

Pilot's Guide
for the

TR:LOGY™

Electronic Standby Indicator

Model ESI-2000

Software Release 1.x



Avionics Systems



Pilot's Guide

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A Digital Revolution in Standby Instrumentation

The Trilogy™ Electronic Standby Instrument (ESI) is a panel-mounted solid-state instrument that provides dependable backup for attitude, altitude and airspeed information for Part 23/25 Fixed Wing Aircraft and Part 27/29 Rotorcraft. The Trilogy ESI-2000 replaces traditional electro-mechanical standby instruments and combines the information into a compact and easy to read 4" x 3" display. Its space-saving footprint, easy installation and complete digital design make it the ideal standby for both new aircraft as well as those outfitted with aging or traditional analog gauges. An internal battery provides backup power for at least 1 hour. Heading is also available, when coupled with the optional magnetometer or configured to receive ARINC 429 Heading , which enables the system to display heading in a dedicated window.

Document Precedence

This Pilot's Guide provides general information about the operation of the ESI-2000. Refer to your FAA-approved Airplane Flight Manual (AFM) and its flight manual supplements for information specific to your aircraft. If there is conflicting information between the AFM and this guide, the AFM takes precedence over this guide.

Disclaimer

This Pilot's Guide is subject to change without notice. The illustrations in this guide are typical to the ESI-2000, but may not exactly match your configuration options or the latest release of the unit.

Export Notice

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Revision E Highlights

- Incorporate Release 1.2.
- Minor corrections.

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CHAPTER 1

DESCRIPTION

Introduction

Refer to Figure 1-1. The ESI-2000 Electronic Standby Indicator is a panel mounted solid state instrument that provides a visual display of attitude (pitch & roll), slip/skid indicator, barometric corrected altitude, indicated airspeed, heading (optional), and battery indications.

The indicator uses an Active Matrix Liquid Crystal Display (AMLCD) with a nominal diagonal size of 3.7 inches and a resolution of $\frac{1}{4}$ VGA (320 X 240 RGB). Flicker free operation is obtained with a 60 Hz refresh rate combined with a minimum 30 Hz update rate.

A bezel mounted light sensor provides automatic dimming with manual offset controlled via the menu access mode. Four soft key buttons on the front of the bezel provide the user with quick access for setting baro level and units, display and button brightness, and access to menu options. A replaceable battery assembly provides backup power.



Figure 1-1: ESI-2000

Software Release

The following software releases are available for the ESI-2000:

- Release 1.0. Original Release.
- Release 1.1. Provides a configuration option to choose airspeed units in either knots or miles per hour and incorporates an Airspeed Unit Descriptor that is shown on the display to show which unit type is being used.
- Release 1.2. New configuration option to receive heading information digitally from an external source. New VG mode for Part 27/29 rotorcraft. New display message to give pilot choice to perform alignment when a overrate condition is detected. Provide “wrapping” functionality to non-numeric Menu lists. “Attitude Fail” is displayed when a problem is detected during alignment instead of waiting for alignment to complete. Provide customer option for Static Source Error Correction (SSEC) and Maximum Indicated Airspeed (Max IAS) functionality set by the factory. Additional software improvements.

Specifications

PHYSICAL	
Size:	Bezel: 4.03" x 3.35" (10.24 x 8.51 cm) Chassis: 3-ATI Opening 7.66" (19.45 cm)
Weight:	2.75 Lbs (1.25 kg) MAX
Power:	+28.0 VDC nominal, 10.0 W MAX (battery not charging) 22.0 W MAX (battery charging) +14.0 VDC (with external converter)
Environmental:	DO-160F
Software:	DO-178B, Level A
Hardware:	DO-254, Level A
Certification: (FAA and EASA)	TSO-C2d (Type B, [Part 23/25] 40 to 400 kts & [Part 27/29] 20 to 350 kts), and for Release 1.1 [Part 23/25] 46 to 460 mph, [Part 27/29] 23 to 403 mph), C3e (Type II, Slip Only), C4c, C6e, C10b (-1,500 to 55,000 ft), C46a, C113, C179. ETSO-C2d (Type B, [Part 23/25] 40 to 400 kts & [Part 27/29] 20 to 350 kts), and for Release 1.1 [Part 23/25] 46 to 460 mph, [Part 27/29] 23 to 403 mph), C3d (Type II, Slip Only), C4c, C6d, C10b (-1,500 to 55,000 ft), C46a, C113, (Non-ETSO Function: Rechargeable Lithium Battery Cells and Lithium Batteries in compliance with UL 1642 + TSO-C179 appendix 1)

Specifications (Continued)

PERFORMANCE	
Attitude:	Accuracy: Error less than or equal to +/-3.0 degrees in pitch and roll with valid air data.
Airspeed, Tape:	Viewable Range: Release 1.0: (Part 23/25 Aircraft 0 to 450 kts) (Part 27/29 Rotorcraft 20 to 350 kts) Release 1.1 & 1.2: (Part 23/25 Aircraft 40 to 550 units) (Part 27/29 Rotorcraft 20 to 550 units)
Airspeed, Readout:	Viewable Range: Release 1.0: Part 23/25 Aircraft 40 to 400 kts. Part 27/29 Rotorcraft 20 to 350 kts Release 1.1 & 1.2: Part 23/25 Aircraft 40 to 400 kts or 46 to 460 mph Part 27/29 Rotorcraft 20 to 350 kts or 23 to 403 mph
Altitude:	Viewable Range: -2,000 to 56,000 ft. / -610 to 17,000 m.
Heading, Magnetic:	Accuracy: 2 degrees static on ground with magnetometer.
Heading, ARINC 429 Release 1.2	Accuracy: Within +/- 0.1 degree of heading source.

Specifications (Continued)

OPERATION LIMITS	
Pitch, Roll, Yaw:	All angles.
Pitch, Roll, Yaw Rate	+/- 100 degrees/second +/- 135 degrees/second (release 1.2)
Altitude:	Calibrated Range: -1,500 to 55,000 ft. / -457 to 16,764 m. BARO: 27.00 to 32.00 inches Hg. 914 to 1083 hPa or mb
Altitude Rate:	Up to $\pm 6,000$ ft/min
Airspeed:	Calibrated Range: Release 1.0: (Part 23/25 Aircraft) 40 to 400 kts (Part 27/29 Rotorcraft) 20 to 350 kts Release 1.1 & 1.2: Part 23/25 Aircraft 40 to 400 kts or 46 to 460 mph Part 27/29 Rotorcraft 20 to 350 kts or 23 to 403 mph
Longitudinal Axis Acceleration:	+/- 7.5 g
Lateral Axis Acceleration:	+/- 7.5 g
Vertical Axis Acceleration:	+/- 12.0 g
BATTERY PERFORMANCE	
Capacity:	Typical: >2 hours Minimum: 1 hour when temperature is -15°C to +60°C (5°F to +140°F)
Discharge Temp. Range:	-40°C to 60°C (-40°F to +140°F)
Charging Temp. Range:	0°C to 45°C (+32°F to +113°F)

Specifications (Continued)

SCHEDULED MAINTENANCE:	Battery capacity meter requires automated calibration periodically. Subject to requirements of FAA document CFR FAR Part 91.411.
SERVICE LIFE:	The indicator has unlimited service life. The battery has approximately 5 years of service life; provided that the procedures for maintenance are followed as detailed in the Battery Capacity Meter Calibration Procedure (see page 2-6)

Optional Equipment

The MAG-3100 and MAG-3000 manufactured by L-3 Avionics Systems are self contained three-axis magnetometers that provides a three component measurement of the earth’s magnetic field. Refer to Figure 1-2 a & b.

If the magnetometer option is used, heading is shown on a tape and digital readout at the bottom of the display.



Figure 1-2a: MAG-3100



Figure 1-2b: MAG-3000

Limitations

When configured to operate with a magnetometer for heading reference input; the use of heading is not authorized to operate in the following polar regions due to magnetic field unsuitability:

- North of 70° N latitude
- South of 70° S latitude
- North of 65° N latitude between 75° and 120° W longitude (northern Canada)
- South of 55° S latitude between 120° and 165° E longitude (south of Australia and New Zealand)

Attitude and air data information is still usable. It is recommended that the magnetometer power be removed in these geographic areas.

Display Elements

ATTITUDE

Attitude Background (refer to Figure 1-3)

The attitude background is divided into an upper blue sky and lower brown ground with the horizon line located where the sky and ground backgrounds meet. The attitude background moves up/down and clockwise/counter-clockwise around the boresight of the aircraft reference symbol in relation to the pitch and roll of the aircraft.

Pitch Ladder (refer to Figure 1-3)

The pitch ladder scale is located in the center of the display with short horizontal lines positioned every $\pm 5^\circ$, and longer, labeled, lines every $\pm 10^\circ$. The pitch ladder rotates around the aircraft reference symbol in relation to aircraft's roll and scrolls up and down in response to the aircraft's pitch. The scale has a maximum pitch of $\pm 80^\circ$. A bullseye is shown at the $\pm 90^\circ$ position of the pitch ladder.

Red "V" shaped chevrons appear on the pitch ladder when the unit is placed in extreme pitch (See Figure 3-12 and 3-13). The chevrons point towards the horizon with the point of the chevron positioned at 35° , 50° and 65° (sky-background) and -25° , -45° , & -65° (ground-background).

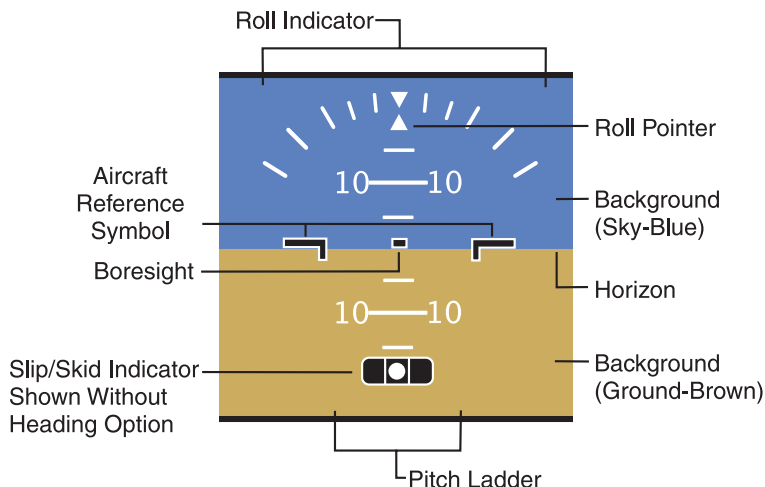
Display Elements (continued)**ATTITUDE (continued)**

Figure 1-3: Attitude Elements

Roll Indicator (refer to Figure 1-3)

The roll indicator consists of a roll scale and a roll pointer. The white scale lines are set at ± 10 , 20, 30, 45, and 60 degree tick marks with a downward white triangle representing the 0° mark. The roll pointer is an upward pointing triangle located on the inner arc radius of the roll scale.

Configuration Options: If the roll pointer is **configured for fixed** the roll scale rotates around the aircraft reference symbol boresight and has a roll angle range of $\pm 180^\circ$. If the roll pointer is **configured for rotating** the roll pointer rotates around the aircraft reference symbol boresight and has a roll angle range of $\pm 180^\circ$.

Aircraft Reference Symbol (refer to Figure 1-3)

Located in the center of the attitude display, the aircraft reference symbol is a fixed square boresight with L-shaped “wings” to each side of the boresight. The symbol provides a fixed reference as compared to the attitude background, pitch ladder, and roll indicator to determine the aircraft’s pitch and roll attitude. The aircraft is at zero-degree pitch when the intersection of the blue (sky) and brown (ground) artificial horizon intersects the boresight.

SLIP/SKID INDICATOR

Slip/Skid Indicator (refer to Figure 1-3)

The indicator has a black background with a white border. A Slip/Skid indicator ball is positioned in the center of the indicator scale between two vertical lines. The Slip/Skid indicator has a range of $\pm 7^\circ$.

The Slip/Skid indicator has two possible locations described below:

- If the ESI-2000 is configured for a magnetometer, then the indicator is located above the heading tape to the left of the heading digital readout.
- If the ESI-2000 is not configured for a magnetometer, then the indicator is located at the bottom-center of the ESI-2000 display.

INDICATED AIRSPEED

Airspeed Units Descriptor (refer to Figure 1-4)

Release 1.1 & 1.2. The Airspeed Units descriptor is located in the lower left corner of the display. The descriptor indicates the units being displayed on the airspeed tape and readout.

Configuration Option: The descriptor may be either “KTS” (knots) or “MPH” (miles per hour).

Airspeed Tape (refer to Figure 1-4)

The IAS tape is located on the left side of the display. The tape scrolls up as aircraft speed decreases and scrolls down as aircraft speed increases. The tape has a viewing span of 60 units.

Configuration Option: The tape background may be either clear or gray.

Release 1.0. The major tick marks are located every 10 kts from 0 to 450; minor tick marks at the midpoint between the major tick marks, and numbered digits every 20 kts from 0 to 440.

Release 1.1 & 1.2. For Part 23/25 fixed wing aircraft the major tick marks at airspeed values of 10 (kts or mph) from 40 to 550 (kts or mph); minor tick marks at the midpoint between the major tick marks, and numbered digits every 20 (kts or mph) from 40 to 540 (kts or mph).

Release 1.1 & 1.2. For Part 27/29 rotorcraft the major tick marks at airspeed values of 10 (kts or mph) from 20 to 550 (kts or mph); minor tick marks at the midpoint between the major tick marks, and numbered digits every 20 (kts or mph) from 20 to 540 (kts or mph). The calibrated range of the tape is from 20 to 350 kts (23 to 403 mph).

INDICATED AIRSPEED (continued)*Airspeed Digital Readout (refer to Figure 1-4)*

The odometer styled IAS digital readout is located in the center of the airspeed tape and displays the current aircraft speed in knots.

Release 1.0. The readout has a viewing range of 40 to 400 kts for Part 23/25 aircraft and 20 to 350 kts for Part 27/29 rotorcraft.

Release 1.1 & 1.2. The readout has a viewing range of 40 to 400 kts (46 to 460 mph). For Part 27/29 Rotorcraft the readout has a viewing range of 20 to 350 kts (23 to 403 mph).

Airspeed Awareness Color Bar (refer to Figure 1-4 and 1-5 a, b, & c)

The airspeed awareness color bar is located along the left side of the indicated airspeed tape. The color bar indicates critical reference airspeeds and operating ranges specific to the aircraft.

Part 23/25 Aircraft

Configuration Option: Airspeed Awareness Color Bar may be configured for V_{NE} (cues - V_{NE} , V_{NO} , V_{fe} , V_{s1} , V_{s0}) or V_{MO} (cues - V_{MO} , V_{fe} , V_{s1} , V_{s0}) aircraft. In addition V_{mc} and V_{yse} may be set up for twin-engine applications.

NOTE

For part 25 Aircraft the Airspeed Awareness Color Bar must be configured for V_{MO}

Cues V_{fe} , V_{s1} , V_{s0} , V_{mc} and V_{yse} may be configured off.

Part 27/29 Rotorcraft

Airspeed Awareness Color Bar may be configured for V_{NE} Power On, V_{NE} Power Off and $V_{CAUTION}$ (the start of the caution range for airspeed warning).

Cues V_{NE} Power On and $V_{CAUTION}$ may be configured off.

INDICATED AIRSPEED (Continued)

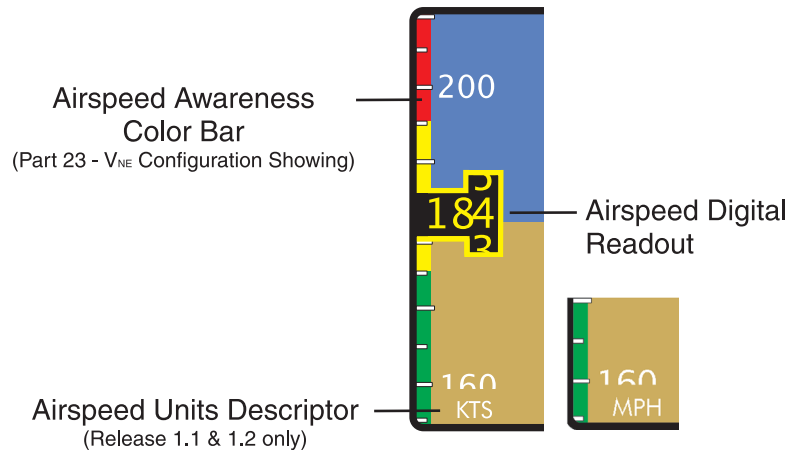


Figure 1-4: IAS Elements

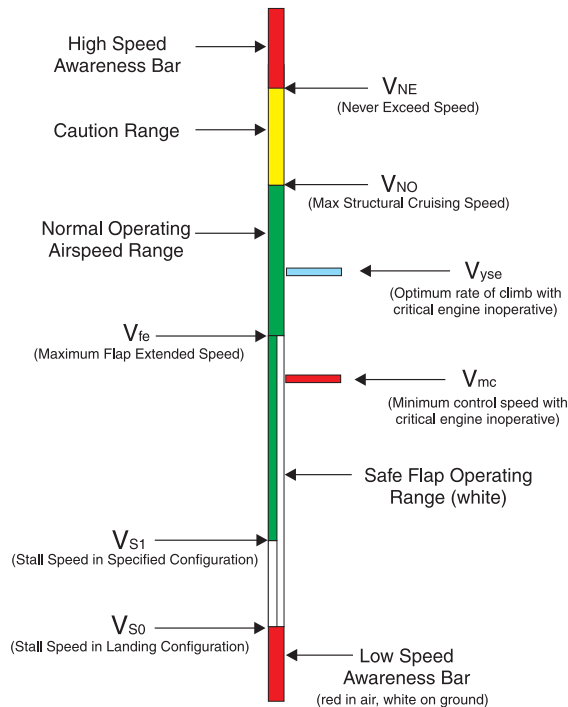


Figure 1-5a: IAS Awareness Bar Cues for Part 23 Aircraft using V_{NE}

INDICATED AIRSPEED (Continued)

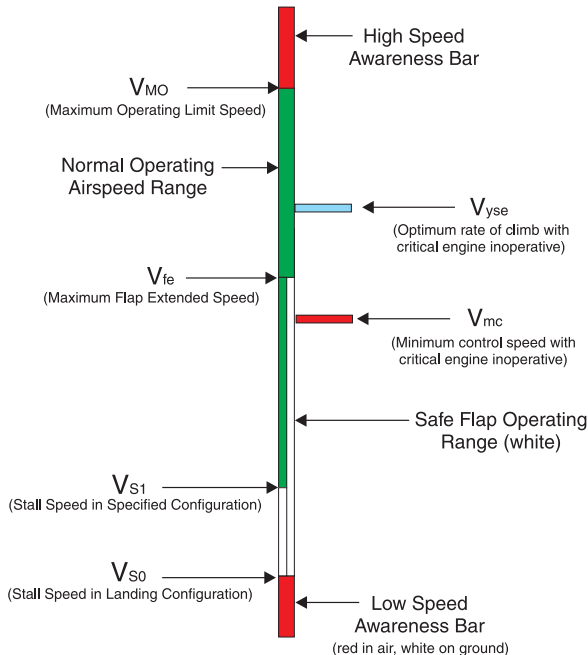


Figure 1-5b: IAS Awareness Bar Cues for Part 23/25 Aircraft using V_{MO}

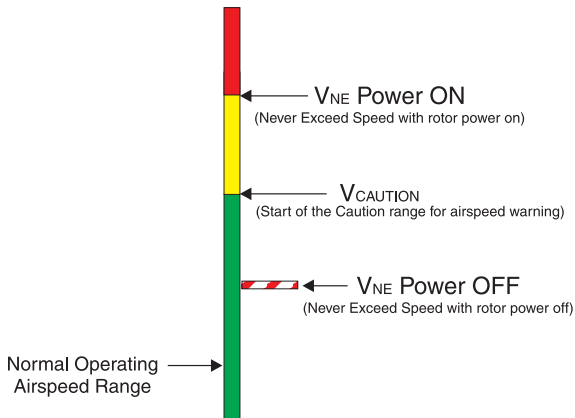


Figure 1-5c: IAS Awareness Bar Cues for Part 27/29 Rotorcraft

ALTITUDE

Barometric Pressure Window (refer to Figure 1-6)

Located at the top right of the display screen. The value shown is used by the indicator to determine the current altitude.

Configuration Option: The baro digits may be white, cyan, or green on a black background.

The units shown in the window can be changed using the menu screen and has three settings: “in. Hg”, “hPa” and “mb”. The barometric (baro) pressure ranges and standard values are shown in the table below:

Unit	Standard Value	Lowest Value	Highest Value
In. Hg	29.92	27.00	32.00
hPa	1013	914	1083
mb	1013	914	1083

Altimeter Tape (refer to Figure 1-6)

The baro-corrected altitude tape is located on the right side of the display. The tape scrolls up as aircraft altitude decreases and scrolls down as aircraft altitude increases. Tick marks are shown every 100 feet and numbered digits every 500 feet. The tape has a maximum viewable altitude of 1000 feet and can go as low as -2000 feet and as high as 56,000 feet.

Configuration Option: The tape background may be either clear or gray.

ALTITUDE (Continued)

Altitude Digital Readout (refer to Figure 1-6)

The odometer styled digital readout is located in the center of the altitude tape and display's the current baro-corrected altitude in feet above mean sea level (MSL). The readout can show a minimum of - 2000 feet and maximum of 56,000 feet. A left justified minus sign “-” is shown when altitude is less than zero.

Metric Altitude Digital Readout (refer to Figure 1-6)

Configuration Option: The Metric Altitude Digital Readout may be configured ON or OFF.

The Metric Digital Readout is located on the right side of the display beneath the odometer styled Altitude Digital Readout. The readout has a black background surrounded by a white box with medium white digits. The readout provides baro-corrected altitude in meters and has a range of -610 to 17,070 meters. A left justified minus sign “-” is shown when altitude is less than zero.

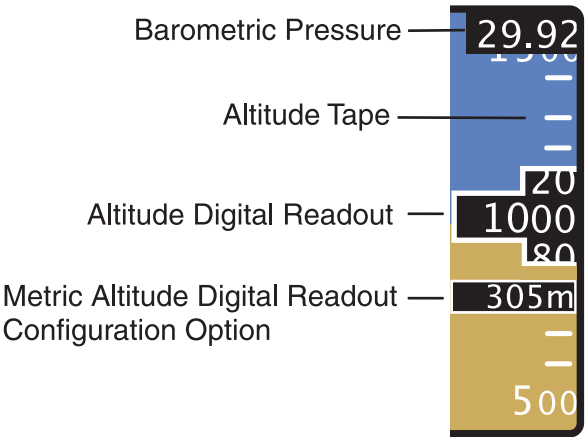


Figure 1-6: Attitude Elements

HEADING (Optional)

Heading Tape (refer to Figure 1-7)

The heading tape is located at the bottom of the display. The tape moves left and right following the direction of the aircraft. The tape is a contiguous 360° linear scale. The tape is removed whenever the menu window is opened or if an attitude exceeding +/- 55 degrees of bank or +/- 55 degrees of pitch (unusual attitude).

Heading Digital Readout (refer to Figure 1-7)

The readout is located above the heading tape and displays the aircraft's current heading referenced to magnetic north. The heading value has a range of 001° to 360° with a resolution of 1°. The readout is removed whenever the menu window is opened.

Heading Index (refer to Figure 1-7)

Also known as lubber line, the heading index is a fixed downward pointing arrowhead located at the bottom of the heading digital readout. The heading index points to the current heading shown on the heading tape and provides the value shown in the heading readout.

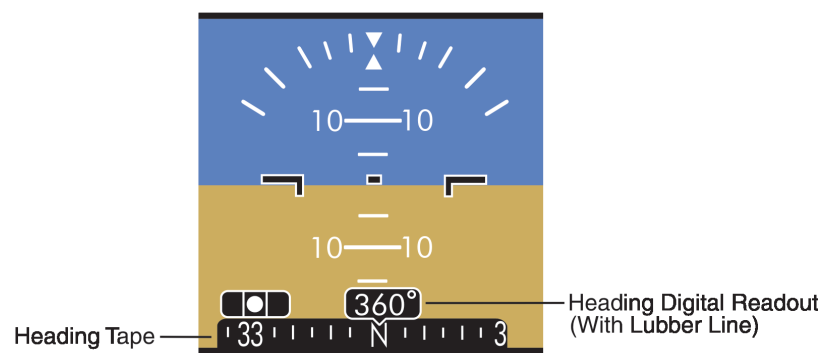


Figure 1-7: Heading Elements

BATTERY

Battery indicators and messages are located on the top-left side of the display. The indicators provide details on the general state of charge (SOC), availability of the battery for discharge or charge, and battery failure. The following table provides a brief description and examples of common battery indicators. Status messages provide details on battery calibration and how to continue operating the indicator using the backup battery. During normal operation of the ESI-2000 (unit powered by aircraft power and the battery has at least 1 hour of run time) no battery indicator or message is shown on the display.

It is important to note that the battery indicator is an indication of the battery’s relative state of charge and is independent of the 1 hr run time expressed by the color of the battery indicator. As the life of the battery comes to an end, the charge capacity of the battery gradually reduces to the point that the battery indicator shows 100% SOC, but is colored amber indicating less than 1 hour run time. If this condition is observed, then the battery is worn out and requires replacement.

BATTERY INDICATORS	DESCRIPTION
Discharge Indicators	
<i>The run time capacity for a green battery indicator is at least 1 hour.</i> <i>The run time capacity for an amber battery indicator is less than 1 hour.</i>	
	Battery is discharging and has a SOC > 90%.
	Battery is discharging and has a SOC ≤ 90% but > 65%.
	Battery is discharging and has a SOC ≤ 65% but > 40%.
	Battery is discharging and has a SOC ≤ 40% but > 15%.
	Battery is discharging and has a SOC ≤ 15%.
	Battery is discharging and has dropped below -15°C (5°F). SOC ≤ 65% but > 40%

BATTERY INDICATORS	DESCRIPTION
Charging Indicators	
	Battery requires charging but is unable due to low or high temperature conditions. The discharge function of the battery continues to work depending on current SOC. Battery will begin to charge when temperature is within 0°C to 45°C (32°F to 113°F). NOTE: The interior of the ESI-2000 can be 10°C to 15°C (18°F to 27°F) warmer than the exterior.
	Battery is currently charging and has a SOC ≤ 15%.
	Battery is currently charging and has a SOC > 15% but ≤ 40%. NOTE: As the battery ages, the charging indicator remains amber at a SOC of 50%, 75% or 100%.
Availability Indicators	
	The accuracy of the battery capacity meter may be degraded and requires a calibration discharge cycle. Until a capacity calibration is performed, the discharge function of the battery continues to work but the battery capacity is not available.
	Battery operation (discharge) is not possible due to high temperature conditions or very low battery voltage. Battery discharge functionality returns to normal when temperature is less than 60°C (140°F) or when internal battery voltage charges to a usable level.
	The battery failed indicator is shown if an unrecoverable failure of the battery system is detected. The battery charge and discharge functions are unavailable.

CHAPTER 2

BASIC OPERATION

Introduction

This chapter describes the user interface with the ESI-2000 electronic indicator that includes, but not limited to instructions on how to select menu items, change display settings, and view status information.

Menu Operation

Refer to Figure 2-1. Pressing the Menu **M** button removes the heading tape and digital readout and opens the Menu window above the **+/-** buttons. Continued pressing of the menu button changes the menu window to the next menu item. The menu items available in the menu list appear in the following order:

- Brightness Adjustment
- Alignment
- Status Screen (The status screen is available only within 3 minutes after application of power)
- Baro Adjustment
- Baro Units
- Battery Shutdown (The battery shutdown menu is only available when the battery is discharging. Refer to Section 3.)
- Battery Cal (The battery calibration menu is only available when the battery is discharging)

Changes made to the menu items appear immediately after the change takes place. The menu window is removed from the display after 5 seconds of inactivity. The Menu items are explained in greater detail in the following paragraphs.

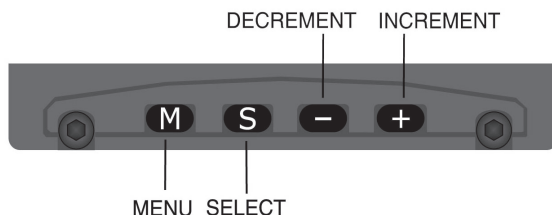


Figure 2-1: Bezel Buttons

BRIGHTNESS ADJUSTMENT (Refer to Figure 2-2)

When selected in the menu window, the current brightness adjustment (0 to 100) is shown. Increase or decrease the brightness value by single press or holding the +/- buttons. The last change to the brightness level will be saved to memory and applied at power-up.

The brightness can also be increased outside the menu window by pressing and holding the **M** button.

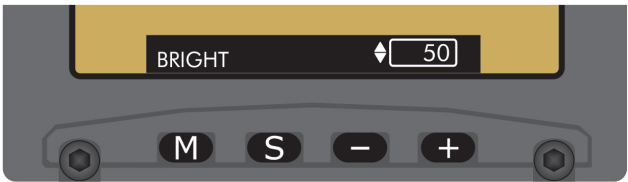


Figure 2-2: Brightness Adjustment Menu

USER INITIATED ALIGNMENT (Refer to Figure 2-3 and 2-4)

When selected in the menu window, pressing the Start **S** button will force the indicator to re-align. The attitude will align within 1 minute if the aircraft is on ground and stationary.

- If a magnetometer is installed the heading reference will align to less than or equal to 2° within 3 minutes.
- Release 1.0 & 1.1. Part 27/29 Rotorcraft only. The user initiated alignment is not available if magnetic heading data is invalid (red X showing in heading tape).

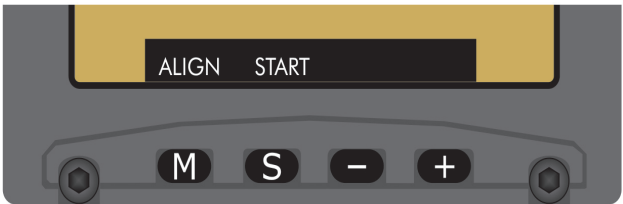
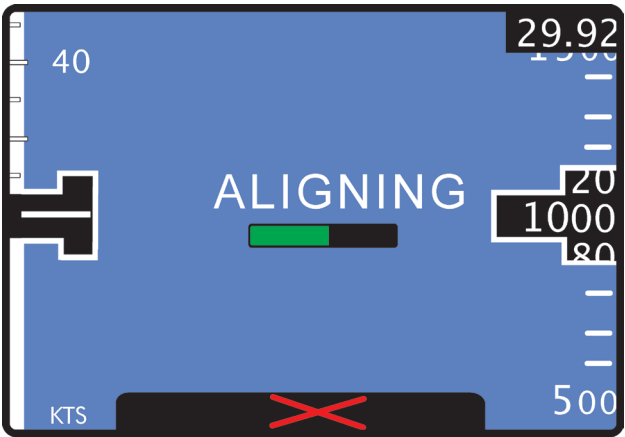


Figure 2-3: Alignment Menu

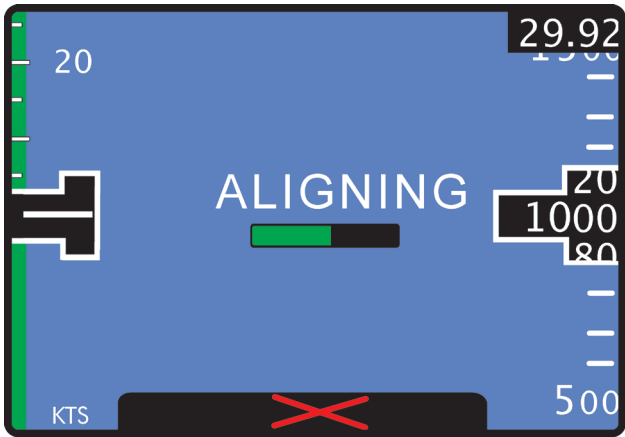
USER INITIATED ALIGNMENT (CONTINUED)

NOTE

Release 1.2. The heading tape and readout are available during alignment if the ESI-2000 is configured to receive external digital heading and heading data is valid.



Alignment Screen for Part 23/25 Aircraft



Alignment Screen for Part 27/29 Aircraft

Figure 2-4: Alignment Screens (Not In Flight)

BARO UNITS ADJUSTMENT (Refer to Figure 2-5)

When selected in the menu window the current barometric unit is shown.

- Press of the **+/-** buttons to change the baro unit selection from/to one of the following units: “in. Hg”, “hPa” or “mb”.
- The unit value changes in the baro window as the units are changed in the menu.

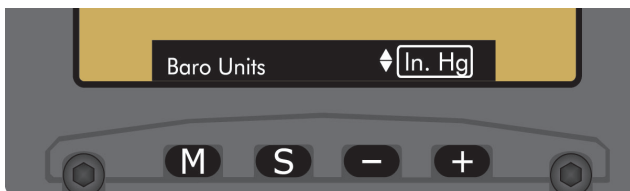


Figure 2-5: Baro Unit Adjustment Menu

BARO ADJUSTMENT (Refer to Figure 2-6)

When selected in the menu window the current barometric pressure is shown. The baro value can be changed as follows:

- A single press of the **+/-** buttons increases or decreases the baro value by 0.01 inches of mercury “in. Hg” or by 1 for “hPa” or “mb”.
- Holding in the **+/-** buttons adjusts the baro value until released.
- A single press of the Select **S** button sets the baro value to the standard value of 29.92 in. Hg or 1013 hPa or mb.



Figure 2-6: Baro Adjustment Menu

The barometric pressure has a range of between 27.00 and 32.00 in. Hg. or 914 and 1083 for hPa or mb. The last change to the baro value will be saved to memory and applied at power-up.

STATUS SCREEN (Refer to Figure 2-7)

When selected in the menu window, pressing the Select **S** button opens the system status screen similar to Figure 2-8.

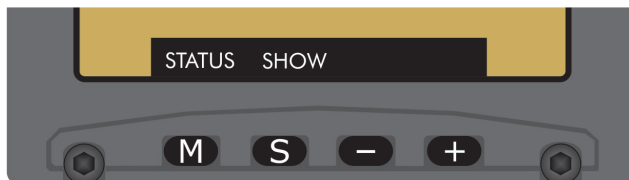


Figure 2-7: Status Menu

The status screen is only available in the menu list within the first 3 minutes after power is applied to the indicator and provides information about the indicator as well as any fault and installation problems detected during the Power-On Self Test. The unit Serial Number, operating hours, battery temperature, and battery charge capacity are displayed on the System Status page. The System OK message is always shown unless an internal failure or Installation problem is detected and listed on the screen.

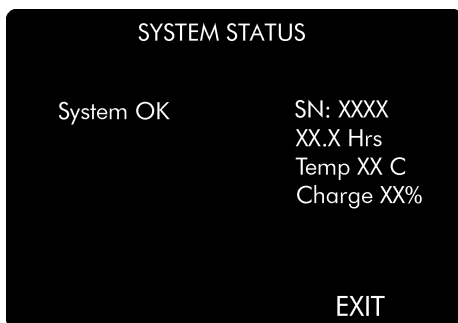


Figure 2-8: Example of Status Screen

Refer to Chapter 4 for a list of fault messages and detailed information.

- Messages appearing with dim gray text preceded with a dash are older messages that were detected prior to the latest application of power. Older messages continue to be viewed for up to four power cycles after it was first detected.

Press the + button to exit the status screen and return to normal operation

BATTERY CAPACITY METER CALIBRATION PROCEDURE (Refer to Figure 2-9)

A controlled discharge of the ESI-2000 is required annually to maintain accuracy of the capacity meter. Take the following into consideration before performing the calibration procedure:

- Read the entire calibration procedure prior to starting.
- The calibration procedure can be performed with the ESI-2000 installed on the aircraft.
- The calibration procedure can be accomplished by the pilot/operator whenever a battery capacity meter calibration is needed.
- The factory recommends the calibration procedure be performed anytime a battery is replaced or an ESI-2000 is replaced; however, the calibration can be performed at anytime and as often as desired in order to align the calibration with scheduled maintenance inspections or to accommodate temperature and time requirements.
- The calibration procedure can take up to 8 hours to complete.
- To assure compliance with the temperature limits of the calibration, if performing the calibration procedure on aircraft the factory recommends, in regions with hot climates, performing the procedure during the cooler months of the year and in regions with cold climates, performing the procedure during the warmer months.
- The battery discharge occurring upon entering the calibration procedure menu selection is considered part of the calibration discharge.

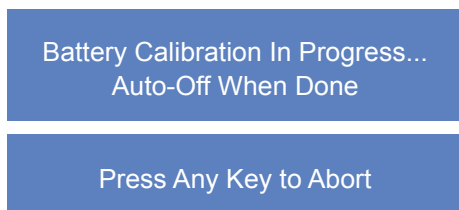
The accuracy of the battery capacity meter may degrade after about a year of standby use or storage. The ESI-2000 alerts the operator when a capacity calibration is required by displaying the following message during startup for 90 seconds:

BATT CAL REQUIRED IN 28 DAYS

This message continues to be displayed at each start up. On day zero (0) the “CAL DUE” battery indicator () is shown on the screen during normal operation. The message and “CAL DUE” battery indicator

BATTERY CAPACITY METER CALIBRATION PROCEDURE (Continued)

1. Take the following into consideration before performing the battery capacity meter calibration:
 - The battery SOC must be $\geq 90\%$ before the calibration of the capacity meter can be accomplished. Refer to charging instructions in step 6.
 - The ambient temperature of the ESI-2000 must remain between 10°C and 25°C (50°F and 77°F) for at least 2 hrs.
 - The battery must not have been in operation (charging or discharging) for at least 2 hrs.
2. Apply power to the ESI-2000.
3. Remove external power from the ESI-2000 by placing the aircraft battery switch(s) OFF.
4. The ESI-2000 automatically switches over to battery power. Press any button as stated by the message.
5. Press the **M** (menu) button and cycle through the menu options until Batt Cal (see Figure 2-9) is located.
6. Press and hold the **+** (Hold) button until the Battery Calibration screen is shown with the following message:



- The “CAL DUE” battery indicator continues to be observed during normal operation if the calibration procedure is aborted.



Figure 2-9: Battery Calibration Menu

BATTERY CAPACITY METER CALIBRATION PROCEDURE (Continued)

CAUTION

THE AMBIENT TEMPERATURE OF THE ESI-2000 MUST REMAIN BETWEEN 10°C AND 25°C (50°F AND 77°F) DURING CALIBRATION.

- If the battery SOC is not $\geq 90\%$, the following message is shown in the middle of the screen:



Battery Requires Charge

- If the battery needs to be charged, reapply external power to the ESI-2000. When the battery is charged to greater than 95% SOC, shut the ESI-2000 down for a rest period of 2 hrs for battery stabilization. After the rest period, reapply power and go to step 2 above.
7. When calibration is complete, the ESI-2000 automatically powers down. A 5 hr rest period is required for the battery calibration to be successful.

CAUTION

APPLYING POWER TO THE ESI-2000 BEFORE THE END OF THE 5 HOUR REST PERIOD INVALIDATES THE BATTERY CAPACITY CALIBRATION.

CHAPTER 3

OPERATING INSTRUCTIONS

Introduction

This chapter describes the operation of the ESI-2000 indicator. Refer to Chap 1 for detailed information on display elements.

Power On

There is no power on/off switch on the ESI-2000. Depending on the aircraft use either the battery switches or avionics master switch to apply power. The indicator will transition through the following startup sequence:

- Self Test
- System Identification
- Alignment
- Normal Operation

SELF TEST

Application of power begins the indicators diagnostic of sensors, circuitry, memory, and battery. The self test lasts for approximately 15 seconds and during this time the display remains blank. If no faults are detected the system identification splash screen is displayed.

CYCLE POWER INSTRUCTIONS

1. Remove input power from the ESI-2000.
2. Shut down the backup power by pressing the **M** button and cycling through the menu options until the *Shutdown* menu is located.
3. Press and hold the **+** button until the “SHUTTING DN” message is shown in the upper left corner of the screen.
4. Reapply input power to the unit.

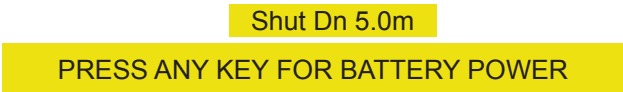
POWER OFF (Refer to Figure 3-1)

NOTE

Manually shutting down the ESI-2000 conserves battery energy and is recommended in hot climate conditions.

Depending on the aircraft, remove power to the ESI-2000 using either the avionics master switch, the battery switch, or dedicated ESI-2000 Power switch (as applicable).

The ESI-2000 automatically switches over to battery power. A countdown timer and a flashing message is displayed on the screen as shown below:



The ESI-2000 automatically shuts down in 5 minutes if no key (button) is pressed. The battery continues to discharge for the entire 5 minutes. When time is less than 30 seconds, the messages change as shown below:



At the end of the 5 minutes the timer and “press any key” message are removed and the following message is shown as the ESI-2000 enters its shutdown mode:



The ESI-2000 can be manually shutdown (only when in discharge mode) using the following procedure:

- 1. Press any key (button) as stated by the message.
- 2. Press the **M** (Menu) button repeatedly until the Shutdown menu is shown. See Figure 3-1.
- 3. Press and hold the **+** (Hold) button until the ‘SHUTTING DN’ message is shown in the upper left corner of the screen.

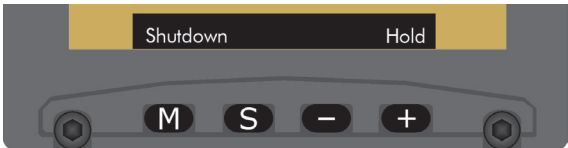


Figure 3-1: Shutdown Menu

SYSTEM IDENTIFICATION (Refer to Figure 3-2)

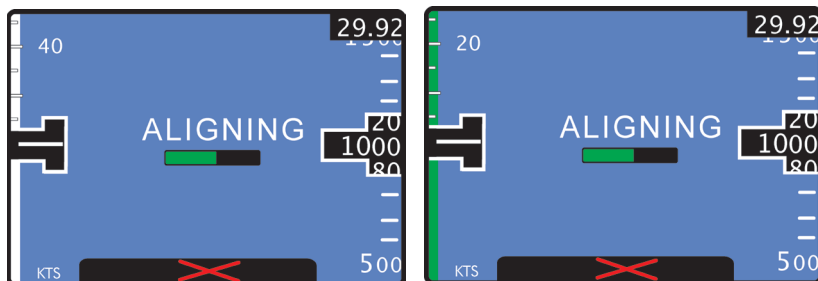
The system identification splash screen displays the following information: Company logo, software and firmware version information. After about 15 seconds the indicator begins to align itself.



Figure 3-2: Example of System ID Screen

ALIGNMENT (Refer to Figure 3-3)

During alignment indicated airspeed, altimeter, and barometric pressure begin displaying information while the attitude data is replaced with an “Aligning” message along with a status bar and heading window (if configured) has a red “X” displayed.



Alignment Screen for Part 23/25 Aircraft

Alignment Screen for Part 27/29 Aircraft

Figure 3-3: Alignment Screen (Not In Flight)

- Within 3 minutes of application of power, the “Aligning” message and status bar are replaced by attitude display elements. The attitude aligns to less than or equal to 1° of vertical in pitch and roll.
- If the indicator is configured for a magnetometer and receiving heading information; within 3 minutes of application of power, the heading tape and readout align to less than or equal to 2° of the heading reference.

NOTES

1. While the indicator is aligning, the user may enter the Menu window to adjust brightness levels, set the baro value, and view the status screen.
2. Release 1.2. The heading tape and readout is available during alignment if the ESI-2000 is configured to receive external digital heading and heading data is valid.

NORMAL OPERATION (Refer to Figure 3-4 a or b)

Normal Operation of the ESI-2000 provides attitude (pitch and roll), barometric corrected altitude, metric altitude readout (optional), indicated airspeed, slip/skid indicator, airspeed awareness cues, and heading (optional) information.

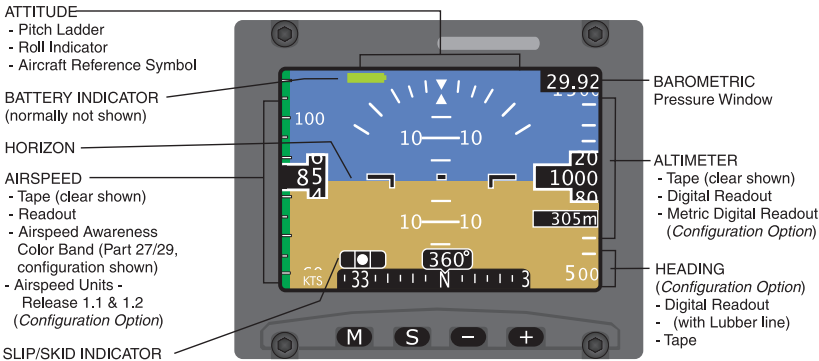


Figure 3-4a: Display Elements for Part 27/29 Aircraft



Figure 3-4b: Display Elements for Part 23/25 Aircraft

Pre-Flight Instructions

Prior to take off, it's recommended the pilot do the following:

MENU SETTINGS

- Set brightness level.
- Set barometric units displayed on Baro window.
- Set barometric pressure.

NOTE

Press the Menu **M** button to open the menu window.
Repeated pressing cycles the menu options. Refer to
Chap. 2 - Basic Operation for specific details.

INSTRUMENT CHECK

1. Check that no battery indicator symbol is shown on the display.
 - If a battery indicator symbol is shown aircraft take-off is not recommended until situation is resolved. Refer to the Battery details on page 1-16.
2. Compare the information displayed on the ESI-2000 with the primary display.
 - Attitude data is within +/- 1.0°.
 - Altitude data is within +/- 20 feet (with correct baro setting).
 - Magnetic heading data is within +/- 4.0° (if available).
 - Release 1.2. External digital heading data is within +/- 1.0° (if available).

NOTE

Airspeed readout shows a white dash until aircraft exceeds 40 knots (Part 23/25 Aircraft) or 20 knots (Part 27/29).

In-Flight Instructions

The ESI-2000 does not require constant attention. When required the pilot may need to do one of the following:

- Set the barometric pressure
- Re-align attitude and heading

NOTE

The aircraft must be in straight and level, non-accelerated flight during re-alignment.

IN-FLIGHT SCREEN EXAMPLES

NOTE

The In-flight screen examples are typical of all software versions of the ESI-2000 with the exception of the airspeed units descriptor which was incorporated in software version 1.1.

Figure 3-5 depicts a display configured with heading, rotating roll pointer, and airspeed configured for V_{NE} (Part 23 aircraft). The display is shown in a Left bank $>60^\circ$ which has caused the heading information to be removed. Chevrons are shown indicating extreme pitch. In addition the airspeed awareness bar is in the caution range.

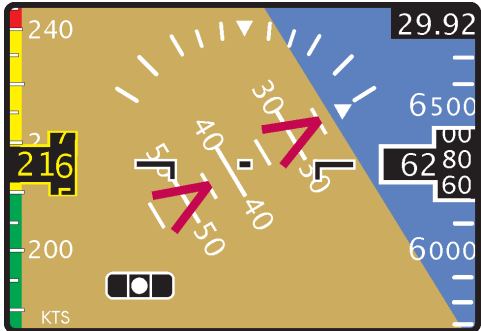


Figure 3-5: De-cluttered Display in Extreme Roll

Figure 3-6 depicts a display configured with heading, and baro color configured cyan. The display is shown ascending at $>60^\circ$ pitch which has caused the heading information to be removed. Chevrons are shown indicating extreme pitch. In addition the airspeed awareness bar is showing low speed awareness (Part 23/25 aircraft).

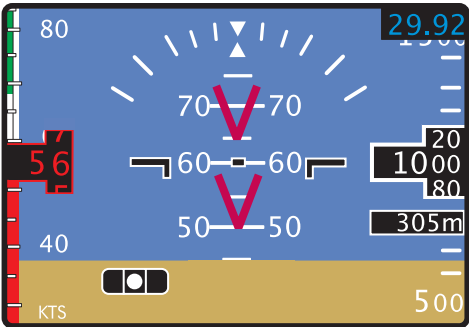


Figure 3-6: De-cluttered Display in Extreme Pitch

NOTE

The red low speed awareness is indicated only while in flight. On the ground the awareness bar remains white.

IN-FLIGHT SCREEN EXAMPLES (Continued)

Figure 3-7) depicts a display configured with heading, rotating roll pointer, metric altitude readout, the baro color configured green, and airspeed configured for V_{NE} . (Part 23 aircraft). The display is shown with the baro menu window active causing the heading information to be removed. In addition the airspeed awareness bar is indicating a high speed warning.



Figure 3-7: Display Showing Menu Window

Figure 3-8 depicts a display configured with heading, fixed roll pointer, metric altitude readout, and gray colored tape areas. The display is shown ascending while banking to the right with the airspeed awareness bar in the normal operating range (appearance similar for both Part 23/25 and Part 27/29 aircraft). Notice how the roll scale has rotated in the same direction as the pitch ladder.

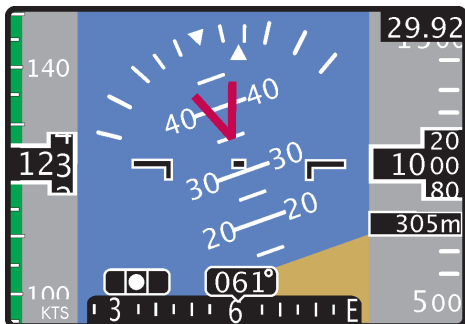


Figure 3-8: Display Ascending Right Bank

IN-FLIGHT SCREEN EXAMPLES (Continued)

Figure 3-9 depicts a display configured with heading, rotating roll pointer, airspeed configured for V_{NE} (Part 23 aircraft), and gray colored tape areas. The display is shown descending while banking to the left with the airspeed awareness bar in the caution range.



Figure 3-9: Display Descending Left Bank

Figure 3-10 depicts a display with airspeed configured for V_{MO} . (Part 23/25 aircraft) The display is shown descending at a 90° pitch with the airspeed awareness bar indicating a high speed warning.

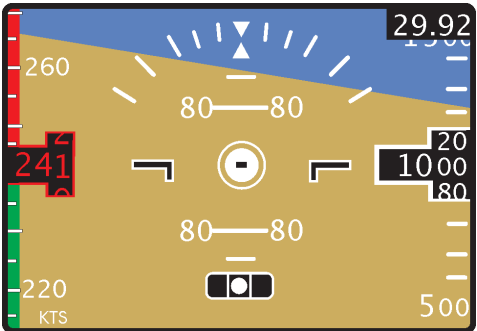


Figure 3-10: Display at 90 degree Descent.

IN-FLIGHT SCREEN EXAMPLES (Continued)

Figure 3-11 depicts a display configured to show twin-engine airspeed set points, V_{yse} and V_{mc} (Part 23/25 aircraft). The display is shown ascending with the airspeed awareness bar showing best rate of climb (V_{yse}) and minimum control speed (V_{mc}) with critical engine inoperative.

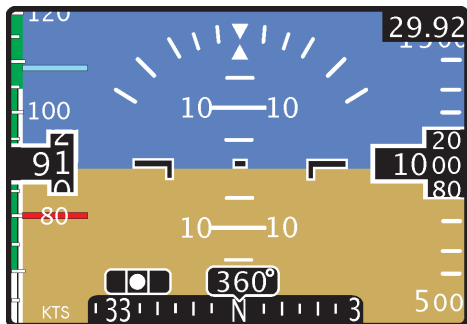


Figure 3-11: Display Showing Vmc & Vyse

Figure 3-12 depicts a display configured to show Part 27/29 Rotorcraft. The display is shown ascending while banking to the left. The Airspeed awareness bar is showing V_{NE} Power On set to 160, V_{NE} Power Off set to 130 (see red/white horizontal bar), and the start of the caution range for airspeed warning ($V_{CAUTION}$) set to 150.



Figure 3-12: Display Showing Airspeed with Part 27/29

ERRORS AND INVALIDITIES

Rate Sensor Limit Exceeded (Refer to Figure 3-13)

Release 1.0 & 1.1. If the ESI-2000 rate of motion (roll, pitch, or yaw) exceeds 100° per second, the heading and attitude data is removed from the display.

When steady and level flight can be maintained, press the menu **M** button twice followed by pressing the Select **S** button to begin re-alignment.

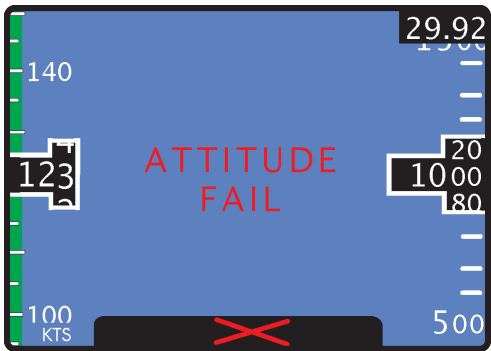


Figure 3-13 Attitude Loss

Release 1.2. If the ESI-2000 rate of motion (roll, pitch, or yaw) exceeds 135° per second the heading and attitude remain working but a Cautionary Message is displayed giving the pilot the option to perform or not perform an alignment. See details on next page.

ERRORS AND INVALIDITIES (Continued)*Cautionary Messages*

The cautionary messages functionality is only used by release 1.2. The messages are displayed when an overrate condition is detected from the ESI-2000 rate sensors and gives the pilot the option to perform or not perform an alignment.

The cautionary message is displayed on the lower portion of the screen above the heading readout and slip/skid indicator.

If the ESI-2000 is configured for a magnetometer as the heading reference, then the following message is displayed if an overrate condition is detected and magnetic heading data is valid.

**CROSS CHECK ATTITUDE & HDG
PRESS + TO ALIGN, - TO CLEAR**

If the ESI-2000 is configured for a magnetometer as the heading reference, then the following message is displayed if an overrate condition is detected and magnetic heading data is invalid.

**CROSS CHECK ATTITUDE
PRESS + TO ALIGN, - TO CLEAR**

If the ESI-2000 is configured for either no heading or for external digital heading, then the following message is displayed if an overrate condition is detected.

**CROSS CHECK ATTITUDE
PRESS + TO ALIGN, - TO CLEAR**

ERRORS AND INVALIDITIES (Continued)

Indicated Airspeed Data Loss (Refer to Figure 3-14)

If airspeed data is lost a red X replaces all the airspeed information and all attitude information is removed from the display; replaced with a “Attitude Fail” message. Cycle power to the ESI-2000, if invalidity continues to be observed refer to Chapter 4 Troubleshooting.

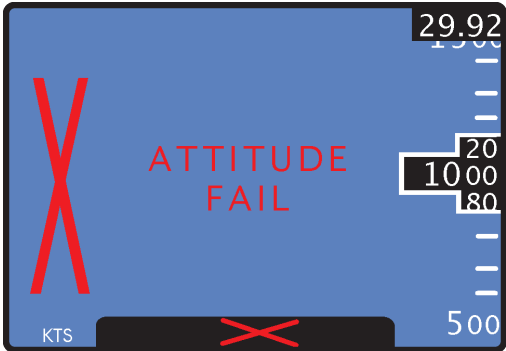


Figure 3-14: Airspeed Loss

NOTE

Release 1.2. The heading tape and readout is available if the unit is configured to receive external digital heading and heading data is valid.

Airspeed Configuration Data Loss (Refer to Figure 3-15)

If airspeed configuration data is lost, the Airspeed Awareness Color Band is removed from the airspeed tape and a yellow SPD message is displayed adjacent to the airspeed tape. Cycle power to the ESI-2000, if configuration data loss continues to be observed refer to Chapter 4 Troubleshooting.



Figure 3-15: Airspeed Awareness Invalidation

ERRORS AND INVALIDITIES (Continued)**Altitude Data Loss (Refer to Figure 3-16)**

If altitude data is lost a red X replaces all the altitude information and all attitude information is removed from the display; replaced with a “Attitude Fail” message. Cycle power to the ESI-2000, if invalidity continues to be observed refer to Chapter 4 Troubleshooting.

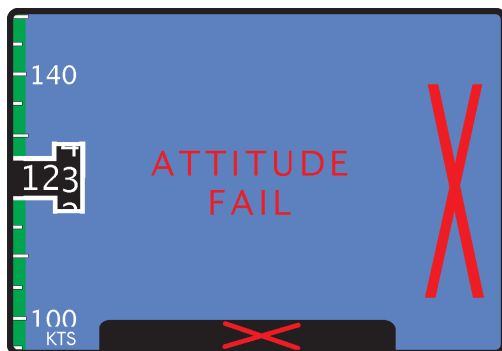


Figure 3-16: Altitude Loss

NOTE

Release 1.2. The heading tape and readout is available if the unit is configured to receive external digital heading and heading data is valid.

ERRORS AND INVALIDITIES (Continued)

Alignment Invalidity (Refer to Figure 3-17)

During alignment the “Align Hold” message replaces the attitude information if the aircraft attitude is beyond straight and level flight for too long a period, or if attitude is in a heightened dynamic state.

While the message is active and the ESI-2000 is configured for a magnetometer as the heading reference, the heading readout is removed and the heading tape is filled with a red X. Returning the aircraft to non-dynamic straight and level flight will cause the “Aligning” message to return.

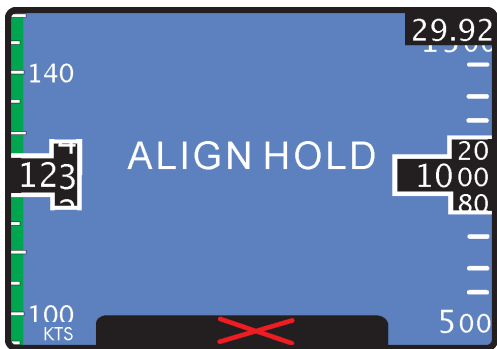


Figure 3-17: Align Hold

NOTE

Release 1.2. The heading tape and readout is available if the unit is configured to receive external digital heading and heading data is valid.

ERRORS AND INVALIDITIES (Continued)**Magnetic Heading Invalidity with Message (Refer to Figure 3-18 & 3-19)**

If magnetic heading data becomes invalid during operation, the heading tape is filled with a red X and the heading digital readout is removed, replaced by either a “No Mag Input” or “Mag Failed” message.

If magnetic heading data becomes valid the display elements automatically reset to normal operation. A re-alignment is recommended.

NOTE

Release 1.0 & 1.1. The alignment menu select is not available while the heading is invalid for part 27/29 Rotorcraft.

If invalidity continues to be observed refer to Chapter 4 Troubleshooting.

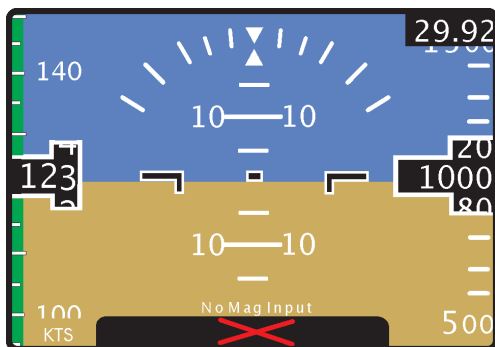


Figure 3-18: Heading Invalidity (No Mag Input)

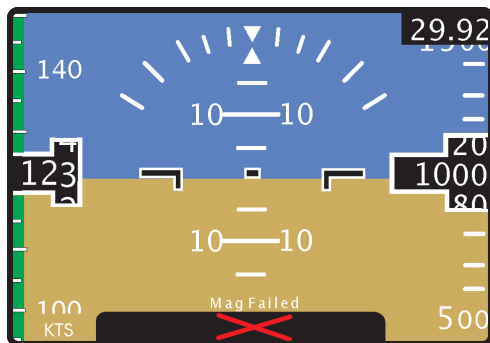


Figure 3-19: Heading Invalidity (Mag Failed)

ERRORS AND INVALIDITIES (Continued)

Magnetic Heading Invalidity, Align Hold and Message (Refer to Figure 3-20 & 3-21)

Units with release 1.0 & 1.1, used on a Part 27/29 Rotorcraft only.

If heading data is invalid prior to power being cycled or if the unit is re-aligned the “Align Hold” message replaces the attitude information, the heading tape is filled with a red X and the heading digital readout is removed, replaced by either a “No Mag Input” or “Mag Failed” message.

If heading data becomes valid the unit completes alignment and normal operation begins.

If invalidity continues to be observed refer to Chapter 4 Troubleshooting.



Figure 3-20: Align Hold (No Mag Input)

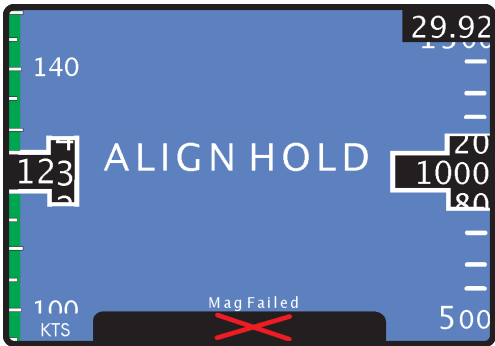


Figure 3-21: Align Hold (Mag Failed)

ERRORS AND INVALIDITIES (Continued)

External Heading Source Invalidity (Refer to Figure 3-22, 3-23, 3-24)

Release 1.2. If external heading source data is lost or becomes invalid during operation the heading tape is filled with a red “X” and the heading digital readout is removed, replaced by either a “No 429 Input” or “Inv 429 Input” message.

If heading data becomes valid the display elements automatically reset to normal operation. A re-alignment is recommended.

If invalidity continues to be observed refer to Chapter 4 Troubleshooting.

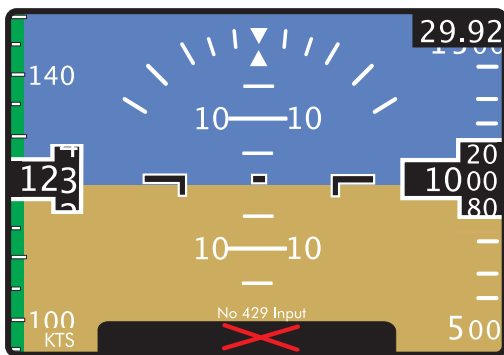


Figure 3-22: Heading Invalidity (No 429 Input)

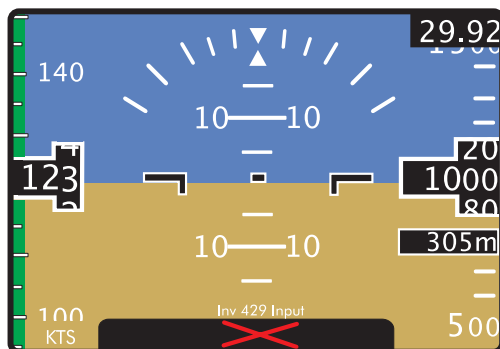


Figure 3-23: Heading Invalidity (Inv 429 Input)

ERRORS AND INVALIDITIES (Continued)

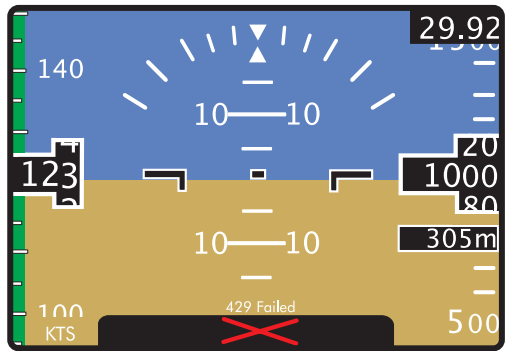


Figure 3-24: Heading Invalidity (429 Failed)

CHAPTER 4
TROUBLESHOOTING

NOTE

Cycle Power Instructions: Remove input power from the ESI-2000 and shut down the backup power by pressing the M button and cycling through the menu options until the Shutdown menu is located. Press and hold the + button until the “SHUTTING DN” message is shown in the upper left corner of the screen. Reapply input power to the unit.

Corrective Actions

CONDITION	CAUSE/CORRECTIVE ACTION
Attitude or heading does not match primary flight display	When aircraft returns to normal flight (straight and level) press the Menu M button twice and press the Select S button to align the indicator. ESI-2000 may be defective. Have ESI-2000 checked by certified service center.
“Attitude Fail” replaces Attitude	Occurs if the rate of motion of the indicator exceeds 100 degrees per second (in any axis). When aircraft returns to normal flight (straight and level) press the Menu M button twice and press the Select S button to align the indicator. OR Indicates loss of airspeed, altitude, or attitude data. Cycle power to the ESI-2000. If the invalidity continues to be observed after power is cycled, check the system status screen for a failure message. If message is observed have ESI-2000 checked by certified service center.

Corrective Actions (continued)

CONDITION	CAUSE/CORRECTIVE ACTION
Airspeed Awareness Color Band removed and SPD message displayed	Indicates loss of airspeed configuration data. Cycle power to the ESI-2000. If airspeed configuration data is not restored, ESI-2000 may be defective. Have ESI-2000 checked by certified service center.
Blank display	Brightness level may be low. Press and hold the Menu M button for at least 5 seconds. Brightness of display should be observed. ESI-2000 may be defective. Have ESI-2000 checked by certified service center.
“BATT WORN OUT... REPLACE” message is displayed on screen during startup	Message will be displayed at startup and remain on screen for 90 seconds. The battery can no longer hold a state of charge greater than 1 hour and requires replacement. Have ESI-2000 checked by certified service center.
Battery Failed Indicator 	Cycle power to the ESI-2000. If the red battery failed indicator continues to be observed after power cycle, battery system has failed and requires replacement. Have ESI-2000 checked by certified service center.

Corrective Actions (continued)

CONDITION	CAUSE/CORRECTIVE ACTION
Battery not available 	Access the “Status Screen” from the menu as described in section 2 of this Pilot’s Guide. 1. If the “Batt Temp” temperature shown in the battery maintenance menu is > 60C° (140F°), then battery operation (discharge) is not possible due to high temperature conditions. • Battery discharge functionality returns to normal when the battery temperature is < 60C° (140F°). 2. If the “Batt Temp” temperature on this screen is NOT Amber, indicating that the battery temperature is < 60C° (140F°), then the battery voltage is too low to operate. Allow unit to continue to charge. • Battery discharge functionality returns to normal after the battery voltage increases to the appropriate level.
Red X in place of Altitude OR Red X in place of Airspeed	Indicates loss of data. Cycle power to the ESI-2000. If the invalidity continues to be observed after power cycle, check the system status screen for a failure message. If message is observed have ESI-2000 checked by certified service center.

Corrective Actions (continued)

CONDITION	CAUSE/CORRECTIVE ACTION
After successful alignment the Heading digital readout is removed and a red X has replaced the digits and tick marks on the heading tape. ESI-2000 configured for magnetic heading only.	One or more of the following conditions are detected. 1. Heading data is invalid. • If heading tape and readout do not become active, cycle power to the ESI-2000. • If the invalidity continues to be observed after power cycle, the ESI-2000 may be defective. Have ESI-2000 checked by certified service center. 2. If a “Mag Failed” message is shown above the heading tape, then the Mag is sending a failure message. • If Mag begins working the message is removed and the heading tape and digital readout return. • If heading tape and readout do not become active, cycle power to the Mag and the ESI-2000. • If the invalidity continues to be observed after power cycle the Mag may be defective. Have Mag checked by certified service center. 3. If a “No Mag Input” message is shown above the heading tape, then no Mag input signal is being detected. • If the input data begins to be received, the message is removed and the heading tape and digital readout return. • If heading tape and readout do not become active, cycle power to the Mag and the ESI-2000. < Continues on next page >

Corrective Actions (continued)

CONDITION	CAUSE/CORRECTIVE ACTION
Continued from previous page.	If the invalidity continues to be observed after power cycle there may be a problem with the Mag connection or the Mag may be defective. Have Mag checked by certified service center. Release 1.0 & 1.1: For Part 27/29 rotorcraft the alignment menu selection is not available. Release 1.2: For Part 27/29 rotorcraft the alignment menu selection is available. Re-alignment through the alignment menu is recommended if the heading tape and digital readout return.
Heading digital readout is removed and heading tape elements replaced with red X during normal operation (after aligning is complete). Version 1.2 only. ESI-2000 configured for external heading source only.	One of the following conditions are detected. - If a "No 429 Input" message is shown above the heading tape, then external 429 data is not being received. - If the LRU providing external heading input data begins working the message is removed and the heading tape and digital readout return. - If the heading tape and readout do not become active, check breakers for the LRU providing external heading input data. - If the breakers are closed; cycle power to the ESI-2000 and the LRU providing external heading input data. - If the invalidity continues to be observed after power cycle, the LRU providing external heading input data or the wiring between the LRU and the ESI-2000 may be defective. < Continues on next page >

Corrective Actions (continued)

CONDITION	CAUSE/CORRECTIVE ACTION
Continued from previous page.	2. If an “Inv 429 Input” message is shown above the heading tape, then invalid external heading input data is being received. • If the LRU providing external heading input data begins sending valid data, the message is removed and the heading tape and digital readout return. • If the heading tape and readout do not become active, cycle power to the ESI-2000 and the LRU providing external heading input data. • If the invalidity continues to be observed after power cycle, the LRU providing external heading input data may be defective. 3. If a “429 Failed” message is shown above the heading tape, then the external heading data is invalid. • If the heading tape and readout do not become active, cycle power to the ESI-2000. • If the invalidity continues to be observed after power cycle there may be a problem with the ARINC 429 connection or the ESI-2000 may be defective. Have system checked by certified service center.

Corrective Actions (continued)

CONDITION	CAUSE/CORRECTIVE ACTION
Attitude display elements replaced with "ALIGN HOLD" after cycling power or re-aligning using the menu option.	The Align Hold message is displayed when the unit is "Aligning" and one or more of the following conditions are detected. 1. The pitch or roll or heading angle of the unit is in a heightened dynamic state. Return the aircraft to non-dynamic straight and level flight will cause the "Aligning" message to return. 2. For Part 27/29 aircraft - The Mag is sending a failed message. This is indicated by the heading digital readout being removed and a large red X in the middle of the heading tape. A "Mag Failed" message is shown above the heading tape. • If Mag begins working the message is removed and the alignment continues. • If the alignment does not become active, cycle power to the Mag. • If the invalidity continues to be observed after power cycle the Mag may be defective. Have the Mag checked by certified service center. < Continues on next page >

Corrective Actions (continued)

CONDITION	CAUSE/CORRECTIVE ACTION
Continued from previous page.	3. For Part 27/29 aircraft - No Mag input signal is being detected. This is indicated by the heading digital readout being removed and a large red X in the middle of the heading tape. A “No Mag Input” message is shown above the heading tape. • If Mag begins working the message is removed and the alignment continues. • If the alignment does not become active, cycle power to the Mag. • If the invalidity continues to be observed after power cycle the Mag may be defective. Have Mag checked by certified service center.
Screen is green	If the screen input data fails to update, the screen elements are removed and replaced with the green screen. Cycle power to the ESI-2000. If the green screen continues to be observed after power cycle the ESI-2000 may be defective, have ESI-2000 checked by certified service center.
System Status Screen: If the following message is shown: • Mag Fail	Mag may be defective. Have Mag checked by certified service center.

Corrective Actions (continued)

CONDITION	CAUSE/CORRECTIVE ACTION
System Status Screen: If one of the following messages is shown: • Install Req. • Mag Swing Req.	Have ESI-2000 system checked by certified service center.
System Status Screen: If one of the following messages appear: • Processor Fail • Memory Fail • Supply Fail • Sensor Fail • Calibration Req. • SSEC Data Fail • V_{Max} Data Fail • Battery Fail	ESI-2000 may be defective. Have ESI-2000 checked by certified service center.

APPENDIX A

Record Of Important Information

Dealer Information

Name_____

Address_____

City, State, Zip_____

Telephone_____

Equipment Information

Date of Purchase_____

Installation Date_____

Model Number_____

Part Number_____

Serial Number_____

Mod Letter _____

Release_____

Aircraft Information

Aircraft Make_____

Aircraft Model_____

Serial Number_____

N Number_____

Register this product online at:

www.I-3avionics.com/customer care/warrantyregistration

Installation Notes

(To be completed by the initial installer)

OPTIONS

Tape Type: ☐ Gray ☐ Clear

Baro Color: ☐ White ☐ Cyan ☐ Green

Roll Pointer: ☐ Fixed ☐ Rotating

Mag Installed: ☐ Yes ☐ No (release 1.0 & 1.1)

Ref Hdg Source: ☐ None ☐ Mag ☐ ARINC 429 (release 1.2)

Keybd: _____

Altimeter Units: ☐ Ft ☐ Ft & M

Airspeed Units: ☐ kts ☐ mph (release 1.1 & 1.2)

AIRSPEED

Part 23 Type V_{NE}

V_{NE} : _____

V_{NO} : _____

V_{fe} : _____

V_{s1} : _____

V_{s0} : _____

V_{yse} : _____

V_{mc} : _____

Part 23/25 Type V_{MO}

V_{MO} : _____

V_{fe} : _____

V_{s1} : _____

V_{s0} : _____

V_{yse} : _____

V_{mc} : _____

Part 27/29 Rotorcraft

V_{NE} (power On): _____

V_{NE} (power Off): _____

$V_{caution}$: _____

Aircraft using SSEC: ☐ Yes ☐ No (release 1.2)

Aircraft using Max IAS: ☐ Yes ☐ No (release 1.2)

Installation Notes

(To be completed by the initial installer)

ANGLES

Panel Angle

Pitch: _____ Roll: _____ Yaw: _____

(NOTE: Pitch, Roll, and Yaw panel angles must be determined at the time of initial installation.)

MAG INSTALL

Mounting

Pitch: _____ Roll: _____ Yaw: _____

Wing Flex Airspeed

No Comp: _____ Full Comp: _____

Compensation

Pitch: _____ Roll: _____

Notes

BATTERY SYMBOL QUICK REFERENCE

BATTERY INDICATOR	DESCRIPTION
Not Shown	No information needs to be conveyed to pilot
Green	More than 1 hour of operation remains
Amber	Less than 1 hour of operation remains
Amber "X"	Battery is not available to power unit (over temp or low battery voltage condition exists)
Red "X"	Battery has failed



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