DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR AC VOLTMETER ME-334/U (TRIO-LAB 309-1)

Headquarters, Department of the Army, Washington, DC
27 February 1976

TP 11-6625-2664-35, 30 May 1974, is changed as follows:

Page 1, paragraph 2, line 8. Change "AMSEL-MA-D'S" to read "DRSEL-MA-Q."

Page 2. Add paragraph 6.1 as follows:

6.1. AN/GSM-256 Equipment Requirements. For calibration using AN/GSM-256, use meter test set, John Fluke, Model 760A (6625-00-935-7002) in place of Meter Calibrator AN/USM-270, and autotransformer W10MT3AS3 (6120-00-168-3705) in place of TF-510/U.

TB 11-6625-2664-35

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30 May 1974

Section I. GENERAL

1. Purpose and Scope. This bulletin provides instructions for the periodic calibration of AC Voltmeter ME-334/U, (Trio-Lab 309-1). It is to be used by calibration personnel primarily in the Transportable Maintenance Calibration Shelter AN/TSM-55A.

2. Reporting of Technical Bulletin Improvement. Reporting by the individual user, of errors, omissions, and recommendations for improving this bulletin, is authorized and encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded to Commander, U. S. Army Electronics Command, ATTN: AMSEL-MA-DS, Fort Monmouth, New Jersey 07703.

3. Test Instrument Description. AC Voltmeter ME-334/U, (Trio-Lab 309-1) is a general purpose instrument designed for checking alternating current voltages in the ranges of 0.01 to 500 volts. Additional data is listed in a, *b*, and c. below.

a. ***Identification***

Nomenclature	Voltmeter, Electronic ME-334/U
Federal stock number	6625-936-1424
Size	6 x 5 x 5 inches (approx)
Weight	4 pounds

b. Specifications.

Input power requirements	105 to 125 vac, 60 Hz
AC voltage range	001 to 500
Accuracy	05% of full scale value
Frequency response	001 to 0.5 volts, 50 Ha to 50 kHz 1 to 50 volts, 50 Hz to 20 kHz. 100 to 500 volts, 50 Hz to 3 kHz.
Input Impedance [1]	10 megohms minum

[1] These specifications are for information only and are not verified in this procedure

4. General Instructions. *a. Calibration Data Card.* During the performance of this calibration annotate Calibration Data Card, DA Form 2416, in accordance with TM 38-750. Repc~table a.ljustments are followed by (R) in this procedure.

b. Calibration Programing.

Time required for calibration.....1 hour (approx)
Calibration level.....Maintenance
Calibration interval . In accordance with TB 43-180.

c. Test Instrument. AC Voltmeter ME-334/U (Trio-Lab 309-1) will be referred to as "test instrument" during this procedure.

5. Differences Among Models. Slight differences may exist due to the availability of repair parts during equipment repair but should not affect the calibration procedure.

Section II. PRELIMINARY INSTRUCTIONS

6. Equipment Required. Table 1 lists minimum use specifications of equipment required for calibration performance checks and adjustments. When any of the equipment listed in this table is not available, equivalent calibrated items may be used provided they meet the minimum use specifications.

Table 1. Equipment Required

Item	Minimum use specifications	Equipment identification [1]
Meter Calibrator	Range 001 to 500 vac Accuracy- 0.25%	AN/USM-270 (HP 6290B)
Teat Oscillator	Range 50 Hz to 50 kHz Amplitude 3 volts Accuracy 3%	AN/USM-264 (HP 652A)
Variac	105 to 125 vac	TF-5l0/U (GR W10MT3A)
Cables (2 required)	18 to 36 Inches length, Rated for 500 vac min	1D-3 and 1C-3

1 The calibration equipment utilized in this procedure was selected from those known to be available at Department of Defense facilities, and the listing by make or model number carries no implication of preference, recommendation, or approval by the Department of Defense for use by other agencies It is recognized that equivalent equipment pruduced by other manufacturers may be capable of equally satisfactory performance in the procedure

7. Precautions. a. To prevent equipment damage, verify that all switches are set to off.

b. Connect the test instrument power cord to the variac and adjust the variac voltage control to minimum.

c, Set al1 controls on the meter calibrator and test oscillator to minimum output, positions to avoid possible damage to the equipment when the power switches are set to on.

8. Meter Calibrator Controls. a. Set FUNCTION SELECTOR switch on Meter Calibrator (HP6920B) to AC.

b. Set OUTPUT SWITCH to OFF (RESET).

c. Set RANGE switch to 1 VOLTS.

d. Adjust output control to 0000.

9. Test Oscillator Controls. a. On Test Oscillator (HP=652A), set FREQUENCY dial to 5

b. Set RANGE switch to X10.

c. Set MONITOR switch to VM.

d. Set A VM ZERO/VERNIER to mid-range.

e. Set AMPLITUDE control to mid-range.

f. Set OUTPUT ATTENUATOR switch to 10 MILLIVOLTS.

10. Regulation Test. a. *Performance Check.*

(1) Connect Cable 1D-3 from test instrument HI and LO terminals to meter calibration HI + and LO - terminals.

(2) Set all power switches on the auxiliary equipment to ON.

(3) Adjust the variac for 115 volts.

(4) Allow sufficient time for equipment to warm up and stabilize. The Unit Under Test requires approximately 20 minutes for this purpose.

(5) Set Test instrument range switch to 1.

(6) Set meter calibrator OUTPUT SWITCH to ON HOLD.

(7) Adjust output control for a full scale indication on test instrument.

(8) Meter calibrator output control should indicate between 995 and 1.005 volts.

(9) Adjust variac for 105 volts

(10) Test instrument should indicate between .995 and 1.005 volts.

(11) Adjust variac for 125 volts.

(12) Test instrument should indicate between .995 and 1.005 volts.

(10) Adjust variac for 115 volts.

b. Adjustments. No adjustments can be made.

11. Voltage Accuracy Test. *a. Performance Check.*

(1) Set meter calibrator OUTPUT SWITCH to OFF (RESET).

(2) Adjust output control for 0000.

(3) Set meter calibrator RANGE switch to 1 VOLTS.

(4) Set OUTPUT SWITCH to ON HOLD.

(5) Set test instrument range switch to positions listed in table 3. For each position listed, adjust meter calibrator output control for full scale indication on test instrument. Meter calibrator indications are as specified.

(6) Adjust meter calibrator output control for a test instrument indication of 400 volts.

(7) Meter calibrator output control should indicate between 398.0 and 402.0 volts.

(8) Adjust meter calibrator output control for a test instrument indication of 300 volts.

(9) Meter calibrator output control should indicate between 298.5 and 301.5 volts.

(10) Adjust meter calibrator output control for a test instrument indication of 200 volts.

(11) Meter calibrator output control should indicate between 199.0 and 201.0 volts.

(12) Set meter calibrator OUTPUT SWITCH to OFF (RESET).

(13) Adjust meter calibrator output control to 0000, and RANGE switch to 1 VOLTS.

b. Adjustments.

(I) Set the power switch to off and disconnect.

(2) Remove Unit Under Test from case by removing four front panel screws and sliding meter assembly forward. Do not unsolder leads. Remove the two side screws located immediately behind the meter flange. Remove the four nuts on the rear of the meter flange. Carefully slide the inner case and front panel to the rear of the printed circuit boards and internal component compartment.

CAUTION

Place all exposed components on an insulated surface in such a manner to prevent short circuit of all exposed connections. Recheck this. Reconnect the unit under test power cord set power switch to on.

(3) Set test instrument range switch to .01.

(4) Set meter calibrator OUTPUT switch to ON HOLD.

(5) Adjust meter calibrator output control for 10 millivolts.

(6) Adjust 10M V ADJ potentiometer R39 for full scale indication. (R)

(7) Adjust meter calibrator output control for 4 millivolts.

(8) Adjust SUPP ADJ potentiometer R55 (located on top of circuit board next to metal chassis screw) for .4 millivolts on low end of .01 range. (R)

(9) Repeat steps (5) thru (8) for minimum error at both ends of scale.

(10) Set test instrument range switch to 1.

(11) Adjust meter calibrator output control for 1 volt.

(12) Adjust 1V ADJ potentiometer R2 for full scale indication on test instrument. (R)

(13) Set meter calibrator OUTPUT SWITCH to OFF (RESET).

(14) Set test instrument range switch to 100.

(15) Set meter calibrator OUTPUT SWITCH to ON HOLD

(16) Adjust meter calibrator output control for 100 volts

(17) Adjust 100V ADJ potentiometer R4 for full scale indication on teat instrument. (R)

(18, Turn power switch off disconnect power cord, and reasonable meter components.

NOTE

Do not put all the retaining screws in at this time.

(19) Connect power cord, turn power switch on and repeat steps (1) thru (5) of performance check.

12. Frequency Response. a. Performance Check.

(1) Disconnect Cable 1D-3 from meter calibrator and unit under test.

(2) Connect Cable 1C-3 from 600 a connector on test oscillator to HI and LO terminals of test instrument.

(3) Set test instrument range switch to .01.

(4) Turn teat oscillator FREQUENCY dial to 5.

(5) Set test oscillator RANGE switch X10.

(6) Set test oscillator MONITOR switch to VM.

(4) Adjust test oscillator AMPLITUDE control for set VM indication on meter.

(8) Set MONITOR switch to A VM.

(9) Adjust VM ZERO/VERNIER control for a 0 indication on test oscillator meter.

(10) Adjust test oscillator AMPLITUDE control for full scale indication on test instrument.

(11) Set test oscillator RANGE switch to X10K.

(12) Adjust test oscillator AMPLITUDE control for full scale indication on test instrument.

(13) Test oscillator meter should indicate between 1.5 and + .5%.

(14) Set test oscillator RANGE switch to X10.

(15) Set test instrument range switch to positions listed in table 4, and repeat steps (4) thru (14), except for steps (10) and (12). Adjust AMPLITUDE control for indication listed in test instrument indication column. In step (11), set RANGE switch to positions

listed in test oscillator RANGE switch column.

b. Adjustments.

(1) Turn unit under test power switch to off and remove power cord.

(2) Remove test instrument from case by removing four front panel screws and sliding meter assembly forward. Do not unsolder leads. Remove the two side screws located immediately behind the meter flange. Remove the four nuts on the rear of the meter flange. Carefully slide the inner case and front panel to the rear of the printed circuit boards and internal component compartment.

CAUTION

Place all exposed components on an insulated surface in such a manner to prevent short circuit *of* all exposed connections. Recheck this.

(3) Reconnect the unit under test power cord set power switch to on.

(4) Set teat oscillator OUTPUT ATTENUATOR switch to 10 MILLIVOLTS.

(5) Set test instrument range switch to .01.

(6) Repeat step (4) thru (11) of performance check.

(7) Adjust 10MV FREQ ADJ capacitor C19 for a full scale indication on test instrument. (R)

NOTE

Some voltmeters have been modified, removing C19 from the circuit.

(8) Set test instrument range switch to 1.

(9) Set test oscillator OUTPUT ATTENUATOR switch to 1 VOLTS.

(10) Repeat step (4) thru (11) of performance check

(11) Adjust 1V FREQ ADJ capacitor C5 for a full scale indication on test instrument.

(12) Repeat performance check. (R)

13. Final Procedure. a. Deenergize and disconnect all test equipment.

b. Replace test instrument protective case.

c. *In* accordance with TM 38-750, annotate and affii calibration DA Label 80 (US Army Calibration System). When the unit under test cannot be adjusted to within tolerance, annotate and affix DA Form 2417 (Unserviceable Test Instrument or Limited Use Tag) (Red Tag).

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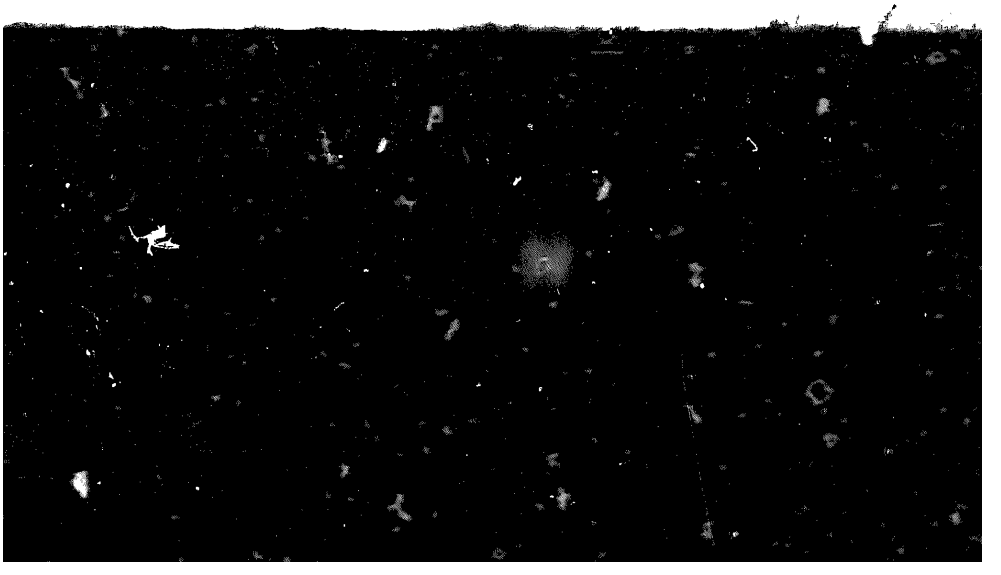

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