

HARTZELL PROPELLER INC.
One Propeller Place
Piqua, Ohio 45356-2634 U.S.A.
Telephone: 937.778.4200
Fax: 937.778.4391

HARTZELL

MANUAL REVISION TRANSMITTAL
Manual 115N (61-00-15)
Propeller Owner's Manual and Logbook

REVISION 21 dated March 2015

Attached is a copy of Revision 21 to Hartzell Manual 115N.

Page Control Chart for Revision 21:

Remove

Page No.

COVER/INSIDE COVER

REVISION HIGHLIGHTS

pages 5 thru 8

SERVICE DOCUMENTS LIST

pages 13 and 14

LIST OF EFFECTIVE PAGES

pages 21 thru 24

TABLE OF CONTENTS

pages 25 thru 34

INTRODUCTION

pages 1-1 and 1-2

pages 1-5 thru 1-16

INSTALLATION AND REMOVAL

pages 3-1 thru 3-4

pages 3-5 thru 3-14

pages 3-23 and 3-24

pages 3-27 thru 3-64

Insert

Page No.

COVER/INSIDE COVER

REVISION HIGHLIGHTS

pages 5 thru 8

SERVICE DOCUMENTS LIST

pages 13 and 14

LIST OF EFFECTIVE PAGES

pages 21 thru 24

TABLE OF CONTENTS

pages 25 thru 34

INTRODUCTION

pages 1-1 and 1-2

pages 1-5 thru 1-20

INSTALLATION AND REMOVAL

pages 3-1 thru 3-4

pages 3-4.1 and 3-4.2,

insert after page 3-4

pages 3-5 thru 3-14

pages 3-23 and 3-24

pages 3-27 thru 3-80

This page may be discarded after proper filing of the revision.

Page Control Chart for Revision 21, continued:

Remove

Insert

Page No.

Page No.

INSPECTION AND CHECK

INSPECTION AND CHECK

pages 5-1 and 5-2

pages 5-1 and 5-2
pages 5-10.1 and 5-10.2,
insert after page 5-10

pages 5-11 and 5-12

pages 5-11 and 5-12

MAINTENANCE PRACTICES

MAINTENANCE PRACTICES

pages 6-1 and 6-2

pages 6-1 and 6-2

pages 6-5 thru 6-12

pages 6-5 thru 6-12

pages 6-33 thru 6-38

pages 6-33 thru 6-46

NOTE 1: When the manual revision has been inserted in the manual, make a record of the information required on the Record of Revisions page in this manual.

NOTE 2: Pages distributed in this revision may include pages from previous revisions if they are on the opposite side of revised page. This is done as a convenience to those users who wish to print a two-sided copy of the new revision.

Manual No. 115N
61-00-15
Revision 21
March 2015

Propeller Owner's Manual and Logbook

“Compact” Models with Aluminum Blades

Constant Speed, Non-Counterweighted
()HC - ()Y() - 1()

Constant Speed, Counterweighted
()HC - ()Y() - 4()

Constant Speed and Feathering
()HC - ()Y() - 2()

Constant Speed and Feathering, Turbine
()HC - ()Y() - 5()

Hartzell Propeller Inc.

One Propeller Place
Piqua, OH 45356-2634 U.S.A.
Ph: 937-778-4200 (Hartzell Propeller Inc.)
Ph: 937-778-4379 (Product Support)
Product Support Fax: 937-778-4391

(This page is intentionally blank.)

REVISION HIGHLIGHTS

Revision 21, dated March 2015, incorporates the following:

- COVER
 - Revised to match the manual revision
- REVISION HIGHLIGHTS
 - Revised to match the manual revision
- SERVICE DOCUMENTS LIST
 - Revised to match the manual revision
- LIST OF EFFECTIVE PAGES
 - Revised to match the manual revision
- TABLE OF CONTENTS
 - Revised to match the manual revision
- INTRODUCTION
 - Revised to add the use of safety cable
 - Revised the section "Reference Publications"
 - Made other language/format changes
- INSTALLATION AND REMOVAL
 - Revised the section, "Tooling"
 - Revised to add the use of safety cable, where applicable
 - Revised Table 3-1, "Torque Table"
 - Revised the section "Installing a One-Piece Spinner Dome, Except Spinner Assembly C-3567-(4,8) With a D-7811-10(P) Spinner Dome" that incorporates Hartzell Propeller Inc. Service Letter HC-SL-61-230
 - Added as Figure 3-11, "Installing the Spacer Base and Spinner Mounting Spacers"
 - Added the section "Installing Spinner Assembly C-3567-(4,8) With a D-7811-10(P) Spinner Dome" that incorporates Hartzell Propeller Inc. Service Bulletin HC-SB-61-353
 - Added as Figure 3-12, "Install the Plastic Forward Bulkhead and Pre-fit the Spinner Dome"
 - Added as Figure 3-13, "Spinner Dome Mounting Hole Alignment"
 - Renumbered the remaining figures

REVISION HIGHLIGHTS, CONTINUED

- INSTALLATION AND REMOVAL, CONTINUED
 - Revised Figure 3-14, "Two-Piece Spinner Mounting (Procedure 1)" to correct callout arrow positions
 - Made other language/format changes
- INSPECTION AND CHECK
 - Added the section, "Low Pitch Stop Hardware Inspection for a PHC-C3YF-2UF/FC7693DFB Propeller" that incorporates Hartzell Propeller Inc. Service Bulletin HC-SB-61-267
 - Made other language/format changes
- MAINTENANCE PRACTICES
 - Added information about 45 degree lubrication fittings that incorporates Hartzell Propeller Inc. Service Letter HC-SL-61-187
 - Added as Figure 6-9, "Low Pitch Stop Adjustment (-2, -5) For Propellers That Use a One-piece Spinner Dome"
 - Added the section "Feathering (-2, -5) Low Pitch Stop Adjustment, For Propellers That Use a One-piece Spinner Dome"
 - Added as Figure 6-10, "Hex Nut Configuration"
 - Added the section "Modification of the Low Pitch Stop Hardware"
 - Made other language/format changes

REVISIONS HIGHLIGHTS**1. Introduction****A. General**

This is a list of current revisions that have been issued against this manual. Please compare it to the RECORD OF REVISIONS page to ensure that all revisions have been added to the manual.

B. Components

- (1) Revision No. indicates the revisions incorporated in this manual.
- (2) Issue Date is the date of the revision.
- (3) Comments indicates the level of the revision.
 - (a) New Issue is a new manual distribution. The manual is distributed in its entirety. All the page revision dates are the same and no change bars are used.
 - (b) Reissue is a revision to an existing manual that includes major content and/or major format changes. The manual is distributed in its entirety. All the page revision dates are the same and no change bars are used.
 - (c) Major Revision is a revision to an existing manual that includes major content or minor content changes over a large portion of the manual. The manual is distributed in its entirety. All the page revision dates are the same, but change bars are used to indicate the changes incorporated in the latest revision of the manual.
 - (d) Minor Revision is a revision to an existing manual that includes minor content changes to the manual. Only the revised pages of the manual are distributed. Each page retains the date and the change bars associated with the last revision to that page.

<u>Revision No.</u>	<u>Issue Date</u>	<u>Comments</u>
Rev. 5	Jan/99	Major Revision
Rev. 6	Sep/00	Minor Revision
Rev. 7	Oct/02	Major Revision
Rev. 8	Jun/03	Minor Revision
Rev. 9	Aug/03	Minor Revision
Rev. 10	Nov/03	Minor Revision
Rev. 11	Dec/04	Minor Revision
Rev. 12	Apr/05	Minor Revision
Rev. 13	Aug/06	Minor Revision
Rev. 14	Jan/09	Minor Revision
Rev. 15	Jul/09	Minor Revision
Rev. 16	Oct/09	Minor Revision
Rev. 17	Jul/12	Minor Revision
Rev. 18	Feb/13	Minor Revision
Rev. 19	Nov/13	Minor Revision
Rev. 20	Mar/14	Minor Revision
Rev. 21	Mar/15	Minor Revision

SERVICE DOCUMENTS LIST

CAUTION 1: DO NOT USE OBSOLETE OR OUTDATED INFORMATION. PERFORM ALL INSPECTIONS OR WORK IN ACCORDANCE WITH THE MOST RECENT REVISION OF THE SERVICE DOCUMENT. INFORMATION CONTAINED IN A SERVICE DOCUMENT MAY BE SIGNIFICANTLY CHANGED FROM EARLIER REVISIONS. 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 APPLICABLE SERVICE DOCUMENT INDEX FOR THE MOST RECENT REVISION LEVEL OF THE SERVICE DOCUMENT.

CAUTION 2: THE INFORMATION FOR THE DOCUMENTS LISTED INDICATES THE REVISION LEVEL AND DATE AT THE TIME THAT THE DOCUMENT WAS INITIALLY INCORPORATED INTO THIS MANUAL. INFORMATION CONTAINED IN A SERVICE DOCUMENT MAY BE SIGNIFICANTLY CHANGED FROM EARLIER REVISIONS. REFER TO THE APPLICABLE SERVICE DOCUMENT INDEX FOR THE MOST RECENT REVISION LEVEL OF THE SERVICE DOCUMENT.

Service Document Number	Incorporation Rev/Date
Service Bulletins	
HC-SB-61-286	Rev. 11, Dec/04
HC-SB-61-244	Rev. 17, Jul/12
HC-SB-61-267	Rev. 21, Mar/15
HC-SB-61-325	Rev. 17, Jul/12
HC-SB-61-353	Rev. 21, Mar/15

LIST OF EFFECTIVE PAGES

Chapter	Page	Revision	Date
Cover	Cover and Inside Cover	Rev. 21	Mar/15
Message	1 thru 4	Rev. 6	Sep/00
Revision Highlights	5 thru 8	Rev. 21	Mar/15
Record of Revisions	9 and 10	Rev. 6	Sep/00
Record of Temporary Revisions	11 and 12	Rev. 6	Sep/00
Service Documents List	13 and 14	Rev. 21	Mar/15
Airworthiness Limitations	15 thru 20	Rev. 19	Nov/13
List of Effective Pages	21 thru 24	Rev. 21	Mar/15
Table of Contents	25 thru 34	Rev. 21	Mar/15
Introduction	1-1 and 1-2	Rev. 21	Mar/15
Introduction	1-3 and 1-4	Rev. 18	Feb/13
Introduction	1-5	Rev. 17	Jul/12
Introduction	1-6 thru 1-20	Rev. 21	Mar/15
Description and Operation	2-1	Rev. 17	Jul/12
Description and Operation	2-2	Rev. 14	Jan/09
Description and Operation	2-3 thru 2-12	Rev. 13	Aug/06
Description and Operation	2-13	Rev. 14	Jan/09
Description and Operation	2-14	Rev. 13	Aug/06
Description and Operation	2-15	Rev. 7	Oct/02
Description and Operation	2-16	Rev. 20	Mar/14
Description and Operation	2-17	Rev. 12	Apr/05
Description and Operation	2-18	Rev. 15	Jul/09
Description and Operation	2-19	Rev. 12	Apr/05
Description and Operation	2-20	Rev. 20	Mar/14
Description and Operation	2-21 and 2-22	Rev. 16	Oct/09
Description and Operation	2-23	Rev. 12	Apr/05
Description and Operation	2-24	Rev. 16	Oct/09
Description and Operation	2-25 and 2-26	Rev. 17	Jul/12
Description and Operation	2-27 and 2-28	Rev. 14	Jan/09
Description and Operation	2-29 thru 2-31	Rev. 17	Jul/12
Description and Operation	2-32	Rev. 12	Apr/05
Installation and Removal	3-1 thru 3-4	Rev. 21	Mar/15
Installation and Removal	3-4.1 and 3-4.2	Rev. 21	Mar/15
Installation and Removal	3-5	Rev. 21	Mar/15
Installation and Removal	3-6	Rev. 14	Jan/09
Installation and Removal	3-7	Rev. 21	Mar/15
Installation and Removal	3-8	Rev. 14	Jan/09
Installation and Removal	3-9	Rev. 21	Mar/15

LIST OF EFFECTIVE PAGES

Chapter	Page	Revision	Date
Installation and Removal	3-10	Rev. 14	Jan/09
Installation and Removal	3-11	Rev. 21	Mar/15
Installation and Removal	3-12	Rev. 14	Jan/09
Installation and Removal	3-13	Rev. 21	Mar/15
Installation and Removal	3-14	Rev. 14	Jan/09
Installation and Removal	3-15	Rev. 17	Jul/12
Installation and Removal	3-16	Rev. 14	Jan/09
Installation and Removal	3-17	Rev. 17	Jul/12
Installation and Removal	3-18	Rev. 15	Jul/09
Installation and Removal	3-19 and 3-20	Rev. 14	Jan/09
Installation and Removal	3-21	Rev. 17	Jul/12
Installation and Removal	3-22	Rev. 14	Jan/09
Installation and Removal	3-23 and 3-24	Rev. 21	Mar/15
Installation and Removal	3-25 and 3-26	Rev. 14	Jan/09
Installation and Removal	3-27	Rev. 17	Jul/12
Installation and Removal	3-28 thru 3-80	Rev. 21	Mar/15
Testing and Troubleshooting	4-1 thru 4-4	Rev. 20	Mar/14
Testing and Troubleshooting	4-5	Rev. 14	Jan/09
Testing and Troubleshooting	4-6	Rev. 17	Jul/12
Testing and Troubleshooting	4-7	Rev. 14	Jan/09
Testing and Troubleshooting	4-8 thru 4-10	Rev. 17	Jul/12
Testing and Troubleshooting	4-11 thru 4-14	Rev. 14	Jan/09
Inspection and Check	5-1	Rev. 21	Mar/15
Inspection and Check	5-2 thru 5-10	Rev. 17	Jul/12
Inspection and Check	5-10.1 and 5-10.2	Rev. 21	Mar/15
Inspection and Check	5-11	Rev. 21	Mar/15
Inspection and Check	5-12 thru 5-30	Rev. 17	Jul/12
Maintenance Practices	6-1 and 6-2	Rev. 17	Jul/12
Maintenance Practices	6-3	Rev. 17	Jul/12
Maintenance Practices	6-4	Rev. 14	Jan/09
Maintenance Practices	6-5	Rev. 21	Mar/15
Maintenance Practices	6-6	Rev. 14	Jan/09
Maintenance Practices	6-7 thru 6-11	Rev. 21	Mar/15
Maintenance Practices	6-12	Rev. 14	Jan/09
Maintenance Practices	6-13 thru 6-15	Rev. 17	Jul/12
Maintenance Practices	6-16	Rev. 16	Oct/09
Maintenance Practices	6-16.1 and 6-16.2	Rev. 16	Oct/09
Maintenance Practices	6-17	Rev. 16	Oct/09

LIST OF EFFECTIVE PAGES

<u>Chapter</u>	<u>Page</u>	<u>Revision</u>	<u>Date</u>
Maintenance Practices	6-18	Rev. 14	Jan/09
Maintenance Practices	6-19 thru 6-21	Rev. 17	Jul/12
Maintenance Practices	6-22	Rev. 14	Jan/09
Maintenance Practices	6-23 thru 6-26	Rev. 17	Jul/12
Maintenance Practices	6-27 and 6-28	Rev. 14	Jan/09
Maintenance Practices	6-29	Rev. 17	Jul/12
Maintenance Practices	6-30 and 6-31	Rev. 14	Jan/09
Maintenance Practices	6-32 and 6-33	Rev. 17	Jul/12
Maintenance Practices	6-34 thru 6-46	Rev. 21	Mar/15
Anti-Ice and De-Ice Systems	7-1 thru 7-3	Rev. 14	Jan/09
Anti-Ice and De-Ice Systems	7-4	Rev. 13	Aug/06
Anti-Ice and De-Ice Systems	7-5 thru 7-8	Rev. 14	Jan/09
Records	8-1 thru 8-4	Rev. 14	Jan/09

(This page is intentionally blank.)

TABLE OF CONTENTS

MESSAGE.....	1
REVISION HIGHLIGHTS	5
RECORD OF REVISIONS	9
RECORD OF TEMPORARY REVISIONS.....	11
SERVICE DOCUMENTS LIST	13
AIRWORTHINESS LIMITATIONS	15
LIST OF EFFECTIVE PAGES	23
TABLE OF CONTENTS.....	27
INTRODUCTION.....	1-1
1. Purpose.....	1-3
2. Airworthiness Limitations	1-4
3. Airframe or Engine Modifications	1-4
4. Restrictions and Placards	1-5
5. General	1-5
A. Personnel Requirements	1-5
B. Maintenance Practices	1-5
C. Continued Airworthiness.....	1-8
D. Propeller Critical Parts.....	1-9
6. Reference Publications	1-10
A. Hartzell Propeller Inc. Publications.....	1-10
B. References to Hartzell Propeller Inc. Publications	1-12
7. Definitions	1-13
8. Abbreviations	1-17
9. Hartzell Propeller Inc. Product Support.....	1-18
10. Warranty Service.....	1-18
11. Hartzell Propeller Inc. Recommended Facilities	1-19

TABLE OF CONTENTS, CONTINUED

DESCRIPTION AND OPERATION	2-1
1. Description of Propeller and Systems.....	2-3
A. System Overview.....	2-3
2. Functional Description of Constant Speed Propeller Types.....	2-5
A. Constant Speed, Non-Counterweighted Propellers ()HC-()()Y()-1()	2-5
B. Constant Speed, Feathering Propellers ()HC-()()Y()-2()	2-7
C. Constant Speed, Counterweighted (Aerobatic) Propellers ()HC-()()Y()-4()	2-11
D. Constant Speed, Feathering, Turbine Propellers ()HC-()()Y()-5()	2-13
3. Model Designation	2-16
A. Aluminum Hub Propeller Model Identification.....	2-16
B. Aluminum Blade Model Identification	2-20
4. Governors	2-23
A. Theory of Operation.....	2-23
B. Governor Types	2-26
C. Identification of Hartzell Propeller Inc. Governors	2-26
5. Accumulator	2-29
A. System Overview.....	2-29
6. Propeller Ice Protection Systems.....	2-31
A. Propeller Anti-ice System	2-31
B. Propeller De-ice System.....	2-32
INSTALLATION AND REMOVAL	3-1
1. Tools, Consumables, and Expendables.....	3-4.1
A. Tooling	3-4.1
B. Consumables.....	3-5
C. Expendables.....	3-5
2. Pre-Installation	3-9
A. Inspection of Shipping Package	3-9
B. Uncrating	3-9

TABLE OF CONTENTS, CONTINUED

C.	Inspection after Shipment.....	3-9
D.	Reassembly of a Propeller Disassembled for Shipment ...	3-9
E.	Air Charge Pressure Check (-2 and -5 Propellers).....	3-9
3.	Spinner Pre-Installation.....	3-11
A.	General.....	3-11
B.	Installation of a Metal Spinner Bulkhead on the Propeller Hub	3-13
C.	Installation of a Composite Spinner Bulkhead on a Propeller Hub - Refer to Table 3-3 and Figure 3-5	3-15
D.	Spinner Adapter to Starter Ring Gear Installation	3-17
4.	Propeller Installation	3-19
A.	Flange Description.....	3-19
B.	Installation of “D” Flange Propellers	3-21
C.	Installation of “F” Flange Propellers.....	3-27
D.	Installation of “N” Flange Propellers	3-31
E.	Installation of “L” Flange Propellers, Except Model HC-E2YL-()	3-37
F.	Installation of HC-E2YL-() Propellers	3-42
G.	Installation of “K” and “R” Flange Propellers	3-46
5.	Damper Installation	3-51
A.	Installation of C-1576 Damper (Hartzell Propeller Inc. Kit A-1583).....	3-51
6.	Spinner Installation	3-51
A.	Installing a Single Piece Spinner Dome, Except Spinner Assembly C-3567-(4,8) With a D-7811-10(P) Spinner Dome.....	3-51
B.	Installing Spinner Assembly C-3567-(4,8) With a D-7811-10(P) Spinner Dome	3-55
C.	Installing a Two-Piece Spinner Dome (Procedure 1).....	3-62
D.	Installing a Two-Piece Spinner Dome (Procedure 2).....	3-65
7.	Post-Installation Checks	3-67
8.	Spinner Removal	3-67
A.	Removal of Single Piece Spinner.....	3-67

TABLE OF CONTENTS, CONTINUED

B.	Removal of Two-Piece Spinner	3-67
C.	Hub Mounted Spinner Bulkhead Removal	3-67
D.	Starter Ring Gear Spinner Adapter Removal	3-67
9.	Propeller Removal	3-68
A.	Removal of "D" Flange Propellers	3-68
B.	Removal of "F" Flange Propellers.....	3-70
C.	Removal of "N" Flange Propellers	3-72
D.	Removal of "L" Flange Propellers, Except Model HC-E2YL-().....	3-74
E.	Removal of HC-E2YL-() Propellers	3-76
F.	Removal of "K" and "R" Flange Propellers	3-78

TESTING AND TROUBLESHOOTING 4-1

1.	Operational Tests	4-3
A.	Initial Run-Up.....	4-3
B.	Static RPM Check	4-3
C.	Post-Run Check	4-4
2.	Propeller Ice Protection Systems.....	4-5
A.	Electric De-ice System	4-5
B.	Anti-ice System.....	4-5
3.	Troubleshooting	4-6
A.	Hunting and Surging.....	4-6
B.	Engine Speed Varies with Flight Attitude (Airspeed)	4-6
C.	Loss of Propeller Control (-1 propellers only).....	4-8
D.	Loss of Propeller Control (-2, -4 or -5 propellers).....	4-8
E.	Failure to Feather or Feathers Slowly (-2 or -5 propellers only)	4-9
F.	Failure to Unfeather.....	4-9
G.	Start Locks (Anti-feather Latches) Fail to Latch on Shutdown (-2 and some -5 feathering propellers only)....	4-10
H.	Vibration	4-11

TABLE OF CONTENTS, CONTINUED

I. Propeller Overspeed.....	4-12
J. Propeller Underspeed.....	4-13
K. Oil or Grease Leakage	4-13
INSPECTION AND CHECK.....	5-1
1. Pre-Flight Checks	5-3
2. Post-Flight Checks.....	5-4
A. HC-C2YR-2CLUF/FLC7666A-4 Propellers Installed on OMA SUD Skycar Aircraft.....	5-4
3. Operational Checks	5-5
4. Required Periodic Inspections and Maintenance.....	5-7
A. Periodic Inspections	5-7
B. Blade Inspection for an HC-C2YR-2CLUF/FLC7666A-4 Propeller Installed on OMA SUD Skycar Aircraft.....	5-9
C. Spinner Bulkhead Inspection for an HC-E3YR-1RF Propeller Installed on S.N.A. Inc. Seawind Aircraft.....	5-10
D. Low Pitch Stop Hardware Inspection for a PHC-C3YF-2UF/FC7693DFB Propeller	5-10.1
E. Periodic Maintenance	5-11
F. Airworthiness Limitations.....	5-11
G. Overhaul Periods.....	5-11
5. Inspection Procedures	5-14
A. Blade Damage.....	5-14
B. Grease or Oil Leakage	5-14
C. Vibration	5-16
D. Tachometer Inspection	5-18
E. Blade Track.....	5-19
F. Loose Blades.....	5-20
G. Corrosion	5-20
H. Spinner Damage.....	5-21
I. Electric De-ice System	5-21
J. Anti-ice System.....	5-21

TABLE OF CONTENTS, CONTINUED

6. Special Inspections	5-25
A. Overspeed/Overtorque	5-25
B. Lightning Strike	5-26
C. Foreign Object Strike	5-27
D. Fire Damage or Heat Damage	5-29
7. Long Term Storage	5-29

MAINTENANCE PRACTICES..... 6-1

1. Cleaning	6-3
A. General Cleaning	6-3
B. Spinner Cleaning and Polishing	6-5
2. Lubrication	6-5
A. Lubrication Intervals	6-5
B. Lubrication Procedure	6-7
C. Approved Lubricants	6-10
3. Air Charge (-2 and -5 Propellers)	6-11
A. Charging the Propeller	6-11
B. Basic pressures	6-13
4. Unfeathering Accumulator Air Charge	6-19
A. Charging a Hartzell Propeller Inc. Accumulator	6-19
5. Blade Repairs	6-21
A. Repair of Nicks or Gouges	6-21
B. Repair of Bent Blades	6-24
6. Painting After Repair	6-25
A. General	6-25
B. Painting of Aluminum Blades	6-26
7. Dynamic Balance	6-29
A. Overview	6-29
B. Inspection Procedures Before Balancing	6-30
C. Modifying Spinner Bulkhead to Accommodate Dynamic Balance Weights	6-31
D. Placement of Balance Weights for Dynamic Balance	6-32

8.	Propeller Low Pitch Setting	6-33
A.	Low Pitch Stop - All Propeller Models.....	6-33
B.	Max. RPM (Static) Low Pitch Stop Adjustment.....	6-35
C.	Modification of the Low Pitch Stop Hardware	6-43
9.	Propeller High Pitch Settings	6-46
A.	High Pitch (Min. RPM) Stop or Feathering Pitch Stop.....	6-46
10.	Start Lock Settings.....	6-46
A.	Start Lock Pitch Stop	6-46
11.	Propeller Ice Protection Systems.....	6-46
A.	Electric De-ice System	6-46
B.	Anti-ice System.....	6-46
	ANTI-ICE AND DE-ICE SYSTEMS	7-1
1.	Introduction	7-3
A.	Propeller De-ice System.....	7-3
B.	Propeller Anti-ice System	7-3
2.	System Description	7-4
A.	De-ice System	7-4
B.	Anti-ice System.....	7-5
3.	De-ice System Functional Tests.....	7-6
4.	Anti-ice System Functional Tests	7-6
5.	De-ice and Anti-ice System Inspections.....	7-7
A.	De-ice System Inspections	7-7
B.	Anti-ice System Inspections	7-7
6.	De-ice and Anti-ice System Troubleshooting	7-8
A.	De-ice System Troubleshooting.....	7-8
B.	Anti-ice System Troubleshooting	7-8
	RECORDS	8-1
1.	Introduction	8-3
2.	Record Keeping	8-3
A.	Information to be Recorded	8-3

LIST OF FIGURES

Cutaway of -1 Series Constant Speed Non-Counterweighted Propeller ()HC-()Y()-1().....	Figure 2-1.....	2-4
Cutaway of -2 Series Constant Speed Feathering Propeller ()HC-()Y()-2.....	Figure 2-2.....	2-6
Cutaway of -4 Series Constant Speed, Counterweighted (Aerobatic) Propeller ()HC-()Y()-4().....	Figure 2-3.....	2-10
Cutaway of -5 Series Constant Speed, Feathering Turbine Propeller ()HC-()Y()-5().....	Figure 2-4.....	2-12
Governor in Onspeed Condition.....	Figure 2-5.....	2-22
Governor in Underspeed Condition.....	Figure 2-6.....	2-22
Governor in Overspeed Condition.....	Figure 2-7.....	2-22
Feathering Governor.....	Figure 2-8.....	2-24
Synchronizer/Synchrophaser Governor.....	Figure 2-9.....	2-24
Governor/Accumulator System.....	Figure 2-10.....	2-28
Determining Torque Value When Using Torquing Adapter.....	Figure 3-1.....	3-6
Diagram of Torquing Sequence for Propeller Mounting Hardware.....	Figure 3-2.....	3-8
Hub Clamping Bolt Location.....	Figure 3-3.....	3-10
■ Metal Spinner Bulkhead and Spinner Mounting (Hub Mounted Spinner).....	Figure 3-4.....	3-12
Composite Bulkhead and Spinner Mounting (Hub Mounted Spinner).....	Figure 3-5.....	3-14
Spinner Adapter and Spinner Mounting (Starter Ring Gear Mount).....	Figure 3-6.....	3-16
“D” Flange Propeller Mounting.....	Figure 3-7.....	3-20
“F” and “N” Flange Propeller Mounting.....	Figure 3-8.....	3-26

LIST OF FIGURES, CONTINUED

“L,” “K,” and “R” Flange Propeller Mounting	Figure 3-9.....	3-36
Damper Installation	Figure 3-10.....	3-50
Installing the Spacer Base and Spinner Mounting Spacers.....	Figure 3-11	3-54
Install the Plastic Forward Bulkhead and Pre-fit the Spinner Dome.....	Figure 3-12.....	3-56
Spinner Dome Mounting Hole Alignment.....	Figure 3-13.....	3-58
Two-Piece Spinner Mounting (Procedure 1).....	Figure 3-14.....	3-62
Two-Piece Spinner Mounting (Procedure 2).....	Figure 3-15	3-64
Spinner Dome to Bulkhead Mounting Hole Alignment	Figure 3-16.....	3-64
Checking Blade Track.....	Figure 5-1	5-18
Blade Play	Figure 5-2.....	5-18
Reciprocating Engine Overspeed Limits	Figure 5-3.....	5-22
Turbine Engine Overspeed Limits	Figure 5-4.....	5-23
Turbine Engine Overtorque Limits.....	Figure 5-5.....	5-24
Lubrication Fitting and Air Charge Valve Location.....	Figure 6-1.....	6-4
Lubrication Fitting	Figure 6-2.....	6-6
Lubrication Label	Figure 6-3.....	6-8
Counterweighted vs Non-Counterweighted Blades	Figure 6-4.....	6-12
Unfeathering Accumulator	Figure 6-5.....	6-18
Repair Limitations.....	Figure 6-6.....	6-22
Low Pitch Stop Adjustment (-1, -4).....	Figure 6-7.....	6-34
Low Pitch Stop Adjustment (-2, -5) For Propellers That Use a Two-piece Spinner Dome.....	Figure 6-8.....	6-36
Low Pitch Stop Adjustment (-2, -5) For Propellers That Use a One-piece Spinner Dome	Figure 6-9.....	6-38
Hex Nut Configuration	Figure 6-10.....	6-42

LIST OF TABLES

Torque Table	Table 3-1	3-7
Metal Spinner Bulkhead Mounting Hardware.....	Table 3-2	3-13
Composite Spinner Bulkhead Mounting Hardware	Table 3-3	3-15
Propeller/Engine Flange O-rings and Mounting Hardware.....	Table 3-4	3-18
Spinner Dome and Spinner Cap Mounting Hardware.....	Table 3-5	3-50
Air Charge Pressure	Table 6-1	6-16
Air Charge Pressure	Table 6-2	6-16
Air Charge Pressure	Table 6-3	6-16
Air Charge Pressure	Table 6-4	6-16.1
Air Charge Pressure	Table 6-5	6-16.1
Air Charge Pressure	Table 6-6	6-16.1
Air Charge Pressure	Table 6-7	6-16.2
Air Charge Pressure	Table 6-8	6-16.2
Air Charge Pressure	Table 6-9	6-17
Air Charge Pressure	Table 6-10	6-17
Accumulator Air Charge Pressure	Table 6-11	6-19
Approved Touch-up Paints	Table 6-12	6-25

INTRODUCTION - CONTENTS

1. Purpose.....	1-3
2. Airworthiness Limitations	1-4
3. Airframe or Engine Modifications	1-4
4. Restrictions and Placards	1-5
5. General	1-5
A. Personnel Requirements	1-5
B. Maintenance Practices	1-5
C. Continued Airworthiness.....	1-8
D. Propeller Critical Parts.....	1-9
6. Reference Publications	1-10
A. Hartzell Propeller Inc. Publications.....	1-10
B. References to Hartzell Propeller Inc. Publications	1-12
7. Definitions	1-13
8. Abbreviations	1-17
9. Hartzell Propeller Inc. Product Support.....	1-18
10. Warranty Service.....	1-18
11. Hartzell Propeller Inc. Recommended Facilities	1-19

(This page is intentionally blank.)

4. Restrictions and Placards

- A. The propellers included in this manual may have a restricted operating range that requires a cockpit placard.
- (1) The restrictions, if present, will vary depending on the propeller, blade, engine, and/or aircraft model.
 - (2) Review the propeller and aircraft type certificate data sheet (TCDS), Pilot Operating Handbook (POH), and any applicable Airworthiness Directives for specific information.

5. General**A. Personnel Requirements**

- (1) Personnel performing maintenance are expected to have sufficient training and certifications (when required by the applicable Aviation Authority) to accomplish the work required in a safe and airworthy manner.
- (2) Compliance to the applicable regulatory requirements established by the Federal Aviation Administration (FAA) or foreign equivalent is mandatory for anyone performing or accepting responsibility for any inspection and/or repair and/or overhaul of any Hartzell Propeller Inc. product.

B. Maintenance Practices

- (1) The propeller and its components are highly vulnerable to damage while they are removed from the engine. Properly protect all components until they are reinstalled on the engine.
- (2) Never attempt to move the aircraft by pulling on the propeller.
- (3) Avoid the use of blade paddles. If blade paddles must be used, use at least two paddles. Do not put the blade paddle in the area of the de-ice or anti-icing boot when applying torque to a blade assembly. Put the blade paddle in the thickest area of the blade, just outside of the de-ice or anti-icing boot. Use one blade paddle per blade.
- (4) Use only the approved consumables, e.g., cleaning agents, lubricants, etc.

- (5) Safe Handling of Paints and Chemicals
 - (a) Always use caution when handling or being exposed to paints and/or chemicals during propeller overhaul and maintenance procedures.
 - (b) Before using paint or chemicals, always read the manufacturer's label on the container and follow specified instructions and procedures for storage, preparation, mixing, and application.
 - (c) Refer to the product's Material Safety Data Sheet (MSDS) for detailed information about physical properties, health, and physical hazards of any chemical.
- (6) Observe applicable torque values during maintenance.
- (7) Approved corrosion protection followed by approved paint must be applied to all aluminum blades. For information concerning the application of corrosion protection and paint, refer to the Maintenance Practices chapter of this manual. Operation of blades without the specified coatings and finishes, i.e., "polished blades", is not permitted.
- (8) Before installing the propeller on the engine, the propeller must be statically balanced. New propellers are statically balanced at Hartzell Propeller Inc.. Overhauled propellers must be statically balanced by the overhaul facility before return to service.
 - (a) Dynamic balance is recommended, but may be accomplished at the discretion of the operator, unless specifically required by the airframe or engine manufacturer.
 - 1 Perform dynamic balance in accordance with the Maintenance Practices chapter of this manual.
 - 2 Additional procedures may be found in the aircraft maintenance manual.
- (9) As necessary, use a soft, non-graphite pencil or crayon to make identifying marks on components.

(10)As applicable, follow military standard NASM33540 for safety wire, safety cable, and cotter pin general practices. Use 0.032 (0.81 mm) diameter stainless steel safety wire unless otherwise indicated.

CAUTION: DO NOT USE OBSOLETE OR OUTDATED INFORMATION. PERFORM ALL INSPECTIONS OR WORK IN ACCORDANCE WITH THE MOST RECENT REVISION OF THIS MANUAL. INFORMATION CONTAINED IN THIS MANUAL MAY BE SIGNIFICANTLY CHANGED FROM EARLIER REVISIONS. USE OF OBSOLETE INFORMATION MAY RESULT IN DEATH, SERIOUS BODILY INJURY, AND/OR SUBSTANTIAL PROPERTY DAMAGE. FOR THE MOST RECENT REVISION LEVEL OF THIS MANUAL, REFER TO THE HARTZELL PROPELLER INC. WEBSITE AT WWW.HARTZELLPROP.COM.

- (11)The information in this manual revision supersedes data in all previously published revisions of this manual.
- (12)Refer to the airframe manufacturer's manuals in addition to the information in this manual because of possible special requirements for specific aircraft applications.

(13) If the propeller is equipped with an ice protection system that uses components supplied by Hartzell Propeller Inc., applicable instructions and technical information for the components supplied by Hartzell Propeller Inc. can be found in the following publications available on the Hartzell Propeller Inc. website at www.hartzellprop.com:

- (a) Hartzell Propeller Inc. Manual 180 (30-61-80) - Propeller Ice Protection System Manual
- (b) Hartzell Propeller Inc. Manual 181 (30-60-81) - Propeller Ice Protection System Component Maintenance Manual
- (c) Hartzell Propeller Inc. Manual 182 (61-12-82) - Propeller Electrical De-Ice Boot Removal and Installation Manual
- (d) Hartzell Propeller Inc. Manual 183 (61-12-83) - Propeller Anti-Icing Boot Removal and Installation Manual

(14) Propeller ice protection system components not supplied by Hartzell Propeller Inc. are controlled by the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).

C. Continued Airworthiness

(1) Operators are urged to stay informed of Airworthiness information using Hartzell Propeller Inc. Service Bulletins and Service Letters that are available from Hartzell Propeller Inc. distributors, or from the Hartzell Propeller Inc. factory by subscription. Selected information is also available on the Hartzell Propeller Inc. website at www.hartzellprop.com.

D. Propeller Critical Parts

- (1) The following maintenance procedures may involve propeller critical parts. These procedures have been substantiated based on Engineering analysis that expects this product will be operated and maintained using the procedures and inspections provided in the Instructions for Continued Airworthiness (ICA) for this product. Refer to the Illustrated Parts List chapter of the applicable maintenance manual for the applicable propeller model for the identification of specific Propeller Critical Parts.
- (2) Numerous propeller system parts can produce a propeller Major or Hazardous effect, even though those parts may not be considered as Propeller Critical Parts. The operating and maintenance procedures and inspections provided in the ICA for this product are, therefore, expected to be accomplished for all propeller system parts.

6. Reference Publications

A. Hartzell Propeller Inc. Publications

NOTE: The following publications are referenced within this manual:

Active Hartzell Propeller Inc. Service Bulletins, Service Letters, Service Instructions, and Service Advisories.

Hartzell Propeller Inc. Manual No. 113B (61-10-13) - Compact Non-Feathering (-1) and Aerobatic (-4) Propeller Overhaul and Maintenance Manual

Hartzell Propeller Inc. Manual No. 117D (61-10-17) - Compact Constant Speed and Feathering Propeller Overhaul and Maintenance Manual

Hartzell Propeller Inc. Manual No. 127 (61-16-27) - Metal Spinner Assembly Maintenance - Available on the Hartzell Propeller Inc. website at www.hartzellprop.com

Hartzell Propeller Inc. Manual No. 130B (61-23-30) - Mechanically Actuated Governor Maintenance Manual

Hartzell Propeller Inc. Manual No. 133C (61-13-33) - Aluminum Blade Overhaul

Hartzell Propeller Inc. Manual No. 159 (61-02-59) - Application Guide - Available on the Hartzell Propeller Inc. website at www.hartzellprop.com

Hartzell Propeller Inc. Manual No. 165A (61-00-65) - Illustrated Tool and Equipment Manual - Available on the Hartzell Propeller Inc. website at www.hartzellprop.com

Hartzell Propeller Inc. Manual No. 173 (61-00-73) - Composite Spinner Field Maintenance and Minor Repair Manual - Available on the Hartzell Propeller Inc. website at www.hartzellprop.com

Hartzell Propeller Inc. Manual No. 180 (30-61-80) - Propeller Ice Protection System Manual - Available on the Hartzell Propeller Inc. website at www.hartzellprop.com

Hartzell Propeller Inc. Manual No. 181 (30-60-81) - Propeller Ice Protection System Component Maintenance Manual - Available on the Hartzell Propeller Inc. website at www.hartzellprop.com

Hartzell Propeller Inc. Manual No. 182 (61-12-82) - Propeller Electrical De-ice Boot Removal and Installation Manual - Available on the Hartzell Propeller Inc. website at www.hartzellprop.com

Hartzell Propeller Inc. Manual No. 183 (61-12-83) - Propeller Anti-icing Boot Removal and Installation Manual - Available on the Hartzell Propeller Inc. website at www.hartzellprop.com

Hartzell Propeller Inc. Manual No. 202A (61-01-02) - Standard Practices Manual, Volumes 1 through 11 (Volume 7, Consumable Materials is available on the Hartzell Propeller Inc. website at www.hartzellprop.com)

Hartzell Propeller Inc. Service Letter HC-SL-61-61Y - Propeller - Overhaul Periods and Service Life Limits for Hartzell Propeller Inc. Aviation Components - Propellers, Governors, and Propeller Damper Assemblies - Available on the Hartzell Propeller Inc. website at www.hartzellprop.com

B. References to Hartzell Propeller Inc. Publications

NOTE: Specific Hartzell Propeller Inc. manuals and service documents are available on the Hartzell website at www.hartzellprop.com. Refer to the section "Required Publications" in this chapter for the identification of these publications.

- (1) Special tooling is required for procedures throughout this manual. For further tooling information, refer to Hartzell Propeller Inc. Illustrated Tool and Equipment Manual 165A (61-00-65).
 - (a) Tooling references appear with the prefix "TE" directly following the tool name to which they apply. For example, a template which is reference number 133 will appear as: template TE133.
- (2) Consumable materials are referenced in certain sections throughout this manual. Specific approved materials are listed in the Consumable Materials chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
 - (a) The reference number for consumable materials appear with the prefix "CM" directly following the material to which they apply. For example, an approved adhesive that is reference number 16 will appear as: approved adhesive CM16. Only those items specified may be used.

7. Definitions

A basic understanding of the following terms will assist in maintaining and operating Hartzell propeller systems.

<u>Term</u>	<u>Definition</u>
Annealed	Softening of material due to overexposure to heat.
Blade Angle	Measurement of blade airfoil location described as the angle between the blade airfoil and the surface described by propeller rotation.
Brinelling.	A depression caused by failure of the material in compression.
Chord	A straight line between the leading and trailing edges of an airfoil.
Cold Rolling	Compressive rolling process for the retention area of single shoulder blades which provides improved strength and resistance to fatigue.
Constant Force.	A force which is always present in some degree when the propeller is operating.
Constant Speed	A propeller system which employs a governing device to maintain a selected engine RPM.
Corrosion	Gradual material removal or deterioration due to chemical action.
Crack	Irregularly shaped separation within a material, sometimes visible as a narrow opening at the surface.
Depression	Surface area where the material has been compressed but not removed.
Distortion	Alteration of the original shape or size of a component.

<u>Term</u>	<u>Definition</u>
Erosion	Gradual wearing away or deterioration due to action of the elements.
Exposure	Material open to action of the elements.
Feathering	A propeller with blades that may be positioned parallel to the relative wind, thus reducing aerodynamic drag.
Gouge.	Surface area where material has been removed
Hazardous Propeller	
Effect	The hazardous propeller effects are defined in Title 14 CFR section 35.15(g)(1).
Horizontal Balance	Balance between the blade tip and the center of the hub.
Impact Damage	Damage that occurs when the propeller blade or hub assembly strikes, or is struck by, an object while in flight or on the ground.
Major Propeller Effect .	The major propeller effects are defined in Title 14 CFR section 35.15(g)(2).
Nick	Removal of paint and possibly a small amount of material.
Onspeed.	Condition in which the RPM selected by the pilot through the propeller control lever and the actual engine (propeller) RPM are equal.
Overhaul.	The periodic disassembly, inspection, repair, refinish, and reassembly of a propeller assembly to maintain airworthiness.

<u>Term</u>	<u>Definition</u>
Overspeed	Condition in which the RPM of the propeller or engine exceeds predetermined maximum limits; the condition in which the engine (propeller) RPM is higher than the RPM selected by the pilot through the propeller control lever.
Overspeed Damage . . .	Damage that occurs when the propeller hub assembly rotates at a speed greater than the maximum limit for which it is designed.
Pitch	Same as "Blade Angle".
Pitting	Formation of a number of small, irregularly shaped cavities in surface material caused by corrosion or wear.
Propeller Critical Part . .	A part on the propeller whose primary failure can result in a hazardous propeller effect, as determined by the safety analysis required by Title 14 CFR section 35.15.
Scratch	See "Nick".
Single Acting.	Hydraulically actuated propeller which utilizes a single oil supply for pitch control.
Synchronizing.	Adjusting the RPM of all the propellers of a multi-engine aircraft to the same RPM.
Synchrophasing	A form of propeller synchronization in which not only the RPM of the engines (propellers) are held constant, but also the position of the propellers in relation to each other.

Abbreviation

Term

- Track In an assembled propeller, a measurement of the location of the blade tip with respect to the plane of rotation, used to verify face alignment and to compare blade tip location with respect to the locations of the other blades in the assembly.
- Underspeed The condition in which the actual engine (propeller) RPM is lower than the RPM selected by the pilot through the propeller control lever.
- Variable Force A force which may be applied, varied, or removed during propeller operation.
- Vertical Balance Balance between the leading and trailing edges of a two-blade propeller with the blades positioned vertically.
- Windmilling The rotation of an aircraft propeller caused by air flowing through it while the engine is not producing power.

8. Abbreviations

<u>Abbreviation</u>	<u>Term</u>
AMM	Aircraft Maintenance Manual
AN	Air Force-Navy (or Army-Navy)
AOG	Aircraft on Ground
FAA	Federal Aviation Administration
Ft-Lb	Foot-Pound
ICA	Instructions for Continued Airworthiness
ID	Inside Diameter
In-Lb	Inch-Pound
IPS	Inches Per Second
kPa	Kilopascals
Lbs	Pounds
MIL-X-XXX	Military Specification
MPI	Major Periodic Inspection
MS	Military Standard
MSDS	Material Safety Data Sheet
NAS	National Aerospace Standards
NASM	National Aerospace Standards, Military
N•m	Newton-Meters
OD	Outside Diameter
POH	Pilot's Operating handbook
PSI	Pounds per Square Inch
RPM	Revolutions per Minute
STC	Supplemental Type Certificate
TBO	Time Between Overhaul
TC	Type Certificate
TSN	Time Since New
TSO	Time Since Overhaul

NOTE: TSN/TSO is considered as the time accumulated between rotation and landing, i.e., flight time.

9. Hartzell Propeller Inc. Product Support

Hartzell Propeller is ready to assist you with questions concerning your propeller system. Hartzell Propeller Inc. Product Support may be reached during business hours (8:00 am through 5:00 pm, United States Eastern Time) at (937) 778-4379 or at (800) 942-7767, toll free from the United States and Canada. Hartzell Propeller Inc. Product Support can also be reached by fax at (937) 778-4391, and by e-mail at techsupport@hartzellprop.com.

After business hours, you may leave a message on our 24 hour product support line at (937) 778-4376 or at (800) 942-7767, toll free from the United States and Canada. A technical representative will contact you during normal business hours. Urgent AOG support is also available 24 hours per day, seven days per week via this message service.

Additional information is available on our website at www.hartzellprop.com.

NOTE: When calling from outside the United States, dial (001) before dialing the above telephone numbers.

10. Warranty Service

If you believe you have a warranty claim, it is necessary to contact Hartzell's Warranty Administrator. Hartzell's Warranty Administrator will provide a blank *Warranty Application* form. It is necessary to complete this form and return it to the Warranty Administrator for evaluation **before proceeding with repair or inspection work**. Upon receipt of this form, the Warranty Administrator will provide instructions on how to proceed. Hartzell Propeller Inc. Warranty may be reached during business hours (8:00 am. through 5:00 pm., United States Eastern Time) at (937) 778-4379, or toll free from the United States and Canada at (800) 942-7767. Hartzell Propeller Inc. Warranty Administration can also be reached by fax, at (937) 778-4391, or by e-mail at warranty@hartzellprop.com.

NOTE: When calling from outside the United States, dial (001) before dialing the above telephone numbers.

11. Hartzell Propeller Inc. Recommended Facilities

- A. Hartzell Propeller Inc. recommends using Hartzell approved distributors and repair facilities for the purchase, repair and overhaul of Hartzell Propeller Inc. propeller assemblies or components.
- B. Information about the Hartzell Propeller Inc. worldwide network of aftermarket distributors and approved repair facilities is available on the Hartzell Propeller Inc. website at www.hartzellprop.com.

(This page is intentionally blank.)

INSTALLATION AND REMOVAL - CONTENTS

1. Tools, Consumables, and Expendables.....	3-4.1
A. Tooling.....	3-4.1
B. Consumables.....	3-5
C. Expendables.....	3-5
2. Pre-Installation.....	3-9
A. Inspection of Shipping Package.....	3-9
B. Uncrating.....	3-9
C. Inspection after Shipment.....	3-9
D. Reassembly of a Propeller Disassembled for Shipment ...	3-9
E. Air Charge Pressure Check (-2 and -5 Propellers).....	3-9
3. Spinner Pre-Installation.....	3-11
A. General.....	3-11
B. Installation of a Metal Spinner Bulkhead on the Propeller Hub.....	3-13
C. Installation of a Composite Spinner Bulkhead on a Propeller Hub - Refer to Table 3-3 and Figure 3-5.....	3-15
D. Spinner Adapter to Starter Ring Gear Installation.....	3-17
4. Propeller Installation.....	3-19
A. Flange Description.....	3-19
B. Installation of "D" Flange Propellers.....	3-21
C. Installation of "F" Flange Propellers.....	3-27
D. Installation of "N" Flange Propellers.....	3-31
E. Installation of "L" Flange Propellers, Except Model HC-E2YL-().....	3-37
F. Installation of HC-E2YL-() Propellers.....	3-42
G. Installation of "K" and "R" Flange Propellers.....	3-46
5. Damper Installation.....	3-51
A. Installation of C-1576 Damper (Hartzell Propeller Inc. Kit A-1583).....	3-51
6. Spinner Installation.....	3-51
A. Installing a One-Piece Spinner Dome, Except Spinner Assembly C-3567-(4,8) With a D-7811-10(P) Spinner Dome.....	3-51
B. Installing Spinner Assembly C-3567-(4,8) With a D-7811-10(P) Spinner Dome.....	3-55
C. Installing a Two-Piece Spinner Dome (Procedure 1).....	3-62
D. Installing a Two-Piece Spinner Dome (Procedure 2).....	3-65

INSTALLATION AND REMOVAL - CONTENTS, CONTINUED

- 7. Post-Installation Checks3-67
- 8. Spinner Removal3-67
 - A. Removal of One-Piece Spinner3-67
 - B. Removal of Two-Piece Spinner3-67
 - C. Hub Mounted Spinner Bulkhead Removal3-67
 - D. Starter Ring Gear Spinner Adapter Removal3-67
- 9. Propeller Removal3-68
 - A. Removal of "D" Flange Propellers3-68
 - B. Removal of "F" Flange Propellers.....3-70
 - C. Removal of "N" Flange Propellers3-72
 - D. Removal of "L" Flange Propellers,
Except Model HC-E2YL-()..... 3-74
 - E. Removal of HC-E2YL-() Propellers3-76
 - F. Removal of "K" and "R" Flange Propellers3-78

LIST OF FIGURES

Determining Torque Value When Using Torquing Adapter	Figure 3-1	3-6
Diagram of Torquing Sequence for Propeller Mounting Hardware	Figure 3-2	3-8
Hub Clamping Bolt Location	Figure 3-3	3-10
Metal Spinner Bulkhead and Spinner Mounting (Hub Mounted Spinner)	Figure 3-4	3-12
Composite Bulkhead and Spinner Mounting (Hub Mounted Spinner)	Figure 3-5	3-14
Spinner Adapter and Spinner Mounting (Starter Ring Gear Mount)	Figure 3-6	3-16
“D” Flange Propeller Mounting	Figure 3-7	3-20
“F” and “N” Flange Propeller Mounting	Figure 3-8	3-26
“L,” “K,” and “R” Flange Propeller Mounting ...	Figure 3-9	3-36
Damper Installation	Figure 3-10	3-50
Installing the Spacer Base and Spinner Mounting Spacers	Figure 3-11	3-54
Install the Plastic Forward Bulkhead and Pre-fit the Spinner Dome	Figure 3-12	3-56
Spinner Dome Mounting Hole Alignment	Figure 3-13	3-58
Two-Piece Spinner Mounting (Procedure 1)..	Figure 3-14	3-62
Two-Piece Spinner Mounting (Procedure 2)..	Figure 3-15	3-64
Spinner Dome to Bulkhead Mounting Hole Alignment	Figure 3-16	3-64

LIST OF TABLES

Torque Table Table 3-13-7

Metal Spinner Bulkhead
Mounting Hardware..... Table 3-23-13

Composite Spinner Bulkhead Mounting
Hardware Table 3-33-15

Propeller/Engine Flange O-rings
and Mounting Hardware..... Table 3-43-18

Spinner Dome and Spinner Cap
Mounting Hardware..... Table 3-53-50

1. Tools, Consumables, and Expendables

The following tools, consumables, and expendables will be required for propeller removal or installation:

NOTE: Compact propellers are manufactured with six basic hub mounting flange designs. The flange types are D, F, K, L, N, or R. The flange type used on a particular propeller installation is indicated in the propeller model number stamped on the hub. For example, HC-C2YE-4A indicates an "F" flange. Refer to Aluminum Hub Propeller Model Identification in the Description and Operation chapter of this manual for a description of each flange.

A. Tooling

CAUTION: USE CARE WHEN USING TOOLS. INCORRECT USE OF TOOLS COULD CAUSE DAMAGE TO THE HUB THAT CANNOT BE REPAIRED AND WOULD REQUIRE THAT THE HUB BE REPLACED.

(1) Tools for Bulkhead Mounting

CAUTION 1: DO NOT USE AN OPEN END WRENCH TO TORQUE THE HUB CLAMPING NUTS ON A SMOOTH FORGED HUB.

CAUTION 2: WHEN USING THE TORQUE WRENCH ADAPTER TE457, MAKE SURE THAT IT IS CORRECTLY ENGAGED ON THE NUT BEFORE APPLYING TORQUE.

(a) For three-bladed propellers that use a smooth forged hub:

- 1 The three-bladed smooth forged hub has less area around the heads of the hub clamping bolts than the previous design of the compact hub.
- 2 Torque wrench adapter Hartzell Propeller Inc. Part Number 101939 TE457 is required when torquing the hub clamping bolts for a three-bladed smooth forged hub.

(b) For a propeller other than a three-bladed propeller that uses a smooth forged hub:

- 1 Use torque wrench adapter Hartzell Propeller Inc. Part Number 101939 TE457 or other applicable torque adapter when torquing the hub clamping bolts.

NOTE: Using a wrench other than Hartzell Propeller Inc. Part Number 101939 TE457 increases the risk of the wrench causing damage to the hub in the areas around the hub clamping bolts.

(2) Tools for Propeller Removal or Installation:

D and F Flange Propellers

- Safety wire pliers (Alternate: Safety cable tool)
- Torque wrench (1/2 inch drive)
- Torque wrench adapters:
 - Hartzell Propeller Inc. Part Number BST-2860 TE150
- 3/4 inch open end wrench

L Flange Propellers

- Safety wire pliers (Alternate: Safety cable tool)
- Torque wrench (1/2 inch drive)
- Torque wrench adapters:
 - Hartzell Part Number BST-2860 TE150
 - or 5/8 inch crowfoot wrench

NOTE: Using a wrench other than Hartzell Propeller Inc. Part Number BST-2860 TE150 increases the risk of the wrench causing damage to the hub in the areas around the mounting fasteners.

- 5/8 inch open end wrench

N Flange Propellers

- Safety wire pliers (Alternate: Safety cable tool)
- Torque wrench (1/2 inch drive)
- Torque wrench adapter:
 - 7/8 inch crowfoot wrench
- 7/8 inch open end wrench

K and R Flange Propellers

- Safety wire pliers (Alternate: Safety cable tool)
- Torque wrench (1/2 inch drive)
- Torque wrench adapters:
 - Hartzell Propeller Inc. Part Number BST-2860 (TE150) or 3/4 inch crowfoot wrench

NOTE: Using a wrench other than Hartzell Propeller Inc. Part Number BST-2860 TE150 increases the risk of the wrench causing damage to the hub in the areas around the mounting fasteners

- 3/4 inch open end wrench

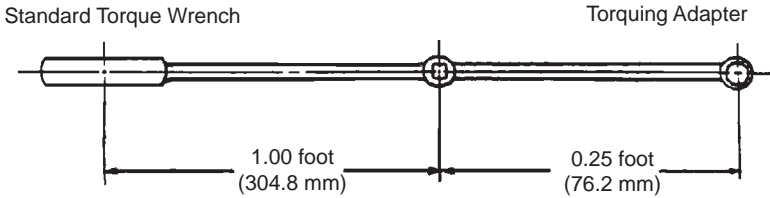
B. Consumables

- Quick Dry Stoddard Solvent or Methyl-Ethyl-Ketone (MEK)

C. Expendables

- 0.032 inch stainless steel aircraft safety wire (Alternate: 0.032 inch [0.81 mm] aircraft safety cable, and associated hardware)
- O-ring - propeller to engine seal (see Table 3-4)

APS0212A



$$\frac{(\text{actual torque required}) \times (\text{torque wrench length})}{(\text{torque wrench length}) + (\text{length of adapter})} = \text{Torque wrench reading to achieve required actual torque}$$

EXAMPLE:

$$\frac{100 \text{ Ft-Lb (136 N}\cdot\text{m)} \times 1.00 \text{ ft (304.8 mm)}}{1.00 \text{ ft (304.8 mm)} + 0.25 \text{ ft (76.2 mm)}} = 80 \text{ Ft-Lb (108 N}\cdot\text{m)} < \text{reading on torque wrench with 3-inch (76.2 mm) adapter for actual torque of 100 Ft-Lb (136 N}\cdot\text{m)}$$

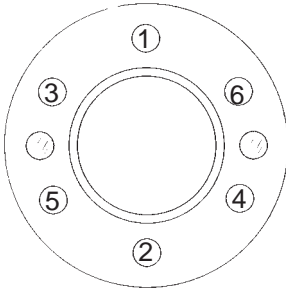
The correction shown is for an adapter that is aligned with the centerline of the torque wrench. If the adapter is angled 90 degrees relative to the torque wrench centerline, the torque wrench reading and actual torque applied will be equal.

Determining Torque Value When Using Torquing Adapter Figure 3-1

Installation Torques	
<u>CAUTION 1:</u>	MOUNTING HARDWARE MUST BE CLEAN AND DRY TO PREVENT EXCESSIVE PRELOAD OF THE MOUNTING FLANGE.
<u>CAUTION 2:</u>	ALL TORQUES LISTED ARE DRY TORQUE.
<u>CAUTION 3:</u>	REFER TO FIGURE 3-1 FOR TORQUE READING WHEN USING A TORQUE WRENCH ADAPTER.
Hub clamping bolts/spinner mtg. nuts	20-22 ft-lbs (28-29 N•m)
D flange propeller mtg. nuts	75-80 ft-lbs (102-108 N•m)
F flange propeller mtg. nuts, except ()HC-C3YF-5	70-80 ft-lbs (95-108 N•m)
F flange propeller mtg. nuts for ()HC-C3YF-5	80-90 ft-lbs (108-122 N•m)
N flange propeller mtg. nuts	90-100 ft-lbs (123-136 N•m)
L flange propeller mtg. nuts	45-55 ft-lbs (62-74 N•m)
K and R flange propeller mtg. studs	60-70 ft-lbs (82-95 N•m)
Damper assembly mtg. nuts	28-30 ft-lbs (38-40 N•m)
Low pitch stop jam nut -1 Application (See Figure 6-7)	14-16 ft-lbs (19-21 N•m)
Low pitch stop jam nut for -2 and -5 applications that use a one-piece spinner dome (See Figure 6-9)	25-30 ft-lbs (34-40 N•m)
Low pitch stop jam nut/Spinner locknut "A" and "B" for -2 and -5 applications that use a two-piece spinner dome (See Figure 6-8, Figure 3-14, and Figure 3-15)	25-30 ft-lbs (34-40 N•m)
Low pitch stop jam nut -4 Application (See Figure 6-7)	27-33 ft-lbs (37-44 N•m)
Governor Max. RPM Stop locking nut	30-36 in-lbs (3.4-4.0 N•m)

**Torque Table
Table 3-1**

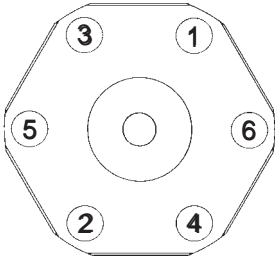
TI-0050
TI-0051



F Flange

Step 1 - Torque all mounting nuts to 40 Ft-Lbs (54 N•m) in the sequence shown

Step 2 - Torque all mounting nuts in accordance with Table 3-1 and Figure 3-1 in the sequence shown



R Flange

Step 1 - Torque all mounting studs to 40 Ft-Lbs (54 N•m) in the sequence shown

Step 2 - Torque all mounting studs in accordance with Table 3-1 and Figure 3-1 in the sequence shown

**Diagram of Torquing Sequence for Propeller Mounting Hardware
Figure 3-2**

2. Pre-Installation**A. Inspection of Shipping Package**

- (1) Examine the exterior of the shipping container for signs of shipping damage, especially at the box ends around each blade. A hole, tear or crushed appearance at the end of the box (at the propeller tips) may indicate the propeller was dropped during shipment, possibly damaging the blades.

B. Uncrating

- (1) Place the propeller on a firm support.
- (2) Remove the banding and any external wood bracing from the cardboard shipping container.
- (3) Remove the cardboard from the hub and blades.

CAUTION: DO NOT STAND THE PROPELLER ON A BLADE TIP.

- (4) Put the propeller on a padded support that supports the entire length of the propeller.
- (5) Remove the plastic dust cover cup from the propeller mounting flange, if installed.

C. Inspection after Shipment

- (1) After removing the propeller from the shipping container, examine the propeller components for shipping damage.

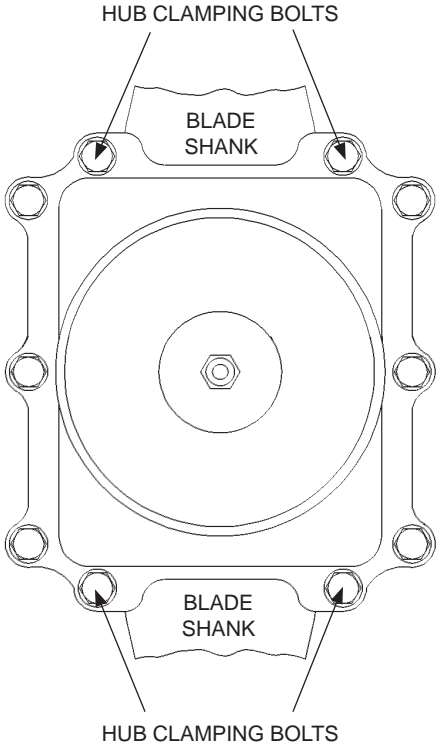
D. Reassembly of a Propeller Disassembled for Shipment

- (1) If a propeller was received disassembled for shipment, it is to be reassembled by trained personnel in accordance with the applicable propeller maintenance manual.

E. Air Charge Pressure Check (-2 and -5 Propellers)

- (1) Perform an air charge pressure check before propeller installation. Refer to the Air Charge section of the Maintenance Practices chapter of this manual.
 - (a) If the air pressure loss is less than 10 percent of the specified pressure, reservice the propeller.
 - (b) If the air pressure loss is greater than 10 percent of the specified pressure, repair the propeller. This repair must be performed at an appropriately licensed repair facility.

APS6158

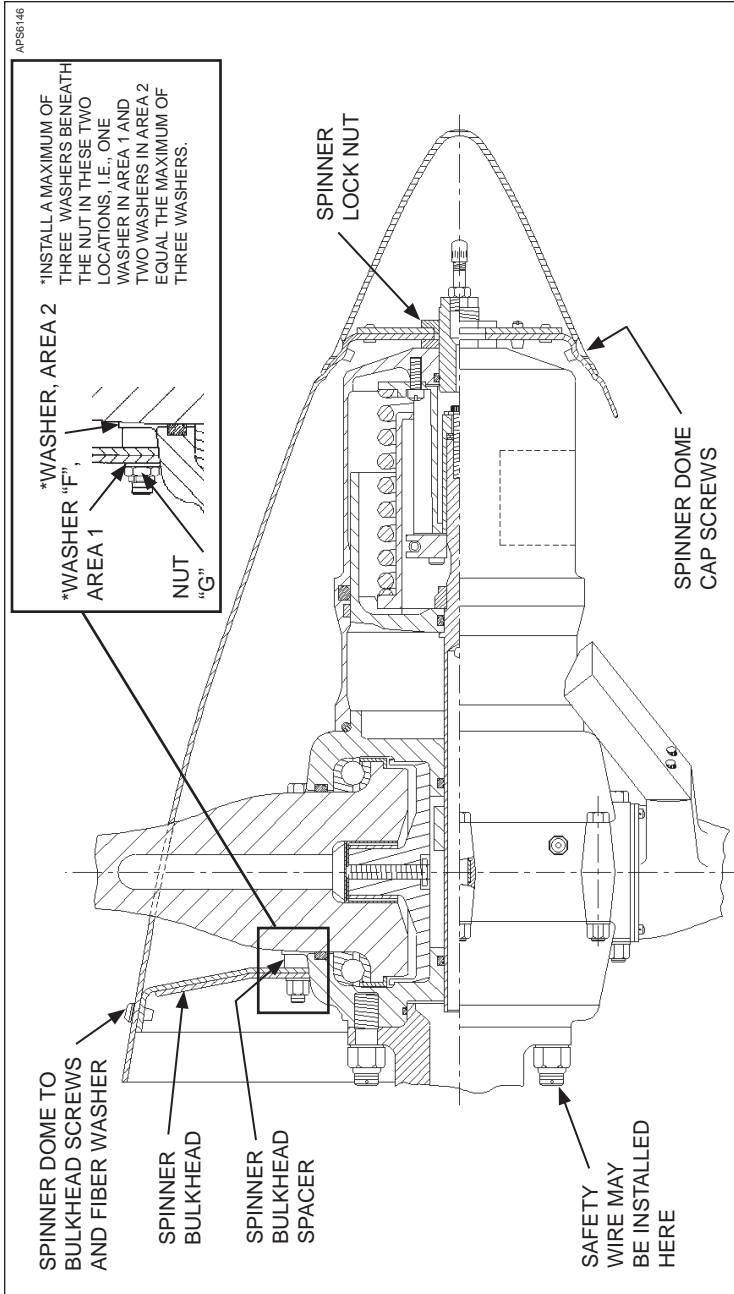


**Hub Clamping Bolt Location
Figure 3-3**

3. Spinner Pre-Installation**A. General**

- (1) The spinner support must be mounted before the propeller can be installed. The spinner will mount either to a bulkhead installed on the propeller hub, or, on some Lycoming engine installations, to an adapter attached to the starter ring gear. Follow the applicable directions in this section.
- (2) Refer to Figure 3-3. Remove the nuts from the hub clamping bolts that are located on either side of the blade shank. The remaining nuts/bolts should not be disturbed. Do not remove the bolts.
- (3) Refer to Figure 3-3. The spinner may be supplied with long hub clamping bolts. If the bolts were supplied with the spinner, remove the bolts on either side of the blade shank and replace them with the bolts supplied with the spinner. The supplied hub clamping bolts will be longer than those removed from the hub.

NOTE: Depending upon the installation, the propeller hub may have been shipped from the factory with the longer hub clamping bolts installed. In this case, the hub clamping bolts will not be supplied with the spinner.



Metal Spinner Bulkhead and Spinner Mounting (Hub Mounted Spinner)
Figure 3-4

B. Installation of a Metal Spinner Bulkhead on the Propeller Hub

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST CHAPTER OF THE APPLICABLE OVERHAUL MANUAL(S) FOR THE IDENTIFICATION OF SPECIFIC PROPELLER CRITICAL PARTS.

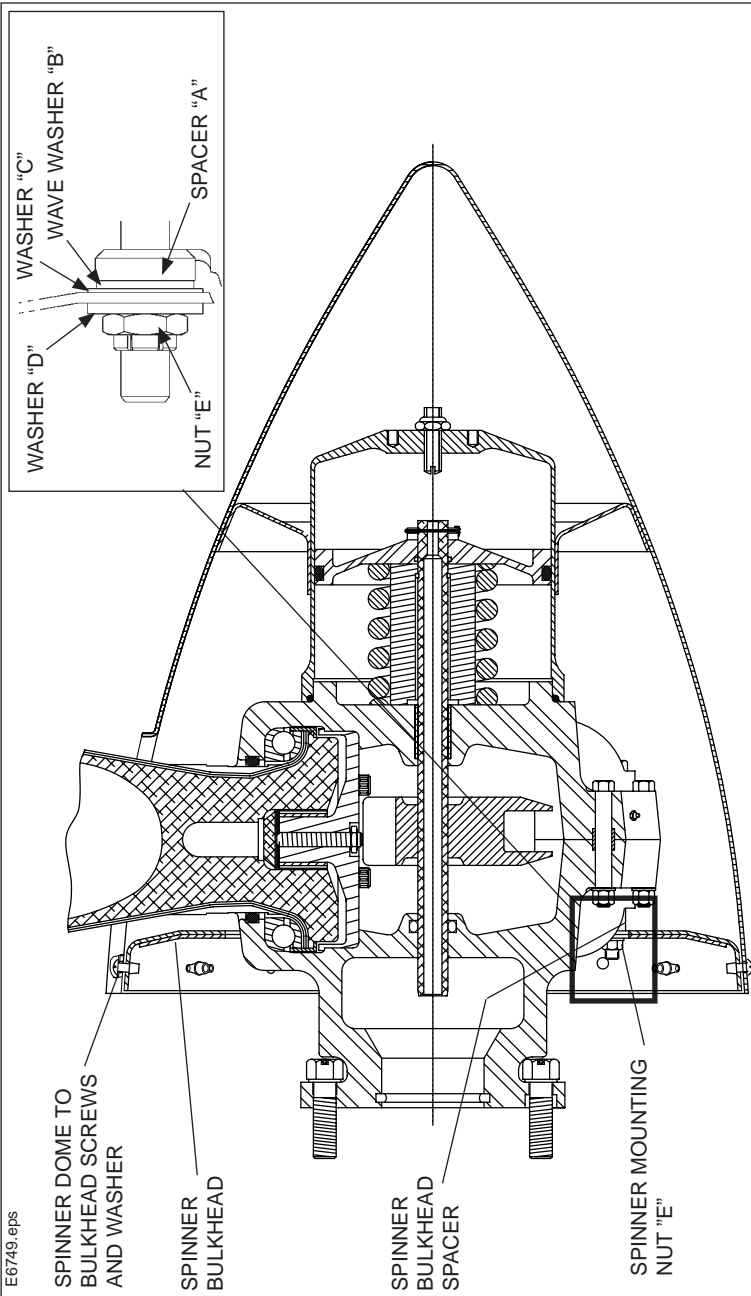
- (1) Refer to Figure 3-4. Put the spinner bulkhead spacers on the hub clamping bolts. Install the spinner bulkhead over the installed spacers on the hub clamping bolts.

CAUTION: A MINIMUM OF ONE THREAD OF THE HUB CLAMPING BOLT MUST BE VISIBLE AFTER THE SPINNER MOUNTING NUT IS INSTALLED.

- (2) When the spinner bulkhead is installed, there must be no less than one thread of the hub clamping bolt exposed beyond the spinner mounting nut. A total of three washers in two areas may be installed beneath the spinner mounting nut to achieve this result. On some installations, it may be necessary to install spacers and one or more washers beneath the head of the bolt in order to avoid interference with aircraft cowling.
- (a) Additional washers (as many as four) may have been used during assembly of the propeller for hub clamping purposes.

Description	Part Number
Flat Washer "F"	B-3834-0663
Spinner Mounting Nut "G"	B-3599

**Metal Spinner Bulkhead Mounting Hardware
Table 3-2**



Composite Bulkhead and Spinner Mounting (Hub Mounted Spinner)
Figure 3-5

E6749.eps

- (6) Install the propeller on the engine flange. Make certain to align the dowel studs in the propeller flange with the corresponding holes in the engine mounting flange.
 - (a) The propeller may be installed on the engine flange in a given position, or 180 degrees from that position. Check the engine and airframe manuals to determine if either manual specifies a propeller mounting position.

CAUTION 1: MOUNTING HARDWARE MUST BE CLEAN AND DRY TO PREVENT EXCESSIVE PRELOAD OF THE MOUNTING FLANGE.

CAUTION 2: TIGHTEN NUTS EVENLY TO AVOID HUB DAMAGE.

- (7) Install the 1/2 inch propeller mounting nuts (dry) with spacers. Refer to Table 3-4.
 - (a) If the propeller is removed between overhaul intervals, mounting nuts may be reused if they are not damaged or corroded.
- (8) Torque the 1/2 inch propeller mounting nuts (dry) in accordance with Table 3-1 and Figure 3-1.
- (9) If required by the aircraft maintenance manual, safety all mounting studs with 0.032 inch (0.81 mm) minimum diameter stainless steel wire or equivalent aircraft safety cable and associated hardware (two studs for each safety). Refer to Figure 3-4.

- (10) If the propeller is equipped with an ice protection system that uses components supplied by Hartzell Propeller Inc., applicable instructions and technical information for the components supplied by Hartzell Propeller Inc. can be found in the following publications available on the Hartzell Propeller Inc. website at www.hartzellprop.com:
 - (a) Hartzell Propeller Inc. Manual 180 (30-61-80) - Propeller Ice Protection System Manual
 - (b) Hartzell Propeller Inc. Manual 181 (30-60-81) - Propeller Ice Protection System Component Maintenance Manual
 - (c) Hartzell Propeller Inc. Manual 182 (61-12-82) - Propeller Electrical De-ice Boot Removal and Installation Manual
 - (d) Hartzell Propeller Inc. Manual 183 (61-12-83) - Propeller Anti-icing Boot Removal and Installation Manual
- (11) Propeller ice protection system components not supplied by Hartzell Propeller Inc. are controlled by the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).
- (12) Install the propeller spinner dome in accordance with the section "Spinner Installation" in this chapter.

C. Installation of "F" Flange Propellers

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST CHAPTER OF THE APPLICABLE OVERHAUL MANUAL(S) FOR THE IDENTIFICATION OF SPECIFIC PROPELLER CRITICAL PARTS.

(1) General

- (a) An "F" flange propeller has six 1/2 inch studs configured in a four inch circle.
- (b) Two dowel pins are also provided to transfer torque and index the propeller with respect to the engine crankshaft. Refer to Figure 3-8.
- (c) The dowel pin locations used on a particular propeller installation are indicated in the propeller model stamped on the hub. Refer to Aluminum Hub Propeller Model Identification in the Description and Operation Chapter of this manual.

(2) Perform the applicable steps under Spinner Pre-Installation within this chapter.

WARNING: CLEANING AGENTS ARE FLAMMABLE AND TOXIC TO THE SKIN, EYES, AND RESPIRATORY TRACT. SKIN AND EYE PROTECTION IS REQUIRED. AVOID PROLONGED CONTACT. USE IN WELL VENTILATED AREA.

- (3) Clean the engine flange and propeller flange with Quick Dry Stoddard Solvent or MEK.
- (4) Refer to Figure 3-8. Install the O-ring in the O-ring groove in the hub bore. Refer to Table 3-4 for the applicable O-ring and mounting hardware.

NOTE: When the propeller is received from the factory, the O-ring has been installed.

WARNING: MAKE SURE THAT ANY EQUIPMENT USED TO INSTALL THE PROPELLER IS RATED UP TO 800 LBS. (363 KG) TO SUPPORT THE WEIGHT OF THE PROPELLER ASSEMBLY DURING INSTALLATION. ONE PERSON MUST NEVER ATTEMPT TO INSTALL AN UNSUPPORTED PROPELLER BY HIMSELF, REGARDLESS OF THE SIZE OR WEIGHT OF THE PROPELLER. MANUALLY LIFTING THE PROPELLER ONTO THE ENGINE CAN RESULT IN PERSONAL INJURY.

CAUTION 1: A PROPELLER MUST BE CORRECTLY SUPPORTED DURING INSTALLATION ON THE ENGINE. AVOID ANY ROCKING OR SHIFTING OF THE PROPELLER WHEN IT IS PARTIALLY ENGAGED WITH THE ENGINE. ROCKING OF THE PROPELLER DURING PROPELLER INSTALLATION CAN DAMAGE THE PROPELLER HUB MOUNTING FACE, CAUSING ACTUATION OIL LEAKAGE OR DAMAGE THAT MAY SCRAP THE HUB. HUB DAMAGE CAN ALSO INTRODUCE METAL INTO THE PROPELLER OIL ACTUATION SYSTEM, WHICH COULD POSSIBLY DAMAGE THE ENGINE.

CAUTION 2: WHEN INSTALLING THE PROPELLER ON THE AIRCRAFT, DO NOT DAMAGE THE ICE PROTECTION SYSTEM COMPONENTS, IF APPLICABLE.

- (5) With a suitable support, such as a crane hoist or similar equipment, carefully move the propeller assembly to the aircraft engine mounting flange in preparation for installation.

- (6) Install the propeller on the engine flange. Make certain to align the dowel pins in the propeller flange with the corresponding holes in the engine mounting flange.
 - (a) The propeller may be installed on the engine flange in a given position, or 180 degrees from that position. Check the engine and airframe manuals to determine if either manual specifies a propeller mounting position.

CAUTION 1: MOUNTING HARDWARE MUST BE CLEAN AND DRY TO PREVENT EXCESSIVE PRELOAD OF THE MOUNTING FLANGE.

CAUTION 2: TIGHTEN NUTS EVENLY TO AVOID HUB DAMAGE.

- (7) Install the 1/2 inch propeller mounting nuts (dry) with washers. Refer to Table 3-4.
 - (a) If the propeller is removed between overhaul intervals, mounting nuts may be reused if they are not damaged or corroded.
- (8) Torque the 1/2 inch propeller mounting nuts (dry) in accordance with Table 3-1, Figure 3-1 and Figure 3-2.
- (9) If required by the aircraft maintenance manual, safety all mounting studs with 0.032 inch (0.81 mm) minimum diameter stainless steel wire or equivalent aircraft safety cable and associated hardware (two studs for each safety). Refer to Figure 3-4.

- █ (10) If the propeller is equipped with an ice protection system that uses components supplied by Hartzell Propeller Inc., applicable instructions and technical information for the components supplied by Hartzell Propeller Inc. can be found in the following publications available on the Hartzell Propeller Inc. website at www.hartzellprop.com:
 - (a) Hartzell Propeller Inc. Manual 180 (30-61-80) - Propeller Ice Protection System Manual
 - (b) Hartzell Propeller Inc. Manual 181 (30-60-81) - Propeller Ice Protection System Component Maintenance Manual
 - (c) Hartzell Propeller Inc. Manual 182 (61-12-82) - Propeller Electrical De-ice Boot Removal and Installation Manual
 - (d) Hartzell Propeller Inc. Manual 183 (61-12-83) - Propeller Anti-icing Boot Removal and Installation Manual
- █ (11) Propeller ice protection system components not supplied by Hartzell Propeller Inc. are controlled by the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).
- █ (12) Install the propeller spinner dome in accordance with the section "Spinner Installation" in this chapter.

D. Installation of "N" Flange Propellers**(1) General**

- (a) An "N" flange propeller has eight 9/16 inch studs configured in a 4.25 inch circle.
- (b) Two dowel pins are also provided to transfer torque and index the propeller with respect to the engine crankshaft. Refer to Figure 3-8.
- (c) The dowel pin locations used on a particular propeller installation are indicated in the propeller model stamped on the hub. Refer to Aluminum Hub Propeller Model Identification in the Description and Operation Chapter of this manual.

- (2) Perform the applicable steps under Spinner Pre-Installation within this chapter.

WARNING: CLEANING AGENTS ARE FLAMMABLE AND TOXIC TO THE SKIN, EYES, AND RESPIRATORY TRACT. SKIN AND EYE PROTECTION IS REQUIRED. AVOID PROLONGED CONTACT. USE IN WELL VENTILATED AREA.

- (3) Clean the engine flange and propeller flange with Quick Dry Stoddard Solvent or MEK.
- (4) Refer to Figure 3-8. Install the O-ring on the engine flange. Refer to Table 3-4 for the applicable O-ring and mounting hardware.

NOTE: When the propeller is received from the factory, the O-ring has been installed.

WARNING: MAKE SURE THAT ANY EQUIPMENT USED TO INSTALL THE PROPELLER IS RATED UP TO 800 LBS. (363 KG) TO SUPPORT THE WEIGHT OF THE PROPELLER ASSEMBLY DURING INSTALLATION. ONE PERSON MUST NEVER ATTEMPT TO INSTALL AN UNSUPPORTED PROPELLER BY HIMSELF, REGARDLESS OF THE SIZE OR WEIGHT OF THE PROPELLER. MANUALLY LIFTING THE PROPELLER ONTO THE ENGINE CAN RESULT IN PERSONAL INJURY.

CAUTION 1: A PROPELLER MUST BE CORRECTLY SUPPORTED DURING INSTALLATION ON THE ENGINE. AVOID ANY ROCKING OR SHIFTING OF THE PROPELLER WHEN IT IS PARTIALLY ENGAGED WITH THE ENGINE. ROCKING OF THE PROPELLER DURING PROPELLER INSTALLATION CAN DAMAGE THE PROPELLER HUB MOUNTING FACE, CAUSING ACTUATION OIL LEAKAGE OR DAMAGE THAT MAY SCRAP THE HUB. HUB DAMAGE CAN ALSO INTRODUCE METAL INTO THE PROPELLER OIL ACTUATION SYSTEM, WHICH COULD POSSIBLY DAMAGE THE ENGINE.

CAUTION 2: WHEN INSTALLING THE PROPELLER ON THE AIRCRAFT, DO NOT DAMAGE THE ICE PROTECTION SYSTEM COMPONENTS, IF APPLICABLE.

- (5) With a suitable support, such as a crane hoist or similar equipment, carefully move the propeller assembly to the aircraft engine mounting flange in preparation for installation.

- (6) Install the propeller on the engine flange. Make certain to align the dowel pins in the propeller flange with the corresponding holes in the engine mounting flange.
 - (a) The propeller may be installed on the engine flange in a given position, or 180 degrees from that position. Check the engine and airframe manuals to determine if either manual specifies a propeller mounting position.

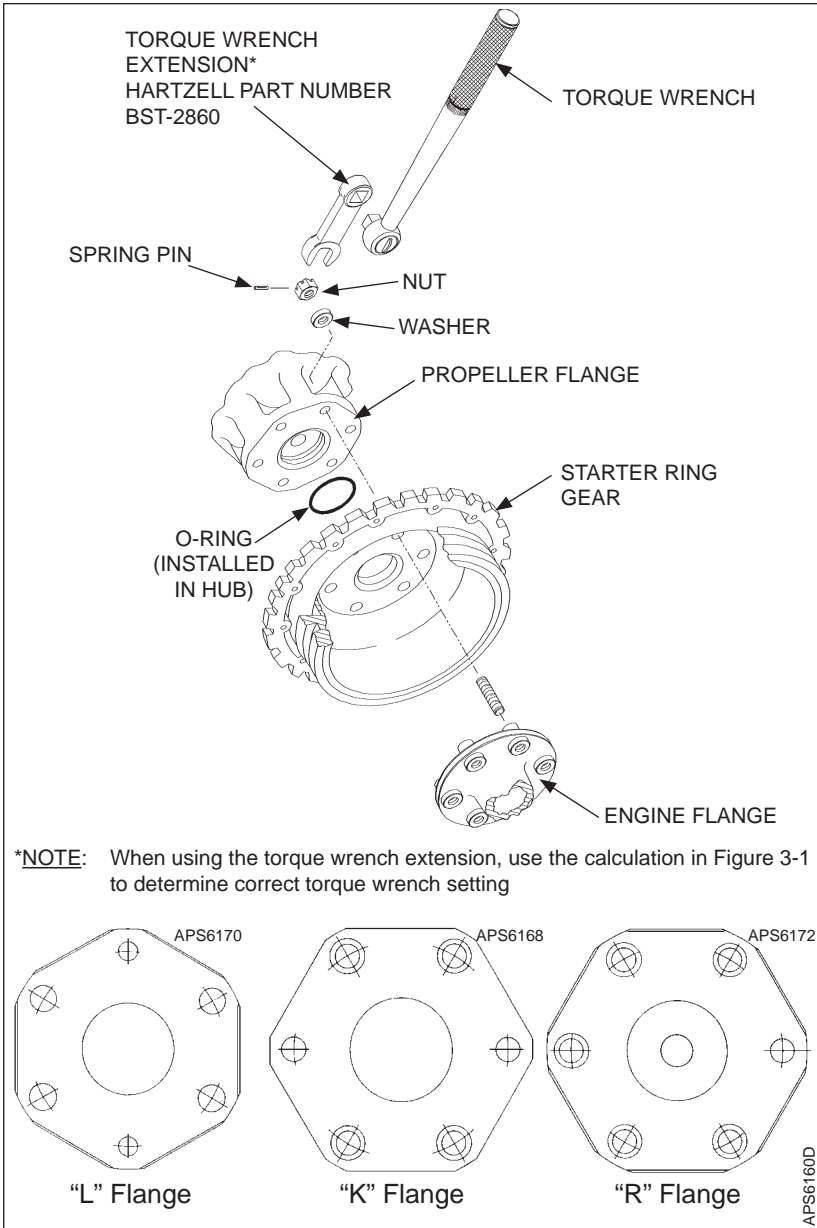
CAUTION 1: MOUNTING HARDWARE MUST BE CLEAN AND DRY TO PREVENT EXCESSIVE PRELOAD OF THE MOUNTING FLANGE.

CAUTION 2: TIGHTEN NUTS EVENLY TO AVOID HUB DAMAGE.

- (7) Install the 9/16 inch propeller mounting nuts (dry) with washers. Refer to Table 3-4.
 - (a) If the propeller is removed between overhaul intervals, mounting nuts may be reused if they are not damaged or corroded.
- (8) Torque the 9/16 inch propeller mounting nuts (dry) in accordance with Table 3-1 and Figure 3-1.
- (9) If required by the aircraft maintenance manual, safety all mounting studs with 0.032 inch (0.81 mm) minimum diameter stainless steel wire or equivalent aircraft safety cable and associated hardware (two studs for each safety). Refer to Figure 3-4.

- █ (10) If the propeller is equipped with an ice protection system that uses components supplied by Hartzell Propeller Inc., applicable instructions and technical information for the components supplied by Hartzell Propeller Inc. can be found in the following publications available on the Hartzell Propeller Inc. website at www.hartzellprop.com:
 - (a) Hartzell Propeller Inc. Manual 180 (30-61-80) - Propeller Ice Protection System Manual
 - (b) Hartzell Propeller Inc. Manual 181 (30-60-81) - Propeller Ice Protection System Component Maintenance Manual
 - (c) Hartzell Propeller Inc. Manual 182 (61-12-82) - Propeller Electrical De-ice Boot Removal and Installation Manual
 - (d) Hartzell Propeller Inc. Manual 183 (61-12-83) - Propeller Anti-icing Boot Removal and Installation Manual
- █ (11) Propeller ice protection system components not supplied by Hartzell Propeller Inc. are controlled by the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).
- █ (12) Install the propeller spinner dome in accordance with the section "Spinner Installation" in this chapter.

(This page is intentionally blank.)



"L," "K," and "R" Flange Propeller Mounting - Figure 3-9

E. Installation of "L" Flange Propellers, Except Model HC-E2YL-()

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST CHAPTER OF THE APPLICABLE OVERHAUL MANUAL(S) FOR THE IDENTIFICATION OF SPECIFIC PROPELLER CRITICAL PARTS.

(1) General

- (a) An "L" flange is an SAE No. 2 flange with six 7/16 inch studs configured in a 4.75 inch circle.
- (b) Four drive bushings transfer torque and index the propeller with respect to the engine crankshaft. The bushings are located on the engine flange and fit into openings on the propeller flange. Refer to Figure 3-9.
- (c) The bushing locations used on a particular propeller installation are indicated in the propeller model stamped on the hub. Refer to Aluminum Hub Propeller Model Identification in the Description and Operation chapter of this manual.

(2) Perform the appropriate steps in the Spinner Pre-Installation section in this chapter.

WARNING: CLEANING AGENTS ARE FLAMMABLE AND TOXIC TO THE SKIN, EYES, AND RESPIRATORY TRACT. SKIN AND EYE PROTECTION ARE REQUIRED. AVOID PROLONGED CONTACT. USE IN WELL VENTILATED AREA.

- (3) Clean the engine flange and propeller flange with Quick Dry Stoddard Solvent or MEK.

- (4) Refer to Figure 3-9. Install the O-ring in the O-ring groove in the rear of the hub. Refer to Table 3-4 for the applicable O-ring and mounting hardware.

NOTE: When the propeller is received from the factory, the O-ring has been installed.

WARNING: MAKE SURE THAT ANY EQUIPMENT USED TO INSTALL THE PROPELLER IS RATED UP TO 800 LBS. (363 KG) TO SUPPORT THE WEIGHT OF THE PROPELLER ASSEMBLY DURING INSTALLATION. ONE PERSON MUST NEVER ATTEMPT TO INSTALL AN UNSUPPORTED PROPELLER BY HIMSELF, REGARDLESS OF THE SIZE OR WEIGHT OF THE PROPELLER. MANUALLY LIFTING THE PROPELLER ONTO THE ENGINE CAN RESULT IN PERSONAL INJURY.

CAUTION 1: A PROPELLER MUST BE CORRECTLY SUPPORTED DURING INSTALLATION ON THE ENGINE. AVOID ANY ROCKING OR SHIFTING OF THE PROPELLER WHEN IT IS PARTIALLY ENGAGED WITH THE ENGINE. ROCKING OF THE PROPELLER DURING PROPELLER INSTALLATION CAN DAMAGE THE PROPELLER HUB MOUNTING FACE, CAUSING ACTUATION OIL LEAKAGE OR DAMAGE THAT MAY SCRAP THE HUB. HUB DAMAGE CAN ALSO INTRODUCE METAL INTO THE PROPELLER OIL ACTUATION SYSTEM, WHICH COULD POSSIBLY DAMAGE THE ENGINE.

CAUTION 2: WHEN INSTALLING THE PROPELLER ON THE AIRCRAFT, DO NOT DAMAGE THE ICE PROTECTION SYSTEM COMPONENTS, IF APPLICABLE.

- (5) With a suitable support, such as a crane hoist or similar equipment, carefully move the propeller assembly to the aircraft engine mounting flange in preparation for installation.
- (6) Install the propeller on the engine flange. Align the engine flange bushings with the corresponding holes in the propeller flange.
 - (a) The propeller may be installed on the engine flange in a given position, or 180 degrees from that position. Check the engine and airframe manuals to determine if either manual specifies a propeller mounting position.

CAUTION 1: MOUNTING HARDWARE MUST BE CLEAN AND DRY TO PREVENT EXCESSIVE PRELOAD OF THE MOUNTING FLANGE.

CAUTION 2: TIGHTEN NUTS EVENLY TO AVOID HUB DAMAGE.

- (7) Torque the 7/16 inch propeller mounting studs (dry) in accordance with Table 3-1 and Figure 3-1.
- (8) If required by the aircraft maintenance manual, safety all mounting studs with 0.032 inch (0.81 mm) minimum diameter stainless steel wire or equivalent aircraft safety cable and associated hardware (two studs for each safety). Refer to Figure 3-6.
 - (a) If the propeller is removed between overhaul intervals, mounting studs may be reused if they are not damaged or corroded.

- (9) If the propeller is equipped with an ice protection system that uses components supplied by Hartzell Propeller Inc., applicable instructions and technical information for the components supplied by Hartzell Propeller Inc. can be found in the following publications available on the Hartzell Propeller Inc. website at www.hartzellprop.com:
 - (a) Hartzell Propeller Inc. Manual 180 (30-61-80) - Propeller Ice Protection System Manual
 - (b) Hartzell Propeller Inc. Manual 181 (30-60-81) - Propeller Ice Protection System Component Maintenance Manual
 - (c) Hartzell Propeller Inc. Manual 182 (61-12-82) - Propeller Electrical De-ice Boot Removal and Installation Manual
 - (d) Hartzell Propeller Inc. Manual 183 (61-12-83) - Propeller Anti-icing Boot Removal and Installation Manual
- (10) Propeller ice protection system components not supplied by Hartzell Propeller Inc. are controlled by the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).
- (11) Install the propeller spinner dome in accordance with the section "Spinner Installation" in this chapter.

(This page is intentionally blank.)

F. Installation of HC-E2YL-() Propellers

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST CHAPTER OF THE APPLICABLE OVERHAUL MANUAL(S) FOR THE IDENTIFICATION OF SPECIFIC PROPELLER CRITICAL PARTS.

(1) General

- (a) An E2YL flange has four 7/16 inch studs and two 7/16 inch bolts configured in a 4.75 inch circle.
- (b) Four drive bushings transfer torque and index the propeller with respect to the engine crankshaft. The bushings are located on the engine flange and fit into openings on the propeller flange. Refer to Figure 3-7.
- (c) The bushing location used on this propeller installation is indicated in the propeller model. Refer to Aluminum Hub Propeller Model Identification in the Description and Operation chapter of this manual.

(2) Perform the applicable steps in the Spinner Pre-installation section in this chapter.

WARNING: CLEANING AGENTS ARE FLAMMABLE AND TOXIC TO THE SKIN, EYES, AND RESPIRATORY TRACT. SKIN AND EYE PROTECTION ARE REQUIRED. AVOID PROLONGED CONTACT. USE IN WELL VENTILATED AREA.

- (3) Clean the engine flange and propeller flange with Quick Dry Stoddard Solvent or MEK.

- (4) Refer to Figure 3-9. Install the O-ring in the O-ring groove in the rear of the hub. Refer to Table 3-4 for the applicable O-ring and mounting hardware.

NOTE: When the propeller is received from the factory, the O-ring has been installed.

WARNING: MAKE SURE THAT ANY EQUIPMENT USED TO INSTALL THE PROPELLER IS RATED UP TO 800 LBS. (363 KG) TO SUPPORT THE WEIGHT OF THE PROPELLER ASSEMBLY DURING INSTALLATION. ONE PERSON MUST NEVER ATTEMPT TO INSTALL AN UNSUPPORTED PROPELLER BY HIMSELF, REGARDLESS OF THE SIZE OR WEIGHT OF THE PROPELLER. MANUALLY LIFTING THE PROPELLER ONTO THE ENGINE CAN RESULT IN PERSONAL INJURY.

CAUTION 1: A PROPELLER MUST BE CORRECTLY SUPPORTED DURING INSTALLATION ON THE ENGINE. AVOID ANY ROCKING OR SHIFTING OF THE PROPELLER WHEN IT IS PARTIALLY ENGAGED WITH THE ENGINE. ROCKING OF THE PROPELLER DURING PROPELLER INSTALLATION CAN DAMAGE THE PROPELLER HUB MOUNTING FACE, CAUSING ACTUATION OIL LEAKAGE OR DAMAGE THAT MAY SCRAP THE HUB. HUB DAMAGE CAN ALSO INTRODUCE METAL INTO THE PROPELLER OIL ACTUATION SYSTEM, WHICH COULD POSSIBLY DAMAGE THE ENGINE.

CAUTION 2: WHEN INSTALLING THE PROPELLER ON THE AIRCRAFT, DO NOT DAMAGE THE ICE PROTECTION SYSTEM COMPONENTS, IF APPLICABLE.

- (5) With a suitable support, such as a crane hoist or similar equipment, carefully move the propeller assembly to the aircraft engine mounting flange in preparation for installation.
- (6) Install the propeller on the engine flange. Align the engine flange bushings with the corresponding holes in the propeller flange.
 - (a) The propeller may be installed on the engine flange in a given position, or 180 degrees from that position. Refer to the engine and airframe manuals to determine if either manual specifies a propeller mounting position.

CAUTION 1: MOUNTING HARDWARE MUST BE CLEAN AND DRY TO PREVENT EXCESSIVE PRELOAD OF THE MOUNTING FLANGE.

CAUTION 2: TIGHTEN NUTS EVENLY TO AVOID HUB DAMAGE.

- (7) Install the 7/16 inch propeller mounting bolts (dry) with washers. Refer to Table 3-4.
 - (a) If the propeller is removed between overhaul intervals, mounting bolts and studs may be reused if they are not damaged or corroded.
- (8) Torque the 7/16 inch nuts on the propeller mounting studs (dry) and the 7/16 inch bolts (dry) in accordance with Table 3-1 and Figure 3-1.
- (9) If required by the aircraft maintenance manual, safety all mounting studs with 0.032 inch (0.81 mm) minimum diameter stainless steel wire or equivalent aircraft safety cable and associated hardware (two studs for each safety). Refer to Figure 3-6.

- (10) If the propeller is equipped with an ice protection system that uses components supplied by Hartzell Propeller Inc., applicable instructions and technical information for the components supplied by Hartzell Propeller Inc. can be found in the following publications available on the Hartzell Propeller Inc. website at www.hartzellprop.com:
 - (a) Hartzell Propeller Inc. Manual 180 (30-61-80) - Propeller Ice Protection System Manual
 - (b) Hartzell Propeller Inc. Manual 181 (30-60-81) - Propeller Ice Protection System Component Maintenance Manual
 - (c) Hartzell Propeller Inc. Manual 182 (61-12-82) - Propeller Electrical De-ice Boot Removal and Installation Manual
 - (d) Hartzell Propeller Inc. Manual 183 (61-12-83) - Propeller Anti-icing Boot Removal and Installation Manual
- (11) Propeller ice protection system components not supplied by Hartzell Propeller Inc. are controlled by the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).
- (12) Install the propeller spinner dome in accordance with the section "Spinner Installation" in this chapter.

G. Installation of “K” and “R” Flange Propellers

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST CHAPTER OF THE APPLICABLE OVERHAUL MANUAL(S) FOR THE IDENTIFICATION OF SPECIFIC PROPELLER CRITICAL PARTS.

(1) General

- (a) A “K” or “R” flange is an SAE No. 2 flange that has six 1/2 inch studs configured in a 4.75 inch circle.
- (b) Four (“K” flange) or five (“R” flange) drive bushings transfer torque and index the propeller with respect to the engine crankshaft. The bushings are located on the engine flange and fit into counterbored holes on the propeller flange. Refer to Figure 3-9.
- (c) An “R” flange propeller may be installed on a “K” engine flange. A “K” flange propeller cannot be installed on an “R” flange engine.
- (d) The bushing locations used on a particular propeller installation are indicated in the propeller model stamped on the hub. Refer to Aluminum Hub Propeller Model Identification in the Description and Operation chapter of this manual.

(2) Perform the applicable steps under Spinner Pre-Installation within this chapter.

WARNING: CLEANING AGENTS ARE FLAMMABLE AND TOXIC TO THE SKIN, EYES AND RESPIRATORY TRACT. SKIN AND EYE PROTECTION IS REQUIRED. AVOID PROLONGED CONTACT. USE IN WELL VENTILATED AREA.

- (3) Clean the engine flange and propeller flange with Quick Dry Stoddard Solvent or MEK.

- (4) See Figure 3-9. Install the O-ring in the O-ring groove in the rear of the hub. See Table 3-4 for the applicable O-ring and mounting hardware.

NOTE: When the propeller is received from the factory, the O-ring has been installed.

WARNING: MAKE SURE THAT ANY EQUIPMENT USED TO INSTALL THE PROPELLER IS RATED UP TO 800 LBS. (363 KG) TO SUPPORT THE WEIGHT OF THE PROPELLER ASSEMBLY DURING INSTALLATION. ONE PERSON MUST NEVER ATTEMPT TO INSTALL AN UNSUPPORTED PROPELLER BY HIMSELF, REGARDLESS OF THE SIZE OR WEIGHT OF THE PROPELLER. MANUALLY LIFTING THE PROPELLER ONTO THE ENGINE CAN RESULT IN PERSONAL INJURY.

CAUTION 1: A PROPELLER MUST BE CORRECTLY SUPPORTED DURING INSTALLATION ON THE ENGINE. AVOID ANY ROCKING OR SHIFTING OF THE PROPELLER WHEN IT IS PARTIALLY ENGAGED WITH THE ENGINE. ROCKING OF THE PROPELLER DURING PROPELLER INSTALLATION CAN DAMAGE THE PROPELLER HUB MOUNTING FACE, CAUSING ACTUATION OIL LEAKAGE OR DAMAGE THAT MAY SCRAP THE HUB. HUB DAMAGE CAN ALSO INTRODUCE METAL INTO THE PROPELLER OIL ACTUATION SYSTEM, WHICH COULD POSSIBLY DAMAGE THE ENGINE.

CAUTION 2: WHEN INSTALLING THE PROPELLER ON THE AIRCRAFT, DO NOT DAMAGE THE ICE PROTECTION SYSTEM COMPONENTS, IF APPLICABLE.

- (5) With a suitable support, such as a crane hoist or similar equipment, carefully move the propeller assembly to the aircraft engine mounting flange in preparation for installation.
- (6) Install the propeller on the engine flange. Align the engine flange bushings with the corresponding holes in the propeller flange.
 - (a) An "R" flange propeller may be installed on a "K" engine flange in a given position, or 180 degrees from that position.
 - (b) An "R" flange propeller may be installed on an "R" engine flange in one position only.
 - (c) A "K" flange propeller may be installed only on a "K" engine flange, but may be installed in a given position, or 180 degrees from that position.
 - (d) Check the engine and airframe manuals to determine if either manual specifies a propeller mounting position.

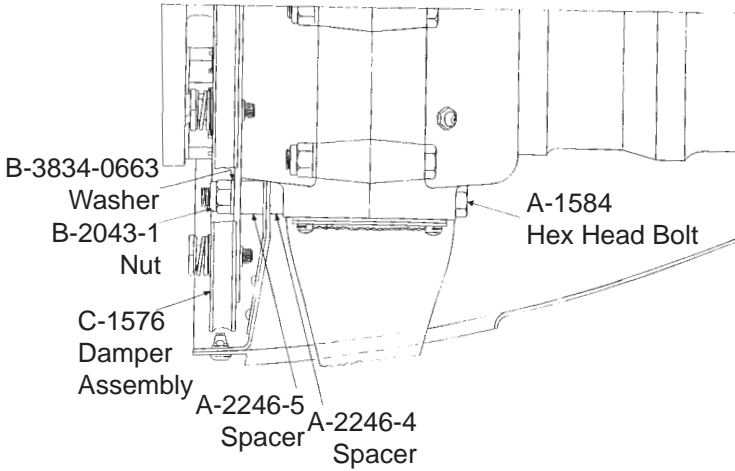
CAUTION 1: MOUNTING HARDWARE MUST BE CLEAN AND DRY TO PREVENT EXCESSIVE PRELOAD OF THE MOUNTING FLANGE.

CAUTION 2: TIGHTEN NUTS EVENLY TO AVOID HUB DAMAGE.

- (7) Torque the 1/2 inch propeller mounting studs (dry) in accordance with Table 3-1, Figure 3-1, and Figure 3-2.
- (8) If required by the aircraft maintenance manual, safety all mounting studs with 0.032 inch (0.81 mm) minimum diameter stainless steel wire or equivalent aircraft safety cable and associated hardware (two studs for each safety). Refer to Figure 3-6.
 - (a) If the propeller is removed between overhaul intervals, mounting studs may be reused if they are not damaged or corroded.

- (9) If the propeller is equipped with an ice protection system that uses components supplied by Hartzell Propeller Inc., applicable instructions and technical information for the components supplied by Hartzell Propeller Inc. can be found in the following publications available on the Hartzell Propeller Inc. website at www.hartzellprop.com:
 - (a) Manual 180 (30-61-80) - Propeller Ice Protection System Manual
 - (b) Manual 181 (30-60-81) - Propeller Ice Protection System Component Maintenance Manual
 - (c) Manual 182 (61-12-82) - Propeller Electrical De-ice Boot Removal and Installation Manual
 - (d) Manual 183 (61-12-83) - Propeller Anti-icing Boot Removal and Installation Manual
- (10) Propeller ice protection system components not supplied by Hartzell Propeller Inc. are controlled by the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).
- (11) Install the propeller spinner dome in accordance with the section "Spinner Installation" in this chapter.

TI-00177



**Damper Installation
Figure 3-10**

Dome or Cap	Washer	Screw
Metal Spinner Dome	A-1020 Fiber	B-3845-8 10-32, Truss Head
Metal Spinner Cap	n/a	B-3866-50 8-32, 100° Head, Cres
Composite Spinner Dome	B-3860-10L Dimpled, 100°, Cres.	B-3867-272 10-32, 100° Head, Cres

**Spinner Dome and Spinner Cap Mounting Hardware
Table 3-5**

5. Damper Installation

- A. Installation of C-1576 Damper (Hartzell Propeller Inc. Kit A-1583)

CAUTION: USE WITH A-2476-16 SPINNER MOUNTING KIT ONLY.

- (1) Use the A-2476-16 spinner mounting kit when installing the C-1576 damper assembly (Figure 3-10).
 - (a) Remove four of the B-3834-0663 washers from the A-2476-16 spinner mounting kit when installing the C-1576 damper assembly.
- (2) Install the propeller spinner dome and cap in accordance with the section "Spinner Installation" in this chapter.

6. Spinner Installation

CAUTION: TO PREVENT DAMAGE TO THE BLADE AND BLADE PAINT, WRAP THE BLADE SHANKS IN SEVERAL LAYERS OF MASKING OR DUCT TAPE BEFORE INSTALLING THE SPINNER DOME. REMOVE THE TAPE AFTER THE SPINNER IS INSTALLED.

- A. Installing a One-Piece Spinner Dome, Except Spinner Assembly C-3567-(4,8) With a D-7811-10(P) Spinner Dome

- (1) The following instructions relate to Hartzell Propeller Inc. spinners only. In some cases, the airframe manufacturer produced the spinner assembly. If so, refer to the airframe manufacturer's manual for spinner installation instructions.
- (2) Examine the low pitch stop hardware configuration.
 - (a) If the visual examination shows that the hardware configuration is one hex nut safety wired to a set screw, no further action is required.
 - (b) If the visual examination shows that the hardware configuration is not one hex nut safety wired to a set screw, modify the propeller assembly to the hardware configuration of one hex nut safety wired to a set screw in accordance with the section "Modification of the Low Pitch Stop Hardware" in the Maintenance Practices chapter of this manual.

- (3) Examine the interior of the spinner dome. If the spinner dome has an internal support (see Figure 2-3) that encircles the propeller cylinder, the cylinder may need to be wrapped with one or more layers of UHMW tape (Hartzell Propeller Inc. P/N B-6654-100).

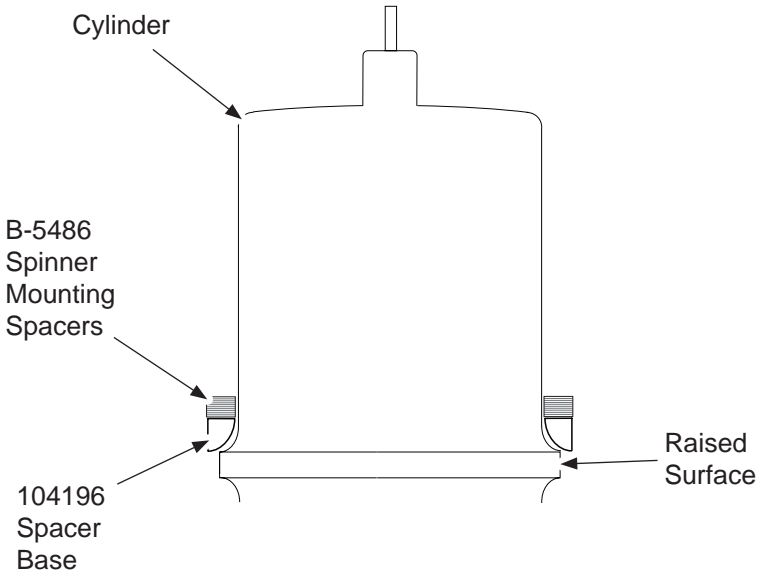
CAUTION: THE SPINNER DOME INTERNAL SUPPORT MUST FIT SNUGLY ON CYLINDER. AN IMPROPERLY SUPPORTED DOME COULD CAUSE CYLINDER DAMAGE OR A CRACK IN THE DOME OR BULKHEAD.

- (4) Install the spinner and check for a snug fit where the internal support contacts the cylinder. If the support does not fit snugly on the cylinder, apply a layer of UHMW tape and recheck. Repeat until the spinner support fits snugly on the cylinder.

CAUTION: TO AVOID DAMAGING THE AIRCRAFT COWLING, THE SCREWS MUST NOT EXTEND MORE THAN THREE THREADS PAST THE BULKHEAD NUTPLATES.

- (5) Attach the spinner to the spinner bulkhead or adapter ring with the supplied screws and washers. Refer to Table 3-5.
- (a) When the spinner dome has been removed to facilitate maintenance, check the spinner internal support to cylinder fit. If the spinner loosens in service, add one or more layers of UHMW tape to the cylinder until the spinner fits snugly.

(This page is intentionally blank.)



TPH-MB-0032

Installing the Spacer Base and Spinner Mounting Spacers
Figure 3-11

**B. Installing Spinner Assembly C-3567-(4,8) With a
D-7811-10(P) Spinner Dome****(1) General**

- (a) This section provides instructions for installing a redesigned C-3567-(4,8)(P) spinner assembly that includes a D-7811-10(P) spinner dome and the following forward support components:

- 1** 104195 Plastic Forward Bulkhead
- 2** 104196 Spacer Base
- 3** B-5486 Spinner Mounting Spacer

NOTE: The forward support components are not compatible with the D-7811-7(P) spinner dome used on the previous design.

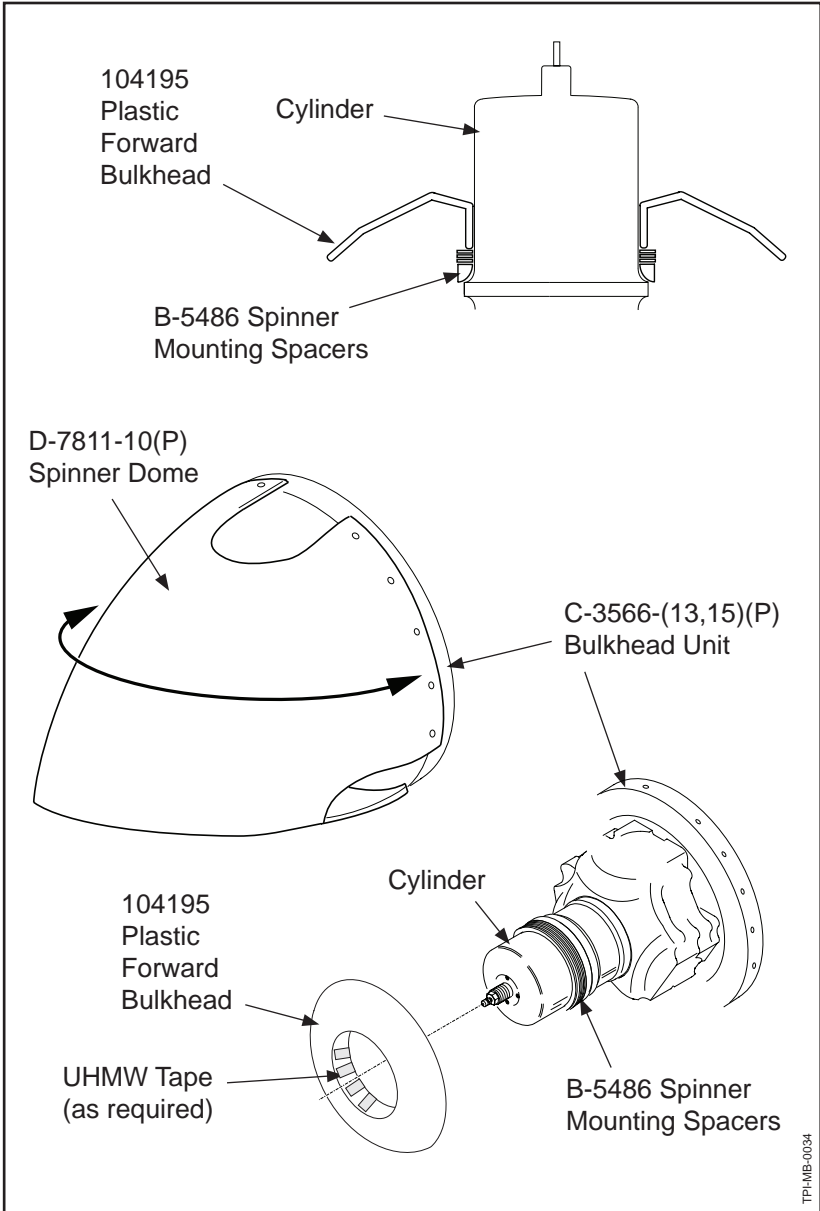
- (b) The redesigned C-3567-(4,8)(P) spinner assembly may be used with the previous design of the C-3567-(4, 8)(P) spinner assembly on the same aircraft.

- 1** The redesigned spinner dome has the same shape and finish as the previous design and appears identical when installed on the aircraft.

(2) Procedure

- (a) Install the C-3566-(13,15)(P) bulkhead unit in accordance with the applicable paragraphs in the section "Spinner Pre-Installation" in this chapter.
- (b) Put the 104196 spacer base on the cylinder with the radiused side of the spacer base against the raised surface on the cylinder. Refer to Figure 3-11.
- (c) Put ten B-5486 spinner mounting spacers on the cylinder on top of the 104196 spacer base.

NOTE: The B-5486 spinner mounting spacers are used to adjust the spinner dome preload. Spacers may be added or removed after pre-fitting the spinner dome later in this procedure.



**Install the Plastic Forward Bulkhead and Pre-fit the Spinner Dome
Figure 3-12**

- (d) Put the 104195 plastic forward bulkhead over the cylinder on top of the B-5486 spinner mounting spacers. Refer to Figure 3-12.

CAUTION: THE 104195 PLASTIC FORWARD BULKHEAD MUST FIT SNUGLY ON THE CYLINDER. IF THE PLASTIC FORWARD BULKHEAD IS LOOSE, IT MAY RESULT IN DAMAGE TO THE CYLINDER.

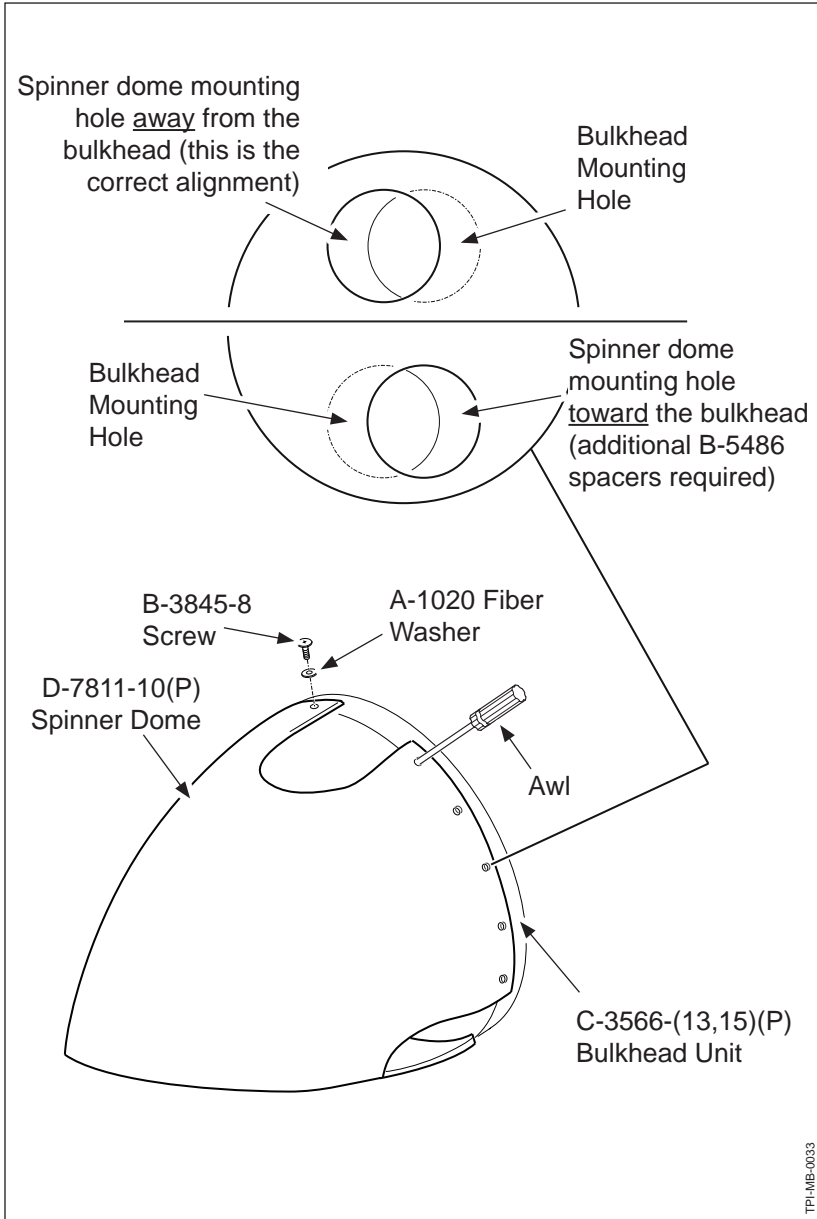
- (e) Pre-fit the D-7811-10(P) spinner dome. Refer to Figure 3-12.

- 1 Put the spinner dome over the 104195 plastic forward bulkhead and gently push the spinner dome as far aft as it will go onto the C-3566-(13,15)(P) bulkhead unit.
 - a Do not install mounting hardware at this time.
- 2 Holding the spinner dome on opposite sides, carefully try to shift the dome from side-to-side.
- 3 If the spinner dome shifts easily, the plastic forward bulkhead may not be snug on the cylinder.
 - a Remove the spinner dome and the plastic forward bulkhead.

CAUTION: IF APPLYING UHMW TAPE TO THE OUTER DIAMETER OF THE CYLINDER, DO NOT COVER ANY LABELS.

- b Apply UHMW tape CM137 or equivalent, to the inside diameter of the plastic forward bulkhead or to the outer diameter of the cylinder.

- (1) Strips of UHMW tape approximately 2 inches (50 mm) long may be applied from front to back at evenly spaced locations around the inside diameter of the plastic forward bulkhead. Refer to Figure 3-12.



Spinner Dome Mounting Hole Alignment
Figure 3-13

- (2) UHMW tape may be applied around the entire circumference of the inside diameter of the plastic forward bulkhead.
- (3) UHMW tape may be applied around the outer diameter of the cylinder where the plastic forward bulkhead will be installed.
- c Repeat steps 6.B.(2)(d) and 6.B.(2)(e).
 - (1) If the spinner dome shifts easily, apply additional layer(s) of UHMW tape until a snug fit is achieved.
- 4 If the spinner dome does not shift, continue to the next step.
- (f) Gently push the D-7811-10(P) spinner dome as far aft as it will go onto the C-3566-(13,15)(P) bulkhead unit. Refer to Figure 3-13.
- (g) Examine the alignment of the mounting holes in the D-7811-10(P) spinner dome and the C-3566-(13,15)(P) bulkhead unit.
 - 1 The spinner dome mounting holes must be away from the bulkhead unit in relation to the bulkhead mounting holes.
 - 2 Approximately 50% of the diameter of each bulkhead unit mounting hole should be visible through the spinner dome mounting holes.

NOTE: The temporary misalignment of the mounting holes is necessary to get the correct preload of the spinner dome.
 - 3 If the mounting hole position is incorrect, add or remove B-5486 spinner mounting spacers as necessary to get proper alignment.
 - a Remove the spinner dome and the 104195 plastic forward bulkhead.
 - b Add or remove B-5486 spinner mounting spacer(s) as required.
 - c Repeat steps 6.B.(2)(d) thru 6.B.(2)(g).
 - 4 If the mounting hole position is correct, continue to the next step.

- (h) Attach the D-7811-10(P) spinner dome to the C-3566-(13,15)(P) bulkhead unit.
- 1 Install three A-1020 fiber washers and three B-3845-8 screws at evenly spaced locations around the spinner dome.

CAUTION: TO PREVENT DAMAGE TO THE NUT PLATES ON THE BULKHEAD UNIT, USE CAUTION WHEN ALIGNING MOUNTING HOLES WITH AN AWL.

- (a) Push on the spinner dome, or use an awl in the adjacent mounting hole to get full alignment of the mounting holes.
- 2 Install the remaining A-1020 fiber washers and B-3845-8 screws.

(This page is intentionally blank.)

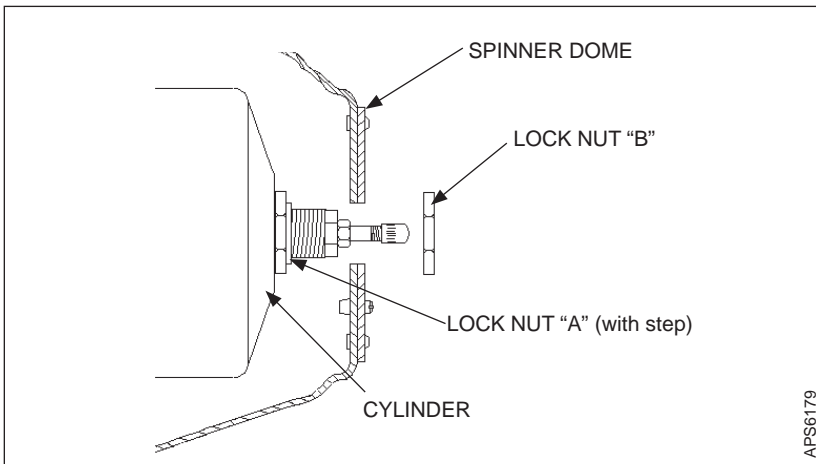
C. Installing a Two-Piece Spinner Dome (Procedure 1)

(1) General

(a) A spinner dome that is installed using Procedure 1 may be identified by the lock nut "A" at the top of the cylinder. The lock nut "A" will have a "step" facing away from the cylinder as illustrated in Figure 3-14.

1 Lock nut "A" may have drilled holes for safety wire, but safety wire is not required in this location.

(b) The following instructions relate to Hartzell Propeller Inc. spinners only. In some cases, the airframe manufacturer produced the spinner assembly. If so, refer to the airframe manufacturer's manual for spinner installation instructions.



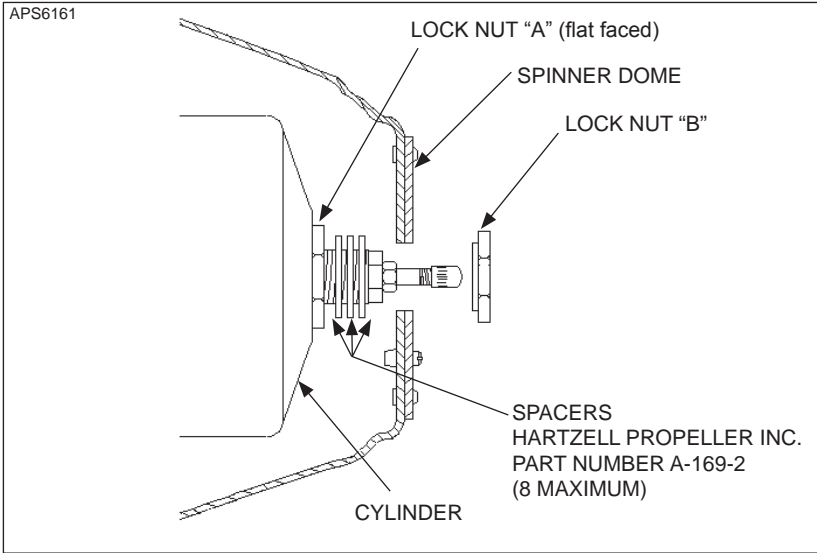
Two-Piece Spinner Mounting (Procedure 1)

Figure 3-14

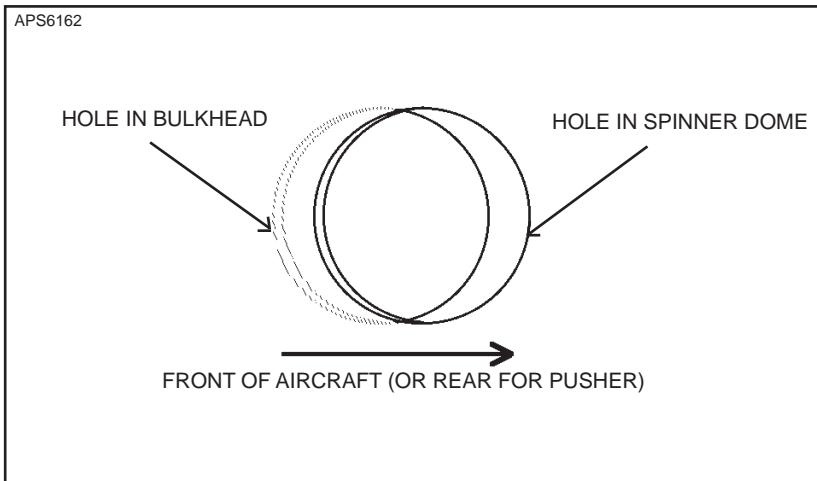
- I (2) Procedure - Refer to Figure 3-14.
- (a) Install the spinner dome.
 - (b) Push the spinner dome toward the bulkhead to align the spinner mounting holes with those of the bulkhead.
 - (c) Using screws and washers, attach the spinner to the bulkhead or adapter ring. Refer to Table 3-5.
 - (d) Install the lock nut "B" on the low pitch stop. Refer to Table 3-1 and Figure 3-1 for lock nut torque.
 - (e) Safety wire the lock nut "B" to each of the two screws on the flat face of the spinner dome surrounding the lock nut "B".

CAUTION: MAKE SURE THAT THE SCREWS DO NOT EXTEND MORE THAN THREE THREADS PAST THE BULKHEAD NUTPLATES. IF THE SCREWS EXTEND MORE THAN THREE THREADS, THIS CAN CAUSE DAMAGE TO THE AIRCRAFT COWLING.

- (f) Using flat head screws, attach the spinner dome cap to the spinner dome. Refer to Table 3-5.



**Two-Piece Spinner Mounting (Procedure 2)
Figure 3-15**



**Spinner Dome to Bulkhead Mounting Hole Alignment
Figure 3-16**

D. Installing a Two-Piece Spinner Dome (Procedure 2)**(1) General**

- (a) A spinner dome that is installed using Procedure 2 may be identified by the lock nut "A" at the top of the cylinder. The lock nut will be flat-faced. Refer to Figure 3-15.

1 Lock nut "A" may have drilled holes for safety wire, but safety wire is not required in this location.

- (b) The following instructions relate to Hartzell Propeller Inc. spinners only. In some cases, the airframe manufacturer produced the spinner assembly. If so, refer to the airframe manufacturer's manual for spinner installation instructions.

(3) Procedure - Refer to Figure 3-15

- (a) Put spacers on the low pitch stop lock nut "A". Up to eight spacers may be used.
- (b) Install spacers, then examine the spinner fit. The spinner is correctly spaced when the holes in the spinner dome are misaligned 1/4 - 1/3 of their diameter toward the front of the aircraft, or rear in a pusher installation. Refer to Figure 3-16. Add or remove spacers to achieve this alignment.
- (c) Install spinner dome.
- (d) Push the spinner dome aft to align the spinner mounting holes with those of the bulkhead or adapter ring.

CAUTION: MAKE SURE THAT THE SCREWS DO NOT EXTEND MORE THAN THREE THREADS PAST THE BULKHEAD NUTPLATES. IF THE SCREWS EXTEND MORE THAN THREE THREADS, THIS CAN CAUSE DAMAGE TO THE AIRCRAFT COWLING.

- (e) Using screws and washers, attach the spinner to the bulkhead or adapter ring. Refer to Table 3-5.
- (f) Install the lock nut "B" (that has a shoulder and safety wire holes) on the low pitch stop. Refer to Table 3-1 and Figure 3-1 for lock nut torque.

- (g) Safety wire the lock nut to each of the two screws on the flat face of the spinner dome surrounding the lock nut.
- (h) Using flat head screws, attach the spinner dome cap to the spinner dome.

7. Post-Installation Checks

Perform Static RPM Check as outlined in the Testing and Troubleshooting chapter in this manual.

8. Spinner Removal

CAUTION: WRAP THE BLADE SHANKS IN SEVERAL LAYERS OF MASKING OR DUCT TAPE BEFORE REMOVING THE SPINNER DOME TO PREVENT DAMAGING THE BLADE AND BLADE PAINT.

A. Removal of One-Piece Spinner

- (1) Remove the screws and washers that attach the spinner to the spinner bulkhead or adapter ring.
- (2) Remove the spinner dome.

B. Removal of Two-Piece Spinner

- (1) Remove the flat head screws that attach the spinner dome cap to the spinner dome.
- (2) Cut and remove the lock nut safety wire.
- (3) Remove the lock nut.
- (4) Remove the screws and washers that attach the spinner dome to the spinner bulkhead.
- (5) Remove the spinner dome.

C. Hub Mounted Spinner Bulkhead Removal

- (1) Remove propeller. Refer to Propeller Removal in this chapter.
- (2) Remove the flat washers and self-locking nuts that attach the spinner bulkhead to the propeller hub. Remove the spinner bulkhead.
- (3) Reinstall the flat washers and self-locking nuts that were removed during the spinner bulkhead removal.

D. Starter Ring Gear Spinner Adapter Removal

- (1) Remove propeller. Refer to Propeller Removal in this chapter.
- (2) Remove the spinner adapter by removing the hardware that attaches the spinner adapter to the starter ring gear.

9. Propeller Removal**A. Removal of "D" Flange Propellers**

- (1) Remove the spinner dome in accordance with the Spinner Removal procedures in this chapter.
- (2) If the propeller is equipped with an ice protection system that uses components supplied by Hartzell Propeller Inc., applicable instructions and technical information for the components supplied by Hartzell Propeller Inc. can be found in the following publications available on the Hartzell Propeller Inc. website at www.hartzellprop.com:
 - (a) Hartzell Propeller Inc. Manual 180 (30-61-80) - Propeller Ice Protection System Manual
 - (b) Hartzell Propeller Inc. Manual 181 (30-60-81) - Propeller Ice Protection System Component Maintenance Manual
 - (c) Hartzell Propeller Inc. Manual 182 (61-12-82) - Propeller Electrical De-Ice Boot Removal and Installation Manual
 - (d) Hartzell Propeller Inc. Manual 183 (61-12-83) - Propeller Anti-Icing Boot Removal and Installation Manual
- (3) Propeller ice protection system components not supplied by Hartzell Propeller Inc. are controlled by the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).
- (4) If installed, cut and remove the safety wire or safety cable on the propeller mounting studs.

WARNING: MAKE SURE THE SLING IS RATED UP TO 800 LBS. (363 KG) TO SUPPORT THE WEIGHT OF THE PROPELLER ASSEMBLY DURING REMOVAL.

- (5) Support the propeller assembly with a sling.

NOTE: Supporting the propeller with the sling may be delayed until all but two mounting nuts and spacers have been removed.

- (6) If the propeller will be reinstalled and it has been dynamically balanced, make an identifying mark (with a felt-tipped pen only) on the propeller hub and a matching mark on the engine flange to make sure of correct positioning of the propeller during re-installation.

NOTE: This will prevent dynamic imbalance.

CAUTION: DISCARD THE PROPELLER MOUNTING NUTS AND SPACERS IF THEY ARE DAMAGED OR CORRODED, OR WHEN THE PROPELLER IS REMOVED FOR OVERHAUL.

- (7) Remove the eight 1/2 inch mounting nuts.
- (a) If the propeller is removed between overhaul intervals, mounting studs, nuts, and spacers may be reused if they are not damaged or corroded.

CAUTION: REMOVE THE PROPELLER FROM THE MOUNTING FLANGE WITH CARE TO PREVENT DAMAGING THE PROPELLER MOUNTING STUDS.

- (8) Using the support sling, remove the propeller from the mounting flange.
- (9) Put the propeller on a cart for transport.

B. Removal of "F" Flange Propellers

- (1) Remove the spinner dome in accordance with the Spinner Removal procedures in this chapter.
- (2) If the propeller is equipped with an ice protection system that uses components supplied by Hartzell Propeller Inc., applicable instructions and technical information for the components supplied by Hartzell Propeller Inc. can be found in the following publications available on the Hartzell Propeller Inc. website at www.hartzellprop.com:
 - (a) Hartzell Propeller Inc. Manual 180 (30-61-80) - Propeller Ice Protection System Manual
 - (b) Hartzell Propeller Inc. Manual 181 (30-60-81) - Propeller Ice Protection System Component Maintenance Manual
 - (c) Hartzell Propeller Inc. Manual 182 (61-12-82) - Propeller Electrical De-Ice Boot Removal and Installation Manual
 - (d) Hartzell Propeller Inc. Manual 183 (61-12-83) - Propeller Anti-Icing Boot Removal and Installation Manual
- (3) Propeller ice protection system components not supplied by Hartzell Propeller Inc. are controlled by the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).
- (4) If installed, cut and remove the safety wire or safety cable on the propeller mounting studs.

WARNING: MAKE SURE THE SLING IS RATED UP TO 800 LBS. (363 KG) TO SUPPORT THE WEIGHT OF THE PROPELLER ASSEMBLY DURING REMOVAL.

- (5) Support the propeller assembly with a sling.

NOTE: Supporting the propeller with the sling may be delayed until all but two mounting nuts and washers have been removed.

- (6) If the propeller will be reinstalled and it has been dynamically balanced, make an identifying mark (with a felt-tipped pen only) on the propeller hub and a matching mark on the engine flange to make sure of correct positioning of the propeller during re-installation.

NOTE: This will prevent dynamic imbalance.

CAUTION: DISCARD THE PROPELLER MOUNTING NUTS AND WASHERS IF THEY ARE DAMAGED OR CORRODED, OR WHEN THE PROPELLER IS REMOVED FOR OVERHAUL.

- (7) Remove the six 1/2 inch mounting nuts.
- (a) If the propeller is removed between overhaul intervals, mounting studs, nuts and washers may be reused if they are not damaged or corroded.

CAUTION: REMOVE THE PROPELLER FROM THE MOUNTING FLANGE WITH CARE TO PREVENT DAMAGING THE PROPELLER MOUNTING STUDS.

- (8) Using the support sling, remove the propeller from the mounting flange.
- (9) Put the propeller on a cart for transport.

C. Removal of "N" Flange Propellers

- (1) Remove the spinner dome in accordance with the Spinner Removal procedures in this chapter.
- (2) If the propeller is equipped with an ice protection system that uses components supplied by Hartzell Propeller Inc., applicable instructions and technical information for the components supplied by Hartzell Propeller Inc. can be found in the following publications available on the Hartzell Propeller Inc. website at www.hartzellprop.com:
 - (a) Hartzell Propeller Inc. Manual 180 (30-61-80) - Propeller Ice Protection System Manual
 - (b) Hartzell Propeller Inc. Manual 181 (30-60-81) - Propeller Ice Protection System Component Maintenance Manual
 - (c) Hartzell Propeller Inc. Manual 182 (61-12-82) - Propeller Electrical De-Ice Boot Removal and Installation Manual
 - (d) Hartzell Propeller Inc. Manual 183 (61-12-83) - Propeller Anti-Icing Boot Removal and Installation Manual
- (3) Propeller ice protection system components not supplied by Hartzell Propeller Inc. are controlled by the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).
- (4) If installed, cut and remove the safety wire or safety cable on the propeller mounting studs.

WARNING: MAKE SURE THE SLING IS RATED UP TO 800 LBS. (363 KG) TO SUPPORT THE WEIGHT OF THE PROPELLER ASSEMBLY DURING REMOVAL.

- (5) Support the propeller assembly with a sling.

NOTE: Supporting the propeller with the sling may be delayed until all but two mounting studs and washers have been removed.

- (6) If the propeller will be reinstalled and it has been dynamically balanced, make an identifying mark (with a felt-tipped pen only) on the propeller hub and a matching mark on the engine flange to make sure of correct positioning of the propeller during re-installation.

NOTE: This will prevent dynamic imbalance.

CAUTION: DISCARD THE PROPELLER MOUNTING NUTS AND WASHERS IF THEY ARE DAMAGED OR CORRODED, OR WHEN THE PROPELLER IS REMOVED FOR OVERHAUL.

- (7) Remove the eight 9/16 inch mounting nuts.
- (a) If the propeller is removed between overhaul intervals, mounting studs, nuts and washers may be reused if they are not damaged or corroded.

CAUTION: REMOVE THE PROPELLER FROM THE ENGINE MOUNTING FLANGE WITH CARE TO PREVENT DAMAGING THE PROPELLER MOUNTING STUDS.

- (8) Using the support sling, remove the propeller from the mounting flange.
- (9) Put the propeller on a cart for transport.

- D. Removal of "L" Flange Propellers, Except Model HC-E2YL-()
- (1) Remove the spinner dome in accordance with the Spinner Removal procedures in this chapter.
 - (2) If the propeller is equipped with an ice protection system that uses components supplied by Hartzell Propeller Inc., applicable instructions and technical information for the components supplied by Hartzell Propeller Inc. can be found in the following publications available on the Hartzell Propeller Inc. website at www.hartzellprop.com:
 - (a) Hartzell Propeller Inc. Manual 180 (30-61-80) - Propeller Ice Protection System Manual
 - (b) Hartzell Propeller Inc. Manual 181 (30-60-81) - Propeller Ice Protection System Component Maintenance Manual
 - (c) Hartzell Propeller Inc. Manual 182 (61-12-82) - Propeller Electrical De-Ice Boot Removal and Installation Manual
 - (d) Hartzell Propeller Inc. Manual 183 (61-12-83) - Propeller Anti-Icing Boot Removal and Installation Manual
 - (3) Propeller ice protection system components not supplied by Hartzell Propeller Inc. are controlled by the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).
 - (4) If installed, cut and remove the safety wire or safety cable on the propeller mounting stud nuts.

WARNING: MAKE SURE THE SLING IS RATED UP TO 800 LBS. (363 KG) TO SUPPORT THE WEIGHT OF THE PROPELLER ASSEMBLY DURING REMOVAL.

- (5) Support the propeller assembly with a sling.
- (6) If the propeller will be reinstalled and it has been dynamically balanced, make an identifying mark (with a felt-tipped pen only) on the propeller hub and a matching mark on the engine flange to make sure of correct positioning of the propeller during re-installation.

NOTE: This will prevent dynamic imbalance.

CAUTION: DISCARD THE PROPELLER MOUNTING STUDS, NUTS, AND WASHERS IF THEY ARE DAMAGED OR CORRODED, OR WHEN THE PROPELLER IS REMOVED FOR OVERHAUL.

- (7) Unscrew the six 7/16 inch mounting studs from the engine bushings.
 - (a) If the propeller is removed between overhaul intervals, mounting studs, nuts and washers may be reused if they are not damaged or corroded.

CAUTION: REMOVE THE PROPELLER FROM THE ENGINE MOUNTING FLANGE WITH CARE TO PREVENT DAMAGING THE PROPELLER MOUNTING STUDS.

- (8) Using the support sling, remove the propeller from the mounting flange.
- (9) Put the propeller on a cart for transport.

E. Removal of HC-E2YL-() Propellers

- (1) Remove the spinner dome in accordance with the Spinner Removal procedures in this chapter.
- (2) If the propeller is equipped with an ice protection system that uses components supplied by Hartzell Propeller Inc., applicable instructions and technical information for the components supplied by Hartzell Propeller Inc. can be found in the following publications available on the Hartzell Propeller Inc. website at www.hartzellprop.com:
 - (a) Hartzell Propeller Inc. Manual 180 (30-61-80) - Propeller Ice Protection System Manual
 - (b) Hartzell Propeller Inc. Manual 181 (30-60-81) - Propeller Ice Protection System Component Maintenance Manual
 - (c) Hartzell Propeller Inc. Manual 182 (61-12-82) - Propeller Electrical De-Ice Boot Removal and Installation Manual
 - (d) Hartzell Propeller Inc. Manual 183 (61-12-83) - Propeller Anti-Icing Boot Removal and Installation Manual
- (3) Propeller ice protection system components not supplied by Hartzell Propeller Inc. are controlled by the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).
- (4) If installed, cut and remove the safety wire or safety cable on the propeller mounting stud nuts.

WARNING: MAKE SURE THE SLING IS RATED UP TO 800 LBS. (363 KG) TO SUPPORT THE WEIGHT OF THE PROPELLER ASSEMBLY DURING REMOVAL.

- (5) Support the propeller assembly with a sling.
- (6) If the propeller will be reinstalled and it has been dynamically balanced, make an identifying mark (with a felt-tipped pen only) on the propeller hub and a matching mark on the engine flange to make sure of correct positioning of the propeller during re-installation.

NOTE: This will prevent dynamic imbalance.

CAUTION: DISCARD THE PROPELLER MOUNTING STUDS, NUTS, OR BOLTS IF THEY ARE DAMAGED OR CORRODED, OR WHEN THE PROPELLER IS REMOVED FOR OVERHAUL.

- (7) Unscrew the four 7/16 inch mounting bolts from the engine bushings.
- (8) Unscrew the two 7/16 inch mounting nuts and the attached studs from the engine bushings.
 - (a) If the propeller is removed between overhaul intervals, mounting studs, nuts and washers may be reused if they are not damaged or corroded.

CAUTION: REMOVE THE PROPELLER FROM THE MOUNTING FLANGE WITH CARE TO PREVENT DAMAGING THE PROPELLER MOUNTING STUDS.

- (9) Using the support sling, remove the propeller from the mounting flange.
- (10) Put the propeller on a cart for transport.

F. Removal of "K" and "R" Flange Propellers

- (1) Remove the spinner dome in accordance with the Spinner Removal procedures in this chapter.
- (2) If the propeller is equipped with an ice protection system that uses components supplied by Hartzell Propeller Inc., applicable instructions and technical information for the components supplied by Hartzell Propeller Inc. can be found in the following publications available on the Hartzell Propeller Inc. website at www.hartzellprop.com:
 - (a) Hartzell Propeller Inc. Manual 180 (30-61-80) - Propeller Ice Protection System Manual
 - (b) Hartzell Propeller Inc. Manual 181 (30-60-81) - Propeller Ice Protection System Component Maintenance Manual
 - (c) Hartzell Propeller Inc. Manual 182 (61-12-82) - Propeller Electrical De-Ice Boot Removal and Installation Manual
 - (d) Hartzell Propeller Inc. Manual 183 (61-12-83) - Propeller Anti-Icing Boot Removal and Installation Manual
- (3) Propeller ice protection system components not supplied by Hartzell Propeller Inc. are controlled by the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).
- (4) If installed, cut and remove the safety wire or safety cable on the propeller mounting stud nuts.

WARNING: MAKE SURE THE SLING IS RATED UP TO 800 LBS. (363 KG) TO SUPPORT THE WEIGHT OF THE PROPELLER ASSEMBLY DURING REMOVAL.

- (5) Support the propeller assembly with a sling.
- (6) If the propeller will be reinstalled and it has been dynamically balanced, make an identifying mark (with a felt-tipped pen only) on the propeller hub and a matching mark on the engine flange to make sure of correct positioning of the propeller during re-installation.

NOTE: This will prevent dynamic imbalance.

CAUTION: DISCARD THE PROPELLER MOUNTING STUDS, NUTS, AND WASHERS IF THEY ARE DAMAGED OR CORRODED, OR WHEN THE PROPELLER IS REMOVED FOR OVERHAUL.

- (7) Unscrew the six 1/2 inch mounting studs from the engine bushings.
 - (a) If the propeller is removed between overhaul intervals, mounting studs, nuts and washers may be reused if they are not damaged or corroded.

CAUTION: REMOVE THE PROPELLER FROM THE MOUNTING FLANGE WITH CARE TO PREVENT DAMAGING THE PROPELLER MOUNTING STUDS.

- (8) Using the support sling, remove the propeller from the mounting flange.
- (9) Put the propeller on a cart for transport.

(This page is intentionally blank.)

INSPECTION AND CHECK - CONTENTS

1. Pre-Flight Checks.....	5-3
2. Post-Flight Checks	5-4
A. HC-C2YR-2CLUF/FLC7666A-4 Propellers Installed on OMA SUD Skycar Aircraft.....	5-4
3. Operational Checks.....	5-5
4. Required Periodic Inspections and Maintenance.....	5-7
A. Periodic Inspections	5-7
B. Blade Inspection for an HC-C2YR-2CLUF/FLC7666A-4 Propeller Installed on OMA SUD Skycar Aircraft.....	5-9
C. Spinner Bulkhead Inspection for an HC-E3YR-1RF Propeller Installed on S.N.A. Inc. Seawind Aircraft.....	5-10
D. Low Pitch Stop Hardware Inspection for a PHC-C3YF-2UF/FC7693DFB Propeller	5-10.1
E. Periodic Maintenance	5-11
F. Airworthiness Limitations.....	5-11
G. Overhaul Periods.....	5-11
5. Inspection Procedures	5-14
A. Blade Damage.....	5-14
B. Grease or Oil Leakage	5-14
C. Vibration	5-16
D. Tachometer Inspection	5-18
E. Blade Track.....	5-19
F. Loose Blades.....	5-20
G. Corrosion	5-20
H. Spinner Damage.....	5-21
I. Electric De-ice System	5-21
J. Anti-ice System.....	5-21
6. Special Inspections	5-25
A. Overspeed/Overtorque.....	5-25
B. Lightning Strike.....	5-26
C. Foreign Object Strike.....	5-27
D. Fire Damage or Heat Damage	5-29
7. Long Term Storage.....	5-29

LIST OF FIGURES

Checking Blade Track..... Figure 5-1 5-18
Blade Play Figure 5-2..... 5-18
Reciprocating Engine Overspeed Limits Figure 5-3..... 5-22
Turbine Engine Overspeed Limits Figure 5-4..... 5-23
Turbine Engine Overtorque Limits..... Figure 5-5..... 5-24

- D. Low Pitch Stop Hardware Inspection for a PHC-C3YF-2UF/FC7693DFB Propeller
- (1) Propellers installed on the following aircraft in accordance with Ram Aircraft STC SA09971SC and with a one piece spinner dome assembly are affected:
 - (a) Cessna T310 (P,Q,R)
 - (b) Cessna 320 (D,E,F)
 - (c) Cessna 340 (A)
 - (d) Cessna 402C
 - (e) Cessna 414 (A)
 - (2) Examine the logbook or visually examine the low pitch stop hardware configuration.
 - (a) If there is an entry that indicates compliance with Hartzell Propeller Inc. Service Bulletin HC-SB-61-267 or compliance with the low pitch stop hardware modification in this manual, or if a visual examination shows that the hardware configuration is one hex nut safety wired to a set screw, no further action is required.
 - (b) If there is not an entry that indicates compliance with Hartzell Propeller Inc. Service Bulletin HC-SB-61-267 or compliance with the low pitch stop hardware modification in this manual, or if visual examination shows that the hardware configuration is not one hex nut safety wired to a set screw, modify the propeller assembly to the hardware configuration of one hex nut safety wired to a set screw in accordance with the section "Modification of the Low Pitch Stop Hardware" in the Maintenance Practices chapter of this manual.

(This page is intentionally blank.)

E. Periodic Maintenance

- (1) Lubricate the propeller assembly. Refer to Lubrication in the Maintenance Practices chapter of this manual for intervals and procedures.

F. Airworthiness Limitations

- (1) Certain components, as well as the entire propeller may have specific life limits established as part of the certification by the FAA. Such limits require mandatory replacement of specified parts after a defined number of hours and/or cycles of use.
- (2) Life limited component times may exist for the propeller models included in this manual. Refer to the Airworthiness Limitations chapter of this manual.
- (3) Operators are urged to keep informed of airworthiness information via Hartzell Propeller Inc. Service Bulletins and Service Letters, which are available from Hartzell distributors or from the Hartzell Propeller Inc. factory by subscription. Selected information is also available on Hartzell Propeller's website at www.hartzellprop.com.

G. Overhaul Periods

In flight, the propeller is constantly subjected to vibration from the engine and the airstream, as well as high centrifugal forces. The propeller is also subject to corrosion, wear, and general deterioration due to aging. Under these conditions, metal fatigue or mechanical failures can occur. In order to protect your safety, your investment, and to maximize the safe operating lifetime of your propeller, it is essential that a propeller be properly maintained and overhauled according to the recommended service procedures.

CAUTION 1: OVERHAUL PERIODS LISTED BELOW, ALTHOUGH CURRENT AT THE TIME OF PUBLICATION, ARE FOR REFERENCE PURPOSES ONLY. OVERHAUL PERIODS MAY BE INCREASED OR DECREASED AS A RESULT OF EVALUATION.

CAUTION 2: CHECK THE LATEST REVISION OF HARTZELL PROPELLER INC. SERVICE LETTER HC-SL-61-61Y FOR THE MOST CURRENT INFORMATION. THE SERVICE LETTER IS AVAILABLE ON THE HARTZELL PROPELLER INC. WEBSITE AT WWW.HARTZELLPROP.COM.

- (1) Reciprocating Engine Installations
 - (a) Propellers installed on piston engine **aerobic aircraft** (certificated as aerobic or other aircraft routinely exposed to aerobic use) are to be overhauled at 1000 hours. See paragraph 4.F.(1)(i) for calendar limits.
 - (b) Propellers installed on **agricultural aircraft** are to be overhauled at 2000 hours. Calendar time is limited to 36 months. These limits apply even if the propeller is later installed on a non-agricultural category aircraft.
 - (c) Propellers installed on Franklin engines are to be overhauled at 1500 hours. See paragraph 4.F.(1)(i) for calendar limits.
 - (d) Two blade propellers manufactured **before** April 1997 are to be overhauled at 2000 hours. See paragraph 4.F.(1)(i) for calendar limits.
 - (e) Two blade propellers manufactured **after** April 1997 (identified by a "B" suffix in the propeller serial number) are to be overhauled at 2400 hours. Calendar time is limited to 72 months.
 - (f) Three blade propellers manufactured **before** 1983 are to be overhauled at 2000 hours. See paragraph 4.F.(1)(i) for calendar limits.
 - (g) Three blade propellers manufactured **after** 1983 are to be overhauled at 2400 hours. See paragraph 4.F.(1)(i) for calendar limits.
 - (h) Four blade propellers are to be overhauled at 2400 hours. See paragraph 4.F.(1)(i) for calendar limits.

MAINTENANCE PRACTICES - CONTENTS

1. Cleaning.....	6-3
A. General Cleaning.....	6-3
B. Spinner Cleaning and Polishing	6-5
2. Lubrication.....	6-5
A. Lubrication Intervals	6-5
B. Lubrication Procedure	6-7
C. Approved Lubricants.....	6-10
3. Air Charge (-2 and -5 Propellers).....	6-11
A. Charging the Propeller.....	6-11
B. Basic pressures	6-13
4. Unfeathering Accumulator Air Charge	6-19
A. Charging a Hartzell Propeller Inc. Accumulator.....	6-19
5. Blade Repairs.....	6-21
A. Repair of Nicks or Gouges	6-21
B. Repair of Bent Blades.....	6-24
6. Painting After Repair	6-25
A. General.....	6-25
B. Painting of Aluminum Blades.....	6-26
7. Dynamic Balance	6-29
A. Overview.....	6-29
B. Inspection Procedures Before Balancing	6-30
C. Modifying Spinner Bulkhead to Accommodate Dynamic Balance Weights.....	6-31
D. Placement of Balance Weights for Dynamic Balance	6-32
8. Propeller Low Pitch Setting.....	6-33
A. Low Pitch Stop - All Propeller Models.....	6-33
B. Max. RPM (Static) Low Pitch Stop Adjustment.....	6-35
C. Modification of the Low Pitch Stop Hardware.....	6-43
9. Propeller High Pitch Settings	6-46
A. High Pitch (Min. RPM) Stop or Feathering Pitch Stop.....	6-46
10. Start Lock Settings.....	6-46
A. Start Lock Pitch Stop.....	6-46
11. Propeller Ice Protection Systems.....	6-46
A. Electric De-ice System	6-46
B. Anti-ice System.....	6-46

LIST OF FIGURES

Lubrication Fitting and Air Charge	
Valve Location.....	Figure 6-16-4
Lubrication Fitting	Figure 6-26-6
Lubrication Label	Figure 6-36-8
Counterweighted vs Non-Counterweighted	
Blades	Figure 6-46-12
Unfeathering Accumulator	Figure 6-56-18
Repair Limitations.....	Figure 6-66-22
Low Pitch Stop Adjustment (-1, -4).....	Figure 6-76-34
Low Pitch Stop Adjustment (-2, -5)	
For Propellers That Use a	
Two-piece Spinner Dome.....	Figure 6-86-36
Low Pitch Stop Adjustment (-2, -5)	
For Propellers That Use a	
One-piece Spinner Dome	Figure 6-96-38
Hex Nut Configuration	Figure 6-106-42

LIST OF TABLES

Air Charge Pressure	Table 6-16-16
Air Charge Pressure	Table 6-2.....6-16
Air Charge Pressure	Table 6-3.....6-16
Air Charge Pressure	Table 6-4.....6-16.1
Air Charge Pressure	Table 6-5.....6-16.1
Air Charge Pressure	Table 6-6.....6-16.1
Air Charge Pressure	Table 6-76-16.2
Air Charge Pressure	Table 6-8.....6-16.2
Air Charge Pressure	Table 6-9.....6-17
Air Charge Pressure	Table 6-10.....6-17
Accumulator Air Charge Pressure	Table 6-116-19
Approved Touch-up Paints	Table 6-12.....6-24

B. Spinner Cleaning and Polishing

- (1) Clean spinner using the General Cleaning procedures above.
- (2) Polish the dome, if necessary, with an automotive-type aluminum polish.

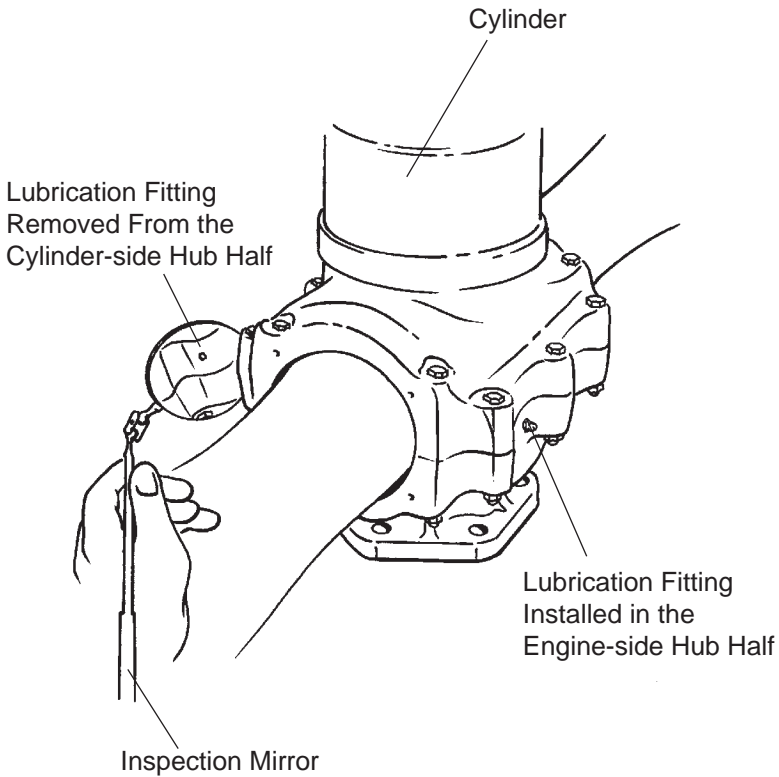
2. Lubrication

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST CHAPTER OF THE APPLICABLE OVERHAUL MANUAL(S) FOR THE IDENTIFICATION OF SPECIFIC PROPELLER CRITICAL PARTS.

A. Lubrication Intervals

- (1) The propeller must be lubricated at intervals not to exceed 100 hours or at 12 calendar months, whichever occurs first.
 - (a) If annual operation is significantly less than 100 hours, calendar lubrication intervals should be reduced to six months.
 - (b) If the aircraft is operated or stored under adverse atmospheric conditions, e.g., high humidity, salt air, calendar lubrication intervals should be reduced to six months.
- (2) Owners of high use aircraft may wish to extend their lubrication interval. Lubrication interval may be gradually extended after evaluation of previous propeller overhauls with regard to bearing wear and internal corrosion.

TI-00102



NOTE: A 2-blade propeller is shown for illustration purposes only.

**Lubrication Fitting
Figure 6-2**

(3) Hartzell Propeller Inc. recommends that new or newly overhauled propellers be lubricated after the first one or two hours of operation because centrifugal loads will pack and redistribute grease, which may result in a propeller imbalance. Redistribution of grease may also result in voids in the blade bearing area where moisture can collect.

(a) Purchasers of new aircraft should check the propeller logbook to verify whether the propeller was lubricated by the manufacturer during flight testing. If it was not lubricated, the propeller should be serviced at the earliest convenience.

B. Lubrication Procedure

WARNING 1: FOLLOW LUBRICATION PROCEDURES CORRECTLY TO MAINTAIN AN ACCURATE BALANCE OF THE PROPELLER ASSEMBLY.

WARNING 2: PITCH CONTROL DIFFICULTY COULD RESULT IF THE PROPELLER IS NOT CORRECTLY LUBRICATED.

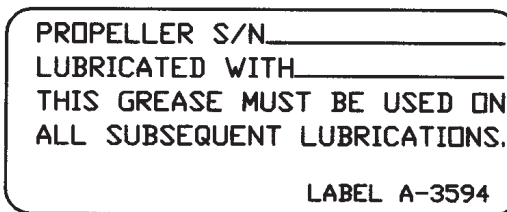
- (1) Remove the propeller spinner.
- (2) Refer to Figure 6-1 and Figure 6-2. Each blade socket has two lubrication fittings. Remove the lubrication fitting caps from the lubrication fittings. Remove the lubrication fittings from either the cylinder-side or the engine-side of the hub assembly.
 - (a) It is preferable to apply grease to the fitting located nearest the leading edge of the blade on a tractor installation, or nearest the trailing edge on a pusher installation. Lubricating at this location reduces the possibility of grease bypassing the bearing area and entering the hub cavity.
 - (b) Some propellers use an internal blade seal that prevents grease from entering the hub cavity. Because this seal is very efficient, it is important to remove the opposite lubrication fitting. Pitch control difficulty could result if the propeller is not correctly lubricated.

- (3) Using a piece of safety wire, loosen any blockage or hardened grease at the threaded holes where the lubrication fitting was removed.

WARNING: WHEN MIXING AEROSHELL GREASES 5 AND 6, AEROSHELL GREASE 5 MUST BE INDICATED ON THE LABEL (HARTZELL PROPELLER INC. P/N A-3594) AND THE AIRCRAFT MUST BE PLACARDED TO INDICATE THAT FLIGHT IS PROHIBITED IF THE OUTSIDE AIR TEMPERATURE IS LESS THAN -40°F (-40°C).

CAUTION: USE HARTZELL PROPELLER INC. APPROVED GREASE ONLY. EXCEPT IN THE CASE OF AEROSHELL GREASES 5 AND 6, DO NOT MIX DIFFERENT SPECIFICATIONS AND/OR BRANDS OF GREASE.

- (4) Aeroshell greases 5 and 6 both have a mineral oil base and have the same thickening agent; therefore, mixing of these two greases is acceptable in Hartzell propellers.
- (5) A label (Hartzell Propeller Inc. P/N A-3494) is normally applied to the propeller to indicate the type of grease previously used. Refer to Figure 6-3.
 - (a) This grease type should be used during re-lubrication unless the propeller has been disassembled and the old grease removed.



PROPELLER S/N _____
LUBRICATED WITH _____
THIS GREASE MUST BE USED ON
ALL SUBSEQUENT LUBRICATIONS.
LABEL A-3594

A-3594

Lubrication Label
Figure 6-3

- (b) Purging of old grease through lubrication fittings is only about 30% effective.
- (c) To completely replace one grease with another, the propeller must be disassembled in accordance with the applicable overhaul manual.

CAUTION 1: OVER LUBRICATING AN ALUMINUM HUB PROPELLER MAY CAUSE THE GREASE TO ENTER THE HUB CAVITY, LEADING TO EXCESSIVE VIBRATION AND/OR SLUGGISH OPERATION. THE PROPELLER MUST THEN BE DISASSEMBLED TO REMOVE THIS GREASE.

CAUTION 2: IF A PNEUMATIC GREASE GUN IS USED, EXTRA CARE MUST BE TAKEN TO AVOID EXCESSIVE PRESSURE BUILDUP.

CAUTION 3: GREASE MUST BE APPLIED TO ALL BLADES OF A PROPELLER ASSEMBLY AT THE TIME OF LUBRICATION.

- (6) Pump 1 fl. oz. (30 ml) grease into the fitting located nearest the leading edge of the blade on a tractor installation, or nearest the trailing edge on a pusher installation, or until grease emerges from the hole where the fitting was removed - whichever occurs first.

NOTE: 1 fl. oz. (30 ml) is approximately 6 pumps with a hand-operated grease gun.

- (7) Reinstall the removed lubrication fittings.
 - (a) A 45 degree lubrication fitting, Hartzell Propeller Inc. part number C-6349, may be installed on the engine-side or cylinder-side of the propeller aluminum hub in any location where a straight lubrication fitting, Hartzell Propeller Inc. part number A-279, was originally installed.
 - 1** The lubrication fittings installed on the engine-side of the aluminum hub must be either all straight, Hartzell Propeller Inc. part number A-279, or all 45 degree, Hartzell Propeller Inc. part number C-6349.

3. Air Charge (-2 and -5 Propellers)

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST CHAPTER OF THE APPLICABLE OVERHAUL MANUAL(S) FOR THE IDENTIFICATION OF SPECIFIC PROPELLER CRITICAL PARTS.

A. Charging the Propeller

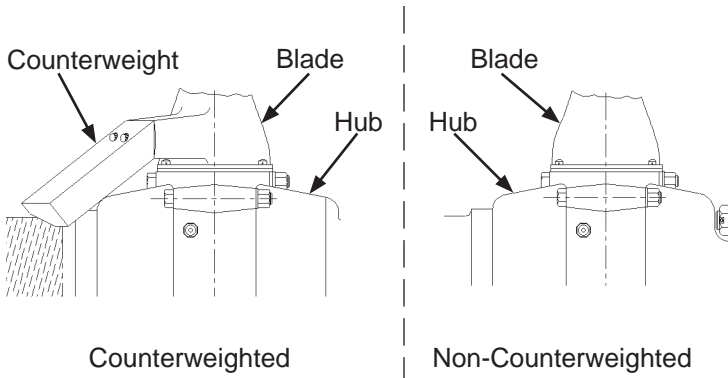
WARNING: EXCEPT FOR THE HC-C3YF-5F PROPELLER, DO NOT AIR CHARGE THE CYLINDER OR MEASURE THE AIR CHARGE ON A PROPELLER THAT IS IN FEATHER POSITION.

- (1) Examine the propeller to make sure that it is positioned on the start locks.
- (2) Using proper control, charge the cylinder with dry air or nitrogen.
 - (a) The air charge valve is located on the cylinder as indicated in Figure 6-1.
 - (b) Nitrogen is the preferred charging medium.

CAUTION: MAKE SURE THAT THE GAUGE IS CALIBRATED BEFORE CHARGING THE CYLINDER OR MEASURING THE AIR PRESSURE.

- (c) Use an appropriate tool that has a calibrated gauge to charge the cylinder or measure air pressure in the propeller.
- (d) The correct charge pressure is identified in Table 6-1 through Table 6-8 in this chapter.

APS6177



Counterweighted vs Non-Counterweighted Blades
Figure 6-4

8. Propeller Low Pitch Setting

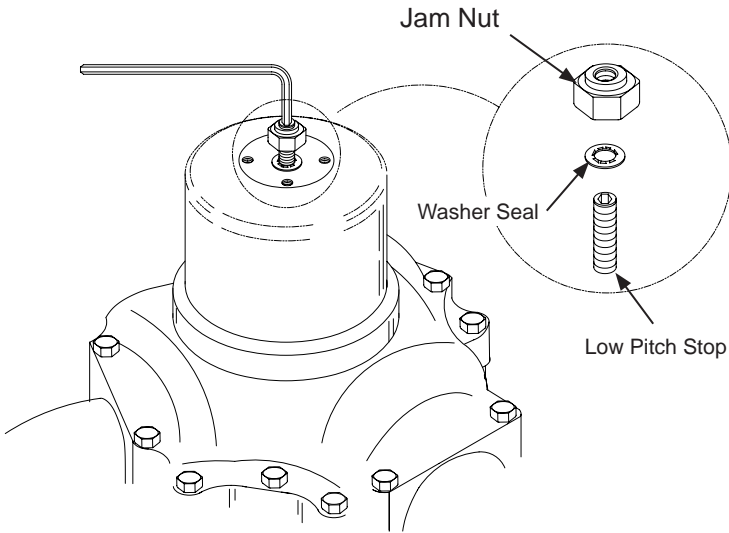
WARNING 1: RPM ADJUSTMENTS MUST BE MADE WITH REFERENCE TO A CALIBRATED TACHOMETER. AIRCRAFT MECHANICAL TACHOMETERS DEVELOP ERRORS OVER TIME, AND SHOULD BE PERIODICALLY RECALIBRATED TO MAKE SURE THE PROPER RPM IS DISPLAYED.

WARNING 2: LOW PITCH BLADE ANGLE ADJUSTMENTS MUST BE MADE IN CONSULTATION WITH THE APPLICABLE TYPE CERTIFICATE OR SUPPLEMENTAL TYPE CERTIFICATE HOLDERS MAINTENANCE DATA.

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS SECTION MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST CHAPTER OF THE APPLICABLE OVERHAUL MANUAL(S) FOR THE IDENTIFICATION OF SPECIFIC PROPELLER CRITICAL PARTS.

A. Low Pitch Stop - All Propeller Models

- (1) The propeller low pitch stop is set at the factory to the aircraft TC or STC Holder's requirements and should not require any additional adjustment. The TC or STC Holder provides the required low pitch stop blade angle and may also provide the acceptable RPM range for a maximum power static condition. Be aware that the aircraft TC or STC holder may specify the static RPM to be less than the RPM to which the engine is rated.
- (2) An overspeed at the maximum power static condition may indicate that the propeller low-pitch blade angle is set too low or that the governor is improperly adjusted.
- (3) An underspeed during the maximum power static condition may be caused by any one or a combination of the following: The propeller low pitch blade angle is too high; the governor is improperly adjusted; the engine is not producing rated power.



W110215.eps

Low Pitch Stop Adjustment (-1, -4)
Figure 6-7

B. Max. RPM (Static) Low Pitch Stop Adjustment

WARNING: SIGNIFICANT ADJUSTMENT OF THE LOW PITCH STOP TO ACHIEVE THE SPECIFIED STATIC RPM MAY MASK AN ENGINE POWER PROBLEM.

Refer to the following applicable procedure for accomplishing an adjustment to the low pitch angle:

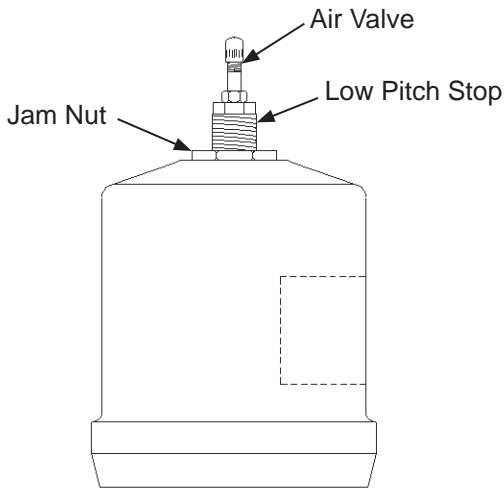
(1) Non-Feathering (-1, -4) Low Pitch Stop Adjustment

(a) Refer to Figure 6-7. While holding the low pitch stop with an allen wrench to prevent the low pitch stop from turning, use a wrench to loosen the jam nut. Turning the low pitch stop in will increase blade pitch to reduce RPM, and turning the low pitch stop out will lower blade pitch and increase RPM. The low pitch stop has 24 threads per inch.

- 1** Turning the stop 3/4 of a turn (0.030 inch [0.762 mm] of linear travel) will change the blade pitch by approximately one degree. One degree of blade pitch will change engine RPM by approximately 140-150 RPM.
- 2** Turning the low pitch stop screw one revolution equals 0.042 inch (1.06 mm) of linear travel, and results in approximately 1.4 degree blade angle change. This blade angle change results in an RPM increase/decrease of approximately 200 RPM.

WARNING: A MINIMUM OF FIVE THREADS IN THE CYLINDER MUST ENGAGE THE LOW PITCH STOP AFTER ADJUSTMENT IS COMPLETED.

- (b) When the low pitch stop is adjusted, torque the low pitch stop jam nut in accordance with Torque Table 3-1.
- (c) Repeat the Static RPM Check in the Testing and Troubleshooting Chapter of this manual.



AP56154.eps

**Low Pitch Stop Adjustment (-2, -5) For Propellers
That Use a Two-piece Spinner Dome
Figure 6-8**

- (2) Feathering (-2, -5) Low Pitch Stop Adjustment For Propellers That Use a Two-piece Spinner Dome

WARNING: AIR PRESSURE (-2, -5 PROPELLERS) MUST BE REDUCED TO 0 PSI BEFORE ANY LOW PITCH ADJUSTMENT MAY BE MADE.

- (a) Refer to Figure 6-8. While holding the low pitch stop with a wrench to prevent the low pitch stop from turning, use a second wrench to loosen the jam nut. Turning the low pitch stop into the cylinder will increase blade pitch and reduce RPM, and turning the low pitch stop out of the cylinder will lower blade pitch and increase RPM. The low pitch stop has 20 threads per inch.

- 1 Turning the low pitch stop 2/3 of a turn (0.030 inch [0.762 mm] of linear travel) will change the blade pitch by approximately one degree. This blade angle change results in an RPM increase/decrease of approximately 140-150 RPM.
- 2 Turning the low pitch stop screw one full turn (0.050 inch [1.27 mm] of linear travel) will change the blade pitch approximately 1.7 degree. This blade angle change results in an RPM increase/decrease of approximately 250 RPM.

- (b) Carefully remove any sealant from the exposed threads of the low pitch stop.

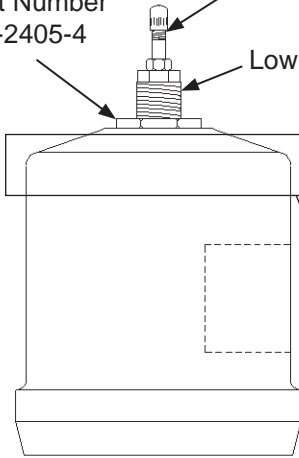
WARNING: A MINIMUM OF FIVE THREADS IN THE CYLINDER MUST ENGAGE THE LOW PITCH STOP AFTER ADJUSTMENT IS COMPLETED.

- (c) When the low pitch stop is adjusted, apply threadlocker CM21 to the threads of the jam nut.
- (d) Torque the low pitch stop jam nut in accordance with Torque Table 3-1.
- (e) Repeat the Static RPM Check in the Testing and Troubleshooting chapter of this manual.

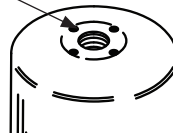
Jam Nut
Hartzell Propeller Inc.
Part Number
A-2405-4

Air Valve

Low Pitch Stop



One of four threaded
holes in the top of the
cylinder



AP56154.eps.TPI:115-001

**Low Pitch Stop Adjustment (-2, -5) For Propellers
That Use a One-piece Spinner Dome
Figure 6-9**

- (3) Feathering (-2, -5) Low Pitch Stop Adjustment, For Propellers That Use a One-piece Spinner Dome

WARNING: AIR PRESSURE (-2 PROPELLERS)
MUST BE REDUCED TO 0 PSI
BEFORE ANY LOW PITCH
ADJUSTMENT MAY BE MADE.

- (a) If a visual examination shows that the hardware configuration is not one hex nut safety wired to a set screw, the propeller assembly may be modified to the hardware configuration of one hex nut safety wired to a set screw in accordance with the section "Modification of the Low Pitch Stop Hardware" in the Maintenance Practices chapter of this manual.
- 1 Some propellers models are required to be modified to the new configuration. For the affected propeller models, refer to the section "Required Periodic Inspections and Maintenance" in the Inspection and Check chapter of this manual.
- (b) Refer to Figure 6-9. While holding the low pitch stop with a wrench to prevent the low pitch stop from turning, use a second wrench to loosen the jam nut. Turning the low pitch stop into the cylinder will increase blade pitch and reduce RPM, and turning the low pitch stop out of the cylinder will lower blade pitch and increase RPM. The low pitch stop has 20 threads per inch.
- 1 Turning the low pitch stop 2/3 of a turn (0.030 inch [0.762 mm] of linear travel) will change the blade pitch by approximately one degree. This blade angle change results in an RPM increase/decrease of approximately 140-150 RPM.
 - 2 Turning the low pitch stop screw one full turn (0.050 inch [1.27 mm] of linear travel) will change the blade pitch approximately 1.7 degree. This blade angle change results in an RPM increase/decrease of approximately 250 RPM.

- (c) Using a clean cloth moistened with MEK CM106 or MPK CM219, carefully remove any sealant from the exposed threads of the low pitch stop.

WARNING: A MINIMUM OF FIVE THREADS IN THE CYLINDER MUST ENGAGE THE LOW PITCH STOP AFTER ADJUSTMENT IS COMPLETED.

- (d) When the low pitch stop is adjusted, apply threadlocker CM21 to the threads of the jam nut.
- (e) Torque the low pitch stop jam nut in accordance with Torque Table 3-1.
- (f) Install a B-7589 set screw in one of the four threaded holes in the top of the cylinder. Refer to Figure 6-9.
 - 1 The top of the set screw must be below the surface of the hex nut.
- (g) Safety the hex nut and the set screw in accordance with military standard MS33540 using 0.032 inch (0.81 mm) stainless steel safety wire unless specified differently.
- (h) Repeat the Static RPM Check in the Testing and Troubleshooting Chapter of this manual.

(This page is intentionally blank.)



A-2405-2
Hex Nut
Two safety
wire holes



A-2405-3
Hex Nut
No safety
wire holes



A-2405-4
Hex Nut
Three safety
wire holes

AP56279A-H

Hex Nut Configuration
Figure 6-10

C. Modification of the Low Pitch Stop Hardware**(1) General**

- (a) The instructions in this section are applicable to -2 and -5 propeller assemblies that use a one piece spinner dome.
- (b) This section provides the instructions to change from the configuration of two hex nuts securing the low pitch stop to the new hardware of one hex nut safety wired to a set screw.

(2) Material Requirements

- (a) For lock nut identification, refer to Figure 6-10 in this chapter.

Old Part Number	New Part Number	Description	Qty per Assembly
A-2405-2	--	Hex Nut	0
A-2405-3	--	Hex Nut	0
A-169-7	--	Spacer	0
--	A-2405-4	Hex Nut	1
--	B-7589	Set Screw	1

NOTE: Only one hex nut is used on low pitch stop for each propeller assembly.

(b) Consumables

CM21 A-6741-21 Loctite 222 Threadlocker

(3) Procedure

CAUTION: WRAP THE BLADE SHANKS IN SEVERAL LAYERS OF MASKING OR DUCT TAPE BEFORE REMOVING THE SPINNER DOME TO PREVENT DAMAGING THE BLADE AND BLADE PAINT.

- (a) Remove the screws and washers that secure the spinner dome to the spinner bulkhead.
- (b) Remove the spinner dome.

CAUTION: SECURE THE LOW PITCH STOP BEFORE REMOVING THE HEX NUTS.

- (c) While holding the low pitch stop with a wrench to prevent the low pitch stop from turning, use a second wrench to remove the jam nuts.
- (d) Discard the hex nuts and any spacers from the low pitch stop.

WARNING: DO NOT REMOVE THE LOW PITCH STOP WITHOUT RELIEVING THE AIR PRESSURE.

- (e) Using a clean cloth moistened with MEK CM106 or MPK CM219, carefully remove any sealant from the exposed threads of the low pitch stop.
- (f) Apply threadlocker CM21 to the threads of a new A-2405-4 hex nut.
- (g) Install the A-2405-4 hex nut on the low pitch stop.
- (h) Torque the low pitch stop jam nut in accordance with Torque Table 3-1.
- (i) Install B-7589 set screw in one of the four threaded holes in the top of the cylinder. Refer to Figure 6-9.
 - 1 The top of the set screw must be below the surface of the hex nut.

- (j) Safety the hex nut and the set screw in accordance with military standard MS33540 using 0.032 inch (0.81 mm) stainless steel safety wire unless specified differently.
- (k) Install the spinner dome in accordance with the applicable section in the Installation and Removal chapter of this manual.
- (g) Repeat the Static RPM Check in the Testing and Troubleshooting Chapter of this manual.
- (h) Make a logbook entry indicating compliance with this section "Modification of the Low Pitch Stop Hardware".

9. Propeller High Pitch Settings**A. High Pitch (Min. RPM) Stop or Feathering Pitch Stop**

- (1) The high pitch and feathering pitch stop are set at the factory per the aircraft manufacturer's recommendations. These stops are adjustable only by an appropriately licensed propeller repair facility or the Hartzell Propeller Inc. factory.

10. Start Lock Settings**A. Start Lock Pitch Stop**

- (1) The start lock pitch stops are set at the factory per the aircraft manufacturer's recommendations. These stops are adjustable only by an appropriately licensed propeller repair facility or the Hartzell Propeller Inc. factory.

11. Propeller Ice Protection Systems**A. Electric De-ice System**

- (1) Consult the Pilot Operating Handbook (including all supplements) regarding flight into conditions of known icing. The aircraft may not be certificated for flight in known icing conditions, even though propeller de-ice equipment is installed.
- (2) Refer to the Anti-ice and De-ice Systems chapter of this manual for functional tests of the de-ice system.

B. Anti-ice System

- (1) Consult the Pilot Operating Handbook (including all supplements) regarding flight into conditions of known icing. The aircraft may not be certificated for flight in known icing conditions, even though propeller anti-ice equipment is installed.
- (2) Refer to the Anti-ice and De-ice Systems chapter of this manual for functional tests of the anti-ice system.