



AEROSPACE INFORMATION REPORT	AIR1184™	REV. B
	Issued 1973-01 Reaffirmed 2007-12 Revised 2016-08 Superseding AIR1184A	
(R) Capacitive Fuel Gauging System Accuracies		

RATIONALE

This document is intended as a complement to AIR5691, and gives more detail on error sources which should be considered in the design of capacitive gauging systems. Note that it is completely revised from Issue A, hence no change bars are provided in this issue.

FOREWORD

This document presents a concise overview of error sources in capacitive fuel gauging systems. The subject matter is directed at individuals who are responsible for specifying gauging system accuracies and, therefore, need insight into the predominant error sources in capacitive fuel gauging systems and means to minimize the errors.

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1. SCOPE

This report is intended to identify the various errors typically encountered in capacitance fuel quantity measurement systems. In addition to identification of error sources, it describes the basic factors which cause the errors. When coupled with appraisals of the relative costs of minimizing the errors, this knowledge will furnish a tool with which to optimize gauging system accuracy, and thus, to obtain the optimum overall system within the constraints imposed by both design and budgetary considerations.

Since the subject of fuel measurement accuracy using capacitance based sensing is quite complex, no attempt is made herein to present a fully-comprehensive evaluation of all factors affecting gauging system accuracy. Rather, the major contributors to gauging system inaccuracy are discussed and emphasis is given to simplicity and clarity, somewhat at the expense of completeness.

An overview of capacitive fuel gauging operation can be found in AIR5691. This document also discusses how to analyze fuel gauging system accuracy as a result of combining the effects of the error sources described here.

1.1 Purpose

This report identifies those sources or causes of error which adversely affect the accuracy of airborne capacitance-type fuel quantity gauging systems.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), <http://www.sae.org>

ARP1870 Aerospace Systems Electrical Bonding and Grounding for Electromagnetic Compatibility and Safety

ARP5412 Aircraft Lightning Environment and Related Test Waveforms

AIR5691 Guidance for the Design and Installation of Fuel Quantity Indicating Systems

ARP8615 Fuel System Components: General Specification For

2.1.2 ARINC Documents

Available from ARINC, 2551 Riva Road, Annapolis, MD 21401-7435, Tel: 410-266-4000, www.arinc.com.

ARINC Report 611 Guidance for the Design and Installation of Fuel Quantity Systems

2.1.3 US Government Publications

Copies of these documents are available online at <http://quicksearch.dla.mil>.

MIL-G-26988 Gage, Liquid Quantity, Capacitor Type Transistorized, General (now cancelled, but included as a historical reference)