## HARTZELL PROPELLER INC. Service Bulletin TRANSMITTAL SHEET <u>HC-SB-30-352</u> Anti-ice - Replacement of Slinger Ring Assembly

December 18, 2014

This page transmits a revision to Service Bulletin HC-SB-30-352.

- Original Issue, dated Jun 10/14
- Revision 1, Dec 18/14

Propeller assemblies that have complied with the replacement instructions required in a previous revision of this Service Bulletin are not affected.

Changes are shown by a change bar in the left margin of the revised pages.

Revision 1 is issued to change the following in the Service Bulletin:

- The reference to the Quest Aircraft, LLC. Service Bulletin SB 13-11 was incorrect. The correct reference is Quest Aircraft, LLC. Service Bulletin SB 14-04.

This Service Bulletin is reissued in its entirety.

HARTZELL PROPELLER INC.

# **Service Bulletin**

TRANSMITTAL SHEET <u>HC-SB-30-352</u> Anti-ice - Replacement of Slinger Ring Assembly

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#### 1. Planning Information

- A. Effectivity
  - Hartzell Propeller Inc. HC-E4N-3P(Y)/D9511FSB propeller with anti-ice kit P/N 103726 installed on the Quest Aircraft, LLC. Kodiak 100 is affected by this Service Bulletin.
    - (a) Contact Quest Aircraft, LLC. for affected aircraft serial numbers.
- WARNING: DO NOT USE OBSOLETE OR OUTDATED INFORMATION. PERFORM ALL INSPECTIONS OR WORK IN ACCORDANCE WITH THE MOST RECENT REVISION OF THIS SERVICE BULLETIN. INFORMATION CONTAINED IN THIS SERVICE BULLETIN MAY BE SIGNIFICANTLY CHANGED FROM EARLIER REVISIONS. FAILURE TO COMPLY WITH THIS SERVICE BULLETIN OR THE USE OF OBSOLETE INFORMATION MAY CREATE AN UNSAFE CONDITION THAT MAY RESULT IN DEATH, SERIOUS BODILY INJURY, AND/OR SUBSTANTIAL PROPERTY DAMAGE. REFER TO THE SERVICE BULLETIN INDEX FOR THE MOST RECENT REVISION LEVEL OF THIS SERVICE BULLETIN.
- B. Concurrent Requirements
  - (1) Additional service documents may apply to the components/propellers affected by this Service Bulletin. Compliance with additional service documents may be necessary in conjunction with the completion of the Accomplishment Instructions in this Service Bulletin. Refer to the Hartzell Propeller Inc website at www.hartzellprop.com for a cross-reference of service documents.
- C. Reason
  - (1) The HC-E4N-3P(Y)/D9511FSB may have been modified in the field for installation of anti-ice kit P/N 103726 or may have shipped from Quest Aircraft, LLC. with the anti-ice kit P/N 103726 installed.
  - (2) Quest Aircraft, LLC. has received reports of contact between the beta arm and the slinger ring assembly resulting in damage to the slinger ring assembly.
  - (3) In extreme conditions, the damage may result in a malfunction of the anti-ice system.
  - (4) Hartzell Propeller Inc. Service Bulletin HC-SL-30-304, Revision 2 introduced a new anti-ice kit P/N 105395 with new installation instructions. Installation of the anti-ice kit P/N 105395 will prevent contact between the beta arm and the slinger ring assembly.

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- D. Description
  - (1) This document provides Additional Maintenance Information (AMI).
  - (2) This Service Bulletin and Quest Aircraft, LLC. Field Service Instruction FSI-084 provide instructions for removal of the slinger ring assembly installed in anti-ice kit P/N 103726 and installation of the a new slinger ring assembly in anti-ice kit P/N 105395.
  - (3) Quest Aircraft, LLC. Service Bulletin SB 14-04 and Field Service Instruction FSI-074 provide instructions for inspection of the anti-ice installation for clearance between the beta arm and the slinger ring assembly.
  - (4) Quest Aircraft, LLC. Service Bulletin SB 14-04 and Field Service Instruction FSI-074 provide compliance requirements if damage or incorrect clearance between the beta arm and the slinger ring assembly is found.
- E. Compliance
  - At next propeller overhaul or as required in accordance with Quest Aircraft, LLC. Service Bulletin SB 14-04, replace the slinger ring in accordance with the Accomplishment Instructions in this Service Bulletin.
- F. Approval

- (1) This technical document is approved by Hartzell Propeller Inc.
- G. Manpower
  - (1) Refer to Quest Aircraft, LLC. Field Service Instruction FSI-074 for man-hour requirements.
- H. Weight and Balance

Not Changed

I. Electrical Load

Not Changed

## Anti-ice - Replacement of Slinger Ring Assembly

<u>CAUTION</u>: DO NOT USE OBSOLETE OR OUTDATED INFORMATION. PERFORM ALL INSPECTIONS OR WORK IN ACCORDANCE WITH THE MOST RECENT REVISION OF ALL DOCUMENTS.

### J. References

- (1) Hartzell Propeller Inc, Metal Spinner Maintenance Manual 127 (61-16-27)
- (2) Hartzell Propeller Inc. Owner's Manual 149 (61-00-49)
- (3) Hartzell Propeller Inc. Four Blade Lightweight Turbine Propeller Overhaul Manual 143 (61-10-43)
- (4) Hartzell Propeller Inc. Ice Protection System Manual 180 (30-61-80)
- (5) Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02)
- (6) Hartzell Propeller Inc. Service Letter HC-SL-30-304
- (7) Quest Aircraft, LLC. Service Bulletin SB 14-04
- (8) Quest Aircraft, LLC. Field Service Instructions FSI-074
- (9) Quest Aircraft, LLC. Field Service Instructions FSI-084
- K. Other Publications Affected
  - (1) Hartzell Propeller Inc. Owner's Manual 149 (61-00-49)
  - (2) Hartzell Propeller Inc. Ice Protection System Manual 180 (30-61-80)
  - (3) Hartzell Propeller Inc. Ice Protection System Component Maintenance Manual 181 (30-60-81)

### 2. Material Information

- A. Material Necessary for Each Propeller/Component:
  - Parts necessary for replacement of the slinger ring assembly -Replacement Kit 105584

<u>Item</u>	Part Number	Description	<u>Qty</u>
<u>Number</u>			
1	7931-13025-06	Slinger Ring Assembly	1
8	7931-13025-11	Special Stud	4
11	B-3834-0632	Washer, Corrosion Resistant	4
12	B-3840-10	Screw, 10-32, Fillister Head	4
13	B-3837-0363	Washer	4
n/a	C-3317-230	O-ring, Propeller-to-Engine Seal	1



### Anti-ice System Components Figure 1

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## Anti-ice - Replacement of Slinger Ring Assembly

B. Parts Contained in Complete Hartzell Propeller Inc. Anti-Ice Kit 105395 (For Reference Only)

<u>Item</u> Number	<u>Keyword</u>	Description	<u>Qty</u>
1	7931-13025-06	Slinger Ring Assembly	1
2	7931-13025-05	Feed Tube, Prop Blade	4
3	B-3834-0663	Washer	4
4	A-2433	Bolt, 3/8-24, Hex-Head	4
5	B-3834-0632	Washer, Corrosion Resistant	4
6	A-2043-1	Nut, Hex, Self-Locking	4
7	7931-4587-03	P-Clip	4
8	7931-13025-11	Special Stud	4
9	A-2246-4	Spacer	4
10	7931-ZN4856	Nut	4
11	B-3834-0632	Washer, Corrosion Resistant	4
12	B-3840-10	Screw, 10-32, Fillister Head	4
13	B-3837-0363	Washer	4

- C. Expendables Locally procured
  - (1) 0.032 inch (0.81 mm) Stainless steel safety wire
  - (2) Abrasive pad (CM47)
  - (3) Masking material
  - (4) Cotton swab
  - (5) Approved solvents:
    - (a) Methyl-Ethyl-Keytone (CM106)
    - (b) Acetone (CM11)
    - (c) Toluene (CM41)
    - (d) Isopropyl Alcohol (CM183)
    - (e) Methyl-Propyl-Keytone (CM219)
  - (6) Sealant, PRC-Desoto International, PR1422A-1/2 or PR1440A-1/2 (CM161)
  - (7) Clean lint free cloth
  - (8) Anti-seize compound (CM118)
    - NOTE 1: Contents of one container of sealant CM161 (4 oz.) is sufficient to bond the slinger ring assemblies on two propeller assemblies.
    - <u>NOTE 2</u>: All CM numbers or materials in this Service Bulletin refer to the Consumable Materials chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Unfeather Tool Installed Figure 2

### Anti-ice - Replacement of Slinger Ring Assembly

- D. Special Tooling
  - (1) Safety wire pliers
  - (2) Torque wrench
  - (3) Torque screw driver
  - (4) Torque wrench adapter\*
  - (5) Unfeather Tool\*
  - (6) Blade angle protractor
  - (7) Feeler gauge or measure
  - (8) Hoist and sling (rated up to 800 LBS (363 KG)
- Locally procured Locally procured Locally procured Hartzell Propeller Inc. P/N AST-2877 Hartzell Propeller Inc. P/N 9943HART-001 Locally procured Locally procured Locally procured
- (9) Beta retraction tool
  \* Contact Quest Aircraft, LLC. for availability of tools.
- 3. Accomplishment Instructions
  - A. Removal and replacement of the slinger ring assembly may be performed by a certified aircraft mechanic with an appropriate rating.
  - B. Remove the spinner dome in accordance with Hartzell Propeller Inc. Owner's Manual 149 (61-00-49) and set it aside.
    - (1) Remove the forward bulkhead and spacers from the forward end of the cylinder.
    - (2) Retain all screws, spacers, and forward bulkhead.

<u>CAUTION 1</u>: WHEN REMOVING THE PROPELLER FROM THE AIRCRAFT, DO NOT DAMAGE THE ICE PROTECTION SYSTEM COMPONENTS.

- <u>CAUTION 2</u>: TO PREVENT DAMAGE TO THE BLADE AND BLADE PAINT, WRAP THE BLADE SHANKS IN SEVERAL LAYERS OF MASKING OR DUCT TAPE.
- C. With a suitable crane hoist and sling and using the beta retraction tool, remove the propeller from the engine in accordance with Hartzell Propeller Inc. Owner's Manual 149 (61-00-49).

## Anti-ice - Replacement of Slinger Ring Assembly

- <u>CAUTION</u>: DO NOT PERMIT THE PROPELLER TO REST ON THE BETA RING.
- D. Put the propeller on a large, padded open container with the bulkhead resting on the edge of the container. Do not remove the hoist.
  - (1) Make sure the edges of the container are padded to protect the bulkhead.

#### <u>CAUTION</u>: DO NOT ATTEMPT TO MOVE THE PROPELLER BLADES BEYOND THE LOW PITCH MECHANICAL STOPS, IF APPLICABLE.

- E. Remove the beta retraction tool.
- F. Install propeller unfeather tool part number 9943HART-001 or equivalent on the propeller.
- G. Using the unfeather tool part number 9943HART-001, position the blades to permit access to the special studs (8), screws (12), nuts (10), and washers (13).
  - (1) Turn the threaded rod of the tool onto the end of the pitch change rod as far as possible.
  - (2) Hand tighten the threaded rod.
  - (3) Put the cylindrical portion of the tool over the threaded rod and put it against the propeller cylinder.
  - (4) Apply a small amount of anti-seize compound, CM118, to the threads of the 1-1/2 inch nut of the unfeather tool.
  - (5) Turn the 1-1/2 inch nut onto the threaded rod of the unfeather tool until the nut contacts the thrust bearing.
  - (6) Do not remove the unfeather tool from the propeller at this time.
- H. Loosen the bulkhead from the propeller
  - (1) Using the hoist, lift the propeller with the cylinder side facing up to permit access to both sides of the bulkhead.
  - (2) Remove and discard the safety wire from the special stud (8), screws (12), nuts (10). Refer to Figure 3.
  - (3) Remove and discard the screw (12) that attach the slinger ring assembly to the spinner bulkhead.
  - (4) Remove the nut (10) from the special stud (8). The nut may remain on the travel tube.



Safety Wire on Nut, Screw, and Special Stud Figure 3

- (5) Remove and keep the screws and washers that attach the bulkhead to the propeller hub.
- (6) Lowering the bulkhead onto the beta ring, move the travel tube away from the special stud (8).
- (7) Using two of the screws and two washers previously used to attach the bulkhead to the propeller hub, attach the bulkhead to the propeller hub.
- (8) Tighten the screws but do not torque.
- (9) Remove and discard the special studs (8) from the bulkhead.
- I. Removal and Installation of the Slinger Ring Assembly
  - (1) Rotate the propeller to permit the cylinder-side of the propeller to be down.
    - <u>NOTE</u>: The propeller must be positioned with the propeller cylinder-side down to remove the slinger ring assembly. This will provide access to the engine-side of the bulkhead.
    - <u>CAUTION</u>: DO NOT DAMAGE THE BULKHEAD WHEN REMOVING THE SLINGER RING ASSEMBLY FROM THE SPINNER BULKHEAD.
    - (a) There are multiple methods to separate the slinger ring assembly from the spinner bulkhead.
    - (b) Hartzell Propeller Inc. recommends the use of a metal or plastic wedge or similar tools and a rubber mallet.
    - (c) Using the wedges and the rubber mallet, separate the slinger ring assembly (1) from the bulkhead.
      - <u>1</u> If the bulkhead is scratched, gouged, or damged during removal of the slinger ring assembly, refer to Hartzell Propeller Inc, Metal Spinner Maintenance Manual 127 (61-16-27).
    - (d) Remove and discard the slinger ring assembly (1).



Spinner Bulkhead Holes That Require Repair Figure 4

### Anti-ice - Replacement of Slinger Ring Assembly

- WARNING: ADHESIVES AND SOLVENTS ARE FLAMMABLE AND TOXIC TO THE SKIN, EYES, AND RESPIRATORY TRACT. SKIN AND EYE PROTECTION ARE REQUIRED. AVOID PROLONGED CONTACT AND BREATHING OF VAPORS. USE SOLVENT RESISTANT GLOVES TO MINIMIZE SKIN CONTACT AND WEAR SAFETY GLASSES FOR EYE PROTECTION. USE IN A WELL VENTILATED AREA AWAY FROM SPARKS AND FLAME. READ AND OBSERVE ALL WARNING LABELS.
- (e) Using the wedges, cleaning solvent and an abrasive pad, CM47 or equivalent, remove all remaining traces of sealant from the bulkhead.
- (f) Drill or ream the holes "A" perpendicular to the spinner bulkhead to a dimension of 0.402 0.411 inch (10.21 10.44 mm). Refer to Figure 4.
- (g) Drill or ream the holes "B" perpendicular to the spinner bulkhead to a dimension of 0.207 0.215 (5.25 5.46 mm). Refer to Figure 4.
- (2) Using the new slinger ring assembly (1), special studs (8), and screws (12) install the slinger ring assembly (1) on the spinner bulkhead.
  - (a) Using screws (12) attach the slinger ring to the spinner bulkhead.
  - (b) Install the special studs (8).
    - <u>1</u> If the special studs (8) or the screws (12) can be installed without interference, remove the slinger ring assembly from the spinner bulkhead and continue with Paragraph 3.I.(3).
    - <u>2</u> If the special studs (8) or the screws (12) can not be installed without interference, contact Hartzell Propeller Inc. Product Support.
- (3) Using cleaning solvent and an abrasive pad, CM47 or equivalent, clean the area of the spinner bulkhead for installation of the new slinger ring assembly (1).
- (4) Using cleaning solvent clean the mounting surface of the new slinger ring assembly (1).
- <u>CAUTION</u>: MAKE SURE THAT THE SEALANT CM161 DOES NOT CAUSE A BLOCKAGE TO THE FLUID FLOW HOLES IN THE BULKHEAD FOR THE FOUR SPECIAL STUDS (8) DURING ASSEMBLY. FLUID HOLES MAY BE CLEANED WITH A SOLVENT SOAKED COTTON SWAB OR SIMILAR DEVICE AS NEEDED.
  - (5) Using masking material, mask the fluid flow holes in the new slinger ring assembly (1) where the special studs (8) will be installed. Refer to Figure 5.



Masking of the Slinger Ring Assembly and Application of Sealant to Groove Figure 5



### Installing the Slinger Ring Assembly to Bulkhead Figure 6



### Securing the Slinger Ring Assembly to Bulkhead Figure 7

### (6) Mix the sealant CM161 in accordance with manufacturer's instructions.

(7) Apply the sealant CM161 to the groove in the new slinger ring assembly (1). The sealant should slightly over-fill the groove. Refer to Figure 5.

<u>NOTE</u>: Using a syringe is the easiest method to fill the groove in the new slinger ring assembly (1).

- (8) Put the slinger ring assembly (1) on the spinner bulkhead, aligning the holes in the new slinger ring assembly (1) with the applicable holes in the spinner bulkhead. Refer to Figure 6.
- (9) Apply sealant CM161 to four screws (12).
- (10) Using screws (12) and washers (13), attach the new slinger ring assembly (1) to the spinner bulkhead. Hand tighten but do not torque at this time. Refer to Figure 7.
- (11) Remove the masking material from the holes for the special stud in the slinger ring assembly (1).
- (12) Install the washer (11) on each of the four special studs (8).
- (13) Apply sealant CM161 to the threads of the four special studs (8).
- (14) Install the four special studs (8) with the washer (11) through the threaded holes in the spinner bulkhead and into the slinger ring assembly (1).
- (15) Using an alternating sequence, torque each special stud (8) to 81-99 In-Lbs (9.1-11.2 N•m).
- (16) Using an alternating sequence, torque each screw (12) to 15-20 In-Lbs (1.7-2.2 N•m).
- (17) Examine the seal line between the spinner bulkhead and the slinger ring assembly (1) for excessive sealant squeeze-out.
- (18) Using a gloved finger or a cloth dampened with an approved solvent, clean and smooth any excess sealant that squeezed out from around the screws (12), special studs (8) or between ID or OD of the slinger ring assembly (1) and the spinner bulkhead.
- (19) Remove the masking material from the fluid flow holes in the slinger ring assembly (1).





### Digital Blade Protractor Set to Zero on the Propeller Cylinder Figure 8



### Correct Installation of Feed Tube Figure 9







Feed Tube in the Incorrect Position to the Spinner Dome Figure 12

## Anti-ice - Replacement of Slinger Ring Assembly

- (20) Inspect the fluid holes and if required, use a cotton swab dampened with solvent to clean remove excess sealant that may block the flow of the anti-icing fluid.
- (21) Permit the sealant to dry for 6 to 8 hours. The spinner bulkhead/slinger ring assembly may be handled with care after 2 hours.
- J. Feed Tube Alignment
  - (1) Rotate the propeller so the cylinder side is facing up, to align the feed to tube the special stud (8).
  - (2) Remove and keep the two screws and two washers that attach the bulkhead to the propeller hub.
  - (3) Lower the bulkhead onto the beta ring.
  - (4) Slowly move the bulkhead up and adjust the position to permit alignment of the feed tubes (2) with the special studs (80).
  - (5) Align the feed tube (2) with the special stud (8).
    - (a) Hand tighten the nut (10) to engage one or two threads.
  - (6) Using the screws and washers previously used to attach the bulkhead to the propeller hub, attach the bulkhead to the propeller hub.
  - (7) Torque the bolts to 96-120 In-Lb (10.8-13.5 N•m).
  - (8) Install the propeller on a propeller build bench or the aircraft engine in accordance with Hartzell Propeller Inc. Owner's Manual 149 (61-00-49).
  - (9) Using the propeller unfeather tool part number 9943HART-001 or equivalent, set the blade angle. Refer to Figure 2.
    - (a) Zero the blade protractor on the cylinder of the propeller as shown in Figure 8.
    - (b) Measure the blade angle at the yellow tape located on the face side of the blade. Refer to Figure 8.
    - (c) Continue tightening the 1-1/2 inch nut until the blade angle measures 24 degrees.

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- <u>CAUTION</u>: DO NOT PERMIT THE SPECIAL STUD (8) TO ROTATE WHEN TORQUING THE NUT (10). IF THE SPECIAL STUD ROTATES, LEAKAGE MAY OCCUR BETWEEN THE SLINGER RING ASSEMBLY (1), THE SPECIAL STUD (8), AND THE SPINNER BULKHEAD.
- (d) If the alignment of the feed tube (2) to the anti-ice boot is equal to the requirements specified in Figure 9 and Figure 10:
  - <u>1</u> Hold the special stud (8) securely to prevent the special stud from rotating and tighten the nut (10) 1/4 to 1/2 turns after snug.
  - <u>2</u> Repeat the alignment for all remaining feed tubes (2).
  - <u>3</u> Safety wire the special stud (8), nut (10), and screw (12).
- (e) If the alignment of the feed tube (2) to the anti-ice boot is not equal to the requirements specified in Figure 9 and Figure 10:
  - <u>CAUTION 1</u>: DO NOT REMOVE ANY HUB CLAMPING BOLTS, NUTS, OR WASHERS.
  - <u>CAUTION 2</u>: LOOSEN ONLY ONE HUB CLAMPING BOLT AT A TIME. THE SEAL BETWEEN THE HUB HALVES MUST BE MAINTAINED.
  - <u>1</u> Loosen the applicable hub clamping bolt.
  - <u>2</u> Position the end of the feed tube (2) to the blade and the anti-ice boot as shown in Figure 9 and Figure 10.
  - 3 With the propeller at 24 degrees, align the opening of the feed tube (2) with the center rib of the anti-icing boot. Refer to Figure 9 and Figure 10 for the gap between the opening of the feed tube and the anti-ice boot and feed tube.
  - <u>4</u> Tighten the hub clamping bolt (4) until snug. Do not torque at the bolt at this time.
  - 5 Repeat the alignment for all remaining feed tubes (2), as required.
  - 6 Torque the hub clamping bolt (4) to 20-22 Ft-Lb (27-29 N•m), securing the feed tube (2).

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- <u>7</u> Hold the special stud (8) securely to prevent the special stud from rotating and tighten the nut (10) 1/4 to 1/2 turns after snug.
- 8 Safety wire the special stud (8), nut (10), and screw (12).
- (10) Remove the unfeather tool from the propeller.

#### K. Propeller Installation

(1) If applicable, install the propeller on the aircraft in accordance with Hartzell Propeller Inc. Owner's Manual 149 (61-00-49).

<u>CAUTION</u>: DO NOT PERMIT THE FEED TUBE TO CONTACT THE SPINNER DOME BLADE CUTOUT.

- (2) Put the spinner dome on the spinner bulkhead, aligning the attaching holes.
  - (a) Check for clearance between the feed tube (2) and the spinner dome blade cut-out. Refer to Figure 12.
  - (b) The feed tube (2) must not contact the spinner dome blade cut-out.
- (3) Remove the spinner dome.
- (4) Adjust the feed tubes (2) as needed to provide positive clearance with the spinner dome.
- (5) If alignment of the feed tubes (2) does not meet the requirements specified in Figure 9, Figure 10, Figure 11, or Figure 12, refer to steps 3.J.(e) in this Service Bulletin.
- (6) Using 0.032 inch (0.81 mm) diameter stainless steel wire, safety the nut (10) to the screws (12) and the special stud (8) as shown in Figure 3. Refer to NASM33540 for safety wiring.
- (7) Install the spinner dome in accordance with Hartzell Propeller Inc. Owner's Manual 149 (61-00-49).
- (8) Check for final clearance between the feed tube (2) and the spinner dome blade cut-out.
- (9) If the feed tube (2) contacts the spinner dome blade cut-out as shown in Figure 11 and Figure 12, remove the spinner dome and repeat the feed tube adjustment in accordance with the instructions provided in this Service Bulletin.

- L. Anti-icing System Maintenance
  - Maintain and inspect the components of the anti-icing system in accordance with Hartzell Propeller Inc. Ice Protection System Component Maintenance Manual 181 (30-60-81).