

HP46-350-ICA

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS
FOR THE
HARTZELL HC-I3YR-1E/7890K PROPELLER AND D-6750-(P) SPINNER
ON PIPER PA-46-350P (MALIBU MIRAGE) AIRCRAFT
Serial Number 4622001 to 4622200 and 4636001 to 4636131

STC SA01340CH

LOG OF REVISIONS

Revision	Revised Pages	Description of Revision	FAA Approved	Date
New	All	Original Release		

NOTE: All changes are indicated by a black vertical line along the left margin.

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INTRODUCTION

PA-46-350P aircraft were originally manufactured with a two-blade aluminum propeller between 1989 and 1997. In 1998, The New Piper Aircraft Inc. ("Piper") made the three-blade composite propeller standard on aircraft serial number 4636132 and on. STC SA01340CH authorizes replacement of the two-blade aluminum propeller with the three-blade composite propeller on the earlier serial number aircraft.

In order to install the three-blade composite propeller, modifications to the propeller de-ice system are made which are the primary reasons for changes to the existing PA-46-350P maintenance manuals. The Instructions for Continued Airworthiness below document the maintenance requirements and procedures associated with the three-blade composite propeller installed on PA-46-350P aircraft S/N 4622001 to 4622200 and 4636001 to 4636131.

Chapter 4 – AIRWORTHINESS LIMITATIONS

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

Chapter 5 - TIME LIMITS / MAINTENANCE CHECKS

All required maintenance, inspections, time intervals and procedures are provided in Hartzell Manual 145 (Hartzell Propeller Owner's Manual) provided with each propeller. Recommended Time-Between-Overhaul (TBO) limits for the STC propeller are also provided in Hartzell Service Letter 61.

Chapter 30 - ICE AND RAIN PROTECTION

Propeller Heat System Description and Operation

The Goodrich propeller de-ice boot used on the Hartzell Top Prop PA-46-350P STC consists of a single multi-strand resistance wire heating element encapsulated within a fabric and neoprene rubber construction. The propeller de-ice timing cycle is controlled by the same 3E1899-1 timer originally type-certified on the aircraft with the two-blade aluminum propeller. When the PROP HEAT switch is turned ON, the timer provides current to the de-ice boots in a 90-second ON, 90-second OFF cycle and powers all three blades simultaneously. This cycle will continue as long as the PROP HEAT switch is in the ON position.

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The STC propeller heat system utilizes existing hardware such as the slip-ring, brush block assembly, cycle timer, and switches where possible. However, some electrical modifications are made to the propeller heat electrical circuits during installation of this STC. The electrical modifications are necessary to accommodate the propeller heat system for the three-blade propeller and include upgrading the existing wiring and circuit protector because of the increased power requirement. The existing timer is retained since it is capable of carrying the increased load. A modification also adds a circuit to disable the auxiliary cabin heater when the propeller de-ice is functioning.

The system is inhibited on the ground through the aircraft weight on wheels squat switch and an added relay to preclude heat stress to the composite propeller. A momentary test switch function is provided through the Surface De-Ice Switch which bypasses the squat-switch inhibit to allow for a pre-flight ground test. The modified system is depicted on Hartzell drawing E-7359 (latest revision) and Goodrich drawing 5E2682 (latest revision)

Propeller Heat System Troubleshooting

Use the troubleshooting routines provided in The New Piper Aircraft PA-46-350P Maintenance Manual but only reference Hartzell drawing E-7359 (latest revision) and Goodrich drawing 5E2682 (latest revision) for system installation details and schematics.

Brush Module Replacement

No Change.

New Brush Alignment

No Change.

Metal Oxide Varistor (MOV) Module Replacement

During installation of the STC, Metal Oxide Varistors (MOV) are installed to the brush block assembly for lightning protection. The MOV installation is shown on Goodrich drawing 5E2682. The MOV module must be replaced in the event of a lightning strike. Reference Goodrich drawing 5E2682 (latest revision) for MOV removal and installation details.

Slip Ring Assembly Replacement

No Change.

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Slip Ring Assembly Alignment

No Change.

Heater Boots Electrical Check (reference Goodrich drawing 5E2682 (latest revision))

- a) Check the electrical resistance of the element within each de-ice boot. Disconnect the heater lead wires to isolate the individual unit.
- b) Check for intermittent open circuits by tensioning the heater wire harness slightly while measuring the resistance. Also, press lightly on the heater surface in the area adjacent to the harness. Resistance must not vary.
- c) The acceptable de-ice boot circuit resistance range is 4.12 - 4.56 ohms. These values only apply to heaters that are not connected to terminal studs. If all three blade heaters are checked in parallel, the acceptable range is 1.37 –1.52 ohms.
- d) If tests show the blade heater to have an open circuit, to be the wrong resistance or to be visibly damaged beyond repair as outlined in this section, replace the heater.

Heater Boot Removal and Installation

See latest revision of Hartzell Manual 135, page 601, Maintenance Manual for Composite Propeller Blades.

PROP HEAT Functional Check

CAUTION: OPERATION OF THE PROPELLER DE-ICE SYSTEM WITHOUT THE ENGINE RUNNING IS LIMITED TO 10 SECONDS OR SEVERE DAMAGE TO THE COMPOSITE BLADES MAY RESULT.

NOTE: It is recommended that a person be stationed near the propeller touching the de-ice boots while the functional test is conducted to warn of any unintended de-ice boot heating. Propeller should be slowly rotated by hand with the propeller heat ON to minimize possibility of overheating and arcing of brush-block and slip-ring.

- a) With engine off, turn on battery master and note the voltage on the aircraft voltmeter.
- b) Turn on auxiliary cabin heat and blower; note voltage level (drop) on main voltmeter.
- b) Turn on propeller de-ice (PROP HEAT switch). Note the voltage increase. The increase verifies the cabin auxiliary heater is shut off by the switch interlock circuit. Verify that propeller de-ice current is zero. Zero de-ice current indicates that the "squat" switch lockout is functioning properly.

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- c) Next, with prop heat still on, push and hold (maximum of 10 seconds) the SURF DEICE switch (functions as propeller de-ice "push to test"). The propeller de-ice ammeter should indicate current flow, which verifies that the test function is working properly. Note heating of de-ice boots through touch.

NOTE: Normal de-ice current (green arc) may not be achieved on battery power.

- d) Shut off all aircraft electrical equipment.
- e) Turn on the battery master and the propeller de-ice and note zero prop de-ice current. With the propeller de-ice still on, depress the "squat" switch on the left main landing gear. The propeller de-ice ammeter should now indicate current flow. This verifies that the squat switch circuit functions properly allowing de-ice function in flight (with weight off the wheels). Shut off all aircraft electrical equipment.
- f) With aircraft secured, start engine. At 1200 RPM, turn on prop de-ice and depress test button. Prop de-ice ammeter should be in the normal operating range (green arc). Cycle time is 90-seconds ON, 90-seconds OFF.

Goodrich (BFG) Timer Test & Troubleshooting

No Change.

Propeller Heater System Periodic Inspection

Reference Hartzell Manual 145 for propeller de-ice system inspection requirements and procedures.

Chapter 61 - PROPELLERS

The STC propeller is an 80" diameter, three-blade Kevlar-composite constant-speed propeller. The propeller is controlled by the existing type-certified Hartzell V-5-2 or V-11-1 governor.

The STC propeller should be installed in accordance with STC Installation Instructions HP46-350-NST. All required maintenance, inspections, time intervals and procedures are provided in Hartzell Manual 145 (Hartzell Propeller Owner's Manual) provided with each propeller.

Recommended Time-Between-Overhaul (TBO) limits for the STC propeller are provided in Hartzell Service Letter 61. Propeller overhaul must be accomplished by an approved Propeller Repair Station.