



# OPERATION MANUAL

## PSD30-2AF FUEL QUANTITY TESTER

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**DATE:** 04/26/2007

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## ELECTROSTATIC DISCHARGE GENERAL WARNINGS FOR ALL EQUIPMENT

**CAUTION:** THIS EQUIPMENT MAY CONTAIN ELECTROSTATIC DISCHARGE (ESD) SENSITIVE COMPONENTS. TO PREVENT ESD SENSITIVE EQUIPMENT FROM POSSIBLE DAMAGE, OBSERVE THE FOLLOWING PRECAUTIONS WHEN HANDLING ANY ESD SENSITIVE COMPONENTS, OR UNITS CONTAINING ESD SENSITIVE COMPONENTS:

- a. Maintenance or service personnel must be grounded through a conductive wrist strap, or a similar grounding device, using a 1 M $\Omega$  series resistor for equipment protection against static discharge, and personal protection against electrical shock.
- b. All tools must be grounded (including soldering tools) that may come into contact with the equipment. Hand contact will provide sufficient grounding for tools that are not otherwise grounded, provided the operator is grounded through an acceptable grounding device such as a wrist strap.
- c. Maintenance or service of the unit must be done at a grounded, ESD workstation.
- d. Before maintenance or service of the equipment, disconnect all power sources, signal sources, and loads connected to the unit.
- e. If maintenance or service must be performed with power applied, take precautions against accidental disconnection of equipment components. Specifically, do not remove integrated circuits or printed circuit boards from equipment while the equipment has power applied.
- f. All ESD sensitive components are shipped in protective tubes or electrically conductive foam. The components should be stored using the original container/package when not being used or tested. If the original storage material is not available, use similar or equivalent protective storage material.
- g. When ESD sensitive components are removed from a unit, the components must be placed on a conductive surface, or in an electrically conductive container.
- h. When in storage or not being repaired, all printed circuits boards must be kept in electrically conductive bags, or other electrically conductive containers.
- i. Do not unnecessarily pick up, hold, or directly carry ESD sensitive devices.

Failure to comply with these precautions may cause permanent damage to ESD sensitive devices. This damage can cause devices to fail immediately, or at a later time without apparent cause.

**REVISION HISTORY BY DRAWING NUMBER**

MANUAL: PSD30-2AF Fuel Quantity Tester

REVISION: 01 – April 26, 2007

<b><u>DRAWING NO.</u></b>	<b><u>REV. LEVEL</u></b>	<b><u>DRAWING NO.</u></b>	<b><u>REV. LEVEL</u></b>
Declaration of Conformity			
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## ***Declaration of Conformity***

**Model – PSD30-2AF  
Fuel Quantity Tester  
Part Number 01-0816-00**

2007

The Aeroflex Wichita, Inc. Model PSD30-2AF has been tested to, and conforms with, the following:

Application of Council Directives		
<i>Category</i>	<i>Directive</i>	<i>Standard</i>
Safety	2006/95/EC	EN 61010-1: 2001
EMC	2004/108/EC	EN 61326: 1998

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\_\_\_\_\_  
Guy Hill  
General Manager Avionics Products

# Safety and Regulatory Information

***Review this product and related documentation to familiarize yourself with safety markings and instructions before you operate this equipment.***

**WARNING** The **WARNING** notice denotes a hazard. It calls attention to a procedure, practice, or the like, that, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

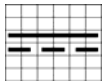
**CAUTION** The **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like, which, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.



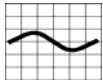
**Caution (refer to accompanying documents).** Attention – refer to the manual. This symbol indicates that information about usage of a feature is contained in the manual.

## Equipment Markings

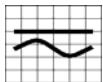
The following markings may appear on this equipment:



**Direct current.** This symbol indicates that the equipment requires direct current input.



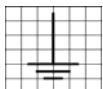
**Alternating current.** This symbol indicates that the equipment requires alternating current input.



**Both direct and alternating current.** This symbol indicates that the equipment requires either ac or dc input at the same connector.



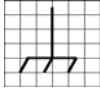
**Three-phase alternating current.** This symbol indicates that the equipment requires 3-phase ac input.



**Earth (ground) terminal.** This symbol indicates the ground (earth) terminal.



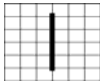
**Protective conductor terminal.** This symbol indicates the protective ground (earth) terminal.



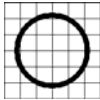
**Frame or chassis terminal.** This symbol indicates the frame or chassis terminal for connection to ground.



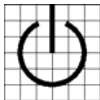
**Equipotentiality.** This symbol indicates an equipotentiality terminal.



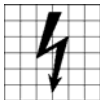
**On (Supply).** This symbol indicates that the power line switch is ON.



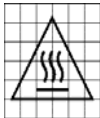
**Off (Supply).** This symbol indicates that the power line switch is OFF.



**Standby.** This symbol indicates that the power line switch is in STANDBY.



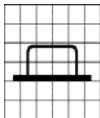
**Caution, risk of electric shock.** Danger – high voltage.



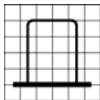
**Caution, hot surface.** Danger – high temperature surface.



**Caution (refer to accompanying documents).** Attention – refer to the manual. This symbol indicates that information about usage of a feature is contained in the manual.



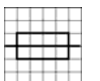
**In-position of a bistable push control.** This symbol indicates the in (on) position of a bistable push control.



**Out-position of a bistable push control.** This symbol indicates the out (off) position of a bistable push control.



**CE Mark.** <sup>TM</sup> of the European Community.



**Fuse Symbol.** To indicate a fuse.

# Warnings

**WARNING** Do not use the equipment in a manner not specified in this manual!

**WARNING** Equipment should only be serviced by authorized personnel.

## Proper Fuse



To avoid fire hazard, use only a fuse identical in type, voltage rating, and current rating as specified on the fuse rating label and/or in the manual.

## Do Not Operate in Explosive Atmospheres

To avoid explosion, do not operate the equipment in an atmosphere of explosive gas.

## Do Not Attempt to Operate if Protection may be Impaired.

If the equipment appears damaged or operates abnormally, protection may be impaired. Do not attempt to operate it. When in doubt, have the equipment serviced.

## Cleaning Warning

Keep the equipment dry to avoid electrical shock to personnel or damage to the equipment. To prevent damage, never apply solvents to the equipment housing. For cleaning, wipe the equipment with a cloth that is lightly dampened with water, mild detergent, or alcohol. Do not use aromatic hydrocarbons, chlorinated solvents, or methanol-based fluids.

## Operating Position

Normal operating position is horizontal, on a flat surface. Vertical position is not considered normal operation.

**WARNING** Equipment is not intended for wet locations. Miscellaneous liquids on or in the equipment could cause hazardous conditions.

## Safety Maintenance

Any obvious damage to the case (from a drop or fall) should be checked by service personnel for loose or damaged parts inside. See parts lists for approved replacement parts.

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## SECTION I GENERAL INFORMATION

### 1.1 EQUIPMENT DESCRIPTION

#### 1.1.1 GENERAL INFORMATION

The PSD30-2AF DC Capacitance Field Calibration Unit is a highly accurate test set with the capability to calibrate and test any DC Capacitance-type quantity measuring systems ("wet" or "dry"). It may be used for functional check or calibration of any capacitive liquid quantity gauging system which uses diode elements integral to the sensor. The PSD30-2AF provides four basic functions:

1. It measures capacitance in picofarads (pF).
2. It measures insulation resistance in megohms.
3. It simulates one capacitor as required.
4. It measures DC voltage.

In addition, the PSD30-2AF provides the capability of displaying the percentage of charge in its power supply batteries

The capacitance measuring circuits is auto-ranging up to 1,999pF. Insulation resistance measurement is auto-ranging up to 2,000MΩ. A two terminal switch ("2-WIRE MEGGER") is provided for isolating system faults reading less than the desired resistance (see S5 on Figure 1-1).

Operation of the PSD30-2AF requires selection of the desired function using the "FUNCTION SELECT" switch (S1). For a particular aircraft test, the specific reading on the "POWER/PROBE SELECT" switch (S3) must also be selected. If the "MEGGER" position is selected on the "FUNCTION SELECT" switch, the test points to be read are selected using the "MEGGER SELECT" switch (S2). Aircraft-specific interface cables are required for each application. These are not supplied with the PSD30-2AF.

The PSD30-2AF is powered by 18 alkaline "C-cell" batteries which can be replaced without requiring recalibration of the tester. The battery condition can be determined by selecting the "BATTERY CHECK" position on the "FUNCTION SELECT" switch (refer to Figure 1). If a low battery condition exists, the LCD display will show a "LO BATT" annunciator. Rechargeable batteries may not be used in the PSD30-2AF.

##### 1.1.1.1 SPECIFICATIONS

Length	10.5 inches
Height	6 inches
Width	12 inches
Weight	11 pounds
Power Requirements	18 C-cell alkaline batteries
Other batteries	None
Fuse Requirements	¼ A Type AGC Aeroflex p/n 36-0004-04 Located on Switch Board Access for qualified service personnell only

## Aeroflex Operation Manual

Altitude	2000 m
Relative Humidity (Non-Condensing)	Maximum relative humidity 80% for temperatures up to 31 °C decreasing linearly to 50% relative humidity at 40 °C.
Pollution Degree	2
Operating Temperature	-20° C to +50° C
Storage Temperature	-30° C to +60° C
DC Capacitance Reading Range	0.1pF to 199.9pF in 0.01pF increments 200pF to 1999pF in 0.1pF increments
DC Capacitance Accuracy	± 10% of reading from 0° C to +50° C ± 15% of reading from -20° C to +0° C
Insulation Resistance Reading	100kΩ to 2,000MΩ
Insulation Resistance Accuracy	± 10% of reading from 0° C to +50° C ± 15% of reading from -20° C to +0° C
DC Voltage Reading (See note below)	0 to +40VDC in 0.01 VDC increments
DC Voltage Accuracy (See note below)	0.5% of full scale
Display	Liquid Crystal
Housing Material	ABS Plastic
Test Input Connector	MS24264R14B15SN

**NOTE:** The AC voltage inputs on this instrument are Installation Category I inputs. Do not exceed 40 VAC. Installation Category I inputs are signal-level inputs with smaller transient overvoltage than Installation Category II.

## 1.1.2 FRONT PANEL COMPONENT IDENTIFICATION AND DESCRIPTION

Refer to Figure 1-1.

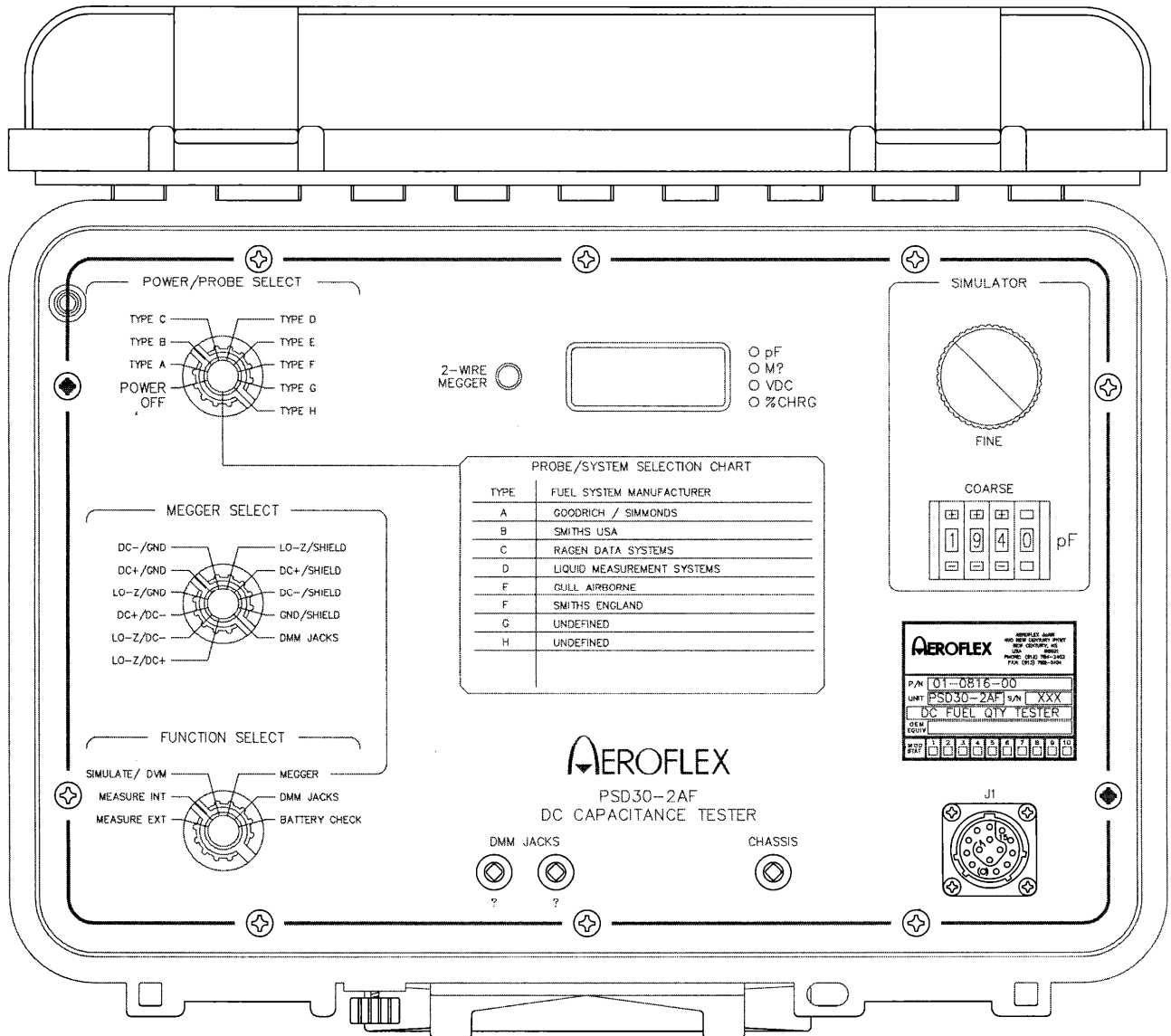


Figure 1-1. Front Panel

DESCRIPTION	FUNCTION
C1 "SIMULATOR"	Continuously variable 0-25 pF capacitor in parallel with decade on Assembly A2.
D1 LIQUID CRYSTAL DISPLAY	Displays numeric value of: <ol style="list-style-type: none"> <li>1. Capacitor under test, either external or internal ("pF").</li> <li>2. Insulation resistance of system wiring or unit under test, in megohms ("MΩ").</li> <li>3. Voltage of unit under test, when present at J2 and J3 (VDC).</li> <li>4. Relative charge of the PSD30-2AF batteries ("% CHRG")</li> </ol>
D2 LCD Function Indicator	Display which function is selected by S1, "FUNCTION SELECT".
J1 PSD30-2AF Input Connector	"J1", input to PSD30-2AF from unit under test.
J2 "DMM+"	Positive input jack to DMM.
J3 "DMM-"	Negative (reference) input jack to DMM.
J4 "CHASSIS"	Access to PSD30-2AF chassis or ground. Normally required to connect the PSD30-2AF to aircraft ground.
S1 "FUNCTION SELECT"	Determines the function which will be displayed on D1, including the check of the battery charge condition.
S2 'MEGGER SELECT"	Determines that the points between a Megger measurement is made.
S3 "POWER/PROBE SELECT"	Turns PSD30-2AF power on. Also provides the capability of scaling the display when different aircraft probes are connected to J1.  TYPE A = Goodrich / Simmonds TYPE B = Smiths USA TYPE C = Ragen Data Systems TYPE D = Liquid Measurement Systems TYPE E = Gull Airborne TYPE F = Smiths England TYPE G = Undefined TYPE H = Undefined
S4 Lid-Close Power-OFF Switch	Turns PSD30-2AF power off, regardless of position of S3.
S5 "2-WIRE MEGGER	Changes the insulation resistance measurement from the normal 3-terminal mode to the 2-terminal mode. Used when resistance is less the 100kΩ
S6 "COARSE"	Adds fixed capacitors in units of 10, 100, and 1000pF in parallel with C1.

### 1.1.3 POWER SUPPLY

Power enters the unit via the switch board. It is filtered, fused and sent to the main board where it is converted to all voltage levels required to power the unit. The four LCD back lighting LED's (DS101-DS104) and U115 along with the function annunciator LED's (CR110-CR113) are set up as a dropping resistor to the input of the +5V regulator (U116), and for U120, the precision +5V unit reference. U117 is the +15V regulator receiving its power from the +27 battery supply. Q102 and T102 is a forward converter type supply that inverts the +27V battery supply to -27V all flyback power left in the core of T102 is routed back to the batteries through CR115. The -27V supplies power to U118, the -15V regulator. The -15V regulator also supplies power to U119, the -5V regulator.

### 1.1.4 MASTER OSCILLATOR

U101 and Y101 make up the master oscillator section of the unit. All unit clocks are generated here and are used as follows:

- |             |               |  |
|-------------|---------------|--|
| 1. U101-4   | 96kHz         | A/D converter chip clock   |
| 2. U101-4,6 | 96kHz & 48kHz | Two clocks "anded" to make a 48kHz 25% duty cycle clock for -15VDC generation. |
| 3. U101-15  | 6000Hz        | Main capacitance excitation signal (LO-Z).                                     |
| 4. U101-3   | 375Hz         | Auto-range clock   |

### 1.1.5 6kHz FILTER/AMPLIFIER

U102A is the basis for a 6kHz active bandpass filter to convert the 6000Hz clock to a sine wave. This signal is routed to U102B to further filter the signal, amplify it and control the final output amplitude of the LO-Z line. U103 is power amp with a gain of 1 to drive T101. T101 provides isolation and level shifting to bring the LO-Z signal to its 20VAC level.

### 1.1.6 CAP REFERENCE DETECTOR

U104 and associated circuitry detects the frequency and amplitude of the LO-Z line to create the voltage reference to the A/D converter. The components connected to U104 pin 3 are for temperature compensation of the capacitance section of the unit.

### 1.1.7 DC CAP DEECTOR

The LO-Z line is routed to the aircraft fuel probe. The returning signal is a DC current proportional to the capacitance of the probe. This return current is nulled by U113 such that the return line from the aircraft appears to be ground. The output of U113 is a voltage representing the DC current returned from the probe and routed to the A/D circuitry. U114 is an analog multiplexer used to select the gain of U113 (depending on the type of probe selected by the user). U137 is another analog multiplexer used for calibrating the offset of the different probe types.

### 1.1.8 DVM MONITOR

The DVM input is scaled by R305, R306, and R307 on the Switch Board (A3) and routed to the A/D section of the Main Board (A1). The DVM input divides the input signal by 200 and has an input impedance of 1M $\Omega$ .

### 1.1.9 BATTERY MONITOR

The Battery Monitor Section monitors the charge remaining in the battery pack. It is an expanded scale voltmeter. The battery voltage is scaled by U108 and expanded such that the output of U108 is 5V, displaying 100% on the unit, when the batteries are approximately 27-1VDC. U108 output falls linearly as the battery voltage decays and its output is 0V when the batteries are about 18 VDC. U109 upon sensing 0V from U118, toggles its output to annunciate LO BAT on the display. U107 ensures the unit stays in the LO BAT disabled mode as the batteries keep discharging.

### 1.1.10 MEGGER CIRCUIT

The Megger Circuit operates as follows: A voltage reference is applied to the unknown resistance to be measured, and the return current is detected, scaled, taken to the reciprocal of and sent to the A/D section of the unit. U108 creates the reference of -10V using the +5V reference, inverting and doubling its magnitude and applying it to the unknown resistance. U110 nulls the return current and inverts the polarity resulting in a voltage proportional to the resistance being measured. U110's mathematical expression is  $500000 \cdot K/R = V_{out}$ , where R is the unknown resistance and K is the constant 1, 10, or 100 which reflects the gain of the circuit selected by the auto range circuitry. U112 is a multiplexer to select the correct feedback to U110 to keep its output at a value usable by the A/D circuit. The feedback is controlled by the auto range circuitry the output of U110 is fed to U111, the math chip, which calculates the reciprocal of the applied voltage and routes the output to the A/D section. U111 performs the mathematical expression  $0.25/V_{in} = V_{out}$ .

### 1.1.11 AUTO RANGE

The auto range circuit is made up of 5 IC's (U121-U125). When an over- or under-range is received from the A/D section it is routed through U121, to check for validity, to U123. U123 is an up-down counter used to set and remember the range. U123's output is routed to the decoder U124 and sent throughout the unit. U125 is a multiplexer used to limit the available valid ranges determined on the selected function. Once a range has been changed U122 delays any range changes for approximately 2.7 seconds to allow for all circuits to stabilize.

### 1.1.12 A/D SECTION

All function signals are routed through either U106 or U114, selected by the function switch on the switch board, to the scaling I.C. U128. One half of U128 selects the reference to the A/D chip U129. In the Measure Capacitance mode the CAPREF signal is the reference, from the Cap Reference circuit. All other functions use the +5V reference divided by 10 or 0.5V. the other half of the U128 selects the magnitude of the input signal, either gain of 1 or divides the input by 10. The only signal that enters the A/D chip at a gain of 1 is the low capacitance range, 0-200pF. U129 is the A/D chip capable of 40,000 bits of resolution with an accuracy of +/-1 bit. With a reference of 0.5V the A/D will have a full scale input of 1.0V displaying 20,000 counts on display. The output of U129 is multiplexed and routed to the decoder gates U126, U127, U130, U133, U135, and U136 to control the information to the decoder/driver I.C. U134 to drive the LCD display DS109.

## **SECTION II**

### **UNPACKING, INSTALLATION AND SHIPMENT**

#### **2.1 UNPACKING AND INSPECTING EQUIPMENT**

Exercise care when unpacking the unit. Make a visual inspection of the unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim. When the equipment has been unpacked, return all the packing material to the container for future use in storing or shipping the equipment. Remove any protective covers from the connectors before using the equipment. Replace any connector covers on the connectors after using the PSD30-2AF.

#### **2.2 SHIPMENT**

The PSD30-2AF is designed to withstand normal usage and handling during shipping. However it is recommended that if it is to be shipped, the batteries be removed and new ones installed at the destination. Battery replacement will not require recalibration and the reduced weight enhances the unit's survivability, as well as reducing shipping cost.

#### **2.3 INSTALLATION**

The PSD30-2AF is powered by alkaline batteries. There is no connector to mains voltages.

There are no ventilation requirements.

#### **2.4 CLEANING**

##### **A. Cleaning Items**

Soft lint-free cloth

Small soft-bristled brush

Mild non-abrasive cleanser

Isopropyl alcohol

##### **B. Cleaning**

##### **CAUTION:**

DO NOT USE COMPRESSED AIR (SUCH AS FROM AN AIR COMPRESSOR) TO CLEAN THE UNIT WITHOUT AN APPROPRIATE AIR TANK FILTER.

##### **CAUTION:**

AFTER CLEANING ELECTRICAL CONNECTORS, ALLOW SUFFICIENT TIME FOR THE CONNECTORS TO DRY BEFORE RECONNECTING.

Use a small amount of cleanser and a soft cloth to remove residues such as dirt and dust. If other substances need to be removed from the equipment exterior, use an appropriate cleanser. Do not use solvent-based cleansers on any painted surfaces, or on the unit Front Panel.

C. Equipment Inspection

Check that the Front Panel and covers are not warped, bent, or otherwise damaged.

Verify correct mounting alignment for all covers and hardware.

Check to ensure that all cover mounting hardware, such as screws and hinges, are present and secure.

Check strain relief fixtures and verify that they are not damaged or worn.

Check for defects or wear in the insulation of wires or wiring harnesses.

Check connectors for pushed-back pins or sockets.

Check connectors for broken or loose wires.

Check that the mounting hardware on all connectors and other assemblies is in place and secure.



## **SECTION III OPERATION INSTRUCTIONS**

### **3.1 GENERAL INFORMATION**

The PSD30-2AF is a general purpose test set which can be used to troubleshoot and calibrate any capacitive liquid gauging system which has diodes integral to the sensor. Aircraft-specific interface cables are required to test fuel quantity.

The PSD30-2AF is battery-powered and current-limited. It is approved as safe for use in all operating modes, with fuel in the tank or with the tank dry. Voltage checks between the tester chassis and ground are not required when using the PSD30-2AF.

The PSD30-2AF should always be connected to airframe ground during system test to permit insulation resistance checks and to insure accurate measurements. However lack of such ground does not constitute a safety hazard.

### **3.2 CAPACITANCE MEASUREMENT**

1. Verify that power is removed from the aircraft system.
2. Connect "CHASSIS" jack (J4) to airframe ground (or the mounting flange of a tank unit removed from the tank).
3. Connect the adapter cable to connector J1, and connect the adapter cable to the aircraft.
4. Using the "POWER/PROBE SELECT" switch (S3), turn on the unit by selecting the appropriate aircraft type. Allow a 3 minute warm-up.
5. Select the "MEASURE EXT" position on the "FUNCTION SELECT" switch (S1).
6. The capacitance is displayed in picofarads on the LCD display (D1).

#### **NOTE**

If the capacitance being measured is in excess of the normal range (0-1,999pF), the LCD will indicate "----".

### **3.3 INSULATION RESISTANCE MEASUREMENT**

1. Verify that power is removed from the aircraft system.
2. Connect "CHASSIS" jack (J4) to airframe ground (or the mounting flange of a tank unit removed from the tank).
3. Connect the adapter cable to connector J1, and connect the adapter cable to the aircraft.
4. Using the "POWER/PROBE SELECT" switch (S3), turn on the unit by selecting a probe type (any Probe Type position is acceptable). Allow a 3 minute warm-up.
5. Select the "MEGGER" position on the "FUNCTION SELECT" switch (S1).
6. Using the "MEGGER SELECT" switch (S2), select the appropriate position.

7. The insulation resistance is displayed in megohms on the LCD display (D1). The unit will indicate over range ("----" will be displayed) above 2,000M $\Omega$ .
8. If more than one position of the "MEGGER SELECT" switch indicates a short circuit ("0001"), depress the "2-WIRE MEGGER" switch (S1) for a more accurate reading.

### 3.4 DC VOLTAGE MEASUREMENT

#### CAUTION

DO NOT CONNECT TO ANY POWER SOURCES OTHER THAN 0-40 VDC.

1. Connect "CHASSIS" jack (J4) to airframe ground (or the mounting flange of a tank unit removed from the tank).
2. Using the "POWER/PROBE SELECT" switch (S3), turn on the unit by selecting a probe type (any Probe Type position is acceptable). Allow a 3 minute warm-up.
3. Select the "DMM JACK" position on the "FUNCTION SELECT" switch (S1).
4. Connect the dc voltage under test to the "DMM+" (J2) and "DMM-" (J3) jacks.
5. The dc voltage is displayed in volts on the LCD display (D1).

### 3.5 CAPACITANCE SIMULATION

1. Connect "CHASSIS" jack (J4) to airframe ground (or the mounting flange of a tank unit removed from the tank).
2. Connect the adapter cable to connector J1, and connect the adapter cable to the aircraft.
3. Using the "POWER/PROBE SELECT" switch (S3), turn on the unit by selecting the appropriate aircraft type. Allow a 3 minute warm-up.
4. Select the "MEASURE INT" position on the "FUNCTION SELECT" switch (S1).
5. Adjust the "COURSE" push-button switches (S6) to approximate the desired capacitance.
6. Adjust the "FINE" capacitor vernier (C1) to the exact capacitance required.

#### NOTE

The knob on C1 has a "two-speed" type of adjustment. Rotating the knob while pressing down gives a "coarse" adjustment, and rotating the knob without pressing down gives a "fine" adjustment.

7. The capacitance is displayed in picofarads on the LCD display (D1).
8. Set the "FUNCTION SELECT" switch (S1) to "SIMULATE/DMM" for the signal conditioner to read capacitance. The display will show a DC voltage (proportional to the capacitance) from the signal conditioner if it is wired on the adapter.

### **3.6 BATTERY CHARGE READING**

1. Using the "POWER/PROBE SELECT" switch (S3), turn on the unit by selecting the appropriate aircraft type. Allow a 3 minute warm-up.
2. Select the "BATTERY CHECK" position on the "FUNCTION SELECT" switch (S1) to determine the battery charge. The charge of the batteries will be displayed as a percentage of the maximum available charge. If the "% CHRG" displayed is 10% or less, replace the batteries. Note that if the battery charge is low, a LO BATT" indication will appear on the display, and the rest of the display will blank until new batteries are installed.

## **SECTION IV SERVICING AND MAINTENANCE**

### **FOR AUTHORIZED SERVICE PERSONNEL ONLY**

#### **4.1 BATTERY REPLACEMENT**

##### **CAUTION:**

REMOVE CONNECTIONS TO THE BATTERY PACK BEFORE DISASSEMBLING ANY PORTION OF THE UNIT.

ELECTROSTATIC DISCHARGE (ESD) CAN DAMAGE ELECTRONIC COMPONENTS. SERVICE EQUIPMENT ONLY AT AN ESD WORKSTATION OR AREA.

When the "% CHRG" indication on D1 (refer to Figure 1) is at 10% or less, the batteries should to be replaced. To gain access to the batteries, remove the Front Panel.

Remove the 10 Phillips screws around the perimeter of the Front Panel. Carefully lift the Front Panel up. Remove the four Phillips screws holding the cover to the rear of the Front Panel. Remove the Front Panel Assembly by carefully unplugging the Front Panel from the Battery Pack.

Disconnect the Front Panel assembly from the Battery Pack. Remove the upper portion of the brackets holding the batteries in place, and replace the batteries. Make certain that the polarity of each battery is correct (refer to Figure 5-1 below). Reinstall the battery brackets, and the Front Panel.

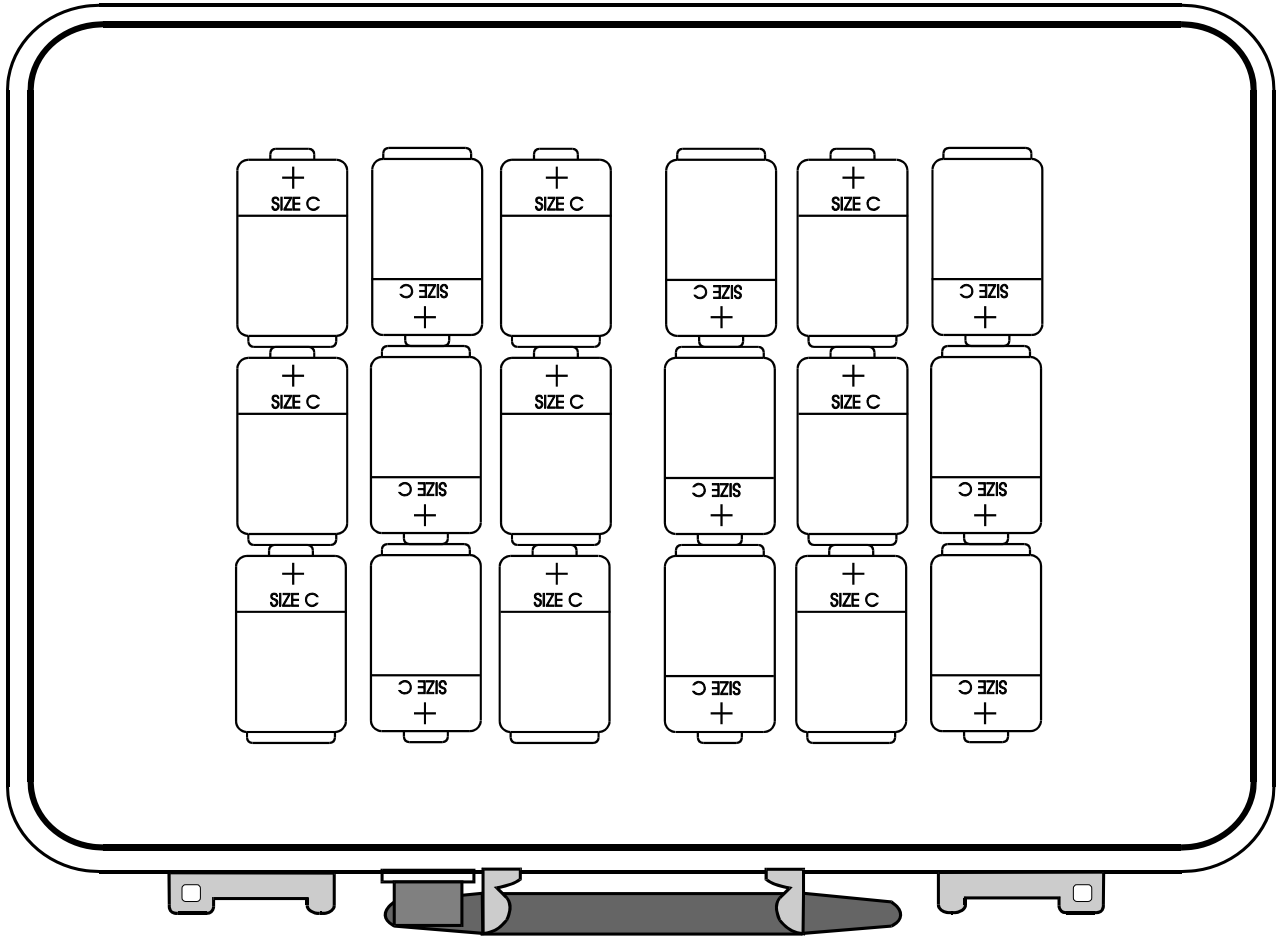


FIGURE 4-1. BATTERY LAYOUT

## 4.2 BILLS OF MATERIALS, ASSEMBLY DRAWINGS, AND SCHEMATICS

To assist in the maintenance of the Aeroflex PSD30-2AF Fuel Quantity Tester, Bills of Materials, Assembly Drawings, and Schematics are available in the PSD30-2AF Maintenance Manual (P/N 06-0816-00 for hard copy, E6-0816-00 for CD) available separately from Aeroflex.