



AEROSPACE RECOMMENDED PRACTICE

ARP1061™

REV. B

Issued 1971-11
Revised 1999-04
Reaffirmed 2008-02
Stabilized 2020-04

Superseding ARP1061A

Altitude Alerting Devices and Systems

RATIONALE

This Technical Report contains no changes from the previous revision, other than the addition of a Stabilization Notice Page. This document has been determined to contain stable technical information which is not dynamic in nature.

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FOREWORD

Changes in the revision are format/editorial only.

1. SCOPE:

This SAE Aerospace Recommended Practice (ARP) provides performance criteria for Altitude Alerting Devices and Systems. These devices can be self-contained or receive remote altitude information and can have integral or remote barometric corrections. Only the generation of the alerting signals is covered by this recommended practice and not the details of the visual or audio alerts operated by these signals. It is recommended that the system's operational correspondence between the selected altitude settings of the Altitude Alerting Device and the Altitude Level Indication normally used to control the aircraft should not exceed ± 250 ft RSS throughout the operating range of the device.

1.1 Range of Altitude:

This recommended practice provides for operational performance up to 80,000 ft of altitude based on pressure altitude, radar altitude or radio altitude in any combination or singular inputs.

- 1.2 This device should contain or accept inputs of altitude, equal to that information displayed and used by the pilot for height control of his aircraft, in increments of not greater than 100 ft of indicated altitude. This device should provide for audio/visual warning signals when the flight altitude deviates from the preselect altitude or height level and for approaching and/or departing a preselect altitude level.

1.3 Other Parameters:

The following is a listing of other parameter inputs which can augment and modify the altitude alerting system in its operation at various levels of flight altitude and landing approach altitudes.

- a. Altitude Rate of Change
- b. Angle of Attack
- c. Radio Altitude
- d. Airspeed Minimum/Maximum
- e. Mach Number Minimum/Maximum
- f. Flap Position
- g. Landing Gear Position
- h. Minimum Decision Height
 - 1. Cat. II Series
 - 2. Cat. III Series
- i. Auto Land System
- j. Automatic Flight Control and Stability Augmentation Systems
- k. Altitude Function Inputs via a C.A.D.C. System
- l. Altitude Rate of Change via INS System

1.4 Purpose:

This ARP establishes an industry recommended practice for altitude warning devices and systems, when used as an alerting device related to altitude information normally used for aircraft height control, but not including the remote sources of such information.

2. 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 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

ARP461B	Synchros
ARP582A	Lighting, Integral, for Aircraft Instruments: Criteria for Design of Red Lighted Instruments
ARP798	Design Criteria for White Incandescent Lighted Aerospace Instruments
ARP4102/4	Flight Deck Alerting System

2.2 RTCA Publications:

Available from RTCA Inc., 1140 Connecticut Avenue, NW, Suite 1020, Washington, DC 20036.

Environmental Conditions and Test Procedures - RTCA Document No. DO-138, June 27, 1968

2.3 Other Publications:

Available from the Superintendent of Documents, U.S. Government Printing office, Washington, DC 20402.

Altitude Reference - U.S. Standard Atmosphere 1962

Airspeed Reference - NASA TN-D822 Tables

3. GENERAL REQUIREMENTS:

3.1 Acceptance Criteria:

These are test requirements related to aircraft instruments and are used to establish the individual acceptability of each instrument. Reference to paragraph 6.

3.2 Qualification Criteria:

These are test requirements related to aircraft instruments and are used to generally establish the quality of the design and manufacture of aircraft instruments. Reference to paragraph 7.

3.3 Materials and Workmanship:

3.3.1 Materials: Materials should be of a quality which experience and/or tests have demonstrated to be suitable and reliable for use in aircraft instruments.

3.3.2 Workmanship: Workmanship should be consistent with high grade aircraft instrument manufacturing practice.

3.4 Identification:

The following information should be legibly and permanently marked on the instrument or nameplate attached thereto:

- a. Name of instrument
- b. SAE ARP - (show number and revision letter)
- c. Manufacturer's part number
- d. Manufacturer's serial number or date of manufacture
- e. Manufacturer's name and address
- f. Altitude Range, operational signal levels and other input parameters (if applicable)
- g. Rating (electrical, vacuum, etc., if applicable)
- h. Aircraft identification (if applicable)
- i. Environment Category - See code in RTCA DO-138, Appendix B
- j. Weight

3.5 Compatibility of Components:

Both self contained and remote components of an Altitude Alerting Device or System are covered by this ARP. Components that are individually acceptable but require matching for proper operation shall be identified in a manner that will assure performance to the requirements of this recommended practice.

3.6 Interchangeability:

Instruments and components which are identified by the same part number in accordance with 3.4 shall be directly and completely interchangeable, as defined by 3.5.

3.7 Environmental Conditions:

The following conditions have been established as design requirements. Tests should be conducted as specified in paragraphs 6 and 7 to insure compliance with this ARP. The instrument should be capable of its intended function throughout the environmental conditions set forth, and the conditions selected should be declared as operating limitations.

3.8 Interaction Provisions:

Operation of the instrument shall not adversely affect interconnected instruments or systems.

3.9 Self Generated Signals:

The generated signals should be capable of operating alert signals in accord with ARP450C, Flight Deck Visual, Audible and Tactual Signals.

3.10 Test Provisions:

As installed on the aircraft the device or system shall have the capability of being tested, without the usage of special test equipment, to assure that the essential alerting signals are properly operating.

3.11 Explosion Category:

The instrument component, when intended for installation either in uninhabited areas of non-pressurized aircraft or in non-pressurized areas of pressurized aircraft, should not cause an explosion when operated in an explosive atmosphere. Instruments intended for mounting in a pressurized area only need not be tested for this category.

3.12 Fire Hazard:

The instrument should be so designed as to safeguard against hazards to the aircraft in the event of malfunction or failure, and the maximum operating temperature or surfaces of any instrument component contacted by combustible fuel or vapor should not exceed 200 °C due to self-heating. All materials should be non-combustible and should not liberate gases or fumes which can result in such corrosion as to cause malfunction of equipment or discoloration of dials or indicia, nor should toxic gases or fumes that are detrimental to performance of the aircraft, or health of personnel, be liberated under the operating conditions specified herein.

3.13 Radio Interference:

The instrument shall not be a source of objectionable interference under operating conditions at any frequencies used on the aircraft, either by radiation, conduction, or feedback in any electronic equipment installed in the same aircraft as the instruments, and capable of performing as required when tested per the procedures of RTCA Document DO-138, paragraphs:

- 11. Audio-Frequency Conducted Susceptibility Test
- 12. Audio-Frequency Conducted Susceptibility Test
- 13. Radio-Frequency Susceptibility Test

Appendix A Standards on Emission of Spurious Radio Frequency Energy (Conducted and Radiated Interference) and Associated Test Procedures

3.14 Magnetic Effect:

The magnetic effect of the instrument shall not adversely affect the performance of other instruments installed in the same aircraft.