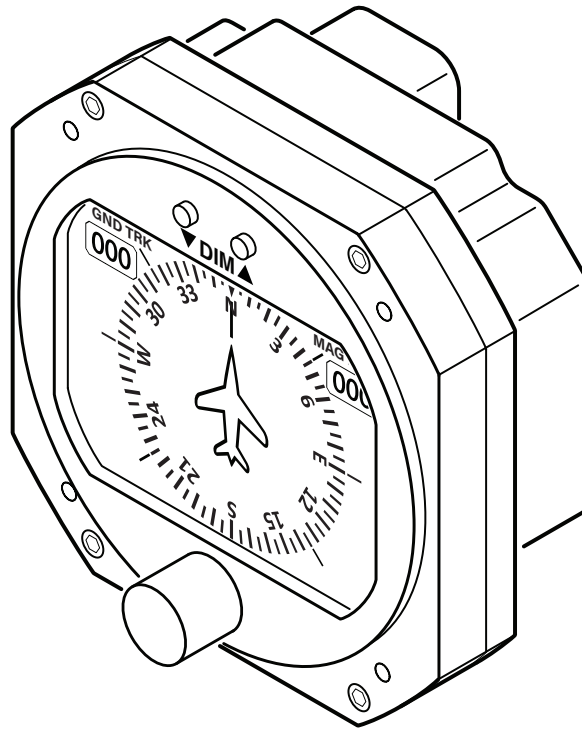




# RCA1510 SERIES

## ELECTRIC DIGITAL HEADING INDICATOR

### INSTALLATION/OPERATION GUIDE



**RCA1510-3**

## REVISION DETAIL

| REVISION | DATE       | DETAIL                                                                                                                                        |
|----------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| A        | 06-27-2017 | Initial Release                                                                                                                               |
| B        | 01-24-2018 | Changed Circuit Breaker Amperage to 1 amp and software version to 5.0.5 (Page 2).<br>Added Quick-Set Heading Bug feature reference (Page 6) . |
| C        | 07-12-2018 | Corrected P/N on Cover Page.                                                                                                                  |
| D        | 07-31-2018 | Update to reflect new software change, pin-out information, GPS input information and Continued Airworthiness information.                    |
| E        | 09-13-2018 | Changed Section 3.2 title from "Magnetic Calibration" to "Initial In-Flight Magnetic Calibration".                                            |
| F        | 12-10-2018 | Update NVG part number.                                                                                                                       |
| G        | 08-26-2021 | Update entire manual to reflect new display and menu features.                                                                                |

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## SECTION 1: INSTRUMENT DESCRIPTION

### 1.1 GENERAL DESCRIPTION

The **RCA1510** is a Digital Heading Indicator with an optional Internal Battery Backup. The instrument utilizes information from an internal magnetometer and GPS data from either an internal GPS that uses an antenna or by an external GPS source (See Table 1.2 Options and Configurations, page 3).

The display has multiple options which can show the Magnetic Heading (MAG HDG) or GPS Ground Track Heading (GND TRK) individually or both simultaneously. The heading can also be shown either as a numerical display or as a Heading Mark on the Heading Dial.

Because the **RCA1510** has no mechanical gyroscope, it is much more accurate than traditional heading indicators. Unlike a mechanical gyroscopic unit, the **RCA1510** is not affected by drifting or wandering. The unit is designed to default to Magnetic Heading in the event that the GPS signal is lost.

### 1.2 PHYSICAL DESCRIPTION

The **RCA1510** is a self-contained multi-volt electric digital instrument that can be installed in a standard three-inch panel mount. Refer to table 1.1 below for leading particulars.

The display is a 3-inch LCD screen that shows a traditional circular compass that rotates against a stationary aircraft pointer and is intended to be intuitive in use.

|                                            |                                                                                                                                                                                                 |
|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <u>OPERATING VOLTAGE</u> .....             | 9 to 32VDC                                                                                                                                                                                      |
| <u>RUNNING CURRENT</u> .....               | (14VDC SYSTEM) ..... 0.35 AMP MAX<br>(28VDC SYSTEM) ..... 0.20 AMP MAX                                                                                                                          |
| <u>CIRCUIT BREAKER SIZE</u> .....          | 1 AMP                                                                                                                                                                                           |
| <u>ACCURACY</u> .....                      | 2 DEGREES                                                                                                                                                                                       |
| <u>OPERATING TEMPERATURE RANGE</u> .....   | -20° TO +55° C                                                                                                                                                                                  |
| <u>MATING CONNECTOR</u> .....              | MS3116E8-4S OR EQUIVALENT                                                                                                                                                                       |
| <u>WEIGHT</u> .....                        | 8.35 oz                                                                                                                                                                                         |
| <u>DISPLAY RESOLUTION</u> .....            | 320 X 240 Pixels, LED Backlight, Color LCD                                                                                                                                                      |
| <u>DIMENSIONS/PANEL CUTOUT</u> .....       | SEE FIGURE 1.1                                                                                                                                                                                  |
| <u>BATTERY BACKUP</u> .....                | Rechargeable LiPO, 3.7V 500 mAh (1.85) Wh                                                                                                                                                       |
| <u>BATTERY LIFE</u> .....                  | Up to 3 Hours                                                                                                                                                                                   |
| <u>EYE VIEWING ANGLE ENVELOPE</u> .....    | Horizontal Left and Right: 35° Left, 35° Right<br>Vertical Up and Down: 35° Up, 35° Down<br>Minimum distance from display surface: 6 inches<br>Maximum distance from display surface: 48 inches |
| <u>SOFTWARE VERSION</u> .....              | 5.0.12                                                                                                                                                                                          |
| <u>FAA SPECIFICATION CONFORMANCE</u> ..... | TSO-C6e, TSO-C113a, DO-160G and DO-178B Level C                                                                                                                                                 |
| <u>MEETS OR EXCEEDS</u> .....              | AS8034B and AS8013A                                                                                                                                                                             |

TABLE 1.1, LEADING PARTICULARS

**1.3 OPTIONS AND CONFIGURATIONS**

For available options and configurations, refer to Table 1.2, below.

| PART NUMBERS   | INTERNAL GPS<br>(SMA Antenna Connection) | NVIS COMPATIBLE | BATTERY BACKUP |
|----------------|------------------------------------------|-----------------|----------------|
| 103-0503-03-01 | X                                        |                 |                |
| 103-0503-03-02 | X                                        | X               |                |
| 103-0503-03-03 | X                                        |                 | X              |
| 103-0503-03-04 | X                                        | X               | X              |
| 103-0503-03-05 |                                          |                 |                |
| 103-0503-03-06 |                                          | X               |                |
| 103-0503-03-07 |                                          |                 | X              |
| 103-0503-03-08 |                                          | X               | X              |

Table 1.2, Options and Configurations

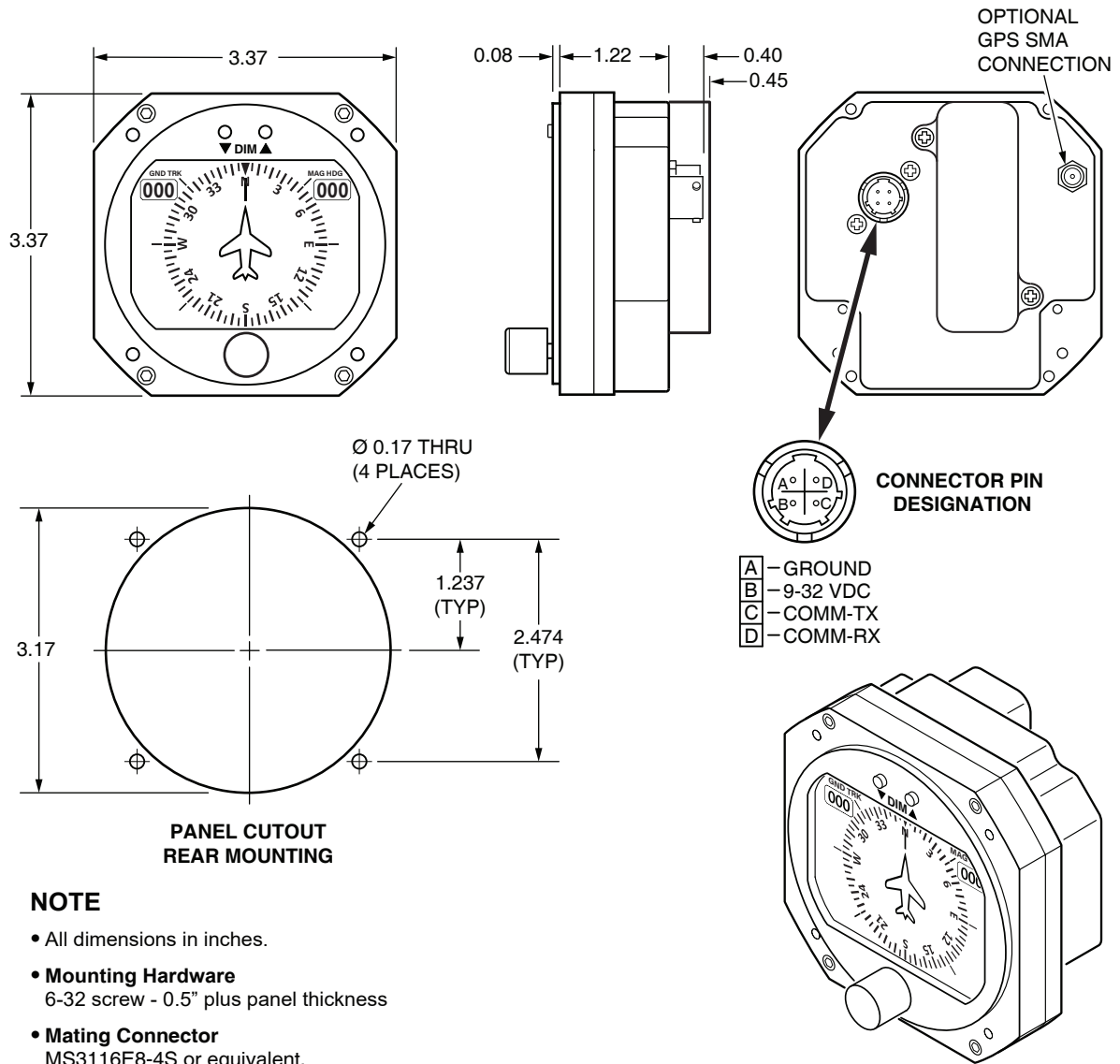


Figure 1.1, General Dimensions

## SECTION 2, INSTALLATION

### 2.1 GENERAL INFORMATION

The conditions and tests required for TSO approval of this article are minimum performance standards. Those installing this article, on or in a specific type or class of aircraft, must determine that the aircraft installation conditions are within the TSO standards. TSO articles must have separate approval for installation in an aircraft. The article may be installed only in accordance with the applicable airworthiness requirements and, if applicable, the requirements of 14 CFR part 43.

### 2.2 HANDLING

Although the RCA1510 Series instruments are totally electronic, improper handling can cause damage. Please observe the following precautions while handling.

1. Do not drop, jar or shake instrument. Store instrument in shipping container until installation.
2. Instruments should be transported in the original shipping container when moved to and from aircraft. If container is not available, carefully carry by hand in upright position.
3. Avoid touching the screen. This is the most vulnerable part of the instrument. Improper handling and cleaning can cause permanent scratching of the screen surface (See *Instrument Care* on Page 8).
4. To prevent further damage, a malfunctioning instrument should be handled as carefully as a new instrument. Most malfunctioning instruments can be repaired and returned to service. Contact Kelly Manufacturing Company for repair and warranty information.

### 2.3 PRE-INSTALLATION INSPECTION

1. When the instrument is first received, inspect container for any shipping damage.
2. Carefully remove the instrument from shipping container and retain container for later storage or shipping.
3. Inspect the instrument for any signs of damage. Contact your Shipper to file any claim due to shipping damage.

### 2.4 INSTALLATION

Install the instrument on the aircraft by using the aircraft manufacturer's recommendations and by the following steps:

1. The **RCA1510** uses standard panel cutouts. Refer to Figure 1.1 "General Dimensions" for instrument and cutout dimensions.

2. Instrument Pinout:

**A** = Ground      **D** = RS232 Communication Receive\*  
**B** = Power      **C** = RS232 Communication Transmit

\*Connect the RS232 GPS output signal to **PIN D** configured for an aviation application at a baud rate of 9600. (See figure 1.1). Do not apply power to COMM pins as damage may occur.

3. Attach GPS input using one of the following methods;

GPS Antenna: Utilize the **RCA1510** internal GPS receiver by connecting an active GPS WAAS antenna (1575.42 MHz, 26.5 dB, 3.5/5 volts) to the SMA connector.

Serial Port Communication Pins: Utilize an external GPS receiver by connecting the serial data output of the GPS receiver to the **RCA1510** (see Instrument Pinout above).

4. Insert instrument into panel cutout (See Figure 1.1) and secure with supplied screws. Use 6-32 *UNC-2b* screws or equivalent. Screw length should not exceed .5 inches plus bezel and panel thickness. Do not tighten.
5. With the aircraft on level surface, use a bubble level on the instrument bezel to level and tighten screws.

**Do Not** modify the instrument in any way. Any modifications will void the warranty and revoke the FAA certifications.

## SECTION 3, INITIAL SETUP/CALIBRATION

### 3.1 SETUP/CONFIGURATION

The **RCA1510** indicator comes standard with multiple configurations and customizable options which will require some minor setup before any flights are performed.

To access the configuration menu perform the following procedure:

Apply power to the **RCA1510** indicator while holding down the two **DIM** buttons (located at the top of the unit) until the blue loading screen is displayed. Once the unit finishes loading, the configuration menu will be displayed on the unit as shown in figure 3.1 below. Turn the selection knob to the desired menu setting and push to open the menu.



Figure 3.1 Configuration Menu

#### INDICATION TYPE

Use Indication Type to set how the heading is shown on the screen. These settings include:

- Single Indication – Displays only Primary Heading Type with numerical read-out.
- Simultaneous Indication Mark – Simultaneously displays both Heading Types (MAG and GND TRK). Displays the Primary Heading Type on the dial with numerical read-out, and displays the Secondary Heading Mark.
- Simultaneous Indication Mark and Number – Simultaneously displays both Heading Types (MAG HDG and GND TRK). Displays the Primary Heading Type on the dial with numerical read-out, and displays the Secondary Heading Type with the Secondary numerical read-out and Heading Mark.



SINGLE INDICATION



SIMULTANEOUS  
INDICATION  
MARK



SIMULTANEOUS  
INDICATION  
MARK AND  
NUMBER

Figure 3.2 Indication Types

#### PRIMARY HEADING POSITION

This menu sets the primary heading display to either the top right or top left position.

#### PANEL TILT SET

If the **RCA1510** is being installed into an aircraft/rotorcraft with a tilted panel, then the tilt angle (in degrees) must be entered here prior to flight so the **RCA1510** indication can offset the tilted panel.

**RESET BATTERY HEALTH**

Used to reset Battery Health when installing a new battery (See Section 4.6 *Battery Replacement*).

**FLIGHT MENU STYLE**

There are two different types of in-flight menu styles. Use this option to select between the two different in-flight menu styles: “Normal Mode” (default) and “Quick Access Mode”.

**DIAGNOSTIC**

Use for viewing instrument details as shown below.



Figure 3.3 Sample Diagnostic Screen

**EXIT**

Select to exit menu.

**3.2 PRE-FLIGHT PROCEDURES**

During pre-flight procedures, the instrument must be provided with adequate electrical power under normal vibration conditions (engine running). A red “X” appears across the screen indicating that the instrument is booting up. After the red “X” disappears, the instrument is fully functional and after 3 minutes, reaches its optimum performance level.

Check that the Battery Charge Status Indicator displays at least 50% charge to ensure a minimum of 30 minutes of operation in the event of a power failure.

**3.3 INITIAL FLIGHT/FLIGHT TEST**

To produce accurate information, after the installation or when deviations in the heading are noticed, the instrument needs to be compensated for the aircraft magnetic field. This deviation can also be the result of installing a new instrument close to the heading indicator, or any change in the aircraft that can affect the magnetic field.

The **Magnetic Calibration** procedure has the goal of finding the magnetic field of the aircraft. During the magnetic calibration procedure, the instrument senses what part of the magnetic field rotates together with the instrument, and considers this the magnetic field of the aircraft. This magnetic field is then subtracted from the measured magnetic field, to obtain the earth’s magnetic field used to calculate the heading.

Refer to the Magnetic Compensation procedure in Section 4.2.1

**ADJUSTMENTS:**

After flight testing and evaluation, additional calibration may be required depending on the users application. Communicate flight test data with Kelly Manufacturing Company to determine appropriate adjustments.



## SECTION 4, OPERATION GUIDE

### 4.1 DISPLAY FEATURES

See Figure 4.1 below for typical display features.

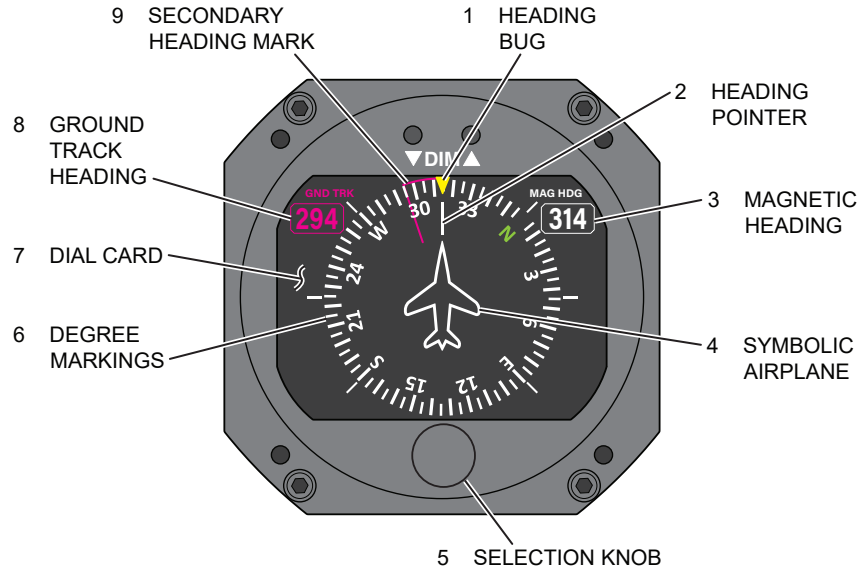


Figure 4.1, Typical Display Features

#### 1. HEADING BUG

The Heading Bug is a pointer that is set to the desired heading on the compass dial. It rotates with the dial.

#### 2. HEADING POINTER

The Heading Pointer is a stationary pointer that indicates the direction of flight against the compass dial.

#### 3. MAGNETIC HEADING (MAG HDG)

The heading number is the numerical reading of the magnetic heading of the aircraft.

#### 4. SYMBOLIC AIRPLANE

The Symbolic Airplane represents the orientation of the aircraft in relation to the direction indicated on the compass dial.

#### 5. SELECTION KNOB

Selection knob is used to set Heading Bug and access Settings Menu.

#### 6. DEGREE MARKINGS

The Degree Markings shows the compass heading in degrees on a rotating dial for analog viewing.

#### 7. DIAL CARD

The Dial Card is a rotating circular compass that aligns the actual heading with the Heading Pointer.

#### 8. GROUND TRACK HEADING (GND TRK)

The heading number is the numerical reading of the GPS Ground Track heading.

#### 9. SECONDARY HEADING MARK

The Secondary Tracking Mark displays the track of the Secondary Heading on the Heading Dial.

## 4.2 IN-FLIGHT PROCEDURES

### 4.2.1 FLIGHT MENU

To access the **Flight Menu**, Press the Flight Menu Selection Knob. The Flight Menu will appear on the lower portion of the screen. Rotate the Selection Knob to the desired setting and press the Selection Knob to select the highlighted menu option. Rotate the Selection Knob to the desired number or action and press Selection Knob to set. (See Figure 4.2 below).

#### NOTE

The Menu Style “**Quick Access Mode**” is an optional style for navigating the Flight Menu which moves through the selections by pressing the Selection Knob instead of turning the Selection Knob as in the “**Normal Mode**” (See Section 3.1 for how to configure Menu Styles).

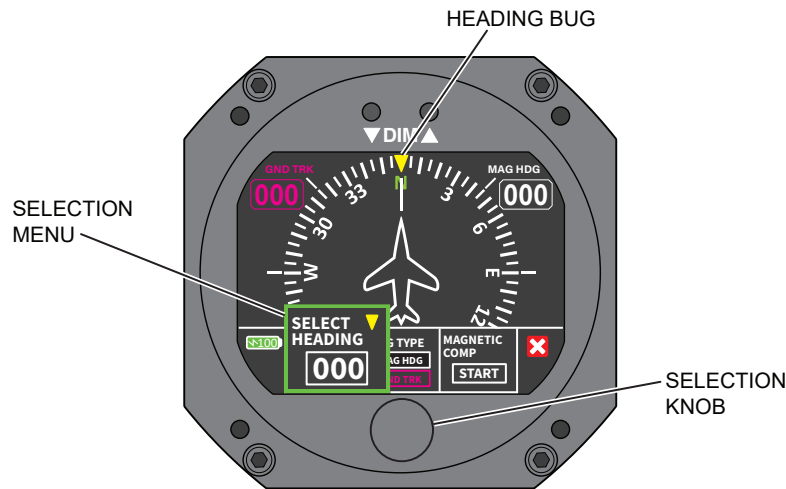


Figure 4.2, Flight Menu

### HEADING

The Heading Bug can be set any time before or during flight. Rotate the **Selection Knob** to open the Flight Menu. The Heading menu is automatically selected and by continually rotating the knob, the desired heading can be selected. The Heading Bug pointer will rotate on the Compass Dial until a new heading is set.



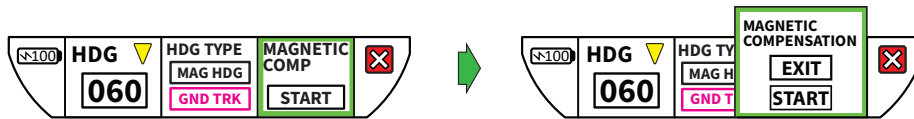
### HEADING TYPE

The **RCA1510** offers two Heading Indicator types – **Magnetic Heading** and **Ground Track** (using GPS data). This Flight Menu selection is used to select which type of heading is displayed as the Primary Heading. The Heading type can be changed any time before or during flight.



## MAGNETIC COMPENSATION

This flight menu option is used to perform the **Magnetic Compensation** procedure.



To compensate the instrument to eliminate the magnetic interference from the aircraft do the following:

1. After the **RCA1510** has been on for at least 3 minutes and the aircraft is in flight, **Select Magnetic Comp -> "Start"** from the flight menu. **"Gathering Mag Data"** is shown on the display. This operation resets any previous compensation and the instrument begins to gather data for 10 minutes to perform the magnetic compensation.
2. During the 10 minutes the instrument is gathering data, perform two 360 degree turns to the right and two 360 deg turns to the left.
3. When the 10 minutes time is over, the instrument will show the message **"Mag Data SAVED"**
4. Turn the instrument off and on. The message will disappear and the instrument is calibrated for the magnetic field of the aircraft (hard iron correction).

### NOTE

- **Magnetic Comp** will not be available until after the instrument has been turned on for at least 3 minutes.
- During the calibration procedure, the instrument could behave erratically due to the calibration process.

## EXIT MENU

After making selections, rotate the Selection Knob all of the way to the right to the red **"X"** and press Selection Knob to leave the menu. The menu will also auto-close if no setting is selected.

### 4.2.2 DIMMER

On startup, the **RCA1510** defaults to its maximum brightness. You may adjust the screen brightness at any time with the DIMMER PUSH BUTTONS (DIM).

Press and hold the DIM (▼) or BRIGHTEN (▲) PUSH BUTTONS until you reach the desired setting and release, or tap each button for incremental steps (See figure 3.2 for dimming controls).

Quickly pressing both buttons simultaneously will reset the screen to maximum brightness.

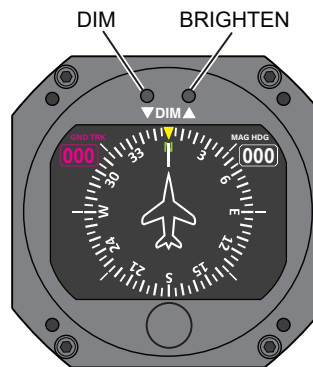


Figure 4.3 Dimmer Controls

### **4.3 FLIGHT LIMITATIONS**

There are no flight limitations to the **RCA1510**. The instrument will operate in a full 360 degrees pitch and roll and may be used in light aerobatic type maneuvers.

Extreme rotation speeds may cause the instrument to display a warning message to indicate to the pilot that the instrument may be operating outside the accuracy limits defined by the TSO. This message is displayed when the full scale of the instrument sensors is being exceeded and should go away within 3 to 10 seconds. Neither the display of the warning message, nor the extreme rotation speeds themselves, negatively affect the instrument so it is not necessary to service the instrument in the rare instance that the warning message is observed.

#### **NOTE**

This article meets the minimum performance and quality control standards required by a technical standard order (TSO). Installation of this article requires separate approval.

### **4.4 EMERGENCY PROCEDURES**

In the rare event that your **RCA1510** does not reset itself, you will need to pull power to the unit and reset the circuit breaker. This will restart the unit and you can continue on without damage to the unit. You do not need to be flying level while the unit resets.

#### **LOW VOLTAGE:**

In a low voltage situation, the **RCA1510** will show a “**Low Voltage**” warning notice at the bottom of the screen. This notice will appear when the voltage goes below 11 volts. This notice will also indicate the amount of voltage the instrument is receiving. At 5 volts, a warning will appear across the screen indicating that the instrument is not receiving enough power and will automatically switch to battery backup power.

### **4.5 BATTERY BACKUP**

The **RCA1510** is equipped with a lithium battery that will automatically provide an hour of battery power in the event of a power loss. If battery power is required for more than an hour, it is recommended to reduce the screen brightness to 80% once the power loss occurs. This will nearly triple the battery power time.

#### **Associated battery messages:**

“**60 Second Countdown**” indicates power loss while stationary (as detected through airspeed) - (normal shutoff).

“**Power Loss Switching to Battery**” indicates a power loss during flight (as detected through airspeed).

“**Batt Pwr**” indicates when the unit is operating in the Battery Mode.  
(To shutdown Battery Mode, simultaneously press and hold both “**Dim**” buttons).

“**Chk Batt**” indicates that either the battery failed the capacity test or is inoperable (See Section 4.8 *Battery Replacement*).

## 4.6 BATTERY REPLACEMENT

When the “**Chk Batt**” warning appears on the screen, it indicates that either the battery failed the capacity test, there was a problem with the capacity test, or the battery is inoperable. Before replacing the battery, perform another capacity test by completing steps 6 through 9 to re-test the battery. If this does not clear the “**Chk Batt**” message, the battery must then be replaced as soon as possible. (See Figure 4.4 below) (replace battery with **P/N 635-0002-01** Battery Assy).

### To replace the battery:

1. Remove Battery Cover screws. (QTY: 2)
2. Remove Battery Cover.
3. Disconnect Battery Assembly.
4. Connect new Battery Assembly.
5. Reinstall Battery Cover and screws.
6. Apply power and allow the instrument to run for at least 3 minutes until the Battery Charge Status icon reaches 100%.
7. Adjust DIM buttons so that the screen brightness is at 100%.
8. Once the Battery Charge Status icon reaches 100%, disconnect power to the instrument and allow the instrument to complete the 60 second countdown.
9. Reapply power and check that no battery related messages appear.

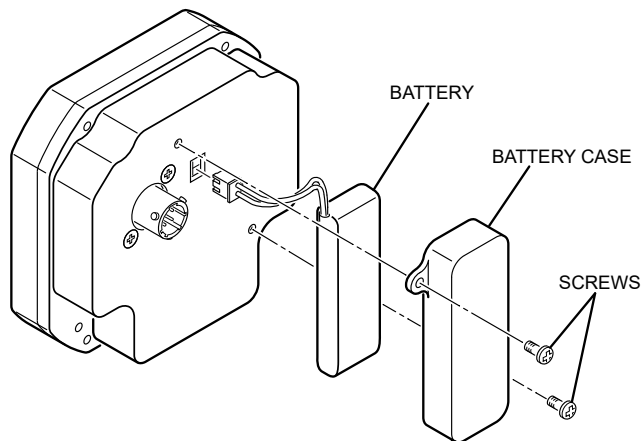


Figure 4.4, Battery Replacement

## SECTION 5, GENERAL INFORMATION

### 5.1 Flight Testing and Adjustments

After flight testing and evaluation, additional calibration may be required depending on the users application. Communicate flight test data with Kelly Manufacturing Company to determine appropriate adjustments.

### 5.2 Instrument Care

The most easily damaged part of your instrument is the screen. Special care should be taken when cleaning the screen to prevent scratches and other damage. Avoid touching the screen at all times.

To clean light spots and dust, use a soft, lint free cotton cloth slightly moistened with distilled water.

You may also use cleaners approved for LCD TV's and laptop computer screens.

Always apply the cleaner to the cloth and not the screen.

#### **-CAUTION-**

- **Do Not** use paper towels, facial tissue or napkins. These products are made from recycled paper and may contain metals and wood chips that will scratch the screen.
- **Do Not** use acetone, alcohol or cleaners containing ammonia.

By avoiding all screen contact and by using proper cleaning methods, the user will be rewarded with many years of service.

### 5.3 Frequently Asked Questions

#### How long should my Digital Heading Indicator last?

There isn't a good answer for this question. There are no moving parts in the RCA1510 so there isn't anything to wear out. The **RCA1510** should give hundreds of hours of trouble free operation.

#### How do I get my instrument repaired?

For any overhaul or repair questions you can contact Kelly Manufacturing Company. Our Service Center can repair or refurbish any R.C. Allen instrument. The only thing really required is information. You can send us your instrument with a letter giving us your name, return shipping address, phone number and a brief description of what is wrong with the instrument or download a form from the Support page on our web site at: [kellymfg.com/support.html](http://kellymfg.com/support.html).

Email us for more information: [SERVICE@KELLYMFG.COM](mailto:SERVICE@KELLYMFG.COM).

Or, Visit our Web Site: [kellymfg.com](http://kellymfg.com)



**APPENDIX A**

**Environmental Qualification:** DO-160G Environmental Qualification Form

**NOMENCLATURE:** ELECTRIC DIGITAL HEADING INDICATOR

**MODEL NUMBER:** RCA1510-series

**TSO NUMBER:** C6e & C113a

**MANUFACTURERS SPECIFICATIONS:** STP 1502 Rev. A

**MANUFACTURER:** Kelly Manufacturing Company


**ADDRESS:** 555 S. Topeka, Wichita, KS 67202

**REVISION & CHANGE NUMBER OF DO-160:** Rev. G **DATES TESTED:** 4/26/16 thru 5/24/16

| CONDITIONS                                                 | SECTION       | DESCRIPTION OF TESTS CONDUCTED                                                                                                                          |
|------------------------------------------------------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature and Altitude                                   | 4.0           | Equipment tested to Category D1                                                                                                                         |
| Low Temperature                                            | 4.5.1         |                                                                                                                                                         |
| High Temperature                                           | 4.5.2 & 4.5.3 |                                                                                                                                                         |
| Altitude                                                   | 4.6.1         |                                                                                                                                                         |
| Temperature Variation                                      | 5.0           | Equipment tested to Category C                                                                                                                          |
| Humidity                                                   | 6.0           | Equipment tested to Category A                                                                                                                          |
| Operational Shocks and Crash Safety                        | 7.0           | Equipment tested to Category B                                                                                                                          |
| Vibration                                                  | 8.0           | Equipment tested to Category U2 curve F & F1                                                                                                            |
| Explosive Atmosphere                                       | 9.0           | Equipment identified as category X, no test performed                                                                                                   |
| Waterproofness                                             | 10.0          | Equipment identified as category X, no test performed                                                                                                   |
| Fluids Susceptibility                                      | 11.0          | Equipment identified as category X, no test performed                                                                                                   |
| Sand and Dust                                              | 12.0          | Equipment identified as category X, no test performed                                                                                                   |
| Fungus                                                     | 13.0          | Equipment identified as category X, no test performed                                                                                                   |
| Salt Fog Test                                              | 14.0          | Equipment identified as category X, no test performed                                                                                                   |
| Magnetic Effect                                            | 15.0          | Equipment tested to Category Z                                                                                                                          |
| Power Input                                                | 16.0          | Equipment tested to Category BXX                                                                                                                        |
| Voltage Spike                                              | 17.0          | Equipment tested to Category A                                                                                                                          |
| Audio Frequency Susceptibility                             | 18.0          | Equipment tested to Category Z                                                                                                                          |
| Induced Signal Susceptibility                              | 19.0          | Equipment tested to Category ZC                                                                                                                         |
| Radio Frequency Susceptibility<br>(Radiated and Conducted) | 20.0          | Equipment tested for Conducted Susceptibility to Category W<br>Equipment tested for Radiated Susceptibility to Category F                               |
| Emissions of Radio Frequency Energy                        | 21.0          | Equipment tested to Category M                                                                                                                          |
| Lightning Induced Transient<br>Susceptibility              | 22.0          | Equipment tested to<br>Pin Injection Test: Waveform set B, Level 3<br>Cable Bundle Test: Waveform set H, Level 3<br>Multiple Burst: Level 3<br>[B3H3L3] |
| Lightning Direct Effects                                   | 23.0          | Equipment identified as category X, no test performed                                                                                                   |
| Icing                                                      | 24.0          | Equipment identified as category X, no test performed                                                                                                   |
| Electrostatic Discharge                                    | 25.0          | Equipment tested to Category A                                                                                                                          |
| Fire, Flammability                                         | 26.0          | Equipment identified as category X, no test performed                                                                                                   |

| REMARKS                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>▪ In the power input test, equipment was tested to subparagraph 16.5.1.4 b, requirement for equipment with digital circuits</li> <li>▪ Equipment also tested to (and passed) section 20, SW/CW radiated susceptibility @100V/m from 100MHz to 1GHz</li> </ul> |

**APPENDIX B**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                |                                                                                                |                                                                                           |                                                                                |                                                                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| <p><b>Instructions for Continued Airworthiness</b></p> <p>Document Number: ICA17.005</p> <p>Revision: B</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                |              |                                                                                           |                                                                                |                                                                                                |
| <p><b>Equipment/Model Number: RCA1510 series</b></p> <p><b>Equipment Description: Electric Digital Heading Indicator</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                |                                                                                                |                                                                                           |                                                                                |                                                                                                |
| <p><b>1. Description</b></p> <p>This document describes the necessary maintenance requirements and instructions necessary to ensure the continued airworthiness of aircraft/rotorcraft with the RCA1510 Electric Digital Heading Indicator installed.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                |                                                                                                |                                                                                           |                                                                                |                                                                                                |
| <p><b>2. Operation</b></p> <p>Operating Instructions for the RCA1510 are detailed in the following document:</p> <ul style="list-style-type: none"> <li>▪ Kelly Manufacturing Company Operation/Installation Guide (Publication No. 1401-5)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                |                                                                                                |                                                                                           |                                                                                |                                                                                                |
| <p><b>3. Equipment Certifications</b></p> <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; vertical-align: top; padding: 2px;"> <ul style="list-style-type: none"> <li>▪ FAA TSO-C6e</li> <li>▪ FAA TSO- C113a</li> </ul> </td> <td style="width: 33%; vertical-align: top; padding: 2px;"> <ul style="list-style-type: none"> <li>▪ AS8013A</li> <li>▪ AS8034B</li> </ul> </td> <td style="width: 33%; vertical-align: top; padding: 2px;"> <ul style="list-style-type: none"> <li>▪ RTCA DO-160G</li> <li>▪ RTCA DO-178B Lv. C</li> </ul> </td> </tr> </table>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                |                                                                                                | <ul style="list-style-type: none"> <li>▪ FAA TSO-C6e</li> <li>▪ FAA TSO- C113a</li> </ul> | <ul style="list-style-type: none"> <li>▪ AS8013A</li> <li>▪ AS8034B</li> </ul> | <ul style="list-style-type: none"> <li>▪ RTCA DO-160G</li> <li>▪ RTCA DO-178B Lv. C</li> </ul> |
| <ul style="list-style-type: none"> <li>▪ FAA TSO-C6e</li> <li>▪ FAA TSO- C113a</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>▪ AS8013A</li> <li>▪ AS8034B</li> </ul> | <ul style="list-style-type: none"> <li>▪ RTCA DO-160G</li> <li>▪ RTCA DO-178B Lv. C</li> </ul> |                                                                                           |                                                                                |                                                                                                |
| <p><b>3. Servicing</b></p> <p>No scheduled service required</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                |                                                                                                |                                                                                           |                                                                                |                                                                                                |
| <p><b>4. Maintenance Instructions</b></p> <p>Every <b>12 months</b>:</p> <p>Check that the RCA1510 Electric Digital Heading Indicator is responding properly and operating within the guidelines detailed in Kelly Manufacturing Company Publication No. 1401-5. Also verify the following:</p> <ul style="list-style-type: none"> <li>▪ No warning/error message exists on the display.</li> <li>▪ No drop off or inconsistency in display brightness.</li> </ul> <p>Every <b>24 months</b>:</p> <p>1) Check functional indication accuracy</p> <p>Note: Indication accuracy can be verified in flight test using the following procedure:</p> <ul style="list-style-type: none"> <li>▪ After take-off and before IFR situations perform two turns in opposite directions of at least 15 degrees</li> <li>▪ Return aircraft to level flight/cruising speeds for a minimum of 2 minutes.</li> <li>▪ Verify the RCA1510 indicates heading within two degrees.</li> </ul> <p>Service is required if the RCA1510 does not pass this flight test. Instrument service can be performed at Kelly Manufacturing Company <a href="mailto:service@kellymfg.com">service@kellymfg.com</a></p> <p>2) Contact Kelly Manufacturing Company with serial number of the unit to determine if update to the World Magnetic Module is required for the GPS of the unit.</p> |                                                                                |                                                                                                |                                                                                           |                                                                                |                                                                                                |
| <p>July 31, 2018</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                | <p>Page 1 of 2</p>                                                                             |                                                                                           |                                                                                |                                                                                                |



**Instructions for Continued Airworthiness**

Document Number: ICA17.005

Revision: B



*Airworthiness Limitations*

There are no airworthiness limitations for the RCA1510  
Reference section 3.6 of Kelly Manufacturing Company Publication 1401-5.

*Notes*

*Revision History*

| Revision | Date      | Detail                                                             |
|----------|-----------|--------------------------------------------------------------------|
| A        | 6/30/2017 | Initial Release                                                    |
| B        | 7/31/2018 | Section referenced under Airworthiness Limitations was section 3.4 |
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**KMC PUBLICATION NO. 1401-5**

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