INST_020215

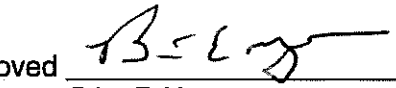
STC SA04045CH

December 10, 2015

INSTRUCTIONS FOR INSTALLATION OF A HARTZELL 5D3-N338A1/78D01B PROPELLER ON PIPER PA-46-500TP AIRCRAFT

LOG OF REVISIONS

Revision	Revised Page(s)	Description of Revision	Engineer	Date
IR	All	Original Release	D. Glaser	12/10/2015

FAA Approved  Date 1/14/16

Brian E. Meyer
STC ODA administrator
Hartzell STC ODA-100082-CE

INST_020215

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Please read these instructions and the Instructions for Continued Airworthiness before starting installation. If you have any questions regarding installation of this STC, please contact Hartzell Propeller at:

Phone: (937) 778-4379 or
1-800-942-7767

E-mail: techsupport@hartzellprop.com

APPLICABLE MODELS AND SERIAL NUMBERS

All Piper PA-46-500TP configurations listed below:

Aircraft Config.	Aircraft Serial Number Range	Engine	Max Cont Power HP @ RPM
PA-46-500TP	4697001 and up	PT6A-42A	500 @ 2000

INST_020215

STC SA04045CH

December 10, 2015

INSTRUCTIONS FOR INSTALLATION OF A HARTZELL 5D3-N338A1/78D01B PROPELLER ON PIPER PA-46-500TP AIRCRAFT

NOTES: 1) These instructions require that the aircraft be in the type-certificated configuration with the four-blade Hartzell HC-E4N-3Q/E8501B-3.5 propeller installed. If any other propeller has been installed, the aircraft must be returned to the original type-certificated HC-E4N-3Q/E8501B-3.5 propeller configuration before installing this STC.

2) Approximately 8 man-hours of labor are required for field-installation of this STC kit when replacing an existing Hartzell HC-E4N-3Q/E8501B-3.5 propeller.

REQUIRED DOCUMENTS:

1) Hartzell Manual 181: Propeller Ice Protection System Component Maintenance Manual.
2) Hartzell Propeller Owner's Manual 486: Raptor Turbine Propeller Series with Composite Blades, Models: ( )D3-( )( )( )
3) Hartzell Propeller Instructions for Continued Airworthiness ICA_020215
4) PA-46-500TP Aircraft Maintenance Manual applicable to aircraft model and serial number (Part No. 767-072 or Part No. 767-005).
5) Hartzell Drawings (latest revisions):
   a. 106285 De-Ice Kit (One Prop)
   b. 106337 Airframe De-Ice Kit
   c. 106293 Ice Protection Installation Drawing
   d. 106342 Airframe De-Ice Installation Drawing
6) Pratt & Whitney PT6A-42A Maintenance Manual

A) Propeller Installation

1. When replacing the HC-E4N-3Q/E8501B-3.5 propeller, remove original spinner and propeller per Chapter 61 – Propeller – Removal/Installation of the applicable PA-46-500TP Aircraft Maintenance Manual.

   NOTE: Step 1 is omitted when installing this STC on new-production aircraft.

2. Unpack and inspect the new 5D3-N338A1/78D01B propeller per Chapter 3 of Hartzell Propeller Owner's Manual 486.

3. Verify/inspect spinner bulkhead and propeller mounted de-ice components are properly installed and secured on the new propeller per Hartzell Drawing 106293.

INST_020215

STC SA04045CH

December 10, 2015

INSTRUCTIONS FOR INSTALLATION OF A HARTZELL 5D3-N338A1/78D01B PROPELLER ON PIPER PA-46-500TP AIRCRAFT

4. Install both engine-mounted propeller de-ice brush blocks, Metal Oxide Varistor (MOV) module, and associated brackets on the engine gearbox by following the steps below.

   a) Remove existing de-ice brush block brackets and attached parts from the engine gearbox as shown in **Figure 1**. Note the position of cable ties that secure the wires near the brush block.

   b) Disconnect existing brush block wires from the existing brush blocks. Label aircraft wire terminals for later reinstallation per list below (refer to PA-46-500TP Aircraft Maintenance Manual Electrical Schematic 91-30-60 to confirm terminal letter and wire number match, as required):

      1) A Wire (outboard boot sector) attached to outboard brush block
      2) B Wire (inboard boot sector) attached to middle brush block
      3) C Wire (GND) attached to inboard brush block

   c) Position a brush block shim(s) (P/N 1H1157), as required, on brush block bracket (P/N 106335) with two B-6637-52 Pan Head screws. Place a B-3837-N832 CRES flat washer under the head of each screw. Temporarily install modular brush block assembly (P/N 105404) onto the bracket using a B-3837-N832 washer and B-6655-08 self-locking nut on each screw as shown in **Figure 2**. Do not torque at this time.

   d) Repeat the process of step c with brush block bracket (P/N 103044), brush block shim(s) (P/N 1H1157), modular brush block assembly (P/N 105404), two B-6637-52 Pan Head screws, four B-3837-N832 CRES flat washer, and two B-6655-08 self-locking nuts as shown in **Figure 3** and drawing 106342. Do not torque at this time.

   e) Install brush block brackets onto the gearbox in the place of the brackets removed in step a, as shown in **Figure 4** and drawing 106342. When viewed from the front of the engine, the bracket with space for the MOV (P/N 106335) goes in the 9 o'clock position and the bracket with only the brush assembly goes in the 4 o'clock position. Torque the nuts holding the bracket to the engine gearbox using torque values provided in the Pratt & Whitney PT6A-42A Maintenance Manual.

   f) Attach short wire harness connecting MOV module assembly (P/N 106340) to de-ice brush block (P/N 105404). As shown in **Figure 5** and **Figure 6**, simultaneously attach the aircraft wires to the brush block module as follows:

1) Terminal A, 4 terminal rings: Connect MOV wire A, two aircraft wires A, and brush block wire A to Terminal A on the de-ice brush block.
2) Terminal B, 4 terminal rings: Connect MOV wire B, two aircraft wires B and brush block wire B to Terminal B on the de-ice brush block.
3) Terminal C, 3 terminal rings: Connect two aircraft wires C (ground) and brush block wire C to Terminal C on the de-ice brush block.

g) Install MOV module onto the mounting bracket as shown in **Figure 6** and drawing 106342 using the following procedure:

1) Orient the MOV module (P/N 106340) on the mounting bracket so the electrical terminals are at the bottom, away from the brush block.
2) In the aft hole, install a B-6637-52 pan head screw and B-6655-08 self-locking nut with a B-3837-N832 flat washer under both the screw head and the nut.
3) In the front hole (which captures the MOV bonding strap) install a B-6637-52 pan head screw and B-6655-08 self-locking nut with a B-3855-31 external tooth lock washer under the screw head and under the nut.
4) Torque front and aft fasteners to 22-25 in-lbs.

h) Connect airframe wires to the brush block assembly at the 4 o'clock position as shown in **Figure 7**. Unlike the first brush block, only one wire goes to each terminal.

i) Temporarily tie-back the brushes in the brush block with string to avoid damage during propeller installation. The completed brush block and MOV installations, ready for propeller installation, are shown in **Figure 8**.

5. Install new propeller on the aircraft in accordance with applicable Piper PA-46-500TP Aircraft Maintenance Manual Chapter 61 and Hartzell Propeller Owner's Manual 486.

6. Remove string holding brushes and check for proper brush to de-ice slip ring alignment. Refer to Hartzell Manual 181, Chapter 7 for slip ring to brush block alignment procedure. Install or remove additional 1H1157 shims, as needed, to line-up the brush block assembly with the slip ring. When aligned, torque the brush block assembly attachment hardware to 22-25 in-lbs.

7. Install the spinner dome on the propeller per spinner installation procedures provided in Chapter 3 of Hartzell Propeller Owner's Manual 486.

NOTE: The 105951( ) spinner assembly consists of the following components:
a) 105949( ) Dome

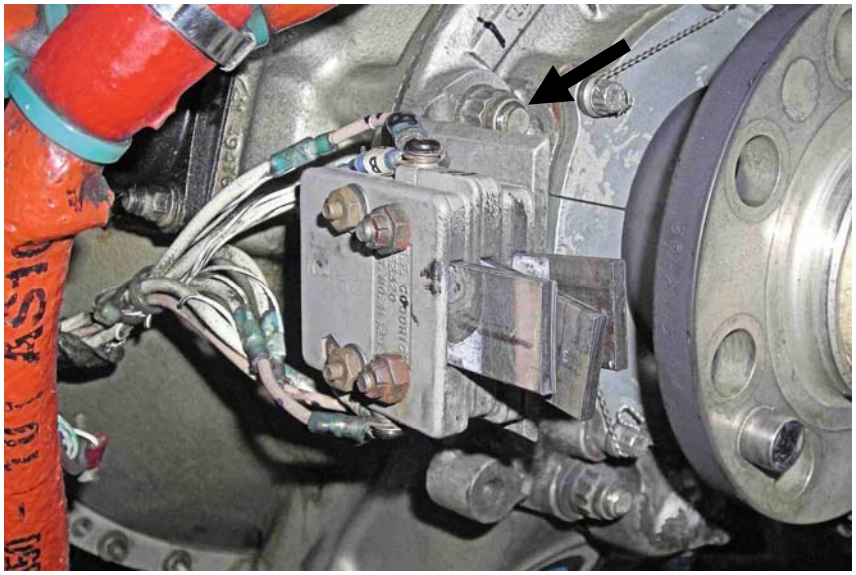
b) 105950( ) Rear Bulkhead
c) C-5292 Forward Bulkhead
d) B-632 Spacer(s)
e) B-3860-10L Conical Washers
f) B-3867-272 10-32 Flush Head Screws

INST_020215

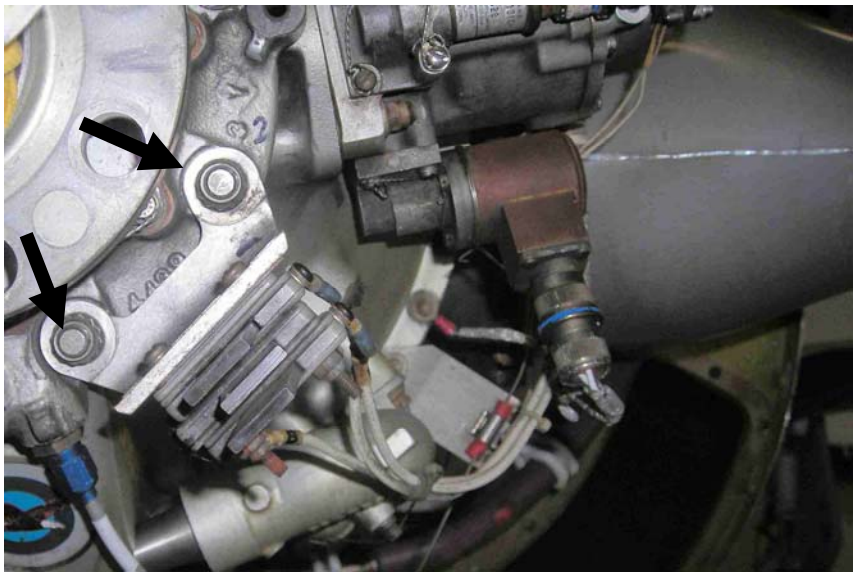
STC SA04045CH

December 10, 2015

INSTRUCTIONS FOR INSTALLATION OF A HARTZELL 5D3-N338A1/78D01B PROPELLER ON PIPER PA-46-500TP AIRCRAFT



(a)



(b)

Figure 1

Remove existing brush block bracket with brush block. When viewed from the front, the brackets are located at the (a) 9 o'clock position and (b) 4 o'clock position.

INST_020215

STC SA04045CH

December 10, 2015

INSTRUCTIONS FOR INSTALLATION OF A HARTZELL 5D3-N338A1/78D01B PROPELLER ON PIPER PA-46-500TP AIRCRAFT

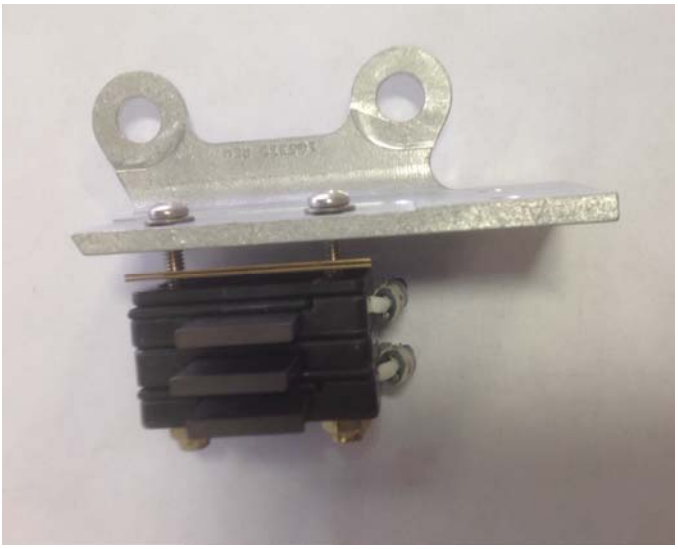


Figure 2
Position new brush block and shim(s) on brush block/ MOV bracket (P/N 106335).

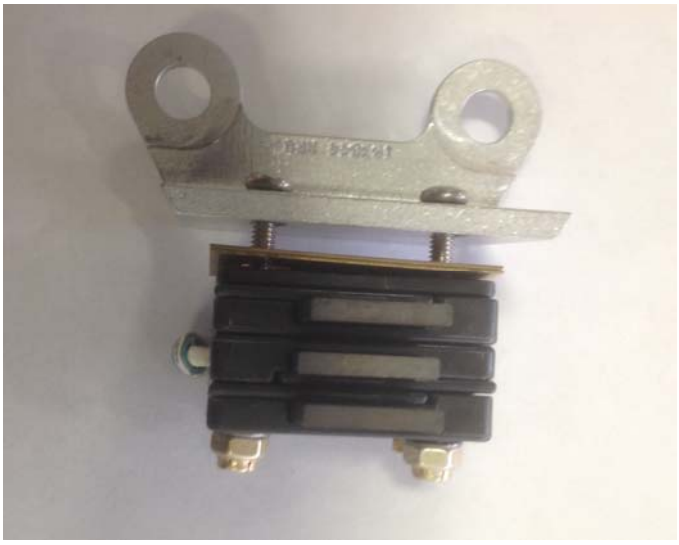


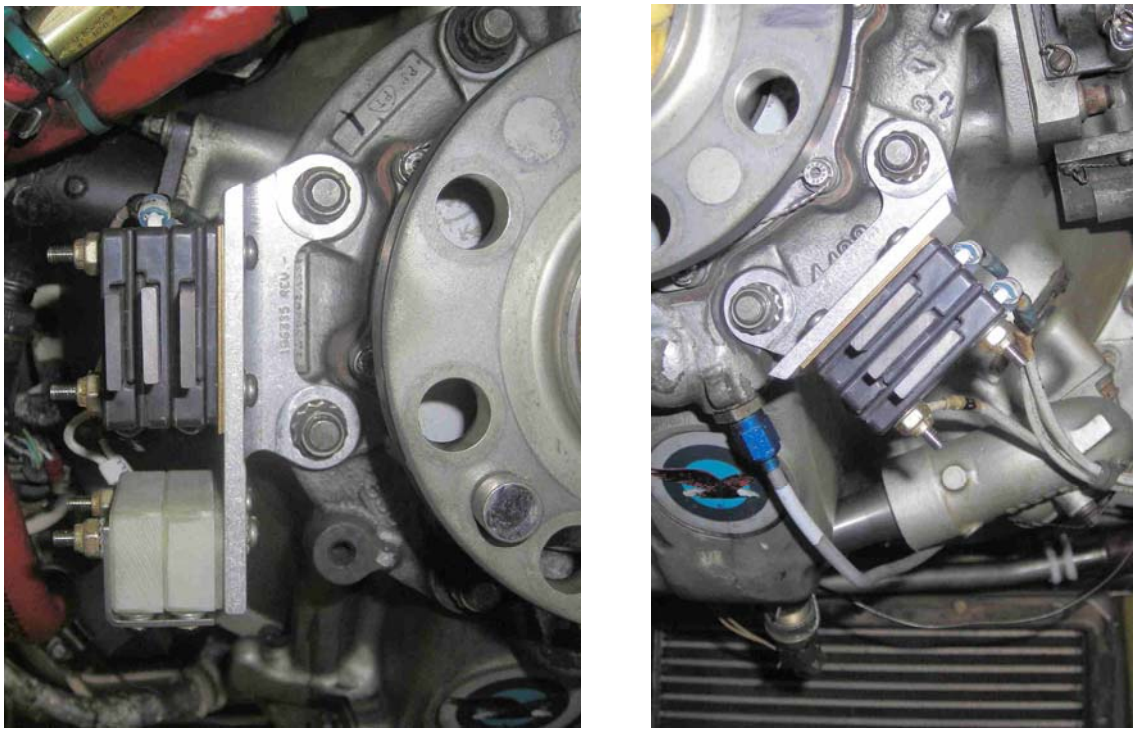
Figure 3
Position new brush block and shim(s) on brush block bracket (P/N 103044).

INST_020215

STC SA04045CH

December 10, 2015

INSTRUCTIONS FOR INSTALLATION OF A HARTZELL 5D3-N338A1/78D01B PROPELLER ON PIPER PA-46-500TP AIRCRAFT



(a) (b)

Figure 4

Install both brush block brackets on the engine, in place of the old brackets. Picture (a) is at the 9 o'clock position (airplane right-side); (b) is at the 4 o'clock position (airplane left-side). Though the wires and MOV are shown in this figure, they should not be connected or installed until steps 4f and 4g.

INST_020215

STC SA04045CH

December 10, 2015

INSTRUCTIONS FOR INSTALLATION OF A HARTZELL 5D3-N338A1/78D01B PROPELLER ON PIPER PA-46-500TP AIRCRAFT

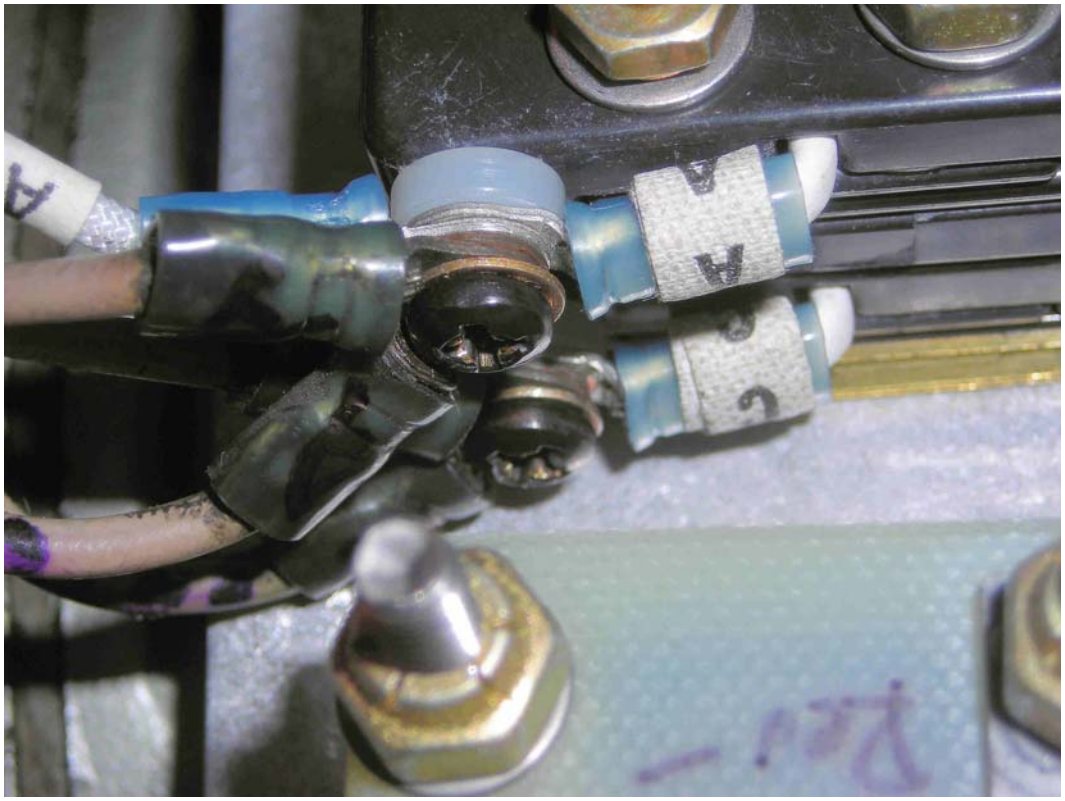


Figure 5

Terminals A and C of the brush block located next to the MOV. MOV is shown in the lower right-hand side of this image for reference, though it is not installed until step 4g.

INST_020215

STC SA04045CH

December 10, 2015

INSTRUCTIONS FOR INSTALLATION OF A HARTZELL 5D3-N338A1/78D01B PROPELLER ON PIPER PA-46-500TP AIRCRAFT

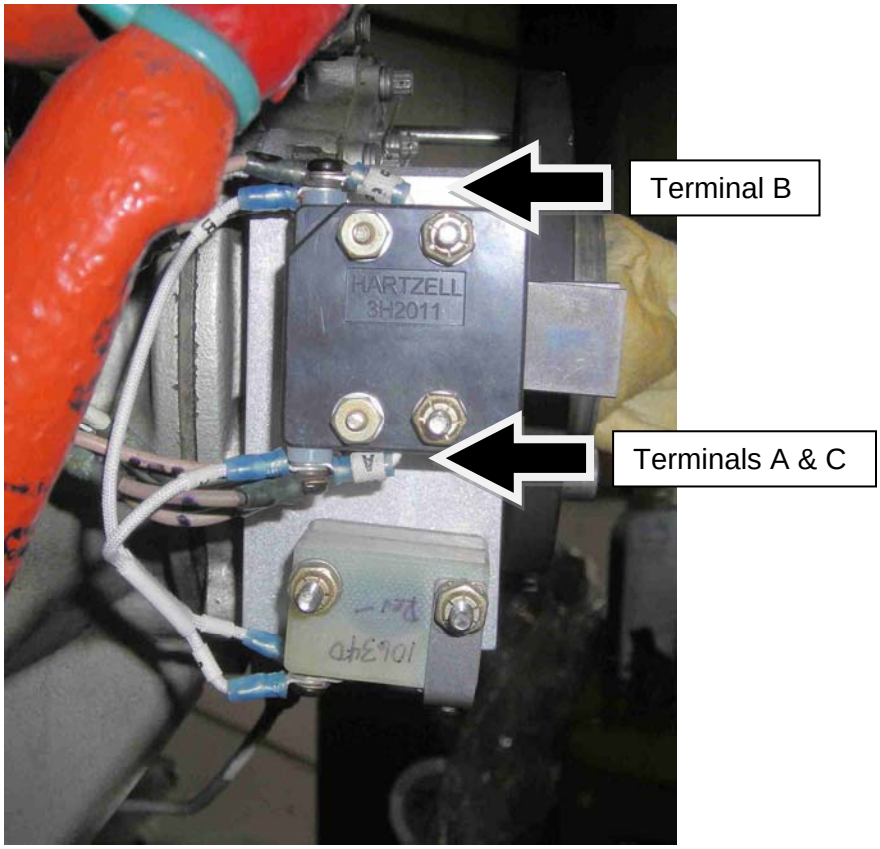


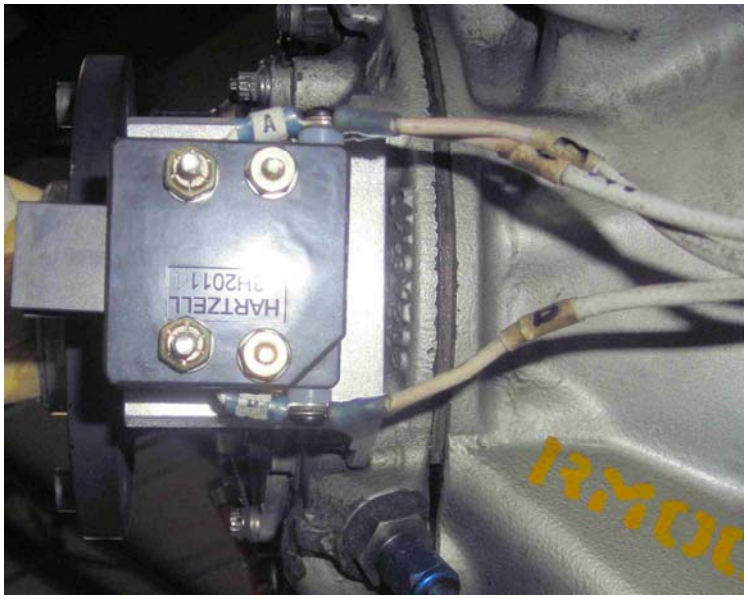
Figure 6
Install MOV on bracket located at the 9 o'clock position.
Capture MOV grounding strap with the forward bolt.

INST_020215

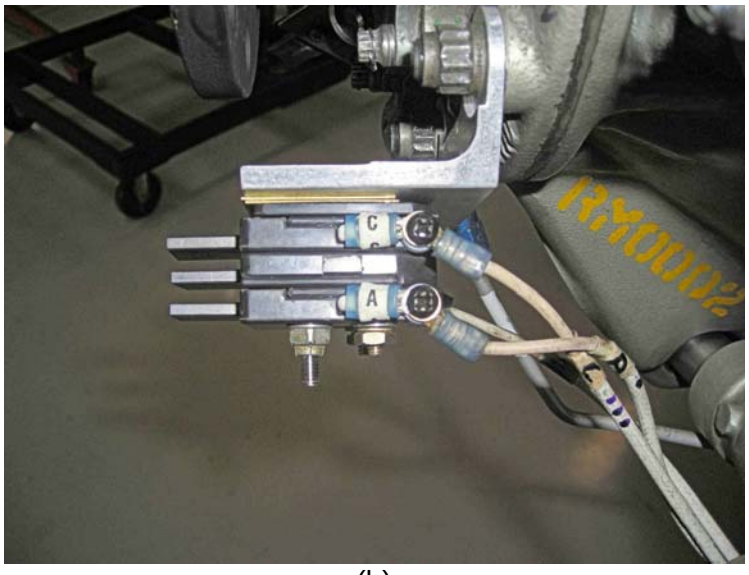
STC SA04045CH

December 10, 2015

INSTRUCTIONS FOR INSTALLATION OF A HARTZELL 5D3-N338A1/78D01B PROPELLER ON PIPER PA-46-500TP AIRCRAFT



(a)



(b)

Figure 7

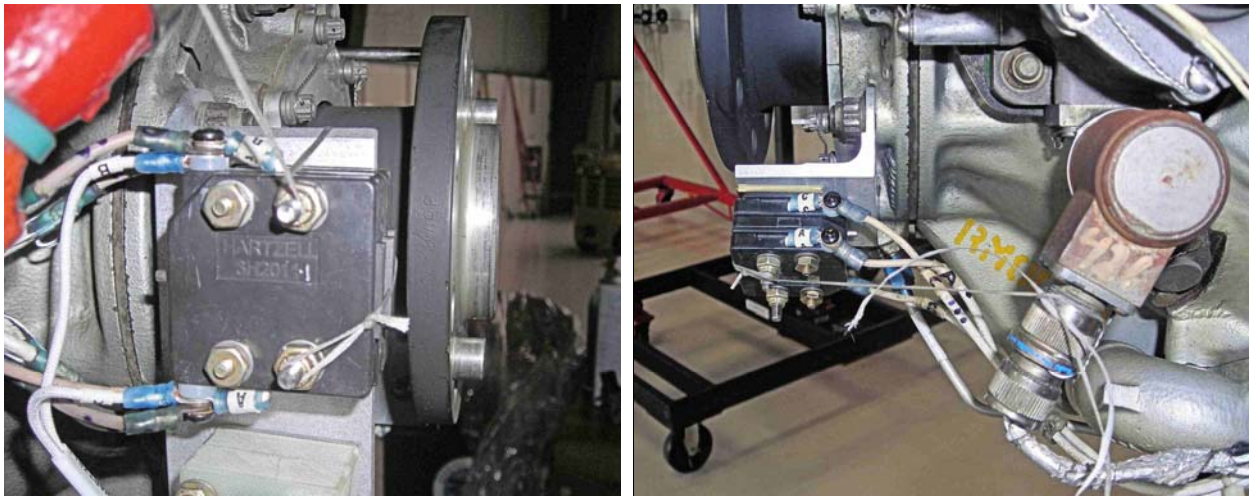
Connect airframe wires to the brush block at the 4 o'clock position. (a) and (b) are different angles of the same brush block.

INST_020215

STC SA04045CH

December 10, 2015

INSTRUCTIONS FOR INSTALLATION OF A HARTZELL 5D3-N338A1/78D01B PROPELLER ON PIPER PA-46-500TP AIRCRAFT



(a) (b)

Figure 8

Completed brush block and MOV installation. Brushes are tied back for propeller installation. (a) Brush block at the 9 o'clock position (airplane right hand side). (b) Brush block at the 4 o'clock position (airplane left-hand side).

INST_020215

STC SA04045CH

December 10, 2015

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B) Functional Ground Tests

1. After a propeller installation, perform the Engine Ground Test and Safety Precautions found in the PA-46-500TP Aircraft Maintenance Manual, Chapter 71, Powerplant – General section.

2. Make adjustments to propeller governor, propeller low pitch and/or engine controls, as needed, to comply with the requirements of the ground test, above. Perform additional ground runs as necessary to confirm engine and propeller settings.

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. IF THIS LIMITATION IS EXCEEDED, CONTACT HARTZELL PRODUCT SUPPORT AT:
Phone: (937) 778-4379 or 1-800-942-7767
e-mail: techsupport@hartzellprop.com

3. Perform Propeller De-Ice System – Adjustment/Test procedure as provided in Instructions for Continued Airworthiness ICA_020215. Perform only the "Operational Test Of The Propeller De-icing System." The purpose of this test is to verify all propeller de-ice boots are operational.

   Each propeller de-ice boot installed on the composite five-blade propeller has two heating zones; inboard and outboard. The propeller de-ice system heats either the inboard zones or the outboard zones of all five blades simultaneously, based on the de-ice timer mode.

   Each zone of all five de-ice boots are momentarily powered during the de-ice timer operational test and the de-ice timer verifies heating circuit resistance. If one or both zones annunciate "PROP HEAT FAIL", check electrical connections at the brush blocks and MOV. Also check the brush block to slip ring alignment per Hartzell Manual 181.

   If further, in-depth trouble shooting is required, perform a "Functional Test of Propeller Deicing System" in accordance with Instructions for Continued Airworthiness (ICA_020215). Refer to Hartzell Propeller Owner's Manual 486 Chapter 8 and ICA_020215 for propeller de-ice maintenance practices, if necessary.

INST_020215

STC SA04045CH

December 10, 2015

INSTRUCTIONS FOR INSTALLATION OF A HARTZELL 5D3-N338A1/78D01B PROPELLER ON PIPER PA-46-500TP AIRCRAFT

C) Documentation and Flight Checks

1. Attach Hartzell Propeller Airplane Flight Manual Supplement AFMS_020215 to existing Airplane Flight Manual.

2. Revise airplane weight and balance records and equipment list to show the removal of the original propeller and installation of the new propeller as follows (confirm weights and arm location with aircraft equipment list):

PA-46-500TP Item	Weight		Arm		Moment	
	[lb]	[kg]	[in]	[cm]	[in-lb]	[cm-kg]
Remove Hartzell HC-E4N-3Q/E8501B-3.5 propeller and D-630-5(P) spinner assembly	-144.8	-65.68	21.6	54.9	-3127.7	-3605.8
Install Hartzell 5D3-N338A1/78D01B propeller and 105951(P) spinner assembly	+128.8	+58.42	21.6	54.9	+2782.1	+3207.3

3. Post-installation dynamic balance is recommended, but not required. Perform post-installation dynamic balance of the propeller/engine combination per Piper PA-46-500TP Aircraft Maintenance Manual Chapter 61 – Propeller – Adjustment/Test. Specific information about balance weight hardware and installation limits are provided in Hartzell Owner's Manual 486, Chapter 6 - Maintenance Practices section.

4. Make the appropriate logbook entries and return aircraft to service with FAA Form 337 referencing STC.

5. Perform a functional check-flight using normal procedures, note maximum RPM setting and readjust propeller governor and/or engine ground idle speeds if necessary per procedures in Piper PA-46-500TP Aircraft Maintenance Manual Chapter 71.

END