*TB 9-6625-2285-24

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR FUEL QUANTITY SYSTEM TEST SET SIMMONDS PRECISION/JC AIR MODEL PSD 60-1AF

Headquarters, Department of the Army, Washington, DC
30 May 2007

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can improve this manual. If you find any mistakes or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to Commander, US Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5000. A reply will be furnished to you. You may also provide DA Form 2028 information to AMCOM via e-mail, fax, or the World Wide Web. Our FAX number is: DSN 788-6546 or Commercial 256-842-6546. Our e-mail address is: 2028@redstone.army.mil. Instructions for sending an electronic 2028 may be found at the back of this manual. For the World Wide Web, use: https://amcom2028.redstone.army.mil.

*This bulletin supersedes TB 9-6625-2285-40, dated 3 July 2006.

SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Fuel Quantity System Test Set, Simmonds Precision/JC Air, Model PSD 60-1AF. TO 33D2-3-119-1 was used as the prime data source in compiling these instructions. The equipment being calibrated will be referred to as the TI (test instrument) throughout this bulletin.

a. Model Variations. None

b. Time and Technique. The time required for this calibration is approximately 3 hours, using the dc and low frequency technique.

2. Forms, Records, and Reports

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

b. Adjustments to be reported are designated (R) at the end of the sentence in which they appear. When adjustments are in tables the (R) follows the designated adjustment. Report only those adjustments made and designated with (R).

3. Calibration Description. TI parameters and performance specifications which pertain to this calibration are listed in table 1.

Table 1. Calibration Description

Test instrument parameters	Performance specifications
Capacitance measurement	Range: 0.1 to 1999 pf 1 to 10,000 pf (extended range) Accuracy: ±0.1% of reading or ±0.2 pf, whichever is greater
Capacitance simulators	Range: 20 pf to 8000 pf (TU) 20 pf to 1000 pf (COMP) Accuracy: ±0.1% of reading or ±0.2 pf, whichever is greater
Resistance measurement	Range: 100 kΩ to 10,000 MΩ[1] Accuracy: ±10% of range

[1]100 kΩ not checked due to TI display circuitry limitations.

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 or AN/GSM-705. Alternate items may be used by the calibrating activity. The items selected must be verified to perform satisfactorily prior to use and must bear evidence of current calibration. The equipment must meet or exceed the minimum use specifications listed in table 2. The accuracies listed in table 2 provide a four-to-one ratio between the standard and TI. Where the four-to-one ratio cannot be met, the actual accuracy of the equipment selected is shown in parenthesis.

5. Accessories Required. The accessories required for this calibration are common usage accessories, issued as indicated in paragraph **4** above, and are not listed in this calibration procedure. The following peculiar accessories are also required for this calibration: Special test cables supplied by the owner.

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
CAPACITANCE/INDUCTANCE MEASURING SYSTEM (METER, MULTIPLE SCALE)	Range: 20 pf to 0.01 μf Accuracy: (±0.05%)	Wayne Kerr, Model 6425B (MIS-45837)
CAPACITANCE STANDARD	Range: 0.01 μf Accuracy: [1]	Arco Electronics, Model SS-32 (7907233)
RESISTANCE STANDARD NO. 1	Range: 1 MΩ to 1 000 MΩ Accuracy: ±2.5%	Beckman, Models CR10M (8598965), CR100M (8598966), and CR1000M (8579478)
RESISTANCE STANDARD NO. 2	Range: 10 GΩ Accuracy: ±2.5%	Penn Airborne, Model 9A-5120-103 (MIS-10412-4)
VARIABLE CAPACITOR	Range: 35 pf to 1150 pf Accuracy: ±0.025% of measured value on test report	General Radio, Type 1422D (8579475)

[1]Characterized using capacitance/inductance measuring system (meter, multiple scale) and test report.

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 as listed in table 2.

c. Unless otherwise specified, verify the result of each test and, whenever the test requirement is not met, take corrective action before continuing with the calibration. Adjustments required to calibrate the TI are included in this procedure. Additional maintenance information is contained in TO 33D2-3-119-1 for this TI.

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

7. Equipment Setup. Set **ON-OFF** power switch to **ON** (fig. 1) position and allow five minutes for TI to warm-up and stabilize.

NOTE

Ensure **LO BAT** is not displayed on digital readout.

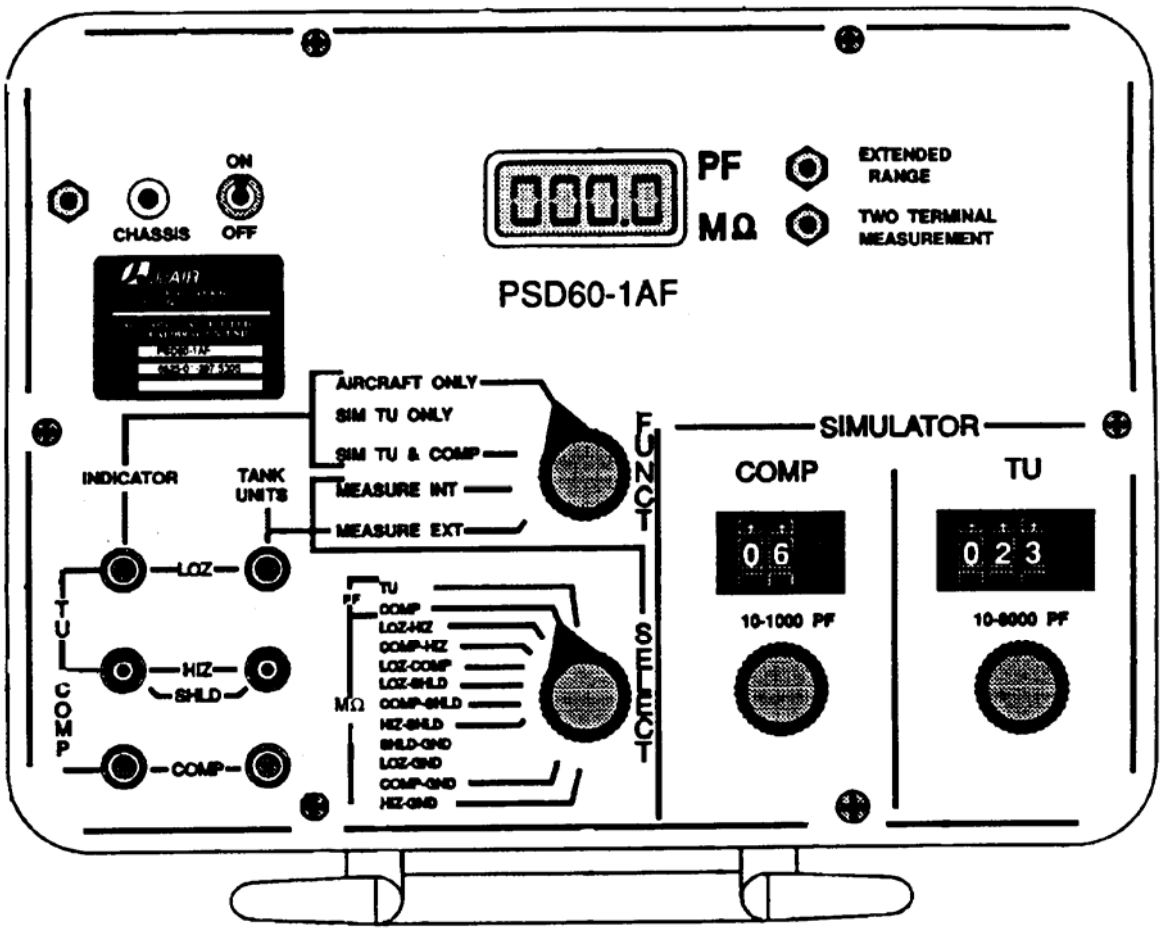

Figure 1. Front panel.

8. Capacitance Measuring Section Accuracy

a. Performance Check

(1) Set **SELECT** switch to **TU**.

(2) Set **FUNCT** switch to **MEASURE EXT**.

(3) Set variable capacitor to 35 pf.

NOTE

Over range is indicated when display indicates **:0:0:00**.

(4) Connect variable capacitor 115 output terminal to TI **TANK UNITS HIZ** terminal using coaxial lead.

NOTE

Leave shield of coaxial lead unconnected at variable capacitor end. Do not connect chassis ground of TI to capacitance standard chassis.

(5) Connect variable capacitor GND terminal to TI **TANK UNITS LOZ** terminal using special cable.

(6) TI display will indicate within ±0.2 pf of measured value on variable capacitor test report.

(7) Set variable capacitor to 1000 pf.

(8) Connect TI **TANK UNITS HIZ** terminal to variable capacitor 1150 output terminal and repeat technique of (4) and (5) above.

(9) Tl display will indicate within ±0.1% of variable capacitor test report value; if not, perform **b** below.

(10) Remove connections from variable capacitor.

(11) Characterize 0.01 μf capacitance standard using capacitance measuring system.

(12) Use technique of (4) and (5) above to connect TI to **HIZ** and **LOZ** terminals of 0.01 μf characterized capacitance standard.

(13) Press **EXTENDED RANGE** pushbutton. TI display will indicate within ±0.1% of characterized value as measured with capacitance measuring system; if not, perform **b** below.

(14) Set **SELECT** switch to **COMP** and substitute TI **TANK UNITS COMP** connection for TI **TANK UNITS LOZ** connection and repeat technique of steps (3) through (13) above.

b. Adjustments

NOTE

TI contains static-sensitive devices. Proper precautions should be taken to prevent damage to TI electronic components.

(1) Remove capacitance standard connection from TI **TANK UNITS LOZ** and **HIZ** terminals.

(2) Remove six screws from front panel and remove front panel assembly from case.

(3) Adjust CLRZ potentiometer (fig. 2) until TI display indicates **0000** and **-** sign on the display alternately illuminates (**R**).

(4) While pressing **EXTENDED RANGE** pushbutton, adjust CERZ (fig. 2) potentiometer until TI display indicates **0000** and **-** sign on the display alternately illuminates (**R**).

(5) Repeat steps (3) and (4) above as necessary.

(6) Repeat technique of **a** (7) and (8) above.

(7) Adjust CLRG (fig. 2) potentiometer for a TI display indication within ±0.1% of test report value (R).

(8) Remove variable capacitor.

(9) Repeat technique of **a** (4) and (5) above substituting .01 μf capacitor standard.

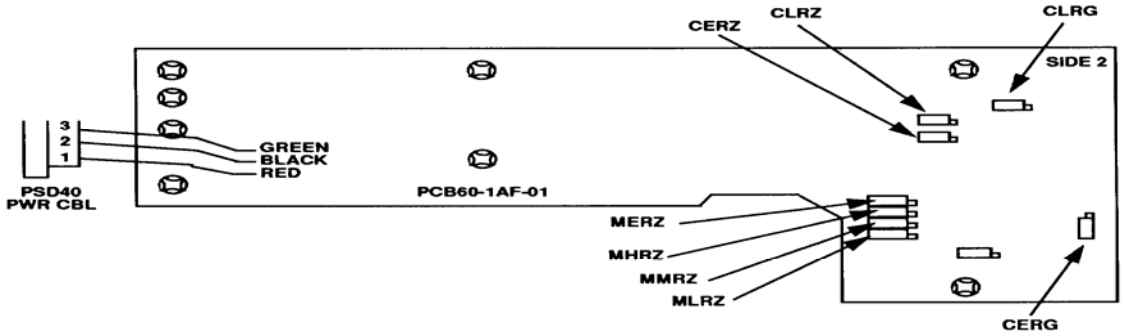

Figure 2. PCB60-1AF-01, side 2 - adjustment locations.

(10) While pressing **EXTENDED RANGE** pushbutton, adjust CERG potentiometer (fig. 2) for a TI display indication within ±0.1% of recorded value (**R**).

(11) Repeat steps **a** (3) through (13) above as necessary.

(12) Install front panel assembly in case and reinstall six screws which were removed.

9. Capacitance Simulation Accuracy

a. Performance Check

(1) Set **SELECT** switch to **TU**.

(2) Set **FUNCT** switch to **MEASURE INT**.

(3) Press and release **SIMULATOR TU +** or **-** pushbuttons as necessary for **SIMULATOR TU** decade indication of **000**.

(4) Turn **SIMULATOR TU** control for indication of **20.0** on TI digital display.

(5) Set **SELECT** switch to **COMP**.

(6) Press and release **SIMULATOR COMP +** or **-** pushbuttons as necessary for **SIMULATOR COMP** decade indication of **00**.

(7) Turn **SIMULATOR COMP** control for indication of **20.0** on TI digital display.

(8) Connect short BNC cable between TI **INDICATOR HIZ** and **TANK UNITS HIZ**.

(9) Connect short BNC cable between TI **INDICATOR COMP** and **TANK UNITS COMP**.

(10) Connect the center pins of TI **INDICATOR LOZ** to **TANK UNITS LOZ** with a short banana to banana jumper lead and 2 pin to banana adapters.

(11) Set **SELECT** switch to **TU**.

(12) Set **FUNCT** switch to **SIM TU ONLY**.

(13) Measured capacitance as indicated on TI digital readout will be between 19.8 and 20.2 pf.

(14) Set **SELECT** switch to **COMP**.

(15) Move connection from TI **TANK UNITS LOZ** to chassis.

(16) Set **FUNCT** switch to **SIM TU & COMP**.

(17) Repeat (13) above.

(18) Set **FUNCT** switch to **MEASURE INT** and remove all cables from TI.

(19) Press and release **+** pushbutton below 10 digits of **COMP** decade to increment decade to 01 and verify TI display increases by approximately 10.

(20) Repeat technique of (19) above for 10 digits 2 through 9.

(21) Repeat technique of (19) above for 100 digits 1 through 9 and verify TI display increases by approximately 100.

(22) Set **SELECT** switch to **TU.**

(23) Press and release **+** pushbutton below 10 digits on **TU** decade and verify TI display increases by approximately 10.

(24) Repeat technique of (23) above for digits 2 through 9.

(25) Repeat technique of (23) above for 100 digits and verify TI display increases by approximately 100.

NOTE

Press **PF EXTENDED RANGE** pushbutton for TI display indications above 1,999.

(26) Repeat technique of (23) above for 1000 digits 1 through 7 and verify TI display increases by approximately 1000.

b. Adjustments. No adjustments can be made.

10. Megometer Accuracy

a. Performance Check

(1) Set **SELECT** switch to **LOZ-HIZ**.

(2) Set **FUNCT** switch to **MEASURE EXT**.

(3) Connect resistance standard No. 1, 1 MΩ, HI terminal to TI **TANK UNITS HIZ** terminal and LO terminal to TI **TANK UNITS LOZ** terminal, using special test cable.

(4) TI display will indicate between .9000 and 1.100.

(5) Set **SELECT** switch to **COMP-HIZ**.

(6) Move resistance standard No. 1 connection from TI **TANK UNITS LOZ** to TI **TANK UNITS COMP** (replace special cable).

(7) TI display will indicate between .9000 and 1.100.

(8) Set **SELECT** switch to **LOZ-COMP**.

(9) Move resistance standard No. 1 connection from TI **TANK UNITS HIZ** to TI **TANK UNITS LOZ**.

(10) TI display will indicate between .9000 and 1.100.

(11) Set **SELECT** switch to **LOZ-SHLD**.

(12) Move resistance standard No. 1 connection from TI **TANK UNITS COMP** to **SHLD** of TI **TANK UNITS LOZ**.

(13) TI display will indicate between .9000 and 1.100.

NOTE

GND, when indicated, means **CHASSIS** connection.

(14) Set **SELECT** switch to each remaining position and move resistance standard No. 1 connections as indicated by **SELECT** switch position.

(15) TI display will indicate between .9000 and 1.100 for each **SELECT** switch position.

(16) Set **SELECT** switch to **HIZ-SHLD** position.

(17) Connect resistance standards as indicated in table 3 to TI **TANK UNITS HIZ** and TI **TANK UNITS HIZ** outer shell **(SHLD)**. TI indications will be within those listed in table 3; if not, perform adjustments as indicated in table 3.

Table 3. Resistance Measurement Accuracy

Resistance standards settings (MΩ)	Test instrument		
	Min	Max	Adjustments
10	9.00	11.00	**b**(1) through (5) and (10) (R)
100	90.00	110.00	**b**(1) through (3) and (6), (7), and (10) (R)
1000	900.00	1100.00	**b**(1) through (3) and (8) through (10) (R)
10,000[1]	9000.00	11000.00	**b**(1) through (3) and (10) through (12) (R)

[1]Substitute resistance standard No. 1 with resistance standard No. 2.

b. Adjustments

(1) Remove resistance standard connections.

(2) Remove six screws from front panel and lift front panel from case.

(3) Set **SELECT** switch to **LOZ-HIZ**.

(4) Connect 10 MΩ resistance standard No. 1, to TI **TANK UNITS LOZ** and **HIZ** using special test cables.

(5) Adjust MLRZ potentiometer (fig. 2) for display indication of 10.00 (R).

(6) Connect 100 MΩ resistance standard No. 1, to TI **TANK UNITS LOZ** and **HIZ** using special test cables.

(7) Adjust MMRZ potentiometer (fig. 2) for display indication of 100.0 (R).

(8) Connect 1000 MΩ resistance standard No. 1, to TI **TANKS UNITS LOZ** and **HIZ** using special test cables.

(9) Adjust MHRZ potentiometer (fig. 2) for display indication of 1000 (R).

(10) Connect 10 GΩ resistance standard No. 2, to TI **TANK UNITS LOZ** and **HIZ** using special test cables.

(11) Adjust MERZ potentiometer (fig. 2) for display indication of 10000 (R).

(12) Replace front panel in case and reinstall six screws.

11. Final Procedure

a. Deenergize and disconnect all equipment.

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

By Order of the Secretary of the Army:

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

Official:

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

0709210

Distribution:

To be distributed in accordance with the initial distribution number (IDN) 344876, requirements for calibration procedure TB 9-6625-2285-24.

Instructions for Submitting an Electronic 2028

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however, only the following fields are mandatory: 1, 3, 4, 5, 6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever" whomever@redstone.army.mil
To: <2028@redstone.army.mil

Subject: DA Form 2028

1. **From**: Joe Smith
2. Unit: home
3. **Address**: 4300 Park
4. **City**: Hometown
5. **St**: MO
6. **Zip**: 77777
7. **Date Sent**: 19-OCT –93
8. **Pub no:** 55-2840-229-23
9. **Pub Title**: TM
10. **Publication Date**: 04-JUL-85
11. Change Number: 7
12. Submitter Rank: MSG
13. **Submitter FName**: Joe
14. Submitter MName: T
15. **Submitter LName**: Smith
16. **Submitter Phone**: 123-123-1234
17. **Problem**: 1
18. Page: 2
19. Paragraph: 3
20. Line: 4
21. NSN: 5
22. Reference: 6
23. Figure: 7
24. Table: 8
25. Item: 9
26. Total: 123
27. **Text**

This is the text for the problem below line 27.