



PILOT'S GUIDE

for the

**4300-XXX Series Electric Attitude Indicator
with Battery Backup**



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Congratulations on selecting one of the most advanced new aviation products. The design team at Mid-Continent has incorporated four decades of experience with aircraft instrumentation to bring you the best possible reliability and value in aviation. We are proud to offer the finest Attitude Indicator in its class. New technology allows our unit to run twice as many hours as older designs. Our self-contained emergency power feature offers pilots a level of safety never before available to fellow aviators. All this is backed by Mid-Continent's world class reputation for high quality and responsive service.

J. Todd Winter

President

Forward

This manual provides operational instructions for use by persons who operate aircraft in accordance with applicable Federal Aviation Regulations (Title 14 CFR).

We welcome your comments concerning this manual. Although every effort has been made to keep this manual free of errors, some may occur. When reporting a specific problem, please describe it briefly and include the manual part number, the paragraph/figure/table number, and the page number. Please email or send your comments to:

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Operating Instructions
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EAI Function

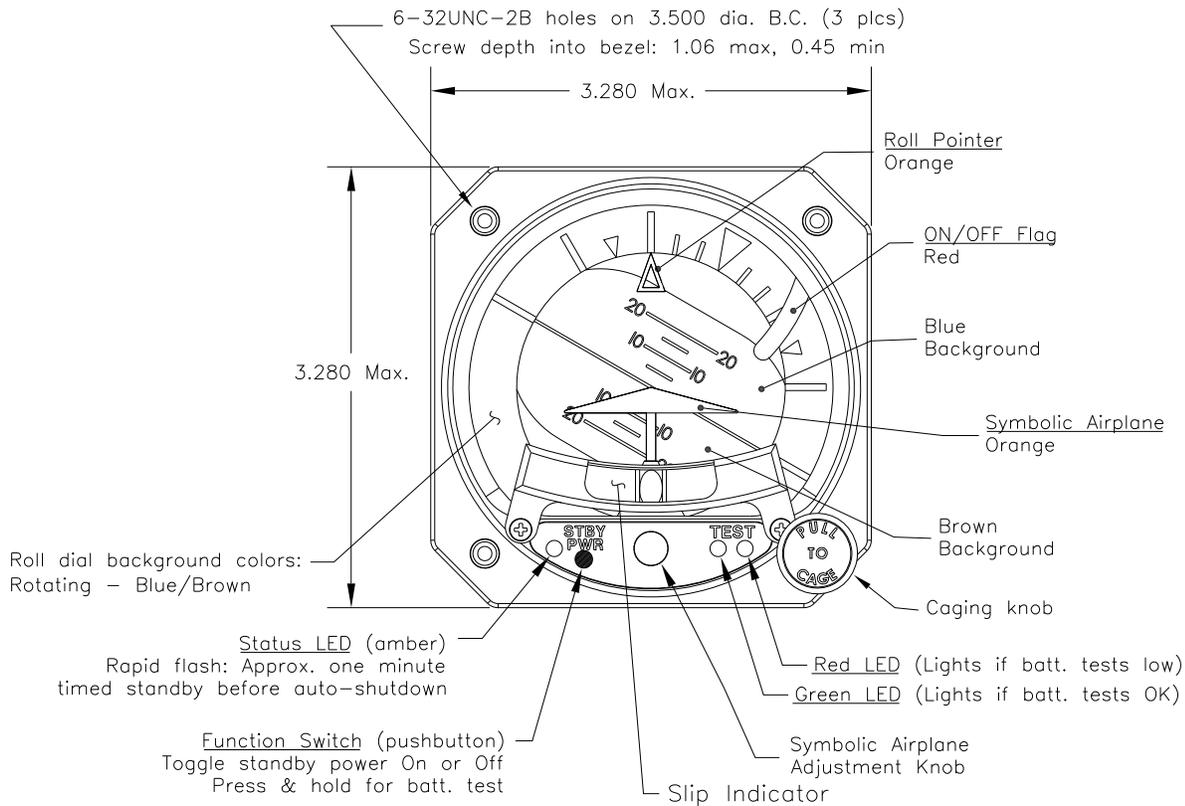


Figure 1
(Representative View)

Roll Pointer:	A) Fixed roll pointer: Indicates aircraft roll displacement relative to a rotating roll dial. B) Rotating roll pointer: Indicates aircraft roll displacement relative to a fixed roll dial.
Gyro Warning Flag:	If loss of operating voltage should occur, gyro warning flag will come into view.
Display:	Lower area of display, when referenced to the symbolic airplane, indicates aircraft nose is below horizon or in a dive attitude. Upper area of display indicates aircraft nose is above horizon or in a climb attitude.
Symbolic Airplane:	Indicates roll and pitch attitude relative to the horizon. The symbolic airplane may be delta or traditional shape. It can be moved (pitch only) using the symbolic airplane adjustment knob.
Horizon Line:	Indicates earth horizon relative to aircraft pitch and roll attitude.
Caging knob: (Quick Erect)	When pulled, manually erects the gyro vertical to the case orientation. Wings level to the horizon.
Symbolic Airplane Adjustment Knob:	Used to adjust the symbolic airplane.
Slip Indicator (option)	Rolling ball indicates sideways slip or skid in a turn.

1 General Description

1.1 Purpose

The Model 4300-xxx Electric Attitude Indicator has two purposes:

1. To function as a primary and/or standby attitude indicator.
2. To continue to operate as a primary and/or standby attitude indicator in the event that the aircraft main DC power source is interrupted or has failed in flight.

In the event that aircraft electrical power is lost, the indicator will switch to an internal backup power source (rechargeable sealed lead acid battery) to permit continued operation of the indicator.

1.2 Functional Description

The 4300-xxx Electric Attitude Indicator offers the unique feature of a self-contained standby power source. Advances in the design of this gyro system allow it to operate for approximately one hour after main input power is lost, depending on the battery condition at the time of power failure.

The indicator requires 10 to 32 VDC input voltage. An integral dial lighting system features a user replaceable light tray assembly. It operates from the aircraft lighting bus and is available in 5V, 14V, or 28V versions. In standby power mode, low intensity LED powered dial lighting is automatically turned on to provide nighttime visibility.

CAUTION:

A RED WARNING FLAG DROPS INTO VIEW TO INDICATE THAT THE GYRO MOTOR IS NOT RECEIVING SUFFICIENT POWER TO OPERATE. THIS WILL NORMALLY OCCUR ONLY IF THE UNIT IS TURNED OFF, OR AFTER THE INTERNAL STANDBY BATTERY IS EXHAUSTED.

A FLASHING AMBER STATUS LIGHT AT THE BOTTOM LEFT OF THE INDICATOR INDICATES THAT MAIN D.C. POWER IS INTERRUPTED OR HAS FAILED AND THAT THE INDICATOR IS RUNNING ON ITS INTERNAL BATTERY. THIS IS A TEMPORARY MODE LASTING APPROXIMATELY ONE MINUTE. FURTHER ACTION IS REQUIRED TO SELECT CONTINUED STANDBY BATTERY OPERATION (SEE SECTION 2.4).

The internal battery is designed for emergency use only. Storage at high ambient temperatures, extended discharging, extended lack of charging, misuse and age will require early battery replacement. Replacement can be done in the field with or without removal of the attitude indicator. Do not operate this instrument without the specified battery intact. Battery substitution, modification, misuse and lack of specified maintenance will void all warranties and hold the manufacturer harmless from any and all claims or legal actions.

Refer to an FAA authorized maintenance facility for testing and maintenance of this instrument excluding battery or light tray replacement.

2 Operation

2.1. General

This section describes the Model 4300-xxx Electric Attitude Indicator operating procedures. The indicator is required to be installed in an aircraft with the specified inputs applied. Figure 1 provides an illustration of a typical Model 4300 display and a table describing indicator functions.

2.2 Preflight checks

The following operational procedures are recommended when preparing the indicator for use:

CAUTION:

THE INDICATOR MAY BE DAMAGED IF THE “PULL TO CAGE” KNOB IS RELEASED WITH A “SNAP”. LOWER THE “PULL TO CAGE” KNOB AVOIDING A “SNAP” RELEASE.

2.3 Preflight Checklist, Normal Operation

- A. Master switch: **On.**
- B. Gyro warning flag (red): **Out of view.**
- C. Pull to cage knob: **Extend fully and return.**
- D. Manually adjust pitch attitude presentation: **As required.**

NOTE:

Indicator may be momentarily caged (also known as ‘quick erect’) by pulling “PULL TO CAGE” knob to the fully extended position, holding knob until the display stabilizes, and then allowing the knob to return to the normal position.

2.4 Standby Operation, Emergency Mode

A. Amber Light Illuminated and Flashing

When the instrument switches to standby battery power, the amber STBY PWR light on the lower left of the unit face flashes for approximately one minute. This is intended to attract the pilot’s attention and allow confirmation that there has been a loss of primary power to the 4300 Electric Attitude Indicator. Pushing the STBY PWR button on the face of the instrument will allow the unit to continue operating on the standby battery for approximately one (1) hour or until the battery is exhausted. An independent standby dial lighting system also operates in this mode. The red gyro warning flag remains out of view, which indicates the gyroscope is valid and running on standby battery power.

Restoring aircraft power will clear any standby operation and resume automatic battery charging.

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B. In-Flight Emergency Procedure - Loss of Main DC Power

In the event of a loss or interruption of main power, the unit will immediately and automatically switch to standby power. The amber standby power light will start flashing and continue for approximately 1 minute, warning the pilot that the Electric Attitude Indicator has lost its main DC power source. The following is a checklist to activate the standby battery in the Electric Attitude Indicator.

1. Amber Light: **Illuminated and flashing.**
2. "STBY PWR" button: **Press one time.**
3. Attitude Indicator: **Gyro warning flag out of view.** If the red warning flag is in view, the indicator is inoperative and must not be used.
4. Amber Light: Illumination will stop when STBY PWR button is pressed.
5. Indicator will run for approximately one hour if battery was fully charged.

If the "STBY PWR" is not pressed during the one-minute warning mode, the red warning flag will appear in view; indicating unit is invalid and will shut down. If operation is desired after the one-minute warning mode and shut down, simply press the "STBY PWR" one time to activate the indicator on standby power.

C. Standby Operation Ground Check - Emergency Mode

- | | |
|-----------------------------|--|
| 1. Master switch: | On – Unit running for 5 minutes minimum –
Red gyro warning flag out of view |
| 2. Master switch: | Off |
| 3. Amber light: | Illuminated and flashing. |
| 4. Press "STBY PWR" button: | Once |
| 5. Amber light: | Extinguished and not flashing. |
| 6. Gyro warning flag: | Not in view. |
| 7. Press "STBY PWR" button: | Once |
| 8. Gyro warning flag: | In view. |
| 9. Master switch: | On |
| 10. Gyro warning flag: | Not in view |
| 11. Master switch: | Off |
| 12. Amber light: | Illuminated and flashing for one minute then
extinguish |

2.5 Standby Battery Check

Standby battery test is recommended only during routine ground or flight operations.

1. Master Switch: **On – Unit running for 5 minutes minimum – Red gyro warning flag out of view.**
2. Press and hold “STBY PWR” button for approximately four seconds. Gyro is now in a one-minute battery test mode. Amber LED will flash during this test sequence.
3. Green light illuminated during full test sequence: **Standby battery is good.**
4. Red light illuminated anytime during one-minute test sequence: **Battery is not charged and may require replacement.** Refer to installation manual P/N 9015762 for instructions.

NOTE

Standby internal dial light automatically illuminates when Electric Attitude Indicator is in the standby mode. This light has no dimming capabilities.

2.6 Shutdown

Upon shutdown of the aircraft the unit will annunciate a Power Loss Warning via a flashing amber STBY PWR light. If not acknowledged, the gyro will automatically shut down after approximately one minute. You may also shut down the gyro during this one minute period by pressing the “STBY PWR” button twice. The red gyro warning flag will come into view. **If the indicator is allowed to operate in Emergency Power Mode long enough to completely drain the battery, then battery service will be required before use in Emergency Mode again.**

3 Equipment Limitations

Actual operation time on the standby battery may vary considerably depending on temperature, charge status, and battery condition. Low temperatures below 32°F will temporarily degrade battery capacity. A poorly maintained battery will suffer accelerated degradation. Extended storage in a discharged state or over-charging will permanently damage a battery. Complete charging is required to bring the battery up to full capacity if it has been stored for more than four months or if it has been partially discharged.

Internal chemistry will slowly degrade battery capacity over several years of operation even when correctly maintained. Recommended replacement interval for the standby battery is 3 years due to naturally diminished capacity.

4. Service Reminder

Standby Battery P/N 9015607

CONTINUED AIRWORTHINESS

This reminder is to advise of the proper maintenance for the Standby Battery manufactured by Mid-Continent Instrument Co., Inc. Regular maintenance of the Standby Battery should be done at the following intervals. Additionally, battery replacement is recommended after three (3) years of use.

1. In normal use the 4300-xxx Attitude Indicator supplies the proper float charge voltage to maintain the Standby Battery at peak capacity. If the 4300-xxx has not been operated for an extended period (more than 3 months) the Standby Battery will slowly self-discharge. Self-discharge rates are directly related to the storage temperature. The higher the storage temperature the faster the self-discharge rate. Therefore, the Standby Battery should be periodically charged or removed from the installation and maintained on a charger per current installation manual number 9015762.

******WARNING******

Battery out gassing and a rotten egg odor may occur due to prolonged high rate overcharging and may result in Standby Battery damage. MCI recommends that the Standby Battery assembly be replaced if out gassing has occurred.

2. On at least an annual basis, as well as any time there may be a question about Standby Battery performance (life) a full capacity test should be performed. To perform a full capacity test use one of the following methods.
 - a. Use Mid-Continent Instruments and Avionics Battery Charger/Tester P/N 36029. When in the capacity test mode this Charger/Tester will charge the battery and measure the time required for discharge (60 minutes minimum). The unit will then automatically switch to the charge/float mode to re-charge and maintain the Standby Battery at full charge.

******WARNING******

The Standby Battery may be permanently damaged if it is left in a discharged state. Recharge a discharged Standby Battery as soon as possible and maintain with a float charge for maximum Standby Battery life.

- b. Refer to the current unit installation manual number 9015762 for other methods to perform the full capacity test.
3. ***Recommended complete replacement interval for the Standby Battery is 3 years because of diminished capacity.***

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NOTE: The Standby Battery contains lead. Do not dispose of in local landfills or other environmentally sensitive areas.



NOTE: Recycle the Standby Battery in accordance with state and local regulations. For recycle locations visit www.rbr.com or call 1-800-8-BATTERY (1-800-822-8837).