SANDIA aerospace

SI 205
Radar Altimeter Indicator

Pilots Guide

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Record Of Revisions

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Section 1 – SI 205 Overview

1.1 Introduction

This manual describes the operation of the SANDIA aerospace SI 205 Radar Altimeter Indicator. The SI 205 is designed to operate with the Garmin GRA 55 or GRA 5500 radar altimeters.

1.2 SI 205 Product Description

The SI 205 can be installed as a stand-alone display of radar altitude or in parallel with an integrated avionics suite. In a stand-alone installation, the pilot may input a Decision Height (DH) setting on the SI 205 display, and the SI 205 deduces the DH crossover point and generates appropriate visual and aural alerts. DH alerting in this scenario is independent of the GRA 55/5500. The SI 205 can also be installed in parallel with an integrated avionics suite. In this scenario, the SI 205 provides a dedicated radar altitude display. The SI 205 can be configured to disable the redundant local Decision Height alerts, and it can optionally generate aural or visual alerts based on discrete outputs from the integrated avionics.

Illustration 1: SI 205 Overview

1.2.1 Functions

The SI 205 performs the following functions:

- Receive and process ARINC Label 164
- Visual and aural annunciations
- Decision Height alert discrete output
- Activate Self Test mode in GRA 55/5500
- Display Radar Altitude (Meters/Feet)
- Auto adjust the brightness of the display
- Volume control
- Enable/Disable Altitude Trend

Various parameters can be configured by the installer (not pilot accessible):

- Altitude Filter Time Constant
- Maximum Trend Scale
- Trend Filter Time Constant
- DH Display Name
- DH Visual Alert
- DH Aural Alert
- Default Decision Height
- ARINC 429 Speed
- Select Rounding Options

1.2.2 System Interfaces

The SI 205 interfaces with Garmin GRA 55 and GRA 5500 radar altimeters via ARINC 429 interface.

Inhibit DH Input: If this discrete input is connected to ground, the decision height functionality is masked from the display.

GRA Altitude Alert Discrete Input 1: If this discrete input is connected to the GRA 55 or GRA 5500, the SI 205 provides a visual and aural annunciation when the input is active.

GRA Altitude Alert Discrete Input 2: If this discrete input is connected to the GRA 55 or GRA 5500, the SI 205 provides a visual and aural annunciation when the input is active.

Aircraft power is the only electrical power interface.

Section 2 - Normal Operation

2.1 Initial Power On

Upon initial power-on, the unit will display the company logo, software version and software checksum for about 10 seconds and then proceed to the normal display.

Illustration 2: Power On Screen

2.2 Pilot Display and Controls

The following shows the on-screen functions and pilot control during normal operation.

Illustration 3: Display Elements

2.2.1 Push Test Button and Encoder

Pushing the “PUSH TEST” button activates the optional manually initiated self test mode in the GRA 55 and GRA 5500 (if this functionality is connected between the SI 205 and the GRA). If the internal GRA self test-passes, the GRA transmits a test altitude of 40 ft, which is displayed by the SI 205. If the self test fails, the text “FAIL” will be prominently displayed on the SI 205 display. This text cannot be removed from the SI205 display unless power is cycled to the GRA. If the manually initiated self test mode is currently inhibited by the GRA, the SI 205 will show “TEST INHIBITED” in place of “RADAR ALTITUDE” on the display, and the self test will not initiate. Refer to the GRA 55 or GRA 5500 Installation Manual for more information about the Self-Test and Self-Test Inhibit Functionality of the GRA. A rotary encoder (turnable knob) is built in with the same “PUSH TEST” button. Rotating the encoder during normal operation sets the Decision Height in the range of 0 to 2500 feet or 0 to 760 meters.

2.3 Radar Altitude

Radar Altitude is displayed below the “RADAR ALTITUDE” text. SI 205 can be configured to display the Radar Altitude in either feet or in meters. If SI 205 receives an indication that the unit providing the Radar Altitude has failed, it will display “FAIL” in place of the Radar Altitude value. If SI 205 receives an indication that the unit providing the Radar Altitude is in “TEST” mode, it will display “TEST” in place of Radar Altitude. If Decision Height alert gets activated, and if DH Visual Alert field is selected to “ALT FIELD” during installation, the Radar Altitude value will blink for two seconds and then stay highlighted as long as the DH alert is active.

Illustration 4: Radar Altitude Highlighted

2.4 Decision Height

Decision Height is displayed below the “DH” or “MIN” text based on the “DH DISPLAY NAME” selection during installation. It is displayed in either in feet or in meters based on the “ALTITUDE UNIT” selection during installation.

Decision Height can be set by turning the Encoder and it changes by the factor shown in the table below:

Decision Height (in Feet)	Increment/ Decrement Factor	Decision Height (in Meters)	Increment/ Decrement Factor
0 to 200 Feet	10 Feet	0 to 60 Meters	3 Meters
200 to 500 Feet	50 Feet	60 to 150 Meters	15 Meters
500 to 2500 Feet	100 Feet	150 to 760 Meters	30 Meters

2.5 Decision Height Alert

Decision Height alerts gets activated if the Radar Altitude crosses below the set Decision Height. The alert is annunciated both visually and aurally. The “DH” or “MIN” text along with the Decision Height or the Radar Altitude will blink for two seconds and then stay highlighted as long as the alert is active. In addition to the blinking, SI 205 also plays the aural alert either sounds of “Minimum” in male or female voice or a tone for about two seconds depending upon “DH AURAL VOICE” selection during installation. Once the alert is active, the alert remains active until the Radar Altitude reaches 50 Feet above the set Decision Height. There is one special scenario. If the Decision Height is set to 0 Feet/Meters, and if the Radar Altitude also becomes 0 Feet/Meters, the alert becomes inactive after a second.

2.6 Trend Indicator

Trend Indicator is displayed on the right side of the display. It could be turned off by disabling “TREND INDICATOR” configuration option during installation.

2.7 “ALT1”

When GRA 1 Altitude Alert input becomes active, SI 205 plays the audio alert for two seconds and blinks “ALT1” text at the bottom row of the display for about two seconds and then keeps it highlighted.

2.8 “ALT2”

When GRA 2 Altitude Alert input becomes active, SI 205 plays the audio alert for two seconds and blinks “ALT2” text at the bottom row of the display for about two seconds and then keeps it highlighted.

2.9 Pilot Configurations

Pressing and holding the Push Test Button for 5 seconds starts the user configuration mode. After entering into the user configuration mode, pushing the Push Test button will cycle through the following user configuration pages: “MIN BRIGHTNESS”, “VOLUME”, “ALTITUDE UNIT” and “ALTITUDE TREND”.

Once in the configuration menus, the SI 205 returns to normal operation mode if no input is received through the button or the encoder for 8 seconds.

2.9.1 Minimum Brightness

The minimum brightness level of the display can be selected in this configuration page. Turning the rotary encoder changes the minimum brightness of the display.

After it returns to the normal operation the brightness of the display is automatically controlled by SI 205. The display becomes brighter as the surrounding light gets brighter. The display becomes dimmer as the surrounding light gets dimmer limiting at the minimum brightness setting. If using Night Vision Goggles, set the Brightness to the lowest brightness setting.

Illustration 5: Minimum Brightness Adjustment

2.9.2 Volume

The aural alert volume can be set at this user configuration page. Turning the rotary encoder changes the volume. For convenience, it plays the aural alert while on this page to help adjust to the desired alert volume. Setting volume to the minimum will mute the aural alert.

Illustration 6: Volume Adjustment

2.9.3 ALTITUDE UNIT

The altitude unit can be selected to “FEET” or “METERS” by turning the rotary encoder on this user configuration page. This configuration affects both the Radar Altitude and the Decision Height.

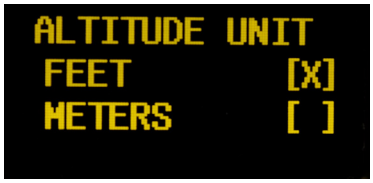

Illustration 7: Altitude Unit Selection

2.9.4 ALTITUDE TREND

The altitude trend can be selected to "ENABLE" or "DISABLE" by turning the rotary encoder on this user configuration page. If "ALTITUDE TREND" is disabled, Trend Indicator will not be displayed on the normal display.

When Altitude Trend is enabled, Trend Indicator display only appears when the altitude trend value is above a threshold set by "MAX TREND SCALE" during installation.

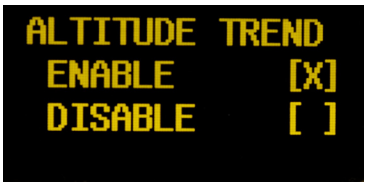

Illustration 8: Altitude Trend Selection

Section 3 – Failure Conditions

3.1 Flash Memory Check

The unit continuously checks for any error in the flash memory and if it encounters any error, it will display an error "EOC CRC FAILED" and will become inoperable. If this occurs, the unit must be returned to the factory for service.

3.2 Memory Check

The unit checks for any random access memory errors during startup and if it encounters any error, it will display an error message saying "RAM TEST FAILED" and will become inoperable. If this occurs, the unit must be returned to the factory for service.