

ICA_080808_97

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS
FOR THE
HARTZELL HC-I3YR-1N/N7605(K)+2 PROPELLER AND HC-I3Y1R-1N/N7605(K)+2
PROPELLER
ON PIPER PA-46-350P (MALIBU MIRAGE) AIRCRAFT SERIAL NUMBER 4622001 to
4622200 and 4636001 to 4636131

STC SA02677CH-D

LOG OF REVISIONS

Revision	Revised Page(s)	Description of Revision	Engineer	Date
New	All	Original Release	B. Meyer	8/8/08

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

ICA_080808_97

**INSTRUCTIONS FOR CONTINUED AIRWORTHINESS
FOR THE
HARTZELL HC-I3YR-1N/N7605(K)+2 PROPELLER AND HC-I3Y1R-1N/N7605(K)+2
PROPELLER
ON PIPER PA-46-350P (MALIBU MIRAGE) and PA-46R-350T (MATRIX) AIRCRAFT
STC SA02677CH**

INTRODUCTION

PA-46-350P aircraft were originally manufactured with a two-blade aluminum propeller between 1989 and 1997. In 1998, Piper made the three-blade composite propeller standard on aircraft serial number 4636132 and on. STC SA01340CH approved the 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. 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

For aircraft with electric propeller de-ice systems, the propeller de-ice system service information is provided on the system installation drawing 102960 and in specific Hartzell service manuals. These manuals can be viewed and/or obtained via the internet on the Hartzell Propeller website (www.hartzellprop.com). The following applicable manuals are located in the "Product Support" section under "HPI Ice Protection System Manuals."

Manual 180 – Propeller Ice Protection System Manual
Refer to "De-Ice Kits for Non-Counterweighted Compact Propellers" to see illustrated parts lists for 102960-1 and 102960-2 de-ice kits.

ICA_080808_97

**INSTRUCTIONS FOR CONTINUED AIRWORTHINESS
FOR THE
HARTZELL HC-I3YR-1N/N7605(K)+2 PROPELLER AND HC-I3Y1R-1N/N7605(K)+2
PROPELLER
ON PIPER PA-46-350P (MALIBU MIRAGE) and PA-46R-350T (MATRIX) AIRCRAFT
STC SA02677CH**

Manual 181 – Propeller Ice Protection System Component Maintenance Manual

Manual 182 – Propeller Electrical De-Ice Boot Removal and Installation Manual.

Propeller Heat System Description and Operation

The Hartzell propeller de-ice boot used on the Hartzell HC-I3YR-1N/N7605K+2 and Hartzell HC-I3Y1R-1N/N7605K+2 propeller 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.

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 drawings E-7359 and 102960 (latest revisions).

Propeller Heat System Troubleshooting

Use the troubleshooting routines provided in Piper PA-46-350P Maintenance Manual but only reference Hartzell drawing E-7359 (latest revision) and Hartzell drawing 102960 (latest revision) for system installation details and schematics.

Brush Module Replacement

No Change.

ICA_080808_97

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS
FOR THE
HARTZELL HC-I3YR-1N/N7605(K)+2 PROPELLER AND HC-I3Y1R-1N/N7605(K)+2
PROPELLER
ON PIPER PA-46-350P (MALIBU MIRAGE) and PA-46R-350T (MATRIX) AIRCRAFT
STC SA02677CH

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 Hartzell drawing 102960. The MOV module must be replaced in the event of a lightning strike per Hartzell Manual 181. Reference Hartzell drawing 102960 (latest revision) for MOV removal and installation details.

Slip Ring Assembly Replacement

No Change.

Slip Ring Assembly Alignment

No Change.

Heater Boots Electrical Check (reference Hartzell drawing 102960 (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 182, Propeller Electrical De-ice Boot Removal and Installation Manual.

PROP HEAT Functional Check

ICA_080808_97

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS
FOR THE
HARTZELL HC-13YR-1N/N7605(K)+2 PROPELLER AND HC-13Y1R-1N/N7605(K)+2
PROPELLER
ON PIPER PA-46-350P (MALIBU MIRAGE) and PA-46R-350T (MATRIX) AIRCRAFT

STC SA02677CH

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.
- 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.

Timer Test & Troubleshooting

No Change.

Propeller Heater System Periodic Inspection

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

ICA_080808_97

INSTRUCTIONS FOR CONTINUED AIRWORTHINESS
FOR THE
HARTZELL HC-I3YR-1N/N7605(K)+2 PROPELLER AND HC-I3Y1R-1N/N7605(K)+2
PROPELLER
ON PIPER PA-46-350P (MALIBU MIRAGE) and PA-46R-350T (MATRIX) AIRCRAFT

STC SA02677CH

Chapter 61 - PROPELLERS

The STC propeller is an 80" diameter, three-blade composite constant-speed propeller. The propeller is controlled by Hartzell V-5-2, V-11-1 or S-1-30 governors.

The STC propeller should be installed in accordance with STC Installation Instructions INST_080808_97FLD. 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.