



# INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

Engine Indicators In  
Beechcraft King Air 90, 200, 300 and  
Piper Cheyenne Series Aircraft  
Installed Per STC SA01946LA

Revision B

Document Number 200809-30

**NOTICE**

This document must be referenced on Block 8 of FAA form 337 and added to the aircraft permanent record as required by 14 CFR Part 91, §91.417 (a)(2)(vi) when the reference FAA-STC modification is accomplished on eligible aircraft. This document complies with the requirements of 14 CFR Part 23, §23.1529, in accordance with 14 CFR Part 23, Appendix G.

Aircraft Model Number \_\_\_\_\_

Aircraft Serial Number \_\_\_\_\_

Aircraft Registration Number \_\_\_\_\_



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## LIST OF EFFECTIVE REVISIONS

Always destroy superseded pages when you insert revised pages

REVISION	DATE	SECTIONS AFFECTED
IR	September 2008	ALL
A	November 2009	1, 2, and 6
B	September 2011	Title page; 1,2,5,6,10



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## 1. INTRODUCTION:

This document provides instructions for the continued airworthiness (ICA) for Blackhawk Modifications, Inc. STC Number ST01946LA which approves the installation of the following types of indicators as an entire stack or individual pairs on Beechcraft King Air Model C90, C90A, E90, F90 equipped with PT6A-135(A) engines; Super King Air Model 200, 200C, 200T, 200CT, A200, A200C, A200CT, B200, B200C, B200T, and B200CT airplanes equipped with either PT6A-42, -52, or -61 engines; Piper Cheyenne Model PA-31T, PA-31T1, and PA-31T2 airplanes and the Beechcraft King Air Model H90 (T-44) airplanes.

- Interstage Turbine Temperature (ITT)
- Torque
- Gas Generator Tachometers
- Propeller Tachometers
- Fuel Flow (not installed on Cheyenne Series Airplanes)
- Oil Pressure/Oil Temperature

This document supplements or supersedes the basic and applicable King Air Model C90, E90, F90, H90, 200, A200, or B200 Series Maintenance Manual and the applicable Piper Cheyenne Series Maintenance Manual, only in those areas listed therein for the appropriate aircraft model and serial number.

## 2. DESCRIPTION:

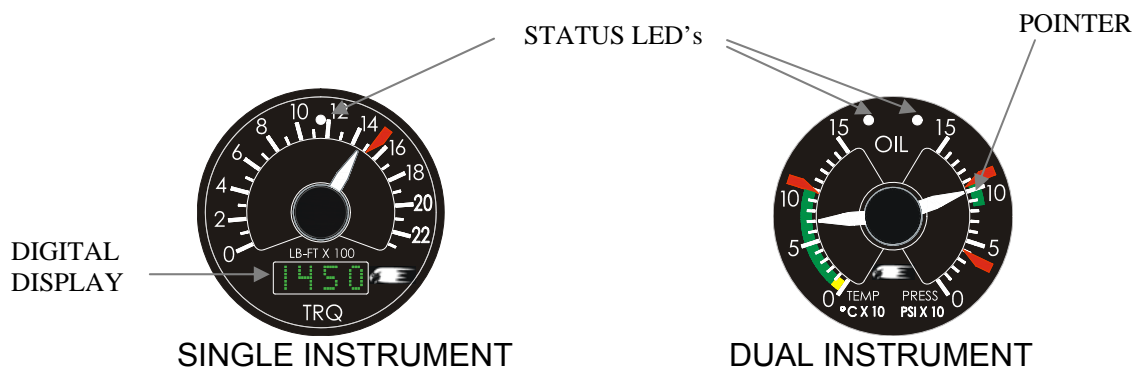
The STC approves the installation of the following types of indicators as an entire stack or individual pairs on King Air Model C90, C90A, E90, F90 equipped with PT6A-135(A) engines; Super King Air Model 200, 200C, 200T, 200CT, A200, A200C, A200CT, B200, B200C, B200T, and B200CT airplanes equipped with either PT6A-42, -52, or -61 engines; Piper Cheyenne Model PA-31T, PA-31T1, and PA-31T2 airplanes and the Beechcraft King Air Model H90 (T-44) airplanes.

Each original indicator has been replaced by a two-inch round electronic, micro-processor based single or dual pointer indicator (**See Figure 1**). Each indicator

- is electrically powered by the DC electrical bus for the engine instruments through a maximum 5 amp circuit breaker.
- indicates the engine parameter based upon a signal from the engine transducers. If originally AC powered, the transducer on the engine has been replaced and is now DC powered.
- displays the indication via the familiar rotating pointer showing power trends and limitations against a fixed scale plate, but now also provides better accuracy via a digital display.
- includes a two-color (green/red) status LED.



- is backlighted and dimmable using the existing engine indicator lighting rheostats. Note: original post-lights have been removed.



**Figure 1: DISCRETE INSTRUMENTS**

### INSTRUMENT SELF TEST

Upon initial power up, each indicator performs a self-test. During this test and prior to assuming normal operation,

- the digital display initially displays “OK”, followed by “----“, then when the self test is complete the actual engine indication.
- the status LED illuminates red then green, then extinguishes.
- the pointer is driven from off scale to the full scale position, followed by the off scale zero position, then displays the actual indication.

During normal operation each indicator is conducting a continuous self-test on the indicator and the transducer’s signal. The result of this self-test is displayed using the status LED which is defined as follows:

Status LED Illumination	Description
None	Instrument is functioning normally <sup>(1)</sup>
Constant Red	Engine is exceeding limit
Flashing Red (4x per second)	Transducer signal has failed
Flashing Red (2x per second)	Instrument is not working correctly.

(1) If the pointer is parked below zero, the indicator is not electrically powered.



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**NOTE**

The status LED on the Oil Temperature/Oil Pressure indicators will illuminate constant red when engine is shutdown.

**ENGINE TORQUE, FUEL FLOW, OR OIL PRESSURE TRANSDUCERS**

If originally equipped with an AC powered torque, fuel flow, or oil pressure transducer, each original transducer has been replaced by an electronic DC powered transducer mounted in the same location, and its function is unchanged from the basic airplane flight manual.

**3. SPECIAL PROCEDURES:**

None required.

**4. SERVICING INFORMATION:**

None required.

**5. MAINTENANCE INSTRUCTIONS:**

A. No scheduled inspection, overhaul, or maintenance is required.

B. Removal and Installation

Indicators and transmitters are simply removed the same as the original indicators in accordance with basic Maintenance Manual.

C. Troubleshooting

Each indication system can be independently troubleshot using the applicable installation drawings, listed in Section 6, which should be with the aircraft permanent records. If installation drawings are not with the aircraft's permanent records, contact Blackhawk for assistance.

**Blackhawk Modifications, Inc.**  
**Technical Services**  
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- a.) Indicator Fails to Power-Up; check for 28 vdc power supply and 0Ω ground at the appropriate connector locations.
- b.) Indicator Powers-Up but Fails to Indicate; check all wiring for faults, i.e. opens, shorts, improper voltages & grounds, using the appropriate wiring diagram. Check the signal transmitter by artificially stimulating it as needed. Always suspect the signal transmitter first. Swapping indicators or transmitters from side to side can also be helpful in determining whether or not it is the indicator or transmitters.
- c.) Accuracy Checks; use the procedures outlined in the original aircraft maintenance manual to check the indication accuracy, accuracy should be within the tolerances listed on the applicable installation drawing. Note: the indicator dial & pointer is the primary indication of each indicator, as such and due to possible internal unit of measure limits, minor differences between the dial & digital indication may be seen. If the indicator accuracy is not within limits always suspect the transmitter first, check the transmitter for proper signal.

#### D. Replacement Parts

All transmitters and indicators are permanently marked with the part number and for any other required part, first refer to the applicable installation drawings, listed in Section 6, of which should be with the aircraft permanent records, then contact Blackhawk for assistance.

#### **Blackhawk Modifications, Inc.**

#### **Parts**

7601 Karl May Drive  
Waco, Texas 76708  
Phone: (254) 755-6711

If installation drawings are not with the aircraft's permanent records, contact Blackhawk for assistance.

#### 6. DIAGRAMS:

The following and applicable diagrams should be with the aircraft permanent records. If not, then contact Blackhawk for assistance.

#### **KING AIR C90, E90, F90 SERIES**

<b>DRAWING NUMBER</b>	<b>DRAWING TITLE</b>
90-001	ENGINE INDICATORS INSTALLATION PROCEDURES <i>(USED PRIOR TO SEP 30, 2008 INSTALLATIONS)</i> .
90-002	PLACARDS

Instructions for Continued Airworthiness

Engine Indicators in Beechcraft 90 and 200 King Air Series and Piper Cheyenne Series Airplanes



90-003	PROPELLER TACHOMETER INSTALLATION PROCEDURES KING AIR 90 SERIES
90-004	TURBINE TACHOMETER INSTALLATION PROCEDURES KING AIR 90 SERIES
90-005	TORQUE INDICATOR INSTALLATION PROCEDURES KING AIR 90 SERIES
90-006	INTERSTAGE TURBINE TEMPERATURE INDICATOR INSTALLATION PROCEDURES KING AIR 90 SERIES
90-007	FUEL FLOW INDICATOR INSTALLATION PROCEDURES KING AIR 90 SERIES
90-008	OIL PRESSURE AND TEMPERATURE INDICATOR INSTALLATION PROCEDURES KING AIR 90 SERIES
90-009	DIGITAL DISPLAY MONITOR PANEL INSTALLATION PROCEDURES KING AIR 90 SERIES

**KING AIR H90 (T-44)**

DRAWING NUMBER	DRAWING TITLE
H90-003	PROPELLER TACHOMETER INSTALLATION PROCEDURES KING AIR H90
H90-004	TURBINE TACHOMETER INSTALLATION PROCEDURES KING AIR H90
H90-005	TORQUE INDICATOR INSTALLATION PROCEDURES KING AIR H90
H90-006	INTERSTAGE TURBINE TEMPERATURE INDICATOR INSTALLATION PROCEDURES KING AIR H90
H90-007	FUEL FLOW INDICATOR INSTALLATION PROCEDURES KING AIR H90
H90-008	OIL TEMPERATURE/PRESSURE INDICATOR INSTALLATION PROCEDURES KING AIR H90
H90-009	SCHEMATIC INDICATOR DATA BUS KING AIR H90

**SUPER KING AIR 200, A200, B200 SERIES**

DRAWING NUMBER	DRAWING TITLE
200-001	PROPELLER TACHOMETER INSTALLATION PROCEDURES KING AIR 200 SERIES
200-002	TURBINE TACHOMETER INSTALLATION PROCEDURES KING AIR 200 SERIES
200-003	TORQUE INDICATOR INSTALLATION PROCEDURES KING AIR 200 SERIES
200-004	INTERSTAGE TURBINE TEMPERATURE INDICATOR INSTALLATION PROCEDURES KING AIR 200 SERIES
200-005	OIL PRESSURE AND TEMPERATURE INDICATOR INSTALLATION PROCEDURES KING AIR 200 SERIES
200-006	FUEL FLOW INDICATOR INSTALLATION PROCEDURES KING AIR 200 SERIES

**KING AIR 90/200/300 SERIES WITH GARMIN G1000**

DRAWING NUMBER	DRAWING TITLE
G1000-001	TORQUE TRANSDUCER INSTALLATION PROCEDURES KING AIR 90/200 SERIES GARMIN G1000 INSTALLATION
G1000-002	FUEL FLOW TRANSMITTER INSTALLATION PROCEDURES KING AIR 90/200 SERIES GARMIN G1000 INSTALLATION

**PIPER CHEYENNE SERIES**

DRAWING NUMBER	DRAWING TITLE
31T-001	PROPELLER TACHOMETER INSTALLATION PROCEDURES PIPER CHEYENNE SERIES
31T-002	TURBINE TACHOMETER INSTALLATION PROCEDURES PIPER CHEYENNE SERIES
31T-003	TORQUE INDICATOR INSTALLATION PROCEDURES PIPER CHEYENNE SERIES
31T-004	INTERSTAGE TURBINE TEMPERATURE INDICATOR INSTALLATION PROCEDURES PIPER CHEYENNE SERIES
31T-005	OIL PRESSURE AND TEMPERATURE INDICATOR INSTALLATION PROCEDURES PIPER CHEYENNE SERIES





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## 7. APPLICATION OF SPECIAL TREATMENTS:

None required.

## 8. SPECIAL TOOLS:

None required.

## 9. ADDITIONAL INFORMATION FOR COMMUTER CATEGORY AIRCRAFT:

None required.

## 10. AIRWORTHINESS LIMITATIONS:

**NOTICE:**

The Airworthiness Limitations Section is FAA approved and specifies maintenance required under §§43.16 and 91.403 of the Federal Aviation Regulations unless an alternative program has been FAA approved.

There are no new (or additional) airworthiness limitations associated with this equipment and/or installation.

## 11. REVISION:

Each time this ICA is revised or reissued, the revised ICA will be distributed to operators using a Service Letter/Bulletin by Blackhawk Modifications, Inc. This revision will include a new Log of Revisions page along with the revised pages. The upper left hand corner of each revised page will reflect the revision letter. That portion of text or an illustration, which has been revised by the addition of, or change in, information is denoted by a solid revision bar located adjacent to the area of change, and placed along the inside margin of a page. Revision bars show only the information changed within the latest revision.

## 12. ASSISTANCE:

For assistance with ICA issues not addressed herein, contact Blackhawk at the following address:

**Blackhawk Modifications, Inc.**  
7601 Karl May Drive  
Waco, Texas 76708  
Phone: (254) 755-6711