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**HARTZELL**

**MANUAL REVISION TRANSMITTAL**  
**Manual 145 (61-00-45)**  
**Propeller Owner's Manual and Logbook**  
**REVISION 15 dated March 2015**

Attached is a copy of Revision 15 to Hartzell Manual 145.

Page Control Chart for Revision 15:

**Remove**

Page No.

**COVER/INSIDE COVER**

**REVISION HIGHLIGHTS**

pages 5 thru 8

**SERVICE DOCUMENTS LIST**

pages 13 and 14

**LIST OF EFFECTIVE PAGES**

pages 19 thru 22

**TABLE OF CONTENTS**

pages 23 thru 32

**INTRODUCTION**

pages 1-1 and 1-2

pages 1-5 thru 1-16

**INSTALLATION AND  
REMOVAL**

pages 3-1 and 3-2

pages 3-3 thru 3-6

pages 3-19 and 3-20

**Insert**

Page No.

**COVER/INSIDE COVER**

**REVISION HIGHLIGHTS**

pages 5 thru 8

**SERVICE DOCUMENTS LIST**

pages 13 and 14

**LIST OF EFFECTIVE PAGES**

pages 19 thru 22

**TABLE OF CONTENTS**

pages 23 thru 32

**INTRODUCTION**

pages 1-1 and 1-2

pages 1-5 thru 1-18

**INSTALLATION AND  
REMOVAL**

pages 3-1 and 3-2

pages 3-2.1 and 3-2.2

insert after page 3-2

pages 3-3 thru 3-6

pages 3-18.1 and 3-18.2

insert after page 3-18

pages 3-19 and 3-20

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

# HARTZELL

Page Control Chart for Revision 15, continued

**Remove**

Page No.

**INSTALLATION AND  
REMOVAL**

ages 3-23 and 3-24

pages 3-25 thru 3-34

**TESTING AND  
TROUBLESHOOTING**

pages 4-3 and 4-4

**MAINTENANCE PRACTICES**

pages 6-1 thru 6-14

pages 6-49 thru 6-62

**Insert**

Page No.

**INSTALLATION AND  
REMOVAL**

pages 3-23 and 3-24

pages 3-24.1 and 3-24.2

insert after page 3-24

pages 3-25 thru 3-34

**TESTING AND  
TROUBLESHOOTING**

pages 4-3 and 4-4

**MAINTENANCE PRACTICES**

pages 6-1 thru 6-14

pages 6-49 thru 6-72

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. 145  
61-00-45  
Revision 15  
March 2015

# Propeller Owner's Manual and Logbook

"Compact" and "Lightweight Compact" Models  
with Composite Blades

Compact Constant Speed, Non-counterweighted  
**()HC-()()Y()-1()**

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

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

Lightweight Compact Constant Speed, Non-counterweighted  
**()HC-()()Y1()-1()**

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**REVISION HIGHLIGHTS**

Revision 15, 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” that incorporates Hartzell Propeller Inc. Service Letter HC-SL-61-230
  - Revised the section “Post Installation Checks”
  - Made other language/format changes
- TESTING AND TROUBLESHOOTING
  - Revised the section, “Operational Tests”
- MAINTENANCE PRACTICES
  - Added information about 45 degree lubrication fittings that incorporates Hartzell Propeller Inc. Service Letter HC-SL-61-187
  - Added as Figure 6-19, “Low Pitch Stop Adjustment For -2 Propellers That Use a One-piece Spinner Dome”
  - Added the section “Feathering (-2) Low Pitch Stop Adjustment, For Propellers That Use a One-piece Spinner Dome”

REVISION HIGHLIGHTS, CONTINUED

- MAINTENANCE PRACTICES, CONTINUED
  - Added as Figure 6-20, "Hex Nut Configuration"
  - Renumbered the remaining figures
  - Added the section "Modification of the Low Pitch Stop Hardware"
  - Made other language/format changes

REVISIONS HIGHLIGHTS1. 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>
Original	Mar/99	New Issue
Rev. 1	Mar/04	Minor Revision
Rev. 2	Jun/06	Minor Revision
Rev. 3	Jul/06	Minor Revision
Rev. 4	Dec/06	Minor Revision
Rev. 5	Oct/08	Minor Revision
Rev. 6	Nov/08	Minor Revision
Rev. 7	Oct/09	Minor Revision
Rev. 8	Jul/10	Minor Revision
Rev. 9	Jun/11	Minor Revision
Rev. 10	Oct/11	Minor Revision
Rev. 11	Dec/12	Minor Revision
Rev 12	May/13	Minor Revision
Rev 13	Oct/13	Minor Revision
Rev 14	Mar/14	Minor Revision
Rev 15	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-61-246	Rev. 2 Jun/06
HC-SB-61-246, R1	Rev. 10 Oct/11
Service Letters:	
HC-SL-61-194	Rev. 2 Jun/06
HC-SL-61-200	Rev. 2 Jun/06
HC-SL-61-187, R3	Rev. 15 Mar/15
HC-SL-61-230	Rev. 15 Mar/15

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LIST OF EFFECTIVE PAGES

Chapter	Page	Revision	Date
Cover and Inside Cover		Rev. 15	Mar/15
Message	1 thru 4	Rev. 1	Mar/04
Revision Highlights	5 thru 8	Rev. 15	Mar/15
Record of Revisions	9 and 10	Rev. 1	Mar/04
Record of Temporary Revisions	11 and 12	Rev. 1	Mar/04
Service Documents List	13 and 14	Rev. 15	Mar/15
Airworthiness Limitations	15 thru 18	Rev. 12	May/13
List of Effective Pages	19 thru 22	Rev. 15	Mar/15
Table of Contents	23 thru 32	Rev. 15	Mar/15
Introduction	1-1 and 1-2	Rev. 15	Mar/15
Introduction	1-3	Rev. 13	Oct/13
Introduction	1-4	Rev. 11	Dec/12
Introduction	1-5	Rev. 13	Oct/13
Introduction	1-6 thru 1-18	Rev. 15	Mar/15
Description and Operation	2-1	Rev. 5	Oct/08
Description and Operation	2-2	Rev. 10	Oct/11
Description and Operation	2-3	Rev. 2	Jun/06
Description and Operation	2-4	Rev. 3	Jul/06
Description and Operation	2-4.1 thru 2-4.4	Rev. 9	Jun/11
Description and Operation	2-5	Rev. 5	Oct/08
Description and Operation	2-6	Rev. 3	Jul/06
Description and Operation	2-7 thru 2-11	Rev. 2	Jun/06
Description and Operation	2-12	Rev. 14	Mar/14
Description and Operation	2-13	Rev. 13	Oct/13
Description and Operation	2-14 thru 2-19	Rev. 2	Jun/06
Description and Operation	2-20 thru 2-22	Rev. 5	Oct/08
Installation and Removal	3-1	Rev. 15	Mar/15
Installation and Removal	3-2	Rev. 6	Nov/08
Installation and Removal	3-2.1 and 3-2.2	Rev. 15	Mar/15
Installation and Removal	3-3	Rev. 15	Mar/15
Installation and Removal	3-4	Rev. 5	Oct/08
Installation and Removal	3-5	Rev. 15	Mar/15
Installation and Removal	3-6	Rev. 5	Oct/08
Installation and Removal	3-7	Rev. 13	Oct/13

LIST OF EFFECTIVE PAGES

Chapter	Page	Revision	Date
Installation and Removal	3-8	Rev. 5	Oct/08
Installation and Removal	3-9 thru 3-14	Rev. 6	Nov/08
Installation and Removal	3-15	Rev. 13	Oct/13
Installation and Removal	3-16	Rev. 6	Nov/08
Installation and Removal	3-17	Rev. 13	Oct/13
Installation and Removal	3-18	Rev. 6	Nov/08
Installation and Removal	3-18.1 and 3-18.2	Rev. 15	Mar/15
Installation and Removal	3-19	Rev. 15	Mar/15
Installation and Removal	3-20 thru 3-22	Rev. 6	Nov/08
Installation and Removal	3-23	Rev. 15	Mar/15
Installation and Removal	3-24	Rev. 6	Nov/08
Installation and Removal	3-24.1 and 3-24.2	Rev. 15	Mar/15
Installation and Removal	3-25	Rev. 15	Mar/15
Installation and Removal	3-26	Rev. 6	Nov/08
Installation and Removal	3-27	Rev. 15	Mar/15
Installation and Removal	3-28	Rev. 6	Nov/08
Installation and Removal	3-29 thru 3-33	Rev. 15	Mar/15
Installation and Removal	3-34	Rev. 6	Nov/08
Testing and Troubleshooting	4-1 and 4-2	Rev. 13	Oct/13
Testing and Troubleshooting	4-3	Rev. 15	Mar/15
Testing and Troubleshooting	4-4 thru 4-6	Rev. 13	Oct/13
Testing and Troubleshooting	4-7 and 4-8	Rev. 5	Oct/08
Testing and Troubleshooting	4-9 thru 4-11	Rev. 13	Oct/13
Testing and Troubleshooting	4-12 thru 4-14	Rev. 5	Oct/08
Inspection and Check	5-1 thru 5-4	Rev. 13	Oct/13
Inspection and Check	5-5 and 5-6	Rev. 5	Oct/08
Inspection and Check	5-7 and 5-8	Rev. 13	Oct/13
Inspection and Check	5-9 and 5-10	Rev. 5	Oct/08
Inspection and Check	5-11 and 5-12	Rev. 13	Oct/13
Inspection and Check	5-13 thru 5-19	Rev. 5	Oct/08
Inspection and Check	5-20 thru 5-22	Rev. 13	Oct/13
Inspection and Check	5-23	Rev. 5	Oct/08
Inspection and Check	5-24	Rev. 13	Oct/13

LIST OF EFFECTIVE PAGES

Chapter	Page	Revision	Date
Inspection and Check	5-25 and 5-26	Rev. 5	Oct/08
Maintenance Practices	6-1 thru 6-5	Rev. 15	Mar/15
Maintenance Practices	6-6	Rev. 5	Oct/08
Maintenance Practices	6-7	Rev. 15	Mar/15
Maintenance Practices	6-8	Rev. 5	Oct/08
Maintenance Practices	6-9 thru 6-13	Rev. 15	Mar/15
Maintenance Practices	6-14 thru 6-20	Rev. 13	Oct/13
Maintenance Practices	6-20.1 thru 6-20.10	Rev. 13	Oct/13
Maintenance Practices	6-21 thru 6-23	Rev. 5	Oct/08
Maintenance Practices	6-24 thru 6-40	Rev. 13	Oct/13
Maintenance Practices	6-41	Rev. 5	Oct/08
Maintenance Practices	6-42	Rev. 13	Oct/13
Maintenance Practices	6-42.1	Rev. 13	Oct/13
Maintenance Practices	6.42.2	Rev. 9	Jun/11
Maintenance Practices	6-43	Rev. 5	Oct/08
Maintenance Practices	6-44	Rev. 13	Oct/13
Maintenance Practices	6-45 thru 6-48	Rev. 5	Oct/08
Maintenance Practices	6-49	Rev. 13	Oct/13
Maintenance Practices	6-50 thru 6-72	Rev. 15	Mar/15
Anti-Ice and De-Ice Systems	7-1 thru 7-8	Rev. 5	Oct/08
Records	801 and 802	Rev. 13	Oct/13
Records	803 thru 812	Orig.	Mar/99
Records	813 thru 816	Rev. 2	Jun/06
Records	817 thru 822	Rev. 3	Jul/06
Records	823 thru 826	Rev. 10	Oct/11
Records	827 and 828	Rev. 13	Oct/13

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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 .....	19
TABLE OF CONTENTS.....	21
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.....	1-8
6. Reference Publications .....	1-9
A. Hartzell Propeller Inc. Publications.....	1-9
B. References to Hartzell Propeller Inc. Publications .....	1-11
7. Definitions .....	1-12
8. Abbreviations .....	1-16
9. Hartzell Propeller Inc. Product Support.....	1-17
10. Warranty Service.....	1-17
11. Hartzell Propeller Inc. Recommended Facilities .....	1-18
DESCRIPTION AND OPERATION.....	2-1
1. Description of Propeller and Systems.....	2-3
A. System Overview.....	2-3

TABLE OF CONTENTS, continued**DESCRIPTION AND OPERATION, continued**

2.	Functional Description of Constant Speed Propeller Types.....	2-5
A.	( )HC-( ) ( )Y( ) (-1( ) with Composite Blades.....	2-5
B.	Constant Speed, Feathering Propellers ( )HC-( ) ( )Y( ) (-2..	2-7
C.	Counterweighted, Aerobatic ( )HC-( ) ( )Y( ) (-4( ) .....	2-11
3.	Model Designation .....	2-12
A.	Aluminum Hub Propeller Model Identification.....	2-12
B.	Composite Blade Model Identification .....	2-13
4.	Governors .....	2-15
A.	Theory of Operation.....	2-15
B.	Governor Types .....	2-17
C.	Identification of Hartzell Governors .....	2-17
5.	Accumulators .....	2-19
A.	System Overview.....	2-19
6.	Propeller Ice Protection Systems System.....	2-20
A.	Propeller Anti-ice System .....	2-20
B.	Propeller De-ice System.....	2-21

**INSTALLATION AND REMOVAL..... 3-1**

1.	Tools, Consumables, and Expendables.....	3-3
A.	Tooling .....	3-3
B.	Consumables.....	3-3
C.	Expendables.....	3-3
2.	Pre-Installation .....	3-7
A.	Inspection of Shipping Package .....	3-7
B.	Uncrating .....	3-7
C.	Inspection after Shipment.....	3-7
D.	Reassembly of a Propeller Disassembled for Shipment ...	3-7
E.	Air Charge Pressure Check (-2 Propellers).....	3-7
3.	Spinner Pre-Installation.....	3-9
A.	General.....	3-9
B.	Installation of a Metal Spinner Bulkhead on a Propeller Hub .....	3-11
C.	Installation of a Composite Spinner Bulkhead on a Propeller Hub .....	3-13



TABLE OF CONTENTS, continued**INSTALLATION AND REMOVAL, continued**

4.	Propeller Installation .....	3-15
	A. Flange Description.....	3-15
	B. Installation of "F" Flange Propellers.....	3-17
	C. Installation of "R" Flange Propellers .....	3-21
5.	Spinner Installation .....	3-24.1
	A. Installing a One-Piece Spinner Dome .....	3-24.1
	B. Two-piece Spinner Dome (Procedure 1) .....	3-27
	C. Two-Piece Spinner Dome (Procedure 2).....	3-29
6.	Post-Installation Checks .....	3-30
7.	Spinner Removal .....	3-30
	A. Removal of One-Piece Spinner .....	3-30
	B. Removal of Two-Piece Spinner .....	3-30
	C. Hub Mounted Spinner Bulkhead Removal .....	3-30
	D. Starter Ring Gear Spinner Adapter Removal .....	3-31
8.	Propeller Removal .....	3-31
	A. Removal of "F" Flange Propellers.....	3-31
	B. Removal of "R" Flange Propellers .....	3-33

**TESTING AND TROUBLESHOOTING ..... 4-1**

1.	Operational Tests .....	4-3
	A. General.....	4-3
	B. Initial Run-Up.....	4-3
	C. Static RPM Check .....	4-3
	D. 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 (or Airspeed) .....	4-6
	C. Loss of Propeller Control (-1 propellers only).....	4-8
	D. Loss of Propeller Control (-2 and -4 propellers) .....	4-8
	E. Failure to Feather or Feathers Slowly (-2 propellers only) .....	4-9
	F. Failure to Unfeather (-2 propellers only).....	4-9

TABLE OF CONTENTS, continued**TESTING AND TROUBLESHOOTING, continued**

G. Start Locks (Anti-feather Latches)	
Fail to Latch on Shutdown (-2 propellers only).....	4-10
H. Vibration .....	4-11
I. Propeller Overspeed.....	4-12
J. Overspeed Avoidance (Operational)	
for Propeller Models ( )HC-( )(2,3)Y( )( )-1( ).....	4-13
K. Overspeed Avoidance (Mechanical Modification)	
for Propeller Models ( )HC-( )(2,3)Y( )( )-1( ).....	4-13
L. Propeller Underspeed.....	4-14
M. Oil or Grease Leakage .....	4-14

**INSPECTION AND CHECK..... 5-1**

1. Pre-Flight Checks .....	5-3
2. Operational Checks .....	5-5
3. Required Periodic Inspections and Maintenance.....	5-6
A. Periodic Inspections .....	5-6
B. Periodic Maintenance .....	5-8
C. Airworthiness Limitations.....	5-8
D. Overhaul Periods.....	5-9
4. Inspection Procedures .....	5-11
A. Blade Damage.....	5-11
B. Grease or Oil Leakage .....	5-11
C. Vibration .....	5-13
D. Tachometer Inspection .....	5-15
E. Blade Track.....	5-16
F. Loose Blades.....	5-17
G. Corrosion .....	5-18
H. Spinner Damage.....	5-18
I. Accumulator.....	5-18
J. Electric De-ice System .....	5-18
K. Anti-ice System.....	5-18
5. Special Inspections .....	5-20
A. Overspeed/Overtorque.....	5-20
B. Lightning Strike.....	5-21
C. Foreign Object Strike/Ground Strike.....	5-23
D. Fire Damage or Heat Damage .....	5-25
6. Long Term Storage.....	5-25

TABLE OF CONTENTS, continued

<b>MAINTENANCE PRACTICES</b> .....	<b>6-1</b>
1. Cleaning.....	6-5
A. General Cleaning.....	6-5
B. Spinner Cleaning and Polishing .....	6-7
2. Lubrication .....	6-7
A. Lubrication Intervals .....	6-7
B. Lubrication Procedure .....	6-9
C. Approved Lubricants.....	6-12
3. Air Charge (-2 Propellers).....	6-13
A. Charging the Propeller.....	6-13
4. N-shank Composite Blades .....	6-15
A. General Description.....	6-15
B. Component Life and Service .....	6-16
C. Personnel Requirements .....	6-19
D. Blade Inspection Requirements.....	6-20
E. Minor Repair .....	6-20.2
5. Legacy Composite Blades .....	6-20.5
A. General Description.....	6-20.5
B. Component Life and Service .....	6-20.7
C. Personnel Requirements .....	6-20.10
D. Determination of Repair.....	6-21
E. Blade Inspection Requirements.....	6-24
F. Coin-Tap Test .....	6-27
G. Airworthy Damage .....	6-28
H. Unairworthy Damage.....	6-35
I. Minor Repair .....	6-35
J. On Wing Blade Shank Inspection.....	6-37
6. Painting of Composite Blades.....	6-40
A. General.....	6-40
B. Procedure .....	6-41
C. Optional Removal of Leading Edge Paint for N7605(B,K) and N7605C( ) Blades .....	6-42.1
7. Dynamic Balance .....	6-44
A. Overview.....	6-44
B. Inspection Procedures Before Balancing .....	6-45

TABLE OF CONTENTS, continued**MAINTENANCE PRACTICES, continued**

C. Modifying Spinner Bulkhead to Accommodate Dynamic Balance Weights.....	6-46
D. Placement of Balance Weights for Dynamic Balance .....	6-47
8. Propeller Low Pitch Setting.....	6-49
A. Low Pitch Stop - All Propeller Models.....	6-49
B. Max. RPM (Static) Low Pitch Stop Adjustment.....	6-51
C. Modification of the Low Pitch Stop Hardware.....	6-59
9. Propeller High Pitch Settings .....	6-63
A. High Pitch (Min. RPM) Stop.....	6-63
10. Start Lock Settings .....	6-63
A. Start Lock Pitch Stop.....	6-63
11. Accumulator Part Number Change .....	6-64
A. General.....	6-64
B. Material Information.....	6-65
C. Accomplishment Instructions.....	6-65
12. Propeller Ice Protection Systems .....	6-66
A. Electric De-ice System .....	6-66
B. Anti-ice System.....	6-66
13. Installation of Erosion Tape CM158.....	6-67
A. General.....	6-67
B. Materials Required .....	6-68
C. Installation Procedure.....	6-69

**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

### ANTI-ICE AND DE-ICE SYSTEMS, continued

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.....801

1. Introduction .....	803
2. Record Keeping .....	803
A. Information to be Recorded .....	803
B. Blade Damage Repair Sheets .....	803
( )7690E.....	804
B7421( ).....	807
7890( ).....	810
( )7690( ).....	813
N( )7893( ).....	817
N7605( ).....	820
N7605C( ).....	823
NG8301( ).....	827

### LIST OF FIGURES

-1 Series Constant Speed, Non-Counterweighted Propeller ( )HC-( )Y( )-1( ) with Large Cylinder.....	Figure 2-1 .....	2-4.2
-1 Series Constant Speed, Non-Counterweighted Propeller ( )HC-( )Y( )-1( ) with Small Cylinder.....	Figure 2-1.1 .....	2-4.3
-1N Series Constant Speed, Non-Counterweighted Propeller .....	Figure 2-1.2.....	2-4.4
Cutaway of -2 Series Constant Speed, Feathering Propeller ( )HC-( )Y( )-2 .....	Figure 2-2.....	2-6
Cutaway of -4 Series Constant Speed, Counterweighted Propeller.....	Figure 2-3.....	2-10
Governor in Onspeed Condition .....	Figure 2-4.....	2-14
Governor in Underspeed Condition .....	Figure 2-5.....	2-14
Governor in Overspeed Condition .....	Figure 2-6.....	2-14
Synchronizer/Synchrophaser Governor .....	Figure 2-7.....	2-16

LIST OF FIGURES, continued

Governor/Accumulator System.....	Figure 2-8.....	2-18
Determining Torque Value When Using Torquing Adapter .....	Figure 3-1 .....	3-4
Diagram of Torquing Sequence for Propeller Mounting Hardware.....	Figure 3-2.....	3-6
Hub Clamping Bolt Location .....	Figure 3-3.....	3-8
Metal Bulkhead and Spinner Mounting (Hub Mounted Spinner).....	Figure 3-4.....	3-10
Composite Bulkhead and Spinner Mounting (Hub Mounted Spinner).....	Figure 3-5.....	3-12
F Flange Propeller Mounting .....	Figure 3-6.....	3-16
R Flange Propeller Mounting.....	Figure 3-7 .....	3-20
Two-Piece Spinner Mounting (Procedure 1)...	Figure 3-8 .....	3-26
Two-Piece Spinner Mounting (Procedure 2)...	Figure 3-9 .....	3-28
Spinner Dome-to-Bulkhead Mounting Hole Alignment .....	Figure 3-10 .....	3-28
Checking Blade Track.....	Figure 5-1 .....	5-16
Blade Play .....	Figure 5-2.....	5-17
Reciprocating Engine Overspeed Limits .....	Figure 5-3.....	5-19
Evidence of Lightning Strike Damage to Composite Blade .....	Figure 5-4 .....	5-22
Grease Fitting and Air Charge Valve Location .....	Figure 6-1 .....	6-6
Lubrication Fitting .....	Figure 6-2.....	6-8
Lubrication Label .....	Figure 6-3.....	6-10
Section of Typical N-shank Composite Blade .....	Figure 6-4 .....	6-14
Basic Components of an N-shank Composite Blade .....	Figure 6-5.....	6-14

LIST OF FIGURES, continued

Section of Typical Legacy Composite Blade .....	Figure 6-6.....	6-20.4
Basic Components of a Legacy Composite Blade .....	Figure 6-7.....	6-20.4
Determination of Repair Flow Chart .....	Figure 6-8.....	6-21
Coin-Tap Test to Check for Debonds and Delaminations.....	Figure 6-9.....	6-26
Interpretation of Erosion Shield Damage.....	Figure 6-10.....	6-28
Missing Portion of the Erosion Shield (Trailing Edge).....	Figure 6-11 .....	6-29
Acceptable Erosion Shield Damage and Unacceptable Crack Locations.....	Figure 6-12.....	6-30
Debonds Exceeding the Allowable Limits.....	Figure 6-13.....	6-30
Legacy Composite Blade Regions .....	Figure 6-14.....	6-32
Inspection Areas for Counterweighted and Non-counterweighted Blades .....	Figure 6-15.....	6-36
Removal of the Leading Edge Paint.....	Figure 6-16.....	6-42.1
Low Pitch Stop Adjustment (-1, -4).....	Figure 6-17 .....	6-50
Low Pitch Stop Adjustment For -2 Propellers That Use a Two-piece Spinner Dome .....	Figure 6-18.....	6-52
Low Pitch Stop Adjustment For -2 Propellers That Use a One-piece Spinner Dome.....	Figure 6-19.....	6-54
Hex Nut Configuration .....	Figure 6-20.....	6-58
Accumulator Part Number Change.....	Figure 6-21 .....	6-64

LIST OF TABLES

Blade Type and Blade Model Designations... Table 2-1 ..... 2-13

Torque Table ..... Table 3-1 ..... 3-5

Metal Spinner Bulkhead  
Mounting Hardware ..... Table 3-2 ..... 3-11

Composite Spinner Bulkhead  
Mounting Hardware ..... Table 3-3 ..... 3-13

Propeller/Engine Flange O-rings  
and Hardware..... Table 3-4 ..... 3-14

Spinner Dome and Spinner Cap  
Mounting Hardware ..... Table 3-5 ..... 3-24

Air Charge Pressure ..... Table 6-1 ..... 6-13

Approved Touch-up Paints ..... Table 6-2 ..... 6-40

■ Erosion Tape..... Table 6-3 ..... 6-69



**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.....	1-8
6. Reference Publications .....	1-9
A. Hartzell Propeller Inc. Publications.....	1-9
B. References to Hartzell Propeller Inc. Publications .....	1-11
7. Definitions.....	1-12
8. Abbreviations.....	1-16
9. Hartzell Propeller Inc. Product Support.....	1-17
10. Warranty Service .....	1-17
11. Hartzell Propeller Inc. Recommended Facilities.....	1-18

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**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) Inspection, Repair, and Overhaul
  - (a) Compliance to the applicable regulatory requirements established by the Federal Aviation Administration (FAA) is mandatory for anyone performing or accepting responsibility for any inspection and/or repair and/or overhaul of any Hartzell Propeller Inc. product.
  - (b) 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.

**B. Maintenance Practices**

- (1) The propeller and its components are highly vulnerable to damage when 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) Use only the approved consumables, e.g., solvents, lubricants, etc.
- (4) 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.
- (5) Observe applicable torque values during maintenance.
- (6) Approved paint must be applied to all composite blades. For information concerning the application of paint, refer to the Maintenance Practices chapter of this manual. Operation of blades without the specified finishes is not permitted.
- (7) Before installing the propeller on the engine, the propeller must be static 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 balancing in accordance with the Maintenance Practices chapter of this manual.
    - 2 Additional procedures may be found in the aircraft maintenance manual.
- (8) As necessary, use a soft, non-graphite pencil or crayon to make identifying marks on components.
- (9) 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](http://WWW.HARTZELLPROP.COM).

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

- (13) 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. by subscription. Selected information is also available on the Hartzell Propeller Inc. website at [www.hartzellprop.com](http://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 Critical Parts.
- (2) Numerous propeller system parts can produce a propeller Major or Hazardous effect, even though those parts may not be considered as 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 113B (61-10-13) - Compact and Lightweight Compact Non-Feathering (-1) and Aerobatic (-4) Propeller Overhaul and Maintenance Manual.

Hartzell Propeller Inc. Manual 117D (61-10-17) - Compact Constant Speed and Feathering Propeller Overhaul and Maintenance Manual.

Hartzell Propeller Inc. Manual 127 (61-16-27) - Metal Spinner Assembly Maintenance Manual - Available on the Hartzell Propeller Inc. website at [www.hartzellprop.com](http://www.hartzellprop.com)

Hartzell Propeller Inc. Manual 130B (61-23-30) - Mechanically Actuated Governor Maintenance Manual

Hartzell Propeller Inc. Manual 135F (61-13-35) - Composite Propeller Blade Maintenance Manual.

Hartzell Propeller Inc. Manual 159 (61-02-59) - Application Guide - Available on the Hartzell Propeller Inc. website at [www.hartzellprop.com](http://www.hartzellprop.com)

Hartzell Propeller Inc. Manual 165A (61-00-65) - Illustrated Tool and Equipment Manual - Available on the Hartzell Propeller Inc. website at [www.hartzellprop.com](http://www.hartzellprop.com)

Hartzell Propeller Inc. Manual 170 (61-13-70) - Composite Propeller Blade Field Maintenance and Minor Repair Manual - Available on the Hartzell Propeller Inc. website at [www.hartzellprop.com](http://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](http://www.hartzellprop.com)

Hartzell Propeller Inc. Manual 180 (30-61-80) - Propeller Ice Protection System Manual - Available on the Hartzell Propeller Inc. website at [www.hartzellprop.com](http://www.hartzellprop.com)

Hartzell Propeller Inc. Manual 181 (30-60-81) - Propeller Ice Protection System Component Maintenance Manual - Available on the Hartzell Propeller Inc. website at [www.hartzellprop.com](http://www.hartzellprop.com)

Hartzell Propeller Inc. Manual 182 (61-12-82) - Propeller Electrical De-ice Boot Removal and Installation Manual - Available on the Hartzell Propeller Inc. website at [www.hartzellprop.com](http://www.hartzellprop.com)

Hartzell Propeller Inc. Manual 183 (61-12-83) - Propeller Anti-icing Boot Removal and Installation Manual - Available on the Hartzell Propeller Inc. website at [www.hartzellprop.com](http://www.hartzellprop.com)

Hartzell Propeller Inc. Manual 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](http://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](http://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](http://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 Inc. 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.
Composite Material. . . . .	Kevlar® (yellow) or graphite (black) fibers bound together with or encapsulated within an epoxy resin.
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.
Debond. . . . .	Separation of two materials that were originally bonded together in a separate operation.
Delamination. . . . .	Internal separation of the layers of composite material.

<u>Term</u>	<u>Definition</u>
Depression . . . . .	Surface area where the material has been compressed but not removed.
Distortion . . . . .	Alteration of the original shape or size of a component
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 rotated 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)
Monocoque . . . . .	A type of construction in which the outer skin carries all or a major part of the stresses
Nick . . . . .	Removal of paint and possibly a small amount of material.
Onspeed . . . . .	Condition in which the RPM selected by the pilot through the

<u>Term</u>	<u>Definition</u>
	propeller control lever and the actual engine (propeller) RPM are equal.
Overhaul . . . . .	The periodic disassembly, inspection, repair, refinish, and reassembly of a propeller assembly.
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.
Porosity . . . . .	An aggregation of microvoids. See "voids".
Propeller Critical Parts . .	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.
Split . . . . .	Delamination of blade extending to the blade surface, normally found near the trailing edge or tip.

<u>Term</u>	<u>Definition</u>
Synchronizing . . . . .	Adjusting the RPM of all the propellers of a multi-engine aircraft to the same RPM.
Synchrophasing . . . . .	A form of propeller sychronization 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.
Underspeed . . . . .	The condition in which the actual engine (propeller) RPM is lower than the RPM selected by the pilot through the propeller control lever
Vertical Balance . . . . .	Balance between the leading and trailing edges of a two-blade propeller with the blades positioned vertically.
Variable Force . . . . .	A force which may be applied or removed during propeller operation.
Voids. . . . .	Air or gas that has been trapped and cured into a laminate.
Windmilling . . . . .	The rotation of an aircraft propeller caused by air flowing through it while the engine is not producing power.

**8. Abbreviations**AbbreviationTerm

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**

- A. Hartzell Propeller Inc. 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](mailto:techsupport@hartzellprop.com).
- B. 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.
- C. Additional information is available on the Hartzell Propeller Inc. website at [www.hartzellprop.com](http://www.hartzellprop.com).

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

**10. Warranty Service**

- A. If you believe you have a warranty claim, it is necessary to contact Hartzell Propeller's Warranty Administrator. Hartzell Propeller'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. The Hartzell Propeller Inc. Warranty Administrator may be reached during business hours (8:00 a.m. through 5:00 p.m., 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](mailto: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 Propeller Inc. 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](http://www.hartzellprop.com).



### INSTALLATION AND REMOVAL - CONTENTS

	<u>Page</u>
1. Tools, Consumables, and Expendables .....	3-2.1
A. Tooling.....	3-2.1
B. Consumables .....	3-3
C. Expendables .....	3-3
2. Pre-Installation.....	3-7
A. Inspection of Shipping Package.....	3-7
B. Uncrating.....	3-7
C. Inspection after Shipment .....	3-7
D. Reassembly of a Propeller Disassembled for Shipment.....	3-7
E. Air Charge Pressure Check (-2 Propellers) .....	3-7
3. Spinner Pre-Installation .....	3-9
A. General .....	3-9
B. Installation of a Metal Spinner Bulkhead on a Propeller Hub .....	3-11
C. Installation of a Composite Spinner Bulkhead on a Propeller Hub .....	3-13
4. Propeller Installation .....	3-15
A. Flange Description .....	3-15
B. Installation of "F" Flange Propellers .....	3-17
C. Installation of "R" Flange Propellers.....	3-21
5. Spinner Installation .....	3-24.1
A. Installing a One-Piece Spinner Dome.....	3-24.1
B. Two-piece Spinner Dome (Procedure 1).....	3-27
C. Two-Piece Spinner Dome (Procedure 2) .....	3-29
6. Post-Installation Checks .....	3-30
7. Spinner Removal .....	3-30
A. Removal of One-Piece Spinner .....	3-30
B. Removal of Two-Piece Spinner.....	3-30
C. Hub Mounted Spinner Bulkhead Removal.....	3-30
D. Starter Ring Gear Spinner Adapter Removal.....	3-31

### INSTALLATION AND REMOVAL - CONTENTS, CONTINUED

8. Propeller Removal .....	3-31
A. Removal of "F" Flange Propellers .....	3-31
B. Removal of "R" Flange Propellers.....	3-33

### LIST OF FIGURES

	<u>Page</u>
Determining Torque Value When Using Torquing Adapter .....	Figure 3-1 ..... 3-4
Diagram of Torquing Sequence for Propeller Mounting Hardware.....	Figure 3-2..... 3-6
Hub Clamping Bolt Location .....	Figure 3-3..... 3-8
Metal Bulkhead and Spinner Mounting (Hub Mounted Spinner) .....	Figure 3-4..... 3-10
Composite Bulkhead and Spinner Mounting (Hub Mounted Spinner) .....	Figure 3-5..... 3-12
F Flange Propeller Mounting .....	Figure 3-6..... 3-16
R Flange Propeller Mounting.....	Figure 3-7 ..... 3-20
Two-Piece Spinner Mounting (Procedure 1)...	Figure 3-8 ..... 3-26
Two-Piece Spinner Mounting (Procedure 2)...	Figure 3-9 ..... 3-28
Spinner Dome-to-Bulkhead Mounting Hole Alignment .....	Figure 3-10 ..... 3-28

### LIST OF TABLES

	<u>Page</u>
Torque Table .....	Table 3-1 ..... 3-5
Metal Spinner Bulkhead Mounting Hardware .....	Table 3-2 ..... 3-11
Composite Spinner Bulkhead Mounting Hardware .....	Table 3-3 ..... 3-13
Propeller/Engine Flange O-rings and Hardware.....	Table 3-4 ..... 3-14
Spinner Dome and Spinner Cap Mounting Hardware .....	Table 3-5 ..... 3-24

**1. Tools, Consumables, and Expendables**

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

**NOTE:** Compact propellers with composite blades are manufactured with one two basic hub mounting flange designs. The flange types are F or R. The flange type used on a particular propeller installation is indicated in the propeller model number stamped on the hub. For example, BHC-J2YE-1C 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

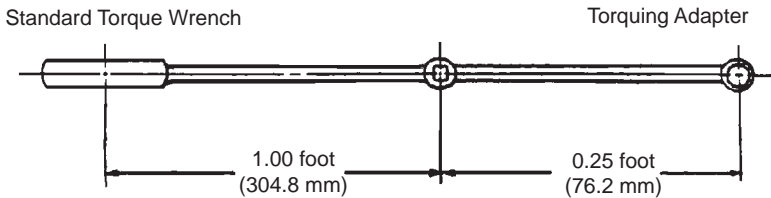
**B. Consumables**

- Quick Dry Stoddard Solvent or MEK

**C. Expendables**

- 0.032 inch (0.81 mm) stainless steel aircraft safety wire (Alternate: 0.032 inch [0.81 mm] aircraft safety cable, and associated hardware)
- O-ring (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:

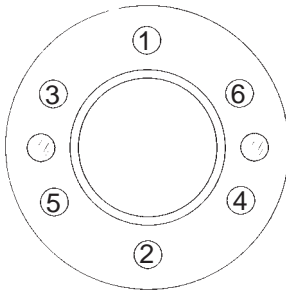
$$\frac{100 \text{ Ft-Lb (136 N}\cdot\text{m)} \times 1.00 \text{ ft (304.8 mm)}}{1.00 \text{ ft (304.8 mm)} + 0.25 \text{ ft (76.2 mm)}} = 80 \text{ Ft-Lb (108 N}\cdot\text{m)} < \text{reading on torque wrench with 3-inch (76.2 mm) adapter for actual torque of 100 Ft-Lb (136 N}\cdot\text{m)}$$

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

<b>Installation Torques</b>	
<b>CAUTION 1:</b> MOUNTING HARDWARE MUST BE CLEAN AND DRY TO PREVENT EXCESSIVE PRELOAD OF THE MOUNTING FLANGE.	
<b>CAUTION 2:</b> ALL TORQUES LISTED ARE DRY TORQUE.	
<b>CAUTION 3:</b> REFER TO FIGURE 3-1 FOR TORQUE READING WHEN USING A TORQUE WRENCH ADAPTER.	
For ( )HC-( )Y( )-( ) <b>ONLY</b> Hub clamping bolts/spinner mounting nuts	20-22 ft-lbs (28-29 N•m)
For ( )HC-( )3Y1( )-1( ) <b>ONLY</b> Hub clamping bolts/spinner mounting nuts	24-26 ft-lbs (33-35 N•m)
F flange propeller mounting nuts	70-80 ft-lbs (95-108 N•m)
For all R flange propeller mounting studs	60-70 ft-lbs (82-94 N•m)
Low pitch stop jam nut -1 Application (See Figure 6-17) P/N A-2043-1, P/N B-3359, P/N B-3599	14-16 ft-lbs (19-21 N•m)
Low pitch stop jam nut -4 Application (See Figure 6-17) P/N A-2043-1, P/N B-3359, P/N B-3599, P/N B-3807	27-33 ft-lbs (37-44 N•m)
Low pitch stop jam nut for -2 applications that use a one-piece spinner dome (See Figure 6-19)	25-30 ft-lbs (34-40 N•m)
Low pitch stop jam nut/Spinner locknut "A" and "B" for two-piece spinner dome (See Figure 6-18, Figure 3-8, and Figure 3-9)	25-30 ft-lbs (34-40 N•m)
Governor Max. RPM Stop locking nut	30-36 in-lbs (3.4-4.0 N•m)

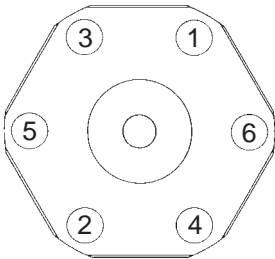
**Torque Table**  
**Table 3-1**



### 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**



- (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.

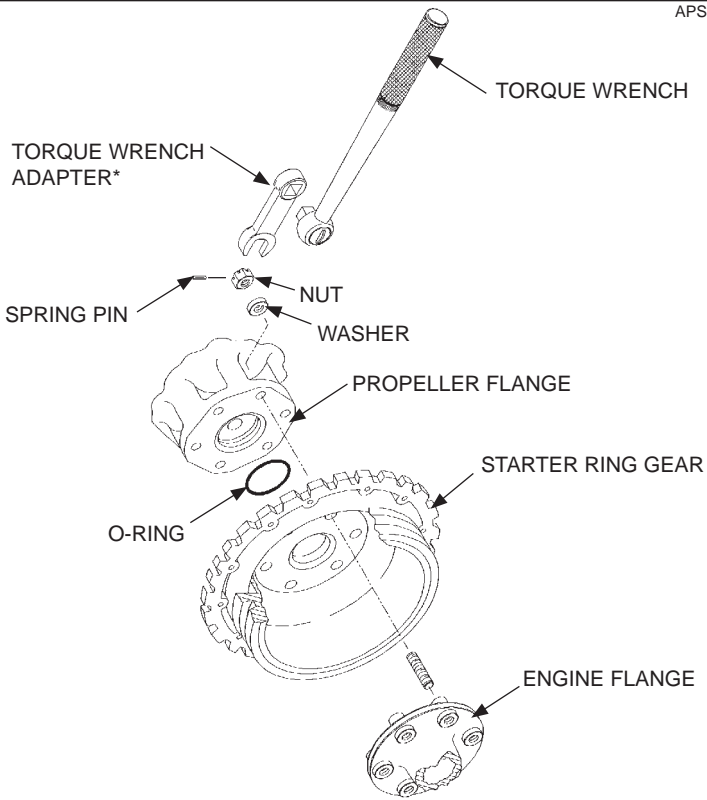
**CAUTION 2:** TIGHTEN NUTS EVENLY TO AVOID HUB DAMAGE.

- (7) Install the 1/2 inch propeller mounting nuts (dry) with spacers. Refer to Table 3-4.
- (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](http://www.hartzellprop.com):
- (a) Harzell Propeller Inc. Manual 180 (30-61-80) - Propeller Ice Protection System Manual
  - (b) Harzell Propeller Inc. Manual 181 (30-60-81) - Propeller Ice Protection System Component Maintenance Manual
  - (c) Harzell Propeller Inc. Manual 182 (61-12-82) - Propeller Electrical De-ice Boot Removal and Installation Manual
  - (d) Harzell Propeller Inc. Manual 183 (61-12-83) - Propeller Anti-icing Boot Removal and Installation Manual

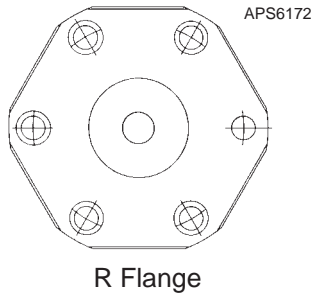
- █ (11) Propeller ice protection system components not supplied by Hartzell Propeller Inc. are controlled by the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).
- █ (12) Install the propeller spinner dome in accordance with the section "Spinner Installation" in this chapter.

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APS6160D



**\*NOTE:** If a torque wrench adapter is used, use the calculation in Figure 3-1 to determine correct torque wrench setting



**R Flange Propeller Mounting  
Figure 3-7**

**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 diameter 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 3-7.
- (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](http://www.hartzellprop.com):
  - (a) Hartzell Propeller Inc. Manual 180 (30-61-80) - Propeller Ice Protection System Manual
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  - (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.

<b>Dome or Cap</b>	<b>Washer</b>	<b>Screw</b>
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. 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**

- (1) The following instructions relate to Hartzell 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) The spinner dome has an internal support (refer to Figure 2-1) that encircles the propeller cylinder. The cylinder may need to be wrapped with one or more layers of UHMW tape (Hartzell Part Number B-6654-100).

**CAUTION:** THE SPINNER DOME INTERNAL SUPPORT MUST FIT SNUGLY ON THE 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.

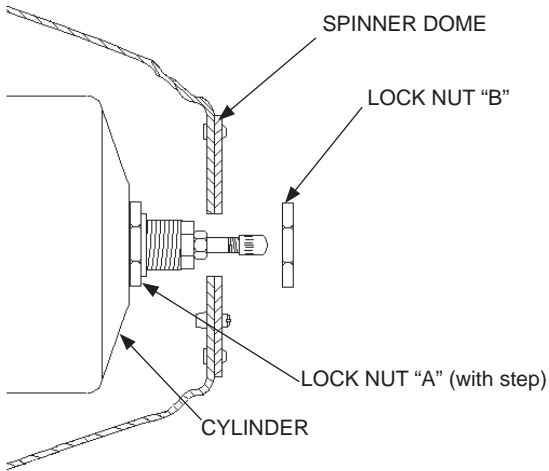
CAUTION: TO AVOID DAMAGING THE AIRCRAFT COWLING, THE SCREWS MUST NOT EXTEND MORE THAN THREE THREADS PAST THE BULKHEAD NUTPLATES.

- (5) Attach the spinner to the spinner bulkhead 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-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.



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APS6179



**Two-Piece Spinner Mounting (Procedure 1)**  
**Figure 3-8**

**B. 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" has a "step" facing away from the cylinder. Refer to Figure 3-8.

**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 spinners only. In some cases, the airframe manufacturer produced the spinner assembly. Refer to the airframe manufacturer's manual for spinner installation instructions.

**(2) Procedure - Refer to Figure 3-8.**

(a) Install the spinner dome.

(b) Push the spinner dome toward the bulkhead to align the spinner mounting holes with those of the bulkhead.

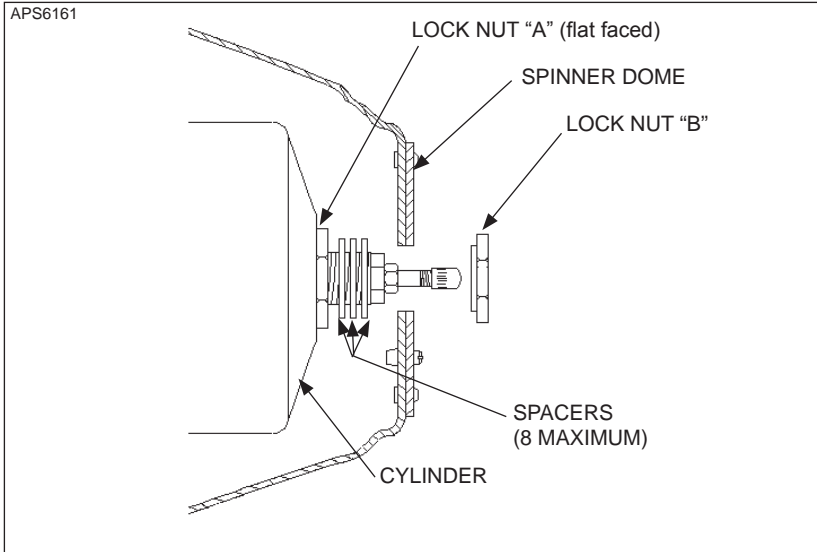
(c) Using screws and washers, attach the spinner to the bulkhead or adapter ring. Refer to Table 3-5.

(d) Install the lock nut "B" on the low pitch stop. Refer to Table 3-1 and Figure 3-1 for lock nut torque.

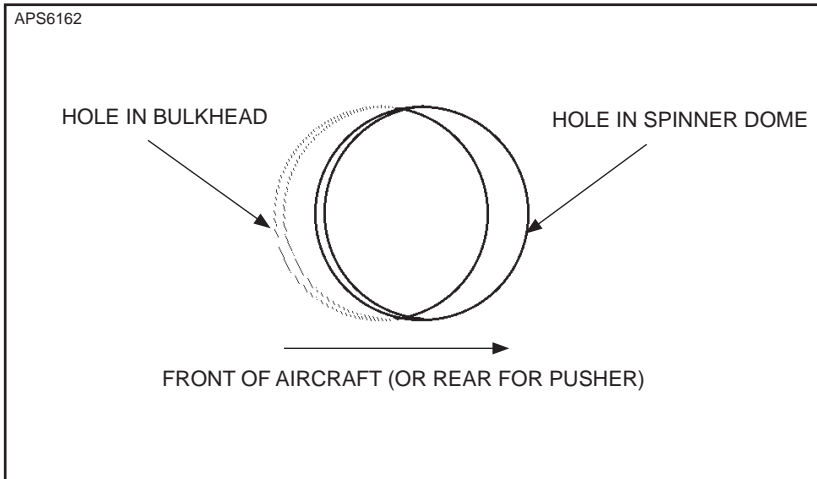
(e) Safety wire the lock nut "B" to each of the two screws on the flat face of the spinner dome surrounding the lock nut "B".

**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 3-9**



**Spinner Dome-to-Bulkhead Mounting Hole Alignment**  
**Figure 3-10**

**C. 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 "A" is flat-faced. Refer to Figure 3-9.

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 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) Procedure - Refer to Figure 3-9.**

- (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 3-10. Add or remove spacers to achieve this alignment.
- (c) Install the 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 “B” to each of the two screws on the flat face of the spinner dome surrounding the lock nut “B”.
- (h) Using flat head screws, attach the spinner dome cap to the spinner dome. Refer to Table 3-5.

## 6. Post-Installation Checks

- A. Perform a Static RPM Check as outlined in the Testing and Troubleshooting chapter of this manual.

## 7. 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 SURFACE.

### 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 the 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 removal of the spinner bulkhead.

**D. Starter Ring Gear Spinner Adapter Removal**

- (1) Remove the 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.

**8. Propeller Removal****A. Removal of "F" Flange Propellers**

- (1) Remove the spinner dome in accordance with the section "Spinner Removal" 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](http://www.hartzellprop.com):
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  - (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 POUNDS (363 KG) TO SUPPORT THE WEIGHT OF THE PROPELLER ASSEMBLY DURING REMOVAL.

- (5) Support the propeller assembly with a sling.
  - (a) 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 six 1/2 inch diameter 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 "R" Flange Propellers
- (1) Remove the spinner dome in accordance with the section "Spinner Removal" 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](http://www.hartzellprop.com):
    - (a) Hartzell Propeller Inc. Manual 180 (30-61-80) - Propeller Ice Protection System Manual
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    - (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 POUNDS 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 NUTS AND SPACERS IF THEY ARE DAMAGED OR CORRODED, OR WHEN THE PROPELLER IS REMOVED FOR OVERHAUL.

- (7) Unscrew the six 1/2 inch diameter mounting studs from the engine bushings.
  - (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.

**1. Operational Tests****A. General**

- (1) The propeller must be installed on an application that uses a propeller governor.
- (2) Perform the test after propeller installation and before every flight.
- (3) The propeller system must be purged of air and proper operation verified.

**B. Initial Run-Up**

- (1) Perform engine start and warm-up per the Pilot's Operating Handbook (POH).

**CAUTION:** AIR TRAPPED IN THE PROPELLER HYDRAULIC SYSTEM WILL CAUSE THE PITCH CONTROL TO BE IMPRECISE AND MAY RESULT IN PROPELLER SURGING.

- (2) Cycle the propeller control throughout its operating range from low to high (or as directed by the POH).
- (3) Repeat this procedure at least three times to purge air from the propeller hydraulic system and to introduce warmed oil to the cylinder.

**NOTE:** Pitch change response on the first operation from low to high blade pitch may be slow, but should speed up on the second and third cycles

- (4) Verify proper operation from low pitch to high pitch and throughout operating range.
- (5) Shut down the engine in accordance with the POH.

**C. Static RPM Check**

**NOTE:** This operational check should be performed after installation, maintenance, or propeller adjustment.

**CAUTION:** A CALIBRATED TACHOMETER MUST BE USED TO MAKE SURE OF THE ACCURACY OF THE RPM CHECK.

- (1) Set the brakes and chock the aircraft or tie aircraft down.
- (2) Back the governor Maximum RPM Stop out one turn.
- (3) Start the engine.

- (4) Advance the propeller control lever to MAX (max RPM), then retard the control lever one inch (25.4 mm).
- (5) SLOWLY advance the throttle to maximum manifold pressure.
- (6) Slowly advance the propeller control lever until the engine speed stabilizes.
  - (a) If engine speed stabilizes at the maximum RPM specified by the TC or STC holder, then the low pitch stop is set correctly.
  - (b) If engine speed stabilizes above or below the rated RPM, the low pitch stop may require adjustment. Refer to the Maintenance Practices chapter of this manual.
- (7) Stop the engine.
- (8) Return the governor maximum RPM stop to the original position or adjust the governor to the rated RPM with the maximum RPM stop screw.
  - (a) If the governor is adjusted to the rated RPM with the maximum RPM stop screw, hold the maximum RPM stop screw in place and torque the maximum RPM stop locking nut in accordance with Table 3-1, Torque Table.

**CAUTION:** REFER TO THE AIRCRAFT MAINTENANCE MANUAL FOR ADDITIONAL PROCEDURES THAT MAY BE REQUIRED AFTER PROPELLER INSTALLATION.

#### D. Post-Run Check

- (1) After engine shutdown, check the propeller for signs of engine oil leakage.

**MAINTENANCE PRACTICES - CONTENTS**

1. Cleaning .....	6-5
A. General Cleaning .....	6-5
B. Spinner Cleaning and Polishing .....	6-7
2. Lubrication .....	6-7
A. Lubrication Intervals .....	6-7
B. Lubrication Procedure .....	6-9
C. Approved Lubricants .....	6-12
3. Air Charge (-2 Propellers) .....	6-13
A. Charging the Propeller .....	6-13
4. N-shank Composite Blades .....	6-15
A. General Description .....	6-15
B. Component Life and Service .....	6-16
C. Personnel Requirements .....	6-19
D. Blade Inspection Requirements .....	6-20
E. Minor Repair .....	6-20.2
5. Legacy Composite Blades .....	6-20.5
A. General Description .....	6-20.5
B. Component Life and Service .....	6-20.7
C. Personnel Requirements .....	6-20.10
D. Determination of Repair .....	6-21
E. Blade Inspection Requirements .....	6-24
F. Coin-Tap Test .....	6-27
G. Airworthy Damage .....	6-28
H. Unairworthy Damage .....	6-35
I. Minor Repair .....	6-35
J. On Wing Blade Shank Inspection .....	6-37
6. Painting of Composite Blades .....	6-40
A. General .....	6-40
B. Procedure .....	6-41
C. Optional Removal of Leading Edge Paint for N7605(B,K) and N7605C( ) Blades .....	6-42.1
7. Dynamic Balance .....	6-44
A. Overview .....	6-44
B. Inspection Procedures Before Balancing .....	6-45
C. Modifying Spinner Bulkhead to Accommodate Dynamic Balance Weights .....	6-46
D. Placement of Balance Weights for Dynamic Balance .....	6-47

MAINTENANCE PRACTICES - CONTENTS, CONTINUED

8. Propeller Low Pitch Setting .....	6-49
A. Low Pitch Stop - All Propeller Models .....	6-49
B. Max. RPM (Static) Low Pitch Stop Adjustment .....	6-51
C. Modification of the Low Pitch Stop Hardware .....	6-59
9. Propeller High Pitch Settings .....	6-63
A. High Pitch (Min. RPM) Stop .....	6-63
10. Start Lock Settings .....	6-63
A. Start Lock Pitch Stop .....	6-63
11. Accumulator Part Number Change .....	6-64
A. General .....	6-64
B. Material Information .....	6-65
C. Accomplishment Instructions .....	6-65
12. Propeller Ice Protection Systems .....	6-66
A. Electric De-ice System .....	6-66
B. Anti-ice System .....	6-66
13. Installation of Erosion Tape CM158 .....	6-67
A. General .....	6-67
B. Materials Required .....	6-68
C. Installation Procedure .....	6-69

LIST OF FIGURES

Grease Fitting and Air Charge Valve Location .....	Figure 6-1 .....	6-6
Lubrication Fitting .....	Figure 6-2 .....	6-8
Lubrication Label .....	Figure 6-3 .....	6-10
Section of Typical N-shank Composite Blade .....	Figure 6-4 .....	6-14
Basic Components of an N-shank Composite Blade .....	Figure 6-5 .....	6-14
Section of Typical Legacy Composite Blade .....	Figure 6-6 .....	6-20.4
Basic Components of a Legacy Composite Blade .....	Figure 6-7 .....	6-20.4
Determination of Repair Flow Chart .....	Figure 6-8 .....	6-21
Coin-Tap Test to Check for Debonds and Delaminations.....	Figure 6-9 .....	6-26
Interpretation of Erosion Shield Damage.....	Figure 6-10 .....	6-28
Missing Portion of the Erosion Shield (Trailing Edge) .....	Figure 6-11 .....	6-29
Acceptable Erosion Shield Damage and Unacceptable Crack Locations.....	Figure 6-12 .....	6-30
Debonds Exceeding the Allowable Limits.....	Figure 6-13 .....	6-30
Legacy Composite Blade Regions .....	Figure 6-14 .....	6-32
Inspection Areas for Counterweighted and Non-counterweighted Blades .....	Figure 6-15 .....	6-36
Removal of the Leading Edge Paint .....	Figure 6-16 .....	6-42.1
Low Pitch Stop Adjustment (-1, -4) .....	Figure 6-17 .....	6-50
Low Pitch Stop Adjustment For -2 Propellers That Use a Two-piece Spinner Dome .....	Figure 6-18 .....	6-52

LIST OF FIGURES, CONTINUED

Low Pitch Stop Adjustment  
For -2 Propellers That Use a  
One-piece Spinner Dome ..... Figure 6-19 ..... 6-54

Hex Nut Configuration ..... Figure 6-20 ..... 6-58

Accumulator Part Number Change..... Figure 6-21 ..... 6-64

LIST OF TABLES

Air Charge Pressure ..... Table 6-1 ..... 6-13

Approved Touch-up Paints ..... Table 6-2 ..... 6-40

Erosion Tape..... Table 6-3 ..... 6-69



## 1. Cleaning

CAUTION 1: 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.

CAUTION 2: DO NOT USE PRESSURE WASHING EQUIPMENT TO CLEAN THE PROPELLER OR CONTROL COMPONENTS. PRESSURE WASHING CAN FORCE WATER AND/OR CLEANING FLUIDS PAST SEALS AND LEAD TO INTERNAL CORROSION OF PROPELLER COMPONENTS.

### A. General Cleaning

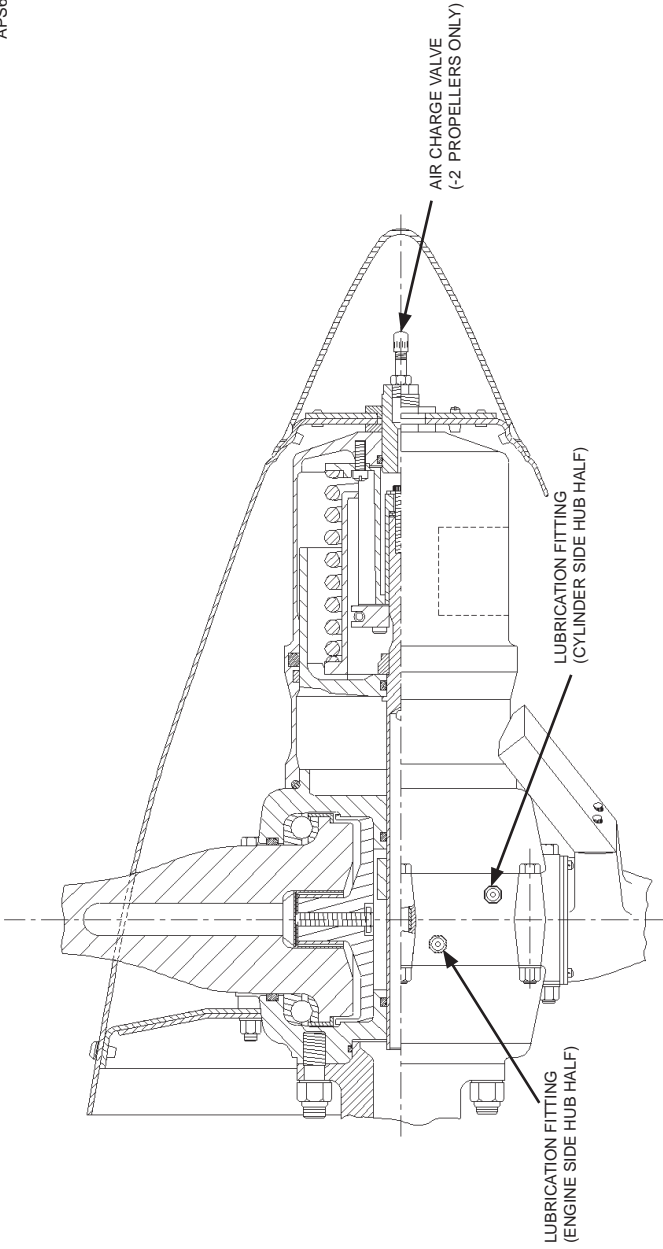
CAUTION 1: WHEN CLEANING THE PROPELLER, DO NOT PERMIT SOAP OR SOLVENT SOLUTIONS TO RUN OR SPLASH INTO THE HUB AREA.

CAUTION 2: DO NOT CLEAN THE PROPELLER WITH CAUSTIC OR ACIDIC SOAP SOLUTIONS. IRREPARABLE CORROSION OF PROPELLER COMPONENTS MAY OCCUR.

CAUTION 3: DO NOT USE ANY SOLVENT DURING CLEANING THAT COULD SOFTEN OR DESTROY THE BOND BETWEEN CHEMICALLY ATTACHED PARTS.

- (1) To remove grease or oil from propeller surfaces, apply Stoddard Solvent or equivalent to a clean cloth and wipe the part clean.
- (2) Using a noncorrosive soap solution, wash the propeller.
- (3) Thoroughly rinse with water.
- (4) Permit to dry.

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**Grease Fitting and Air Charge Valve Location  
Figure 6-1**

**B. Spinner Cleaning and Polishing**

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

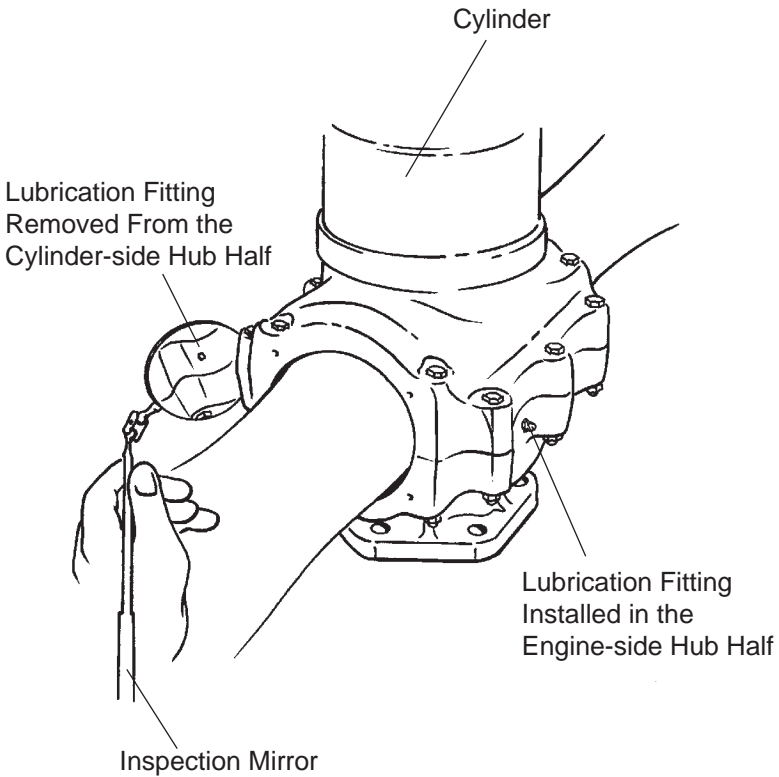
**2. Lubrication**

**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 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.

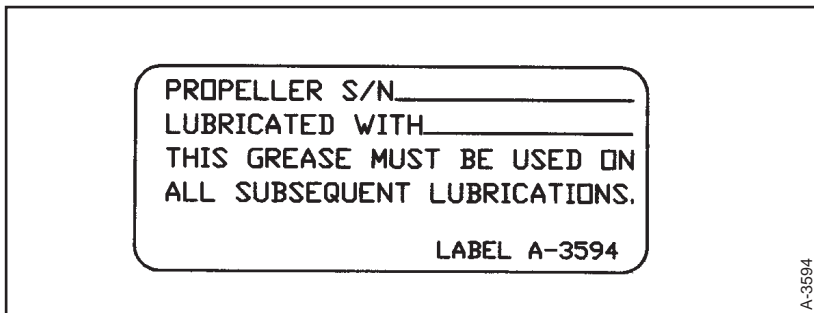
- (1) Remove the propeller spinner.
- (2) Refer to Figure 6-1 and Figure 6-2. Each blade socket has two lubrication fittings. Remove the lubrication fitting caps the lubrication fittings. Remove the lubrication fittings from either the cylinder-side or the engine side of the hub assembly.
  - (a) It 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 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 permitted 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.



Lubrication Label  
Figure 6-3

- (b) Purging of old grease through lubrication fittings is only about 30 percent 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.

- 2 The lubrication fittings installed on the cylinder-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.
- (8) Tighten the fittings until snug.
    - (a) Make sure that the ball of each lubrication fitting is properly seated.
  - (9) Reinstall a lubrication fitting cap on each lubrication fitting.
- C. Approved Lubricants

The following lubricants are approved for use in Hartzell compact propellers:

- Aeroshell 6 - Recommended "all purpose" grease. Used in most new production propellers since 1989. Higher leakage/oil separation than Aeroshell 5 at higher temperatures (approximately 100°F [38°C]).
- Aeroshell 5 - Good high temperature qualities, very little oil separation or leakage. Cannot be used in temperatures colder than -40°F (-40°C). Aircraft serviced with this grease must be placarded to indicate that flight is prohibited if the outside air temperature is less than -40°F (-40°C).
- Aeroshell 7 - Good low temperature grease, but high leakage/oil separation at higher temperatures. This grease has been associated with sporadic problems involving seal swelling.
- Aeroshell 22 - Qualities similar to Aeroshell 7.
- Royco 22CF - Not widely used. Qualities similar to Aeroshell 22.



**3. Air Charge (-2 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.

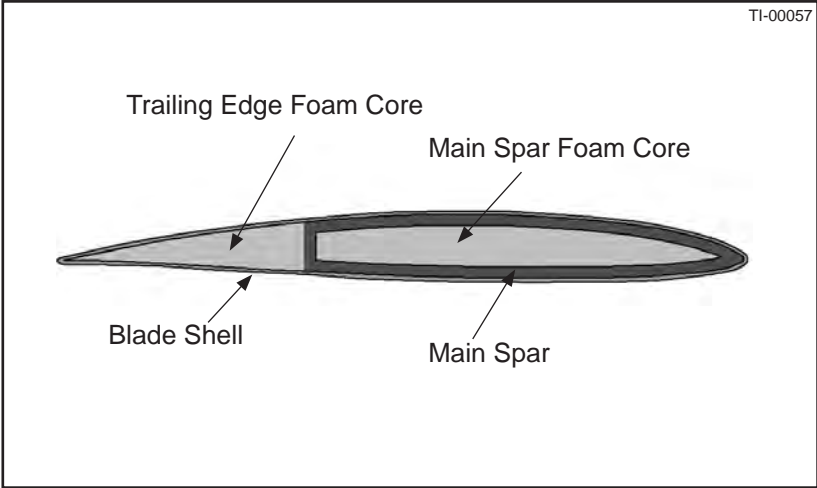
**A. Charging the Propeller**

**WARNING:** DO NOT CHARGE THE CYLINDER OR MEASURE THE AIR CHARGE ON A PROPELLER THAT IS IN FEATHER POSITION.

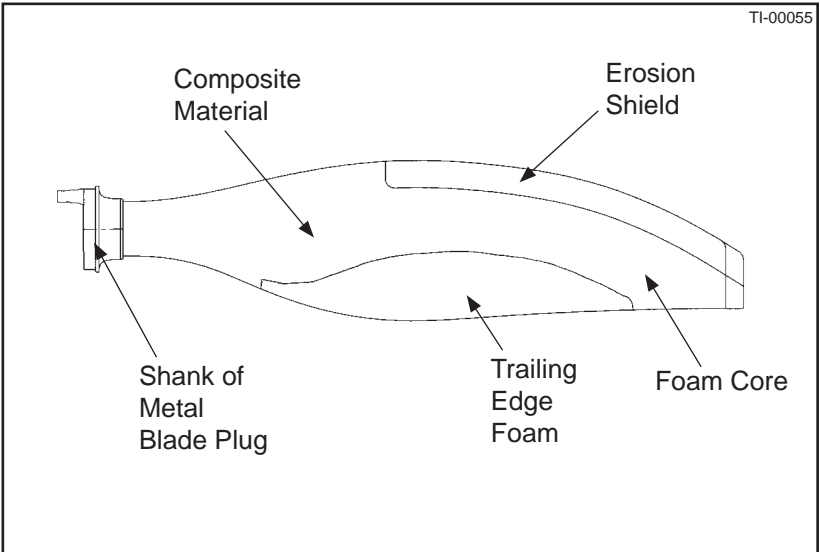
- (1) Examine the propeller to make sure that it is positioned on the start locks
- (2) Using proper control, charge the cylinder with dry air or nitrogen.
  - (a) The air charge valve is located on the cylinder as indicated in Figure 6-1.
  - (b) Nitrogen is the preferred charging medium.
  - (c) The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

°F	°C	P.S.I.	Bar
100 to 70	38 to 21	41	2.9
40 to 70	4 to 21	38	2.6
0 to 40	-18 to 4	36	2.5
-30 to 0	-34 to -18	33	2.3

**Air Charge Pressure  
Table 6-1**



**Section of Typical N-shank Composite Blade**  
**Figure 6-4**



**Basic Components of an N-shank Composite Blade**  
**Figure 6-5**

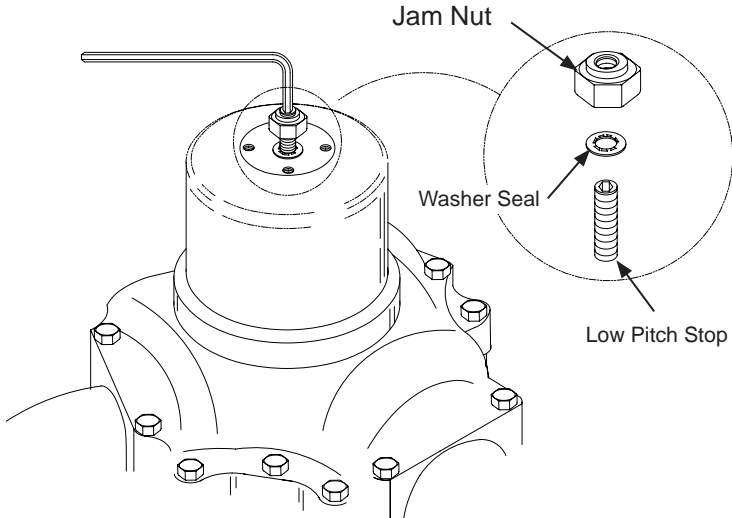
**8. Propeller Low Pitch Setting**

**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 ACCORDANCE WITH THE APPLICABLE TYPE CERTIFICATE OR SUPPLEMENTAL TYPE CERTIFICATE HOLDER'S MAINTENANCE DATA.

**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 and 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.



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**Low Pitch Stop Adjustment (-1, -4)**  
**Figure 6-17**

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

**WARNING 3:** 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 6-17. 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.

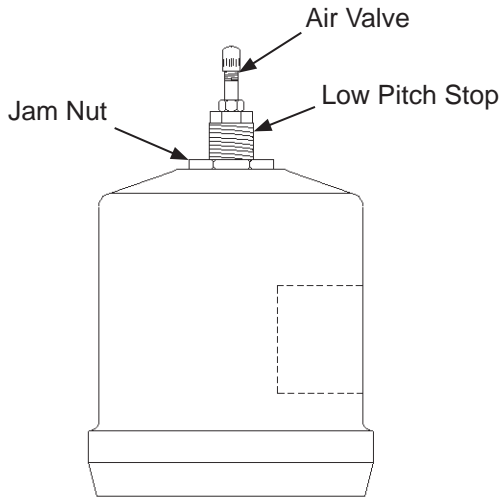
(b) Carefully remove any sealant from the exposed threads of the low pitch stop.

**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.



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**Low Pitch Stop Adjustment  
For -2 Propellers That Use a Two-piece Spinner Dome  
Figure 6-18**

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

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

- (a) Refer to Figure 6-18. 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.

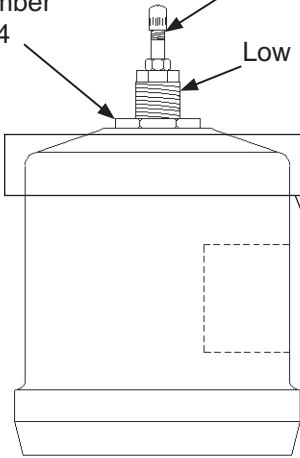
**WARNING:** A MINIMUM OF FIVE THREADS IN THE CYLINDER MUST ENGAGE THE LOW PITCH STOP AFTER ADJUSTMENT IS COMPLETED.

- (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.

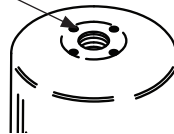
Jam Nut  
Hartzell Propeller Inc.  
Part Number  
A-2405-4

Air Valve

Low Pitch Stop



One of four threaded  
holes in the top of the  
cylinder



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**Low Pitch Stop Adjustment For -2 Propellers  
That Use a One-piece Spinner Dome  
Figure 6-19**



- (3) Feathering (-2) 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, 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.
- (b) Refer to Figure 6-19. 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 6-19.
  - 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.

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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 6-20

**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 6-20 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 Methyl-Ethyl-Keytone (MEK) CM106 or Methyl Propyl Ketone (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".

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

- (1) The high pitch stops are set at the factory per the aircraft manufacturer's recommendations. These stops are adjustable only by a certified propeller repair station or the Hartzell Propeller Inc. factory.

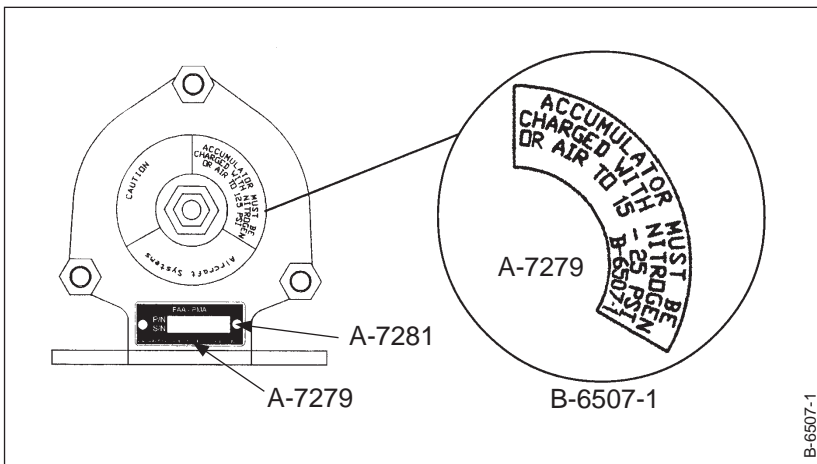
**10. Start Lock Settings****A. Start Lock Pitch Stop**

- (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 factory.

### 11. Accumulator Part Number Change

#### A. General

- (1) The HC-C(2,3)YR-1A/7690( ) propeller with 8907-001 accumulator uses a standard accumulator, part number 8907-001.
- (2) This accumulator is charged, per Hartzell's specifications, to a lower pressure than that specified on the manufacturer's accumulator label. There is concern that these accumulators may subsequently be used on other installations with an improper air charge.
- (3) A new accumulator configuration, part number 8907-040, has been created. The label on this new part number accumulator specifies the reduced air pressure required for the propeller systems affected.
  - (a) The 8907-040 configuration is physically identical to the original 8907-001 accumulator.
- (4) This procedure changes the part number and labels to reidentify 8907-001 accumulators.



**Accumulator Part Number Change**  
**Figure 6-21**

**B. Material Information****(1) Material Necessary for Each Propeller/Component**

<u>Part Number</u>	<u>Keyword</u>	<u>Quantity</u>
A-7279	Nameplate	1
A-7281	Drive Lock Stud	2
B-6507-1	Label	2

**C. Accomplishment Instructions****(1) Removal Instructions**

- (a) Remove the drive lock studs that fasten the original nameplate.

WARNING: THE SERIAL NUMBER MUST BE TRANSFERRED FROM THE ORIGINAL NAMEPLATE TO THE NEW NAMEPLATE TO PROVIDE FUTURE SERIAL NUMBER TRACEABILITY OF THIS COMPONENT.

- (b) Using a Vibra Engraving machine or equivalent, transfer the serial number from the original nameplate to the new A-7279 nameplate.

- (c) Discard the original nameplate.

**(2) Installation Instructions**

- (a) Using two A-7281 drive lock studs, install the new A-7279 nameplate that shows the transferred serial number.

- (b) Install B-6507-1 labels directly over original labels. Refer to Figure 6-21.

- 1 The B-6507-1 label specifies an air charge of 15-25 psi. Apply the new label directly over the currently installed label to cover the air charge specified on the currently installed label.

**12. 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.

**13. Installation of Erosion Tape CM158****A. General**

**NOTE:** Specific Hartzell Propeller Inc. manuals and service documents are available on the Hartzell website at [www.hartzellprop.com](http://www.hartzellprop.com). Refer to the Required Publications section in the Introduction chapter of this manual for the identification of these publications.

- (1) This section provides the procedures for the installation of erosion tape CM158 on a blade that will not have an anti-icing or de-ice boot installed.
  - a** For the installation of erosion tape CM158 on a blade that has a de-ice boot installed, refer to Hartzell Propeller Inc. Propeller Electrical De-ice Boot Removal and Installation Manual 182 (61-12-82).
  - b** For the installation of erosion tape CM158 on a blade that has an anti-icing boot installed, refer to Hartzell Propeller Inc. Propeller Anti-icing Boot Removal and Installation Manual 183 (61-12-83).
- (2) Application of erosion tape CM158 is required for the blade models listed in Table 6-3.
- (3) Application of erosion tape CM158 is optional but highly recommended for all other models of composite blades.
- (4) A minimum temperature of 60°F (10°C) is required for erosion tape CM158 application.
- (5) Keep hands clean at all times.
- (6) Paint must cure for a minimum of 8 hours before installing erosion tape CM158.

**B. Materials Required**

**NOTE:** Specific Hartzell Propeller Inc. manuals and service documents are available on the Hartzell website at [www.hartzellprop.com](http://www.hartzellprop.com). Refer to the Required Publications section in the Introduction chapter of this manual for the identification of these publications.

**(1) Consumables**

**NOTE:** For additional information about CM numbers or materials refer to the Consumable Materials chapter of Hartzell Standard Practices Manual 202A (61-01-02) or contact the Hartzell Propeller Inc. Product Support Department.

- (a) Erosion Tape CM158, Hartzell Propeller Inc. part number A-6741-168
- (b) Methyl-Ethyl-Keytone (MEK) CM106, Methyl Propyl Ketone (MPK) CM219, or Acetone CM173
- (c) Cheesecloth, Grade 90 CM159, locally procured
- (d) Masking Tape, locally procured
- (e) 3M Adhesive Promoter 86A, CM124, optional

**(2) Tools**

**NOTE:** For additional information about TE numbers or materials in this manual refer to the Hartzell Propeller Inc. Illustrated Tool and Equipment Manual 165 (61-00-65) or contact the Hartzell Propeller Inc. Product Support Department.

- (a) Ball Point Pen or Pencil, locally procured
- (b) Measuring Tape, locally procured
- (c) Rubber Roller TE330 or Silicon Roller TE331

**C. Installation Procedure**

**WARNING:** ADHESIVES AND SOLVENTS ARE FLAMMABLE AND TOXIC TO THE SKIN, EYES, AND RESPIRATORY TRACT. SKIN AND EYE PROTECTION ARE REQUIRED. AVOID PROLONGED CONTACT AND BREATHING OF VAPORS. USE SOLVENT RESISTANT GLOVES TO MINIMIZE SKIN CONTACT AND WEAR SAFETY GLASSES FOR EYE PROTECTION. USE IN A WELL VENTILATED AREA AWAY FROM SPARKS AND FLAME.

**CAUTION:** DO NOT INSTALL EROSION TAPE CM158 ON A BLADE THAT HAS PAINT THAT HAS CURED LESS THAN 8 HOURS.

**(1) Preparation**

- (a) Cut the appropriate length of erosion tape CM158 in accordance with Table 6-3.
- (b) Radius the corners of the erosion tape CM158 to 0.5 inch (13 mm) to remove any sharp corners.
- (c) Using a pencil or a ball point pen, measure and make a mark on the nonadhesive side of the erosion tape CM158 to indicate the centerline of the erosion tape.

<b>Blade Model</b> (That does not have a de-ice or anti-icing boot installed)	<b>Tape Length</b> (per Blade)
N7605-( ) or N7605C-( )	14.87 inches (377.8 mm)
N( )7893-( )	13.33 inches (338.5 mm)
NG8301( )	13.12 inches (333.2 mm)

**Erosion Tape  
Table 6-3**

- (d) Using a non-graphite pencil CM162 or equivalent, measure and make a mark on the blade 1.00 inch (25.4 mm) outboard of the metal blade shank near the leading edge.
  - 1 This alignment mark on the blade will be used to align the inboard edge of the erosion tape at installation.
- (e) Using a clean cloth dampened with solvent CM106 (MEK), CM219 (MPK), or CM41 (toluene) thoroughly clean the area of the blade where the erosion tape CM158 will be installed.
  - 1 Using a clean, lint-free cloth, immediately wipe the area dry.
  - 2 Permit the area to air dry.
  - 3 Repeat the cleaning and drying of the area.



(2) Application of Optional Adhesive Promoter CM124

NOTE: Adhesive promoter CM124 will increase the adhesion between the erosion tape CM158 and the blade.

- (a) Using masking tape or equivalent as masking material, apply the masking material to the perimeter of the area where the erosion tape CM158 will be installed.
- (b) Apply a thin, uniform layer of adhesive promoter CM124 to the area of the blade where the erosion tape CM158 will be installed.
- (c) Remove the masking material.

CAUTION: THE ADHESIVE PROMOTER CM124 WILL BEGIN TO LOSE ADHESION AFTER 60 MINUTES AT ROOM TEMPERATURE.

- (d) Permit the adhesive promoter CM124 to dry at room temperature for a minimum of 15 minutes and a maximum of 60 minutes.

(3) Installation of the Erosion Tape CM158

- (a) Peel the backing material from the erosion tape CM158.
- (b) Holding the erosion tape CM158 with the adhesive side toward the blade, align the end of the erosion tape with the alignment mark on the blade (outboard of the metal shank and near the leading edge), while aligning the centerline that was marked on the erosion tape with the leading edge of the blade.
- (c) Press the erosion tape CM158 into position on the leading edge of the blade while maintaining light tension on the erosion tape to minimize air bubbles and keep the tape straight.
- (d) Using a roller, such as TE330 or TE331, or fingers, press the erosion tape CM158 down onto the leading edge of the blade.

- (e) Using a roller, such as TE330 or TE331, or fingers, work the erosion tape CM158 into position on one side of the blade.
- 1 Starting at the outboard end of the blade and working toward the shank, use a hard rubber or nylon roller, such as TE330 or TE331, or fingers to firmly seat the erosion tape CM158 to the blade.
  - 2 Make sure that there are no wrinkles and that no air is trapped under the erosion tape CM158.
- CAUTION: DO NOT DAMAGE THE BLADE WHEN REMOVING AIR BUBBLES.**
- 3 Remove air bubbles under the erosion tape by carefully puncturing the erosion tape CM158 with a sharp pin and pressing out the trapped air.
- (f) Repeat the procedure on the other side of the blade.