3% of FS (±4% of FS for 260-5 and 270 on 5000 V range)
Dc current	Range: 0 to 10 A Accuracy: ±2% of FS (±1.5% of FS for 260-5, 260-6, 260-6P, 260-7, 260-7P, and 260-7PM on 50 µA range)
Resistance	Range: 0 to 20 MΩ Accuracy: ±3° of arc for model 260-4 ±2° of arc for model 270 ±2.5° of arc for RX1 range and 2° of arc for all other ranges for models 260-5, 260-6, 260-6P, 260-7 260-7P, and 260-7PM

[1]For Simpson, Models 260 Series M refer to the basic Models 260-4 through 260-7.

Calibration Performance and Adjustments Dc Current						
Test instrument[4]		Digital voltmeter indications (mV dc)				Test instrument adjustments (fig. 9)
Dc amps ranges	Indications	Models 260-4 and 270		Models 260-5, 260-6P, 260-6 260-7, 260-7P, and 260-7PM		
		Min	Max	Min	Max	
50 µA	50 µA	49	51	49.25	50.75	[1]
		All models				
		Min		Max		
1 mA	1 mA	98		102		[2]
10 mA	10 mA	98		102		- - -
10 mA	6 mA	58		62		- - -
10 mA	2 mA	18		22		- - -
100 mA	100 mA	98		102		- - -
500 mA	500 mA	49		51		- - -
10 A	10 A	98		102		[3]

[1]R1 for models 260-6, 260-6P, and 260-7. R32 for models 260-4 and 260-5 (R).

[2]R2 for models 260-6, and 260-6P. R27 for models 260-4, 260-5, and 270 (R).

[3]R22 for models 260-4, 260-5, and 270 (R)

[4]The TI must be calibrated in the horizontal position.

Table 11. Calibration Description for Simpson, Models 260-4, 260-5, 260-6, 260-6P, 260-7, 260-7M, 260-7P, 260-7PM, and 270[1] - Continued.

Dc Voltage				
Test instrument[3]		Dc voltage standard indications (V)		Test instrument adjustments
Dc volts ranges	Indications (V)	Min	Max	
1	1	0.98	1.02	None
2.5	2.5	2.45	2.55	
10	10	9.80	10.2	
50	50	49	51	
250	250	245	255	
500	500	490	510	
1000	1000	980	1020	
5000[1]	5000 (900)	4900 (4850)[2]	5100 (5150)[2]	

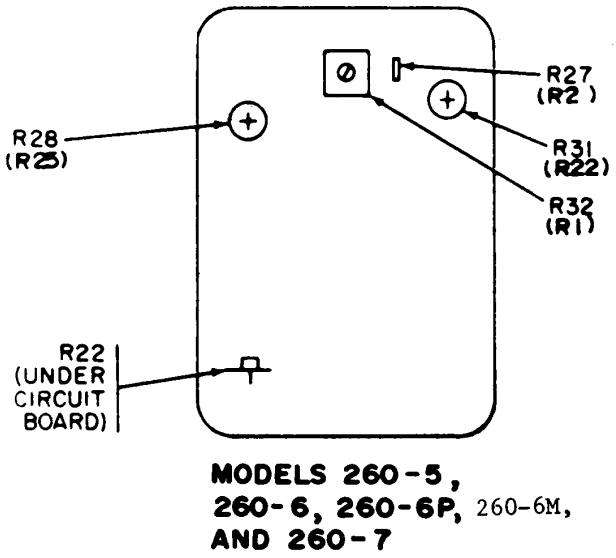
[1]Calibrate at 900 V with indications of 800 (750) and 1000 (1050) if item A10 is not available.
[2]Indication in parentheses for models 260-5 and 270. No 5000 V check for models 260-6, 260-6P, and 260-7.
[3]The TI must be calibrated in the horizontal position.

Ac voltage				
Test instrument[5]		Ac calibrator indications (V)[1]		Test instrument adjustments (fig. 9)
Ac volts ranges	Indications (V)	Min	Max	
250	250	242.5	257.5	[2]
2.5	2.5	2.425	2.575	[3]
10	10	9.7	10.3	- - -
50	50	48.5	51.5	- - -
250	250	242.5	257.5	- - -
500	500	485	515	- - -
1000	1000	970	1030	- - -
5000	800	650(600)[4]	950(1000)[4]	- - -

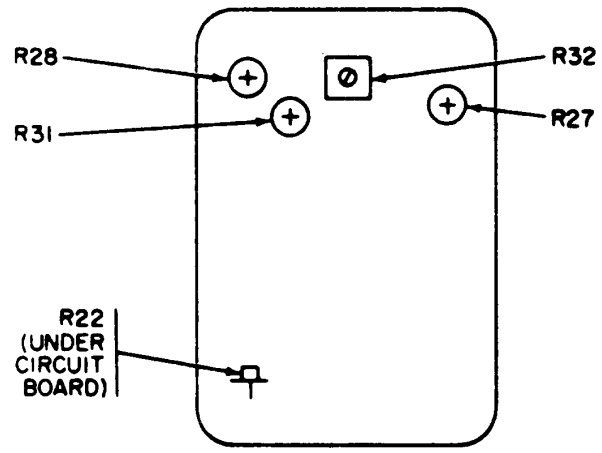
[1]Adjust frequency for 60 Hz.
[2]R31 for models 260-4, 260-5, and 270, R22 for models 260-6, 260-6P, and 260-7 (R)
[3]R28 for models 260-4, 260-5, and 270. R25 for models 260-6, 260-6P, and 260-7 (R). Repeat 250 and 2.5 V adjustments as required.
[4]Indication in parentheses for models 260-5 and 270. No 5000-V check for models 260-6, 260-7, and 260-6P.
[5]The TI must be calibrated in the horizontal position.

Resistance								
Test instrument[2]		Resistance standard indications (Ω)						Test instrument adjustments
Resistance ranges[1]	Indication ohms scale (Ω)	Model 260-4		Models 260-5 260-6, 260-6P, and 260-7		Model 270		
		Min	Max	Min	Max	Min	Max	
RX1	12	10.5	13.7	10.7	13.5	11.1	13	None
RX100	12	1050	1370	1110	1300	1110	1300	
RX10,000	12	105,000	137,000	111,000	130,000	111,000	130,000	

[1]Short leads and adjust ZERO OHMS control for 0 indication on ohms scale. Repeat for each range.
[2]The TI must be calibrated in the horizontal position.



MODELS 260-5, 260-6, 260-6P, 260-6M, AND 260-7



MODELS 260-4 AND 270

Figure 9. Simpson, Models 260-4, 260-5, 260-6, 260-6M, 260-6P, 260-7, and 270.

Table 12. Calibration Description for Simpson, Models 261, 261-2, 270-3, and 270-4

Test instrument parameters	Performance Specifications	
	Models 261 and 261-2	Models 270-3 and 270-4
Dc voltage	Range: 0 to 5000 V Accuracy: ±1.5% of FS ±2.5% of FS on 5000 V range	Range: 0 to 1000 V (5000 V for 270-3 Accuracy: ±1.75% of FS ±2.75% of FS for 270-3 on 5000 V range
Dc current	Range: 0 to 10 A Accuracy: ±1.5% of FS ±1.0% of FS on 50 µA range	Range 0 to 10 A Accuracy: ±1.75% of FS ±1.25% of FS (on 50 µA range
Ac voltage	Range: 0 to 5000 V Accuracy: ±3% of FS ±4% of FS for 5000 V range	Range: 0 to 1000 (5000 V for 270-3) Accuracy: ±3% of FS ±4% of FS for 270-3 on 5000 V range
Resistance	Range: 0 to 20 MΩ Accuracy: ±1.5° of arc ±2° of arc RX1 range	Range: 0 to 20 MΩ Accuracy: ±1.25° of arc ±1.75° of arc on RX1 range

Calibration Performance Limits and Adjustments

Dc Current

Test instrument[1]		Digital voltmeter indications (mV dc)				Test instrument adjustments (fig. 10)
Dc amps ranges	Indications	Models 270-3 and 270-4		Models 261, and 261-2		
		Min	Max	Min	Max	
50 µA	50 µA	49.375	50.625	49.5	50.5	[1]
1 mA	1 mA	98.25	101.75	98.5	101.5	[2]
10 mA	10 mA	98.25	101.75	98.5	101.5	- - -
10 mA	6 mA	58.25	61.75	58.5	61.5	- - -
10 mA	2 mA	18.25	21.75	18.5	21.5	- - -
100 mA	100 mA	98.25	101.75	98.5	101.5	- - -
500 mA	500 mA	49.125	50.875	49.23	50.75	- - -
10 A	10 A	98.25	101.75	98.5	101.5	[3]

[1]R32 on models 270-3, 261, and 261-2; R1 on model 270-4 (R).
[2]R27 on models 270-3, 261, and 261-2; R2 on model 270-4 (R)
[3]R22 on models 270-3, 261, and 261-2; no adjustment on model 270-4 (R)

Dc Voltage

Test Instrument		Dc voltage standard indications (V)				Test instrument adjustments
Dc volts ranges	Indications (V)	Models 270-3 and 270-4		Models 261, and 261-2		
		Min	Max	Min	Max	
1	1	0.9825	1.0175	0.985	1.015	None
2.5	2.5	2.456	2.544	2.462	2.538	
10	10	9.825	10.175	9.850	10.150	
50	50	49.125	50.875	49.25	50.75	
250	250	245.62	254.38	246.25	253.75	
500	500	491.25	508.75	492.5	507.5	

Table 12. Calibration Description for Simpson, Models 261, 261-2, 270-3, and 270-4 - Continued

Dc Voltage - Continued						
Test Instrument		Dc Voltage Standard Indications (V)				Test instrument adjustments
Dc volts ranges	Indications (V)	Models 270-3 and 270-4		Models 261, and 261-2		
		Min	Max	Min	Max	
1000	1000	982.5	1017.5	985	1015	
5000[1]	5000 (900)	4862[2] (863)	5137[2] (1037)	4875 (875)	5125 (1025)	

1Calibrate at 900 V if item A10 is not available.
2Not applicable to model 270-4.

Ac Voltage				
Test instrument		Ac calibrator indications (V)[1]		Test instrument adjustments (fig. 10)
Ac volts ranges	Indications (V)	Min	Max	
250	250	242.5	257.5	[2]
2.5	2.5	2.425	2.575	[3]
10	10	9.7	10.3	- - -
50	50	48.5	51.5	- - -
500	500	485	515	- - -
1000	1000	970	1030	- - -
5000[4]	800	600	1000	- - -

[1]Adjust frequency for 60 Hz.
[2]R31 for models 270-3, 261, and 261-2; R22 for model 270-4 (R).
[3]R28 for models 270-3, 261, and 261-2; R25 for model 270-4 (R). Repeat 250 and 2.5 V adjustments as required.
[4]Not applicable to model 270-4.

Resistance						
Test Instrument		Resistance Standard Indications (Ω)				Test instrument adjustments
Resistance ranges[1]	Indications ohms scale (Ω)	Models 270-3 and 270-4		Models 261, and 261-2		
		Min	Max	Min	Max	
RX1	12	11.2	12.9	11.1	13	None
RX100	12	1130	1260	1125	1275	
RX10,000	12	113,000	126,000	112,500	127,500	

[1]Short leads and adjust ZERO OHMS control for 0 indication on ohms scale. Repeat for each range.

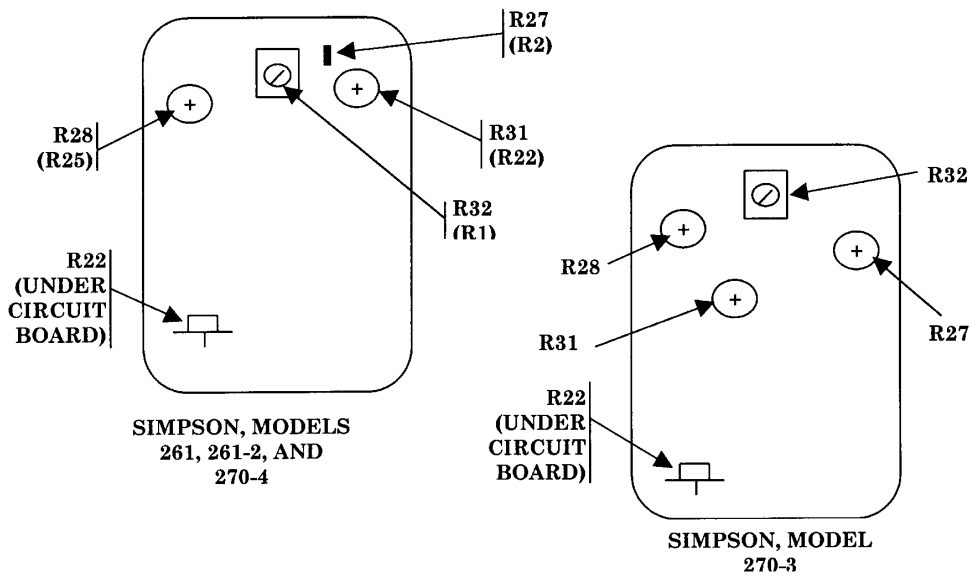


Figure 10. Simpson, Models 261, 261-2, 270-3, and 270-4.

Table 13. Calibration Description for Simpson, Model 262

Test instrument parameters	Performance specifications
Dc voltage	Range: 0 to 4000 V Accuracy: ±3% of FS
Ac voltage	Range: 0 to 800 V Accuracy: ±5% of FS
Dc current	Range: 0 to 16 A Accuracy: ±3% of FS
Resistance	Range: 0 to 50 MΩ Accuracy: ±3% of arc length

Calibration Performance Limits and Adjustments

Dc Current

Test Instrument		Digital voltmeter indications (mV dc)		Test instrument adjustments
Dc amp ranges	Indications	Min	Max	
80 µA	80 µA	77.6	82.4	None
160 µA	160 µA	15.52	16.48	
1.6 mA	1.6 mA	15.52	16.48	
16 mA	16 mA	15.52	16.48	
160 mA	160 mA	15.52	16.48	
1.6 A	1.6 A	15.52	16.48	
16 mA AMP	16 A	15.52	16.48	

Table 13. Calibration Description for Simpson, Model 262 - Continued.

Dc Voltage				
Test Instrument		Dc voltage standard indications (V)		
Dc volts ranges	Indications (V)	Min	Max	Test instrument adjustments
1.6	1.6	1.552	1.648	None
8	8	7.76	8.24	
8	6	5.76	6.24	
8	2	1.76	2.24	
40	40	38.8	41.2	
160	160	155.2	164.8	
400	400	388	412	
1600	1600	1552	1648	
4000[1]	4000 (900)	3880 (880)	4120 (1020)	

[1]Calibrate at 900 V if item A10 is not available.

Ac Voltage				
Test instrument		Ac calibrator indications (V)[1]		
Ac volts ranges	Indications (V)	Min	Max	Test instrument adjustments
3	3	2.85	3.15	None
8	8	7.6	8.4	
40	40	38	42	
160	160	152	168	
800	800	760	840	

[1]Adjust frequency for 60 Hz.

Resistance				
Resistance standard settings (Ω)	Test Instrument			
	Resistance ranges[1]	Meter indications on 0 to 160 V dc scale		
		Min	Max	Adjustments
4.5	RX1	75.2	84.8	None
45	RX10	75.2	84.8	
450	RX100	75.2	84.8	
4500	RX1K	75.2	84.8	
45 k	RX10K	75.2	84.8	
450 k	RX100K	75.2	84.8	

[1]Short leads and adjust OHMS ADJUST for 0 indication on ohms scale. Repeat for each range.

Table 14. Calibration Description for Simpson, Models 269 and 269 Series 1

Test instrument parameters	Performance specifications
Dc voltage	Range: 0 to 4000 V Accuracy: ±3% of FS
Ac voltage	Range: 0 to 800 V Accuracy: ±5% of FS
Dc current	Range: 0 to 16 A Accuracy: ±3% of FS
Resistance	Range: 0 to 200 MΩ Accuracy: ±3% of arc

Calibration Performance Limits and Adjustments

Dc Current

Test instrument		Digital voltmeter indications (mV dc)		Test instrument adjustments
Dc amp ranges	Indications	Min	Max	
16 µA	16 µA	15.52	16.48	None
16 µA	10 µA	95.2	104.8	
16 µA	4 µA	35.20	44.80	
160 µA	160 µA	15.52	16.48	
1.6 mA	1.6 mA	15.52	16.48	
16 mA	16 mA	15.52	16.48	
160 mA	160 mA	15.52	16.48	
1.6 A	1.6 A	15.52	16.48	
16 A	16 A	15.52	16.48	

Dc Voltage

Test instrument		Dc voltage standard indications (V)		Test instrument adjustments
Dc volts ranges	Indications (V)	Min	Max	
1.6	1.6	1.552	1.648	None
8	8	7.76	8.24	
40	40	38.8	41.2	
160	160	155.2	164.8	
400	400	388	412	
800	800	776	824	
1600	1600	1552	1648	
4000[1]	4000 (900)	3880 (780)	4120 (1020)	

[1]Perform if 4000 V probe is available. Calibrate at 900 V if item A10 is not available.

Ac Voltage

Test Instrument		Ac calibrator indications (V)[1]		Test instrument adjustments
Ac volts ranges	Indications (V)	Min	Max	
3	3	2.85	3.15	None
8	8	7.6	8.4	
40	40	38	42	
160	160	152	168	
800	800	760	840	

[1]Adjust frequency for 60 Hz.

Table 14. Calibration Description for Simpson, Models 269 and 269 Series 1 - Continued

Resistance				
Test Instrument		Resistance standard indications (Ω)		Test instrument adjustments
Resistance ranges[1]	Indications Ohms scale (Ω)	Min	Max	
RX1	18	15.8	20.4	None
RX10	18	158	204	
RX100	18	1.58 k	2.04 k	
RX1K	18	15.8 k	20.4 k	
RX10K	18	158 k	204 k	
RX100K	6	495 k	715 k	

[1]Short leads and adjust ZEROOHMS control for 0 indication on ohms scale.

Table 15. Calibration Description Simpson, Model 269 Series II and III, AN/USM-319 and AN/USM-319A

Test instrument parameters	Performance specifications	
	AN/USM-319 and Simpson model 269 series II	AN/USM-319A and Simpson, model 269 series III
Dc voltage	Range: 0 to 4000 V Accuracy: ±2% of FS ±4% of FS on 4000 V range	Range: 0 to 4000 V Accuracy: ±1.5% of FS ±3.5% of FS on 4000 V range
Ac voltage	Range: 0 to 800 V Accuracy: ±3% of FS	Range: 0 to 800 V Accuracy: ±2.5% of FS
Dc current	Range: 0 to 8 A Accuracy: ±2% of FS	Range: 0 to 8 A Accuracy: ±1.5% of FS
Resistance	Range: 0 to 200 MΩ Accuracy: ±3° of arc	Range: 0 to 200 MΩ Accuracy: ±2° of arc

Calibration Performance Limits and Adjustments

Dc Current

Test Instrument		Digital Voltmeter Indications (mV dc)				Test instrument adjustments (fig. 11)
Dc amps ranges	Indications	AN/USM-319 and model 269 series II		AN/USM-319A and model 269 series III		
		Min	Max	Min	Max	
16 µA	16 µA	15.68	16.32	15.76	16.24	R40 (R)
16 µA	10 µA	96.8	103.2	97.6	102.4	- - -
16 µA	4 µA	36.8	43.2	37.6	42.4	- - -
160 µA	160 µA	15.68	16.32	15.76	16.24	- - -
1.6 MA	1.6 MA	15.68	16.32	15.76	16.24	- - -
16 MA	16 MA	15.68	16.32	15.76	16.24	- - -
160 MA	160 MA	15.68	16.32	15.76	16.24	- - -
1.6 A	1.6 A	15.68	16.32	15.76	16.24	R1 (R)
8 A	8 A	78.4	81.6	78.8	81.2	R35 (R)

Table 15. Calibration Description Simpson, Model 269 Series II and III, AN/USM-319 and AN/USM-319A - Continued

Dc Voltage						
Test instrument		Dc voltage standard indications (V)				Test instrument adjustments
Dc volts ranges	Indications (V)	AN/USM-319 and model 269 series II		AN/USM-319A and model 269 series III		
		Min	Max	Min	Max	
.8	.8	- - -	- - -	0.788	0.812	None
1.6[1]	1.6	- - -	- - -	1.576	1.624	
8	8	7.84	8.16	7.88	8.12	
40	40	39.2	40.8	39.4	40.6	
160	160	156.8	163.2	157.6	162.4	
400	400	392	408	394	406	
800	800	784	816	788	812	
1600	1600	1568	1632	1576	1624	
4000[2]	4000 (900)	3840 (740)	4160 (1060)	3860 (760)	4140 (1040)	

[1]On some models

[2]Perform if 4000 V probe is available. Calibrate at 900 V if item A10 is not available.

Ac Voltage						
Test instrument		Ac calibrator indications[1] (V)				Test instrument adjustments (fig. 11)
Ac volts ranges	Indications (V)	AN/USM-319 and model 269 series II		AN/USM-319A and model 269 series III		
		Min	Max	Min	Max	
3	3	2.91	3.09	2.925	3.075	R38 (R)
8	8	7.76	8.24	7.8	8.2	- - -
40	40	38.8	41.2	39	41	- - -
160	160	155.2	164.8	156	164	R37 (R)
400	400	388	412	390	410	- - -
800	800	776	824	780	820	- - -

[1]Adjust ac calibrator frequency for 60 Hz.

Resistance						
Test instrument		Resistance standard indications[1] (Ω)				Test instrument Adjustments
Resistance ranges[1]	Indications ohms scale (Ω)	AN/USM-319 and model 269 series II		AN/USM-319A and model 269 series III		
		Min	Max	Min	Max	
RX1	12	10.4	13.7	10.6	13.4	None
RX10	12	104	137	106	134	
RX100	12	1.04 k	1.37 k	1.06 k	1.34 k	
RX1K	12	10.4 k	13.7 k	10.6 k	13.4 k	
RX10K	12	104 k	137 k	106 k	134 k	
RX100K	4	330 k	475 k	340 k	460 k	

[1]Short leads and adjust ZERO OHMS control for 0 indication on ohms scale.

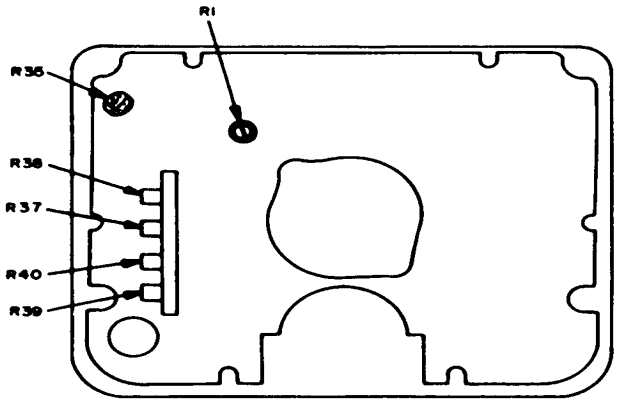


Figure 11. Simpson, Models 269 Series II and III, AN/USM-319, and AN/USM-319A.

Table 16. Calibration Description Western Reserve Electronics, Model 300M and AN/USM 303

Test instrument parameters	Performance specifications
Dc current	Range: 10 µA to 10 A Accuracy: Search mode: ±2% of FS Digital mode: ±1% of indication
Dc Voltage	Range: 0.1 to 1000 V Accuracy: Search mode: ±2% FS Digital mode: ±1% of indication
Ac Voltage	Range: 0.1 to 1000 V, 60 to 400 Hz Accuracy: Search mode: ±3% FS Digital mode: ±1% of indication
Resistance	Range: 1Ω to 1 MΩ Accuracy: Search mode: ±10% of indication plus lead resistance (0.1Ω nominal) Digital mode: ±1% of indication plus lead resistance (0.1Ω nominal)

Calibration Performance Limits and Adjustments

Dc Current

Test instrument				Digital voltmeter indications (mV dc)		Test instrument adjustments (fig. 12)
Digital switch settings	Mode selector switch settings	Range switch settings	Meter Indications	Min	Max	
9910	Search	.1 dcMA	.1 MA	98	102	---
9910	Digital	.1 dcMA	t[1]	99	101	---
9910	Search	1 dcMA	1 MA	98	102	---
9910	Digital	1 dcMA	t	99	101	---
9910	Search	10 dcMA	10 MA	98	102	---
9910	Digital	10 dcMA	t	99	101	---
9910	Search	10 dcMA	.6 MA	58	62	---
9910	Search	10 dcMA	.3 MA	28	32	---

See footnote at end of table.

Table 16. Calibration Description Western Reserve Electronics, Model 300M and AN/USM 303 - Continued

Calibration Performance Limits and Adjustments Dc Current - Continued						
Test instrument				Digital voltmeter indications (mV dc)		Test instrument adjustments (fig. 12)
Digital switch settings	Mode selector switch settings	Range switch settings	Meter Indications	Min	Max	
9910	Search	100 dcMA	100 MA	98	102	- - -
9910	Digital	100 dcMA	t	99	101	- - -
100	Search	1 dc Amps	.1 Amp	98	102	- - -
100	Digital	1 dc Amps	t	99	101	R74 (R)
9910	Search	1 dc Amps	1 Amp	98	102	- - -
9910	Digital	1 dc Amps	t	99	101	R79 (R)
9910	Search	10 dc Amps	10 Amp	98	102	- - -
9910	Digital	10 dc Amps	t	99	101	R78 (R)

[1]Denotes center of voltage/current target area.

Dc Voltage						
Test instrument				Dc voltage standard indications (V)		Test instrument adjustments (fig. 12)
Digital switch settings	Mode selector switch settings	Range switch settings (V dc)	Meter indications	Min	Max	
111	Search	1	.1	.08	.12	- - -
111	Digital	1	t[1]	.1099	.1121	R73 (R)
333	Search	1	.3	.28	.32	- - -
333	Digital	1	t	.3297	.3363	- - -
666	Search	1	.6	.58	.62	- - -
666	Digital	1	t	.6593	.6727	- - -
9910	Search	1	1	.98	1.02	- - -
9910	Digital	1	t	.99	1.01	- - -
9910	Search	10	10	9.8	10.2	- - -
9910	Digital	10	t	9.9	10.1	- - -
9910	Search	100	100	98	102	- - -
9910	Digital	100	t	99	101	- - -
9910	Search	1000	1000	980	1020	- - -
9910	Digital	1000	t	990	1010	- - -

[1]Denotes center of voltage/current target area.

Table 16. Calibration Description Western Reserve Electronics, Model 300M and AN/USM 303 - Continued

Ac Voltage						
Test Instrument				Ac[1] calibrator indications (V)		Test instrument adjustments (fig. 12)
Digital switch settings	Mode selector switch settings	Range switch settings (V ac)	Meter indications (V ac)	Min	Max	
9910	Search	1	1	.97	1.03	- - -
9910	Digital	1	t[2]	.99	1.01	R72 (R)
100	Search	1	.1	.097	.103	- - -
100	Digital	1	t	.099	.101	R71 (R)
9910	Search	10	10	9.7	10.3	- - -
9910	Digital	10	t	9.9	10.1	C4 (R)
9910	Search	100	100	97	103	- - -
9910	Digital	100	t	99	101	C5 (R)
9910	Search	1000	1000	970	1030	- - -
9910	Digital	1000	t	990	1010	C7 (R)

[1]Adjust frequency for 400 Hz.
[2]Denotes center of voltage/current target area.

Resistance						
Test instrument				Resistance standard indications (Ω)		Test instrument adjustments
Digital wheels settings	Mode selector switch settings	Range switch settings (Ω)	Meter indications (Ω)	Min	Max	
9910	Search	X1[1]	10	8.9	10.9	None
9910	Digital	X1	t[2]	9.8	10	
9910	Search	X10	100	89.9	109.9	
9910	Digital	X10	t	98.9	100.9	
9910	Search	X100	1000	899	1099	
9910	Digital	X100	t	989.9	1009.9	
9910	Search	X1K	10,000	8999	10,999	
9910	Digital	X1K	t	9899	10,099	
9910	Search	X10K	100,000	89,999	109,999	
9910	Digital	X10K	t	98,999	100,999	
9910	Search	X100K	1,000,000	899,999	1,099,999	
9910	Digital	X100K	t	989,999	1,009,999	

[1]Press OHMS ADJUST control and adjust for meter pointer indication of infinity ∞. Repeat for each range.
[2]Denotes center of voltage/current target area.

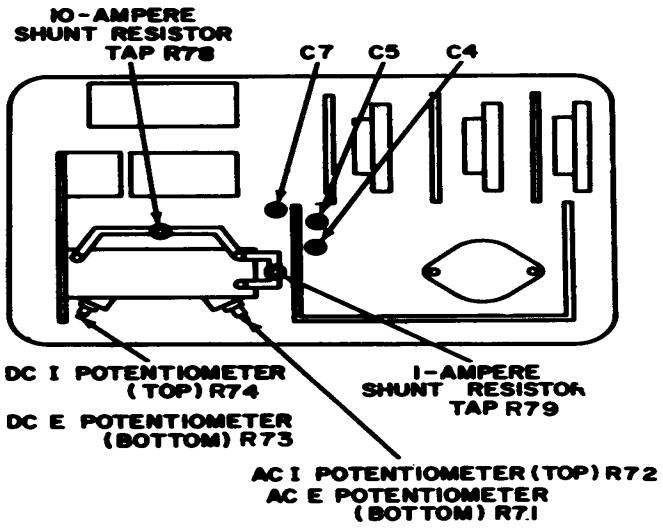


Figure 12. Western Reserve Electronics, Model 300M and AN/USM 303

Table 17. Calibration Description for Simpson, Model 303

Test instrument parameters	Performance specifications
Dc voltage	Range: 0 to 1200 V Accuracy: ±3% of FS
Ac voltage	Range: 0 to 1200 V Accuracy: ±5% of FS
Resistance	Range: 0 to 1000 MΩ Accuracy: ± 3% of linear scale

Calibration Performance Limits and Adjustments

Dc Voltage

Test instrument		Dc voltage standard indications (V)		Test instrument adjustments (fig. 13)
Dc volts ranges	Indications (V)	Min	Max	
1.2[1]	1.2	1.164	1.236	Potentiometer A (R)
12	12	11.64	12.36	- - -
12	8	7.64	8.36	- - -
12	4	3.64	4.36	- - -
60	60	58.2	61.8	- - -
300	300	291	309	- - -
1200	1000	964	1036	- - -

[1]Short DCV and GND leads together and adjust ZERO ADJ for 0 indication on TI prior to making first check. Recheck 0 for each range.

Table 17. Calibration Description for Simpson, Model 303 - Continued

Ac Voltage				
Test Instrument		Ac calibrator indications[1] (V)		Test instrument adjustments (fig. 13)
Ac volts ranges	Indications (V)	Min	Max	
1.2[2]	1.2	1.14	1.26	Potentiometer C (R)
12	12	11.4	12.6	- - -
60	60	57	63	- - -
300	300	285	315	- - -
1200	1000	940	1060	- - -

[1]Adjust frequency for 60 Hz.
[2]Short ACV and GND leads together and adjust ZERO ADJ for 0 indication on TI. Recheck for each range.

Resistance				
Test instrument		Resistance standard indications (Ω)		Test instrument adjustments
Resistance ranges	Indications Ohms scale (Ω)	Min	Max	
RX1	10	8.7	11.5	None
RX100	10	870	1150	
RX1K	10	8.7K	11.5K	
RX10K	10	87K	115	
RX1MEG	10	8.7M[2]	11.5M[2]	

[1]For each range prior to connecting to resistance standard, short ACV-OHMS and GND leads. Adjust ZERO ADJ for 0 on ohms scale. Open leads and adjust OHMS ADJ for full scale indication on ohms scale. Repeat above until 0 and full scale is obtained.
[2]Connect resistance standards in series, as required, to obtain TI indications.

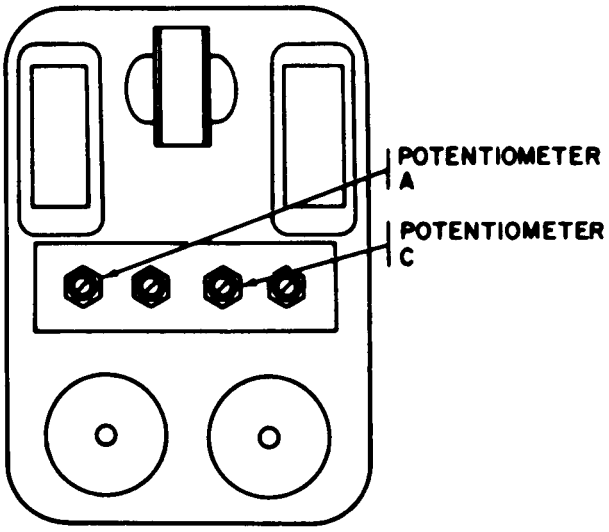


Figure 13. Simpson, Model 303 - rear view.

Table 18. Calibration Description for Triplett, Models 310 and 310C

Test instrument parameters	Performance specifications	
	Model 310	Model 310C
Dc volts	Range: 0 to 1200 V Accuracy: ±3% of FS	Range: 0 to 600 V Accuracy: ±3% of FS
Ac volts	Range: 0 to 1200 V Accuracy: ±4% of FS	Range: 0 to 600 V Accuracy: ±4% of FS
Ohms	Range: 0 to 20 MΩ of dc scale Accuracy: ±3%	Range: 0 to 20 MΩ of dc scale Accuracy: ±3%
Dc amps	Range: 0.6 to 600 mA Accuracy: ±3% of FS	Range: 0.6 to 600 mA Accuracy: ±3% of FS

Calibration Performance Limits and Adjustments

Dc Current

Test Instrument		Digital voltmeter indications (mV dc)		Test instrument adjustments
Ac amps ranges	Indications (MA)	Min	Max	
.6	.6	58.2	61.8	None
6	6	58.2	61.8	
60	60	58.2	61.8	
600	600	58.2	61.8	

Dc Voltage

Test instrument		Dc voltage standard indications (V)		Test instrument adjustments
Ac volts ranges	Indications (V)	Min	Max	
3	3	2.91	3.09	None
3	2	1.91	2.09	
3	1	0.91	1.09	
12	12	11.64	12.36	
60	60	58.2	61.8	
300	300	291	309	
600	600	582	618	
1200[1]	1000	964	1036	

[1]Model 310 only.

Ac Voltage

Test instrument		Ac calibrator indications[1] (V)		Test instrument adjustments
Ac volts ranges	Indications (V)	Min	Max	
3	3	2.88	3.12	None
12	12	11.52	12.48	
60	60	57.6	62.4	
300	300	288	312	
600	600	576	624	
1200	1000	952	1048	

[1]Adjust frequency for 60 Hz.

Table 18. Calibration Description for Triplett, Models 310 and 310C - Continued

Resistance				
Test Instrument		Meter indications (0 to 300 dc scale)		
Resistance standard settings (Ω)	Resistance ranges[1]	Min	Max	Test instrument adjustments
200	X1	140	160	None
2000	X10	140	160	
20,000	X100	140	160	
200,000	X1K	140	160	

[1]Short leads and adjust OHMS ADJ control for 0 indication on OHMS scale. Repeat for each range.

Table 19. Calibration Description for Simpson, Model 313

Test instrument parameters	Performance specifications
Dc voltage	Range: 0 to 1000 V Accuracy: ±3% of FS
Dc current	Range: 0 to 1 A Accuracy: ±3% of FS
Ac voltage	Range: 0 to 1000 V, 20 Hz to 100 kHz Accuracy: ±3% of FS at 400 Hz ±6% of FS, 20 Hz to 100 kHz
Resistance	Range: 0 to 1000 MΩ Accuracy: ±3° of arc

Calibration Performance Limits and Adjustments

Dc Current

Test instrument		Digital voltmeter indications (mV dc)		Test instrument adjustments (fig. 14)
Dc amps ranges	Indications	Min	Max	
100 µA	100 µA	97	103	R27 (R)
1 mA	1 mA	97	103	- - -
1 mA	.6 mA	57	63	- - -
1 mA	.2 mA	17	23	- - -
10 mA	10 mA	97	103	- - -
100 mA	100 mA	97	103	- - -
1 A	1 A	97	103	R13 (R)

Dc Voltage

Test instrument		Dc voltage standard indications (V)		Test instrument adjustments (fig. 14)
Dc volts ranges	Indications (V)	Min	Max	
.3 V[1]	.3	.291	.309	R32
1 V	1	.97	1.03	- - -
3 V	3	2.91	3.09	- - -
10 V	10	9.7	10.3	- - -
30 V	30	29.1	30.9	- - -
100 V	100	97	103	- - -
300 V	300	291	309	- - -
1000 V	1000	970	1030	- - -

[1]Short leads and adjust OHMS ADJ control for 0 indication on OHMS scale. Repeat for each range.

Table 19. Calibration Description for Simpson, Model 313 - Continued.

Ac Voltage					
Test Instrument		Ac Calibrator			Test instrument adjustments (fig. 14)
Ac volts ranges	Indications (V)	Frequency Hz	Indications (V) Min	Indications (V) Max	
.3 V	.3	100	.291	.309	R24 (R)
1 V	1	100	.97	1.03	- - -
1 V	1	10 k	.94	1.06	C3 (R)
1 V	1	100 k	.94	1.06	Repeat C3 adjustment
3 V	3	100	2.91	3.09	- - -
10 V	10	100	9.7	10.3	- - -
30 V	30	100	29.1	30.9	- - -
30 V	30	10 k	28.2	31.8	C4 (R)
30 V	30	20 k	28.2	31.8	Repeat C4 adjustment
100 V	100	100	97	103	- - -
300 V	300	100	291	309	- - -
1000 V	1000	100	970	1030	- - -

Resistance				
Test instrument		Resistance standard indications (Ω)		Test instrument adjustments
Resistance ranges[1]	Indications Ohms scale (Ω)	Min	Max	
RX1	10	8.7	11.2	None
RX10	100	87	112	
RX100	1 k	870	1.12 k	
RX1K	10 k	8.7 k	11.2 k	
RX10K	100 k	87 k	112 k	
RX100K	1 m	870 k	1.12 M	
RX1M	10 M	8.7 M	11.2 M	

[1]Short leads together and adjust ZERO adjust for 0 indication on TI. Open leads and adjust ohms adjust for infinity on TI meter, repeat above until 0 and infinity are obtained. Repeat for each range prior to making resistance measurement.

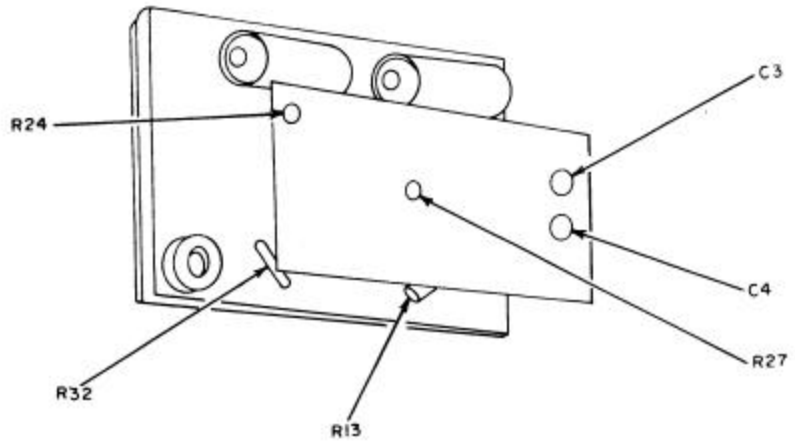


Figure 14. Simpson, Model 313 - rear view.

Table 20. Calibration Description for Triplett, Model 630

Test instrument parameters	Performance specifications
Dc voltage	Range: 0 to 6000 V Accuracy: ±3% of FS for SN 208038 and below (±5% of FS on 6000 V range) ±2% of FS for SN 208039 and above and for models with no SN (±4% of FS on 6000-V range)
Ac voltage	Range: 0 to 6000 V Accuracy: ±4% of FS for SN 208038 and below (±5% of FS on 6000 V range) ±3% of FS for SN 208039 and above and for models with no SN (±4% of FS on 6000-V range)
Dc amps	Range: 0 to 12 A Accuracy: ±3% of FS for SN 208038 and below ±2% of FS for SN 208039 and above and for models with no SN
Resistance	Range: 0 to 100 MΩ Accuracy: ±3% of scale length for SN 208038 and below ±2% of scale length for SN 208039 and above and for models with no SN

Calibration Performance Limits and Adjustments

Dc current

Test instrument		Digital voltmeter indications (mV dc)		Test instrument adjustments
Dc amps ranges	Indications (MA)	Min[1]	Max[1]	
60 µA	60 µA	58.2 (58.8)	61.8 (61.2)	None
1.2 MA	1.2 MA	11.64(11.76)	12.36(12.24)	
12 MA	12 MA	11.64(11.76)	12.36(12.24)	
120 MA	120 MA	11.64(11.76)	12.36(12.24)	
12 A	12 A	11.64(11.76)	12.36(12.24)	

[1]Indications in parentheses are for model 630, SN 208039 and above, and for models with no SN.

Dc Voltage

Test instrument		Dc voltage standard[1] indications (V)		Test instrument adjustments
Dc volts ranges	Indications (V)	Min	Max	
3	3	2.91 (2.94)	3.09 (3.06)	None
12	12	11.64 (11.76)	12.36 (12.24)	
12	8	7.64 (7.76)	8.36 (8.24)	
12	4	3.64 (3.76)	4.36 (4.24)	
60	60	58.2 (58.8)	61.8 (61.2)	
300	300	291 (294)	309 (306)	
1200	1000	964 (976)	1036 (1024)	
6000	6000	5700 (5760)	6300 (6240)	

[1]Indications in parentheses are for models 630, SN 208039 and above, and for models with no SN.
[2]Calibrate at 700 V with indications of 400 (460) and 1000 (940) if item A10 is not available.

Table 20. Calibration Description for Triplett, Model 630 - Continued

Ac Voltage				
Test instrument		Ac calibrator indications[1] (V)		
Ac volts ranges	Indications (V)	Min[2]	Max[2]	Test instrument adjustments
3	3	288 (291)	3.12 (3.09)	None
12	12	11.52 (11.64)	12.48 (12.36)	
60	60	57.6 (58.2)	62.4 (61.8)	
300	300	288 (291)	312 (309)	
1200	1000	952 (964)	1048 (1036)	
6000	800	500 (560)	1100 (10400)	

[1]Adjust frequency for 60 Hz.

[2]Indications in parentheses are for model 630, SN 208039 and above, and for models with no SN.

Resistance				
Test instrument		Resistance standard indications (Ω)		
Resistance ranges[1]	Indications ohms scale (Ω)	Min[2]	Max[2]	Test instrument adjustments
X1	4.4	3.88 (4.0)	4.90 (4.6)	None
X10	44	38.8 (40)	49.0 (46)	
X1000	4.4 k	3880 (4000)	4900 (4600)	
X100000	440 k	388 k (400 k)	490 k (460 k)	

[1]Short leads and adjust OHM ADJ control for 0 indication on ohms scale. Repeat for each range.

[2]Indications in parentheses are for models with SN 208039 and above, and for models with no SN.

Table 21. Calibration Description for AN/USM 189 and Triplett, Models 630A, 630NA and 630NS

Test instrument parameters	Performance specifications		
	AN/USM 189 and model 630A	Model 630NA	Model 630NS
Dc voltage	Range: 0 to 6000 V Accuracy: ±1.5% of FS ±3.5% of FS on 6000 V range	Range: 0 to 6000 V Accuracy: ±1.5% of FS ±3% of FS on 6000 V range	Range: 0 to 1200 V Accuracy: ±1.5% of FS
Ac voltage	Range: 0 to 6000 V Accuracy: ±3% of FS ±5% of FS 6000 V range	Range: 0 to 6000 V Accuracy: ±3% of FS ±4% of FS on 6000 V range	Range: 0 to 1200 V Accuracy: ±3% of FS
Dc current	Range: 0 to 12 A Accuracy: ±1.5% of FS	Range: 0 to 12 A Accuracy: ±1.5% of FS	Range: 0 to 12 A Accuracy: ±1.5% of FS
Resistance	Range: 0 to 100 MΩ Accuracy: ±1.5% of scale length	Range: 0 to 100 MΩ Accuracy: ±1.5% of scale length	Range: 0 to 100 MΩ Accuracy: ±1.5% of scale length

Table 21. Calibration Description for AN/USM 189 and Triplett, Models 630A, 630NA and 630NS - Continued

Dc Current				
Test instrument		Digital voltmeter indications (mV dc)		Test instrument adjustments
Dc amps ranges	Indications	Min[1]	Max[2]	
60 µA	60 µA	59.1	60.9	None
.12 MA	.12 MA	11.82	12.18	
1.2 MA	1.2 MA	11.82	12.18	
12 MA	12 MA	11.82	12.18	
120 MA	120 MA	11.82	12.18	
1200 MA	1200 MA	11.82	12.18	
12 A	12 A	11.82	12.18	
Dc Voltage				
Test instrument		Dc voltage standard indications (V)		Test instrument adjustments
Dc volts ranges	Indications (V)	Min	Max	
.6	.6	.591	.609	None
3	3	2.955	3.045	
3	2	1.955	2.045	
3	1	0.955	1.045	
12	12	11.82	12.18	
60	60	59.1	60.9	
300	300	295.5	304.5	
1200	1200	1182	1218	
6000[1]	6000 (800)	5820 (5790)[2]	6180 (6210)[2]	

[1]Calibrate at 800 V with indications of 620 (590) and 980 (1010) if item A10 is not available.
[2]Indications in parentheses for model 630A.

Ac Voltage					
Test Instrument		Ac calibrator			Test instrument adjustments (fig. 15)
Ac volts range	Indications (V)	Frequency Hz	Indications (V)		
			Min	Max	
3	3	60	2.91	3.09	- - -
3	3 [1]	20 k	2.76	3.24	C3 (R)
12	12	60	11.64	12.36	- - -
60	60	60	58.2	61.8	- - -
300	300	60	291	309	- - -
1200	1000	60	964	1036	- - -
6000	800	60	560 (500)[2]	1040 (1100)[2]	- - -

[1]For models 630NA and 630NS.
[2]Model 630A only.

Table 21. Calibration Description for AN/USM 189 and Triplett, Models 630A, 630NA and 630NS - Continued

Resistance				
Test instrument		Resistance standard indications (Ω)		Test instrument adjustments
Resistance ranges[1]	Indications (Ω)	Min	Max	
X1	4	3.7	4.4	None
X10	40	37	44	
X100	400	370	440	
X1K	4 k	3700	4400	
X10K	40 k	37 k	44 k	
X100K	400 k	370 k	440 k	

[1]Short leads and adjust OHM ADJ control for 0 indication on ohms scale. Repeat for each range.

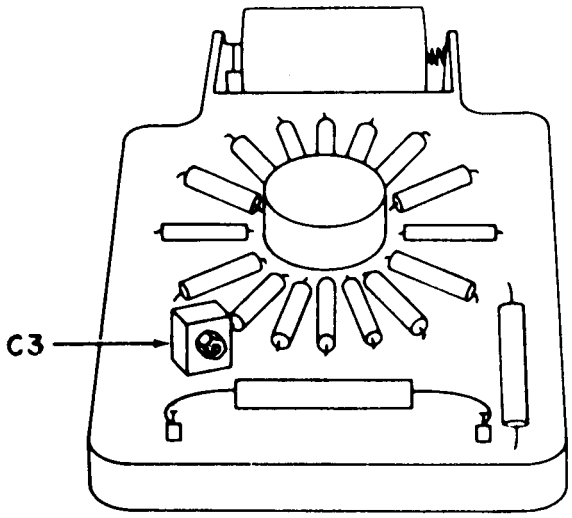


Figure 15. Multimeter, Triplett, Model 630NA - rear view

Table 22. Calibration Description for Triplett, Model 630PL and 630PLK

Test instrument parameters	Performance specifications	
	Model 630PL	Model 630PLK
Dc voltage	Range: 0 to 5000 V Accuracy: ±3% of FS ±5% of FS on 5000 V range	Range: 0 to 5000 V Accuracy: ±2% of FS ±4% of FS on 5000 V range
Ac voltage	Range: 0 to 5000 V Accuracy: ±4% of FS ±5% of FS on 5000 V range	Range: 0 to 5000 V Accuracy: ±3% of FS ±5% of FS on 5000 V range
Dc current	Range: 0 to 10 A Accuracy: ±3% of FS	Range: 0 to 10 A Accuracy: ±2% of FS

Table 22. Calibration Description for Triplett, Model 630PL and 630PLK - Continued

Test instrument parameters	Performance specifications	
	Model 630PL	Model 630PLK
Resistance	Range: 0 to 100 MΩ Accuracy: ±3% of scale length	Range: 0 to 100 MΩ Accuracy: ±2% of scale length

Calibration Performance Limits and Adjustments

Dc Current

Test instrument		Digital voltmeter indications (mV dc)		Test instrument adjustments
Dc amps ranges	Indications	Min[1]	Max[1]	
100 µA	100 µA	97 (98)	103 (102)	None
10 MA	10 MA	97 (98)	103 (102)	
100 MA	100 MA	97 (98)	103 (102)	
1000 MA	1000 MA	97 (98)	103 (102)	
10 A	10 A	97 (98)	103 (102)	

[1]Indications in parentheses are for model 630PLK.

Dc Voltage

Test instrument		Dc voltage standard indications (V)		Test instrument adjustments
Dc volts ranges	Indications (V)	Min[1]	Max[1]	
2.5	2.5	2.425 (2.45)	2.575 (2.55)	None
10	10	9.7 (9.8)	10.3 (10.2)	
10	6	5.7 (5.8)	6.3 (6.2)	
10	2	1.7 (1.8)	2.3 (2.2)	
50	50	48.5 (49)	51.5 (51)	
250	250	242.5 (245)	257.5 (255)	
1000	1000	970 (980)	1030 (1020)	
5000[2]	5000	4750 (4800)	5250 (5200)	

[1]Indications in parentheses are for model 630PLK.

[2]Calibrate at 800 V with indications of 550 (600) and 1050 (1000) if item A10 is not available.

Ac Voltage

Test instrument		Ac calibrator indications (V)		Test instrument adjustments
Ac volts ranges	Indications (V)	Min[2]	Max[2]	
3	3	288 (291)	3.12 3.09	None
10	10	9.6 (9.7)	10.4 (10.3)	
50	50	48 (48.5)	52 (51.5)	
250	250	240 (242.5)	260 (257.5)	
1000	1000	960 (970)	1040 (1030)	
5000	800	550 (550)	1050 (1050)	

[1]Adjust frequency for 60 Hz.

[2]Indications in parentheses are for model 630PLK.

Table 22. Calibration Description for Triplett, Model 630PL and 630PLK - Continued

Resistance				
Test instrument		Resistance standard indications (Ω)		
Resistance ranges[1]	Indications ohms scale (Ω)	Min[2]	Max[2]	Test instrument adjustments
X1	4	3.7 (3.8)	4.4 (4.3)	None
X10	40	37 (38)	44 (43)	
X1K	4 K	3.7 K (3.8 K)	4.4 K (4.3 K)	
X100K	400 K	370 K (380 K)	440 K (430 K)	

[1]Short leads and adjust OHMS ADJ control for 0 indication on ohms scale. Repeat for each range.
[2]Indications in parentheses are for model 630PLK.

Table 23. Calibration Description for Triplett, Models 666HH and 666R

Test instrument parameters	Performance specifications
Dc voltage	Range: 0 to 1000 V; 1000 to 5000 V Accuracy: ±3% of FS; ±4% of FS
Ac voltage	Range: 0 to 1000 V; 1000 to 5000 V Accuracy; ±4% of FS; 5% of FS
Dc current	Range: 0 to 500 mA Accuracy: ±3% of FS
Resistance model 666HH	Range: 0 to 400 kΩ Accuracy: ±3% arc length
Resistance model 666R	Range: 0 to 3 MΩ Accuracy: ±3% arc length (1.5 div on dc scale)

Dc Current				
Test instrument		Digital voltmeter indications (mV dc)		
Dc amps ranges	Indications	Min	Max	Test instrument adjustments
10 mA	10 mA	97	103	None
100 mA	100 mA	97	103	
500 mA	500 mA	48.5	51.5	
1 A	1 A	97	103	

Dc Voltage				
Test instrument		Dc voltage standard indications (V)		
Dc volts ranges	Indications (V)	Min	Max	Test instrument adjustments
10	10	9.7	10.3	None
10	6	5.7	6.3	
10	2	1.7	2.3	
50	50	48.5	51.5	
250	250	242.5	257.5	
1000	1000	970	1030	
5000	800	600	1000	

Table 23. Calibration Description for Triplett, Models 666HH and 666R - Continued

Ac Voltage				
Test instrument		Ac calibrator indications[1] (V)		Test instrument adjustments
Ac volts ranges	Indications (V)	Min	Max	
10	10	9.6	10.4	None
50	50	48	52	
250	250	240	260	
1000	1000	960	1040	
5000	750	500	1000	

[1]Adjust frequency for 60 Hz.

Resistance (Model 666R)				
Test instrument		Meter indications (0 to 50 dc scale)		Test instrument adjustments
Resistance standard settings (Ω)	Resistance ranges[1]	Min	Max	
20	X1	23.5	26.5	None
2000	X100	23.5	26.5	
20000	X1000	23.5	26.5	

[1]Short leads and adjust OHMS ADJ control for 0 indication on ohms scale. Repeat for each range.

Resistance (Model 666HH)				
Test instrument		Meter indications (0 to 50 dc scale)		Test instrument adjustments
Resistance standard settings (Ω)	Resistance ranges[1]	Min	Max	
12	LO Ω	23.5	26.5	None
2200	HI Ω	23.5	26.5	

[1]Short leads and adjust OHMS ADJ control for 0 indication on ohms scale. Repeat for each range.

Table 24. Calibration Description for Weston, Model 785

Test instrument parameters	Performance specifications
Dc voltage	Range: 0 to 1000 V Accuracy: ±2% of FS
Ac voltage	Range: 0 to 750 V Accuracy; ±3% of FS
Dc current	Range: 0 to 10 A Accuracy: ±2% of FS
Ac current	Range: 0 to 10 A Accuracy: ±5% of FS
Resistance	Range: 0 to 30 MΩ Accuracy: ±2% of FS

Table 24. Calibration Description for Weston, Model 785 - Continued

Test instrument parameters		Performance specifications		
Dc Current				
Test instrument		Digital voltmeter indications (mV dc)		Test instrument adjustments
Dc amps ranges	Indications	Min	Max	
50 µA[1]	50 µA	49	51	None
1 mA	1 mA	98	102	
10 mA	10 mA	98	102	
100 mA	100 mA	98	102	
1 A	1 A	98	102	
10 A	10 A	98	102	
Dc Voltage				
Test instrument		Dc voltage standard indications (V)		Test instrument adjustments
Dc volts ranges	Indications (V)	Min	Max	
1	1	0.98	1.02	None
10	10	9.8	10.2	
10	6	5.8	6.2	
10	2	1.8	2.2	
50	50	49	51	
200	200	196	204	
500	500	490	510	
1000	1000	980	1020	
[1]	100 mV	0.098	0.102	

[1]Connect dc voltage standard between TI 50 µ DC MV + and - connectors.

Ac Voltage				
Test instrument		Ac calibrator indications[1] (V)		Test instrument adjustments
Ac volts ranges	Indications (V)	Min	Max	
5	5	4.85	5.15	None
15	15	14.55	15.45	
30	30	29.1	30.9	
150	150	145.5	154.5	
300	300	291	309	
750	750	727.5	772.5	

[1]Adjust frequency for 60 Hz.

Ac Current				
Test instrument		Digital voltmeter indications (mV dc)		Test instrument adjustments
Ac amps ranges	Indications	Min	Max	
.5	.5	.95	1.05	

1	1	.95	1.05

Table 24. Calibration Description for Weston, Model 785 - Continued

Ac Current				
Test instrument		Digital voltmeter indications (mV dc)		Test instrument adjustments
Ac amps ranges	Indications	Min	Max	
5	5	.95	1.05	None
10	10	.95	1.05	

[1]Calibrate at 60 Hz.

Resistance				
Test Instrument		Resistance standard indications (Ω)		
Resistance ranges[1]	Indications ohms scale (Ω)	Min	Max	Test instrument adjustments
R Direct	25	23.5	27.5	None
RX10	25	235	275	
RX100	25	2350	2750	
RX1000	25	23,500	27,500	
RX10,000	25	235,000	275,000	

[1]Short leads and adjust ohmmeter adjuster for 0 indication on ohms scale. Repeat for each range.

13. Final Procedure

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

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 TI cannot be adjusted within tolerance, repair the TI in accordance with the maintenance manual. When repair is delayed for 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.

By Order of the Secretary of the Army:

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

Official:

DON J. DELANDRO
Brigadier General, United States Army
The Adjutant General

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