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DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR FIRE CONTROL SUBSYSTEM TEST SET AN/GSM-249 4931-00-121-8707

Headquarters, Department of the Army, Washington, DC
1 April 1976

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*This bulletin supersedes TB 4931-363-34, 1 June 1975

SECTION I
IDENTIFICATION AND DESCRIPTION

WARNING

The digital multimeter of the test set contains high-voltage converters. Removal of high voltage levels is not assured until the multimeter is disconnected and high-voltage points are grounded. Use insulated calibration tool when required. High voltage may be present at adjustment points. Dangerous voltages and currents are present in voltage calibration equipment.

1. Test Instrument Identification. This bulletin provides information for the periodic calibration of Fire Control Subsystem Test Set AN/GSM-249. The component of this test set requiring calibration is the digital multimeter (fig. 1).

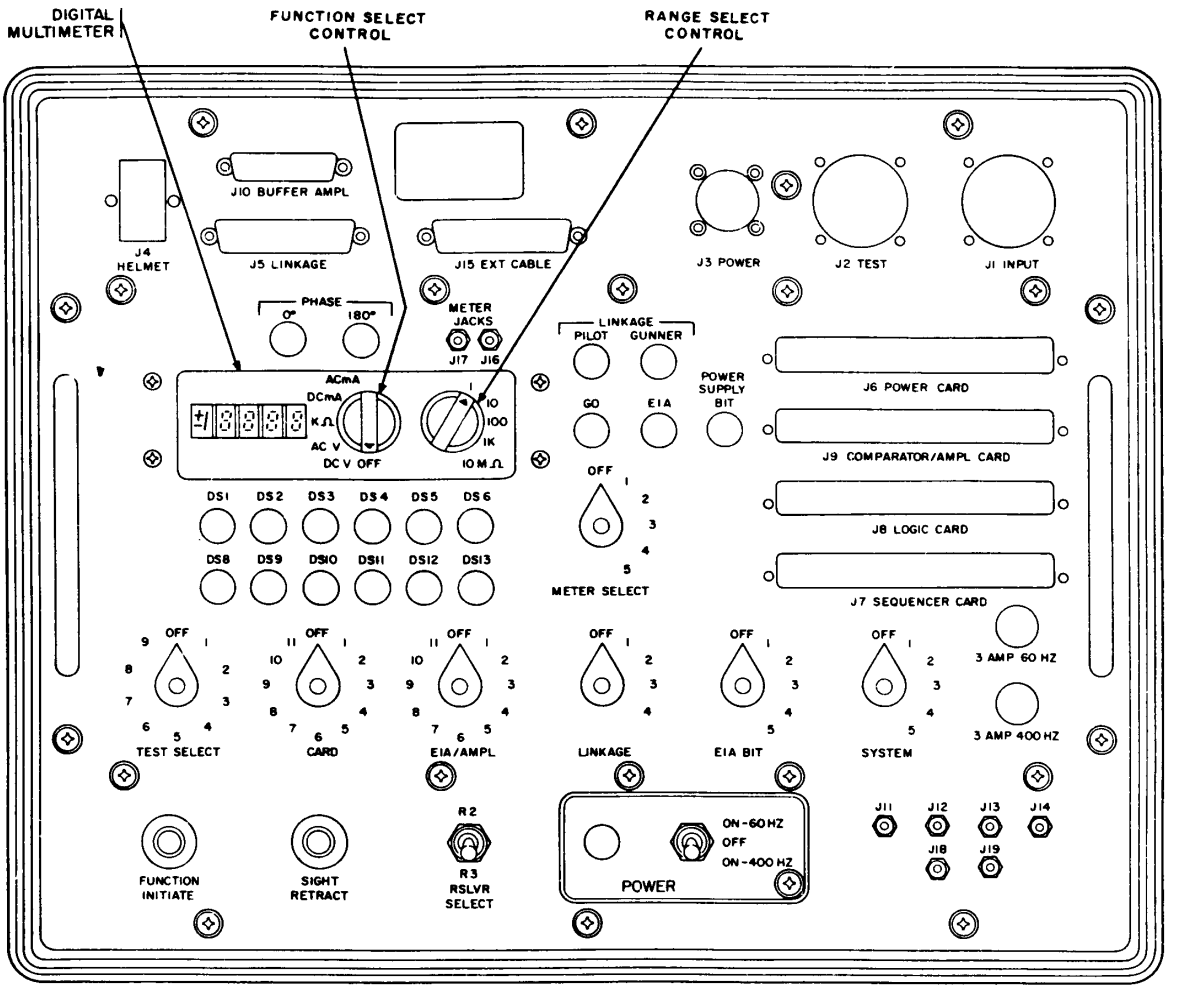

Figure 1. Fire control subsystem test set - control panel

2. Calibration Description. See table 1 for the calibration description.

Table 1. Calibration Description

Test Instrument Parameters	Performance Specifications
DC voltage	Range: 0 to 100 volts Accuracy: ±1% of reading
AC voltage	Range: 0 to 150 volts, 400 ±20 Hz Accuracy: ±0.5% of reading
Ohms	Range: 0 to 100K Accuracy: ±5% of reading

3. Forms and Records. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, the Army Maintenance Management System (TAMMS).

SECTION II
EQUIPMENT REQUIREMENTS

4. Equipment and Accessories Required. Equipment and accessories required for calibration performance checks and adjustments are listed in table 2 and 3. The equipment and accessories identified in tables 2 and 3 are issued with the secondary transfer calibration standards set.

NOTE

Minimum use specifications are the principal parameters required for performance of the calibration and are included to assist in the selection of alternate equipment which may be used at the discretion of the calibration activity. Satisfactory performance of alternate items shall be verified prior to use. All applicable equipment must bear evidence of current calibration.

Table 2. Equipment Required

Item	Minimum Use Specifications	Calibration* Equipment
AC calibrator	Range: 0 to 158 volts ac, 20 Hz to 1 kHz Accuracy: ±0.1%	745A Calibration Standard, AC Precision Hewlett Packard MIS 10342 Type 1
DC calibrator	Range: 0 to 101 volts dc Accuracy: ±0.5%	332A Voltage Standard John Fluke 7911393
Decade resistor	Range : 0 to 105K Accuracy. ±1%	Biddle-Gray Model 601147-1 (7910328)

*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 produced by other manufacturers may be capable of equally satisfactory performance in the procedure.

Table 3. Accessories Required

Item	Part No.	Description
Adapter	7907528	Banana jack to pin plug (black)
Adapter	7907517	Banana jack to pin plug (red)
Lead, electrical	7907498	24-inch, No. 18, with single banana-plug terminations (red)
Lead, electrical	7907497	24-inch, No. 18, with single banana-plug terminations (black)

SECTION III
PRELIMINARY OPERATIONS

NOTE

Personnel should familiarize themselves with this entire bulletin prior to performing calibration.

WARNING

The digital multimeter contains high-voltage converters. Removal of high voltage levels is not assured until the multimeter is disconnected from TB1 and the high-voltage points are grounded. Dangerous voltages and currents are present, in the voltage calibration equipment. Use extreme caution when working with this equipment.

NOTE

When the unit under test is not within tolerance, perform the specified adjustment and continue the performance check. When the unit under test cannot be brought within tolerance, the deficiency must be corrected before continuing with the procedure.

5. Preliminary Operations. Energize voltage calibration equipment listed in table 2 and allow sufficient time for equipment to warm up and stabilize.

SECTION IV
CALIBRATION PROCESS

WARNING

Use insulated calibration tool. High voltage may be present at adjustment points.

6. Digital Multimeter Voltage Range and Accuracy (fig. 2)

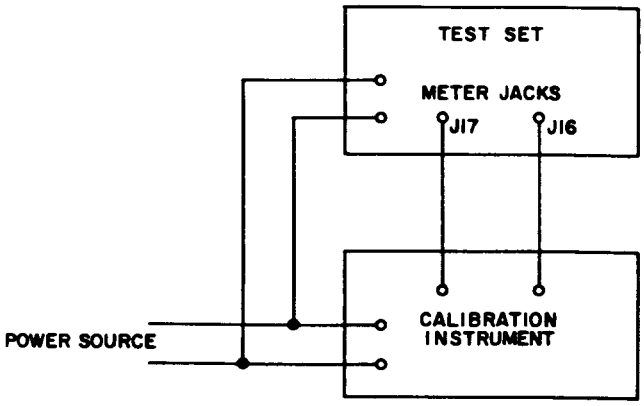

Figure 2. Digital multimeter calibration

a. Performance Check

(1) Set all switches having an OFF position to OFF.

(2) If a 115-volt, 60-Hz power source is to be used, connect power cable W3 between J3 on the test set and the power source. If a 115-volt, 400-Hz power source is to be used, connect power cable W4 between J3 on the test set and the power source.

(3) Set the POWER switch to ON-60 Hz if 60-Hz power is used. Set to ON-400 Hz if 400-Hz power is used. Observe that the POWER indicator lights. Set TEST SELECT switch to 2.

(4) Connect the dc voltage calibrator to METER JACKS J16 and J17 with test leads. Energize the dc calibrator.

(5) Set the dc voltage calibrator and the digital multimeter controls to the settings given in table 4. For each setting, check that the digital multimeter reading is the same as that of the dc calibrator within the tolerance specified.

Table 4. Performance Check

Function Select	Range Select	Test Input	Multimeter Reading
DCV	1	1.000 VDC	0.99 to 1.01
DCV	10	10.00 VDC	9.9 to 10.1
DCV	100	100.0 VDC	99.0 to 101.0

(6) If the indication is within tolerance, proceed to (7). If the digital multimeter reading is out of tolerance, perform adjustment as indicated in **b** below.

(7) Deenergize and disconnect the dc calibrator.

(8) Connect the ac voltage calibrator to METER JACKS J16 and J17 with test leads. Energize the ac calibrator.

(9) Set the ac calibrator and the digital multimeter controls to the settings given in table 5. For each setting, check that the digital multimeter reading is the same as that of the ac calibrator within the tolerance specified. If the indication is within tolerance, proceed to (11).

Table 5. AC Performance Check

Function Select	Range Select	Test Input	Multimeter Reading
ACV	1	1.000 VDC 400 Hz	0.995 to 1.005
ACV	10	10.00 VDC 400 Hz	9.95 to 10.05
ACV	100	100.0 VDC 400 H7	99.5 to 100.5

(10) If any digital multimeter reading is out of tolerance, perform adjustment as indicated in **b** below.

(11) Deenergize and disconnect the ac calibrator.

(12) Deenergize the test set and disconnect it from the power source.

(13) Connect the decade resistor to METER JACKS J16 and J17 with test leads.

(14) Set the decade resistor and the digital multimeter controls to the settings given in table 6. For each setting, check that the digital multimeter reading is the same as that of the decade resistor within the tolerance specified.

Table 6. Resistance Performance Check

Function Select	Range Select	Test Input	Multimeter Reading
KΩ	1	1.000K	0.95K to 1.05K
	10	1 0.00K	9.5K to 10.5K
	100	100.0K	95.0K to 105.0K

(15) If the digital multimeter reading is out of tolerance, return the multimeter to the manufacturer's facility for repair.

b. Adjustment

(1) Remove the test set chassis assembly from the test set container.

(2) Remove the power supply mounting plate by removing 10 screws. Lay the plate adjacent to the test set chassis assembly without putting strain on the wiring.

(3) Remove the rear cover of the digital multimeter by removing one screw in the center of the cover. Adjustments are located in the lower left-hand corner. Reference designations for the adjustments are stamped on the adjacent panel.

NOTE

No zero adjustment is ever required on any measurement function or range scale and none is provided.

(4) If any reading of the digital multimeter varies from that specified in table 4 or 5, adjust the corresponding adjustment listed in table 7 until the display indicates the exact value of test input applied.

Table 7. Calibration Adjustments

Function Select	Range Select	Test Input	Adjustment
DCV	1.0	1.000 VDC	R10
ACV	1.0	1.000 VAC, RMS 400 Hz	R4

NOTE

It the only test standard available does not provide the full-scale values shown in the tables, then the closest value to the specified input should be used and the control adjusted for that display value. It is desirable to use input signals of at least 50 percent of full scale if that option is available.

WARNING

Use insulated calibration tool. High voltage may be present at calibration points.

(5) Replace the rear cover of the digital multimeter.

(6) Replace the power supply mounting plate.

(7) Install the test set chassis assembly in the test set container.

7. Final Procedure

a. Deenergize and disconnect all equipment.

NOTE

Reinstall protective covers on unit under test, if necessary.

b. In accordance with TM 38-750, annotate and affix calibration label DA label 80 (U.S. Army Calibration System). When the unit under test cannot be adjusted within tolerance or utilized with an appropriate correction chart, annotate and affix red tag DA Form 2417 (Unserviceable Test Instrument or Standard (red tag)).

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