HARTZELL PROPELLER INC.
One Propeller Place
Piqua, Ohio 45356-2634 U.S.A.
Telephone: 937.778.4200
Fax: 937.778.4215

MANUAL REVISION TRANSMITTAL
Manual 144 (61-10-44)
Six-Blade Lightweight Turbine Propeller
Overhaul Manual

REVISION 5 dated April 2023

Remove Pages:	**Insert Pages:**
Entire Manual	**Entire Manual**

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

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

(This page is intentionally blank.)

Manual No. 144
61-10-44
Revision 5
April 2023

Six Blade Lightweight Turbine Propeller Overhaul Manual

HC-A6A-3( )

Hartzell Propeller Inc.
One Propeller Place
Piqua, Ohio 45356-2634 U.S.A.
Phone: 937.778.4200
Fax: 937.778.4215

REVISION 5 HIGHLIGHTS

Revision 5, dated April 2023, incorporates the following:

Front matter (Cover, Revision Highlights, etc.), has been revised to match this revision.

Updated the Hartzell Propeller Inc. logo on the cover and revised the header on all pages.

Minor language/format changes and renumbering, if applicable are marked with a revision bar, but are not listed below.

- CHECK
  - Revised the section, "Hex Head Bolt"
  - Revised the section, "Beta Rod"
  - Revised the section, "Bearing Race"
- FITS AND CLEARANCES
  - Revised the section, "Blade Tolerances"
  - Removed Table 8-2, "Blade Tolerances"
- ILLUSTRATED PARTS LIST
  - Revised the illustrated parts list for the D-1066 Hub Unit

(This page is intentionally blank.)

REVISION 5 HIGHLIGHTS

1. Introduction

A. General

(1) This is a list of current revisions that have been issued against this manual. Please compare to RECORD OF REVISIONS page to make sure 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 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 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 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 format changes over a large portion of the manual. The manual is distributed in its entirety. All the 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.

Revision No.	Issue Date	Comments
Original	Aug/87	New Issue
Revision 1	Apr/03	Minor Revision
Revision 2	Aug/17	Reissue
Revision 3	Aug/21	Minor Revision
Revision 4	Jun/22	Minor Revision
Revision 5	Apr/23	Major Revision

(This page is intentionally blank.)

RECORD OF REVISIONS

This is a record of revisions inserted into this manual.
Revision 5 includes all prior revisions.

Revision Number	Issue Date	Date Inserted	Inserted By
5	Apr/23	Apr/23	HPI

(This page is intentionally blank.)

RECORD OF TEMPORARY REVISIONS

Update this page to show all temporary revisions inserted into this manual.
Revision 2 includes all prior temporary revisions, up to and including TR-009.

Temporary Revision No.	Section/ Page	Issue Date	Date Inserted	Inserted By	Date Removed	Removed By

RECORD OF TEMPORARY REVISIONS

Update this page to show all temporary revisions inserted into this manual.
Revision 2 includes all prior temporary revisions, up to and including TR-009.

Temporary Revision No.	Section/ Page	Issue Date	Date Inserted	Inserted By	Date Removed	Removed By

SERVICE DOCUMENT 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:	
SB 163	Rev. 2 Aug/17
SB 166	Rev. 2 Aug/17
SB 166A	Rev. 2 Aug/17
SB 168	Rev. 2 Aug/17
HC-SB-61-225	Rev. 1 Apr/03
HC-SB-61-289	Rev. 2 Aug/17
HC-SB-61-309	Rev. 2 Aug/17
HC-SB-61-354	Rev. 2 Aug/17

Service Document Number	Incorporation Rev./Date
Service Letters:	
HC-SL-61-250	Rev. 2 Aug/17
HC-SL-61-256	Rev. 2 Aug/17
HC-SL-61-348	Rev. 2 Aug/17
HC-SL-61-354	Rev. 2 Aug/17

Service Document Number	Incorporation Rev./Date

Service Document Number	Incorporation Rev./Date

AIRWORTHINESS LIMITATIONS

1. Airworthiness Limitations

   A. Life Limits

      (1) Certain component parts, as well as the entire propeller, may have specific life limits established by the FAA. Such limits require replacement of items after a specific number of hours of use.

      (2) For airworthiness limitations information, refer to Hartzell Propeller Inc. Owner's Manual 154 (61-00-54).

(This page is intentionally blank.)

LIST OF EFFECTIVE PAGES

Chapter	Page	Rev. Level	Date
Cover/Inside Cover	Cover/Inside Cover	Rev. 5	Apr/23
Revision Highlights	1 thru 4	Rev. 5	Apr/23
Record of Revisions	1 and 2	Rev. 5	Apr/23
Record of Temporary Revisions	1 and 2	Rev. 5	Apr/23
Service Document List	1 and 2	Rev. 5	Apr/23
Airworthiness Limitations	1 and 2	Rev. 5	Apr/23
List of Effective Pages	1 and 2	Rev. 5	Apr/23
Table of Contents	1 and 2	Rev. 5	Apr/23
Introduction	1 thru 22	Rev. 5	Apr/23
Description and Operation	1 thru 6	Rev. 5	Apr/23
Testing and Fault Isolation	1-1 thru 1-10	Rev. 5	Apr/23
Automatic Test Requirements	2-1 and 2-2	Rev. 5	Apr/23
Disassembly	3-1 thru 3-14	Rev. 5	Apr/23
Cleaning	4-1 thru 4-4	Rev. 5	Apr/23
Check	5-1 thru 5-90	Rev. 5	Apr/23
Repair	6-1 thru 6-20	Rev. 5	Apr/23
Assembly	7-1 thru 7-66	Rev. 5	Apr/23
Fits and Clearances	8-1 thru 8-8	Rev. 5	Apr/23
Special Tools, Fixtures, and Equipment	9-1 thru 9-4	Rev. 5	Apr/23
Illustrated Parts Lists	10-1 thru 10-16	Rev. 5	Apr/23
Illustrated Parts Lists	10A-1 and 10A-10	Rev. 5	Apr/23

(This page is intentionally blank.)

TABLE OF CONTENTS

(This page is intentionally blank.)

INTRODUCTION - CONTENTS

(This page is intentionally blank.)

1. General (Rev. 1)

   A. Statement of Purpose

      (1) This manual has been reviewed and accepted by the FAA. Additionally, this manual contains data that has been approved in a manner acceptable to the FAA administrator.

      (2) This manual provides maintenance and overhaul procedures for use in propeller repair stations by personnel that are trained and experienced with Hartzell Propeller Inc. products.

         (a) This manual does not provide complete information for an inexperienced technician to attempt propeller overhaul without supervision.

      (3) This manual is intended to be the primary source of maintenance and overhaul information for the applicable Hartzell propeller/component models.

         (a) Propeller models addressed in this manual may be Type Certificated by the FAA, or may be experimental. Experimental parts must not be installed on a Type Certificated propeller. Always use the current illustrated parts list for the assembly of any propeller. Always refer to the aircraft Type Certificate (TC) or Supplemental Type Certificate (STC) to determine installation eligibility of any propeller. If installation eligibility is not identifiable, an additional installation approval, such as FAA form 337 field approval or Supplemental Type Certificate may be required. If in doubt, contact Hartzell Propeller Inc. Product Support.

         (b) Information published in Service Bulletins, Service Letters, Service Advisories, and Service Instructions may supersede information published in this manual. The reader must consult active Service Bulletins, Service Letters, Service Advisories, and Service Instructions for information that may have not yet been incorporated into the latest revision of this manual.

      (4) This manual makes reference to other Hartzell Propeller Inc. manuals that provide important details for procedures such as anodizing, penetrant inspection, and overhaul procedures for hub units.

      (5) Where possible, this manual is written in the format specified by ATA iSpec 2200.

B. Item References

(1) Item references throughout the text in this manual refer to item numbers in the Illustrated Parts List chapter of this manual. The item numbers appear in parentheses directly following the part name. Only the item base number will appear in the text of the manual. Item base numbers and the alpha variants of the base numbers will appear in the illustrated parts list. There are two reasons for the use of alpha variants:

(a) A part may be superseded, replaced, or obsoleted by another part. For example, the pitch change block unit (105733) that is item 320 was superseded by the pitch change block unit (105733-1) that is item 320A.

(b) An Illustrated Parts List may contain multiple configurations. Effectivity codes are used to distinguish different part numbers within the same list. For example, one configuration may use a piston (B-2419) that is item 80, yet another configuration uses a piston (104256) that is item 80A. Effectivity codes are very important in the determination of parts in a given configuration.

2. Reference Publications

A. Hartzell Propeller Inc. Publications

(1) Information published in Service Bulletins, Service Letters, Service Advisories, and Service Instructions may supersede information published in this manual. The reader must consult active Service Bulletins, Service Letters, Service Advisories, and Service Instructions for information that may have not yet been incorporated into the latest revision of this manual.

(2) In addition to this manual, one or more of the following publications are required for information regarding specific recommendations and procedures to maintain propeller assemblies that are included in this manual.

Manual No. (ATA No.)	Available at www.hartzellprop.com	Hartzell Propeller Inc. Manual Title
n/a	Yes	Active Hartzell Propeller Inc. Service Bulletins, Service Letters, Service Instructions, and Service Advisories
Manual 135F (61-13-35)	-	Composite Propeller Blade Maintenance Manual
Manual 148 (61-16-48)	Yes	Composite Spinner Maintenance Manual
Manual 154 (61-00-54)	Yes	Propeller Owner's Manual and Logbook for Six-Blade Lightweight Turbine Propellers with Composite Blades
Manual 159 (61-02-59)	Yes	Application Guide
Manual 165A (61-00-65)	Yes	Illustrated Tool and Equipment Manual
Manual 180 (30-61-80)	Yes	Propeller Ice Protection System Manual
Manual 202A (61-01-02)	Vol. 7, Yes Vol. 11, Yes	Standard Practices Manual, Volumes 1 through 11

B. Vendor Publications

None.

3. Personnel Requirements (Rev. 1)

   A. Service and Maintenance Procedures in this Manual

      (1) Personnel performing the service and maintenance procedures in this manual are expected to have the required equipment/tooling, training, and certifications (when required by the applicable Aviation Authority) to accomplish the work in a safe and airworthy manner.

      (2) Compliance to the applicable regulatory requirements established by the Federal Aviation Administration (FAA) or international equivalent is mandatory for anyone performing or accepting responsibility for the inspection and/or repair of any Hartzell Propeller Inc. product.

         (a) Maintenance records must be kept in accordance with the requirements established by the Federal Aviation Administration (FAA) or international equivalent.

         (b) Refer to Federal Aviation Regulation (FAR) Part 43 for additional information about general aviation maintenance requirements.

4. Special Tooling and Consumable Materials (Rev. 1)

   A. Special Tooling

      (1) Special tooling may be required for procedures in this manual. For further tooling information, refer to Hartzell Propeller Inc. Illustrated Tool and Equipment Manual 165A (61-00-65).

         (a) Tooling reference numbers appear with the prefix “TE” directly following the tool name to which they apply. For example, a template that is reference number 133 will appear as: template TE133.

   B. Consumable Materials

      (1) 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) Consumable material reference numbers appear with the prefix “CM” directly following the material to which they apply. For example, an adhesive that is reference number 16 will appear as: adhesive CM16. Only the material(s) specified can be used.

5. Safe Handling of Paints and Chemicals (Rev.1)

   A. Instructions for Use

      (1) Always use caution when handling or being exposed to paints and/or chemicals during propeller overhaul and/or maintenance procedures.

      (2) Before using paint or chemicals, always read the manufacturer's label on the container(s) and follow specified instructions and procedures for storage, preparation, mixing, and/or application.

      (3) Refer to the product's Material Safety Data Sheet (MSDS) for detailed information about the physical properties, health, and physical hazards of any paint or chemical.

6. Calendar Limits and Long Term Storage (Rev. 2)

   A. Calendar Limits

      (1) The effects of exposure to the environment over a period of time create a need for propeller overhaul regardless of flight time.

      (2) A calendar limit between overhauls is specified in Hartzell Propeller Inc. Service Letter HC-SL-61-61Y.

      (3) Experience has shown that special care, such as keeping an aircraft in a hangar, is not sufficient to permit extension of the calendar limit.

      (4) The start date for the calendar limit is when the propeller is first installed on an engine.

      (5) The calendar limit is not interrupted by subsequent removal and/or storage.

      (6) The start date for the calendar limit must not be confused with the warranty start date, that is with certain exceptions, the date of installation by the first retail customer.

   B. Long Term Storage

      (1) Propellers that have been in storage have additional inspection requirements before installation. Refer to the Packaging and Storage chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

7. Component Life and Overhaul (Rev. 2)

WARNING: CERTAIN PROPELLER COMPONENTS USED IN NON-AVIATION APPLICATIONS ARE MARKED WITH DIFFERENT PART NUMBERS TO DISTINGUISH THEM FROM COMPONENTS USED IN AVIATION APPLICATIONS. DO NOT ALTER THE PART NUMBERS SHOWN ON PARTS DESIGNATED FOR NON-AVIATION APPLICATIONS OR OTHERWISE APPLY THOSE PARTS FOR USE ON AVIATION APPLICATIONS.

A. Component Life

(1) Component life is expressed in terms of hours of service (Time Since New, TSN) and in terms of hours of service since overhaul (Time Since Overhaul, TSO).

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

(2) Time Since New (TSN) and Time Since Overhaul (TSO) records for the propeller hub and blades must be maintained in the propeller logbook.

(3) Both TSN and TSO are necessary for defining the life of the component. Certain components, or in some cases an entire propeller, may be "life limited", which means that they must be replaced after a specified period of use (TSN).

(a) It is a regulatory requirement that a record of the Time Since New (TSN) be maintained for all life limited parts.

(b) Refer to the Airworthiness Limitations chapter in the applicable Hartzell Propeller Inc. Owner's Manual for a list of life limited components.

(4) When a component or assembly undergoes an overhaul, the TSO is returned to zero hours.

(a) Time Since New (TSN) can never be returned to zero.

(b) Repair without overhaul does not affect TSO or TSN.

(5) Blades and hubs are sometimes replaced while in service or at overhaul.

(a) Maintaining separate TSN and TSO histories for a replacement hub or blade is required.

(b) Hub replacement

1 If the hub is replaced, the replacement hub serial number must be recorded (the entry signed and dated) in the propeller logbook.

2 The propeller will be identified with the serial number of the replacement hub.

NOTE: Propeller assembly serial numbers are impression stamped on the hub. For stamping information, refer to the Parts Identification and Marking chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

3 The TSN and TSO of the replacement hub must be recorded and maintained in the propeller logbook.

4 If tracking any component(s) other than the hub/blades, maintain these TSN/TSO records separately in the propeller logbook.

NOTE: Hub replacement does not affect the TSN/TSO of any other propeller components.

B. Overhaul

(1) Overhaul is the periodic disassembly, cleaning, inspecting, repairing as necessary, reassembling, and testing in accordance with approved standards and technical data approved by Hartzell Propeller Inc.

(2) The overhaul interval is based on hours of service, i.e., flight time, or on calendar time.

(a) Overhaul intervals are specified in Hartzell Propeller Inc. Service Letter HC-SL-61-61Y.

(b) At such specified periods, the propeller hub assembly and the blade assemblies must be completely disassembled and inspected for cracks, wear, corrosion, and other unusual or abnormal conditions.

(3) Overhaul must be completed in accordance with the latest revision of the applicable component maintenance manual and other publications applicable to, or referenced in, the component maintenance manual.

(a) Parts that are not replaced at overhaul must be inspected in accordance with the check criteria in the applicable Hartzell Propeller Inc. component maintenance manual.

(b) Parts that must be replaced at overhaul are identified by a "Y" in the O/H column of the Illustrated Parts List in the applicable Hartzell Propeller Inc. component maintenance manual.

(4) The information in this manual supersedes data in all previously published revisions of this manual.

8. Damage/Repair Types (Rev. 1)

A. Airworthy/Unairworthy Damage

(1) Airworthy damage is a specific condition to a propeller component that is within the airworthy damage limits specified in the applicable Hartzell Propeller Inc. component maintenance manual.

(a) Airworthy damage does not affect the safety or flight characteristics of the propeller and conforms to its type design.

(b) Airworthy damage does not require repair before further flight, but should be repaired as soon as possible to prevent degradation of the damage.

(2) Unairworthy damage is a specific condition to a propeller component that exceeds the airworthy damage limits specified in the applicable Hartzell Propeller Inc. component maintenance manual.

(a) Unairworthy damage can affect the safety or flight characteristics of the propeller and does not conform to its type design.

(b) Unairworthy damage must be repaired before the propeller is returned to service.

B. Minor/Major Repair

(1) Minor Repair

(a) Minor repair is that which may be done safely in the field by a certified aircraft mechanic.

1 For serviceable limits and repair criteria for Hartzell propeller components, refer to the applicable Hartzell Propeller Inc. component maintenance manual.

(2) Major Repair

(a) Major repair cannot be done by elementary operations.

(b) Major repair work must be accepted by an individual that is certified by the Federal Aviation Administration (FAA) or international equivalent.

1 Hartzell recommends that individuals performing major repairs also have a Factory Training Certificate from Hartzell Propeller Inc.

2 The repair station must meet facility, tooling, and personnel requirements and is required to participate in Hartzell Propeller Inc. Sample Programs as defined in the Approved Facilities chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

9. Propeller Critical Parts (Rev. 1)

   A. Propeller Critical Parts

      (1) Procedures in this manual may involve Propeller Critical Parts (PCP).

         (a) 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.

         (b) Refer to the Illustrated Parts List chapter in the applicable Hartzell Propeller Inc. maintenance manual to identify the Propeller Critical Parts.

      (2) Numerous propeller system parts can produce a propeller Major or Hazardous effect, even though those parts may not be considered as Propeller Critical Parts.

         (a) 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.

10. Warranty Service (Rev. 1)

   A. Warranty Claims

      (1) If you believe you have a warranty claim, contact the Hartzell Propeller Inc. Product Support Department to request a *Warranty Application* form. Complete this form and return it to Hartzell Product Support for evaluation **before proceeding with repair or inspection work**. Upon receipt of this form, the Hartzell Product Support Department will provide instructions on how to proceed.

         (a) For Hartzell Propeller Inc. Product Support Department contact information, refer to the “Contact Information” section in this chapter.

11. Hartzell Propeller Inc. Contact Information (Rev. 2)

A. Product Support Department

(1) Contact the Product Support Department of Hartzell Propeller Inc. about any maintenance problems or to request information not included in this publication.

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

(a) Hartzell Propeller Inc. Product Support may be reached during business hours (8:00 a.m. through 5:00 p.m., United States Eastern Time) at (937) 778-4379 or at (800) 942-7767, toll free from the United States and Canada.

(b) Hartzell Propeller Inc. Product Support can also be reached by fax at (937) 778-4215, and by e-mail at techsupport@hartzellprop.com.

(c) 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.

1 A technical representative will contact you during normal business hours.

2 Urgent AOG support is also available 24 hours per day, seven days per week via this message service.

(d) Additional information is available on the Hartzell Propeller Inc. website at www.hartzellprop.com.

B. Technical Publications Department

(1) For Hartzell Propeller Inc. service literature and revisions, contact:

Hartzell Propeller Inc.
Attn: Technical Publications Department
One Propeller Place
Piqua, Ohio 45356-2634 U.S.A.

Telephone: 937.778.4200
Fax: 937.778.4215
E-mail: manuals@hartzellprop.com

C. Recommended Facilities

(1) Hartzell Propeller Inc. recommends using Hartzell-approved distributors and repair facilities for the purchase, repair, and overhaul of Hartzell propeller assemblies or components.

(2) Information about the Hartzell Propeller Inc. worldwide network of aftermarket distributors and approved repair facilities is available on the Hartzell website at www.hartzellprop.com.

12. Definitions (Rev. 4)

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

Term	Definition
Annealed	Softening of material due to overexposure to heat
Aviation Certified	Intended for FAA or international equivalent type certificated aircraft applications. A TC and PC number must be stamped on the hub, and a PC number must be stamped on blades.
Aviation Experimental	Intended for aircraft/propeller applications not certified by the FAA or international equivalent. Products marked with an “X” at or near the end of the model number or part number are not certified by the FAA or international equivalent and are not intended to use on certificated aircraft.
Beta Operation	A mode of pitch control that is directed by the pilot rather than by the propeller governor
Beta Range	Blade angles between low pitch and maximum reverse blade angle
Beta System	Parts and/or equipment related to operation (manual control) of propeller blade angle between low pitch blade angle and full reverse blade angle
Blade Angle	Measurement of blade airfoil location described as the angle between the blade airfoil and the surface described by propeller rotation
Blade Centerline	An imaginary reference line through the length of a blade around which the blade rotates
Blade Station	Refers to a location on an individual blade for blade inspection purposes. It is a measurement from the blade “zero” station to a location on a blade, used to apply blade specification data in blade overhaul manuals. Note: Do not confuse *blade station* with *reference blade radius*; they may not originate at the same location.
Blemish	An imperfection with visible attributes, but having no impact on safety or utility
Brinelling	A depression caused by failure of the material in compression

Term	Definition
Bulge	An outward curve or bend
Camber	The surface of the blade that is directed toward the front of the aircraft. It is the low pressure, or suction, side of the blade. The camber side is convex in shape over the entire length of the blade.
Chord	A straight line distance between the leading and trailing edges of an airfoil
Chordwise	A direction that is generally from the leading edge to the trailing edge of an airfoil
Co-bonded	The act of bonding a composite laminate and simultaneously curing it to some other prepared surface
Composite Material	Kevlar®, carbon, or fiberglass fibers bound together with, or encapsulated within an epoxy resin
Compression Rolling	A process that provides improved strength and resistance to fatigue
Constant Force	A force that is always present in some degree when the propeller is operating
Constant Speed	A propeller system that employs a governing device to maintain a selected engine RPM
Corrosion (Aluminum)	The chemical or electrochemical attack by an acid or alkaline that reacts with the protective oxide layer and results in damage of the base aluminum. Part failure can occur from corrosion due to loss of structural aluminum converted to corrosion product, pitting, a rough etched surface finish, and other strength reduction damage caused by corrosion.
Corrosion (Steel)	Typically, an electrochemical process that requires the simultaneous presence of iron (component of steel), moisture and oxygen. The iron is the reducing agent (gives up electrons) while the oxygen is the oxidizing agent (gains electrons). Iron or an iron alloy such as steel is oxidized in the presence of moisture and oxygen to produce rust. Corrosion is accelerated in the presence of salty water or acid rain. Part failure can occur from corrosion due to loss of structural steel converted to corrosion product, pitting, a rough etched surface finish and other strength reduction damage caused by corrosion.

Term	Definition
Corrosion Product (Aluminum)	A white or dull gray powdery material that has an increased volume appearance (compared to non-corroded aluminum). Corrosion product is not to be confused with damage left in the base aluminum such as pits, worm holes, and etched surface finish.
Corrosion Product (Steel)	When iron or an iron alloy such as steel corrodes, a corrosion product known as rust is formed. Rust is an iron oxide which is reddish in appearance and occupies approximately six times the volume of the original material. Rust is flakey and crumbly and has no structural integrity. Rust is permeable to air and water, therefore the interior metallic iron (steel) beneath a rust layer continues to corrode. Corrosion product is not to be confused with damage left in the base steel such as pits and etched surface finish.
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
Defect	An imperfection that affects safety or utility
Delamination	Internal separation of the layers of composite material
Dent	The permanent deflection of the cross section that is visible on both sides with no visible change in cross sectional thickness
Depression	Surface area where the material has been compressed but not removed
Distortion	Alteration of the original shape or size of a component
Edge Alignment	Distance from the blade centerline to the leading edge of the blade
Erosion	Gradual wearing away or deterioration due to action of the elements
Exposure	Leaving material open to action of the elements

Term	Definition
Face	The surface of the blade that is directed toward the rear of the aircraft. The face side is the high pressure, or thrusting, side of the blade. The blade airfoil sections are normally cambered or curved such that the face side of the blade may be flat or even concave in the midblade and tip region.
Face Alignment	Distance from the blade centerline to the highest point on the face side perpendicular to the chord line
Feathering	The capability of blades to be rotated parallel to the relative wind, thus reducing aerodynamic drag
Fraying	A raveling or shredding of material
Fretting	Damage that develops when relative motion of small displacement takes place between contacting parts, wearing away the surface
Galling	To fret or wear away by friction
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
Inboard	Toward the butt of the blade
Intergranular Corrosion	Corrosion that attacks along the grain boundaries of metal alloys
Jog	A term used to describe movement up/down, left/right, or on/off in short incremental motions
Laminate	To unite composite material by using a bonding material, usually with pressure and heat
Lengthwise	A direction that is generally parallel to the pitch axis
Loose Material	Material that is no longer fixed or fully attached
Low Pitch	The lowest blade angle attainable by the governor for constant speed operation

Term	Definition
Major Propeller Effect	The major propeller effects are defined in Title 14 CFR section 35.15(g)(2)
Minor Deformation	Deformed material not associated with a crack or missing material
Monocoque	A type of construction in which the outer skin carries all or a major part of the load
Nick	Removal of paint and possibly a small amount of material
Non-Aviation Certified	Intended for non-aircraft application, such as Hovercraft or Wing-in-Ground effect (WIG) applications. These products are certificated by an authority other than FAA. The hub and blades will be stamped with an identification that is different from, but comparable to TC and PC.
Non-Aviation Experimental	Intended for non-aircraft application, such as Hovercraft or Wing-In-Ground effect (WIG) applications. Products marked with an “X” at or near the end of the model number or part number are not certified by any authority and are not intended for use on certificated craft.
Onspeed	Condition in which the RPM selected by the pilot through the propeller control/condition lever and the actual engine (propeller) RPM are equal
Open Circuit	Connection of high or infinite resistance between points in a circuit which are normally lower
Outboard	Toward the tip of the blade
Overhaul	The periodic disassembly, inspection, repair, refinish, and reassembly of a propeller assembly to maintain airworthiness
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/condition lever
Pitch	Same as “Blade Angle”
Pitting	Formation of a number of small, irregularly shaped cavities in surface material caused by corrosion or wear

Term	Definition
Pitting (Linear)	The configuration of the majority of pits forming a pattern in the shape of a line
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
Reference Blade Radius	Refers to the propeller reference blade radius in an assembled propeller, e.g., 30-inch radius. A measurement from the propeller hub centerline to a point on a blade, used for blade angle measurement in an assembled propeller. An adhesive stripe (blade angle reference tape CM160) is usually located at the reference blade radius location. Note: Do not confuse *reference blade radius* with *blade station*; they may not originate at the same point.
Reversing	The capability of rotating blades to a position to generate reverse thrust to slow the aircraft or back up
Scratch	Same as “Nick”
Short Circuit	Connection of low resistance between points on a circuit between which the resistance is normally much greater
Shot Peening	Process where steel shot is impinged on a surface to create compressive surface stress, that provides improved strength and resistance to fatigue
Single Acting	Hydraulically actuated propeller that 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
Station Line	See "Blade Station"
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
Ticking	A series of parallel marks or scratches running circumferentially around the diameter of the blade

Term	Definition
Track	In an assembled propeller, a measurement of the location of the blade tip with respect to the plane of rotation, used to verify face alignment and to compare blade tip location with respect to the locations of the other blades in the assembly
Trailing Edge	The aft edge of an airfoil over which the air passes last
Trimline	Factory terminology referring to where the part was trimmed to length
Underspeed	The condition in which the actual engine (propeller) RPM is lower than the RPM selected by the pilot through the propeller control/condition lever
Unidirectional Material	A composite material in which the fibers are substantially oriented in the same direction
Variable Force	A force that may be applied or removed during propeller operation
Vertical Balance	Balance between the leading and trailing edges of a two-blade propeller with the blades positioned vertically
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
Woven Fabric	A material constructed by interlacing fiber to form a fabric pattern
Wrinkle (aluminum blade)	A wavy appearance caused by high and low material displacement
Wrinkle (composite blade)	Overlap or fold within the material

13. Abbreviations (Rev. 2)

Abbreviation	Term
AD	Airworthiness Directives
AMM	Aircraft Maintenance Manual
AOG	Aircraft on Ground
AR	As Required
ATA	Air Transport Association
CSU	Constant Speed Unit
FAA	Federal Aviation Administration
FH	Flight Hour
FM	Flight Manual
FMS	Flight Manual Supplement
Ft-Lb	Foot-Pound
HMI	Human Machine Interface
ICA	Instructions for Continued Airworthiness
ID	Inside Diameter
In-Lb	Inch-Pound
IPL	Illustrated Parts List
IPS	Inches Per Second
kPa	Kilopascals
Lb(s)	Pound(s)
Max.	Maximum
Min.	Minimum
MIL-X-XXX	Military Specification
MPI	Major Periodic Inspection (Overhaul)
MS	Military Standard
MSDS	Material Safety Data Sheet

Abbreviation	Term
N	Newtons
N/A	Not Applicable
NAS	National Aerospace Standards
NASM	National Aerospace Standards, Military
NDT	Nondestructive Testing
NIST	National Institute of Standards and Technology
N•m	Newton-Meters
OD	Outside Diameter
OPT	Optional
PC	Production Certificate
PCP	Propeller Critical Part
PLC	Programmable Logic Controller
PMB	Plastic Media Blasting (Cleaning)
POH	Pilot’s Operating Handbook
PSI	Pounds per Square Inch
RF	Reference
RPM	Revolutions per Minute
SAE	Society of Automotive Engineers
STC	Supplemental Type Certificate
TBO	Time Between Overhaul
TC	Type Certificate
TSI	Time Since Inspection
TSN	Time Since New
TSO	Time Since Overhaul
UID	Unique Identification
WIG	Wing-In-Ground-Effect

(This page is intentionally blank.)

DESCRIPTION AND OPERATION - CONTENTS

(This page is intentionally blank.)

1. General (Rev. 1)

A. Propeller/Blade Model Designation

(1) Hartzell Propeller Inc. uses a model number designation system to identify specific propeller and blade assemblies. The propeller model number and blade model number are separated by a slash (/).

(a) Example: *propeller model number / blade model number*

(2) The propeller model number is impression stamped on the propeller hub.

(a) For additional information about the propeller model number designation system, refer to the applicable Hartzell Propeller Inc. owner's manual.

(3) The blade model number is impression stamped on the butt end of the blade, and also identified by a label on the cylinder.

(a) For additional information about the model number designation system for composite blades, refer to Hartzell Propeller Inc. Composite Propeller Blade Maintenance Manual 135F (61-13-35).

(b) For additional information about the model number designation system for aluminum blades, refer to Hartzell Propeller Inc. Aluminum Blade Overhaul Manual 133C (61-13-33).

2. Operation

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER 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 THIS MANUAL FOR THE IDENTIFICATION OF SPECIFIC PROPELLER CRITICAL PARTS.

A. HC-A6A-3( )

(1) The series HC-A6A-3( ) propeller is a constant-speed, single acting, hydraulically-actuated type of propeller with feathering and reversing capabilities. It is designed primarily for use with Pratt & Whitney Series PT-6 turboprop engines.

(2) Feather angle, reverse angle, and low pitch stop angles are adjustable to compensate for tolerances and wear.

(3) In the single-acting control system, propeller RPM is controlled by the governor that is installed on the engine and supplies pressurized engine oil. The governor has been modified to act as a hydraulic low pitch valve and as a beta valve when the propeller is in the reverse mode of operation.

NOTE: The beta valve usually is built into the base of the governor.

(4) An increase in oil pressure into the propeller from zero (0) psi to approximately 385 psi (27.07 kg/cm2) causes propeller pitch to decrease in the positive range and to increase in the negative (reversing) range. A reduction of governor oil pressure causes an increase in blade angle.

(5) A loss of oil supply from the governor results in feathering the propeller since the combined action of feathering spring and blade counterweights forces oil from the propeller back into the engine

(6) Engine oil pressurized from the governor forced into a cavity between the piston and the cylinder moves the piston forward from high to low pitch position range. This linear motion is transmitted from the piston to each blade assembly through a pitch change rod, a slotted fork unit, and a blade pitch change assembly. Blade pitch is controlled by a knob bolted and pinned to the shank of the blade. A slider block on the end of the knob minimizes friction and provides blade-to-blade pitch angle adjustment.

(7) Each blade is supported by a blade retention split-bearing, which permits pitch change. Counterweights mounted on the blades, and the large feathering spring inside the cylinder, oppose governor oil pressure and increase pitch to the feathered position.

(8) The governor is linked to the propeller piston through external mechanisms that shut off the governor oil supply when the piston reaches its predetermined low pitch setting and prevent the governor from moving the piston beyond the prescribed low pitch position.

(9) The piston engages beta rods at predetermined settings. Movement of the blades to a lower pitch causes the rods to move the beta ring away from the engine.

(10) A carbon block assembly rides in the groove of the beta ring. Linear motion from the low pitch position into the beta and reverse pitch range is transmitted from the rotating propeller assembly to the fixed engine through the beta ring and carbon block assembly.

(11) The carbon block assembly is attached to an engine-supplied lever. This lever is connected to a beta valve mounted on a governor and to the power lever that is controlled in the cockpit. Blade movement below the preadjusted low pitch angle will move the beta lever and cause the beta valve to interrupt the hydraulic connection between propeller and governor. This prevents further travel of the blade pitch to a lower angle.

B. Feathering the Propeller

(1) The propeller is feathered by releasing the governor oil pressure. This allows the counterweights and feathering spring to feather the blades.

(2) Pulling the governor pitch control back to the limit of its travel opens a port in the governor. This allows the feathering spring to force oil out of the propeller back into the engine and increase blade angle to the feathered position.

(3) Because of such variables as blade design and counterweight mass, elapsed time up to fifteen (15) seconds is typical for feathering with this system.

C. Unfeathering the Propeller

(1) The propeller is installed (or removed) with the blades in a feathered position. The propeller has no centrifugal high pitch stops, so it feathers itself when stationary.

(2) The propeller is unfeathered by pushing the governor control back into normal flight range position, restarting the engine, and using the governor to pump oil into the propeller. When the propeller has rotated a few turns, the governor will start to unfeather the blades.

(3) When the propeller is unfeathered in flight, "windmilling" occurs and reduces the time required to accomplish unfeathering.

D. Reversing the Propeller

(1) In the reverse mode of operation, the governor is reset to act as a source of pressurized oil. Control of the propeller then is transferred to the beta valve which controls blade angle rather than RPM.

NOTE: The beta valve usually is built into the base of the governor.

(2) The propeller is reversed by manually repositioning the cockpit-controlled cable to cause the beta valve to supply oil from the governor pump to the propeller.

(3) When the propeller reaches desired reverse position, movement of the beta ring and carbon block assembly cause the beta valve to shut off flow of oil to the propeller, holding the blade in a fixed position.

TESTING AND FAULT ISOLATION - CONTENTS

LIST OF FIGURES

(This page is intentionally blank.)

1. Troubleshooting Guide

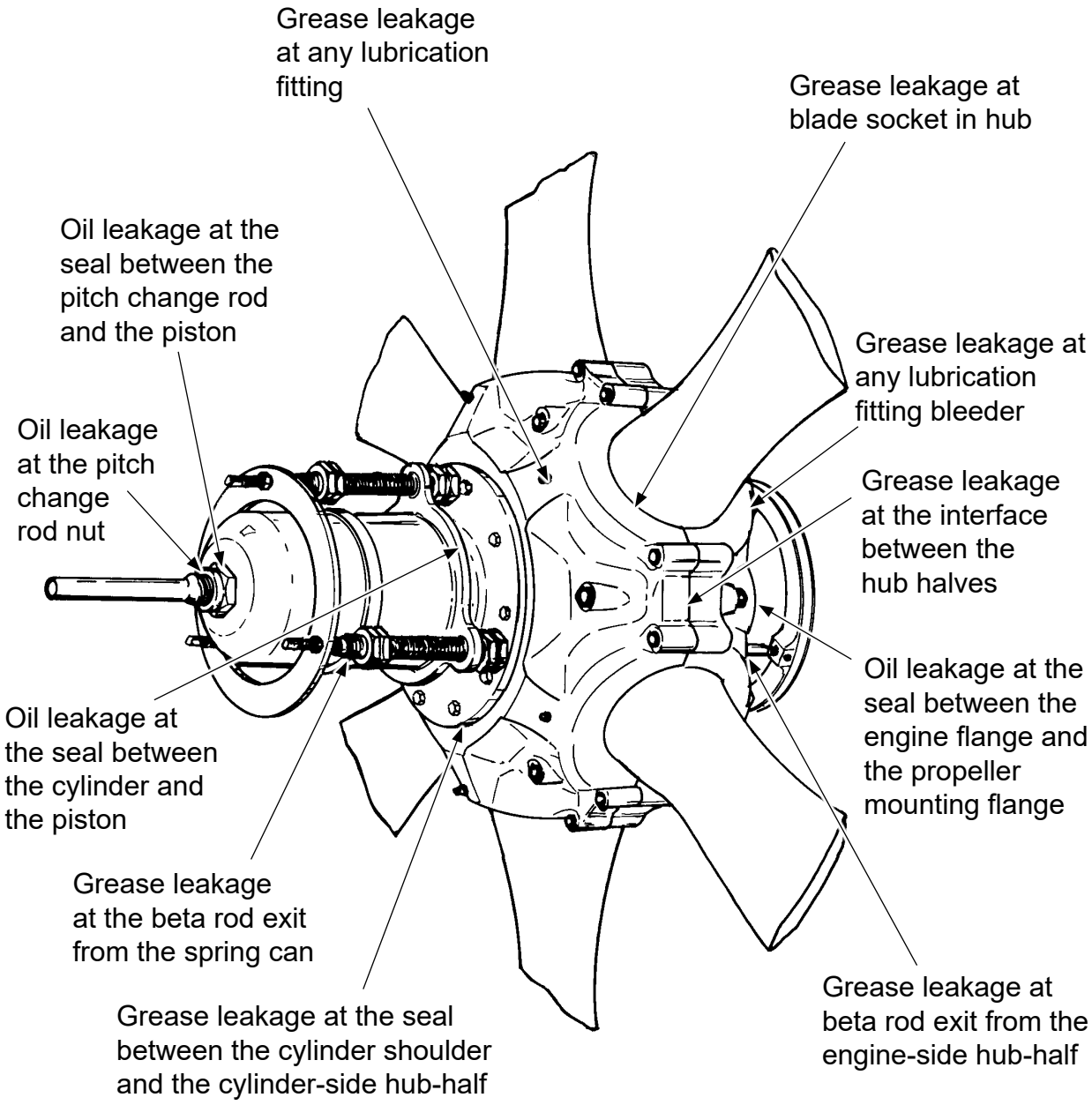
CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

The purpose of this chapter is to isolate probable causes and suggest remedies for common propeller service problems. In all cases, the remedy for a problem should follow the procedures detailed in the applicable section of this manual.

Problem		Probable Cause	Remedy
A. Too Much Friction in the Hub Mechanism		There is not enough clearance between the various moving parts in the pitch change mechanism.	Examine each moving part individually. Increase the clearance between the individual parts as necessary to decrease friction in the mechanism.
	or	The ball bearings in the blade retention split bearing are unusually rough or chipped.	Replace the blade retention split bearing assembly.
B. Too Much Friction in the Piston		There is too much blade preload.	Disassemble the propeller and readjust the blade preload.
	or	There is a lack of lubrication.	Add the approved lubricant.
	or	The ball bearings in the blade retention split bearing are unusually rough or chipped.	Replace the blade retention split bearing assembly.
	or	There is not enough clearance between the moving parts in the pitch change mechanism.	Examine each moving part individually. Increase the clearance between the individual parts as necessary to decrease friction in the mechanism.
	or	The piston felt seal is too tight.	Replace the piston felt seal.

Problem		Probable Cause	Remedy
C. Failure to Change Pitch (Sluggish rpm in both directions)		There is too much friction in the moving parts.	Refer to the problem, "Too Much Friction in the Hub Mechanism" in this chapter.
	or	The oil passages are blocked.	Examine the hydraulic system.
	or	A new governor has been installed that has the wrong direction of rotation or with the bypass plug in the wrong hole.	Refer to the governor manufacturer's manual for instructions about correct installation, if necessary.
D. Surging RPM or Torque		There is too much friction in the pitch change mechanism.	Refer to the problem, "Too Much Friction in the Hub Mechanism" in this chapter.
	or	Air is trapped in the propeller actuating piston or in the engine shaft.	The engine should have a provision for allowing trapped air to escape from the system during one-half of the pitch cycle. Before each flight , exercise the propeller by changing pitch or feathering.
	or	The governor pressure is too low.	Refer to the governor manufacturer's manual for instructions about correct installation, if necessary.
	or	The governor does not have enough dampening.	Refer to the governor manufacturer's manual for instructions about providing enough dampening.
	or	The beta system rigging is not correct	Refer to the engine or aircraft manual for rigging instructions.

Problem	Probable Cause	Remedy
E. Abnormal Propeller Vibration	There is a bent, cracked, or damaged blade.	Refer to Hartzell Propeller Inc. Composite Propeller Blade Maintenance Manual 135F (61-13-35).
	or There is a cracked or damaged hub.	Refer to the Aluminum Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
	or There are broken blade retention bearings.	Replace the bearings and examine the other blade retention components.
	or There is grease leakage.	Refer to the problem, "Grease Leakage" in this chapter.
F. Slight Vibration	The blades are not tracking	Refer to the problem, "Blades Not Tracking" in this chapter.
	or The static balance is not correct.	Refer to the Static and Dynamic Balance chapter of Hartzell Propeller inc. Standard Practices Manual 202A (61-01-02).
	or The dynamic balance is not correct.	Refer to the Static and Dynamic Balance chapter of Hartzell Propeller inc. Standard Practices Manual 202A (61-01-02).
	or There is blade wear.	Refer to Hartzell Propeller Inc. Composite Propeller Blade Maintenance Manual 135F (61-13-35).
	or There is grease leakage.	Refer to the problem, "Grease Leakage" in this chapter.



NOTE: The only potential source for grease leakage is in the blade retention area of the hub.

Inspection for Leakage of Oil or Grease
Figure 1-1

Problem		Probable Cause	Remedy
G.	Oil Leakage (Refer to Figure 1-1)	There is a defective O-ring seal between the piston and the cylinder.	Remove the propeller from the engine and inspect the O-ring and the sealing surface. Replace any defective O-ring.
	or	There is a defective O-ring seal between the pitch change rod and the piston.	Remove the propeller from the engine and inspect the O-ring and the sealing surface. Replace any defective O-ring.
	or	There is a defective O-ring seal on the pitch change rod nut.	Remove the propeller from the engine and inspect the O-ring and the sealing surface. Replace the defective O-ring.
	or	There is a defective O-ring seal between the engine flange and the propeller mounting flange.	Remove the propeller from the engine and inspect the O-ring and the sealing surface. Replace the defective O-ring.
H.	Grease Leakage (Refer to Figure 1-1)	There is a defective lubrication fitting.	Replace the defective lubrication fitting.
	or	There is a defective lubrication fitting cap.	Replace the defective lubrication fitting cap.
	or	There is a defective seal at the blade socket in the hub.	Disassemble the propeller and replace the defective seal.
	or	There is a defective seal at the interface between the hub halves.	Disassemble the propeller and add the approved adhesive sealant to the mating surface of the hub halves.
	or	There is a defective seal at the beta rod exit from the hub or the spring can.	Replace the defective seal(s).

Problem	Probable Cause	Remedy
I. End-Play of the Blade Refer to Figure 8-2 and Table 8-2, Blade Tolerances	There is a buildup of manufacturing tolerances.	Disassemble the propeller and reset the preload.
	or The blade retention bearing is worn.	Inspect and/or replace the blade retention bearing.
	or The blade needle bearing is worn.	Disassemble the propeller, remove the blade, and inspect the blade needle bearing. Replace the worn blade needle bearing.
J. Fore-and-Aft Movement of the Blade Refer to Figure 8-2 and Table 8-2, Blade Tolerances	There is a buildup of manufacturing tolerances.	Disassemble the propeller and reset the preload.
	or The blade retention bearing is worn.	Inspect and/or replace the blade retention bearing.
	or The blade needle bearing is worn.	Disassemble the propeller, remove the blade, and inspect the blade needle bearing. Replace the worn blade needle bearing.
K. In-and-Out Movement of the Blade Refer to Figure 8-2 and Table 8-2, Blade Tolerances	There is a buildup of manufacturing tolerances.	Disassemble the propeller and reset the preload.
	or The blade retention bearing is worn.	Examine and/or replace the blade retention bearing.
L. Too Much Radial Play of the Blade (backlash) Refer to Figure 8-2 and Table 8-2, Blade Tolerances	The blade retention bearing is worn.	Examine and/or replace the blade retention bearing.
	or The blade needle bearing is worn.	Disassemble the propeller, remove the blade, and examine the blade needle bearing. Replace the worn blade needle bearing.
	or The pitch adjustment unit is worn or out of tolerance.	Replace the pitch adjustment unit.
	or There is a buildup of manufacturing tolerances.	Try another combination of parts.
M. Blades Not Tracking	There is ground strike damage.	For composite blade repair procedure, refer to Hartzell Propeller Inc. Composite Propeller Blade Maintenance Manual 135F (61-13-35).

2. Lightning Strike on Hub or Blade (Rev. 1)

A. Before Further Flight

(1) In the event of a propeller lightning strike, an inspection is required before further flight.

(a) A lightning strike on the propeller usually leaves arcing damage on the blade, as evidence of where it entered or left the tip of the blade.

(b) Refer to the Special Inspections chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02) for lightning strike inspection criteria.

(This page is intentionally blank.)

AUTOMATIC TEST REQUIREMENTS (NOT APPLICABLE) (Rev. 1)

NOTE: In accordance with ATA iSpec 2200 specification, this space is reserved for automatic test requirements. Such requirements are not applicable to the Hartzell Propeller Inc. propellers included in this manual.

(This page is intentionally blank.)

DISASSEMBLY - CONTENTS

LIST OF FIGURES

(This page is intentionally blank.)

1. Important Information (Rev. 3)

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

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER 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 IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

A. Removing the Propeller

(1) Remove the propeller from the aircraft in accordance with the applicable Hartzell Propeller Inc. owner's manual.

B. Record Serial Numbers/Blade Location Before Disassembly

(1) Make a record of the serial number and model number of the hub, blades, and any other serial-numbered parts and compare with the data in the propeller logbook.

(a) For the location of the serial number on the hub, refer to the Parts Identification and Marking chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

CAUTION 1: DO NOT ETCH, SCRIBE, PUNCH MARK, OR SIMILARLY IDENTIFY PARTS IN ANY MANNER THAT MAY BE HARMFUL TO THE STRENGTH OR FUNCTION OF THE PROPELLER.

CAUTION 2: GRAPHITE ("LEAD") PENCIL MARKS WILL CAUSE CORROSION. ALL MARKS MADE ON PARTS MUST BE MADE WITH A CRAYON OR SOFT, NON-GRAPHITE PENCIL SUCH AS CM162.

(2) Before disassembly, use a crayon or soft, non-graphite pencil such as CM162 to number the blades counterclockwise from the serial number impression stamped on the propeller hub unit.

(a) Make a record of each blade serial number and the hub socket/arm from which it was removed.

C. Ice Protection System (if applicable)

(1) If the propeller is equipped with an ice protection system supplied by Hartzell, refer to Hartzell Propeller Inc. Ice Protection System Manual 180 (30-61-80) for technical information about the applicable ice protection system.

(2) If the propeller is equipped with an ice protection system not supplied by Hartzell Propeller Inc., refer to the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA) for technical information about the applicable ice protection system.

2. Propeller Disassembly

A. General

WARNING: THE USE OF BLADE PADDLES TO MOVE BLADES CAN RESULT IN THE OVERLOAD AND DAMAGE OF THE BLADE PITCH CHANGE MECHANISM. THIS DAMAGE IS NOT REPAIRABLE AND CAN RESULT IN SEPARATION BETWEEN THE BLADE AND THE PITCH CHANGE MECHANISM, CAUSING LOSS OF PITCH CONTROL DURING FLIGHT.

CAUTION 1: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER 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 IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

CAUTION 2: USE COMPRESSED AIR THAT HAS BEEN FILTERED FOR MOISTURE, OR NITROGEN TO ACTUATE THE PROPELLERS.

CAUTION 3: DO NOT USE MORE THAN 200 PSI (13.78 BARS) OF PRESSURE WHEN ACTUATING PROPELLERS INCLUDED IN THIS MANUAL.

CAUTION 4: USE ENOUGH PRESSURE TO MAKE SURE THAT THE PROPELLER ACTUATES AGAINST EACH POSITIVE STOP.

(1) Remove and discard the safety wire when applicable during the disassembly procedure.

(2) Use of the reverse stop modification kit (20) is not permitted.

(a) If the reverse stop modification kit (20) is installed, remove and discard the applicable parts during the disassembly process. Refer to the Illustrated Parts List chapter of this manual for the parts included in the reverse stop modification kit (20).

B. Disassembly of the Propeller

(1) Disassemble the beta feedback block assembly (900).

(a) Remove and discard the T-head cotter pin (950) from the clevis pin (920).

(b) Remove and discard the clevis pin (920) from the yoke unit (910) and the carbon block unit (930).

(c) Remove and discard the carbon block unit (930) from the yoke unit (910).

(2) Remove and discard the self-locking hex nut (830) from each beta rod (720).

(3) Remove the beta rod support ring (820).

(4) Remove and discard the thin hex nut (810) from each beta rod (720).

(5) Remove and discard the 10-32 fillister head screw (150) and the washer (140) from the piston unit (110).

(6) Using the modified deep well socket TE120 or equivalent and a crowfoot adapter, remove and discard the 1 1/8-12, self-locking, hex, nut (10).

(7) Remove the piston unit (110).

(8) Remove and discard the piston-side pitch change rod O-ring (100) from the piston unit (110).

(9) Remove and discard the piston dust seal (170) from the piston unit (110).

(10) Remove and discard the piston O-ring (160) from the piston unit (110).

(11) Remove and discard the drilled, thin, hex nuts (780, 790) from each beta rod (720).

CAUTION: DO NOT DAMAGE THE THREADS OR THE BETA RING (700) WHEN REMOVING THE SET SCREW (710).

(12) Remove and discard each set screw (710) from the beta ring (700).

(a) The head of the set screw (710) could strip during removal.

1 If necessary, use a locally procured screw removal tool in accordance with the manufacturer's directions to remove the set screw (710).

CAUTION: DURING REMOVAL OF THE BETA RODS (720) DO NOT TURN EACH BETA ROD (720) MORE THAN TWO TURNS AT ONE TIME. DO NOT BEND THE BETA RODS (720).

(13) Using a 5/16 inch wrench, turn each beta rod (720) a maximum of two turns until each beta rod (720) is free from the beta ring (700).

(14) Remove the assembly that consists of the beta rod with the beta spring retainer (770), beta compression spring (760), and crimped retaining ring (750).

(15) Remove and discard the hex head, 1/4-28, bolt (230) from the mounting holes of the cylinder (200).

(16) Manually turn the blades of the propeller to reverse blade pitch to raise the cylinder (200) off of the hub unit (500).

(17) Using the modified deep well socket TE120 or an applicable crowfoot adapter on the hex section of the pitch change rod (380), turn the pitch change rod (380) from the fork (430).

WARNING: THE FEATHERING SPRING ASSEMBLY IS PRELOADED TO APPROXIMATELY 800 POUNDS (362.4 KG) FORCE. MAKE SURE OF THE SAFETY OF PERSONNEL IN THE AREA DURING DISASSEMBLY PROCEDURES.

(18) Carefully lift out the pitch change rod (380) with the cylinder unit (200) and the feathering spring assembly attached.

(19) Put aside the cylinder (200) with the feathering spring assembly attached for later disassembly.

(20) Remove and discard the self-locking hex nut (800) from each beta rod (720).

(21) Remove the beta spring retainer (770) from the beta rod (720).

(22) Remove and discard the beta compression spring (760) from the beta rod (720).

(23) Remove and discard the two crimped retaining rings (750) from the groove provided for them in the beta rod (720).

CAUTION: DO NOT SEPARATE THE HALVES OF THE HUB UNIT (500) UNTIL ALL OF THE PROPELLER BLADES ARE SUPPORTED BY STANDS. IF NOT SUPPORTED, THE PROPELLER BLADES MAY FALL OUT OF THE HUB UNIT (500) AFTER THE HALVES OF THE HUB UNIT (500) ARE SEPARATED.

(24) Put a blade stand TE126, or equivalent, under each propeller blade at approximately 10 inches (254 mm) from the tip.

(25) Remove and discard the self-locking nuts (640) and washers (630) from the hex head bolts (410, 420) that clamp together the halves of the hub unit (500).

(26) Attach the dummy pitch change rod TE298 to the fork unit (430).

(a) Optionally, a locally procured tool that will permit the fork unit (430) to be lifted and turned may be used instead of the dummy pitch change rod TE298.

(27) Rotate the fork unit (430) counterclockwise until the pitch adjust block units (1430) are removed from the slots of the fork unit (430).

(28) Put the fork unit (430) in the bottom of the engine-side half of the hub unit (500).

CAUTION: MAKE SURE THAT THE BLADES ARE LOOSE IN THE SOCKETS OF THE HUB UNIT (500) BEFORE SEPARATING THE HALVES OF THE HUB (UNIT (500)

(29) Loosen the thin hex nut (1570) and the set screw (1560) until the blades become loose in the blade sockets of the hub unit (500).

CAUTION: DO NOT DAMAGE THE PROPELLER BLADE WHEN TRYING TO SEPARATE THE HALVES OF THE HUB UNIT (500).

(30) Using a gentle end-play type motion on the tip of one propeller blade, loosen the seal between the halves of the hub unit (500).

CAUTION: DO NOT USE A SCREWDRIVER OR OTHER SHARP TOOL TO PRY APART THE HALVES OF THE HUB UNIT (500).

(31) Using a plastic wedge TE138, or similar tool, gently pry apart the halves of the hub unit (500).

(a) If the hub halves are not easy to separate, a hub lifting tool that consists of a drilled plate with hook on it can be locally manufactured that will bolt to the cylinder-side hub half and permit a hoist to help in the separation of the halves of the hub unit..

1 The requirements for the hub lifting tool are as follows:

a A metal plate that is strong enough to safely lift the hub unit (500) and that is large enough to permit holes to be drilled in it so it can be attached to the cylinder mounting holes of the hub unit (500).

b A hook or eyelet that is strong enough to safely lift the hub unit (500).

2 Drill holes in the metal plate that match the location of the cylinder mounting holes in the hub unit (500).

3 Attach the hook or eyelet to the center of the plate in a way that is strong enough to safely lift the hub unit (500).

4 Attach a hoist to the hook or eyelet.

5 Carefully raise the hoist to put tension on the hub unit (500).

6 Use a combination of tension from the hoist and a plastic wedge TE138, or similar tool to gently pry apart the halves of the hub unit (500).

CAUTION: DO NOT PERMIT THE PROPELLER BLADE ASSEMBLIES TO FALL OUT OF THEIR SOCKETS WHEN THE CYLINDER-SIDE HALF OF THE HUB UNIT (500) IS REMOVED.

(32) Remove the cylinder-side half of the hub unit (500).

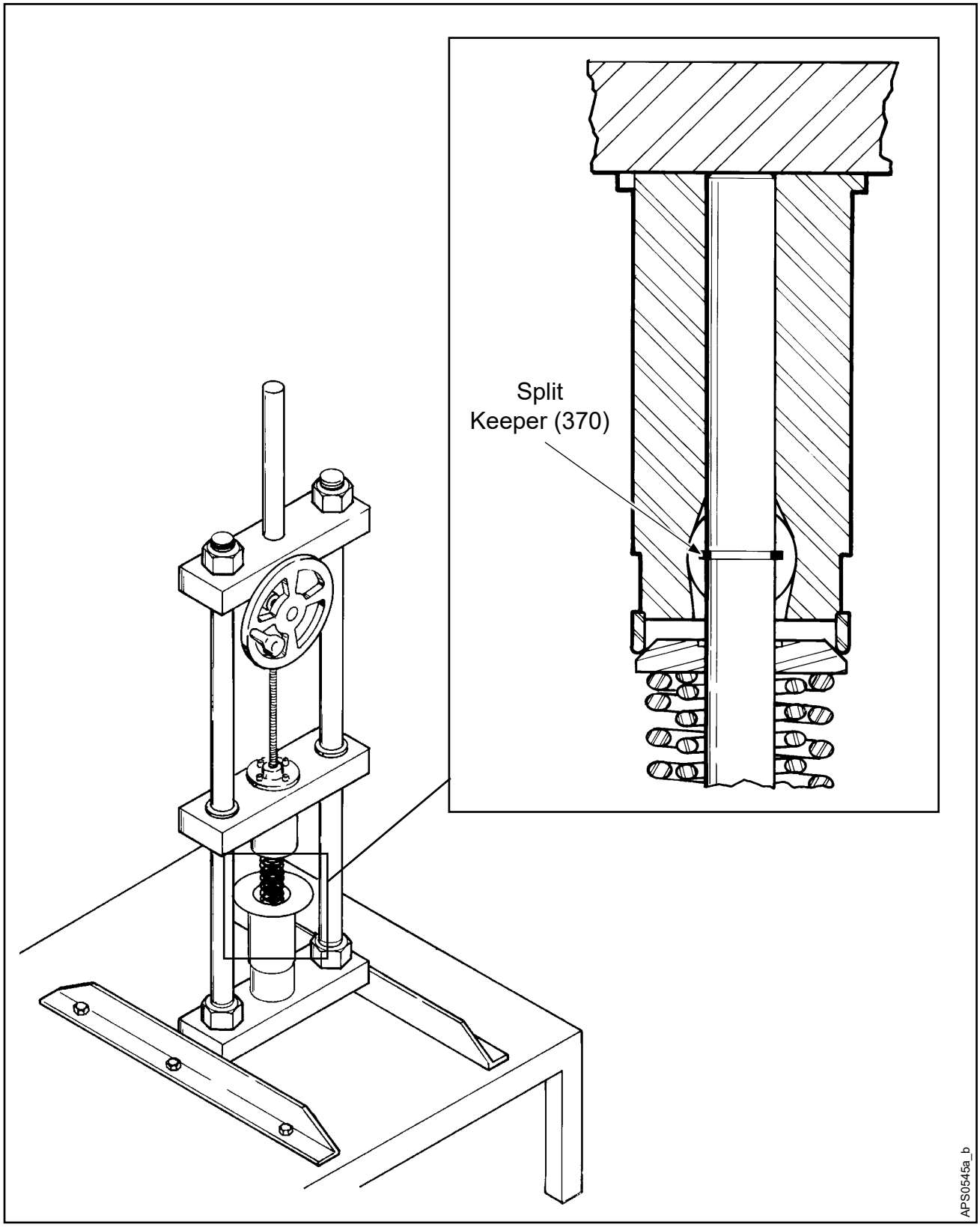
(a) If a hub lifting tool and hoist were used, remove them from the cylinder-side half of the hub unit (500).

(33) Manually rotate the blades until the fork can be removed.

(34) Remove the fork (430).

(35) Using blade clamp TE25, if desired, remove each blade from the hub socket and put aside for later disassembly.

(This page is intentionally blank.)



Disassembly of the Feathering Compression Spring
Figure 3-1

C. Disassembly of the Cylinder and Feathering Spring Assembly - Refer to Figure 3-1

WARNING: THE FEATHERING SPRING ASSEMBLY IS PRELOADED TO APPROXIMATELY 800 POUNDS (362.4 KG) FORCE. MAKE SURE OF THE SAFETY OF PERSONNEL IN THE AREA DURING DISASSEMBLY PROCEDURES.

(1) Put the cylinder and feathering spring assembly in the spring compressor fixture TE59 or equivalent.

(2) Compress the cylinder/spring pack until there is access to the split keeper (370).

(3) Remove and discard the two halves of the split keeper (370).

(4) Permit the cylinder/spring pack to slowly decompress.

(5) Remove the cylinder/spring pack from the spring compressor fixture TE59 or equivalent.

(6) Remove the plastic bearing guide (300), roller thrust bearing race (310), roller thrust bearing (320), roller thrust bearing race (330), feathering compression springs (340, 350), and rear spring retainer (360) from the pitch change rod (380).

(7) Remove the smaller diameter feathering compression spring (350) from the larger diameter feathering compression spring (340).

(8) Remove and discard the 10-32 cap screw (260) that attaches the stop ring (250) and the pitch stop shim (240) to the cylinder (200).

(9) Remove the stop ring (250) and the pitch stop shim (240) from the cylinder (200).

D. Disassembly of the Blade Retention Parts

(1) Remove and discard the blade O-ring (1640).

(2) Remove the hub-side race (1620) from the blade.

(3) Remove and discard the bearing balls (1610) from the blade.

(4) Remove and discard the ball spacer (1630) from the blade.

(5) Remove the preload plate assembly (1540) from the blade.

(6) Remove and discard the thin hex nut (1570) and the set screw (1560) from the preload plate assembly (1540).

(7) Remove and discard the bolts (1420) that attach the pitch change knob bracket (1400) to the blade.

(8) Remove the pitch change knob bracket (1400) from the blade using the following steps:

(a) If the dowel pin (1410) remains in the blade, remove and discard the dowel pin (1410).

(b) If the dowel pin (1410) remains in the pitch change knob bracket (1400), removal of the dowel pin (1410) from the pitch change knob bracket (1400) is not required.

(9) Remove and discard the pitch change knob cap (1530), the screw (1520) and the knob unit retaining washer (1510) from the pitch adjust block unit (1430).

CAUTION: DO NOT REMOVE THE O-RINGS (1440,1500) FROM THE PITCH CHANGE ADJUST BLOCK UNIT (1430) UNTIL INSTRUCTED. IF THE O-RINGS (1440,1500) ARE REMOVED, THE VERY SMALL NEEDLE ROLLERS (1480) WILL FALL OUT.

(10) Remove the pitch adjust block unit (1430).

(a) Put the pitch adjust block unit (1430) in a small container.

(b) Keeping the pitch adjust block unit (1430) in the small container, disassemble the pitch adjust block unit (1430) in accordance with the following steps:

1 Remove and discard the O-rings (1440, 1500).

2 Remove the spacers (1450, 1490).

3 Remove the inner ring (1460).

4 Remove the needle rollers (1470).

(11) Using a suitable gear puller, brass drift, or bearing press remove the bearing retaining ring (1580).

(12) Remove the blade-side race (1610) from the blade.

(13) Repeat this disassembly of the blade retention parts procedure for each remaining blade assembly.

E. Blade Disassembly

(1) For composite blade overhaul procedures, counterweight disassembly, and balance weight disassembly, refer to Hartzell Propeller Inc. Composite Propeller Blade Maintenance Manual 135F (61-13-35).

F. Hub Disassembly

(1) For a hub unit (500) that uses a 105450 rod hub bushing (550) in the hub bore, disassemble the 105450 rod hub bushing (550) from the hub unit (500) using the following steps:

(a) Remove and discard the external spiral retaining ring (570) from the OD of the rod hub bushing (550).

(b) Remove the rod hub bushing (550) from the bore of the hub unit (500).

(c) Remove and discard the O-ring (560) from the OD of the rod hub bushing (550).

(2) For additional hub disassembly instructions, refer to the Aluminum Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(This page is intentionally blank.)

CLEANING - CONTENTS

(This page is intentionally blank.)

1. Cleaning Procedures (Rev. 3)

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

A. General Cleaning

(1) Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

B. Cleaning Steel Parts for Magnetic Particle Inspection

(1) Refer to the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

C. Cleaning Steel Parts for Cadmium Replating Procedures

(1) Refer to the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

D. Cleaning Aluminum Parts for Penetrant Inspection

(1) Refer to the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

E. Cleaning Titanium Parts for Penetrant Inspection

(1) Refer to the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

F. Cleaning Aluminum Parts for Chromic Acid Anodizing Procedures

(1) Refer to the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

G. Cleaning Cylinder Threads (Propellers with screw-on cylinders only)

CAUTION: DO NOT USE GLASS BEAD OR OTHER ABRASIVE CLEANING METHODS, AS THEY MAY CAUSE EXCESSIVE DAMAGE TO THE CYLINDER THREADS.

(1) It is preferable that the cylinder threads be cleaned only with solvent CM23; however, removal of sealant in the threaded area can be difficult.

(2) Plastic media may be used to remove the sealant from the cylinder threads, if minimal pressure and duration is used to minimize possible abrasion of the aluminum threads.

(This page is intentionally blank.)

CHECK - CONTENTS

CHECK - CONTENTS

LIST OF FIGURES

LIST OF TABLES

(This page is intentionally blank.)

1. Inspection Interval Requirements (Rev. 1)
   A. General
      (1) For information about life limited components and mandatory inspections, refer to the Airworthiness Limitations chapter of the applicable Hartzell Propeller Inc. owner's manual.
      (2) For overhaul periods of Hartzell Propeller Inc. propellers, refer to Hartzell Propeller Inc. Service Letter HC-SL-61-61Y.
2. Dimensional Inspection (Rev. 1)
   A. Diameter Measurements
      (1) When measuring the diameter of a part with a two point measuring instrument, take at least two measurements unless specified differently.
         (a) Obtaining a measurement outside the specified tolerance at any point of measurement is cause for retirement of the part when a minimum of two measurements are taken.
         (b) Alternately, take eight evenly spaced measurements, unless specified differently.
            1 Obtaining a measurement outside the specified tolerance on three or more measurements is cause for retirement of the part when eight measurements are taken (two of eight measurements may be out of specified tolerance).
            2 This alternate method may not be used to accept a diameter that has obvious damage beyond repairable (serviceable) limits.
      (2) When measuring the diameter of a part with a three point measuring instrument, take one measurement. A measurement outside the specified tolerance is cause for retirement of the part.
   B. Decimal Places
      (1) Inspect the part features to the number of decimal places specified. If three decimal places are specified, inspect the part to three decimal places only.

3. Inspection Criteria/Procedures (Rev. 2)

A. Propeller Components (Except for those listed separately in this section)

(1) Refer to Table 5-1, "Component Inspection Criteria" in this chapter.

B. Hubs

(1) Aluminum Hubs: Refer to the Aluminum Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

C. Blades

(1) Composite Blades: Refer to Hartzell Propeller Inc. Composite Propeller Blade Maintenance Manual 135F (61-13-35).

D. Ice Protection Systems

(1) For ice protection systems supplied by Hartzell, refer to Hartzell Propeller Inc. Ice Protection System Manual 180 (30-61-80).

(2) For ice protection systems not supplied by Hartzell, refer to the applicable TC or STC holder’s Instructions for Continued Airworthiness (ICA).

E. Spinner Assemblies

(1) Composite Spinners: Refer to Hartzell Propeller Inc. Composite Spinner Maintenance Manual 148 (61-16-48).

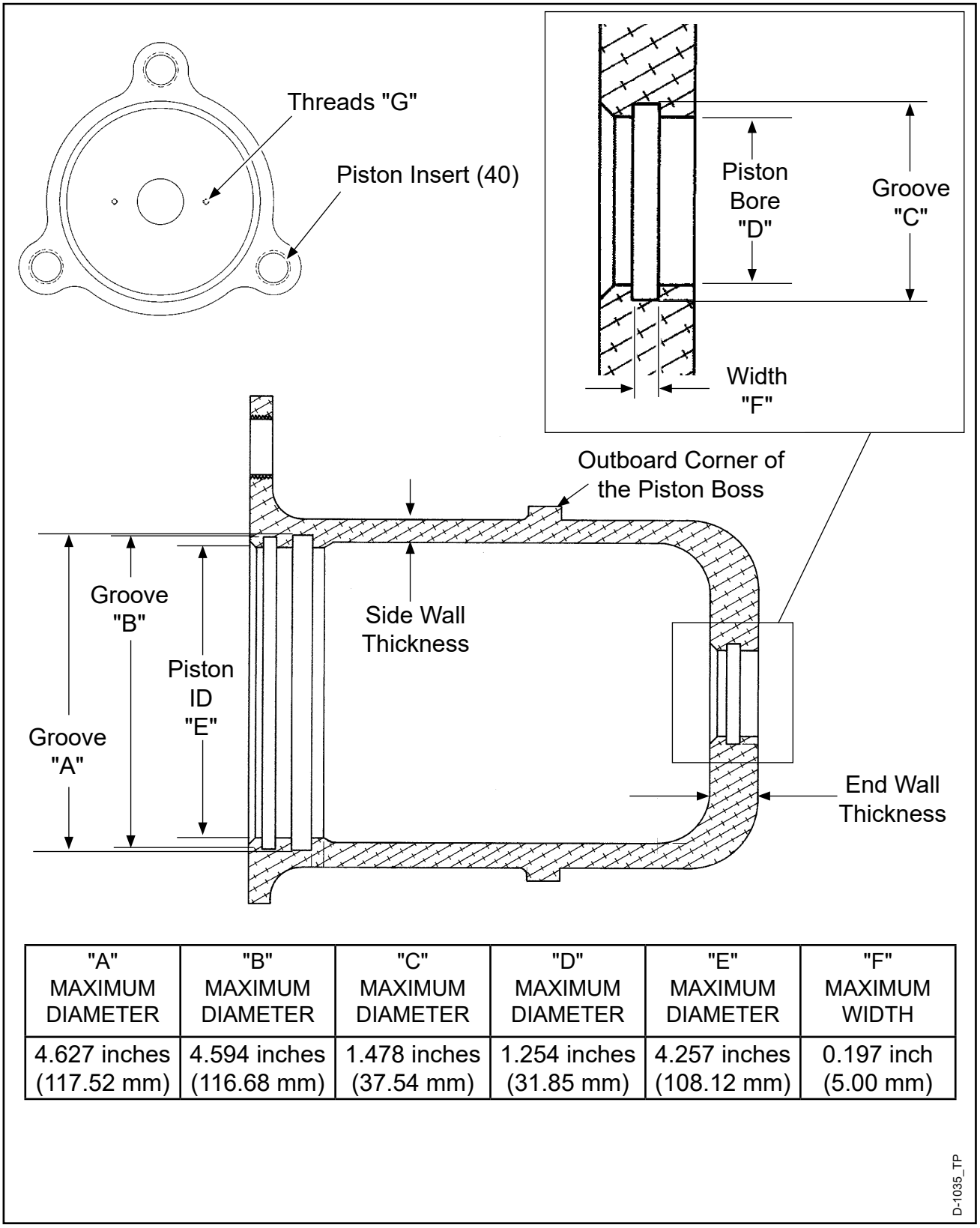
F. Special Inspections (Lightning Strike, Foreign Object Strike, etc.)

(1) Refer to the Special Inspections chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

4. Propeller Component Checks

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER 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 IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

Refer to Table 5-1, "Component Inspection Criteria" in this chapter.



"A" MAXIMUM DIAMETER	"B" MAXIMUM DIAMETER	"C" MAXIMUM DIAMETER	"D" MAXIMUM DIAMETER	"E" MAXIMUM DIAMETER	"F" MAXIMUM WIDTH
4.627 inches (117.52 mm)	4.594 inches (116.68 mm)	1.478 inches (37.54 mm)	1.254 inches (31.85 mm)	4.257 inches (108.12 mm)	0.197 inch (5.00 mm)

Piston Unit
Figure 5-1

Component Inspection Criteria
Table 5-1

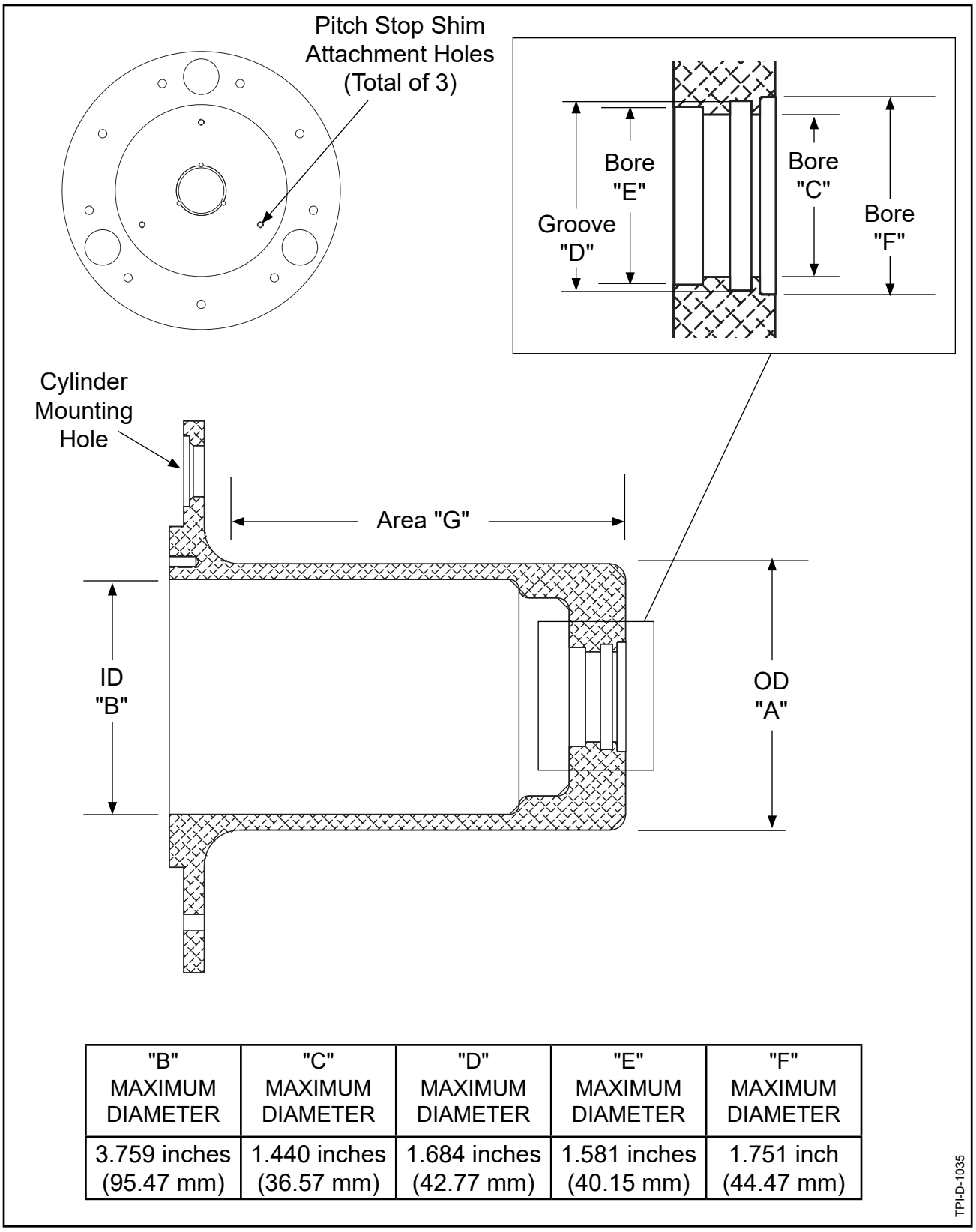
Inspect	Serviceable Limits	Corrective Action
A. PISTON UNIT (Item 110) Refer to Figure 5-1.		
(1) Visually examine the outside surfaces of the piston unit for corrosion product, pitting, or other damage.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted depth of damage is 0.008 inch (0.20 mm). The maximum permitted depth of pitting is 0.005 inch (0.12 mm). The maximum permitted diameter of pitting or damage is 0.0625 inch (1.587 mm).	Using glass cleaning, remove the corrosion product. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A, (61-02-02). Repair the outside surfaces of the piston unit to a minimum diameter of the damage depth x 10. If the corrosion product cannot be removed or if the pitting or damage is greater than the permitted serviceable limits, replace the piston unit.
(2) Visually examine each of the two small threaded holes in the piston unit threads "G" for damage.	There must be two small threaded holes in the piston unit. A maximum of 1/2 of one thread total accumulated damage for each threaded hole is permitted.	If there are no small threaded holes in the piston unit, modify the piston unit in accordance with the section, "Modifying the D-1035 Piston Unit for Safety Screws" in the Repair chapter of this manual. If the damage is greater than the permitted serviceable limits, replace the piston unit.
(3) Visually examine the piston unit features "A', "B", "C", "D", "E", and "F" for wear or damage.	If there is wear or damage, measure the piston unit in accordance with dimensions given in Figure 5-1. The maximum permitted depth of damage is 0.002 inch (0.05 mm).	If any measurement is greater than the dimension given in Figure 5-1 or if the depth of damage is greater than the permitted serviceable limits, replace the piston unit.
(4) Visually examine the outboard corner of the piston boss for damage.	A maximum of 0.25 inch (6.3 mm) total accumulated damage to the piston boss is permitted.	If the damage is greater than the permitted serviceable limits, replace the piston unit.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
A. PISTON UNIT, CONTINUED (Item 110) Refer to Figure 5-1.		
(5) Visually examine the piston unit for coverage of anodize or chemical conversion coating.	There must be complete coverage of anodize or chemical conversion coating.	If the coverage of anodize or chemical conversion coating is less than the permitted serviceable limits, apply chemical conversion coating or anodize the piston unit in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(6) Measure the end wall thickness of the piston unit.	The minimum permitted end wall thickness of the piston unit is 0.665 inch (16.90 mm).	If the end wall thickness of the piston unit is less than the permitted serviceable limits, replace the piston unit.
(7) Measure the side wall thickness of the piston unit along the full length of piston travel.	The minumum permitted side wall thickness of the piston unit is 0.340 inch (8.64 mm).	If the side wall thickness of the piston unit is less than the permitted serviceable limits, replace the piston unit.
(8) Measure the ID of the piston insert (120).	The maximum permitted ID of the piston insert (120) is 0.825 inches (20.95 mm).	If the ID of the piston insert (120) is greater than the permitted serviceable limits, replace the piston insert (120) in accordance with the section. "Replacing the A-1079 Piston Insert in the D-1035 Piston" in the Repair chapter of this manual.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
A. PISTON UNIT, CONTINUED (Item 110) Refer to Figure 5-1.		
(9) Penetrant inspect the piston unit in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). NOTE: It is not necessary to remove the piston insert (120), to etch the piston unit, or to remove the anodize coating from the piston unit before penetrant inspection.	A relevant indication is not permitted.	If there is relevant indication, replace the piston unit.



"B" MAXIMUM DIAMETER	"C" MAXIMUM DIAMETER	"D" MAXIMUM DIAMETER	"E" MAXIMUM DIAMETER	"F" MAXIMUM DIAMETER
3.759 inches (95.47 mm)	1.440 inches (36.57 mm)	1.684 inches (42.77 mm)	1.581 inches (40.15 mm)	1.751 inch (44.47 mm)

TPI-D-1035

Cylinder Unit
Figure 5-2

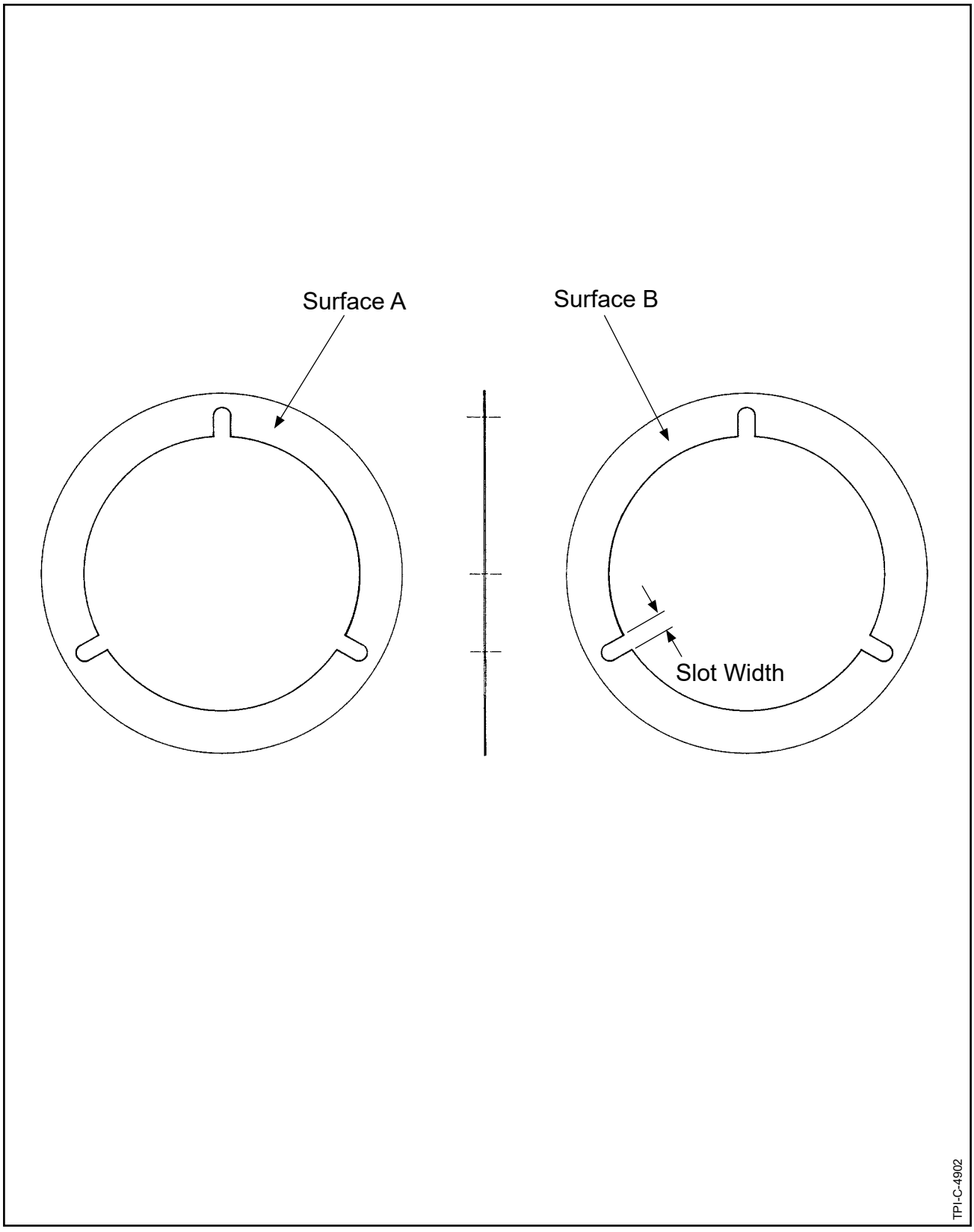
Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
B. CYLINDER UNIT (Item 200) Refer to Figure 5-2.		
(1) Before beginning the inspection of the cylinder unit (200), make sure that the two rod cylinder bushings (210, 220) have been removed.		
(2) Visually examine Area "G" of the cylinder unit for hard anodize coverage.	There must be complete coverage of hard anodize in Area "G".	If the hard anodize coverage in Area "G" is not complete, replace the cylinder unit.
(3) Along the full length of piston travel, visually examine the surface for damage or wear.	If there is damage or wear, measure the depth of the damage or wear. The maximum permitted depth of damage or wear is 0.001 inch (0.025 mm).	If the damage or wear is greater than the permitted serviceable limits, replace the cylinder unit.
(4) Measure OD "A" of the cylinder unit along the full length of piston travel.	The minimum permitted OD "A" along the full length of piston travel is 4.244 inches (107.80 mm).	If OD "A" is less than the permitted serviceable limit, replace the cylinder unit.
(5) For all surface areas except along the full length of piston travel, visually examine the surface for damage.	If the cylinder is damaged, measure the depth of damage. The maximum permitted depth of damage is 0.005 inch (0.12 mm).	If the damage is greater than the permitted serviceable or repair limits, replace the cylinder unit.
(6) Visually examine each of the pitch stop shim attachment holes in the cylinder unit.	A maximum of 1/2 of one thread total accumulated damage for each threaded hole is permitted.	If there are no pitch stop shim attachment holes in the cylinder, modify the piston in accordance with the section, "Cylinder Unit D-1036 Modification" in the Repair chapter of this manual. If the damage is greater than the permitted serviceable limits, replace the cylinder unit.
(7) Measure the cylinder features ID "B, Bore "C", Groove "D",Bore "E". and Bore "F".	Measure the cylinder in accordance with Figure 5-2.	If the measurement of any feature is greater than the permitted serviceable limits, replace the cylinder.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
B. CYLINDER UNIT, CONTINUED (Item 200) Refer to Figure 5-2.		
(8) Using white light, visually examine the immediate area around each cylinder mounting hole on both sides of the mounting flange for cracks.	A crack is not permitted.	If there is a crack, replace the cylinder.
(9) Penetrant inspect the cylinder unit in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A relevant indication is not permitted.	If there is relevant indication, replace the cylinder unit.

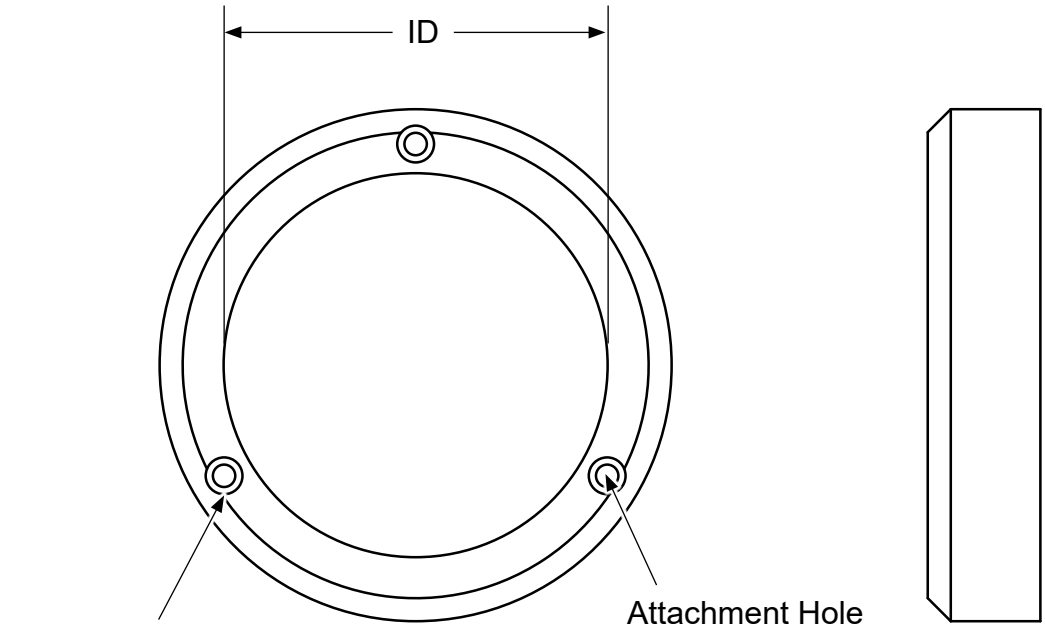
(This page is intentionally blank.)



Pitch Stop Shim
Figure 5-3

Component Inspection Criteria
Table 5-1

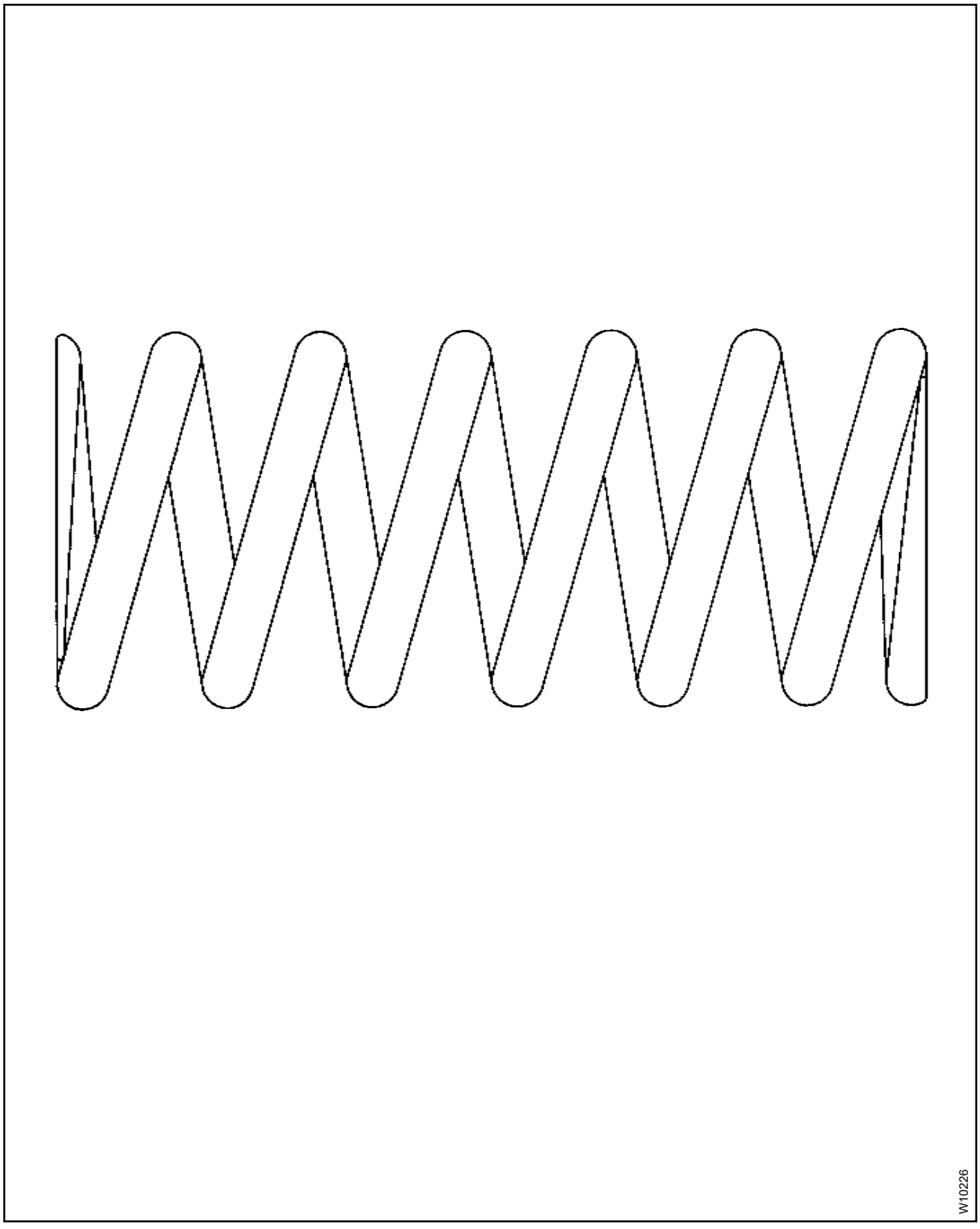
Inspect	Serviceable Limits	Corrective Action
C. PITCH STOP SHIM (Item 240) Refer to Figure 5-3.		
(1) Visually examine the pitch stop shim for corrosion product, pitting, or other damage.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. If the pitch stop shim is damaged, measure the depth of the damage. The maximum permitted depth of pitting or other damage is 0.001 inch (0.025 mm). A high spot or an edge above the surrounding machined surfaces is not permitted on surface A or surface B. The maximum permitted total coverage of pitting or other damage is 10% of the total area. Pitting or other damage is not permitted to interfere with the fit or performance of the mating part.	Remove corrosion product using glass bead cleaning. A high spot may be removed by polishing using an abrasive pad CM47 or equivalent. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed or if the pitting or other damage is greater than the permitted serviceable limits, replace the pitch stop shim.
(2) Visually examine each slot for wear.	If there is wear, measure the slot. The maximum permitted slot width is 0.265 inch (6.73 mm).	If the slot width is greater than the permitted serviceable limits, replace the pitch stop shim.
(3) Visually examine the pitch stop shim for cadmium plating coverage.	Loss of cadmium plating, caused by interference with the clamping fastener threads, around each slot is permitted. A few random scratches and corners with cadmium plating missing are permitted. In all other areas, complete coverage of the cadmium plating is required.	If the cadmium plating coverage is less than the permitted serviceable limits, cadmium replate and bake the pitch stop shim in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Stop Ring
Figure 5-4

Component Inspection Criteria
Table 5-1

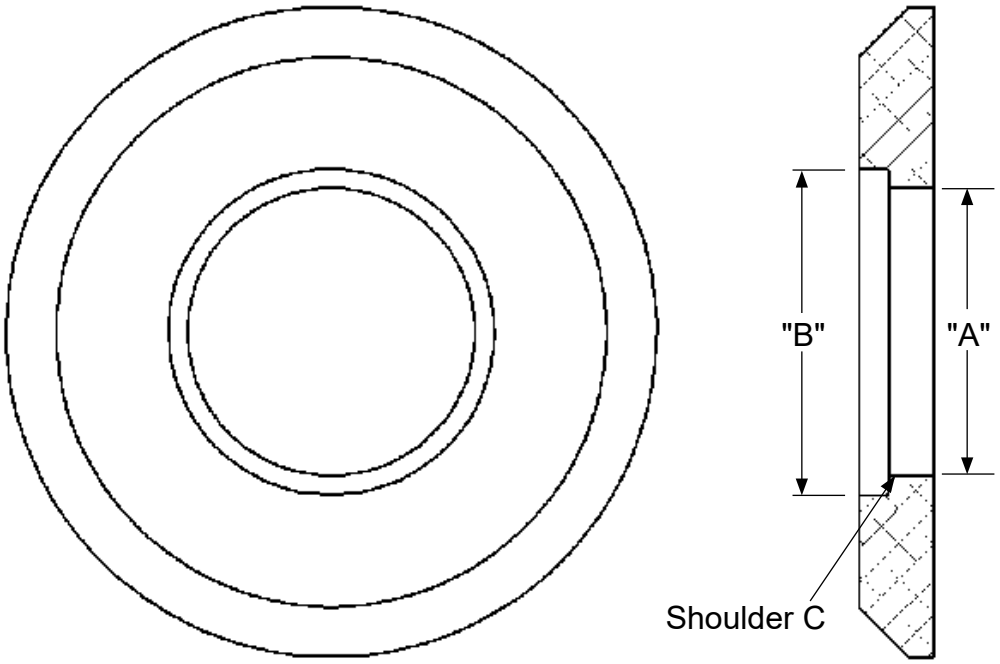
Inspect	Serviceable Limits	Corrective Action
D. STOP RING (Item 250) Refer to Figure 5-4.		
(1) Except for the attachment hole and the counterbore of the attachment hole, visually examine the stop ring for damage.	If there is damage, measure the depth of the damage. The maximum permitted depth of damage is 0.025 inch (0.63 mm). The maximum permitted total area of accumulated damage is 0.5 square inch (322 square mm). Material that is raised above the normal machined surface is not permitted.	Remove material that is raised above the normal machined surface using an abrasive pad CM47 or equivalent. If the damage is greater than the permitted serviceable limits, replace the stop ring.
(2) Visually examine the ID of each attachment hole for damage or wear.	If there is damage or wear, measure the ID of the attachment hole. The maximum permitted ID is 0.225 inches (5.71 mm).	If the ID is greater than the permitted serviceable limits, replace the stop ring.
(3) Visually examine the counterbore of the attachment hole for damage or wear.	If there is damage or wear in the counterbore of the attachment hole, measure the depth of the damage or wear. The maximum permitted depth of damage or wear is 0.005 inches (0.12 mm).	If the depth of the damage or wear in the counterbore of the attachment hole is greater than the permitted serviceable limits, replace the stop ring.
(4) Visually examine the ID of the stop ring for wear.	If there is wear, measure the ID of the stop ring. The maximum permitted ID is 3.762 inches (95.55 mm).	If the ID of the stop ring is greater than the permitted serviceable limits, replace the stop ring.



Feathering Compression Spring
Figure 5-5

Component Inspection Criteria
Table 5-1

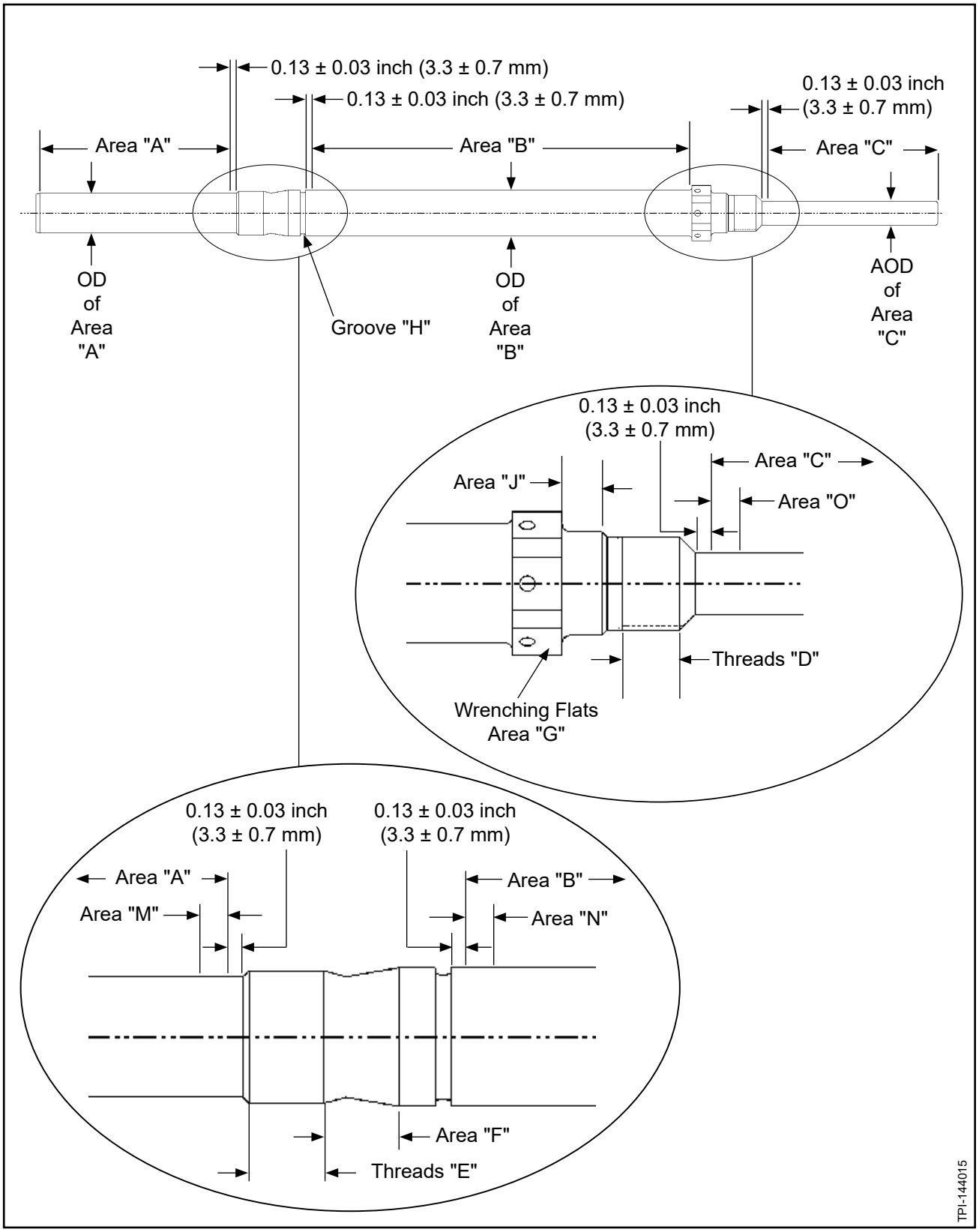
Inspect	Serviceable Limits	Corrective Action
E. FEATHERING COMPRESSION SPRING (Item 340, 350) Refer to Figure 5-5.		
(1) Visually examine the feathering compression spring and identify all surfaces where the nylon coating has wear through to the titanium spring material. If no nylon coating is missing, then further inspection is not required. Examine any exposed titanium surface for corrosion product, pitting, wear, or other damage.	Corrosion product on the titanium surface is not permitted. If there is corrosion product on the titanium surface, remove it in accordance with the corrective action repair limits. If the feathering compression spring has pitting or is damaged, measure the depth of pitting or damage. The maximum permitted depth of pitting or damage to the titanium surface is 0.003 inch (0.07 mm). There is no limit to the amount of nylon coating that may be missing.	Remove corrosion product using glass bead cleaning locally applied to the titanium surface only. Apply masking material to the nylon surfaces to protect them from abrasion by the glass bead. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the pitting, wear, or damage is greater than the permitted serviceable limits, replace the feathering compression spring.



Rear Spring Retainer
Figure 5-6

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
F. REAR SPRING RETAINER (Item 360) Refer to Figure 5-6.		
(1) Visually examine the rear spring retainer for corrosion product and pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed or if the pitting is greater than the permitted serviceable limits, replace the rear spring retainer.
(2) Visually examine the rear spring retainer for damage.	The maximum permitted depth of damage is 0.010 inch (0.25 mm). Material that is raised above the normal machined surface is not permitted.	Remove material that is raised above the normal machined surface using an abrasive pad CM47 or equivalent. If the damage is greater than the permitted serviceable limits, replace the rear spring retainer.
(3) Visually examine bore "A" for wear.	If there is wear, measure the ID of bore "A". The maximum permitted ID is 1.440 (28.95 mm).	If the wear is greater than the permitted serviceable limits, replace the rear spring retainer.
(4) Visually examine bore "B" for wear.	If there is wear, measure the ID of bore "B". The maximum permitted ID is 1.634 inch (41.50 mm).	If the wear is greater than the permitted serviceable limits, replace the rear spring retainer.
(5) Visually examine shoulder "C" for damage or wear.	A few areas of wear or damage are permitted. The surface must be flat enough to support the rear spring retainer on the interfacing split keeper.	If the damage or wear is greater than the permitted serviceable limits, replace the rear spring retainer.



Pitch Change Rod
Figure 5-7

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
G. PITCH CHANGE ROD (Item 380) Refer to Figure 5-7.		
(1) Except for area "F" and area "J", visually examine the pitch change rod for corrosion product and pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. For all except for area "F" and area "J", the maximum permitted depth of pitting is 0.004 inch (0.10 mm). Pitting is not permitted to be through the chrome in Area A.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). For all except for area "F" and area "J", the maximum permitted depth of repair is 0.005 inch (0.12 mm). The maximum permitted area of total repair is 1 square inch (645 square mm). Repair cannot be through the chrome in Area A. If the corrosion product cannot be removed, replace the pitch change rod. If the pitting or repair is through the chrome in Area A, return the pitch change rod to Hartzell Propeller Inc. for chrome re-plating. If the pitting is greater than the permitted serviceable limits or the corrective action repair limits, replace the pitch change rod.
(2) Measure the width of groove "H".	The minimum permitted width of groove "H" is 0.157 inch (3.98 mm).	If the width of groove "H" is less than the permitted serviceable limits, send the pitch change rod to Hartzell Propeller Inc. for modification.
(3) Visually examine the pitch change rod for chrome plating coverage in areas "A", "B", and "C".	Minor wear on corners and random light scratches are permitted; otherwise, complete chrome plating coverage is required.	If the chrome plating coverage is less than the permitted serviceable limits, send the pitch change rod to Hartzell Propeller Inc. for chrome re-plating.
(4) Visually examine the external threads in areas "D" and "E" for damage.	A maximum of 1/2 of one thread total accumulated damage in each threaded area is permitted. The damaged thread must not interfere with the threads of a mating part.	If the damage is greater than the permitted serviceable limits, replace the pitch change rod.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
G.	PITCH CHANGE ROD, CONTINUED (Item 380) Refer to Figure 5-7.		
(5)	Visually examine the taper area "F" for pitting, wear, and damage.	Pitting, wear, or damage is not permitted at the smallest diameter of the taper or within 0.093 inch (2.36 mm) of the thread. The remaining taper surface may have a maximum depth of pitting, wear, or damage of 0.004 inch (0.10 mm) over 10% of the surface area. High spots or edges above the surrounding machined surfaces are not permitted.	If damage causes high spots above the existing surface, remove only the high spots using an abrasive pad CM47 or equivalent. If pitting, wear, or damage is greater than the permitted serviceable limits, replace the pitch change rod.
(6)	Visually examine the pitch change rod for straightness.	The pitch change rod must be straight; bending is not permitted.	If there is bending, return the pitch change rod to Hartzell Propeller Inc. for repair.
(7)	Visually examine the wrenching flats "G" on the pitch change rod shoulder for displaced material damage.	Displaced material must not protrude above or below the pitch change rod shoulder surfaces. Sufficient flat surfaces "G" must remain to support an applied open end wrench torque.	Using an abrasive pad CM47 or equivalent, remove the protruding displaced material to be flush with the pitch change rod shoulder thickness. If the damage is greater than the permitted serviceable limits, replace the pitch change rod.
(8)	Measure the OD of area "A" of the pitch change rod.	Except for Area "M", the minimum permitted OD of area "A" is 1.245 inch (31.63 mm). Area "M", that has a length of 0.25 ± 0.030 inch (6.3 ± 0.76 mm), is permitted to have undersize chrome plating. The minimum permitted OD of Area "M" is 1.241 inch (31.53 mm).	If the OD of area "A" or "M" is less than the permitted serviceable limits, send the pitch change rod to Hartzell Propeller Inc. for chrome re-plating.

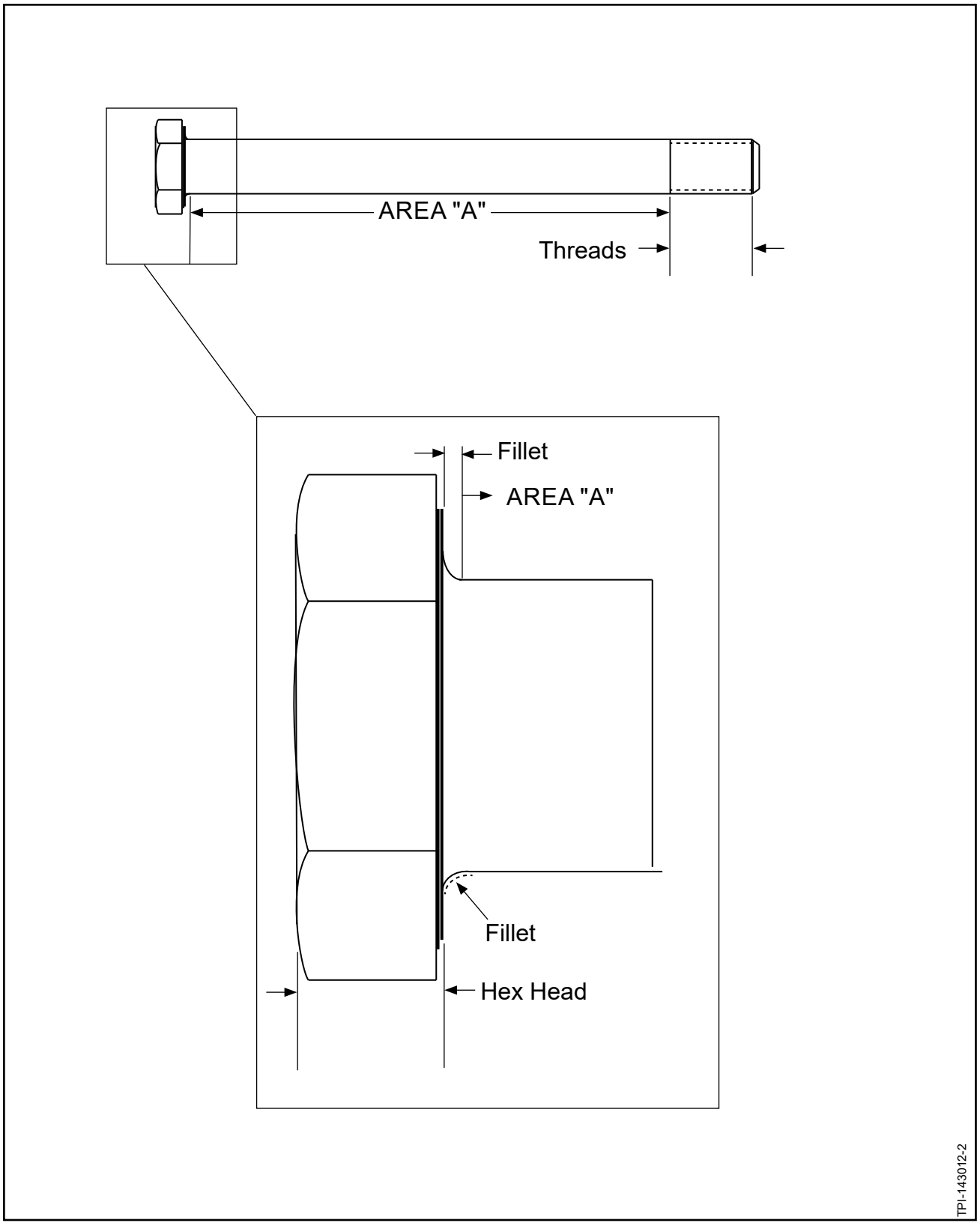
Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
G. PITCH CHANGE ROD, CONTINUED (Item 380) Refer to Figure 5-7.		
(9) Measure the OD of area "B" of the pitch change rod.	Except for Area "N", the minimum permitted OD of area "B" is 1.432 inch (36.38 mm). Area "N", that has a length of 0.25 ± 0.030 inch (6.3 ± 0.76 mm), is permitted to have undersize chrome plating. The minimum permitted OD of Area "N" is 1.428 inch (36.28 mm).	If the OD of area "B" is less than the permitted serviceable limits, send the pitch change rod to Hartzell Propeller Inc. for chrome re-plating.
(10) Measure the OD of area "C" of the pitch change rod.	Except for Area "O", the minimum permitted OD of area "C" is 0.747 inch (18.98 mm). Area "O", that has a length of 0.25 ± 0.030 inch (6.3 ± 0.76 mm), is permitted to have undersize chrome plating. The minimum permitted OD of Area "O" is 0.743 inch (18.88 mm).	If the OD of area "C" or "O" is less than the permitted serviceable limits,send the pitch change rod to Hartzell Propeller Inc. for chrome re-plating.
(11) Visually examine the area "J" between the pitch change rod wrenching shoulder and the threads where the piston O-ring contacts for corrosion product, pitting, or damage.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. Pitting or damage is not permitted in the O-ring contact area of area "J". The maximum permitted depth of damage in the area that is outside of the O-ring contact area of area "J" is 0.008 inch (0.20 mm). The maximum permitted depth of pitting in the area that is outside of the O-ring contact area of area "J" is 0.005 inch (0.12 mm).	Remove corrosion product by polishing with an abrasive pad CM47 or equivalent. If the pitting or damage is greater than the permitted serviceable limits, replace the pitch change rod.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
G. PITCH CHANGE ROD, CONTINUED (Item 380) Refer to Figure 5-7.		
(12) Measure the ID of each hole in the wrenching flat of the pitch change rod.	The maximum permitted ID of each hole in the wrenching flat is 0.195 inch (4.95 mm).	If the ID of any hole in the wrenching flat of the pitch change rod is greater than the permitted serviceable limits, replace the pitch change rod.
(13) Visually examine the ID of the pitch change rod for unwanted material.	Unwanted material is not permitted.	Remove all unwanted material. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(14) Penetrant inspect the pitch change rod in accordance with Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). NOTE: The pitch change rod must be returned to Hartzell Propeller Inc. for the penetrant inspection because the chrome plating must be removed before the penetrant inspection.	A relevant indication is not permitted.	If there is a relevant indication, replace the pitch change rod.

(This page is intentionally blank.)

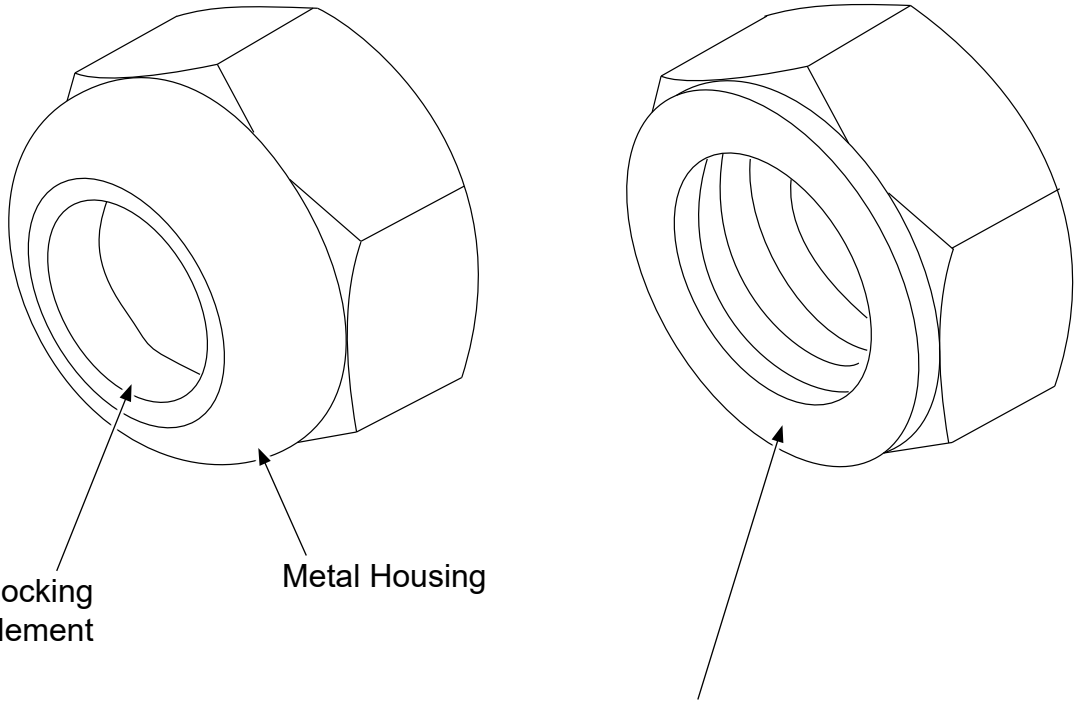


Hex Head Bolt
Figure 5-8

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
H. HEX HEAD BOLT (Items 410, 420) Refer to Figure 5-8.		
(1) Visually examine the hex head bolt for corrosion product and pitting.	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.002 inch (0.05 mm). No more than 5% of the total unthreaded surface may be pitted. The maximum permitted diameter of an individual pit is 0.032 inch (0.81 mm).Pitting is not permitted in the fillet between the hex head and the grip, Area "A". Pitting must not affect the fit or function of the hex head bolt.	Remove corrosion product using glass bead cleaning in accordance with the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If corrosion product cannot be removed, replace the hex head bolt. If the pitting is greater than the permitted serviceable limits, replace the hex head bolt.
(2) Except for the threads, visually examine the hex head bolt for damage or scratches.	The maximum permitted depth of damage or a scratch is 0.002 inch (0.05 mm). Scratches or damage must not affect the fit or function of the hex head bolt. Pushed up material is not permitted.	Pushed up material may be removed with a thread file. Use of the thread file must not affect the fit or function of the hex head bolt. If the depth of a scratch or damage is greater than the permitted serviceable limits or if the scratch, damage, or repair affects the fit or function of the hex head bolt, replace the hex head bolt.
(3) Visually examine the hex head bolt for circumferential scoring caused by installation and removal.	Circumferential scoring that reduces the diameter of the hex head bolt is not permitted. The minimum permitted OD in Area "A" is 0.370 inch (9.40 mm).	If scoring is greater than the permitted serviceable limits or if the OD in Area "A" is less than the permitted serviceable limits, replace the hex head bolt.
(4) Visually examine the wrenching surfaces of the head of the hex head bolt for metal movement caused by wrenching.	Limited damage from wrenching is permitted, but it must be possible to torque the hex head bolt and metal movement must not interfere with the installation of the hex head bolt or cause damage to the hub.	Remove metal movement with a file or equivalent. Only corners may be repaired. Refacing a complete surface is not permitted. If metal movement is greater than the permitted serviceable limits, replace the hex head bolt.

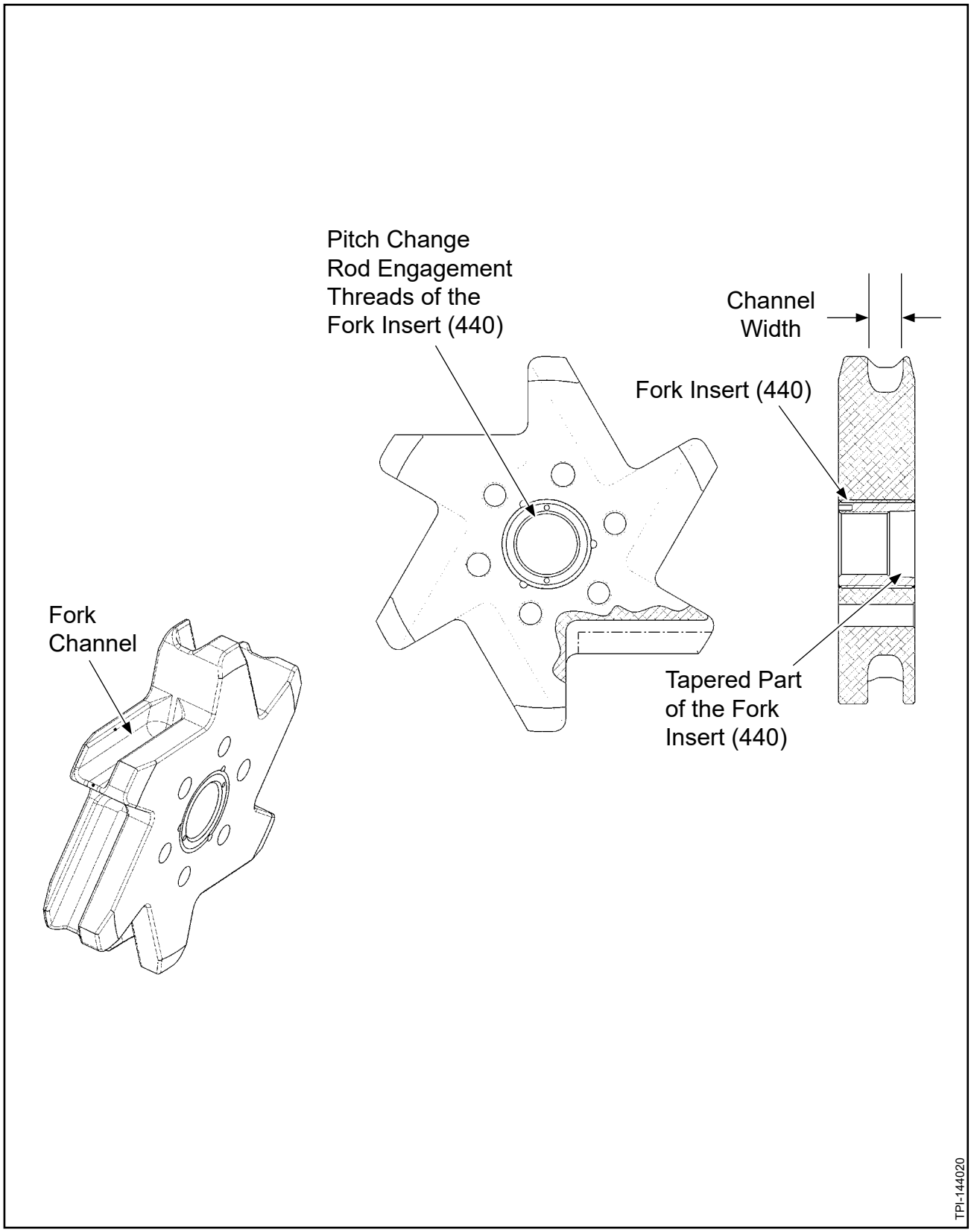
CAUTION: DO NOT USE MODIFIED A-2043-1 NUTS ON THE PROPELLER ASSEMBLY. A-2043-1 NUTS THAT HAVE BEEN MODIFIED ARE TO BE USED ONLY FOR THE HEX HEAD BOLT THREAD CHECK.



A-2043-1 Nut Modification
Figure 5-9

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
H. HEX HEAD BOLT, CONTINUED (Items 410, 420) Refer to Figure 5-8.		
(5) Visually examine the threads of the hex head bolt for damage and pitting.	A maximum total accumulation of 3/4 thread of damage and pitting is permitted. Thread damage must not cause damage to the mating part. An A-2043-1 nut with the plastic locking element removed should be able to be freely rotated by hand on the bolt threads. For the modification of the nut, refer to Figure 5-9.	Limited thread file repair is permitted, but must be considered as thread damage. If the damage and pitting is greater than the permitted serviceable limits, replace the hex head bolt.
(6) Magnetic particle inspect each bolt in accordance with the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A relevant indication is not permitted.	If there is a relevant indication, replace the hex head bolt.
(7) Visually examine the hex head bolt for cadmium plating coverage.	Cadmium plating must completely cover the bolt with the following exceptions: A few scratches and corners with cadmium plating missing, minor abrading of cadmium plating on the threads, or minor abrading of the cadmium plating on the hex head because of wrenching are permitted.	If the cadmium plating coverage is less than the permitted serviceable limits, cadmium replate the hex head bolt in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Fork
Figure 5-10

Component Inspection Criteria
Table 5-1

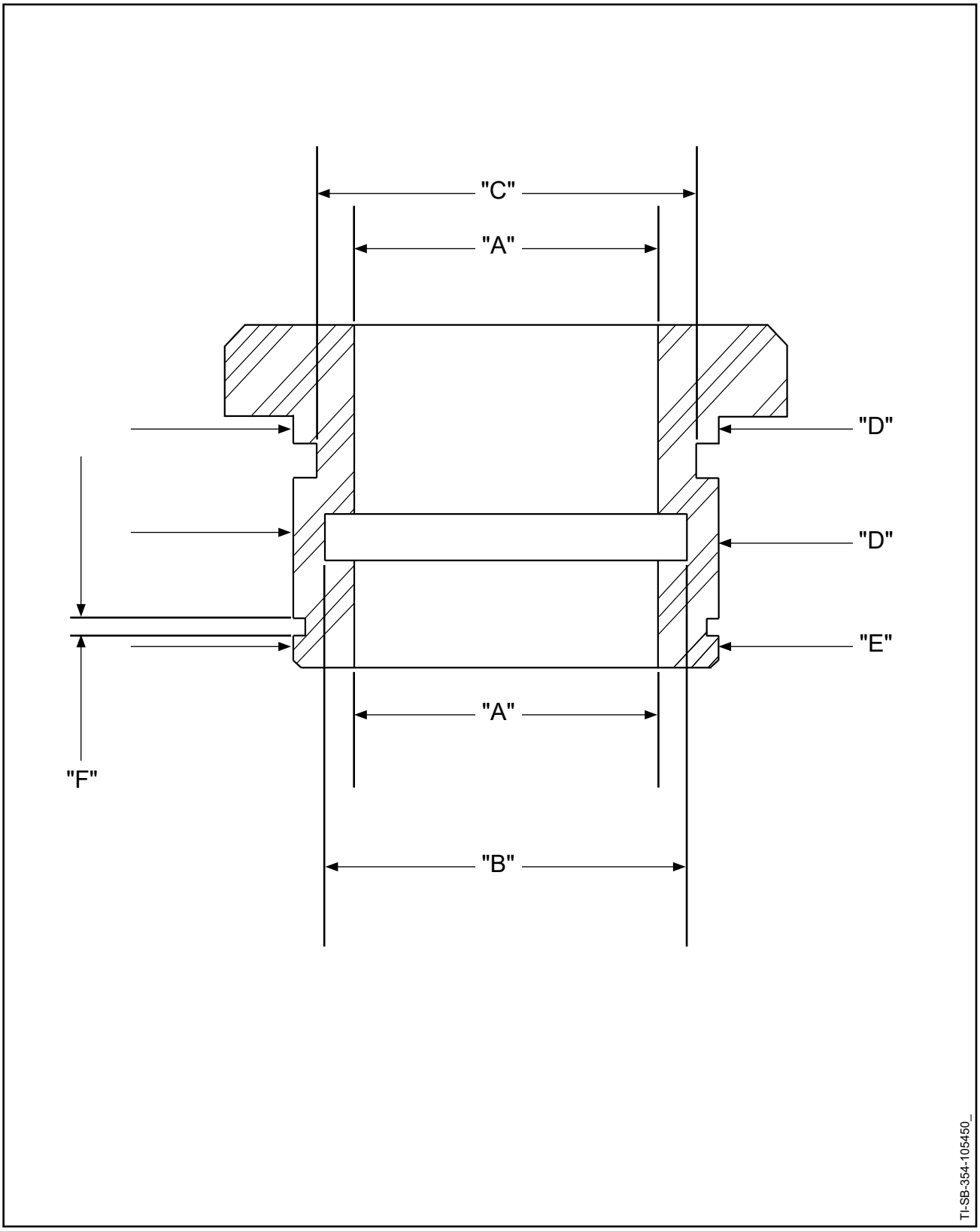
Inspect	Serviceable Limits	Corrective Action
I. FORK AND FORK INSERT (Item 430 and Item 440) Refer to Figure 5-10.		
(1) Using plastic media cleaning, remove the Xylan® coating from the channels of the fork. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). When all the inspections are satisfactory, reinstall the Xylan® coating to the channels of the fork in accordance with the section "Applying Xylan® Coating to the C-1054 6-Way Fork Unit" in the Special Adhesive and Bonding chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).		
(2) Visually examine the fork for corrosion product or pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. If the fork is damaged, measure the damage. The maximum depth of pitting is 0.005 inch (0.12 mm). The maximum permitted total area of damage is 0.5 square inch (322 square mm). The maximum permitted diameter of an individual pit is 0.032 inch (0.81 mm). A maximum of 10 non-linear pits within a 1 square inch (645 square mm) area are permitted. Linear pitting is not permitted.	Remove corrosion product using glass bead cleaning. Apply masking material to the carbide coating in the channels of the fork and to the fork insert (440). Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the pitting cannot be removed or if the pitting is greater than the permitted serviceable limits, replace the fork.
(3) Visually examine the fork insert (440) for a tight bond to the fork.	The fork insert (440) must be tightly bonded to the fork.	If the fork insert (440) is not tightly bonded to the fork, return the fork to Hartzell Propeller Inc. for replacement of the fork insert (440).
(4) Visually examine the pitch change rod engagement threads of the fork insert (440) in the bore of the fork for damage.	One thread of total accumulated damage is permitted.	If the damage is greater than the permitted serviceable limits, return the fork to Hartzell Propeller Inc. for replacement of the fork insert (440).
(5) Visually examine the tapered part of the fork insert (440) for wear or damage.	If there is wear or damage, measure the depth of wear or damage. The maximum permitted depth of wear or damage is 0.003 inch (0.07 mm).	If the wear or damage is greater than the permitted serviceable limits, return the fork to Hartzell Propeller Inc. for replacement of the fork insert (440).

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
I.	FORK AND FORK INSERT, CONTINUED (Item 430 and Item 440) Refer to Figure 5-10.		
(6)	Visually examine the walls of the channel for carbide coating (black) coverage.	There must be complete carbide coating coverage.	If the carbide coating coverage is not complete, replace the fork.
(7)	Visually examine the external surfaces, not including the fork channel surfaces and the fork insert (440) for wear or damage.	If there is wear or damage, measure the depth of wear or damage. The maximum permitted depth of wear or damage is 0.005 inch (0.12 mm). Pushed-up material is not permitted.	Using an abrasive pad CM47 or equivalent, remove pushed-up material. If the wear or damage is greater than the permitted serviceable limits, replace the fork.
(8)	Measure the width of each channel in the fork.	The maximum permitted width of each channel is 0.754 inch (19.15 mm).	If the width of a channel is greater than the permitted serviceable limits, replace the fork.
(9)	Penetrant inspect the fork in accordance with the Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A relevant indication is not permitted.	If there is a relevant indication, replace the fork.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
J. HUB UNIT (Item 500)		
(1) Complete the inspection of the hub in accordance with the Aluminum Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).		
(2) Instructions for modification to install a new pitch change rod hub bushing in the pitch change rod bore on the engine side hub half of a D-1066 propeller hub, refer to the section "Modifying a D-1066 Hub to Use a 105450 Pitch Change Rod Hub Bushing" in the Repair chapter of this manual.		
(3) If the hub unit uses a 105450 pitch change rod bushing (550), inspect the engine-side bore in accordance with the section "D-1066-1 Aluminum Hub Engine Side Interface with 105450 Bushing" in this chapter.		



Hub Bushing P/N 105450
Figure 5-11

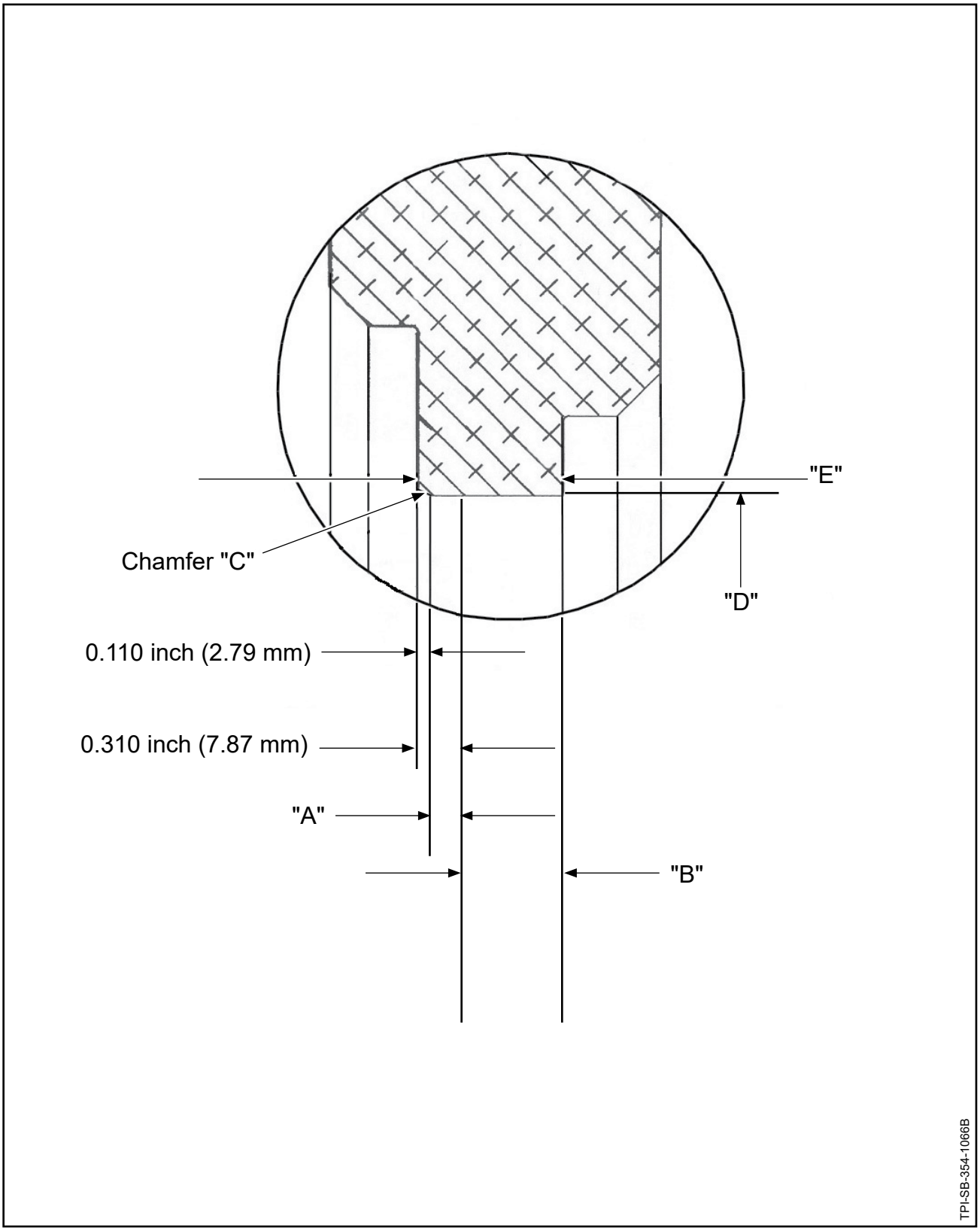
Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
K.	HUB BUSHING, ROD, PART NUMBER 105450 (Item 550) Refer to Figure 5-11.		
(1)	Visually examine and measure the pitch change rod bushing ID ("A").	Minor scratches are permitted. The maximum permitted ID is 1.252 inch (31.80 mm)	If there are scratches or damage greater than the permitted serviceable limits or the ID is greater than the permitted serviceable limits, replace the pitch change rod bushing.
(2)	Visually examine and measure the pitch change rod bushing ID O-ring groove ("B").	A smooth surface finish is required. The maximum permitted ID is 1.496 inch (37.99 mm).	If ID O-ring groove surface is greater than the permitted serviceable limits or the ID is greater than the permitted serviceable limits, replace the pitch change rod bushing.
(3)	Visually examine the side walls of the ID O-ring groove ("B").	Minor scratches are permitted.	If there are scratches or damage greater than the permitted serviceable limits, replace the pitch change rod bushing.
(4)	Visually examine and measure the pitch change rod bushing OD O-ring groove ("C").	A smooth surface finish is required. The minimum permitted OD is 1.558 inch (39.58 mm).	If OD O-ring groove surface is greater than the permitted serviceable limits or the OD is less than the permitted serviceable limits, replace the pitch change rod bushing.
(5)	Visually examine the side walls of the OD O-ring groove("C").	Minor scratches are permitted.	If there are scratches or damage greater than the permitted serviceable limits, replace the pitch change rod bushing.
(6)	Visually examine and measure the pitch change rod bushing OD between the retaining ring groove and the end of the part that is away from the shoulder ("E").	Minor scratches and some scoring are permitted. The minimum permitted OD is 1.743 inch (44.28 mm).	If a scratch or scoring is greater than the permitted serviceable limits or the OD is less than the permitted serviceable limits, replace the pitch change rod bushing.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
K.	HUB BUSHING, ROD, PART NUMBER 105450, CONTINUED (Item 550) Refer to Figure 5-11.		
(7)	Visually examine and measure the pitch change rod bushing OD between the retaining ring groove and the shoulder. ("D").	Minor scratches are permitted. The minimum permitted OD is 1.748 inch (44.40 mm).	If a scratch is greater than the permitted serviceable limits or the OD is less than the permitted serviceable limits, replace the pitch change rod bushing.
(8)	Measure the width of the pitch change rod bushing retaining ring groove ("F").	The maximum permitted width is 0.076 inch (1.93 mm).	If the width is greater than the permitted serviceable limit, replace the pitch change rod bushing.
(9)	Visually examine each shoulder next to the pitch change rod bushing retaining ring groove ("F").	The maximum permitted total accumulated damage for each shoulder is 25% of the circumference.	If the damage is greater than the permitted serviceable limit, replace the pitch change rod bushing.
(10)	Visually examine all remaining surfaces for damage.	Damage is not permitted to interfere with the fit or function of the pitch change rod bushing.	If the damage is greater than the permitted serviceable limit, replace the pitch change rod bushing.

(This page is intentionally blank.)



Hub-to-Bushing Interface Inspection
Figure 5-12

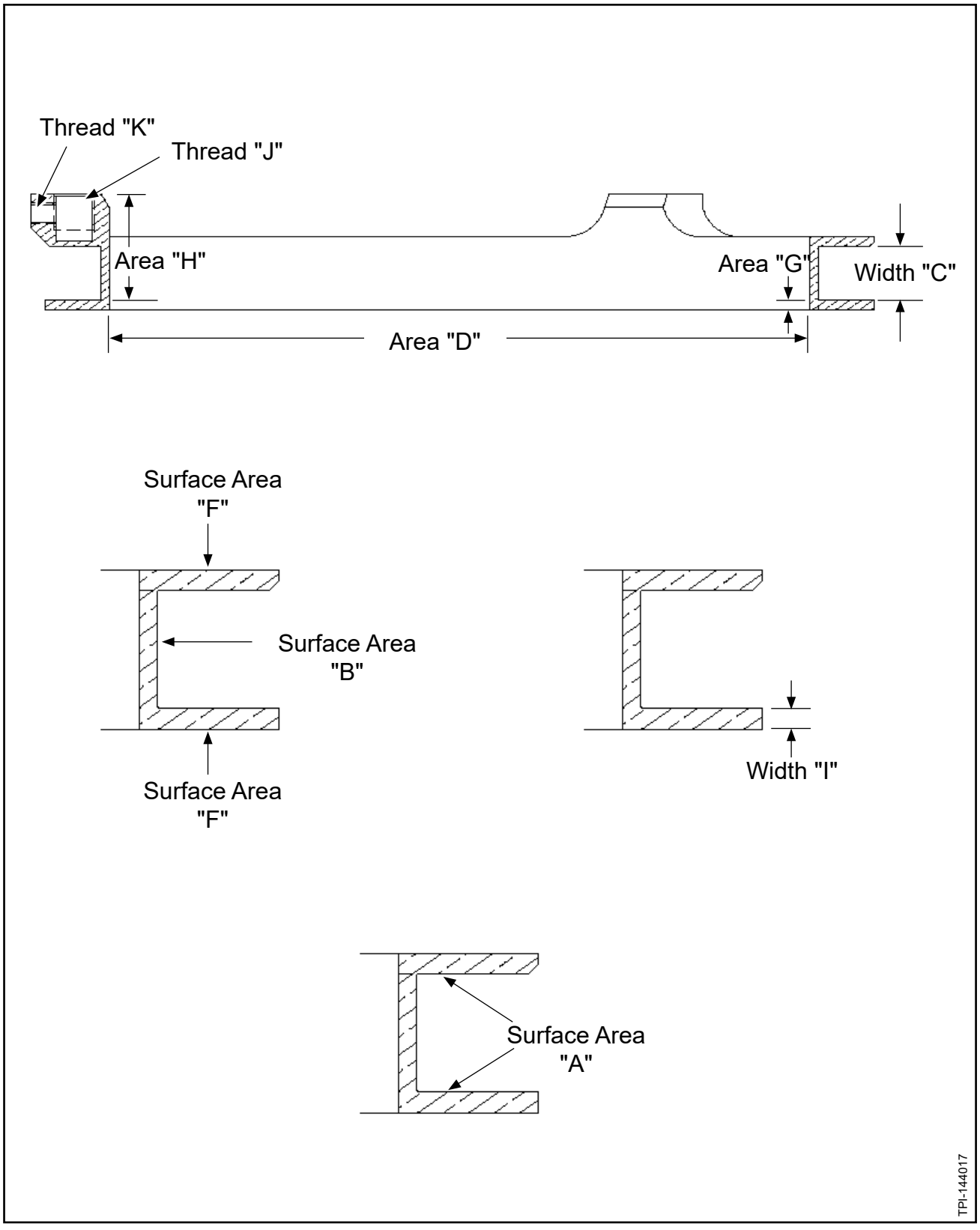
Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
L.	D-1066-1 ALUMINUM HUB ENGINE SIDE INTERFACE WITH 105450 BUSHING (Item 500) Refer to Figure 5-12.		
(1)	Visually examine the pitch change rod bore O-ring interface area ("A").	A smooth surface is required.	If the wear or damage is greater than the permitted serviceable limits, replace the hub.
(2)	Visually examine the pitch change rod bore ("B").	A rough surface finish or imperfections are permitted to a maximum depth of 0.002 inch (0.050 mm). The maximum permitted diameter of an individual pit is 0.0625 inch (1.588 mm). The maximum permitted depth of an individual pit is 0.002 inch (0.050 mm). Linear corrosion pitting is not permitted. Damage is not permitted to be greater than 25% of the total available inside diameter bore area.	If wear or damage is greater than the permitted serviceable limits, replace the aluminum hub.
(3)	Visually examine the 1.800 +/- 0.010 X 40 degree chamfer for damage ("C").	Damage that interferes with the installation of the pitch change rod bushing OD O-ring and could damage the O-ring is not permitted.	Remove damage using an abrasive pad such as CM47, or equivalent. The maximum permitted length of the chamfer along the bore centerline is 0.110 inch (2.79 mm). If damage is greater than the permitted serviceable limits or the corrective action limits, replace the aluminum hub.
(4)	Measure the ID of the hub shoulder that encircles the 105450 pitch change rod hub bushing when it is installed ("D").	The maximum permitted ID of the hub shoulder is 1.757 inch (44.62 mm).	If the ID is greater than the permitted serviceable limits, replace the aluminum hub.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
L.	D-1066-1 ALUMINUM HUB ENGINE SIDE INTERFACE WITH 105450 BUSHING, CONTINUED (Item 380) Refer to Figure 12.		
	(5) Measure the width of the hub shoulder that fits between the 105450 pitch change rod hub bushing shoulder and the retaining ring groove. This includes any wear caused by the shoulder of the 105450 pitch change rod hub bushing or the retaining ring ("E").	The minimum permitted width of the hub shoulder is 0.798 inch (20.27 mm).	If the width of the hub shoulder is less than the permitted serviceable limits, replace the hub.

(This page is intentionally blank.)



C-1055 Beta Ring
Figure 5-13

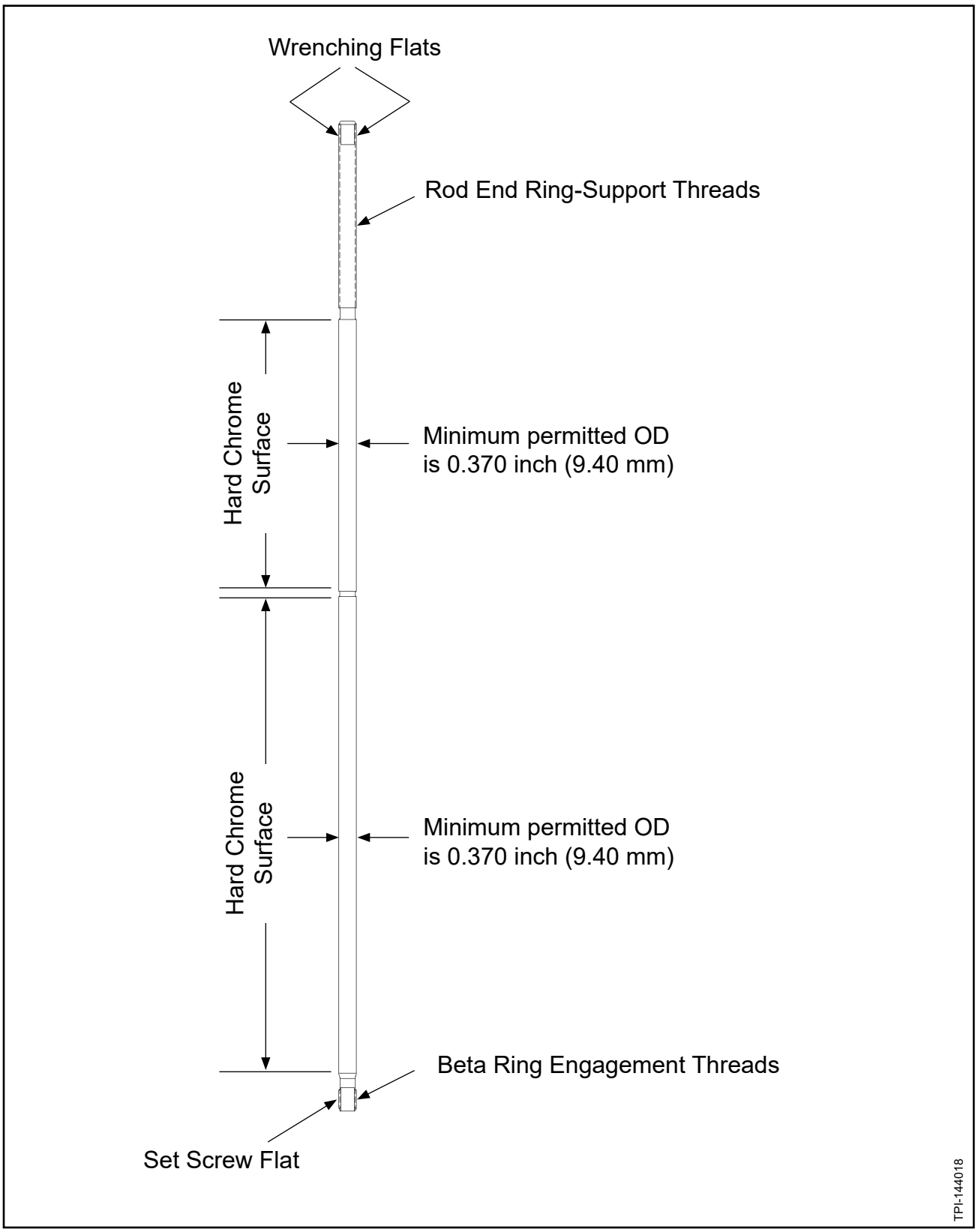
Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
M. BETA RING (Item 700) Refer to Figure 5-13.		
(1) Visually examine the beta ring for a crack.	A crack is not permitted.	If there is a crack, replace the beta ring.
(2) Visually examine the bottom of the threaded holes for impressions made by the beta rods.	The maximum permitted depth of an impression in this area is 0.004 inch (0.10 mm).	If the depth of an impression is greater than the permitted serviceable limits, replace the beta ring.
(3) Visually examine the sidewalls of the groove for any scratches (Area "A").	The maximum permitted depth of a scratch is 0.004 inch (0.10 mm). Pushed-up material caused by scratches is not permitted.	If there is a scratch that is 0.004 inch (0.10 mm) deep or less, polish using emery cloth to remove pushed-up material adjacent to the scratch only. If the depth of the scratch is greater than the permitted serviceable limits, replace the beta ring.
(4) Visually examine the back wall of the beta ring groove for any scratches or gouges (Area "B").	A scratch or gouge must be repaired. The maximum permitted depth of repair is 0.007 inch (0.17 mm).	Blend a scratch or a gouge by polishing using emery cloth. If the depth of the damage or of the repair is greater than the permitted serviceable limits, replace the beta ring.
(5) Measure the width of the groove in the beta ring (Width "C").	The maximum permitted width is 0.510 inch (12.95 mm).	If the width is greater than the permitted serviceable limits, replace the beta ring.
(6) Measure the ID of the beta ring (Area "D").	The maximum permitted ID of the beta ring is 6.557 inches (166.54 mm).	If the ID is greater than the permitted serviceable limits, replace the beta ring.
(7) Measure the width of the non-lug side flange on the beta ring. Measure a minimum of four separate points on the flange (Width "I").	The minimum permitted width at any one point on the flange is 0.073 inch (1.86 mm).	If the width is less than the permitted serviceable limits, replace the beta ring.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
M.	BETA RING, CONTINUED (Item 700) Refer to Figure 5-13.		
(8)	Measure any depression or gouge on the outside surface of the beta ring (Area "F").	A depression or gouge must be removed. The maximum permitted depth for a depression or gouge is 0.007 inch (0.17 mm).	Using emery cloth, blend a depression or a gouge by polishing. If the depth of the damage or of the repair is greater than the permitted serviceable limits, replace the beta ring.
(9)	Visually examine the area beginning on the side opposite the lugs, extending 0.1875 inch (4.763 mm) toward the lug side of the inner surface as shown ("Area G").	A groove or scratch that is 0.007 inch (0.17 mm) deep or less must be removed. A groove or scratch that is deeper than 0.007 (0.17 mm) is cause for retirement of the beta ring.	If there is a groove or scratch that is 0.007 inch (0.17 mm) deep or less, polish the inner surface using emery cloth, maintaining a maximum ID of 6.557 inches (166.54 mm). See "M.(6)". If damage is greater than the permitted serviceable limits or corrective action, replace the beta ring.
(10)	Visually examine the inner surface, not including "Area G" above, but including the inner surface of the lug areas, for grooves and scratches ("Area H").	A groove or scratch that is equal to or less than 0.007 inch (0.17 mm) deep does not require repair.	If there is a groove or scratch that is deeper than 0.007 inch (0.17 mm), polish the inner surface using emery cloth, maintaining a maximum ID of 6.557 inches (166.54 mm). See "M.(6)" above. If damage is greater than the permitted serviceable limits or corrective action, replace the beta ring.
(11)	Visually examine the three threaded holes "J" for damage.	A maximum of one half thread of total accumulated damage is permitted.	If the damage is greater than the permitted serviceable limits, replace the beta ring.
(12)	Visually examine the three threaded holes "K" for damage.	A maximum of one half thread of total accumulated damage is permitted.	If the damage is greater than the permitted serviceable limits, replace the beta ring.
(13)	Penetrant inspect the beta ring in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Pre-penetrant etch is not required.	A relevant indication is not permitted.	If there is a relevant indication, replace the beta ring.

(This page is intentionally blank.)



Beta Rod
Figure 5-14

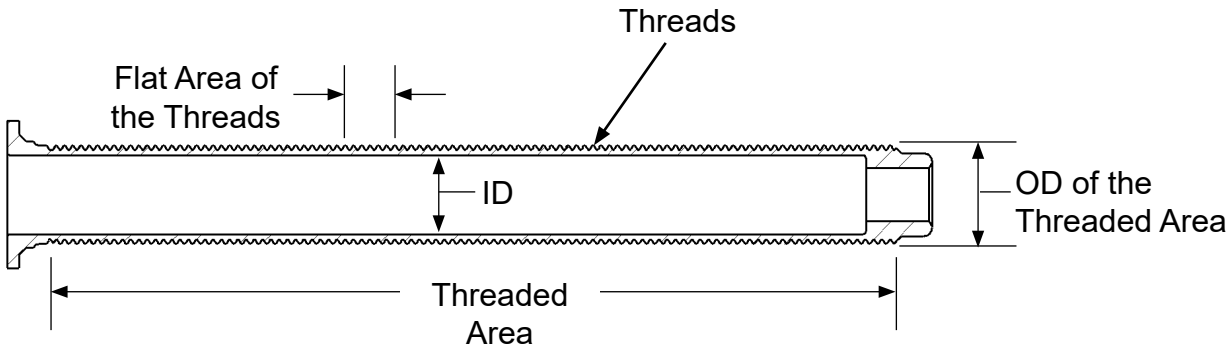
Component Inspection Criteria
Table 5-1

Inspect		Serviceable Limits	Corrective Action
N.	BETA ROD (Item 720) Refer to Figure 5-14.		
(1)	Visually examine each beta rod for bending or distortion.	Bending or distortion is not permitted.	If there is bending or distortion, replace the beta rod.
(2)	Visually examine each beta rod for damage that penetrates the hard chrome surface.	Damage must not penetrate the hard chrome surface.	If the damage is greater than the permitted serviceable limits, replace the beta rod.
(3)	Visually examine the beta ring engagement threads for damage or wear.	Damage or wear up to 90 degrees of circumference for each thread is permitted. A maximum of one half thread of total accumulated damage or wear is permitted.	If the damage or wear is greater than the permitted serviceable limits, replace the beta rod.
(4)	Visually examine the rod end ring-support threads for damage or wear.	Damage or wear up to 90 degrees of circumference for each thread is permitted. A maximum of one half thread of total accumulated damage or wear is permitted.	If the damage or wear is greater than the permitted serviceable limits, replace the beta rod.
(5)	Visually examine the cadmium plating coverage on the threaded areas of the beta rod.	Except for a few minor scratches and corners with cadmium plating missing, cadmium plating must completely cover the threaded areas of the beta rod.	If the cadmium plating coverage is less than the permitted serviceable limits, replate and bake the beta rod in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(6)	Measure the OD of each beta rod.	Refer to Figure 5-14 for the applicable limits.	If the OD is less than the permitted serviceable limits, replace the beta rod.
(7)	Visually examine the wrenching flats of the beta rod.	Sufficient flat must exist without damage to permit an open-end wrench to engage.	If a wrench will not engage, replace the beta rod.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
N.	BETA ROD, CONTINUED (Item 720) Refer to Figure 5-14.		
	(8) Visually examine the set screw flat of the beta rod.	Sufficient flat must exist without damage to permit engagement by the beta ring set screw to prevent beta rod rotation in the beta ring.	If the damage is greater than the permitted serviceable limits, replace the beta rod.
	(9) Magnetic particle inspect each beta rod in accordance with the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). CAUTION: DO NOT REMOVE THE HARD CHROME PLATING TO DO THIS INSPECTION.	A relevant indication is not permitted.	If there is a relevant indication, replace the beta rod.

(This page is intentionally blank.)



Beta Spring Retainer
Figure 5-15

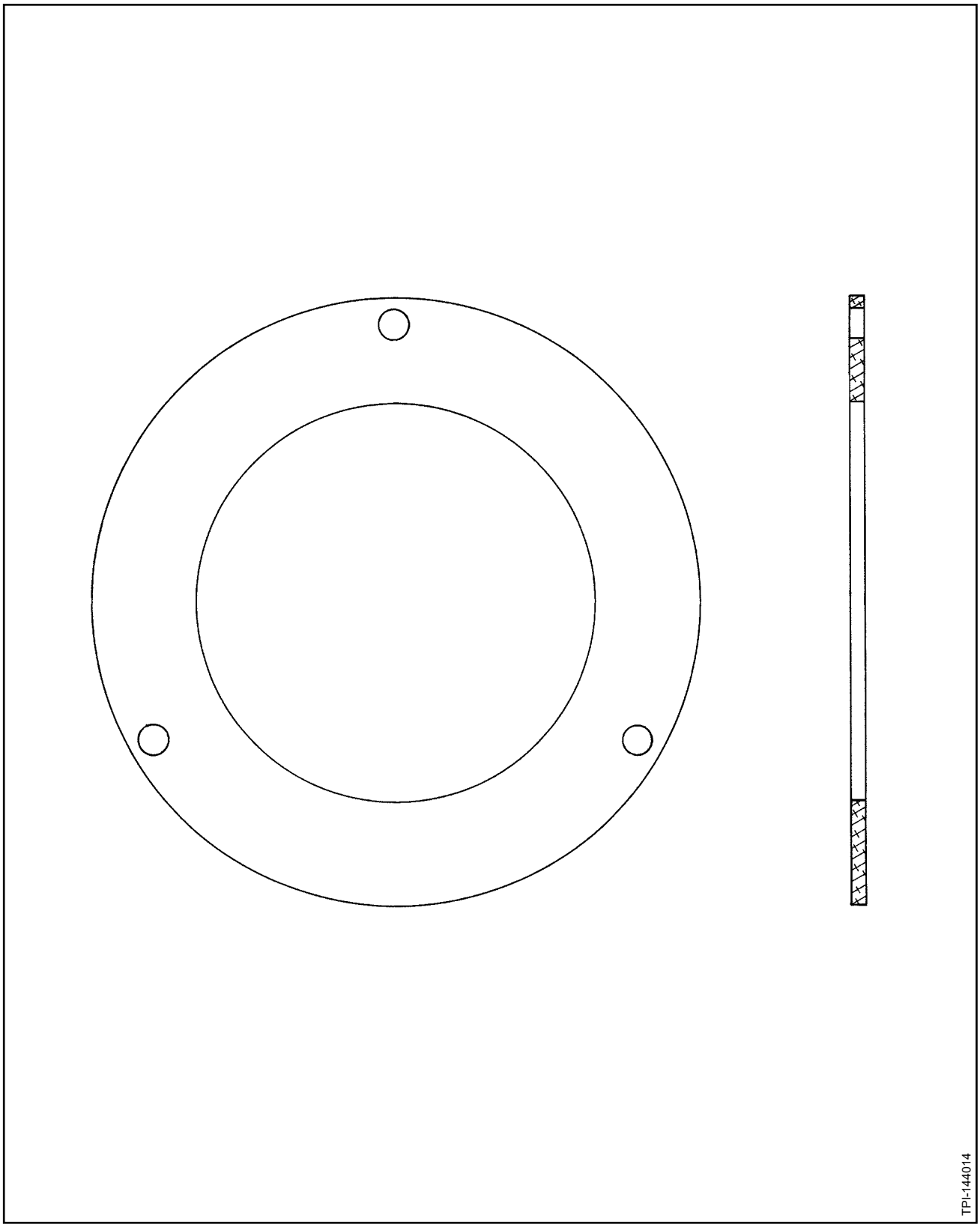
Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
O.	BETA SPRING RETAINER (Item 770) Refer to Figure 5-15.		
(1)	Visually examine the beta spring retainer for corrosion product and pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Remove corrosion product with glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed or if the depth of pitting is greater than the permitted serviceable limits, replace the beta spring retainer.
(2)	Visually examine the threads for damage.	Where the spring retainer touches the piston insert (120), the maximum permitted linear length of a flat area of the threads is 0.50 inch (12.7 mm). In all other areas of the threads, one thread total accumulated damage is permitted.	If the damage is greater than the permitted serviceable limits, replace the beta spring retainer.
(3)	Visually examine the beta spring retainer for damage in the remaining areas.	The maximum permitted depth of damage is 0.005 inch (0.12 mm). Damage must not interfere with installation of mating parts or the operation of the beta system.	If the depth of damage is greater than the permitted serviceable limits, replace the beta spring retainer.
(4)	Except in the flat area of the threads, measure the OD of the threaded area.	Except in the flat area of the threads, the minimum permitted OD is 0.735 inch (18.67 mm).	Except in the flat area of the threads, if the OD is less than the permitted serviceable limits, replace the beta spring retainer.
(5)	Measure the ID of the beta spring retainer.	The maximum permitted ID of the beta spring retainer is 0.600 inch (15.24 mm).	If the ID is greater than the permitted serviceable limits, replace the beta spring retainer.
(6)	Visually examine the beta spring retainer for cadmium plating coverage.	In the flat area of the threads, cadmium plating may be missing. For all other areas, except for a few minor scratches and corners with cadmium plating missing, complete coverage is required.	If the coverage is less than the permitted serviceable limits, replate and bake the beta spring retainer in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
O.	BETA SPRING RETAINER, CONTINUED (Item 770) Refer to Figure 5-15.		
	(7) Magnetic particle inspect the beta spring retainer in accordance with the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A relevant indication is not permitted.	If there is a relevant indication, replace the beta spring retainer.

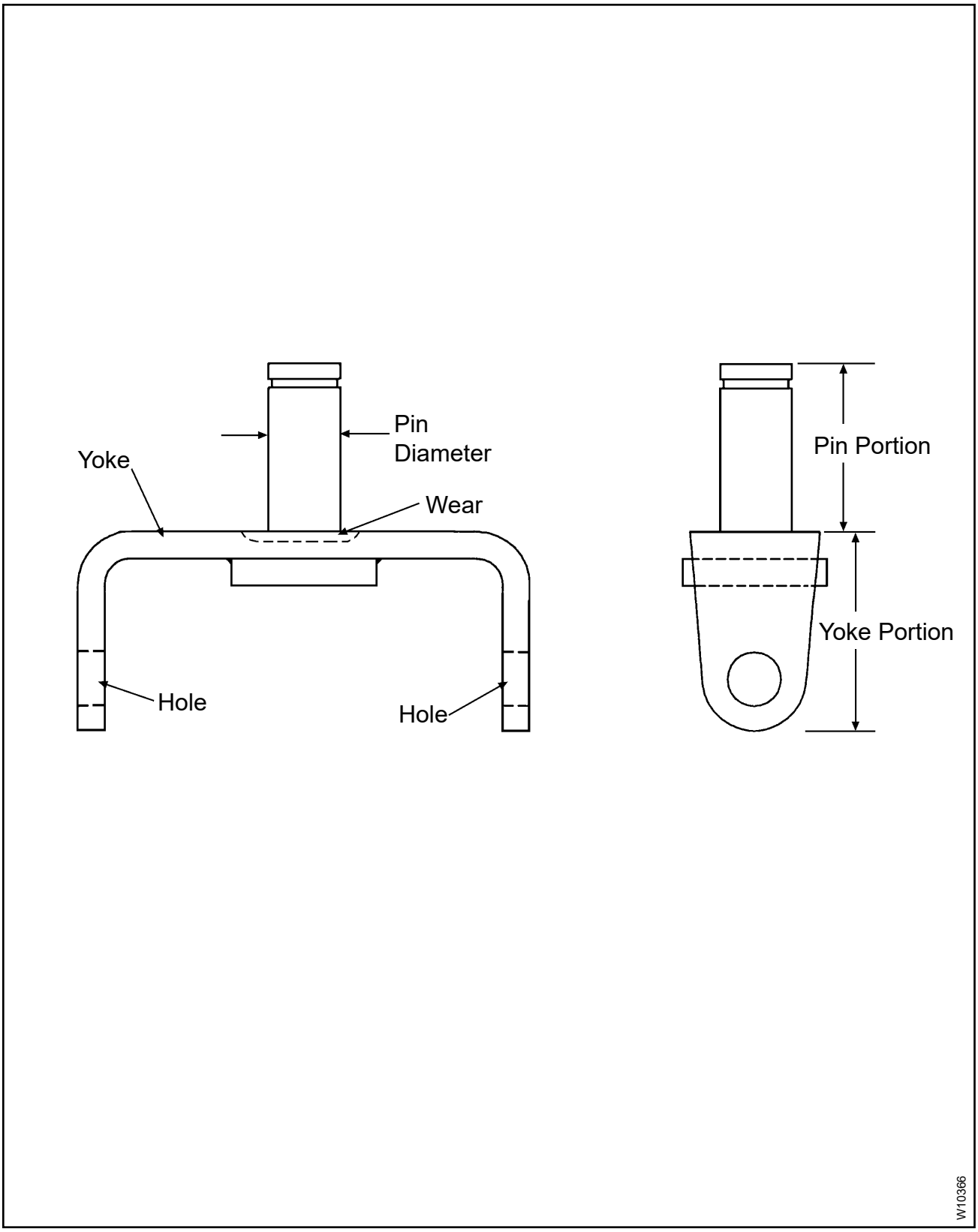
(This page is intentionally blank.)



Beta Rod Support Ring
Figure 5-16

Component Inspection Criteria
Table 5-1

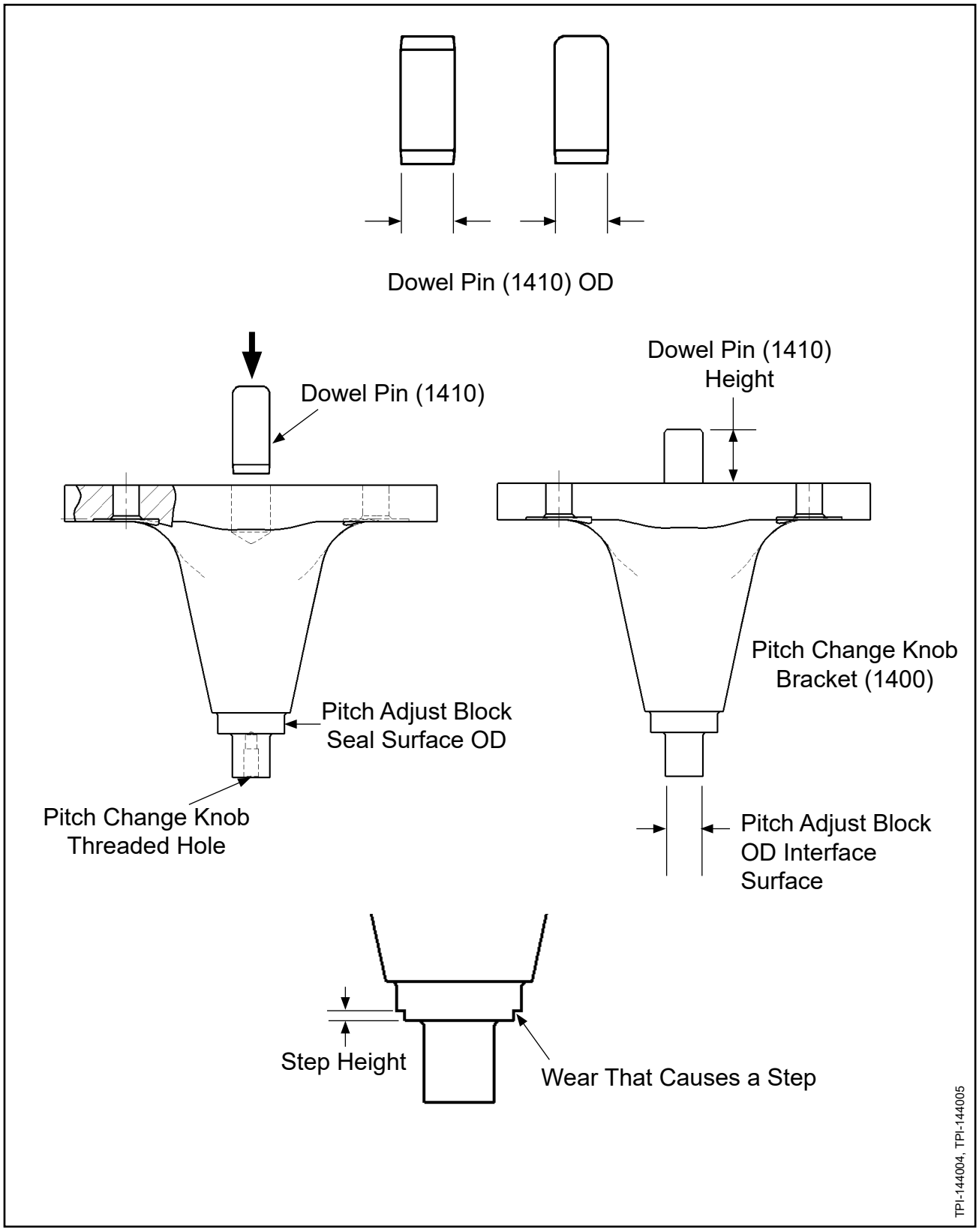
	Inspect	Serviceable Limits	Corrective Action
P.	BETA ROD SUPPORT RING (Item 820) Refer to Figure 5-16.		
(1)	Visually examine the beta rod support ring for corrosion product and pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted area of pitting is 10% of the beta rod support ring surface. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed or the depth of pitting is greater than the permitted serviceable limits, replace the beta rod support ring.
(2)	Visually examine the beta rod support ring for wear.	If there is wear, measure the depth of wear. The maximum permitted depth of wear is 0.005 inch (0.12 mm).	If the wear is greater than the permitted serviceable limits, replace the beta rod support ring.
(3)	Visually examine the beta rod support ring for flatness.	The beta rod support ring must be flat in accordance with a visual examination. Measuring the flatness is not required.	If the flatness of the beta support ring is not within the permitted serviceable limits, replace the beta rod support ring.
(4)	Visually examine the beta rod support ring for anodize coverage.	A few scratches and corners with anodize missing are permitted; otherwise, complete anodize coverage is required.	If the anodize coverage is less than the permitted serviceable limits, anodize the beta rod support ring in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Yoke Unit
Figure 5-17

Component Inspection Criteria
Table 5-1

	Inspect		Serviceable Limits	Corrective Action
Q.	YOKE UNIT (Item 910) Refer to Figure 5-17.			
	(1)	Visually examine the yoke unit for corrosion product and pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted depth of pitting is 0.005 inch (0.12 mm) in the yoke portion only. Pitting is not permitted in the pin portion.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed or if the pitting is greater than the permitted serviceable limits, replace the yoke unit.
	(2)	Visually examine the yoke unit for damage.	The maximum permitted depth of damage is 0.005 inch (0.12 mm) in the yoke portion only. Light scratches are permitted in the pin portion. Material that is raised above the normal diameter of the pin is not permitted. Damage must not interfere with the mating part.	Remove material that is raised above the normal diameter of the pin with an abrasive pad CM47 or equivalent. If the damage is greater than the permitted serviceable limits, replace the yoke unit.
	(3)	Measure the diameter of the pin.	The minimum permitted diameter of the pin is 0.2475 inch (6.287 mm)	If the diameter of the pin is less than the permitted serviceable limits, replace the yoke unit.
	(4)	Measure the ID of each of the two holes in the yoke portion.	The maximum permitted ID of a hole is 0.1895 inch (4.813 mm).	If the ID of either hole is greater than the permitted serviceable limits, replace the yoke unit.
	(5)	Examine the yoke portion of the yoke unit for wear in the area where the pin and yoke meet.	The maximum permitted depth of wear is 0.005 inch (0.12 mm).	If the depth of wear is greater than the permitted serviceable limits, replace the yoke unit.
	(6)	Visually examine the yoke unit for cadmium plating coverage.	A few scratches and corners with cadmium plating missing is permitted. In all other areas, complete coverage of the cadmium plating is required.	If the cadmium plating coverage is less than the permitted serviceable limits, replate the yoke unit in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Dowel Pin and Pitch Change Knob Bracket
Figure 5-18

Component Inspection Criteria
Table 5-1

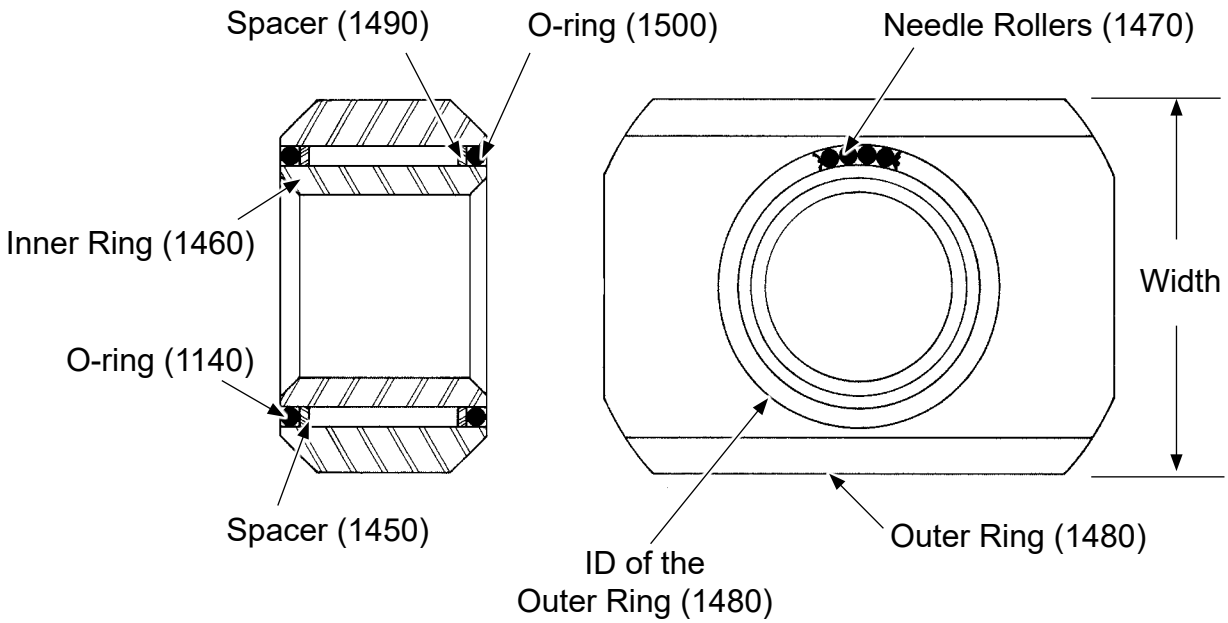
	Inspect	Serviceable Limits	Corrective Action
R.	PITCH CHANGE KNOB BRACKET (Item 1400) Refer to Figure 5-18.		
	(1) If dowel pin removal is not required, apply masking material to protect the dowel pin from penetrant inspection materials. Dowel pin extension from the pitch change knob bracket base must meet the permitted serviceable limits for this part given in this section.		
	(2) Visually examine the pitch adjust block OD interface surface for corrosion product, pitting, or scratches.	Corrosion product or pitting is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. Pitch adjust block impressions of any depth are not permitted. Minor scratches less than 0.001 inch (0.025 mm) deep are permitted. Sharp edges or pushed up edges from scratches are not permitted.	Using an abrasive pad CM47 or equivalent, remove corrosion product, sharp edges, and pushed-up edges. If scratches are deeper than the permitted serviceable limits, replace the pitch change knob bracket. If the corrosion product cannot be removed or if there is pitting or pitch adjust block impressions, replace the pitch change knob bracket.
	(3) Measure the OD of the pitch adjust block OD interface surface.	The minimum permitted OD is 0.359 inch (9.11 mm).	If the OD is less than the permitted serviceable limits, replace the pitch change knob bracket.
	(4) Visually examine the pitch adjust block seal surface OD of the pitch change knob bracket for scratches, corrosion product, or pitting.	Corrosion product or pitting is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. Minor scratches less than 0.001 inch (0.025 mm) deep are permitted. Sharp or pushed up edges from scratches are not permitted.	Using an abrasive pad CM47 or equivalent, remove corrosion product, sharp edges, and pushed-up edges. If scratches are deeper than the permitted serviceable limits, replace the pitch change knob bracket. If the corrosion product cannot be removed or if there is pitting or pitch adjust block impressions, replace the pitch change knob bracket.
	(5) Measure the pitch adjust block seal surface OD of the pitch change knob bracket.	The minimum permitted OD is 0.635 inch (16.12 mm).	If the OD is less than the permitted serviceable limits, replace the pitch change knob bracket.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
R.	PITCH CHANGE KNOB BRACKET, CONTINUED (Item 1400) Refer to Figure 5-18.		
	(6) Measure step height of the wear on the pitch adjust block seal surface OD of the pitch change knob bracket.	The maximum permitted step height is 0.013 inch (0.33 mm).	If the step height of the wear on the pitch adjust block seal surface OD of the pitch change knob bracket is greater than the permitted serviceable limits, replace the pitch change knob bracket.
	(7) Visually examine the pitch change knob bracket for corrosion product and pitting. NOTE: This inspection and repair does not include the pitch adjust block OD interface surface or the pitch adjust block seal surface OD.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. If the pitch change knob bracket has pitting, measure the depth, diameter, and area of pitting. The maximum permitted depth of pitting is 0.003 inch (0.07 mm). The maximum permitted total area of pitting is 0.500 square inch (322 square mm). The maximum permitted diameter of an individual pit is 0.032 inch (0.81 mm). A maximum of 10 non-linear pits within 1 square inch (645 square mm) area are permitted. Linear pitting is not permitted.	Do not glass bead clean the pitch adjust block surface OD or the pitch adjust block OD interface surface. For all surfaces of the pitch change knob bracket other than those listed above, remove corrosion product using glass bead cleaning or local polishing using emery cloth. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). The maximum permitted depth for repair is 0.005 inch (0.12 mm). The maximum permitted total area of repair is 1 sq. inch (645 sq. mm). For each hole used to attach the pitch change bracket to the blade, the maximum permitted repair is 25% of the surface area of the hole. Lightly polish to remove raised material or pushed up edge and blend into machined surfaces. If damage or repair is greater than the permitted serviceable limits or repair limits, replace the pitch change knob bracket.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
R.	PITCH CHANGE KNOB BRACKET, CONTINUED (Item 1400) Refer to Figure 5-18.		
(8)	Visually examine the pitch change knob bracket for nicks, scratches, or other damage. NOTE: This inspection and repair does not include the pitch adjust block OD interface surface or the pitch adjust block seal surface OD.	If the pitch change knob bracket is damaged, measure the damage. The maximum permitted depth of nicks, scratches, or other damage is 0.003 inch (0.07 mm). The maximum permitted total area of nicks, scratches, or other damage is 0.500 square inch (322 square mm) area. Raised material or edges of pushed up material on the surfaces that interface with other components are not permitted.	The maximum permitted depth of repair is 0.005 inch (0.12 mm). The maximum permitted total area of repair is 1 square inch (645 sq. mm). For each hole used to attach the pitch change bracket to the blade, the maximum permitted repair is 25% of the surface area of the hole. Using emery cloth, lightly polish to remove raised material or pushed up edge and blend into machined surfaces. If the damage or repair is greater than the permitted serviceable or repair limits, replace the pitch change knob bracket.
(9)	Measure the dowel pin height from the pitch change knob bracket base.	The minimum permitted height is 0.390 inch (9.91 mm). The maximum permitted height is 0.440 inch (11.17 mm).	If the dowel pin height is greater than the permitted height, press the pin into the bracket to the correct height. If dowel pin height is less than the permitted serviceable limits, replace the pin. The replacement pin must fit tightly.
(10)	If the dowel pin is removed, visually examine the dowel pin hole for corrosion product and pitting.	Corrosion product or pitting is not permitted.	If there is corrosion product or pitting, replace the pitch change knob bracket.
(11)	Visually examine the pitch change knob bracket threaded hole for corrosion product or damage.	A maximum of 3/4 of one thread total accumulated damage is permitted.	If the damage is greater than the permitted serviceable limits, replace the pitch change knob bracket.
(12)	Penetrant inspect the pitch change knob bracket in accordance with Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A relevant indication is not permitted.	If there is a relevant indication, replace the pitch change knob bracket.



Pitch Adjust Block
Figure 5-19

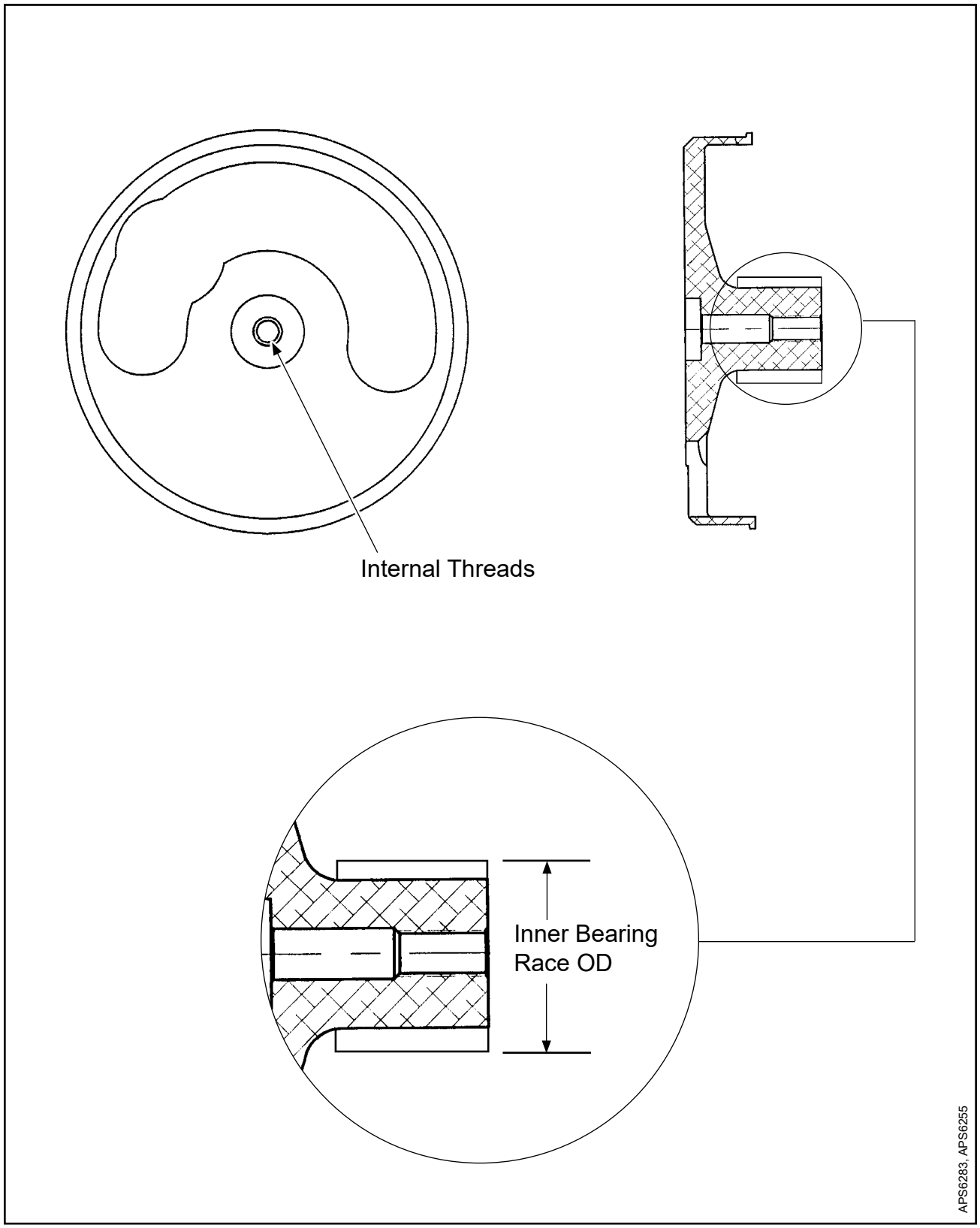
Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
S. BLOCK, PITCH ADJUST UNIT (Item 1430) Refer to Figure 5-19.		
(1) Make sure that the pitch change block adjust unit has been disassembled in accordance with the instructions in the Disassembly chapter of this manual and that each part has been cleaned using MEK CM106 or MPK CM219.		
(2) Visually examine the outer ring (1480) of the pitch change block unit for damage.	The maximum permitted depth of damage to the outer ring (1480) is 0.001 inch (0.025 mm).	If the depth of damage to the outer ring (1480) is greater than the permitted serviceable limits replace the pitch adjust block unit.
(3) Except for the ID of the outer ring (1480), visually examine the outer ring (1480) of the pitch adjust block unit for wear.	If there is wear, measure the width of the outer ring (1480). The minimum permitted width is 0.737 inch (18.72 mm).	If the width of the outer ring (1480) is less than the permitted serviceable limits, replace the pitch adjust block unit.
(4) Visually examine the ID of the outer ring (1480) of the pitch adjust block unit for wear.	Wear to the ID of the outer ring (1480) is not permitted.	If there is wear to the ID of the outer ring (1480), replace the pitch adjust block unit.
(5) Visually examine the inner ring (1460) of the pitch adjust block unit for damage.	The maximum permitted depth of damage to the inner ring (1460) is 0.001 inch (0.025 mm).	If the depth of damage to the inner ring (1460) is greater than the permitted serviceable limits, replace the pitch adjust block.
(6) Visually examine the inner ring (1460) of the pitch adjust block unit for wear.	If there is wear, measure the OD of the inner ring (1460). The minimum permitted width is 0.737 inch (18.72 mm).	If the width of the inner ring (1460) is less than the permitted serviceable limits replace the pitch adjust block unit.
(7) Visually examine each needle roller (1470) (quantity 40) of the pitch adjust block unit for damage or wear.	Damage or wear to the needle roller (1470) is not permitted.	If there is damage or wear to any needle roller (1470), replace the pitch adjust block unit.
(8) Visually examine each spacer (1450, 1490) of the pitch adjust block unit for damage or wear.	Damage or wear to the spacer (1450, 1490) is not permitted.	If there is damage or wear to the spacer (1450, 1490), replace the spacer (1450, 1490).

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
S.	BLOCK, PITCH ADJUST UNIT, CONTINUED (Item 1430) Refer to Figure 5-19.		
(9)	Magnetic particle inspect the inner ring (1460) in accordance with the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A relevant indication is not permitted.	If there is a relevant indication, replace the pitch adjust block.
(10)	Magnetic particle inspect the outer ring (1480) in accordance with the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A relevant indication is not permitted.	If there is a relevant indication, replace the pitch adjust block.

(This page is intentionally blank.)



Preload Plate Assembly
Figure 5-20

Component Inspection Criteria
Table 5-1

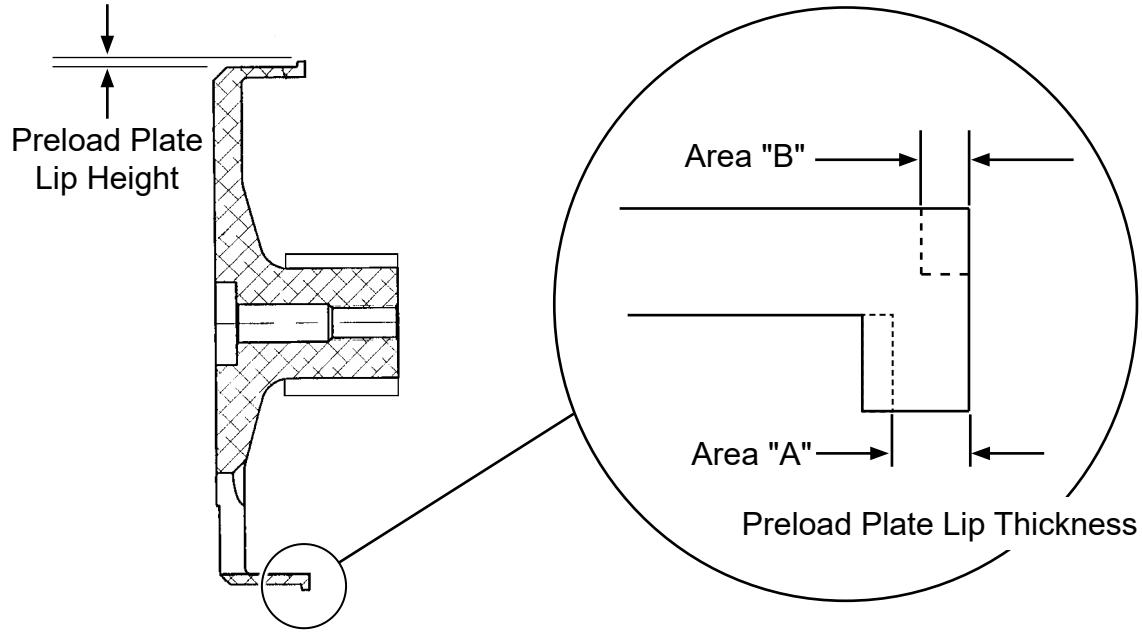
Inspect	Serviceable Limits	Corrective Action
T. PRELOAD PLATE ASSEMBLY (Item 1540) Refer to Figure 5-20.		
(1) Visually examine the aluminum part of the preload plate assembly for corrosion product.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits.	Mask the internal threads then remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the preload plate assembly.
(2) Visually examine the aluminum part of the preload plate assembly for pitting.	The maximum permitted depth of pitting is 0.004 inch (0.10 mm).	Pitting may be removed by polishing using an abrasive pad CM47 or equivalent, up to 0.007 inch (0.17 mm) deep. If the depth of the pitting or polishing is greater than the permitted serviceable limits, replace the preload plate assembly.
(3) Visually examine the internal threads for damage.	A maximum of two threads of total accumulated damage are permitted.	If the damage is greater than the permitted serviceable limits, replace the preload plate assembly.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
T. PRELOAD PLATE ASSEMBLY, CONTINUED (Item 1540) Refer to Figure 5-21.		
(4) Visually examine the OD of the inner bearing race (1550) for corrosion product, brinelling, pitting, and damage.	Corrosion product is not permitted. If there is corrosion, remove it in accordance with the corrective action repair limits. Raised material is not permitted. The maximum permitted depth of brinelling is 0.003 inch (0.07 mm). The maximum permitted depth of pitting and damage is 0.005 inch (0.12 mm). The maximum permitted total area of brinelling, pitting, and damage is 5%.	Mask the internal threads then remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Polish raised material using abrasive pad CM47 or equivalent. If corrosion product cannot be removed, or if raised material, brinelling, pitting, or damage of the inner bearing race is greater than the permitted serviceable limits, replace the preload plate assembly.
(5) Measure the OD of the inner bearing race (1550).	The minimum permitted OD is 1.124 inches (28.55 mm).	If the OD is less than the permitted serviceable limits, replace the preload plate assembly.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
T. PRELOAD PLATE ASSEMBLY, CONTINUED (Item 1540) Refer to Figure 5-21.		
(6) If the inner bearing race (920) is removed, visually examine the preload plate spindle for corrosion product, raised material, and damage.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. Raised material is not permitted. The maximum permitted depth of damage is 0.004 inch (0.10 mm).	Mask the internal threads then remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Polish raised material using abrasive pad CM47 or equivalent. If corrosion product cannot be removed, or if raised material or damage to the preload plate spindle is greater than the permitted serviceable limits, replace the preload plate assembly.



Lip Thickness in Area "A"	Maximum Permitted Depth of Damage in Area "B"
0.060 inch (1.53 mm)	0.013 inch (0.33 mm) or less
0.061 inch (1.55 mm)	0.014 inch (0.35 mm)
0.062 inch (1.58 mm)	0.015 inch (0.38 mm)
0.063 inch (1.61 mm)	0.016 inch (0.40 mm)
0.064 inch (1.63 mm)	0.017 inch (0.43 mm)
0.065 inch (1.66 mm)	0.018 inch (0.45 mm)
0.066 inch (1.68 mm)	0.019 inch (0.48 mm)
0.067 inch (1.71 mm) or greater	0.020 inch (0.50 mm)

Example 1: Lip thickness in Area "A" is greater than 0.063 inch (1.61 mm)
Depth of damage in Area "B" is 0.016 inch (0.40 mm).
Preload plate is within permitted serviceable limits

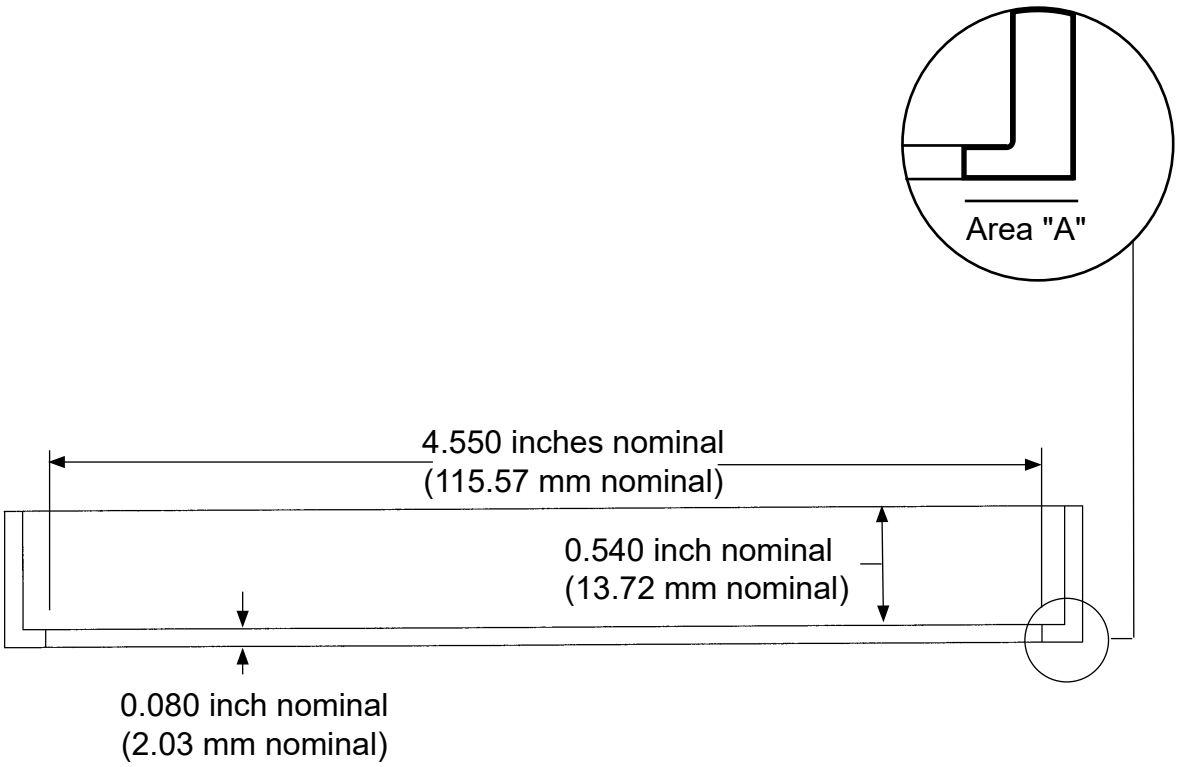
Example 2: Lip thickness in Area "A" is less than 0.063 inch (1.61 mm)
Depth of damage in Area "B" is 0.018 inch (0.45 mm)
Damage is more than permitted serviceable limits,
replace the preload plate.

APS6283, APS6284

Preload Plate Lip Measurement
Figure 5-21

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
T. PRELOAD PLATE ASSEMBLY, CONTINUED (Item 1540) Refer to Figure 5-21.		
(7) Visually examine the preload plate lip for damage. If the lip is damaged, measure the height.	The minimum permitted lip height is 0.040 inch (1.02 mm).	Remove any rough edges or evidence of fretting. If damage or repair is greater than the permitted serviceable limits, or the lip height is less than the permitted serviceable limits, replace the preload plate assembly.
(8) Visually examine the preload plate lip for damage. If the lip is damaged, measure the lip thickness.	The minimum lip thickness in Area "A" is 0.060 inch (1.53 mm). The maximum permitted depth of damage in Area "B" of the lip of the preload plate is dependent on the thickness in Area "A" of the lip of the preload plate. Use the information and examples in Figure 5-21 to find the maximum permitted depth of damage in Area "B" when lip thickness in Area "A" is equal to or greater than the dimension specified in Figure 5-21.	If the lip thickness in Area "A" is less than the permitted serviceable limit, replace the preload plate. If the depth of damage in Area "B" is greater than the permitted serviceable limits, replace the preload plate.
(9) Penetrant inspect the preload plate in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). NOTE: Removal of the bearing inner ring and pre-penetrant etch are not required.	A relevant indication is not permitted.	If there is a relevant indication, replace the preload plate assembly.



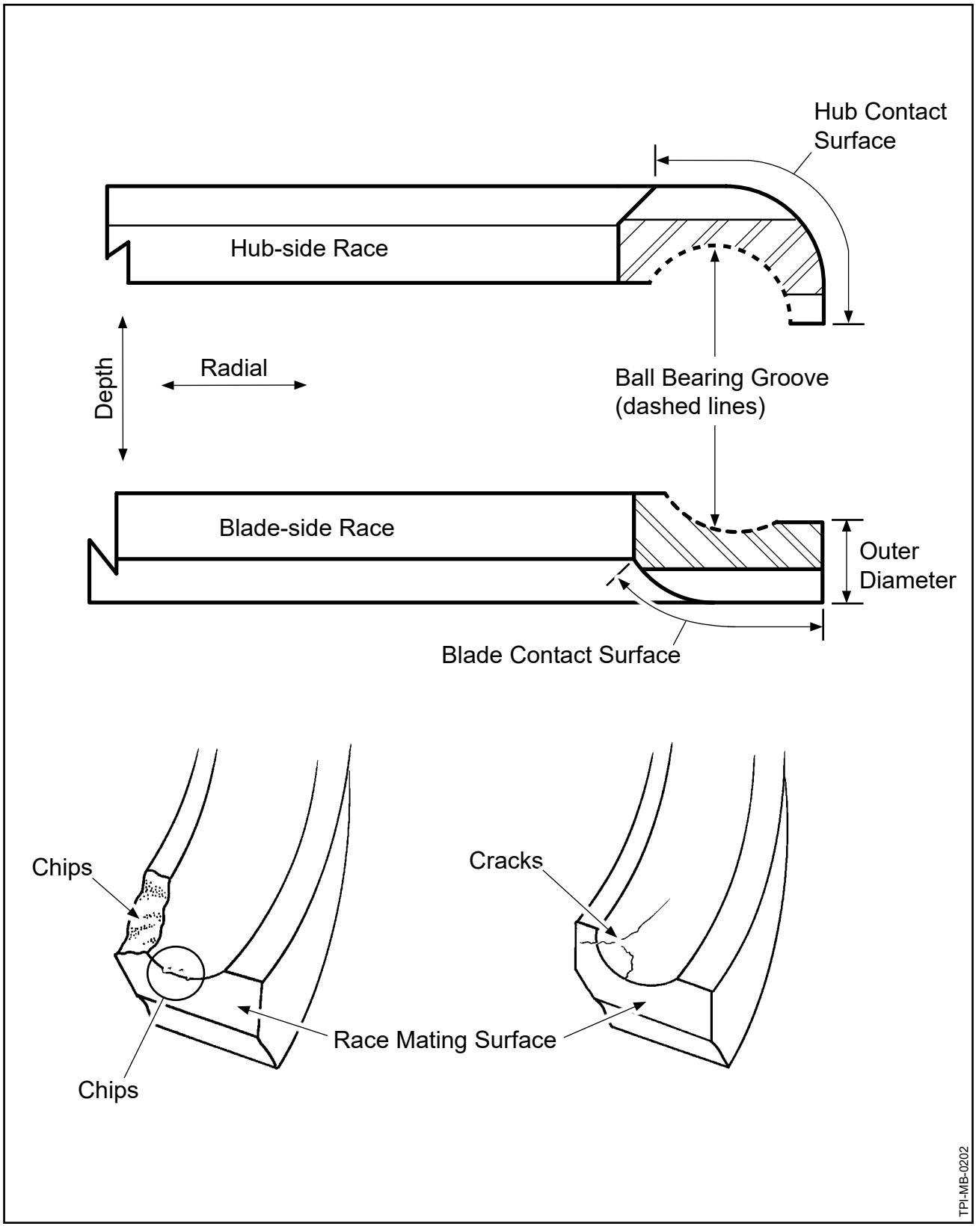
NOTE: Dimensions are for identification purposes only

B-1041

Bearing Retaining Ring
Figure 5-22

Component Inspection Criteria
Table 5-1

Inspect		Serviceable Limits	Corrective Action
U.	BEARING RETAINING RING (Item 1580) Refer to Figure 5-22.		
(1)	Not including Area "A", visually examine the bearing retaining ring for corrosion product and pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted depth of pitting is 0.005 inch (0.12 mm). Pitting must not interfere with the ability of the bearing retaining ring to fit tight to the blade and the bearing race.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed or if the pitting is greater than the permitted serviceable limits, replace the bearing retaining ring.
(2)	Visually examine the bearing retaining ring for corrosion product, pitting, or wear in Area "A".	Corrosion product, pitting, or wear is not permitted.	If there is corrosion product, pitting or wear, replace the bearing retaining ring.
(3)	Not including Area "A", visually examine the bearing retaining ring for wear, damage, or fretting.	If there is wear, damage, or fretting, examine the fit of the bearing retaining ring. The bearing retaining ring must fit tightly to the blade and the bearing race when installed over the blade and bearing race.	If wear, damage, or fretting is greater than the permitted serviceable limits, replace the bearing retaining ring.
(4)	Visually examine the entire bearing retaining ring for cadmium plating coverage.	A few random scratches and corners with cadmium plating missing are permitted; otherwise, complete coverage is required.	If cadmium plating is not on all surfaces, replate the bearing retaining ring in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Bearing Race
Figure 5-23

Component Inspection Criteria
Table 5-1

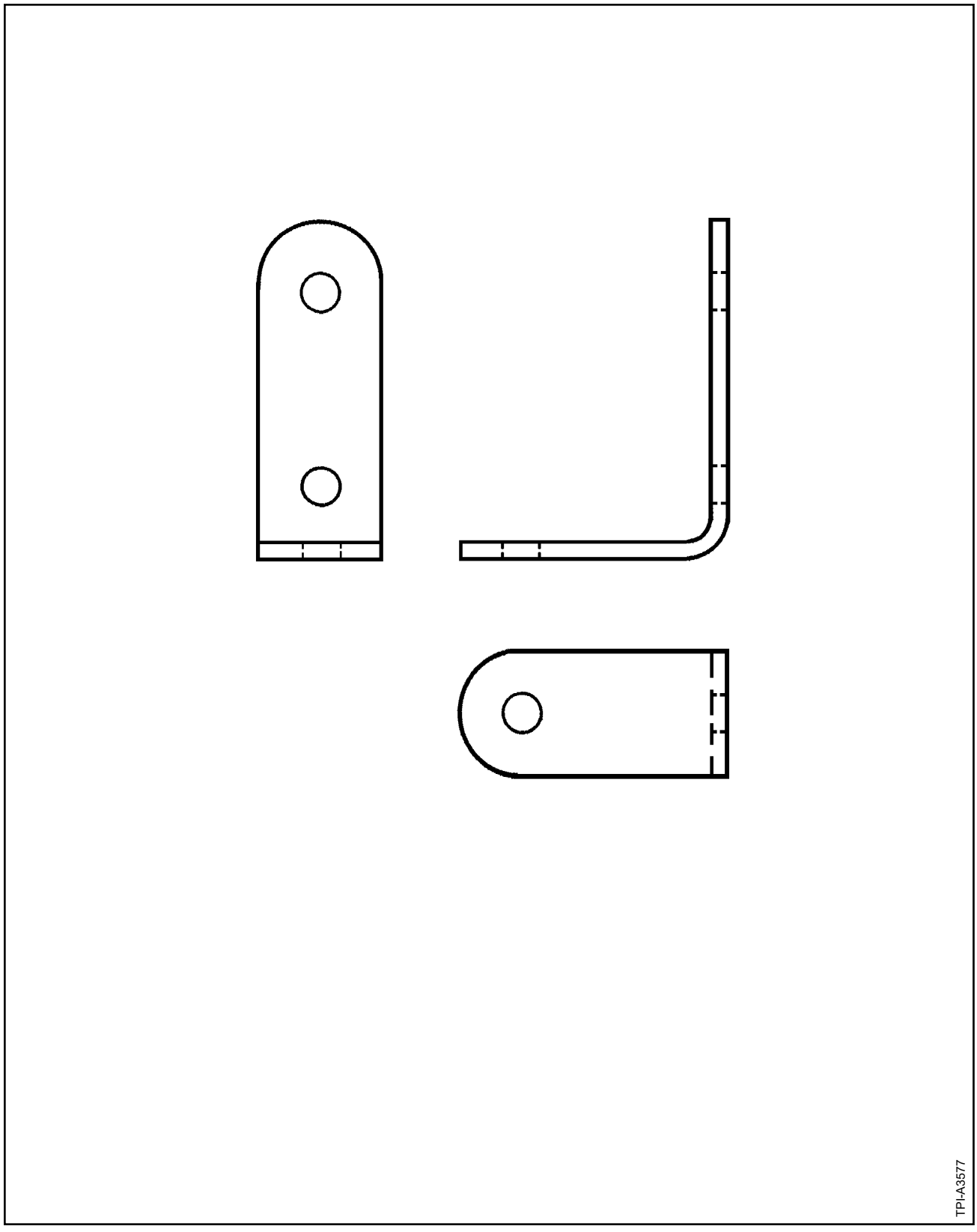
	Inspect	Serviceable Limits	Corrective Action
V.	BEARING RACE (Item 1600, 1620) Refer to Figure 5-23.		
	(1) Visually examine the ball bearing groove in each bearing race for corrosion product.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits.	Remove corrosion product using glass bead cleaning. For glass bead cleaning refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the bearing race.
	(2) Visually examine the ball bearing groove in each bearing race for pitting, wear, fretting, and damage.	The maximum permitted depth of pitting is 0.003 inch (0.076 mm) in the ball bearing groove. The maximum permitted diameter of a pit is 0.032 inch (0.81 mm). The maximum permitted total area of pitting in the ball bearing groove on a complete bearing race is 0.12 square inch (77.4 square mm) (two bearing races for each bearing set). Pitting must not interfere with bearing ball movement or support.	If the pitting is greater than the serviceable limits, replace the bearing race.
		If the ball bearing groove has wear, measure the wear. The maximum permitted depth of wear is 0.005 inch (0.12 mm).	If the wear is greater than the permitted serviceable limits, replace the bearing race.
		Fretting damage is not permitted.	If there is fretting damage, replace the bearing race.
		For damage other than pitting, the maximum permitted depth of damage is 0.003 inch (0.076 mm) and must not interfere with bearing ball movement or support.	If damage is greater than the permitted serviceable limits, replace the bearing race.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
V. BEARING RACE, CONTINUED (Item 1600, 1620) Refer to Figure 5-23.		
(3) Except for the ball bearing groove, visually examine all other surfaces of each bearing race for corrosion product.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits.	Remove corrosion product using glass bead cleaning. For glass bead cleaning refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the bearing race.
(4) Except for the ball bearing groove, visually examine all other surfaces of each bearing race for pitting, wear, fretting, and damage.	The maximum permitted depth of pitting is 0.005 inch (0.12 mm). The maximum permitted diameter of a pit is 0.062 inch (1.57 mm). The maximum permitted total area of pitting on all surfaces except the ball bearing groove of a complete bearing race is 0.25 square inch (161.2 square mm) (two bearing races for each bearing set).	If the pitting is greater than the permitted serviceable limits, replace the bearing race.
	Fretting damage is permitted on the outer diameter of the bearing races that interface with the bearing retaining ring (1580). Fretting must not loosen the tight fit with the bearing retaining ring (1580).	Clean the fretted area thoroughly using an abrasive pad CM47 or equivalent to reduce fretting damage to a minimum. If the fit of the bearing retaining ring (1580) to the bearing race is not tight, replace the bearing race.
	Wear is not permitted.	If there is wear, replace the bearing race.
	For damage other than pitting or fretting, the maximum permitted depth of damage is 0.005 inch (0.12 mm) and must not interfere with the mating surfaces.	If the damage is greater than the permitted serviceable limits, replace the bearing race.

Component Inspection Criteria
Table 5-1

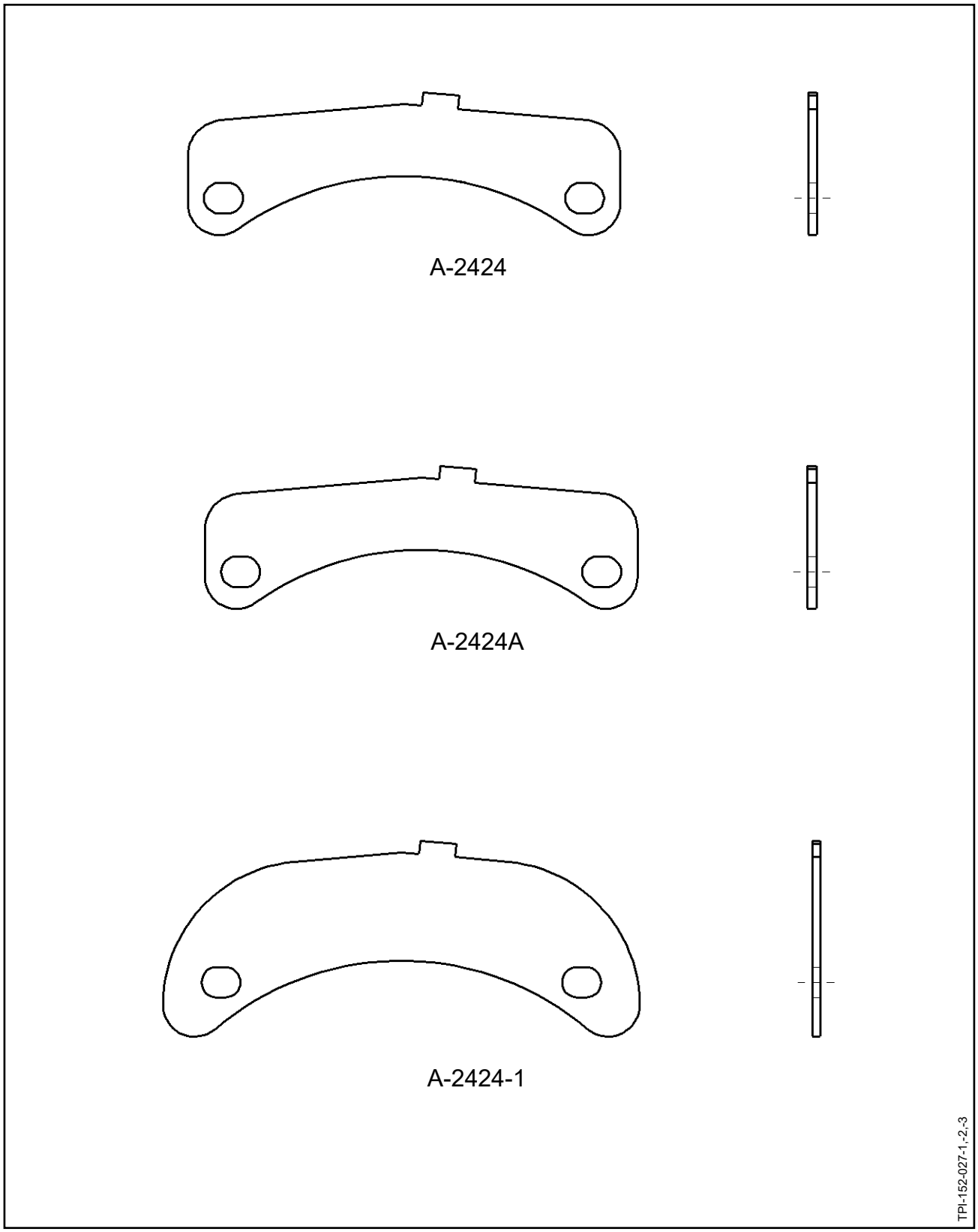
	Inspect	Serviceable Limits	Corrective Action
V.	BEARING RACE, CONTINUED (Item 1600, 1620) Refer to Figure 5-23.		
	(5) Visually examine the bearing race for chips or cracks that are adjacent to the mating surfaces of the bearing race.	Chips or cracks that are adjacent to the mating surfaces of the bearing race are not permitted.	If there are chips or cracks adjacent to the mating surfaces of the bearing race, replace the bearing race.
	(6) Magnetic particle inspect each bearing race in accordance with the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A relevant indication is not permitted.	If there is a relevant indication, replace the bearing race.



Synchrophasing Target Bracket
Figure 5-24

Component Inspection Criteria
Table 5-1

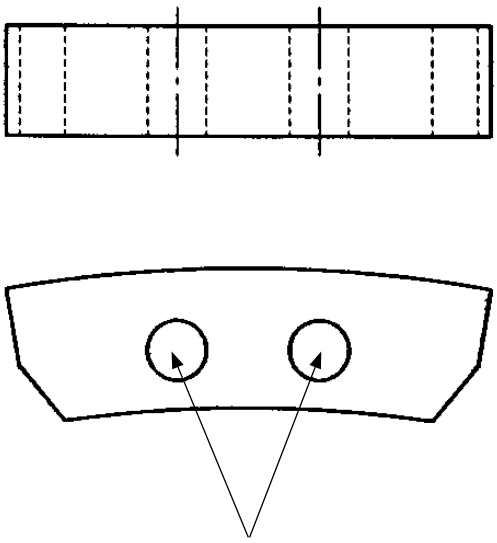
	Inspect		Serviceable Limits	Corrective Action
W.	SYNCHROPHASING TARGET BRACKET (Item 1100) Refer to Figure 5-24.			
	(1)	Visually examine the synchrophasing target bracket for corrosion product and pitting.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the pitting is greater than the permitted serviceable limits, replace the synchrophasing target bracket.
	(2)	Visually examine the synchrophasing target bracket for cracks.	A crack is not permitted.	If there is a crack, replace the synchrophasing target bracket.
	(3)	Visually examine the synchrophasing target bracket surface that contacts the nut and washer for damage.	Individual radial impressions caused by the nut and washer are permitted. Circumferential gouging that removes material is not permitted.	If the damage is more than the permitted serviceable limits, replace the synchrophasing target bracket.
	(4)	Visually examine the synchrophasing target bracket for cadmium plating coverage.	A maximum of 10% of visible base metal is permitted.	If cadmium plating coverage is less than the permitted serviceable limits, replate the synchrophasing target bracket in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Balance Weight
Figure 5-25

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
X. BALANCE WEIGHT (Item 1310) Refer to Figure 5-25.		
(1) Visually examine the balance weight for corrosion product.	Corrosion product is not permitted. Remove corrosion product in accordance with the corrective action instructions.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed, replace the balance weight.
(2) Visually examine the balance weight for pitting, wear, or damage.	The maximum permitted depth of pitting, wear, or damage is 0.003 inch (0.07 mm).	Using an abrasive pad CM47 or equivalent, polish to a maximum depth of 0.005 inch (0.12 mm). If the depth of pitting, wear, or damage is greater than the serviceable limits or the corrective action limits, replace the balance weight.
(3) For an aluminum (gray color) balance weight: Visually examine the balance weight for anodize coverage.	Except for a few scratches and corners with anodize coating missing, complete coverage is required.	If the coverage is less than the permitted serviceable limits, re-anodize the weight in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(4) For a steel (silver color) balance weight: Visually examine for cadmium plating coverage.	Except for a few scratches and corners with cadmium plating missing, complete cadmium plating coverage is required.	If the coverage is less than the permitted serviceable limits, replate the weight in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



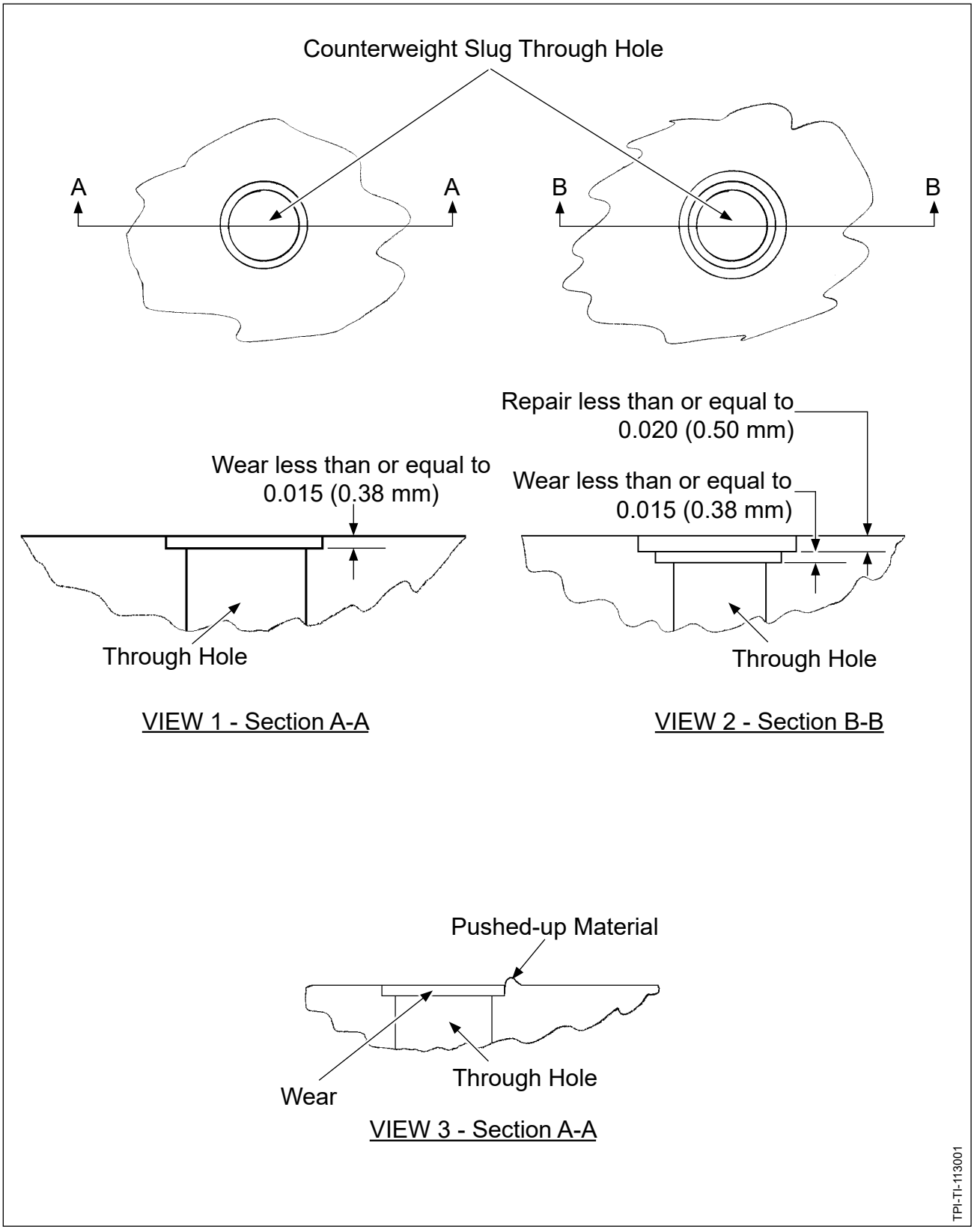
Counterweight Slug Through Hole

TPI-144035

Counterweight Slug
Figure 5-26

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
Y.	COUNTERWEIGHT SLUG B-1933 (BRASS BASE METAL) (Item 2000) Refer to Figure 5-26.		
	CAUTION: DO NOT USE CHEMICAL STRIPPING TO REMOVE THE CADMIUM PLATING FROM A BRASS COUNTERWEIGHT SLUG.		
	Before inspection of the B-1933 counterweight slug, remove the cadmium plating by mechanically stripping using glass bead cleaning, in accordance with the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).		
	(1) Visually examine the counterweight slug for removal of the cadmium plating.	Cadmium plating must be completely removed from the counterweight slug.	Using glass bead cleaning, remove the cadmium plating. Refer to Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
	(2) Visually examine the counterweight slug for corrosion product.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
	CAUTION: MAJOR MATERIAL REMOVAL WILL AFFECT WEIGHT AND COULD AFFECT PROPELLER DYNAMIC BALANCE AS BLADES CHANGE ANGLE DURING PROPELLER ROTATION.		
	(3) Visually examine each counterweight slug for pitting or wear.	The maximum permitted depth of pitting or wear is 0.005 inch (0.12 mm). Pitting or wear that interferes with installation, fit, or function of the counterweight slug is not permitted.	Pitting or wear may be polished with an abrasive pad CM47 or equivalent to a maximum permitted depth of 0.010 inch (0.25 mm). If the depth of pitting, wear, or polishing is greater than the permitted serviceable limits or the corrective action limits, replace the counterweight slug.
	(4) Visually examine each counterweight slug for scratches, gouges, or other damage.	The maximum permitted depth of a scratch, gouge, or damage is 0.050 inch (1.27 mm). Damage that interferes with installation, fit, or function of the counterweight slug is not permitted.	Material that is pushed up above the normal surface is not permitted. Remove all pushed up material by polishing, If a scratch, gouge, or other damage is greater than the permitted serviceable limits, replace the counterweight slug.



Counterweight Slug Through Hole Wear
Figure 5-27

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
Y.	COUNTERWEIGHT SLUG B-1933 (BRASS BASE METAL), CONTINUED (Item 2000) Refer to figure 5-26.		
(5)	Visually examine the area around each through hole for wear caused by the retention bolt or nut.	The maximum permitted depth of wear is 0.015 inch (0.38 mm). Refer to Figure 5-27, View 1 and View 2. Material that is pushed-up above the normal surface is not permitted. Refer to Figure 5-27, View 3.	Remove all pushed-up material by polishing with an abrasive pad CM47 or equivalent. If the wear is greater than the permitted serviceable limits, repair the weight slug in accordance with the section, "Brass Counterweight Slug Mounting Hole Repair" in the Repair chapter of this manual. If the wear and repair are collectively greater than the permitted serviceable limits and repair limits, replace the counterweight slug.
(6)	After successfully completing the inspections required in paragraphs Y.(1) through Y.(5), cadmium plate to Type II, Class 1, the B-1933 counterweight slug in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).		
(7)	Visually examine the counterweight slug for cadmium plating, especially in the through holes for attachment.	Complete cadmium plating coverage is required, especially in the through holes for attachment.	If the cadmium plating coverage is less than the permitted serviceable limits, remove the cadmium plating by mechanically stripping using glass bead cleaning, and replate the counterweight with Type II, Class 1 coverage in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(This page is intentionally blank.)

REPAIR - CONTENTS

LIST OF FIGURES

(This page is intentionally blank.)

WARNING 1: DO NOT ATTEMPT IN THE FIELD ANY REPAIR, REPLACEMENT, REPLATING, RE-ANODIZING, OR RE-SHOT PEENING PROCEDURE NOT SPECIFICALLY AUTHORIZED BY HARTZELL PROPELLER INC. OR NOT SPECIFICALLY REFERRED TO IN HARTZELL PROPELLER INC. MANUALS. CONTACT THE FACTORY FOR GUIDANCE ABOUT THE AIRWORTHINESS OF ANY PART WITH UNUSUAL WEAR OR DAMAGE.

WARNING 2: ADHESIVES AND SOLVENTS ARE FLAMMABLE AND TOXIC TO THE SKIN, EYES, AND RESPIRATORY TRACT. SKIN AND EYE PROTECTION ARE REQUIRED. AVOID PROLONGED CONTACT AND BREATHING OF VAPORS. USE SOLVENT RESISTANT GLOVES TO MINIMIZE SKIN CONTACT AND WEAR SAFETY GLASSES FOR EYE PROTECTION. USE IN A WELL VENTILATED AREA AWAY FROM SPARKS AND FLAME. READ AND OBSERVE ALL WARNING LABELS.

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER 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 IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

1. General Repair Requirements (Rev. 2)

   A. Shot Peening

      CAUTION: THE PEENING MARKS ON CERTAIN PROPELLER PARTS ARE NOT TOOL MARKS AND SHOULD NOT BE REMOVED.

      (1) Some propeller assembly parts have been shot peened at Hartzell Propeller Inc. to improve fatigue strength.

      (2) Shot peened surfaces may require re-shot peening because of rust, corrosion, fretting, or nicks. For shot peening procedures, refer to the Shot Peening chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

WARNING: FAILURE TO CORRECTLY SHOT PEEN APPLICABLE PROPELLER PARTS MAY CREATE AN UNSAFE CONDITION THAT MAY RESULT IN DEATH, SERIOUS BODILY INJURY, AND/OR SUBSTANTIAL PROPERTY DAMAGE. A QUALITY SHOT PEENING PROCESS IS CRITICAL FOR FLIGHT SAFETY. SHOT PEENING OF PROPELLER PARTS REQUIRES SPECIAL TECHNIQUES, TRAINING, MATERIALS, AND EQUIPMENT.

(a) Only repair stations that are properly certified by Hartzell Propeller Inc. should shot peen Hartzell propeller parts.

1 For certification requirements, refer to the Approved Facilities chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

2 For a list of repair stations that are certified by Hartzell Propeller Inc. to perform shot peening on Hartzell propeller parts:

a Go to the Sample Program Approvals page on the Hartzell Propeller Inc. website at www.hartzellprop.com

b Contact Hartzell Propeller Inc. Product Support

(1) Refer to the section, "Contact Information" in the Introduction chapter of this manual.

B. Aluminum and Steel Parts

(1) Remove scratches, nicks, burrs, and other minor damage using a fine emery cloth or abrasive pad, such as CM47.

(a) Blend the polished area in with the surrounding area.

(b) Use extreme care to completely remove the damage while removing as little material as possible.

(2) After any repair, inspect the part in accordance with the applicable inspection criteria to be sure it is within the permitted limits.

2. Repair/Modification Procedures (Rev. 2)

A. Propeller Components (Except for those listed separately in this section)

(1) For repair and modification procedures of propeller components (except for those listed separately in this section), refer to the applicable section in this chapter.

B. Hubs

(1) Aluminum Hubs: Refer to the Aluminum Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

C. Blades

(1) Composite Blades: Refer to Hartzell Propeller Inc. Composite Propeller Blade Maintenance Manual 135F (61-13-35).

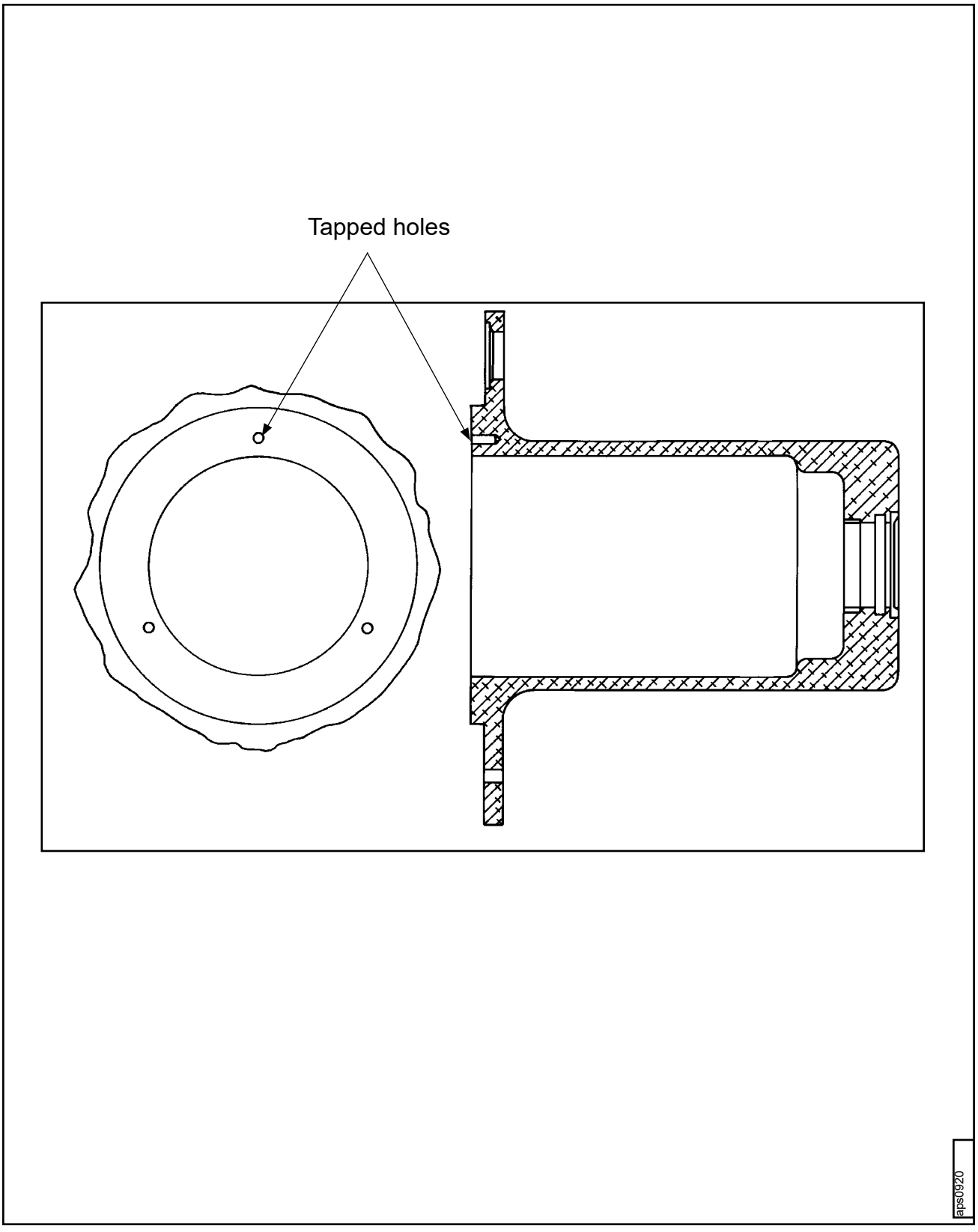
D. Spinner Assemblies

(1) Composite Spinners: Refer to Hartzell Propeller Inc. Composite Spinner Maintenance Manual 148 (61-16-48).

E. Ice Protection Systems

(1) For ice protection systems supplied by Hartzell, refer to Hartzell Propeller Inc. Ice Protection System Manual 180 (30-61-80).

(2) For ice protection systems not supplied by Hartzell, refer to the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).



Modification of the D-1036 Cylinder to a D-4904 Cylinder
Figure 6-1

3. Specific Repair Requirements

A. Modification of the D-1036 Cylinder to a D-4904 Cylinder

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 IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

(1) General

(a) At overhaul, modification of the D-1036 cylinder to a D-4904 cylinder or replacement of the D-1036 with a servicable D-4904 cylinder is required.

(b) The procedure in this section gives instructions to modify the cylinder by drilling and tapping three holes for attachement of the stop ring.

(2) Tools Required

(a) "C" clamps or a similar device

(b) Thin center punch - a #3 transfer punch is recommended

(c) Drill press

(d) #21 drill bit

(e) 10-32UNF-GH3 tap

(f) C-4901 stop ring (250)

(3) Modification Procedure - Refer to Figure 6-1.

(a) Put the stop ring (250) on the inboard end of the cylinder unit (200) and manually center the stop ring (250) so that the inside diameters are aligned.

(b) Using "C" clamps or a similar device, hold the stop ring (250) to the cylinder (200) to prevent movement while making marks for the holes to be drilled.

(c) Insert a thin center punch through the screw holes in the stop ring (250) and tap to mark the cylinder (200) at the three screw hole locations.

(d) Remove the stop ring (250) from the cylinder (200).

CAUTION: USE CAUTION WHEN DRILLING THE HOLES IN THE CYLINDER (200). DRILLING DEEPER THAN 0.620 INCH (15.74 MM) IS CAUSE FOR RETIREMENT OF THE CYLINDER (200).

(e) Using a drill press with a #21 drill bit, drill three holes 0.600 inch (15.24 mm) deep at the places previously marked on the cylinder (200).

(f) Using a 10-32UNF-GH3 tap, thread each of the three holes with complete threads to a depth of 0.425 inch (10.79 mm).

1 Partial threads are permitted at greater than the 0.425 inch (10.79 mm) depth.

(g) Check the threaded depth of the hole.

1 Sufficient threaded depth can be checked by measuring a screw threaded into the hole.

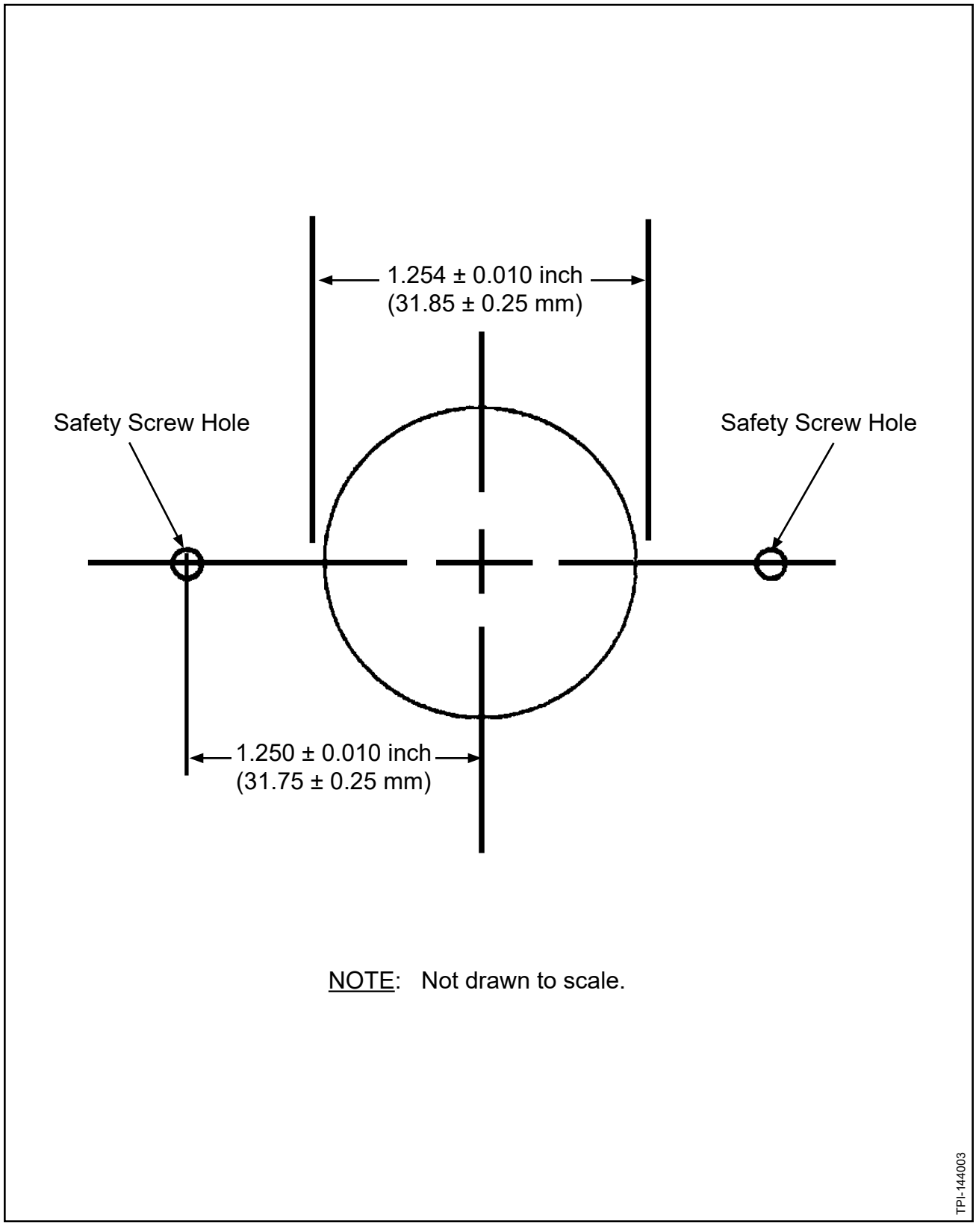
(h) Visually examine for burrs or raised edges.

CAUTION: DO NOT DAMAGE THE SURROUNDING AREA WHEN REMOVING BURRS.

(i) Making sure to not damage surrounding material, remove any burrs or raised edges by lightly sanding or filing the affected edge.

(j) Clean the cylinder (200) to remove metal particles. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(This page is intentionally blank.)



Template for Modification of the D1035 Piston Unit for Safety Screws
Figure 6-2

B. Modification of the D-1035 Piston Unit for Safety Screws

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 IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

(1) General

(a) This procedure creates two screw holes in the forward end of the propeller piston unit (110) to provide a method to lockwire the A-2967 nut.

(2) Tools Required

(a) Template - Refer to Figure 6-2

(b) #21 Drill Bit (0.159 inch [4.03 mm] diameter)

(c) Tap - 10-32UNF-3B

(3) Modification Procedure

(a) Make a template in accordance with the drawing shown in Figure 6-2.

(b) Using the pitch change rod bore holes in the piston unit (110) for alignment, put the template on the forward end of the piston unit (110).

1 The "clocking" or rotational position of the template with respect to the piston unit (110) is not important.

CAUTION: THE DEPTH, LOCATION, AND DIAMETER OF THE HOLES IS CRITICAL TO MAKE SURE THAT THERE IS NO LOSS OF FATIGUE STRENGTH IN THE PISTON UNIT (110).

(c) Using a #21 drill bit, drill two safety screw holes 0.159 inch (0.403 mm) diameter by 0.353 inch ± 0.010 inch (8.96 ± 0.25 mm) deep in the piston unit (110) at the places indicated on the template.

(d) Measure the depth of each newly drilled hole.

1 If either hole is deeper than 0.363 inch (9.22 mm), replace the piston unit (110).

(e) Using a 10-32WF-38 tap, thread each hole with complete threads to a miniumum depth of 0.207 inch (5.25 mm).

(f) Do a check of the threaded depth of the hole.

1 Adequate threaded depth can be checked by measuring a screw threaded into the hole.

(g) Visually examine for burrs or raised edges.

CAUTION: DO NOT DAMAGE THE SURROUNDING AREA WHEN REMOVING BURRS.

(h) Making sure not to damage surrounding material, remove any burrs or raised edges by lightly sanding or filing the affected edge.

(i) Clean the piston unit (110) to remove metal particles. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

C. Replacement of the A-1079 Piston Insert in the D-1035 Piston

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 IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

(1) Removing the piston insert (120).

CAUTION: DO NOT DAMAGE THE THREADS IN THE LUG OF THE PISTON UNIT (110) WHEN REMOVING THE PISTON INSERT (120).

(a) Using care not to damage the threads in the lug of the piston unit (110), bore the piston insert (120) until it is thin.

1 If the threads in the lug of the piston unit (110) are damaged, replace the piston unit (110).

(b) Using a locally procured pick tool, remove the remainder of the piston insert (120).

CAUTION: DO NOT DAMAGE THE THREADS IN THE LUG OF THE PISTON UNIT (110) WHEN RE-TAPPING THE THREADS.

(c) Using a 15/16-20 UNEF-3B tap, carefully re-tap the threads in the lug of the piston unit (110).

1 If the threads in the lug of the piston unit (110) are damaged, replace the piston unit (110).

(d) Complete an inspection of the piston unit (110) in accordance with Table 5-1, "Component Inspection Criteria" of the Check chapter in this manual.

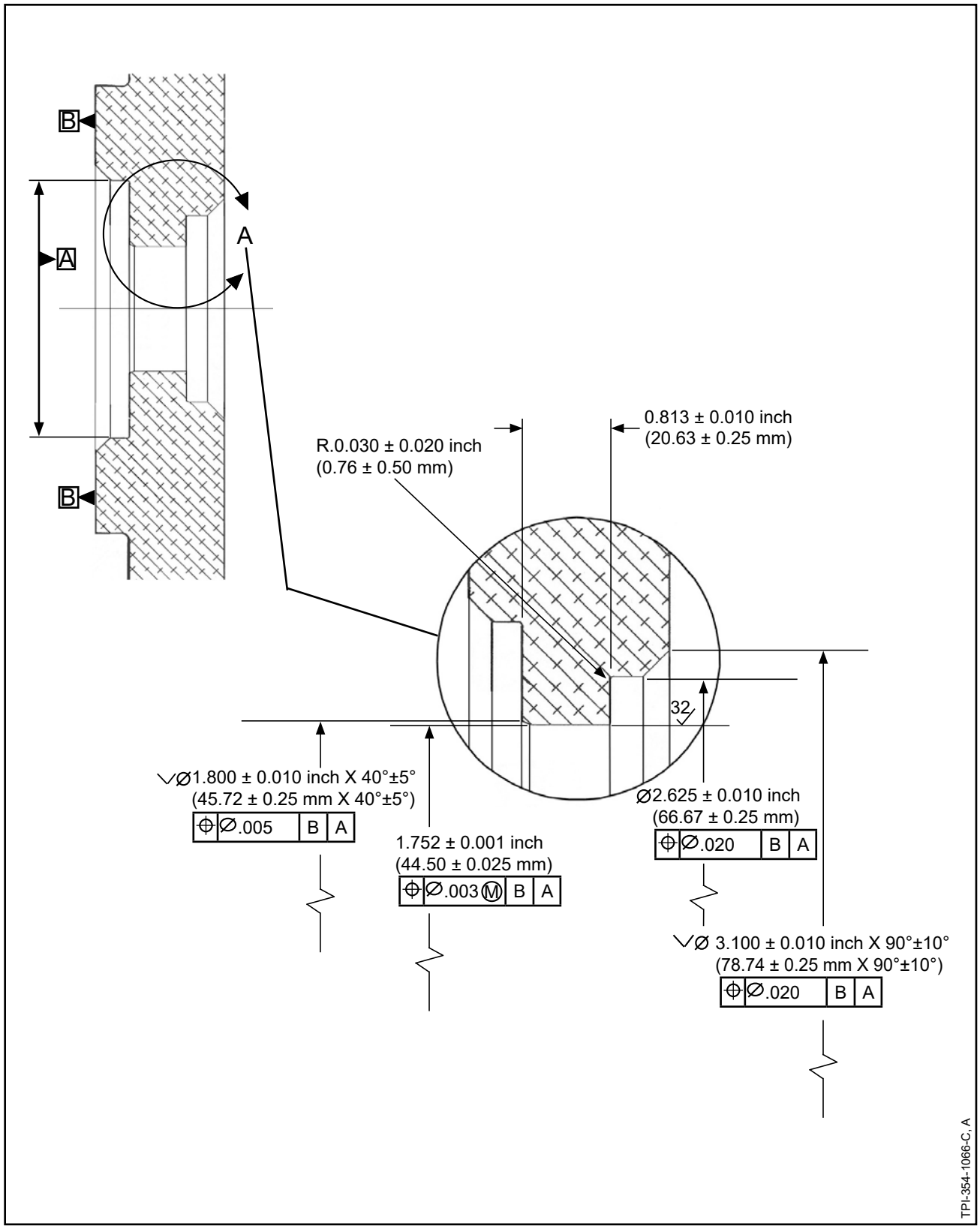
(e) If the inspection of the piston unit (110) is satisfactory, install a piston insert (120) in accordance with the instructions given in this section.

(2) Installing the piston insert (120).

(a) Visually examine the threaded hole in the lug of the piston unit (110) for complete anodize coverage.

1 If the anodize coverage of the threaded hole in the lug of the piston unit (110) is not complete, anodize the piston unit (110) in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02)..

(b) Install a new piston insert (120) in accordance with the instructions in the section, "Bonding of A-1079 Insert into D-1035 Pistion" in the Special Adhesive and Bonding chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Hub Bore Modification Dimensions
Figure 6-3

D. Modification of a D-1066 Hub to Use a 105450 Pitch Change Rod Hub Bushing

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 IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

(1) General

(a) This section provides instructions for modification of the hub unit (500) to install a rod hub bushing (550) in the pitch change rod bore on the engine-side half of a D-1066 propeller hub unit (500).

(2) Materials and Consumables

(a) Rod hub bushing p/n 105450 (550)

(b) External spiral retaining ring (570)

(c) O-ring (560)

(d) Lubricant CM12

(3) Modification Instructions

(a) Machine the propeller hub unit (500) in accordance with the dimensions specified in Figure 6-3.

(b) Remove any burrs.

(c) Machined surfaces must have a surface finish of at least 63 micro inches (1.6 micro meters), except as specified in Figure 6-3.

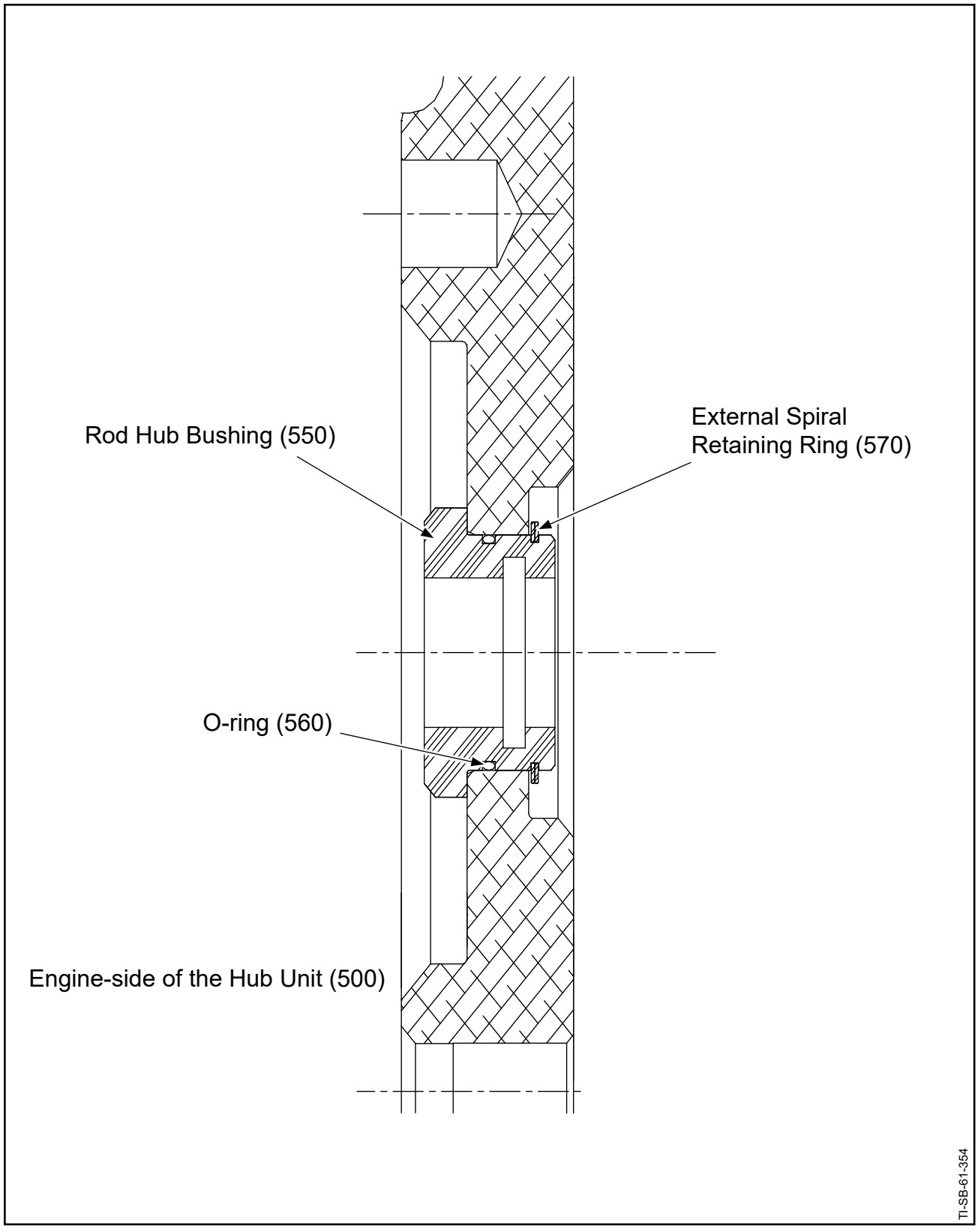
(d) Hub unit (500) stamping:

1 For stamping information, refer to the Parts Identifivcation and Marking chapter of Hartzell Propeler Inc. Standard Practice Manual 202A (61-01-02).

2 Using a round bottom impression stamp, strike through the current part number of the hub unit (500). Make sure that the part number of the hub unit (500) can be read.

3 Near the part number of the hub unit (500), use round bottom impression stamps to identify the hub unit (500) with the new D-1066-1 part number.

NOTE: Stamping the new part number D-1066-1 indicates compliance with the modification of the hub unit (500) in accordance with this modification. A new hub unit (500) could also be stamped with the D-1066-1 part number, but could have additional configuration changes.



New Pitch Change Rod Hub Bushing Installation
Figure 6-4

(e) Inspect all newly machined dimensions in accordance with this modification procedure.

1 At this point other overhaul procedures can be performed in accordance with Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02) and this manual.

2 If anodizing is completed before machining, chemical conversion coating must be applied to the machined areas of the hub unit (500) in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(f) Perform the other overhaul procedures of the hub unit (500) that are specified in Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02) for the D-1066-1 propeller hub unit and in this manual.

(4) Installation of the Rod Hub Bushing (550)

(a) Using lubricant CM12, lubricate the O-ring (560).

(b) Install the O-ring (560) on the outside diameter O-ring groove of the rod hub bushing (550).

(c) Using lubricant CM12, lubricate the bore of the hub unit (500) before installing the rod hub bushing (550).

(d) Install the rod hub bushing (550) into the hub unit (500) with the external spiral retaining ring groove on the inside of the hub unit. (500). Refer to Figure 6-4.

(e) Install the external spiral retaining ring (570) in the groove on the rod hub bushing (550).

(f) Using pressure check tools TE441-5 and TE441-3, complete a leak inspection in accordance with the Aluminum Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

E. Repair of the Brass Counterweight Slug Mounting Hole

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 IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS

(1) General

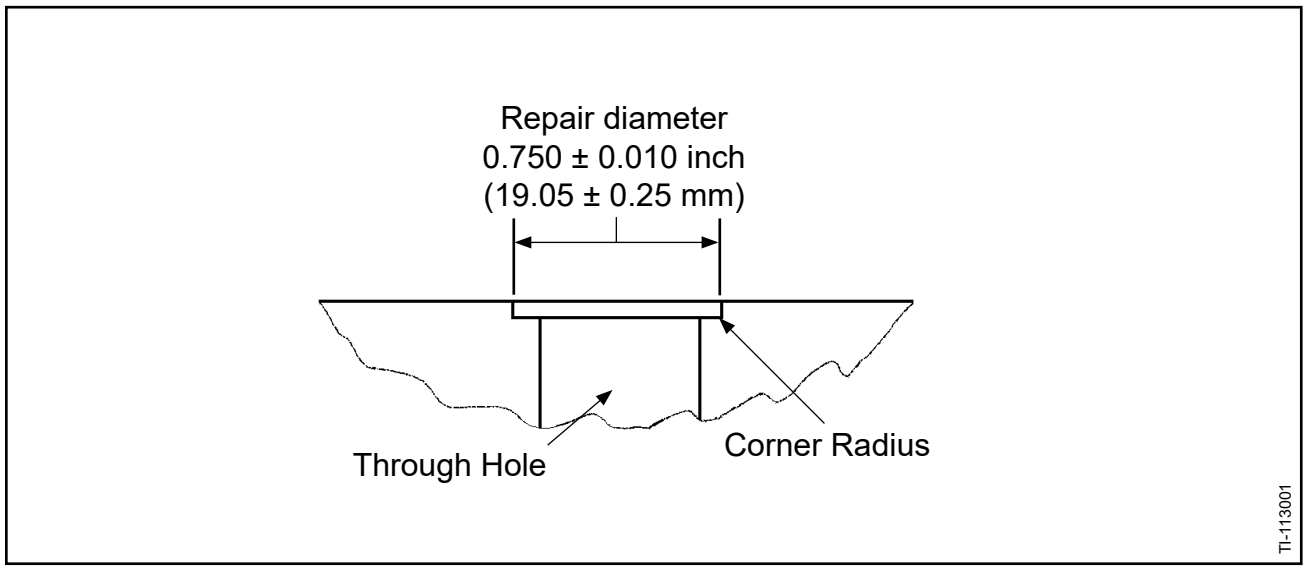
(a) This procedure provides the instructions to remove wear around the mounting through hole of the counterweight slug (2000).

(2) Procedure

(a) Use a locally procured end mill cutter that is 0.750 ± 0.010 inch (19.05 ± 0.25 mm) outside diameter.

1 The corner radius blending between the outside diameter and the cutting end must be 0.005 to 0.033 inch (0.13 to 0.83 mm). Refer to Figure 6-5.

(b) Put the brass counterweight slug (2000) in the end mill.



Repair of the Brass Counterweight Slug Mounting Hole
Figure 6-5

CAUTION: MAKE SURE THAT THE BRASS COUNTERWEIGHT SLUG (2000) IS HELD TIGHTLY IN THE END MILL WITH THE THROUGH HOLE CENTERED UNDER THE END MILL CUTTER.

(c) Center the through hole that will be repaired under the end mill cutter and make sure that the brass counterweight slug (2000) is held tightly in the end mill.

CAUTION: DO NOT SPOTFACE DEEPER THAN THE MAXIMUM PERMITTED DEPTH.

(d) Spotface the brass counterweight slug (2000) to remove wear damage.

1 The maximum permitted depth of repair is 0.020 inch (0.50 mm).

2 Spotface to a greater depth is not permitted.

3 If the repair is greater than the maximum permitted depth of repair, replace the brass counterweight slug (2000).

(e) Remove all burrs.

(f) Break any sharp corners.

(g) Visually examine the repair to make sure that the repair is centered on the through hole.

(h) Cadmium plating of any bare brass surface is required. Refer to the Check chapter of this manual.

(This page is intentionally blank.)

ASSEMBLY - CONTENTS

ASSEMBLY - CONTENTS, CONTINUED

LIST OF FIGURES

LIST OF FIGURES, CONTINUED

LIST OF TABLES

1. General (Rev. 5)

WARNING 1: ANY PART IDENTIFIED IN THIS MANUAL AS AN EXPERIMENTAL OR NON-AVIATION PART MUST NOT BE USED IN AN FAA OR INTERNATIONAL EQUIVALENT TYPE CERTIFICATED PROPELLER. A PART IDENTIFIED AS EXPERIMENTAL OR NON-AVIATION DOES NOT HAVE FAA OR INTERNATIONAL EQUIVALENT APPROVAL EVEN THOUGH IT MAY STILL SHOW AN AVIATION TC OR PC NUMBER STAMP. USE ONLY THE APPROVED ILLUSTRATED PARTS LIST PROVIDED IN THE APPLICABLE OVERHAUL MANUAL OR ADDITIONAL PARTS APPROVED BY AN FAA ACCEPTED DOCUMENT FOR ASSEMBLY OF A PROPELLER. THE OPERATOR ASSUMES ALL RISK ASSOCIATED WITH THE USE OF EXPERIMENTAL PARTS. USE OF EXPERIMENTAL PARTS ON AN AIRCRAFT MAY RESULT IN DEATH, SERIOUS BODILY INJURY, AND/OR SUBSTANTIAL PROPERTY DAMAGE.

WARNING 2: ADHESIVES AND SOLVENTS ARE FLAMMABLE AND TOXIC TO THE SKIN, EYES, AND RESPIRATORY TRACT. SKIN AND EYE PROTECTION ARE REQUIRED. AVOID PROLONGED CONTACT AND BREATHING OF VAPORS. USE SOLVENT RESISTANT GLOVES TO MINIMIZE SKIN CONTACT AND WEAR SAFETY GLASSES FOR EYE PROTECTION. USE IN A WELL VENTILATED AREA AWAY FROM SPARKS AND FLAME. READ AND OBSERVE ALL WARNING LABELS.

CAUTION 1: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER 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 IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

CAUTION 2: THE USE OF BLADE PADDLES TO MOVE BLADES CAN RESULT IN THE OVERLOAD AND DAMAGE OF THE BLADE PITCH CHANGE MECHANISM. THIS DAMAGE IS NOT REPAIRABLE AND CAN RESULT IN SEPARATION BETWEEN THE BLADE AND THE PITCH CHANGE MECHANISM, CAUSING LOSS OF PITCH CONTROL DURING FLIGHT.

A. Important Information

(1) Read all assembly instructions before beginning the assembly procedures.

(2) Protect all unassembled components from damage.

(3) Use applicable torque values. Refer to Table 8-1, "Torque Values", in the Fits and Clearances chapter of this manual.

(4) Unless specified differently, safety wire in accordance with NASM33540 using 0.032 inch (0.81 mm) safety wire.

(5) For information about additional weight slugs that may be required to be attached to the counterweight arms of certain blade models, refer to the Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

CAUTION: BEFORE ASSEMBLING THE PROPELLER, DETERMINE IF AN ICE PROTECTION SYSTEM IS REQUIRED.

B. Ice Protection Systems

(1) If installing an ice protection system supplied by Hartzell, refer to Hartzell Propeller Inc. Ice Protection System Manual 180 (30-61-80).

(2) If installing an ice protection system not supplied by Hartzell, refer to the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).

C. O-rings

(1) Unless specified differently, lubricate all O-rings with lubricant CM12 before installing them in the propeller assembly.

(2) Hartzell Propeller Inc. recommends that the lot number and cure date for each O-ring be recorded with all work orders when an O-ring is installed in any propeller assembly.

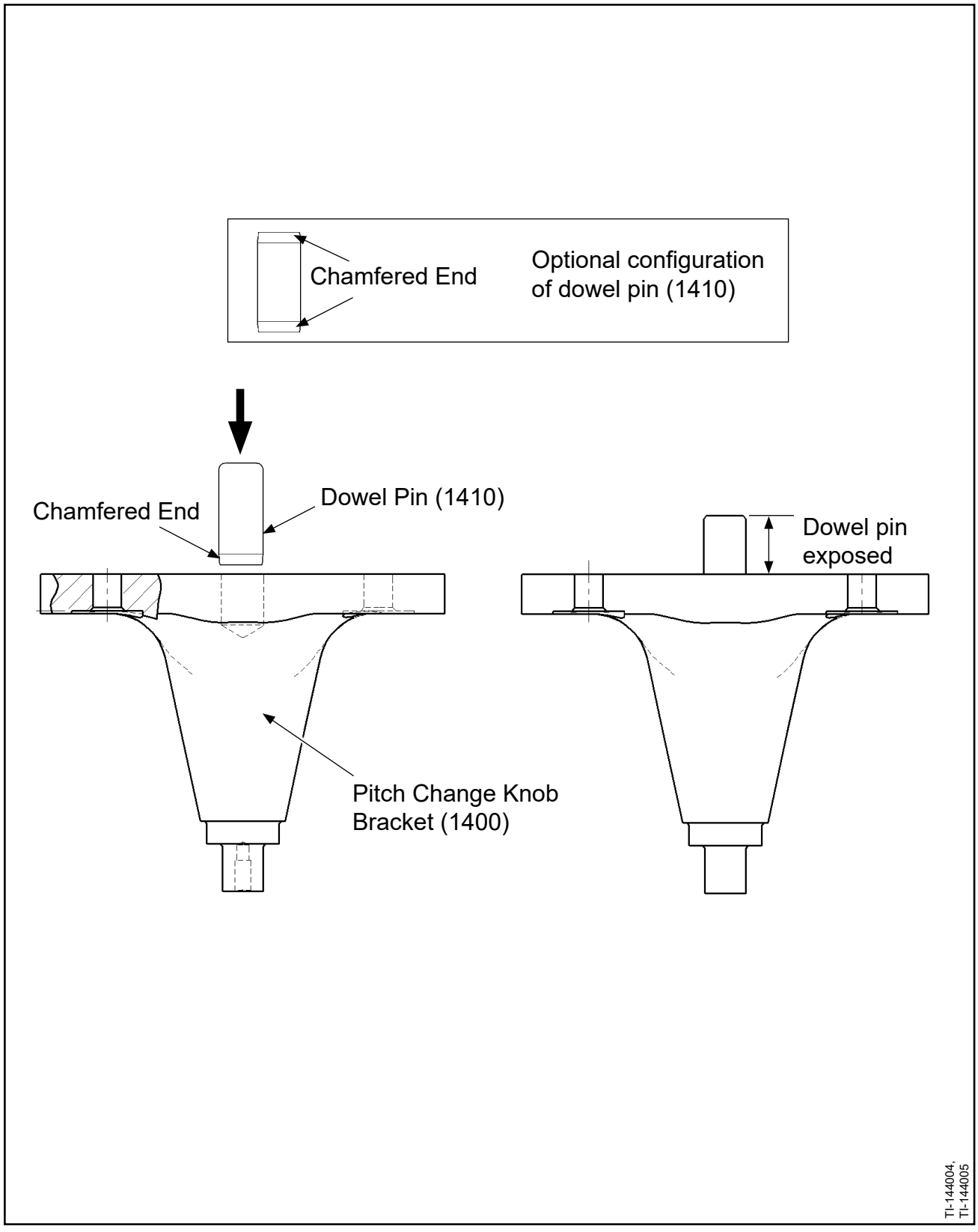
D. Blade Bore Plug/Bearing Installation

(1) For composite blades, refer to Hartzell Propeller Inc. Composite Propeller Blade Maintenance Manual 135F (61-13-35).

E. Blade Angle Information

(1) For specific blade angle information, refer to the Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

(This page is intentionally blank.)



Installing the Dowel Pin into the Pitch Change Knob Bracket
Figure 7-1

2. Assembly of HC-A6A-3( ) Propeller Models

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 IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

CAUTION 2: WHEN ACTUATING A PROPELLER, USE NITROGEN OR COMPRESSED AIR THAT HAS BEEN FILTERED FOR MOISTURE.

CAUTION 3: DO NOT EXCEED A PRESSURE OF 200 PSI (13.78 BARS) WHEN ACTUATING PROPELLERS COVERED IN THIS MANUAL.

CAUTION 4: USE SUFFICIENT PRESSURE TO MAKE SURE THAT THE PROPELLER ACTUATES AGAINST EACH POSITIVE STOP.

A. Blade Unit Assembly Procedures

(1) General

(a) The following procedure assumes that the blade has been inspected, reworked, and repaired and that the blade bore plug, blade bore bearing, blade thrust bearing, and counterweight clamps are installed in accordance with Hartzell Propeller Inc. Composite Propeller Blade Maintenance Manual 135F (61-13-35).

(2) Install the dowel pin (1410), if applicable. Refer to Figure 7-1.

(a) Press the chamfered end of the dowel pin (1410) into the pitch change knob bracket (1400), leaving 0.415 ± 0.025 inch (10.54 ± 0.63 mm) of the dowel pin (1410) exposed. Refer to Figure 7-1.

(3) Install the pitch change knob unit.

(a) Make sure that the surfaces of the butt of the blade and the pitch change knob bracket (1400) are clean and free of oil, dirt, and other foreign materials. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(b) Put the pitch change knob bracket (1400) on the butt of the blade with the dowel pin (1410) in the hole provided for it.

(c) Align the holes in the pitch change knob bracket (1400) with the threaded holes in the butt of the blade.

(d) Using a soft mallet, tap the pitch change knob bracket (1400) until it is firmly in position against the butt of the blade.

(e) Install a hex head bolt (1420) in each hole in the pitch change knob bracket (1400).

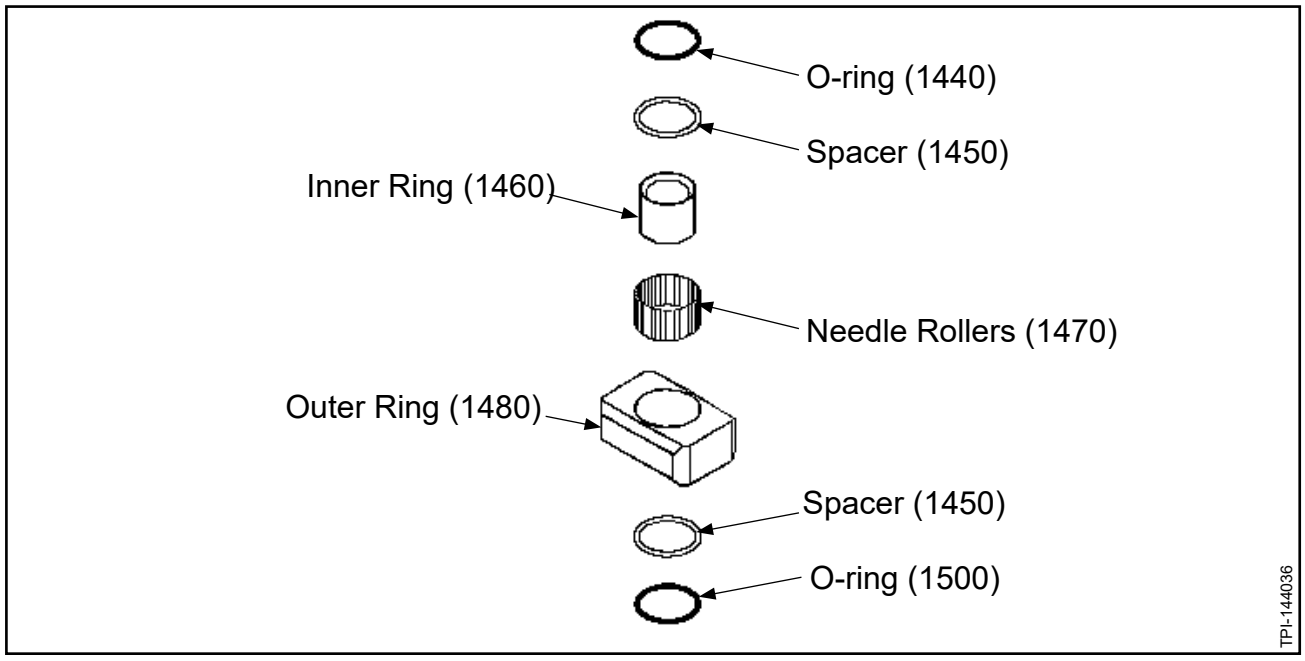
(f) Torque each hex head bolt (1420) in accordance with Torque Table 8-1 in the Fits and Clearances chapter of this manual.

(4) Assembling the Pitch Adjust Block Unit

(a) Using a locally procured cotton swab with lubricant CM12, lightly lubricate the ID of the outer ring (1480).

(b) Install 20 of the needle bearing rollers (1470) in the ID of the outer ring (1480). Refer to Figure 7-2.

NOTE: Tweezers and a 10X magnifier is helpful when assembling the pitch adjust block unit (1430)



Assembling the Pitch Adjust Block Unit
Figure 7-2

(c) Making sure that the needle rollers (1470) do not fall to the side, install the inner ring (1460) over the needle bearing rollers (1470) in the ID of the outer ring (1480).

(d) Install the remaining 20 needle bearing rollers (1470) between the inner ring (1460) and the outer ring (1480).

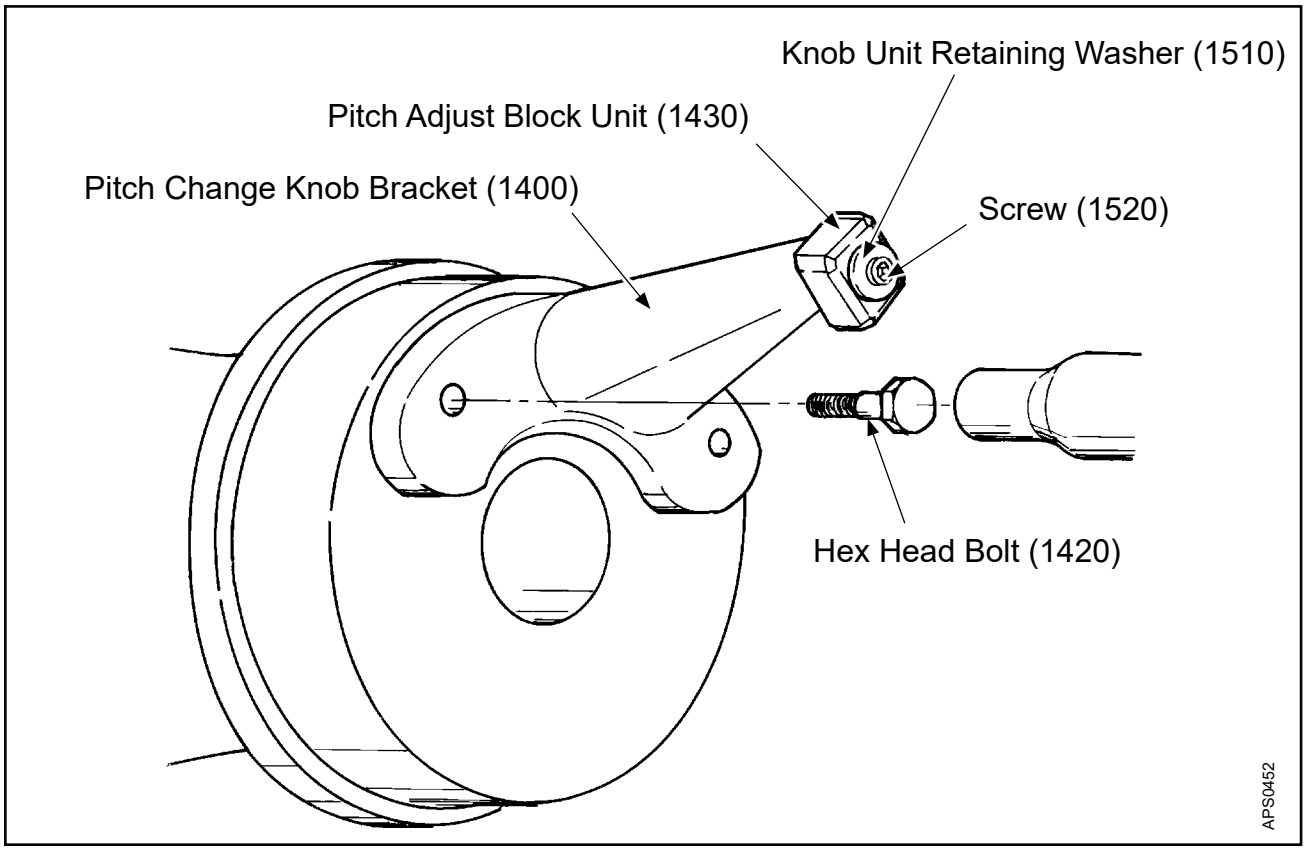
(e) Visually examine the installed needle bearing rollers (1470) to make sure that there are no spaces between the needle bearing rollers (1470).

1 A space between the needle bearing rollers (1470) is an indication that a needle bearing roller(s) (1470) is missing.

a If the missing roller needle bearing roller(s) (1470) cannot be found, replace the pitch adjust block unit (1430).

(f) Making sure that the needle rollers (1470) do not fall out, carefully install a spacer (1450) and an O-ring (1440) on each end of the outer ring (1480). Refer to Figure 7-2.

(5) Install the pitch adjust block unit (1430) on the end of the pitch change knob bracket (1400). Refer to Figure 7-3.



Installing the Pitch Change Knob Bracket and Pitch Adjust Block
Figure 7-3

CAUTION: DO NOT PERMIT ADHESIVE OR PRIMER TO GET ON THE BEARINGS OF THE PITCH ADJUST BLOCK UNIT (1430).

(a) Optional recommended primer CM127 application.

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

1 Using care to prevent the primer CM127 from getting on the bearings, apply primer CM127 to the ID of the pitch adjust block unit (1430).

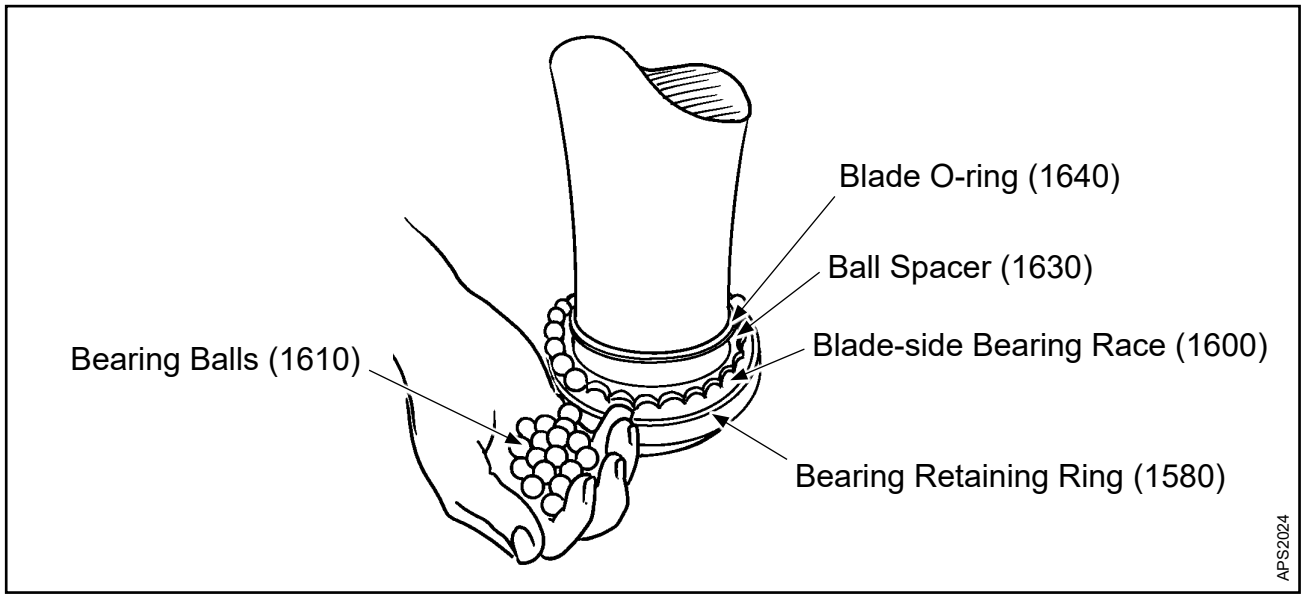
2 Wait 30 to 70 seconds before applying adhesive to the ID of the pitch adjust block unit (1430).

(b) Adhesive application.

1 Using care to prevent the adhesive from getting on the bearings, apply adhesive CM74 or CM140 to the ID of the pitch adjust block unit (1430).

(c) Put the pitch adjust block unit (1430) on the end of the pitch change knob bracket (1400).

(d) Using the knob unit retaining washer (1510) and the screw (1520), attach the pitch adjust block unit (1430) to the pitch change knob bracket (1400).



Installing the Blade Bearing Balls
Figure 7-4

(e) Torque the screw (1520) in accordance with Torque Table 8-1.

(f) Put the pitch change knob cap (1530) over the screw (1520).

(5) Using lubricant CM12, lubricate the blade O-ring (1640).

(6) Install the blade O-ring (1640) over the base of the blade shank.

(7) Install the ball spacer (1630), bearing balls (1610), and hub-side bearing race (1620). Refer to Figure 7-4 and Figure 7-5.

(a) Using lubricant CM12, lubricate the blade-side bearing race (1600).

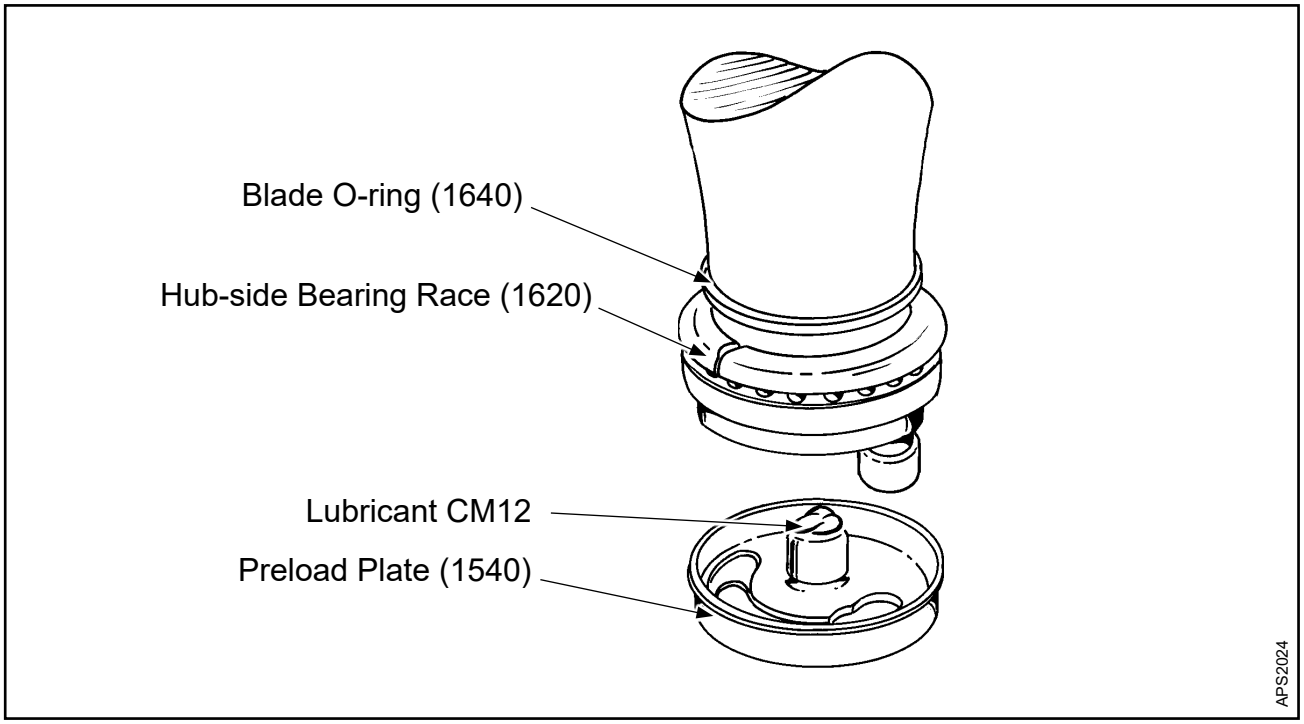
(b) Put the ball spacer (1610) on the blade-side bearing race (1600).

CAUTION: ALL BEARING BALLS (1610) INSTALLED IN A SINGLE BEARING MUST BE OF THE SAME GAUGE. BEARING BALLS (1610) SUPPLIED BY HARTZELL PROPELLER INC. ARE OF THE SAME GAUGE.

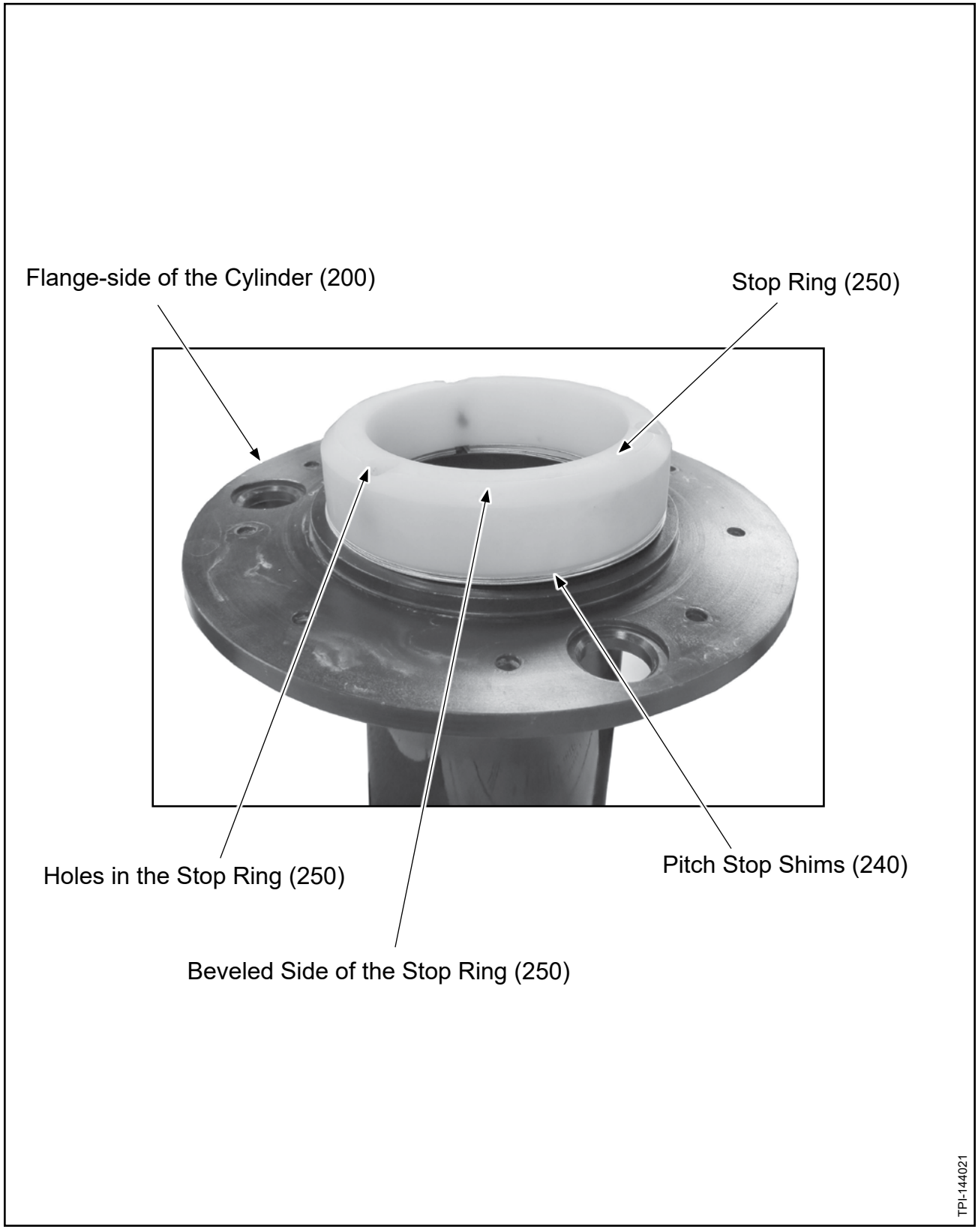
(c) Put the bearing balls (1610) in the openings of the ball spacer (1630) on the blade-side bearing race (1600).

CAUTION: THE HALVES OF THE HUB-SIDE BEARING RACE (1620) MUST HAVE MATCHING SERIAL NUMBERS

(d) Put the hub-side bearing race (1620) on the bearing balls (1610).



Installing the Preload Plate on the Blade Shank
Figure 7-5



Installing the Pitch Stop Shims and Stop Ring
Figure 7-6

(8) Install the preload plate (1540).

(a) Install the set screw (1560) in the preload plate (1540) so the end of the set screw (1560) protruding toward the blade butt is flush with the preload plate (1540).

NOTE: The set screw (1560) will be repositioned later to set the blade preload.

(b) Install the nut (1570) on the set screw (1560) and position the nut (1570) a short distance from the preload plate (1540).

NOTE: Thread locking compound will be applied to the set screw (1560) between the nut (1570) and the preload plate (1540) later in the build process.

(c) Put approximately one tablespoon of lubricant CM12 on top of the preload plate inner bearing race (1550) to lubricate the blade bore bearing. Refer to Figure 7-5.

NOTE: Using this amount of lubricant will force lubrication into the blade bore bearing when the preload plate (1540) is installed on the blade.

(d) Install the preload plate (1540) on the butt of the blade. Refer to Figure 7-5.

(9) Repeat the steps in the section, "Blade Unit Assembly Procedures" in this chapter for the remaining blades.

B. Rod Cylinder Bushings, Pitch Stop Shims, and Stop Ring Assembly Procedures

(1) Installing the Rod Cylinder Bushings

(a) Install the rod cylinder bushing (210) and the rod cylinder bushing (220) in accordance with the section, "Bonding of A-1186 and A-1799 Delrin® Bushings into a D-1036 or D-4904 Cylinder" in the Adhesive and Bonding chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02)

(2) Installing the Pitch Stop Shims, and Stop Ring - Refer to Figure 7-6

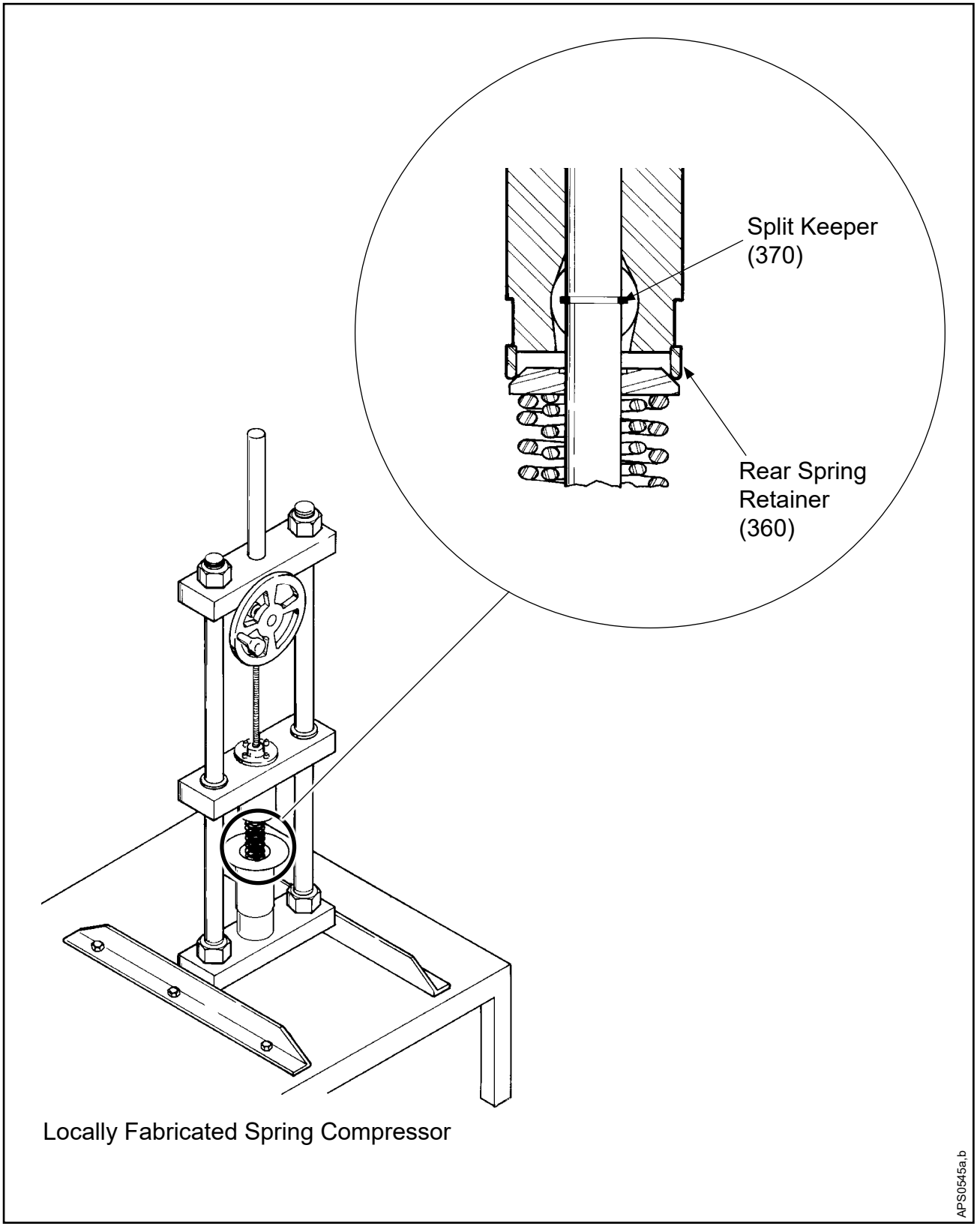
(a) Put the cylinder unit (200) on a padded surface with the flange-side of the cylinder unit (200) pointing upward.

(b) Put five pitch stop shims (240) on the cylinder unit (200).

1 If the quantity of pitch stop shims (240) required to get reverse pitch is known and that quantity is different than five, use the known number of pitch stop shims (240).

(c) Align the holes in the pitch stop shims (240) with the holes in the cylinder unit (200).

(d) With the beveled side of the stop ring (250) pointing upward, put the stop ring (250) on the pitch stop shims (240).



Cylinder/Spring Unit Assembly
Figure 7-7

(e) Align the holes in the stop ring (250) with the holes in the pitch stop shims (240) and with the holes in the cylinder unit (200).

(f) Using three 10-32 cap screws (260), attach the stop ring (250) and the pitch stop shims (240) to the cylinder unit (200).

(g) Torque the 10-32 cap screws (260) in accordance with Torque Table 8-1.

C. Cylinder/Spring Unit Assembly Procedures - Refer to Figure 7-7.

(1) Install the O-ring (100) in the O-ring groove in the pitch change rod hole of the cylinder unit (200).

(2) Install the pitch change rod (380) in the cylinder unit (200).

(3) Put the combined pitch change rod (380) and cylinder unit (200) in the locally fabricated spring compressor fixture.

(4) Put the plastic guide bearing (300), roller thrust bearing race (310), roller thrust bearing (320), and roller thrust bearing race (330) on the pitch change rod (380).

(5) Put the smaller diameter feathering compression spring (350) and the larger diameter feathering compression spring (340) on the pitch change rod (280).

(6) Put the rear spring retainer (360) on the pitch change rod (380).

(7) Prepare the split keeper (370).

(a) Using an appropriate customer procured cutting tool, cut the split keeper (370) at the slots provided.

(b) Remove any burrs at the cut edges of the two pieces of the split keeper (370)

WARNING: MAKE SURE OF THE SAFETY OF PERSONNEL IN THE AREA DURING THE ASSEMBLY PROCEDURE. WHEN COMPRESSED, THE FEATHERING COMPRESSION SPRINGS (340, 350) ARE LOADED TO APPROXIMATELY 800 POUNDS (363 KG) FORCE.

(8) Compress the feathering compression springs (340, 350) until the split keeper (370) can be installed.

(9) Install the two pieces of the split keeper (370).

CAUTION: MAKE SURE THAT THE TWO PIECES OF THE SPLIT KEEPER (370) ARE COMPLETELY ENGAGED AND DO NOT DISLODGE FROM THE GROOVE IN THE PITCH CHANGE ROD (380) DURING DECOMPRESSION OF THE CYLINDER/SPRING PACK.

(10) While constantly observing the two pieces of the split keeper (370) to make sure that they remain in the correct positions in the groove of the pitch change rod (380), carefully decompress the cylinder/spring pack.

WARNING: USE CARE WHEN HANDLING A CYLINDER (200) THAT CONTAINS COMPRESSED FEATHERING COMPRESSION SPRINGS (340, 350).

(11) Remove the pitch change rod/cylinder from the locally fabricated spring compressor fixture.

(12) Put the pitch change rod/cylinder unit in a safe place until required during assembly of the propeller.

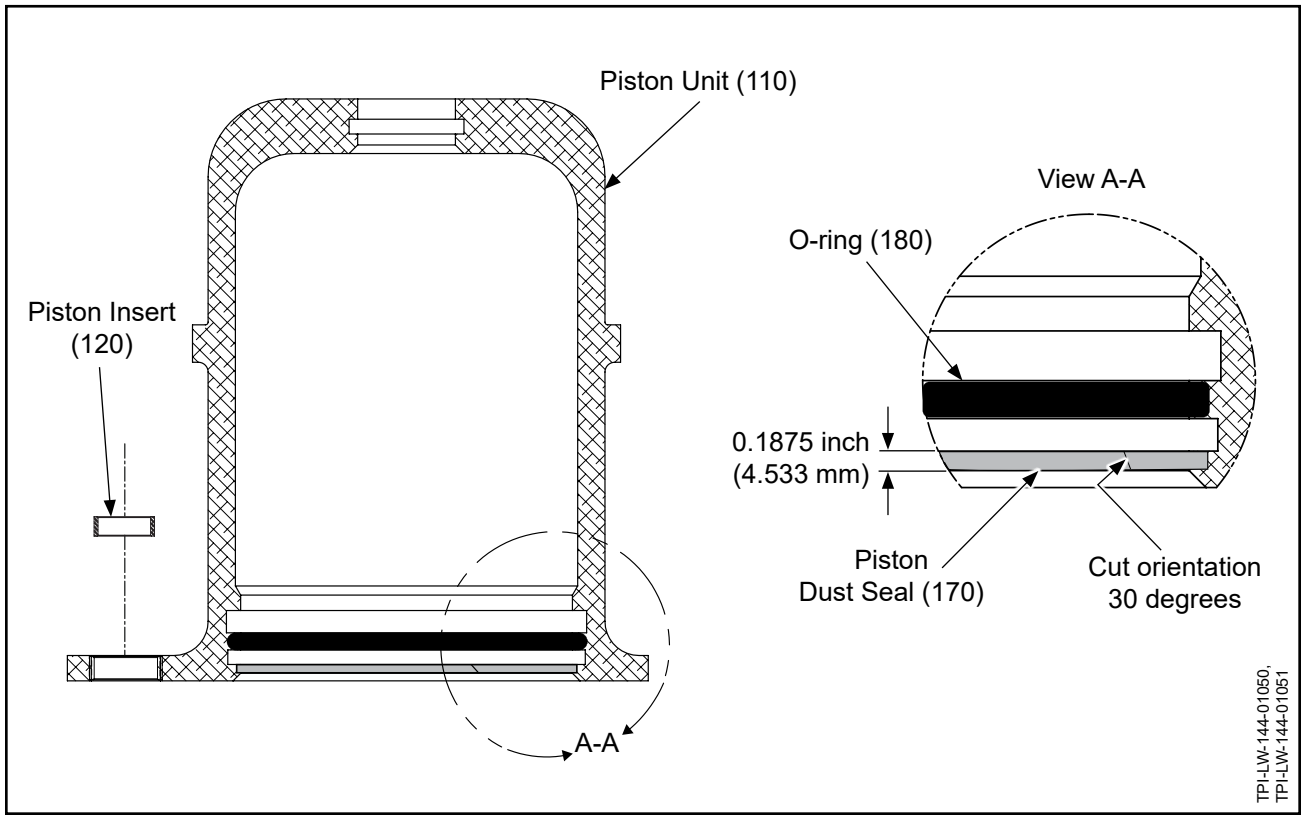
D. Assembling the Piston Unit - Refer to Figure 7-8.

(1) If the piston insert (120) in the piston unit (110) was removed, make sure that it has been installed in accordance with the section, "Bonding of A-1079 Insert into D-1035 Piston" in the Special Adhesive and Bonding Procedures chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(2) Install the piston O-ring (180) in the groove in the piston unit (110). Refer to Figure 7-8, View A-A.

(3) Cut the necessary length of piston dust seal material (170).

(a) Cut the piston dust seal material (170) on a 30 degree diagonal so there will be an overlap at the parting line with a smooth surface, free of fuzz. Refer to Figure 7-8, View A-A.



Locations of the Piston O-ring and Piston Dust Seal
Figure 7-8

(4) Soak the piston dust seal (170) in aviation grade turbine engine oil until the dust seal (170) is completely saturated.

(5) Squeeze the excess oil from the piston dust seal (170).

CAUTION: MAKE SURE THAT THE PISTON DUST SEAL (170) IS FREE OF FUZZ.

(6) If the piston dust seal (170) has fuzz or long strands that could interfere with O-ring operation, replace the piston dust seal (170).

(7) Install the thinnest section of the piston dust seal (170) in the remaining piston groove. Refer to Figure 7-8, View A-A.

(This page is intentionally blank.)

E. Synchrophasing Target Bracket Installation

(1) If the propeller will have ice protection, install the synchrophasing target bracket (1100) on the spinner bulkhead.

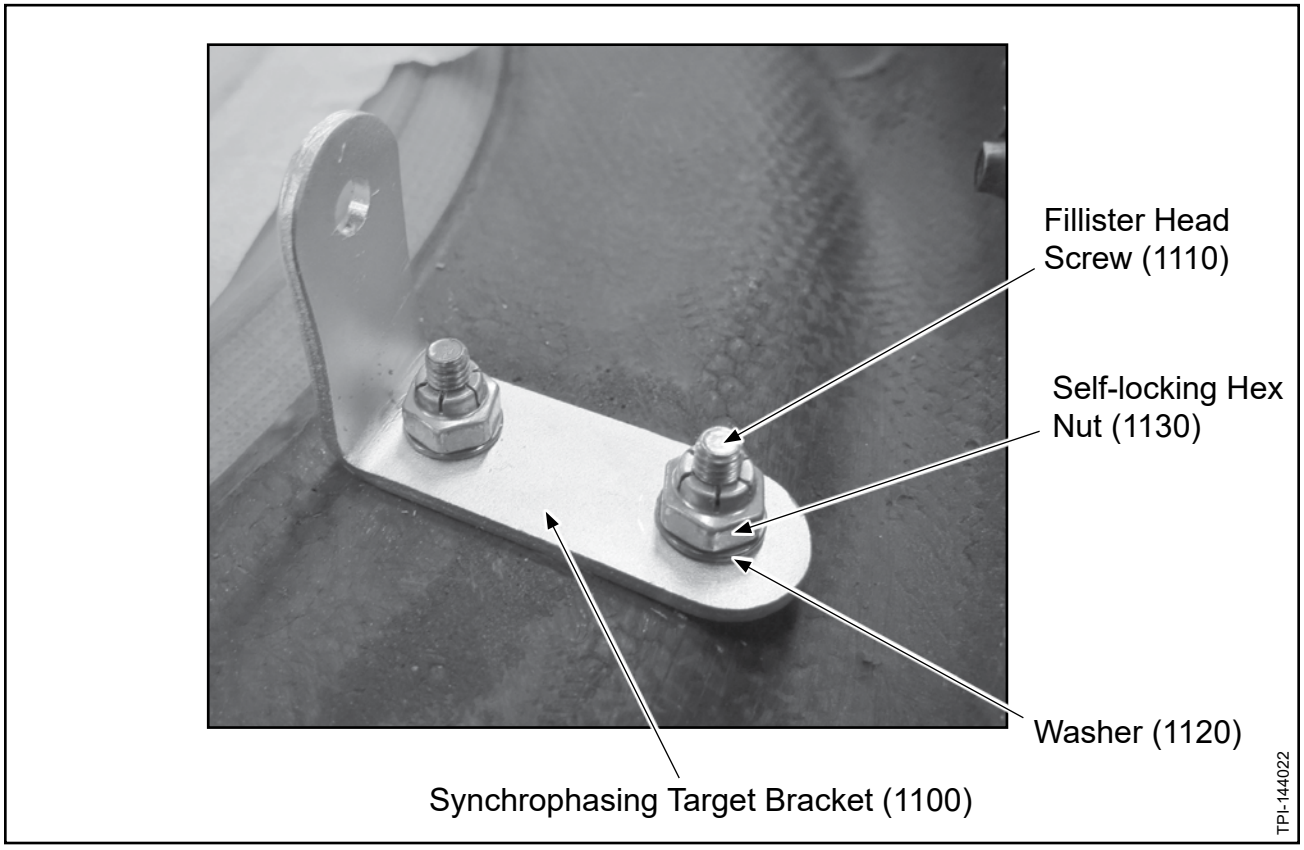
(a) Put the synchrophasing target bracket (1100) on the inside of the spinner bulkhead as shown in Figure 7-9.

(b) Put a fillister head screw (1110) through each hole in the bulkhead and through the hole in the synchrophasing target bracket (1100) as shown in Figure 7-9.

(c) Install a washer (1120) and a self-locking hex nut (1130) on each fillister head screw (1110) as shown in Figure 7-9.

CAUTION: DO NOT CRUSH THE COMPOSITE LAYERS OF THE SPINNER BULKHEAD WHEN TORQUING THE SELF-LOCKING HEX NUT (1130) .

(d) Torque each self-locking hex nut (1130) in accordance with Torque Table 8-1.



Synchrophasing Target Bracket Installation
Figure 7-9

F. Hub Assembly Procedures

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

(1) For assembly procedures of the hub unit (500) before following the propeller assembly procedures in this manual, refer to the Aluminum Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(2) For a D-1066-1 hub unit (500) install the rod hub bushing (550), in accordance with the installation instructions in the section, "Modifying a D-1066 Hub to Use a 105450 Pitch Change Rod Hub Bushing" in the Repair chapter of this manual.

(3) Install a new pitch change rod O-ring (600) in the engine-side half of the hub unit (500). Refer to Figure 7-11.

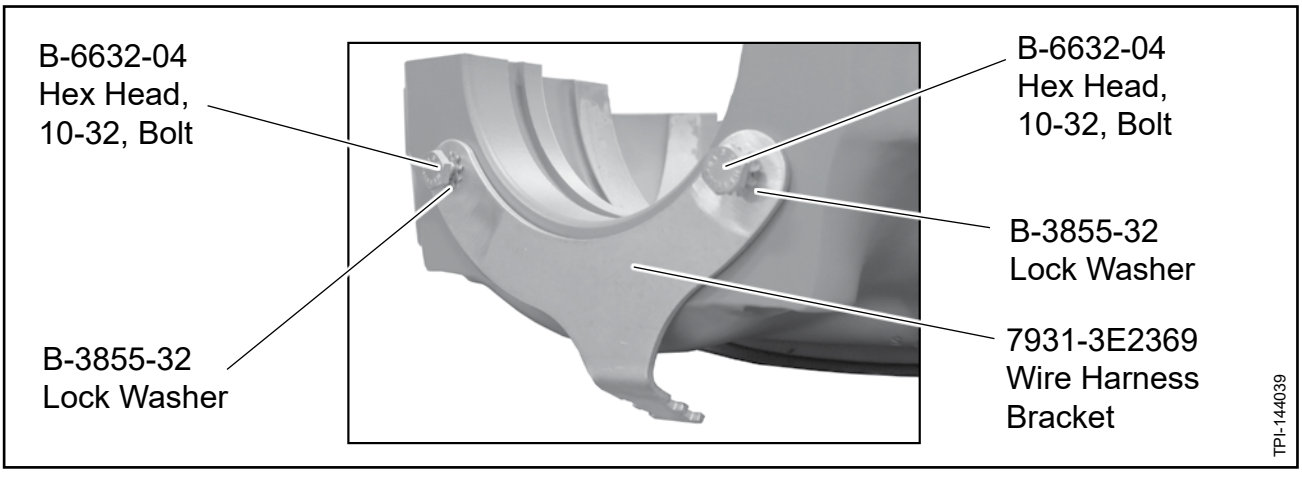
(4) Install an O-ring (620) in each beta rod hole in the engine-side half of the hub unit (500).

(5) If the propeller will have a de-ice system, install the 7931-3E2369 wire harness bracket. Refer to Figure 7-10.

(a) With the end of the 7931-3E2369 wire harness bracket pointing toward the engine-side half of the hub, align the holes in the 7931-3E2369 wire harness bracket with the holes that are adjacent to the blade socket of the hub unit (500)

(b) Install a B-3855-32 lock washer and a B-6632-04 hex head, 10-32, bolt in each hole.

(c) Torque the B-6632-04 hex head, 10-32, bolt in accordance with the Torque Values Table 8-1 in the Fits and Clearances chapter of this manual.



Installing the Wire Harness Bracket
Figure 7-10

(6) With the threaded holes pointing upward, put the beta ring (700) over the rotatable fixture of the assembly table TE129.

CAUTION: INSTALL THE SPINNER BULKHEAD/DE-ICE SLIP RING BEFORE ASSEMBLING THE BETA COMPONENTS.

(7) With the smooth side of the bulkhead pointing upward, put the spinner bulkhead over the rotatable fixture of the assembly table TE129.

NOTE: If a synchrophasing target bracket (1100) was installed, the bracket will be pointing downward.

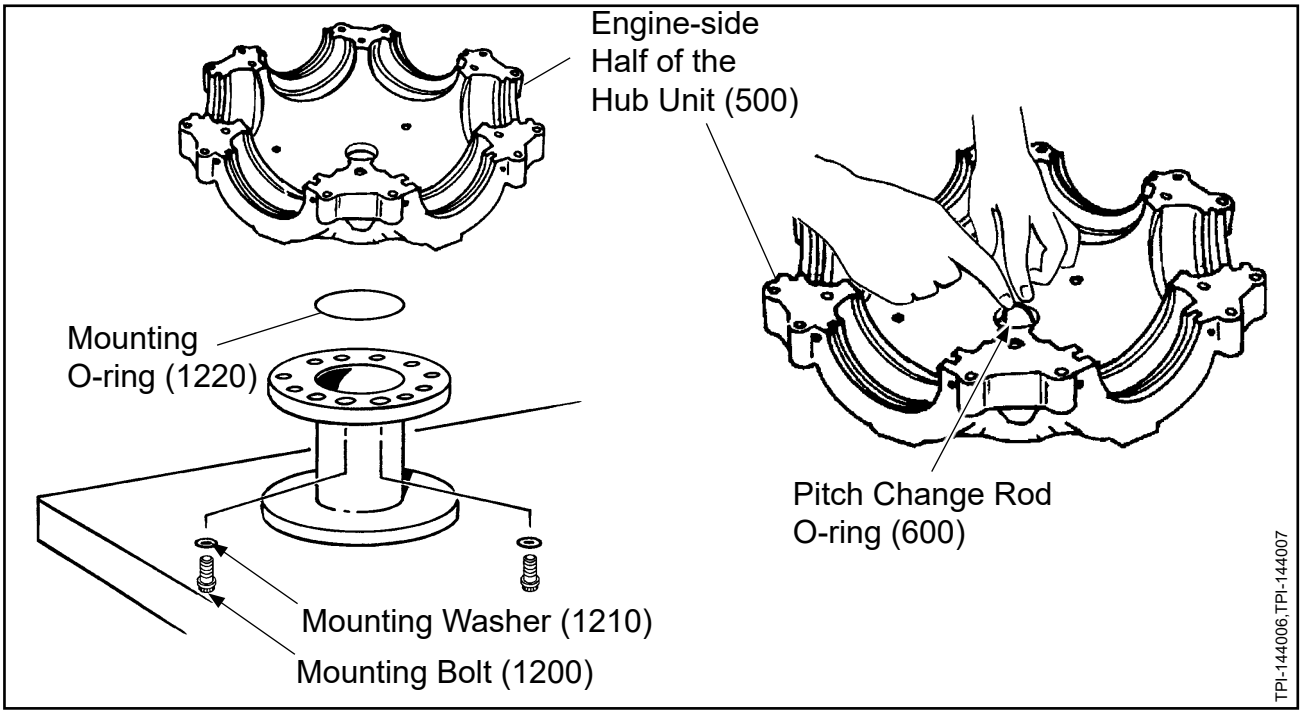
(8) Install the mounting flange O-ring (1220) on the rotatable fixture of the assembly table TE129 to seal between the hub unit (500) and the rotatable fixture. Refer to Figure 7-11.

(9) Install the engine-side half of the hub unit (500) on the rotatable fixture of the propeller assembly table TE129. Refer to Figure 7-11.

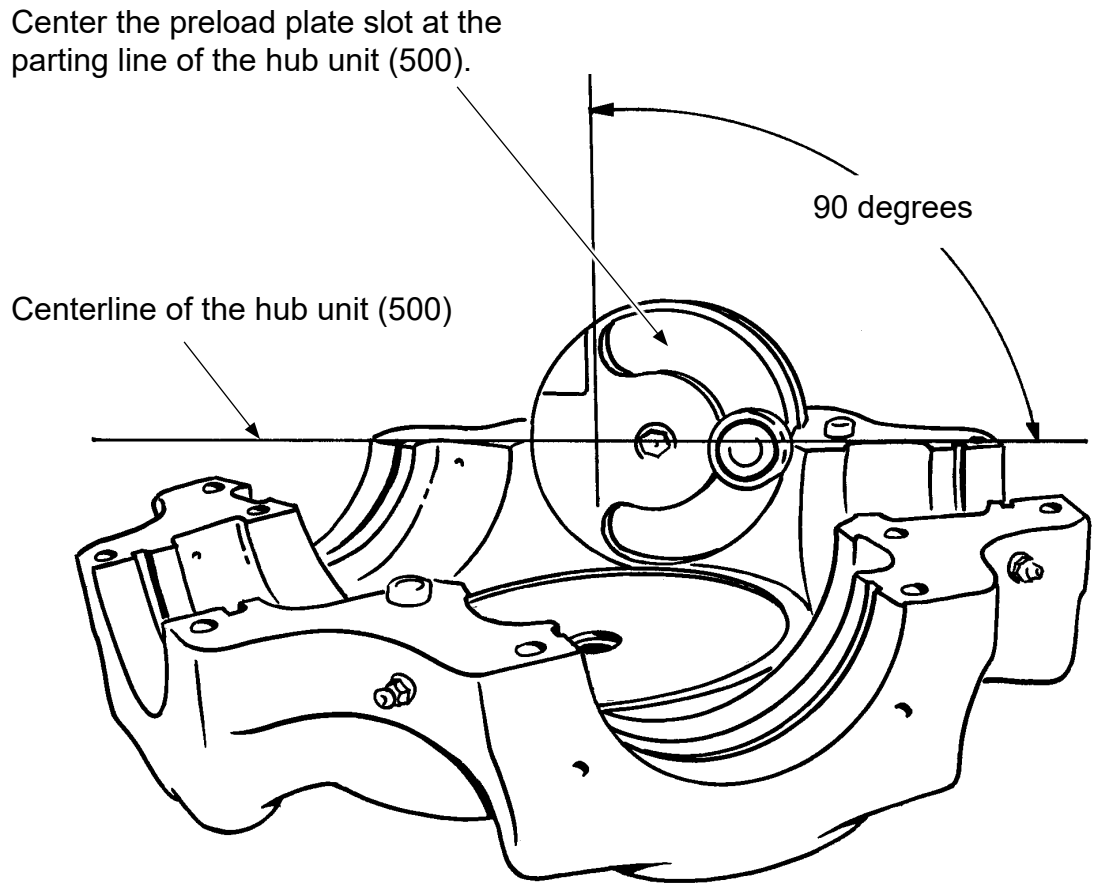
(10) Using one washer (1210) and one bolt (1200) in each of two mounting holes in the hub unit (500) that are 180 degrees apart, install the engine-side half of the hub unit (500) on the rotatable fixture on the propeller assembly table TE129 or equivalent. Refer to Figure 7-11.

(11) Torque the bolts (1200) until tight.

(a) For the mounting torque values, refer to Hartzell Propeller Inc. Owner's Manual 154.



Installing the Engine-Side Hub Half on the Rotatable Fixture
Figure 7-11



NOTE: For illustration purposes, a five bladed propeller is shown and the fork assembly (430) has been removed.

Installing a Blade in the Hub Socket
Figure 7-12

G. Blade Installation

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

(1) Using solvent CM11, CM23, CM106, or CM173, clean the inside surface of the hub unit (500), the parting line face, and the O-ring grooves.

(2) Permit the solvent CM11, CM23, CM106, or CM173 to dry.

(3) Apply a thin layer of lubricant CM12 to the blade retention radii of the engine-side half of the hub unit (500) and the O-ring grooves.

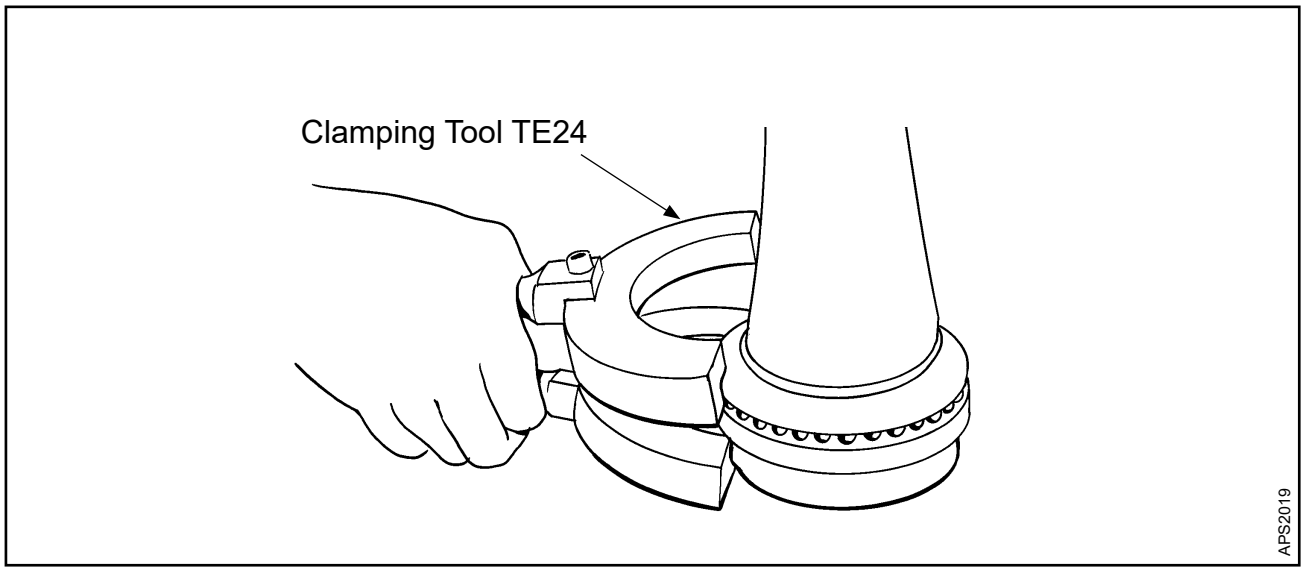
(4) Put the fork assembly (430) in the engine-side half of the hub unit (500).

(5) Put a blade stand TE126 or equivalent, under each blade to be installed at approximately 10 inches (254 mm) from the tip.

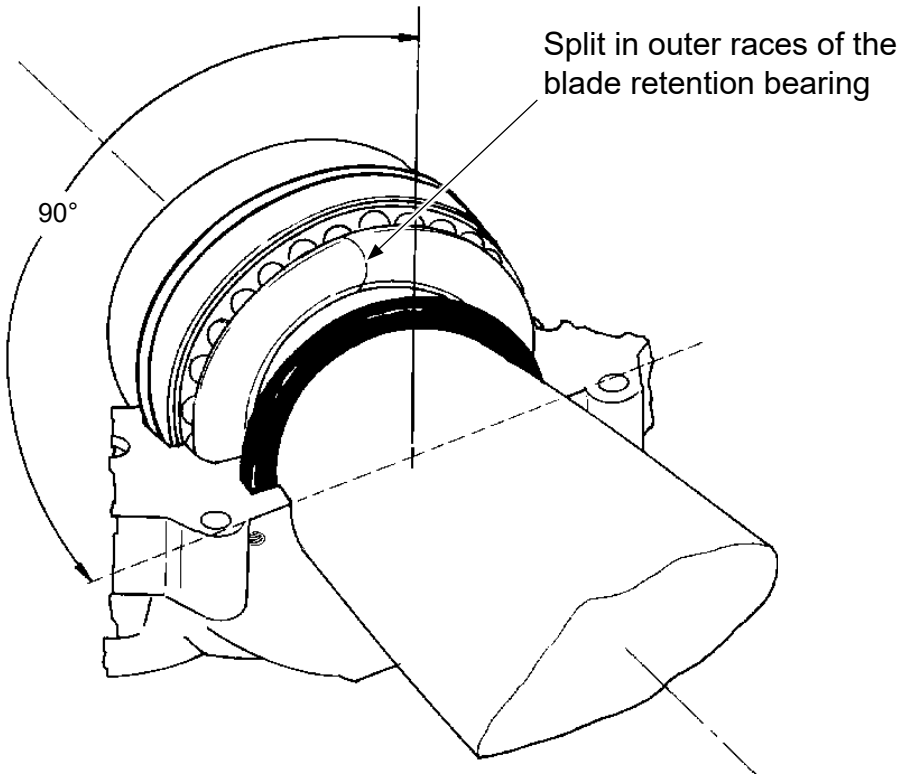
(6) Install each previously constructed blade assembly using the following steps:

NOTE: Blade retention components clamp TE25 may be used to hold the parts together when installing a blade. Refer to Figure 7-13.

(a) Center the blade knob slot of the preload plate (1540) at the parting line of the hub unit (500). Refer to Figure 7-12.



Applying the Clamping Tool TE24 to the Blade Assembly
Figure 7-13



Position of the Split in the Blade Retention Bearing Races
Figure 7-14

CAUTION: THE SPLIT IN THE OUTER RACES OF THE BLADE RETENTION BEARING MUST BE AT A 90 DEGREE ANGLE TO THE PARTING SURFACES OF THE HUB UNIT (500).

(b) Align the split in the outer races of the blade retention bearing 90 degrees from the parting line of the hub unit (500). Refer to Figure 7-14.

(c) Repeat steps 2.G.(1) through 2.G.(6)(b) for the remaining blades.

(7) Install each guide bushing (520) in each hole provided for it in the hub unit (500).

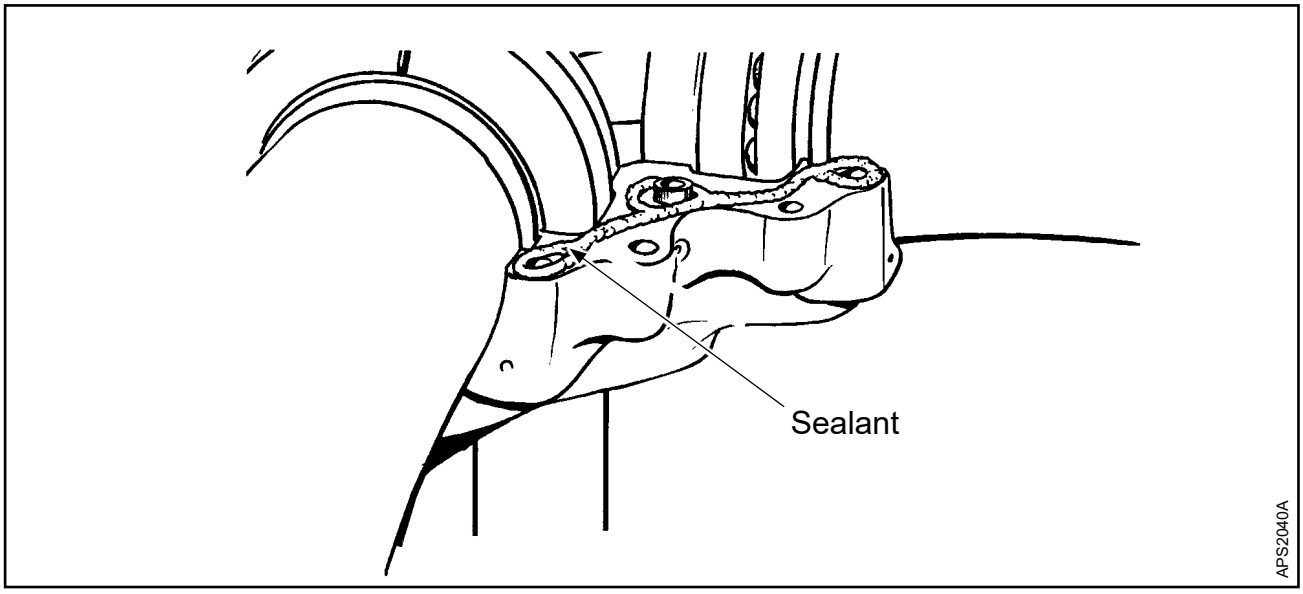
NOTE: When assembling a propeller that will be disassembled for shipping, it is not necessary to remove the pitch change rod and the cylinder-side half of the hub unit (500) to install the remaining hex head bolts (410, 420), washers (630) and self-locking nuts (640), or to apply CM66, CM92, or CM257 to the mating surfaces of the hub unit (500).

CAUTION: DO NOT PERMIT EXCESSIVE SEALANT TO BE SQUEEZED INTO THE BLADE RETENTION SOCKETS.

(8) Put a bead of sealant CM66, CM92, or CM257 on the mating surfaces of the hub unit (500). Refer to Figure 7-15.

(a) The sealant must contact the blade O-rings (1640).

(b) Use only enough sealant on the mating surfaces so that a small amount will be squeezed out along the entire parting surface when the self-locking nuts (640) are correctly torqued.



Applying Sealant Between the Hub Halves
Figure 7-15

(9) Using the guide hub bushings (520), align the halves of the hub unit (500).

(10) Making sure the blade O-rings (1640) are in the blade O-ring grooves of the hub unit (500), put the cylinder-side half of the hub unit (500) on the engine-side half of the hub unit (500).

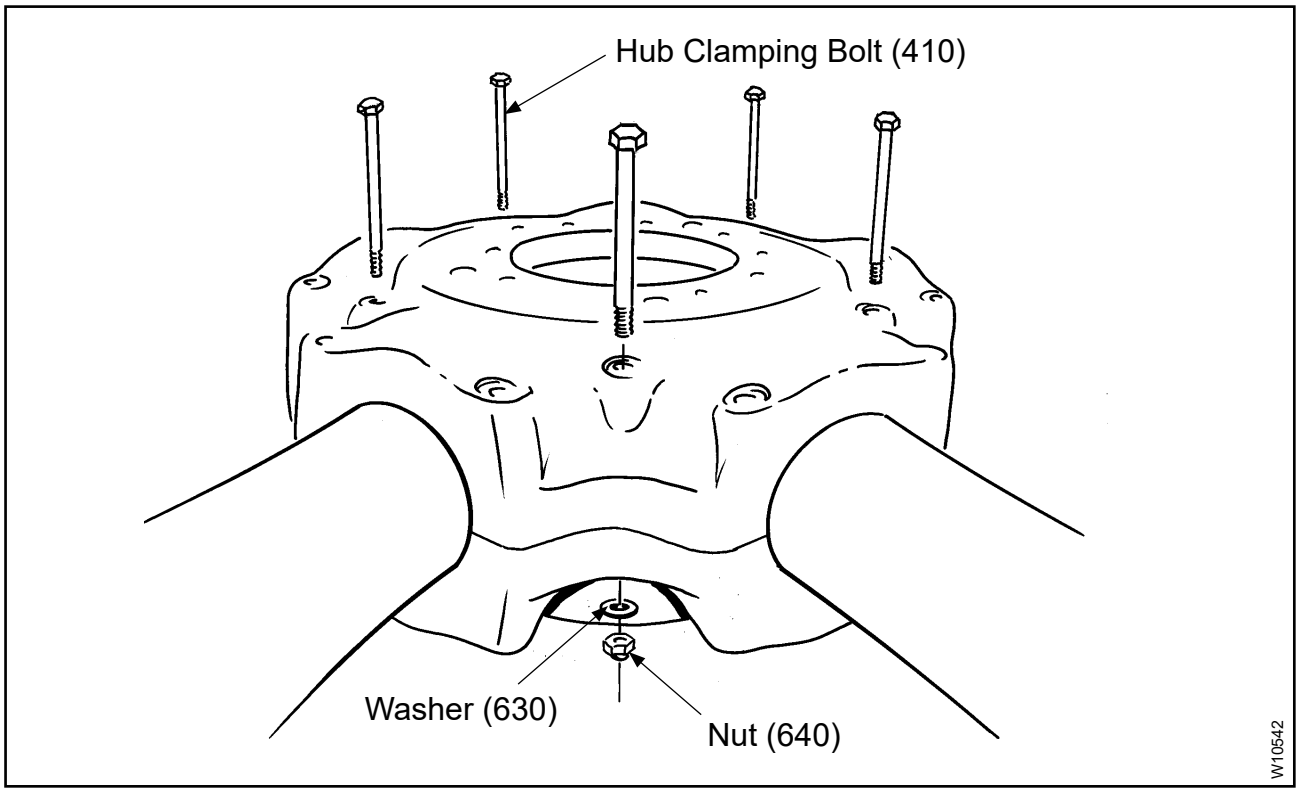
(11) Midway between each of the six blade sockets, install a bolt (410), washer (630), and nut (640). Refer to Figure 7-16.

NOTE: A soft mallet may be used to help install the bolts (410) in the holes in the halves of the hub unit (500).

CAUTION: USE A STAGGERED SEQUENCE WHEN TORQUING THE NUTS (640) TO MAKE SURE OF UNIFORM PULL-DOWN OF THE HALVES OF THE HUB UNIT (500).

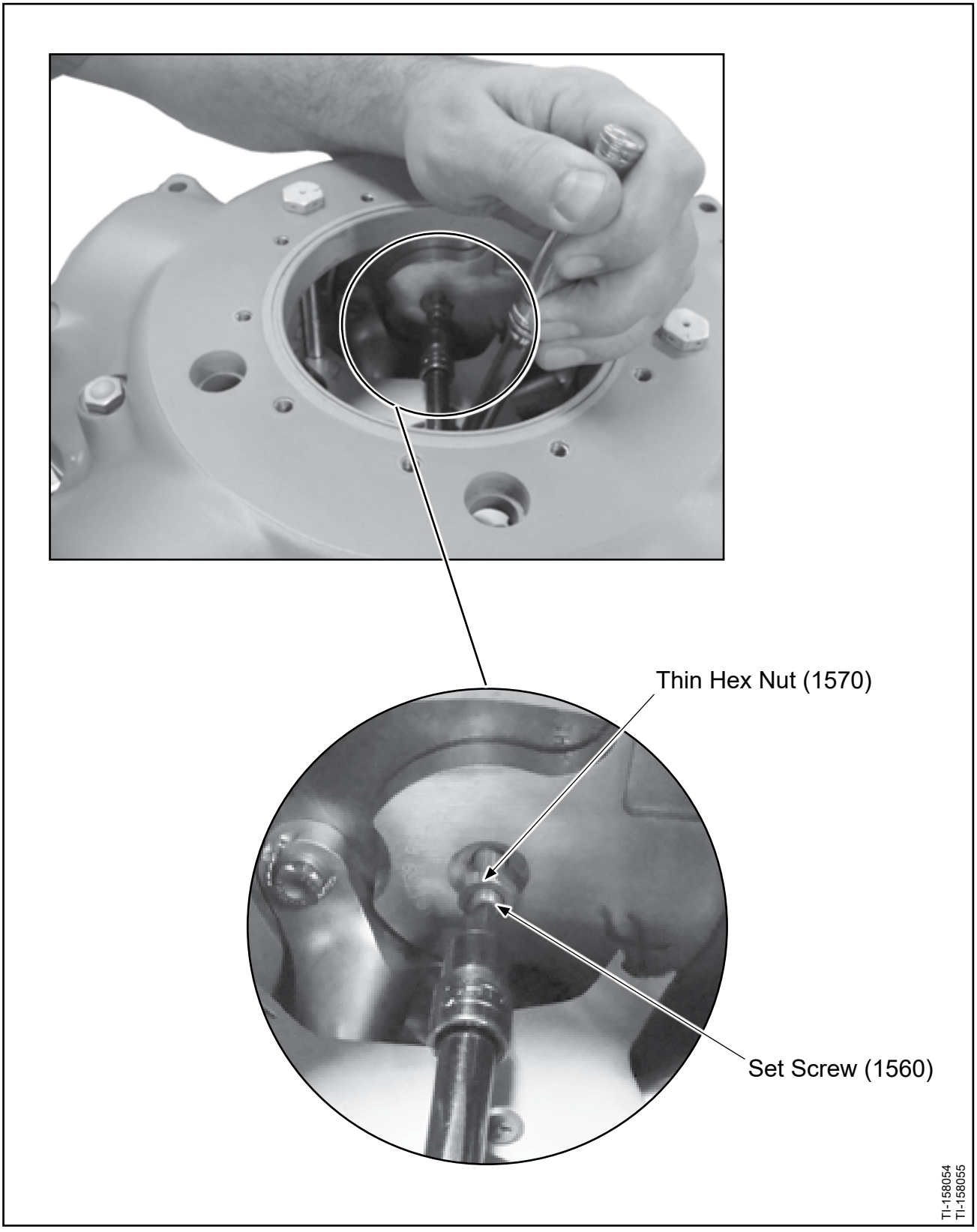
(12) Using a staggered sequence, torque each nut (640) in accordance with the Torque Values Table 8-1 in the Fits and Clearances chapter of this manual.

(13) Remove the blade stands TE126 or equivalent, from each blade.



Installing the Cylinder-side Hub Half to Set Blade Preload
Figure 7-16

(This page is intentionally blank.)



Tightening Preload Plate Hex Head Screw and Jam Nut
Figure 7-17

H. Setting the Blade Preload

(1) Tighten the preload set screw (1560) until the tip of the blade stops moving vertically. Refer to Figure 7-17

(2) Gently push on the tip of each blade to make sure the blade is correctly seated in the retention socket of the hub unit (500).

(3) Loosen the set screw (1560) and retighten until the blade tip stops moving, then turn the set screw an additional 1/4 turn into the preload plate (1540).

(4) Make sure that the blade turns freely in the hub unit (500).

(a) If the blade does not turn freely, examine the following:

1 The blade O-ring (1640) for correct fit in the groove in the hub unit (500)

2 The needle rollers in the blade bore bearing may be skewed. The needle rollers must be parallel to the axis of blade pitch change.

3 The blade preload may be too tight.

4 Binding caused by an excess of CM92, CM66, or CM257

(b) If the blade turns freely, continue to the next step.

(5) Apply one drop of thread locking compound CM21 on the threads of each preload set screw (1560) between the thin hex nut (1570) and the preload plate (1540).

CAUTION: MAKE SURE TO PREVENT THE SET SCREW (1560) FROM ROTATING WHEN TORQUING THE THIN HEX NUT (1570).

(6) Torque the thin hex nut (1570) against the preload plate (1540) in accordance with the Torque Values Table 8-1 in the Fits and Clearances chapter of this manual. Refer to Figure 7-17.

(7) Repeat Steps 2.I.(1) through 2.I.(6) for the remaining blades.

(8) Move the blades by hand to make sure that the blades have full range of movement from reverse pitch to feather pitch.

(a) If there is not full blade angle movement, remove the hub clamping bolts (410), nuts (640), and washers (630) and slightly separate the halves of the hub unit (500) to permit rotation of the preload plate (1540).

(b) After the preload plate (1540) has been correctly positioned, repeat the installation procedure for hub clamping bolts (410).

I. Installing the Fork

(1) By hand, rotate all of the blades to the same blade angle.

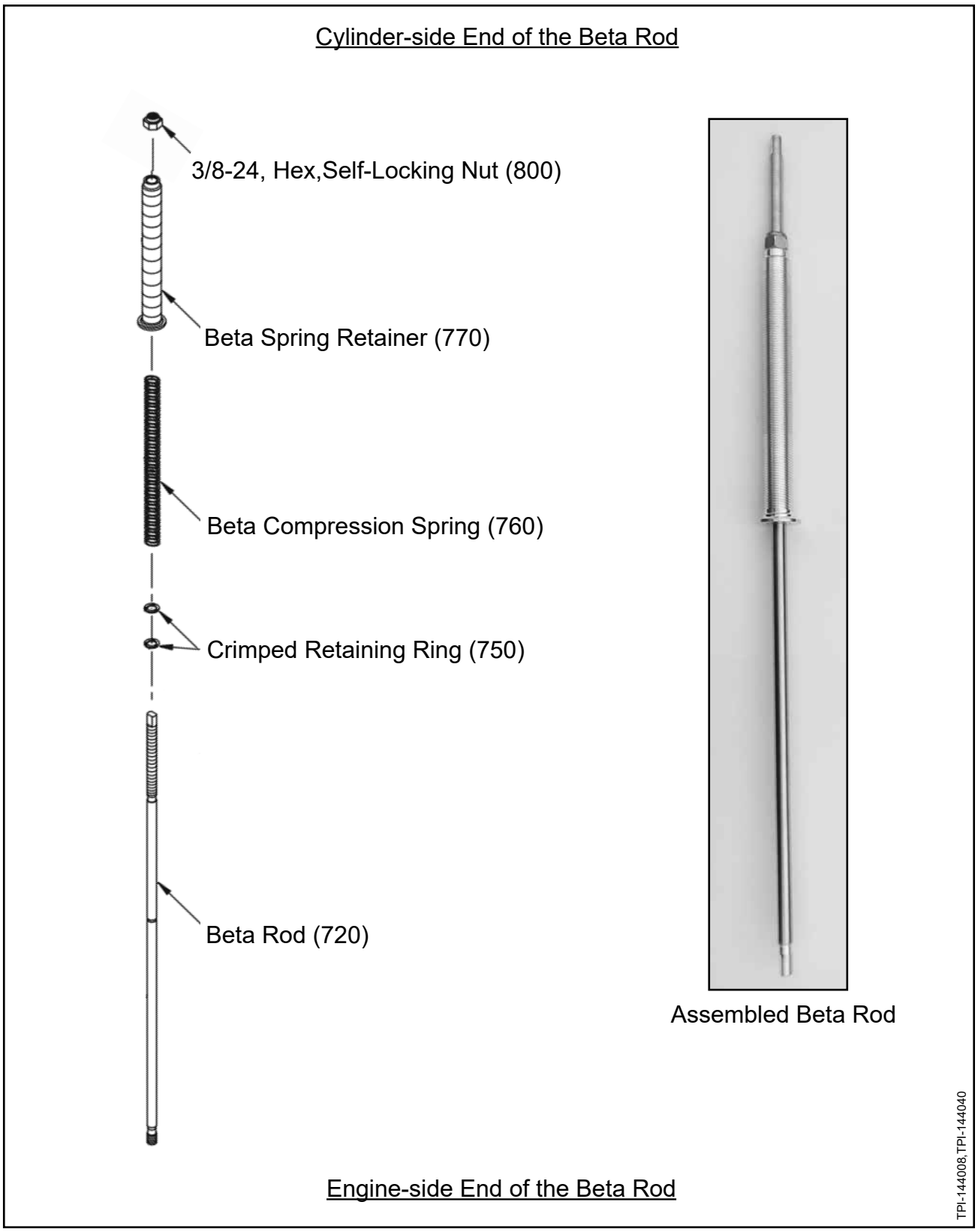
(2) Turn all of the pitch adjust block units (1430) so that they are parallel to the surface of the hub unit (500).

(3) Attach the dummy pitch change rod TE298 to the fork unit (430).

(a) Optionally, a locally procured tool that will permit the fork unit (430) to be lifted and turned may be used instead of the dummy pitch change rod TE298.

(4) Pick up the fork unit (430) and rotate it, making sure that each pitch adjust block unit (1430) is in the slot of the fork assembly (430).

(This page is intentionally blank.)



Assembling the Beta Rods
Figure 7-18

J. Assembly and Installation of the Beta Rods - Refer to Figure 7-18

(1) Install the two crimped retaining rings (750) in the groove provided for them in the beta rod (720).

(a) Using the special tool TE65 (AST-2849), crimp the retaining rings together by compressing them to a 0.550 inch (13.97 mm) maximum outside diameter.

(2) Put the beta rod (720) in a locally procured vise that has padding installed to prevent damage to the beta rod (720).

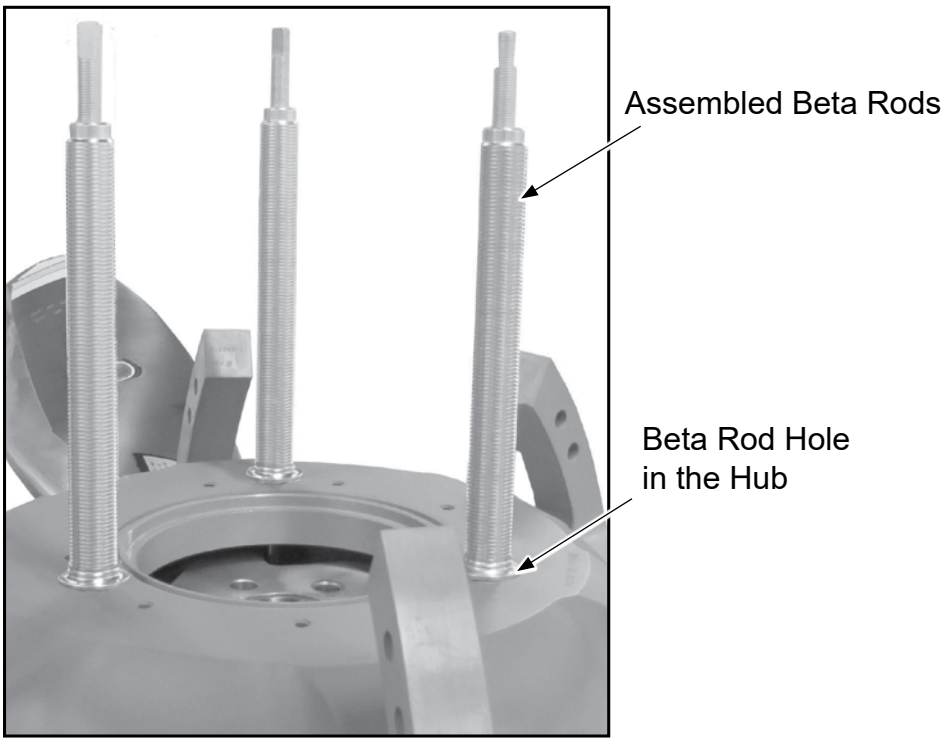
(3) Install the beta compression spring (760) on the beta rod (720).

(4) Install the beta spring retainer (770) on the beta rod (720).

(5) Turn the nut (800) on the beta rod (720) until the beta spring retainer (770) is flush with the bottom of the crimped retaining ring (750).

(6) Apply lubricant CM12 to the engine-side end of each beta rod (720).

(7) With the engine-side end of the assembled beta rod pointing toward the hub unit (500), install each beta rod (720) in the beta rod hole in the hub unit (500). Refer to Figure 7-19.



Installing the Beta Rods
Figure 7-19

(This page is intentionally blank.)

K. Installing the Assembled Cylinder - Refer to Figure 7-20

(1) Install the cylinder mounting O-ring (400) in the groove provided for it on the top of the cylinder-side half of the hub unit (500).

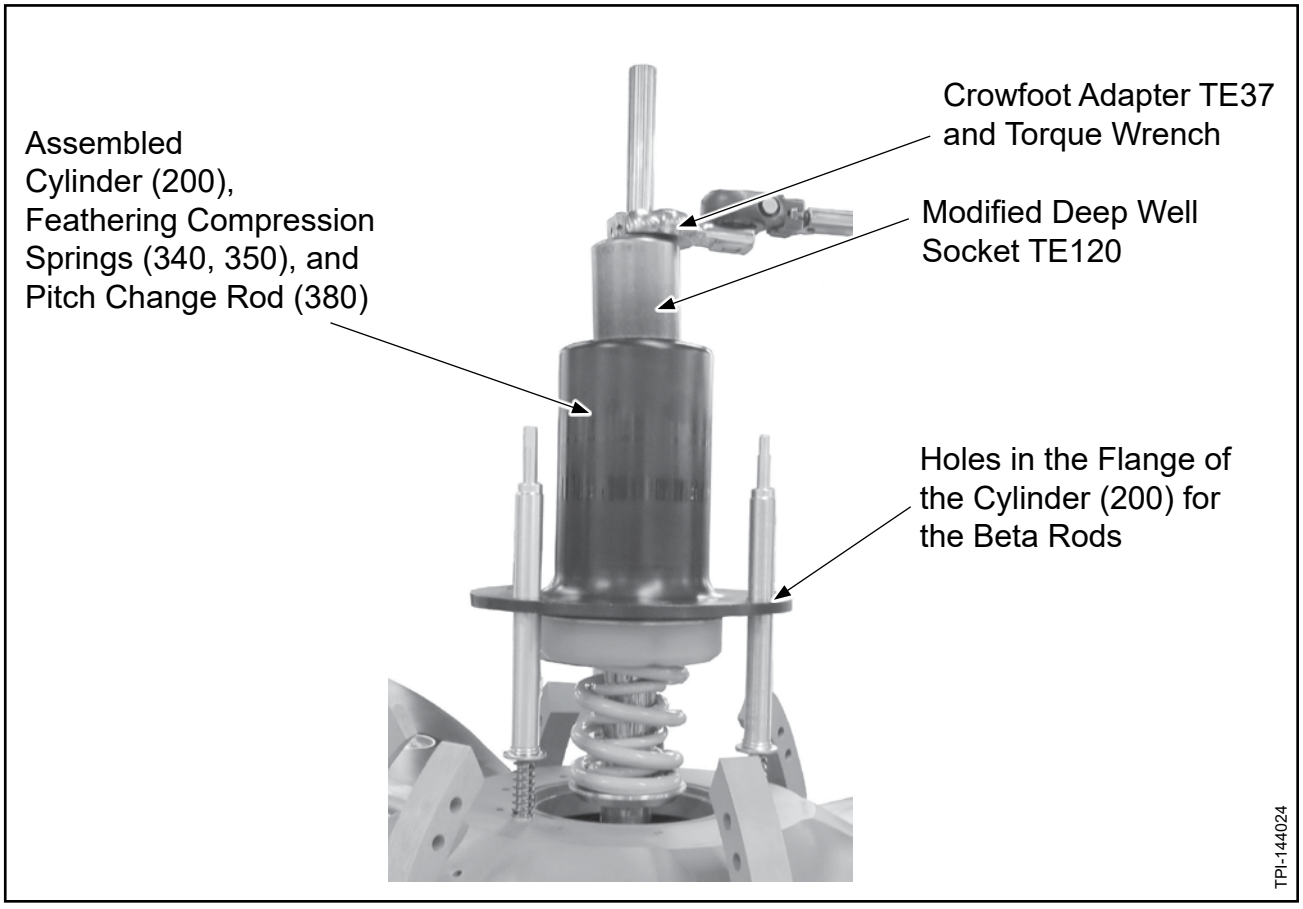
(2) Apply a thin layer of anti-seize compound CM118 to the external threads of the pitch change rod (380) that extend from the pitch change rod/cylinder unit and that will turn into the fork assembly (430).

(3) Align the cylinder-side ends of the beta rods (720) with the holes in the cylinder (200).

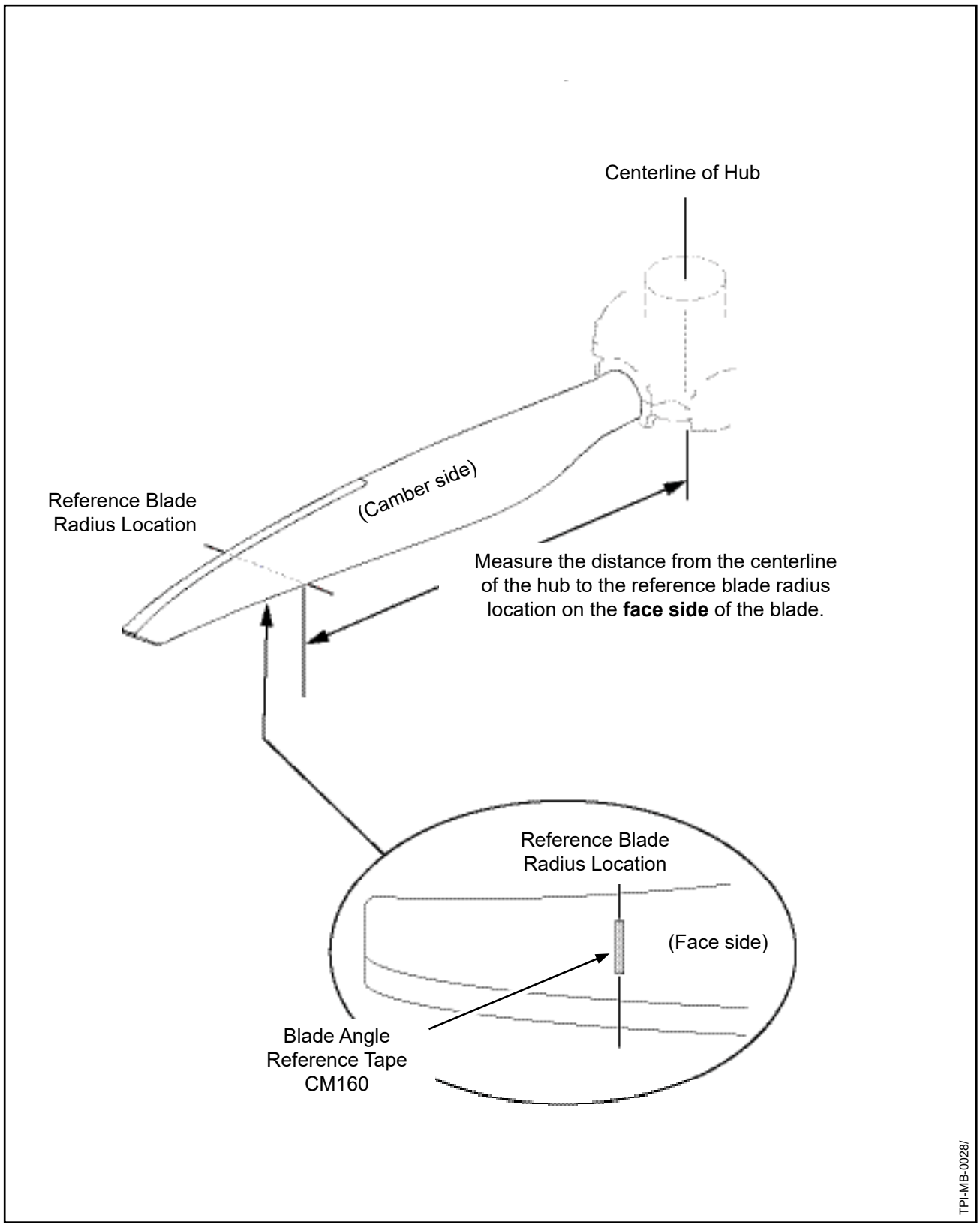
(4) Install the cylinder (200) on the beta rods (720).

(5) Put a modified deep well socket TE120 on the pitch change rod (380).

(6) Using a crowfoot adapter TE37 and a locally procured torque wrench, turn the pitch change rod (380) into the fork assembly (430).



Installing the Assembled Cylinder
Figure 7-20



Blade Angle Reference Tape
Figure 7-21

L. Blade Angle Reference Tape Application (Optional) Rev. 2

CAUTION: DO NOT CONFUSE REFERENCE BLADE RADIUS WITH BLADE STATION. REFERENCE BLADE RADIUS AND BLADE STATION OF THE SAME NUMBER MAY NOT ALWAYS INDICATE THE SAME LOCATION ON THE BLADE.

(1) Reference blade radius is measured from the center of the propeller hub to a predetermined reference location on the blade for blade angle measurement.

(2) Blade stations are used during the repair or overhaul process of a blade to define a blade span location for dimensional measurement.

(3) Establish a reference blade radius location

(a) Refer to the Aircraft Type Certificate Data Sheet or the Hartzell Propeller Inc. Application Guide, Manual 159 (61-02-59), for the reference blade radius location specified for the applicable aircraft installation.

(b) Beginning with blade one, measure from the center of the propeller hub to the reference blade radius location specified. Refer to Figure 7-21.

(c) Apply a piece of reference tape CM160 to the face side of the blade at the reference blade radius location, perpendicular to the blade centerline as shown in Figure 7-21.

1 Put the reference tape CM160 on the blade so that the reference blade radius location runs through the centerline of the tape.

(d) Repeat steps (3)(b) and (3)(c) for the remaining blades in the hub assembly.

(e) Put a pattern cut-out over each piece of reference tape CM160.

(f) Spray each piece of reference tape CM160 with clear lacquer CM129 to prevent peeling.

(This page is intentionally blank.)

M. Checking the Blade-to-Blade Angle Tolerance

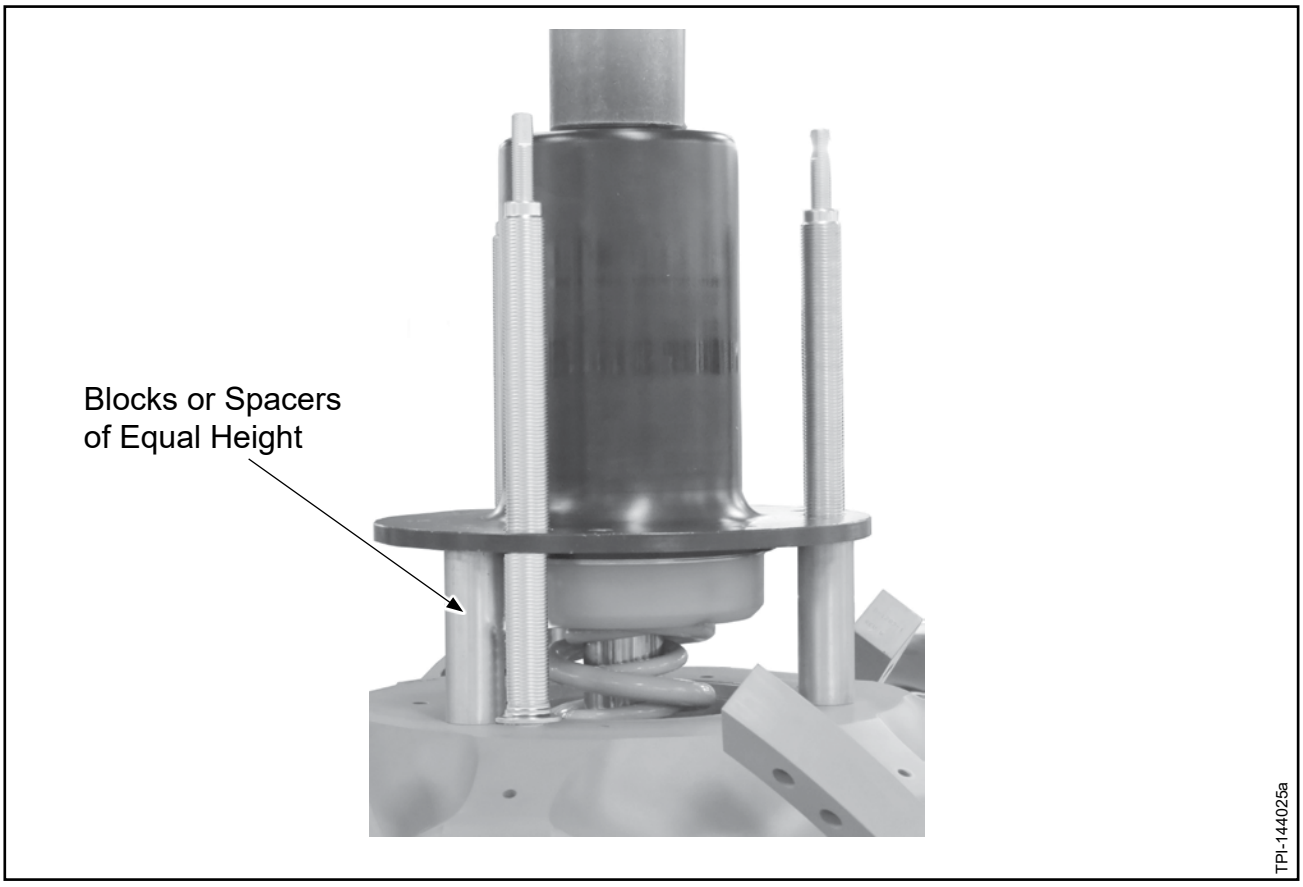
NOTE: The purpose of checking the blade angles is to verify that the blade angles of all six blades are within 0.2 degree of each other at the reference blade radius.

(1) Put two blocks or spacers of equal height (± 0.0005 inch (0.012 mm) under the cylinder (200) and on opposite sides of the pitch change rod (380) to hold the propeller in a low blade angle position. Refer to Figure 7-22.

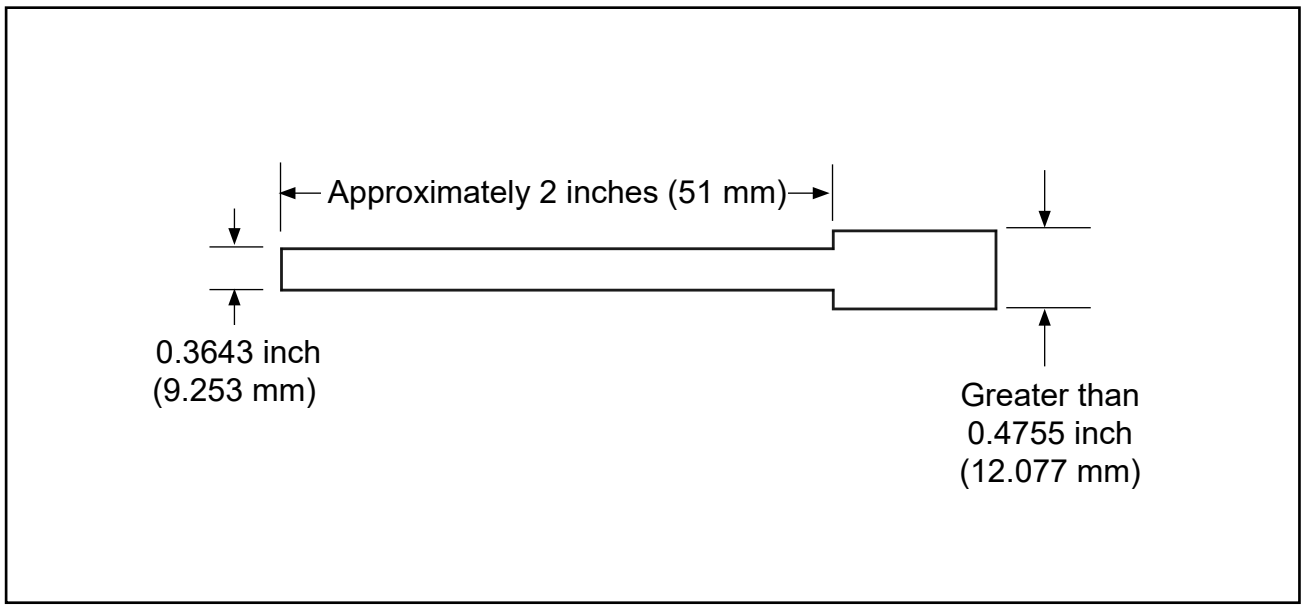
(2) Measure the blade angle at the reference blade radius location that is indicated by the blade angle reference tape.

(a) The propeller does not have to be at the final low pitch position for this measurement, but the blade angle for this check is 18 - 25 degrees.

(b) Move the blades by hand toward the high pitch position to make sure that the pitch adjust blocks (1430) are correctly seated against the fork assembly (430).

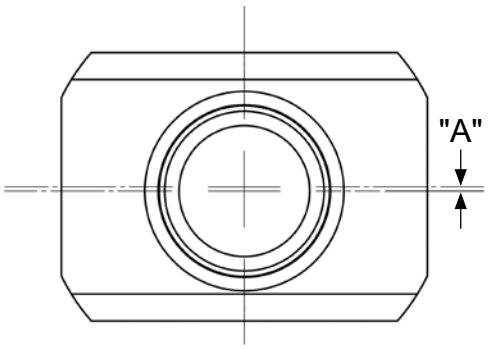


Checking Blade-to-Blade Angle Tolerance
Figure 7-22



Tool to Change a Pitch Adjust Block Unit
Figure 7-23

Part Number	"A"
B-1034	0.000
B-1034-2	0.002
B-1034-4	0.004
B-1034-6	0.006
B-1034-8	0.008
B-1034-10	0.010
B-1034-12	0.012



Pitch Adjust Block Unit Dimensions
Table 7-1

(3) Using a protractor, measure to make sure that the angle of each blade within the propeller varies no more than 0.2 degree from highest to lowest angle measurement.

(a) If the difference between the highest blade angle and the lowest blade angle is greater than 0.2 degree:

1 Rotate the pitch adjust block unit(s) (1430) 180° on the blade(s) or replace the pitch adjust block unit(s) (1430).

a For the pitch adjust block unit(s) (1430) dimension differences, refer to Table 7-1.

b To replace the pitch adjust block unit(s) (1430), a locally procured tool that permits the needle rollers (1470) and the outer ring (1480) to be removed from the inner ring (1460) can be used. Refer to Figure 7-23.

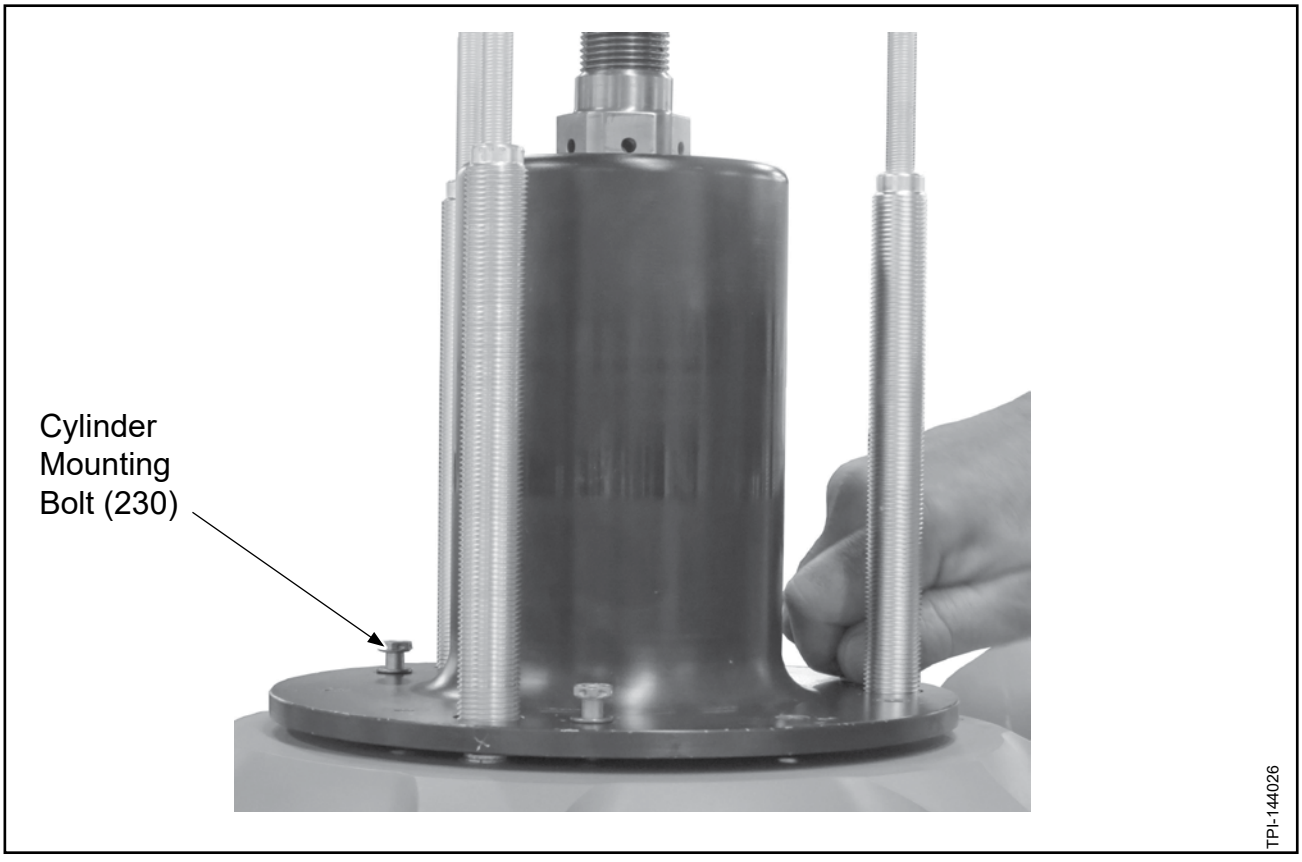
2 Remeasure the blade-to-blade angle tolerance until the tolerance is achieved on all six blades.

NOTE: Each blade has tolerances for blade angles at the various blade stations. The ultimate effects of these tolerances upon vibration during operation are magnified by the blade-to-blade tolerances in the assembled propeller. Maintaining a blade-to-blade tolerance within 0.2 degree at the reference blade radius has been found to be an acceptable limit. Although not a requirement, an additional measurement of the blade-to-blade tolerance at the outermost blade station may be a worthwhile verification that all blades of a set are within tolerance. The difference between the highest blade angle and the lowest blade angle at the outermost station should not be greater than 0.4 degree.

(b) If the difference between the highest blade angle and the lowest blade angle is within 0.2 degree, continue to the next step.

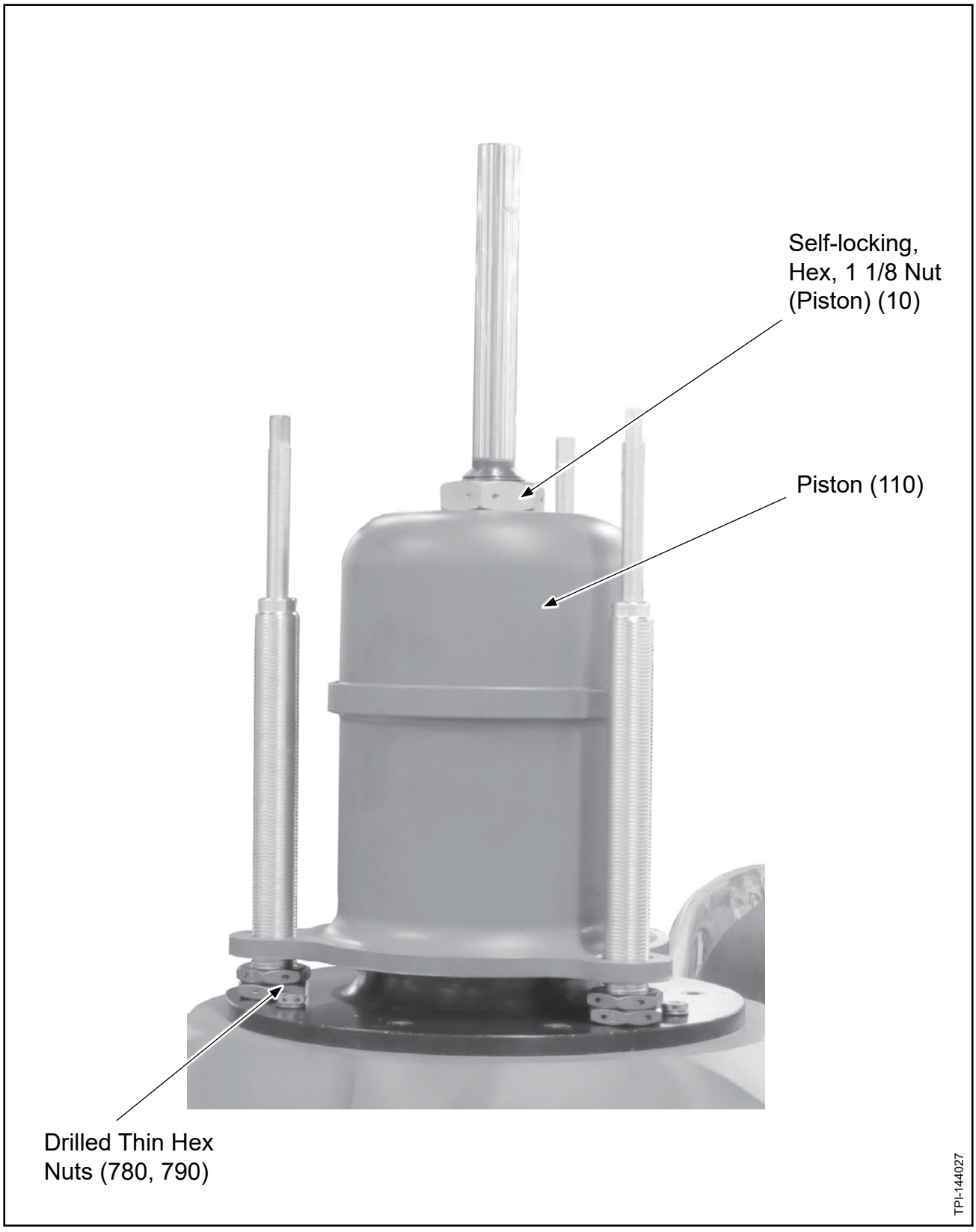
(4) Install one cylinder mounting bolt (230) between each beta rod.

(a) Torque each cylinder mounting bolt (230) in accordance with Table 8-1, Torque Values. Refer to Figure 7-24.



Installing the Cylinder Mounting Bolts
Figure 7-24

(This page is intentionally blank.)



Installing the Piston
Figure 7-25

N. Installing the Piston - Refer to Figure 7-25 and Figure 7-26

(1) Install the drilled thin hex nuts (780, 790) on each beta rod (720) and turn the drilled thin hex nuts (780, 790) until they touch the flange of the cylinder (200).

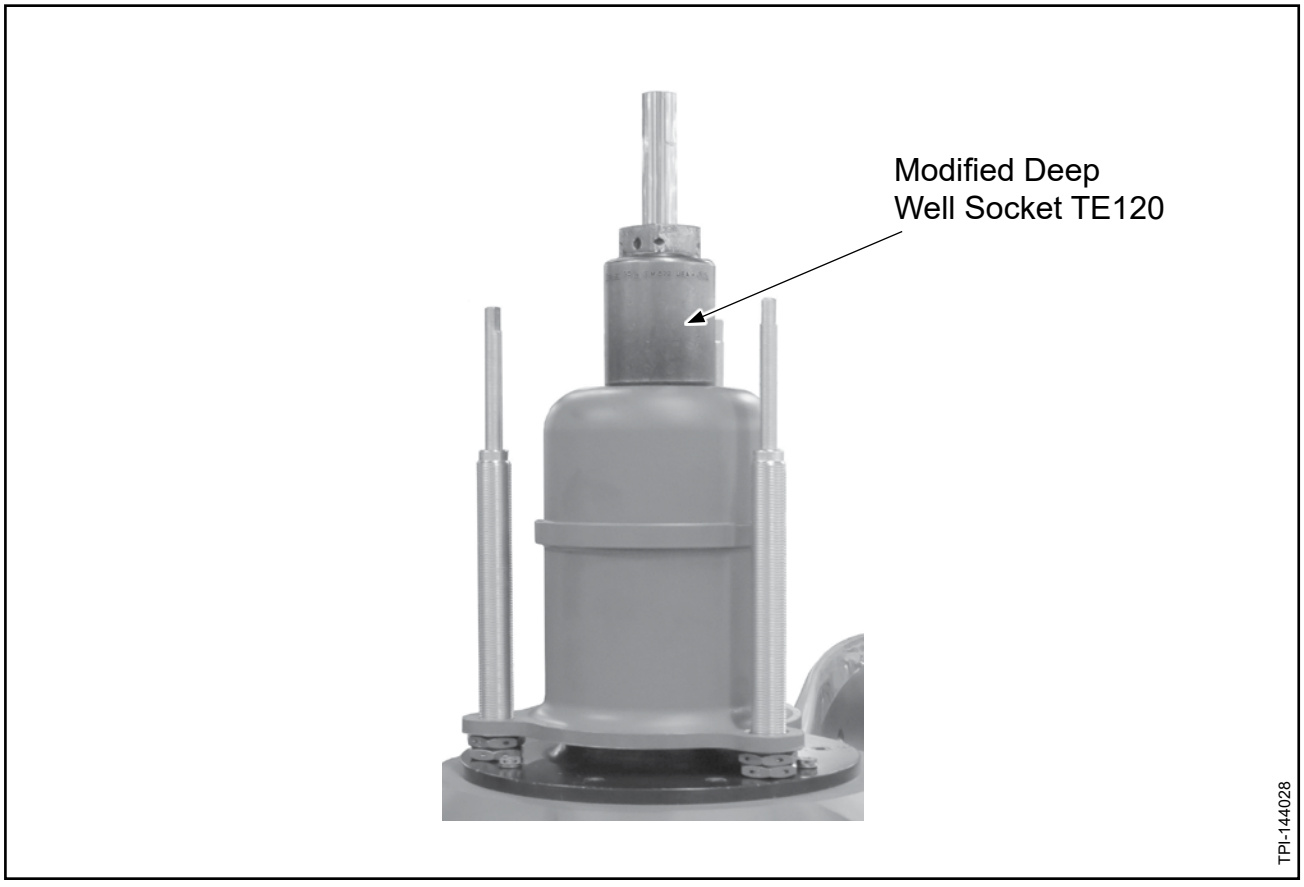
(2) Align the holes in the flange of the piston (110) with the beta rods (720).

(3) Install the piston (110).

(4) Turn the self-locking, 1 1/8-12 hex nut (10) on the pitch change rod (380) until it touches the piston (110).

(5) Put a modified deep well socket TE120 on the self-locking, 1 1/8-12 hex nut (10).

(6) Torque the self-locking, 1 1/8-12 hex nut (10) in accordance with Table 8-1, Torque Values.



Torquing the Piston Nut
Figure 7-26

O. Setting the Reverse Pitch Blade Angle

(1) Refer to the applicable Aircraft Type Certificate Data Sheet or Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59) for the specific reverse pitch blade angle and reference blade radius required.

(2) Move the propeller blades to reverse pitch blade angle.

(3) Measure the reverse pitch blade angle at the reference blade radius.

(a) If the reverse pitch blade angle is not within the specified reverse angle:

1 Disassemble the cylinder and adjust the quantity of pitch stop shims (573).

a Using more shims will increase the pitch blade angle

b Using fewer shims will decrease the pitch blade angle

(b) When the measurement of the reverse pitch blade angle is correct, reassemble the propeller using the applicable steps in this chapter.

P. Installing the Spinner Bulkhead

(1) Using hex head 1/4-28 bolts (670), attach the spinner bulkhead to the hub unit (500).

(2) Using a height gauge with a dial indicator, measure the run-out of the slip ring. Refer to Figure 7-27.

(a) The total indicated run-out (TIR) of the slip ring is 0.008 inch (0.2032 mm).

(b) The total indicated run-out (TIR) measurement must not be greater than 0.0020 inch (0.0508 mm) within any 4.0 inch (101.5 mm) arc of slip ring travel.

(c) If the slip ring run-out is not within tolerance, the slip ring may need to be resurfaced. Refer to Hartzell Propeller Inc. Propeller Ice Protection System Component Maintenance Manual 181 (30-60-81).

Installing the Spinner Bulkhead
Figure 7-27

Q. Installing the Beta Ring

CAUTION: DO NOT TURN THE BETA RODS (720) MORE THAN TWO TURNS IN SUCCESSION. TURNING A THE BETA ROD (720) MORE THAN TWO TURNS IN SUCCESSION CAN CAUSE WARPING OF THE BETA RING (700) .

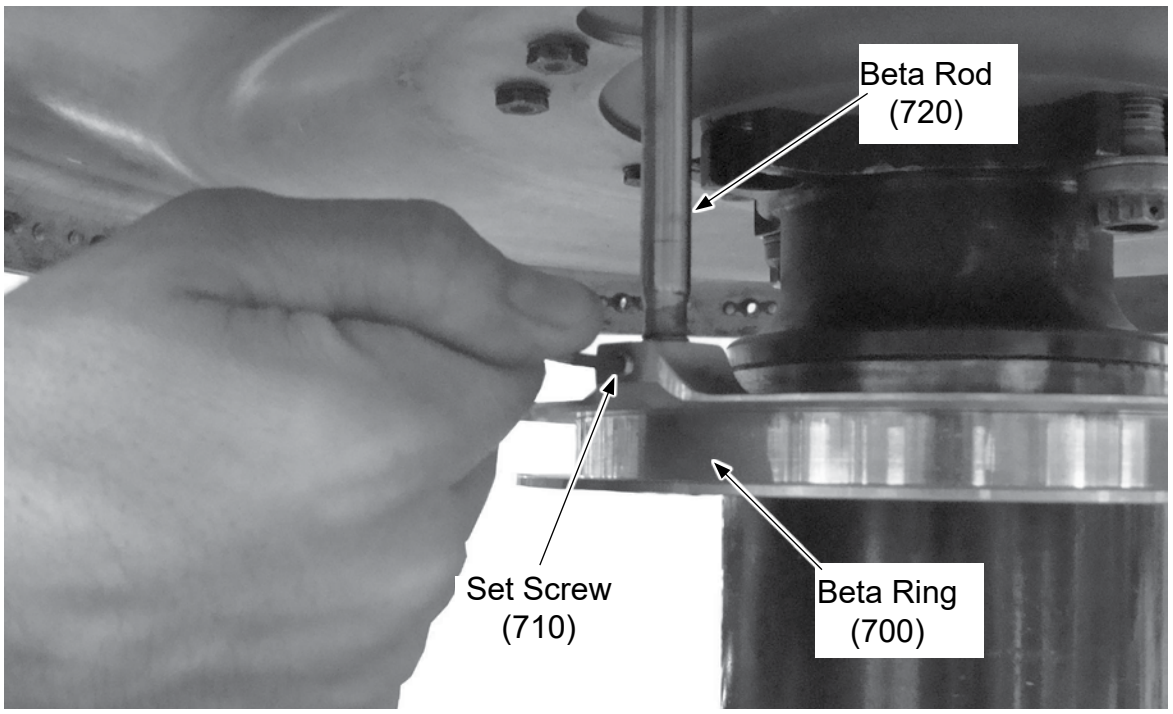
(1) Install the beta ring (700) on the engine-side ends of the beta rods (720), using the following steps. Refer to Figure 7-28.

(a) Start each beta rod (720) in a threaded hole in the beta ring (700).

(b) Turn the beta rod (720) in the threaded hole of the beta ring (700) until it bottoms out.

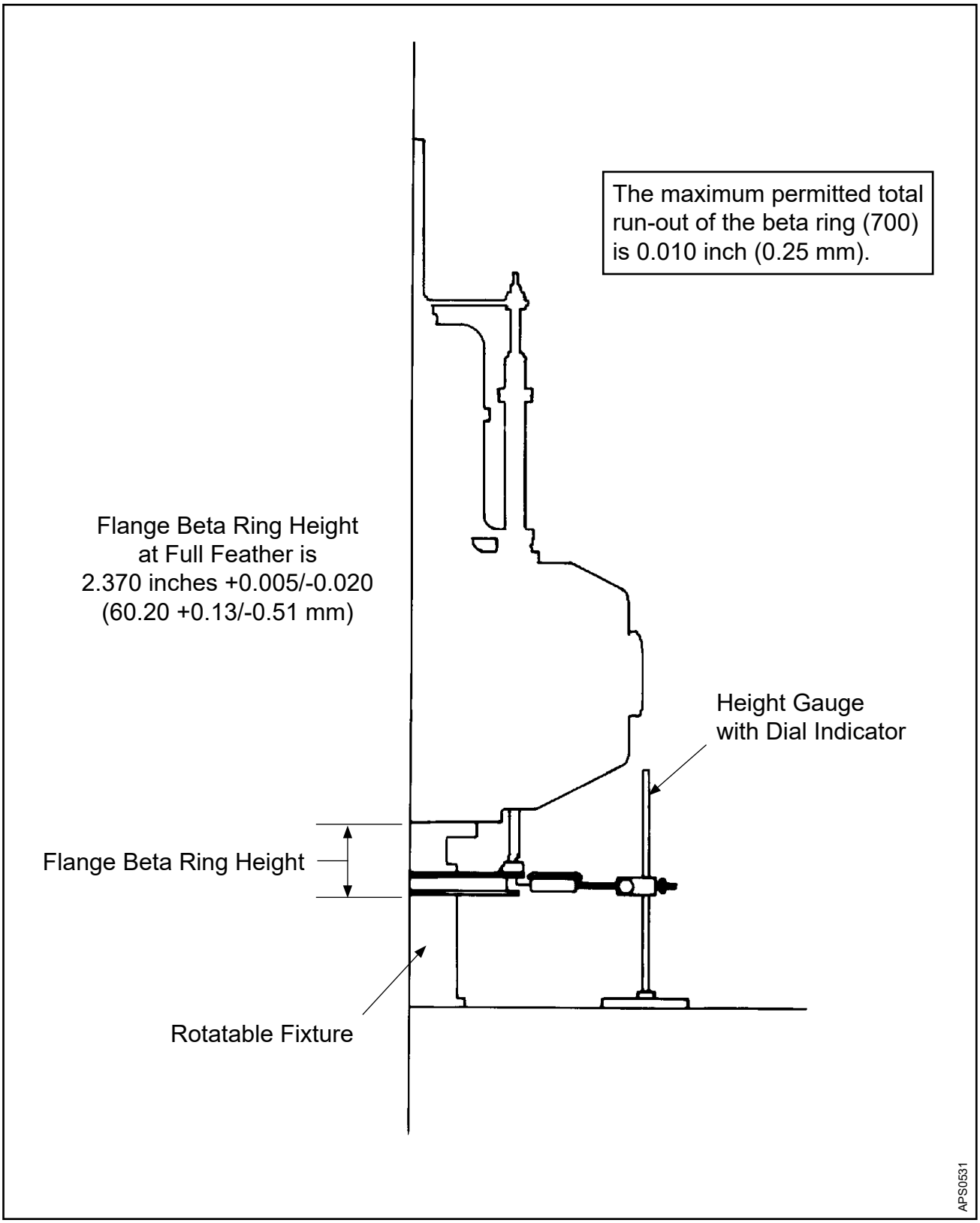
(c) Turn out the beta rod (720) until the flat on the beta rod aligns with the set screw (710) in the beta ring (700).

(d) Torque each beta rod set screw (710) in accordance with Torque Values Table 8-1 in the Fits and Clearances chapter of this manual.



Installing the Beta Ring
Figure 7-28

(This page is intentionally blank.)



Beta Ring Height and Run-Out
Figure 7-29

R. Beta Ring Height and Run-out

CAUTION: THE MAXIMUM PERMITTED TOTAL RUN-OUT OF THE BETA RING (700) IS 0.010 INCH (0.25 mm).

(1) Set the height and run-out of the beta ring (700). Refer to Figure 7-29.

(a) Move the propeller to full feather position.

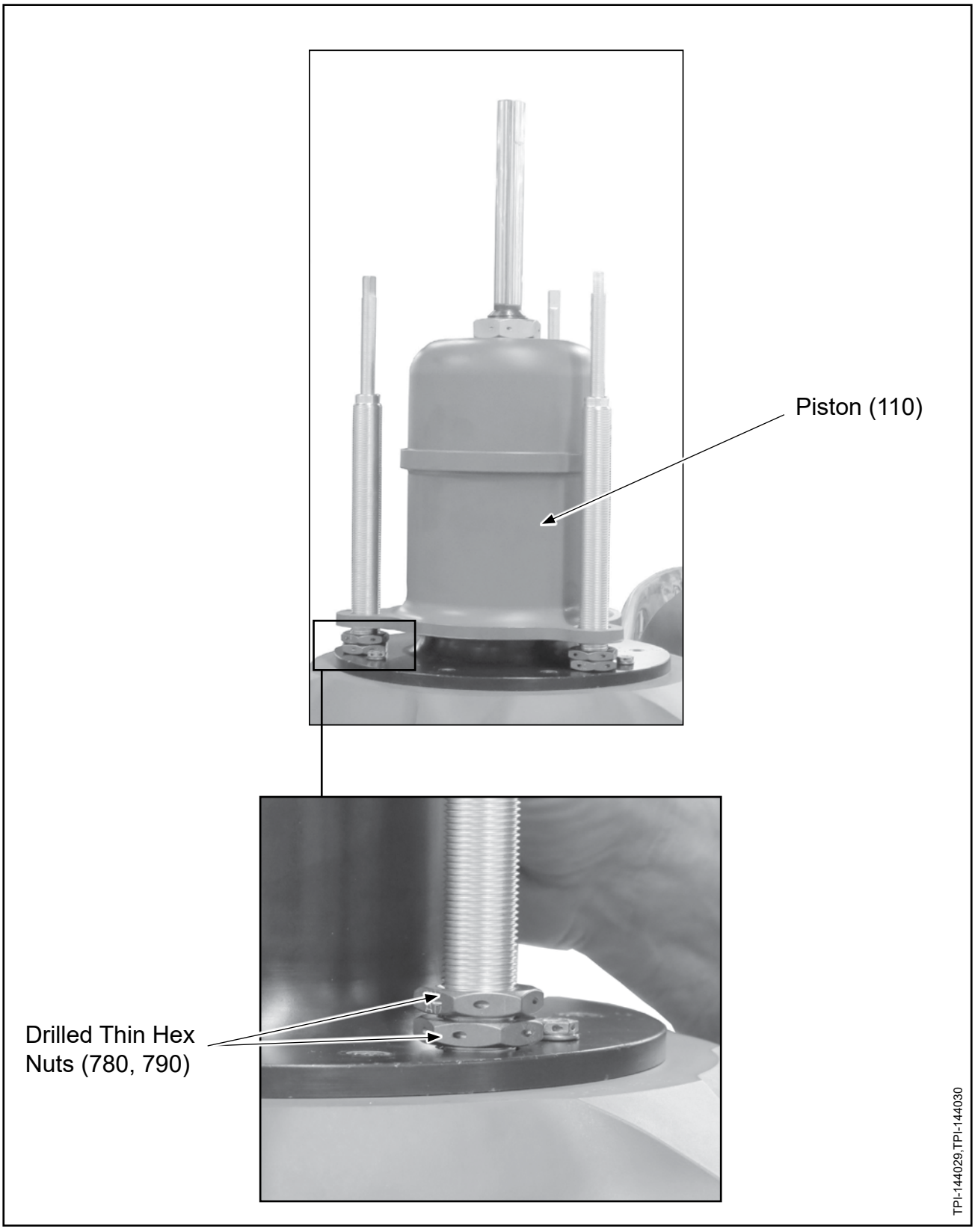
(b) Using a depth micrometer, measure the height of the beta ring (700).

(c) Turn a self-locking, 3/8-24, hex nut (800) on the end of each beta rod (720).

(d) Turn each self-locking, 3/8-24, hex nut (800) as necessary, until the height measurement of the beta ring (700) is correct in accordance with the permitted limits shown in Figure 7-29.

(e) Using a dial indicator, measure the run-out of the beta ring (700).

1 Turn each self-locking, 3/8-24, hex nut (800) as necessary, until the run-out measurement of the beta ring (700) is correct in accordance with the permitted limits shown in Figure 7-29.



Setting the Feather Pitch Blade Angle
Figure 7-30

S. Setting the Feather Pitch Blade Angle - Refer to Figure 7-30

(1) Refer to the applicable Aircraft Type Certificate Data Sheet or Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59) for the specific feather pitch blade angle and reference blade radius required.

(2) Move the propeller to the approximate feather pitch angle.

(a) This requires approximately 100 psi (6.8 bars) of pressure. Adjust the pressure as required for feather pitch blade angle.

(3) Using a digital protractor TE97 or equivalent, measure the feather pitch blade angle.

(4) If the blade feather angle is not correct, apply enough pressure to the propeller to move the pitch change rod (380) forward to access the drilled thin hex nuts (780, 790).

(5) Change the blade feather angle by turning the drilled thin hex nuts (780, 790) (feather). Refer to Figure 7-30.

NOTE: One full turn of the drilled thin hex nuts (780, 790) (feather) equals approximately 1.5 degrees of blade angle.

(a) Turn the drilled thin hex nuts (780, 790) clockwise to decrease the blade feather angle.

(b) Turn the drilled thin hex nuts (780, 790) counterclockwise to increase the blade feather angle.

(6) Turn the drilled thin hex nuts (780, 790) on the beta rod until they touch each other.

(7) Holding the top drilled thin hex nut (790) in place, torque the other drilled thin hex nut (780) in accordance with the Torque Values Table 8-1 in the Fits and Clearances chapter of this manual.

(8) Measure the blade feather angle again for all blades.

(9) If the blade feather angles are not correct, make adjustments as necessary using the applicable steps in this section.

NOTE: When assembling a propeller that will be disassembled for shipping, it is not necessary to install safety wire to the two drilled thin hex nuts (780, 790).

(10) When the blade feather angles are correct, safety wire the two drilled thin hex nuts (780, 790) together.

T. Setting the Low Pitch Blade Angle - Refer to Figure 7-31

(1) Refer to the applicable Aircraft Type Certificate Data Sheet or Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59) for the specific low pitch blade angle and reference blade radius required.

(2) Move the propeller to the approximate low pitch angle.

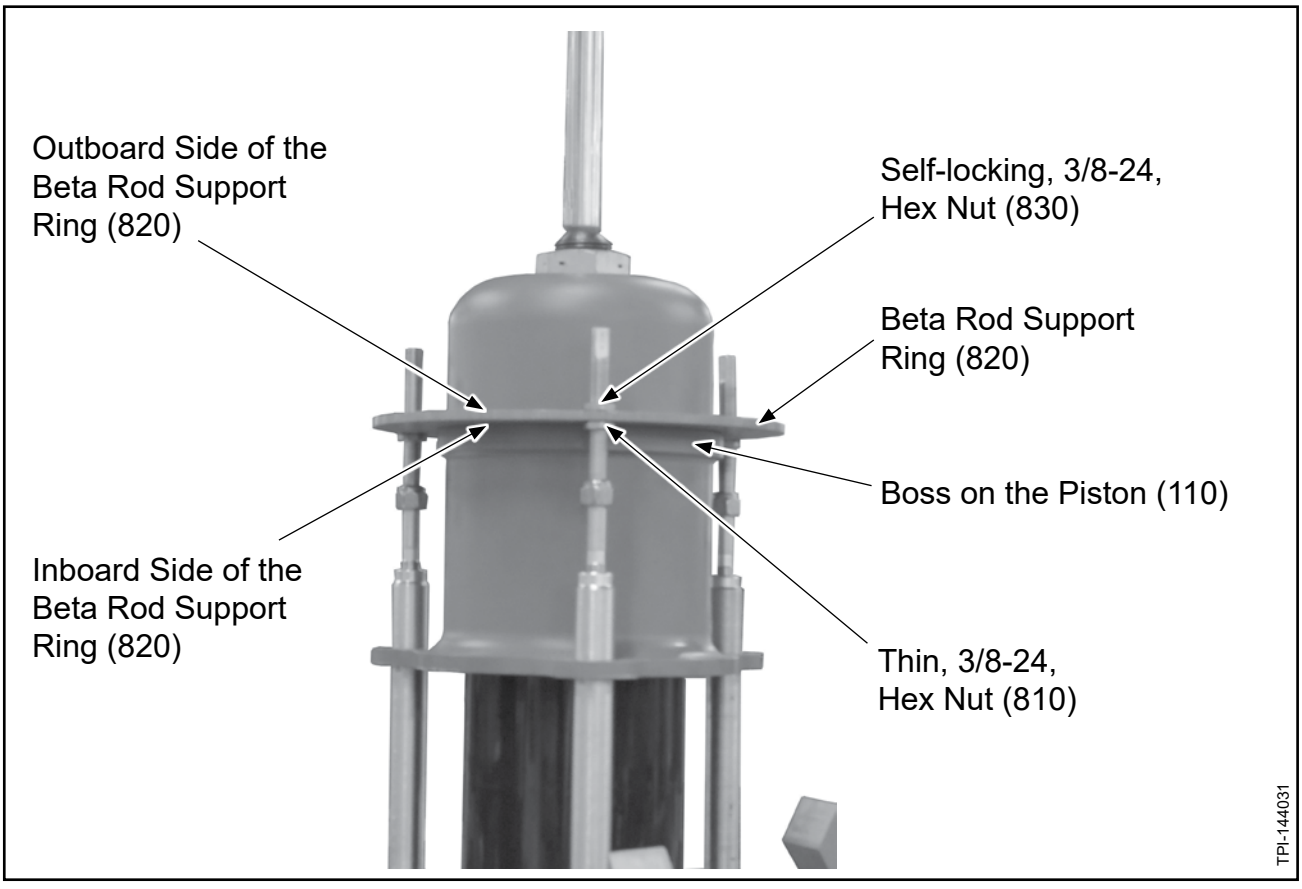
(a) This requires approximately 100 psi (6.8 bars) of pressure. Adjust the pressure as required for low pitch blade angle.

(3) Turn a thin, 3/8-24, hex nut (810) on each beta rod (720) until the nuts (810) are lower than the boss on the piston (110).

(4) Align the holes in the beta rod support ring (820) with the beta rods (720).

(5) Install the beta rod support ring (820) until it touches the boss of the piston (110).

(6) With the beta rod support ring (820) touching the boss of the piston (110), turn a self-locking, self-locking, 3/8-24, hex nut (830) on the end of each beta rod (720) until the self-locking, 3/8-24, hex nut (830) touches the outboard side of the beta rod support ring (820).



Installing the Nut for Setting Low Pitch Angle
Figure 7-31

(7) Using a digital protractor TE97 or equivalent, measure the low pitch blade angle.

(a) If the low pitch blade angle is not correct, reduce the pressure from the propeller.

(b) Turn the self-locking, 3/8-24, hex nut (830) either clockwise to increase the low pitch blade angle or counterclockwise to decrease the low pitch blade angle.

NOTE: One full turn of the self-locking, 3/8-24, hex nut (800) equals approximately 1° of blade pitch.

(8) When the low pitch angle is correct, turn the thin, 3/8-24, hex nut (810) on each beta rod (720) until the thin, 3/8-24, hex nut (810) is tight against the inboard side of the beta rod support ring (820).

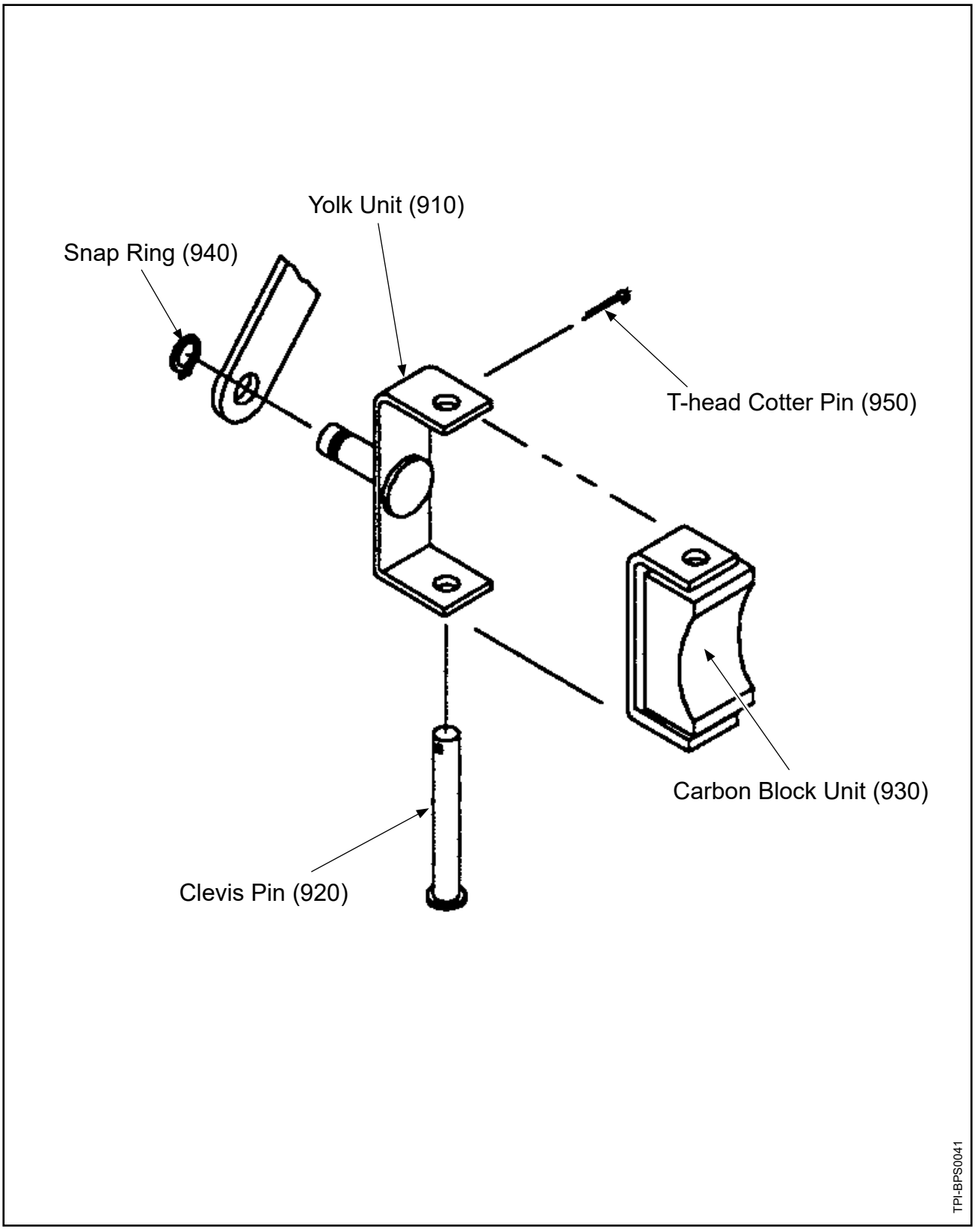
(9) Move the propeller blades to reverse blade pitch.

(10) Using a dial indicator, measure the run-out of the beta ring (700).

(a) Loosen the thin, 3/8-24, hex nut(s) (810), adjust each self-locking, 3/8-24, hex nut (830), and retighten the thin, 3/8-24, hex nut(s) (810) as necessary, until the run-out measurement of the beta ring (700) is correct in accordance with the permitted limits shown in Figure 7-29.

(11) Measure the low pitch blade angle to make sure that it is still correct.

(a) If the low pitch blade angle is not correct, repeat step 2.U.(6)(b) through step 2.U.(10) until the measurements are correct.



Assembling the Carbon Block
Figure 7-32

U. Carbon Block Reassembly - Refer to Figure 7-32

(1) Put the carbon block unit (930) in the yoke unit (910) and align the holes in the yoke unit (910) with the through hole in the carbon block unit (930).

(2) Install the clevis pin (920) through one hole in the yoke unit (910), through the carbon block unit (930), and out the opposite hole in the yoke unit (910).

(3) Install the T-head cotter pin (950) through the hole in the clevis pin (920).

(4) The external snap ring (940) will be installed at the installation of the carbon block assembly onto the aircraft.

(5) Refer to the Fits and Clearances chapter in this manual for the installation of the carbon block assembly on the aircraft.

V. Propeller Lubrication

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

(1) Lubricate the propeller in accordance with the Propeller Lubrication chapter of the Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

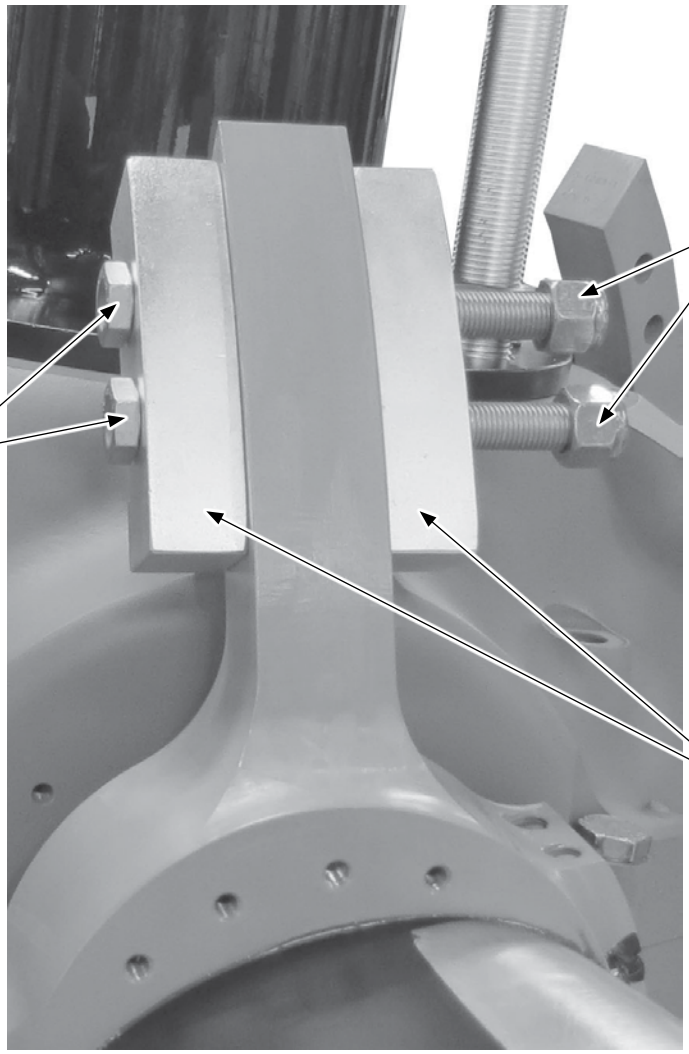
W. Static Balance

NOTE: When assembling a propeller that will be disassembled for shipping, it is not necessary to install safety wire to the static balance weight screws (1300).

(1) Perform static balance of the propeller in accordance with the Static and Dynamic Balance chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

X. Label Placement

(1) Refer to the Parts Identification and Marking chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02) for information about label use.



Installing the Counterweight Slugs
Figure 7-33

3. Counterweight Slug Installation

A. General

(1) For the applicable blade counterweight slugs to be installed on each propeller model, refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

(2) Use of corrosion protection thin film compounds

(a) The steel bolts that attach the brass counterweight slugs to the blade mounted counterweight clamps can experience severe corrosion in the grip area near the bolt head.

1 The steel bolts have the Hartzell Propeller Inc. part number A-1712.

2 The brass counterweight slugs have the Hartzell Propeller Inc. part number B-1933.

3 The corrosion is considered to be the result of a galvanic interaction between the steel bolt and the brass weight slug.

(b) Maintenance practices in this manual have been changed to make every effort to make sure that a layer of cadmium plate is on the brass counterweight slug to protect the interfacing retention bolts.

(c) A second source of protection that is not required, is a corrosion arresting thin film compound that may be applied to the steel bolts.

(d) Two thin film compounds have been researched by Hartzell Propeller Inc. and are approved for optional application to the steel bolts when used for attaching brass counterweight slugs to blade mounted counterweight clamps.

1 These thin film compounds are identified as ACF-50 and CarWell AR500.

2 Both compounds meet Navy & Air Force specification MIL-C-81309, Amendment 3, Type II for use on aviation parts and surfaces to inhibit/stop many types of corrosion including dissimilar metal corrosion.

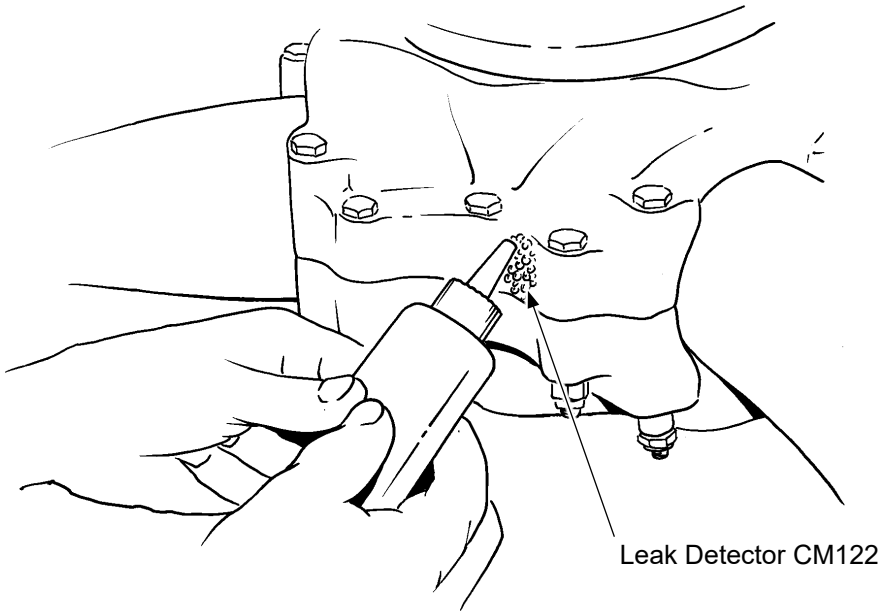
3 The compounds eliminate moisture containing salt, dirt, and air pollutants from the surface of the metal to provide corrosion protection for slightly more than one year.

4 Although the approved thin film compounds have lubricative properties, they may be applied to the entire bolt and the attaching nut if desired with no change to the specified installation torque.

B. Procedure

(1) Using new counterweight slug mounting bolts (2010), install the counterweight slugs (2000), as shown in Figure 7-33.

(2) Torque each counterweight slug mounting nut (2020) in accordance with the Torque Values Table 8-1 in the Fits and Clearances chapter of this manual.



Hub Leak Test
Figure 7-34

4. Leak Test (Rev. 3)

A. Leak Test Procedure

NOTE: Refer to the Illustrated Parts List chapter of this manual for the location of the lubrication fittings and lubrication plugs (engine-side/cylinder-side) for the applicable propeller model.

(1) Install the lubrication fittings (650) in the applicable side of the hub.

(a) Tighten each lubrication fitting (650) until finger-tight, then tighten one additional 360 degree turn.

(2) Install the lubrication plugs (651) in the applicable side of the hub.

(a) Leave one lubrication plug hole open for leak testing.

(b) Tighten each lubrication plug (651) until finger-tight, then tighten one additional 360 degree turn.

(3) With the hub installed on the propeller test stand, perform the leak test in accordance with the following steps:

(a) Move the propeller to to high or low pitch as applicable.

1 Non-feathering propellers (list models): High pitch

2 Feathering propellers (list models): Low pitch

(b) Apply leak detector CM122 to the open lubrication plug hole. Refer to Figure 7-34.

1 If there is any indication of air exiting the hub, refer to the Testing and Fault Isolation chapter of this manual.

(4) After the leak test is complete, install the remaining lubrication plug (651) in the applicable side of the hub.

(a) Tighten the lubrication plug (651) until finger-tight, then tighten one additional 360 degree turn.

5. Propeller Disassembled for Shipping

A. General

(1) A propeller disassembled for shipping has had one or more blades removed from the propeller after assembly. The propeller was fully assembled, tested, inspected, lubricated and statically balanced before blade removal and shipping.

(2) A propeller disassembled for shipping must be assembled by trained personnel in accordance with Hartzell Propeller Inc. manuals.

(3) For additional general assembly information, refer to the General section at the beginning of this chapter.

B. Preparing the Propeller for Shipping

NOTE 1: New hardware was installed during propeller assembly for shipping. When disassembling a propeller for shipping, it is not necessary to discard hardware that would require replacement at overhaul.

NOTE 2: New O-rings have been installed during propeller assembly for shipping. During propeller disassembly for shipping, it is not necessary to replace O-rings unless damaged during component installation or removal.

NOTE 3: Specific Hartzell Propeller Inc. manuals and service documents are available on the Hartzell Propeller Inc. website at www.hartzellprop.com. Refer to the Required Publications section in the Introduction chapter of this manual for the identification of these publications.

(1) Before removal, make a mark to indicate alignment of each blade assembly, fork assembly (430), spinner bulkhead and balance weight location with the hub unit (500). Refer to the Marking before Disassembly section in the Disassembly chapter of this manual.

(2) If the propeller will be shipped without the bulkhead installed, put index labels AR-20 and AR-30 on the hub unit (500) and bulkhead to show alignment of the bulkhead to the hub unit (500), before removing the bulkhead from the hub unit (500).

(3) Remove all balance weight screws (1300) and balance weights (1310).

(4) Disconnect the electric de-ice lead wires from the hub unit (500) and bulkhead, if applicable.

(5) Disassemble the propeller in accordance with the Disassembly chapter of this manual.

NOTE: It is not necessary to remove the pitch adjust sleeve unit (280) from the cylinder or the piston (110) and hex nut (10) from the pitch change rod (380).

(6) Propeller Reassembly with Blades Removed for Shipping

(a) When reassembling the propeller with the blades removed, do not accomplish procedures related to blade installation or setting of blade angles.

(b) Reassemble the propeller without the blade assemblies. Refer to the Assembly section in this chapter.

(7) Packing the Propeller and Blades for Shipping

(a) Refer to the Packaging and Storage chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02), for packing the propeller and blades for shipping.

(b) Pack the propeller without the blades for shipping.

(c) Pack the blades for shipping with the preload plate, thrust bearing, blade O-ring, and grease on each blade shank.

6. Reassembly of a Propeller Disassembled for Shipping

A. Unpacking the Propeller and Blades

(1) Carefully unpack the propeller and blades from shipping.

(2) Visually inspect all propeller components for shipping damage. If there is damage, refer to the Check chapter of this manual for specific inspection, serviceable limits, and corrective action criteria.

B. Preparing the Propeller for Reassembly

NOTE 1: New hardware was installed during propeller assembly for shipping. When disassembling a propeller from shipping, it is not be necessary to discard hardware that would require replacement at overhaul.

NOTE 2: New O-rings have been installed during propeller assembly for shipping. During propeller disassembly from shipping, it is not necessary to replace O-rings, unless they were damaged during component installation or removal.

(1) Make sure that each blade assembly, the fork assembly (430), the spinner bulkhead, and each balance weight has been marked for alignment with the hub unit (500).

(2) Remove all balance weight screws (1300) and balance weights (1310).

C. Propeller Reassembly

(1) Reassemble HC-A6A-3( ) propellers in accordance with the section, "Assembly of HC-A6A-3( ) Propeller Models" in this chapter.

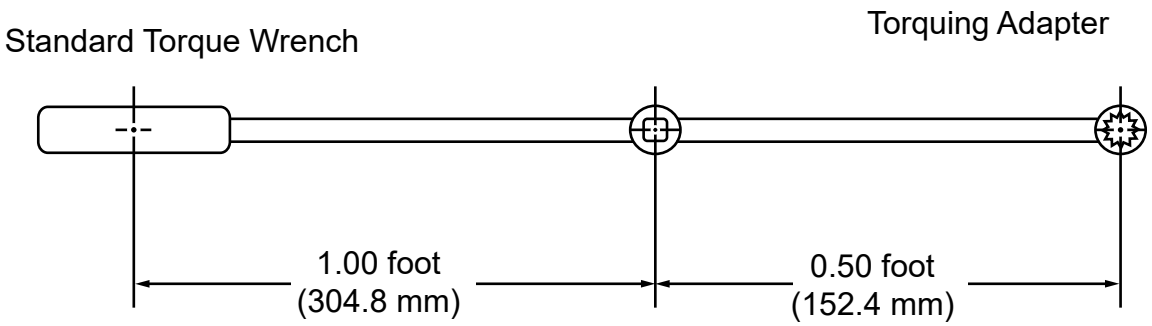
(2) Reconnect the electric de-ice lead wires to the bulkhead, if applicable.

FITS AND CLEARANCES - CONTENTS

LIST OF FIGURES

LIST OF TABLES

(This page is intentionally blank.)



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

EXAMPLE:

$$\frac{\text{100 Ft-Lb (136 N•m) x 1 ft (304.8 mm)}}{\text{1 ft (304.8 mm) + 0.50 ft (152.4 mm)}} = \text{66.7 Ft-Lb (90.4 N•m)}$$

reading on torque wrench with 6-inch (152.4 mm) adapter for actual torque of 100 Ft-Lb (136 N•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.

APS212

Calculating Torque When Using a Torque Wrench Adapter
Figure 8-1

1. Torque Values (Rev. 1)

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER 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 IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

A. Important Information

(1) The structural integrity of joints in the propeller that are held together with threaded fasteners is dependent upon proper torque application.

(a) Vibration can cause an incorrectly tightened fastener to fail in a matter of minutes.

(b) Correct tension in a fastener depends on a variety of known load factors and can influence fastener service life.

(c) Correct tension is achieved by application of measured torque.

(2) Use accurate wrenches and professional procedures to make sure of correct tensioning.

(3) For the torque values to use when assembling a Hartzell Propeller Inc. propeller, refer to Table 8-1, "Torque Values" in this chapter.

(4) When an adapter is used with a torque wrench, use the equation in Figure 8-1 to determine the correct torque value.

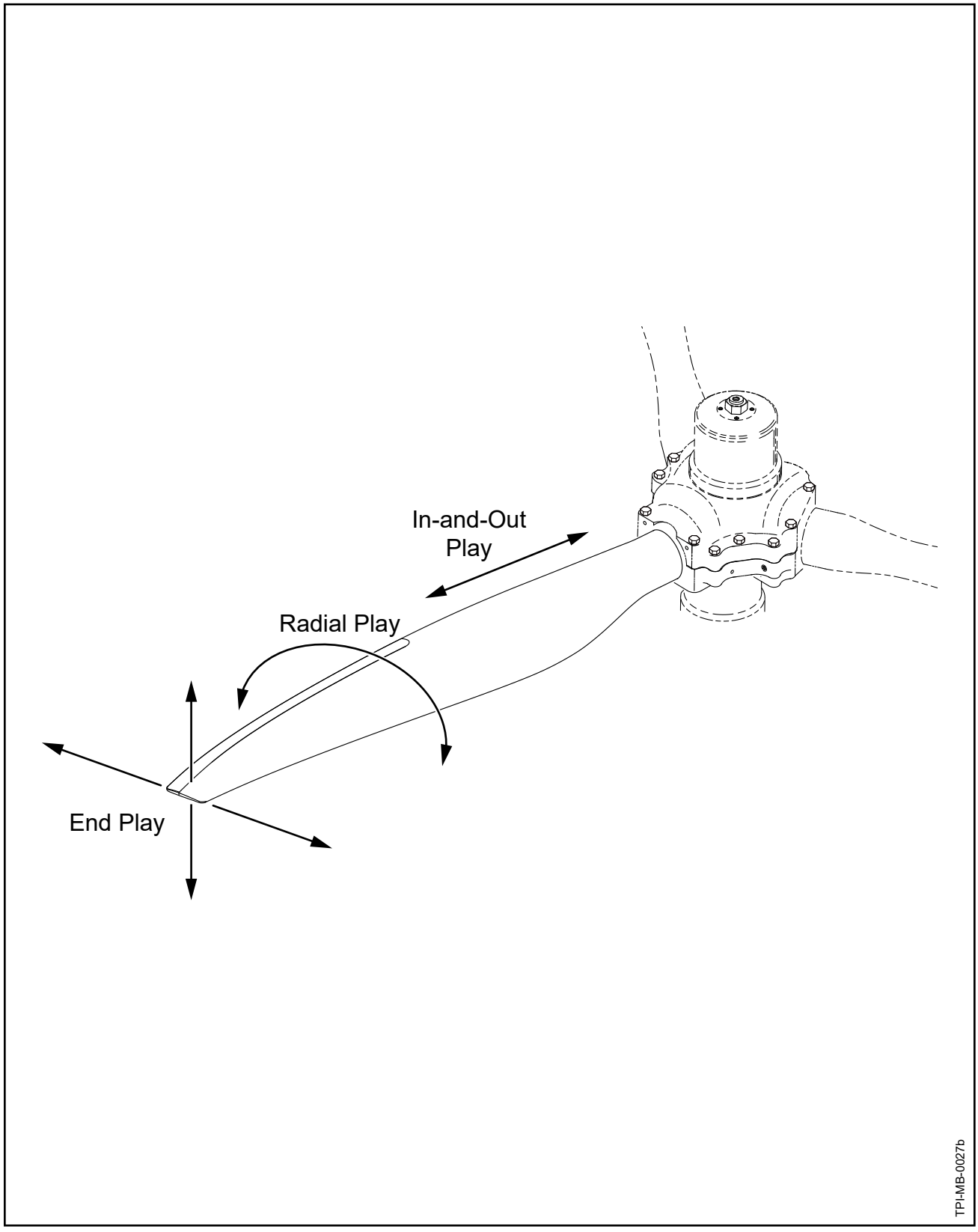
CAUTION 1: TORQUE VALUES ARE BASED ON NON-LUBRICATED THREADS, UNLESS SPECIFIED IN TABLE 8-1.

CAUTION 2: FOR TORQUE READING WHEN USING A TORQUE WRENCH ADAPTER, REFER TO FIGURE 8-1.

NOTE: Torque tolerance is ± 10 percent unless otherwise noted.

Item No.	Part Number	Nomenclature	Torque		
			Ft-Lb	In-Lb	N•m
10	A-2697	Nut, Pitch Change Rod	40	480	54
230	B-6626-LH5	Bolt,1/4-28,Hex Head (Cylinder Mounting)	16	192	22
260	B-6606-LE16P	Screw, 10-32, Cap	---	35-41	4.0-4.6
380	D-1059 D-4905	Rod, Pitch Change	60 wet	720 wet	81 wet
640	A-2043-1	Nut, Self-Locking (Hub Clamping)	22	264	30
-670	B-6626-LH5	Bolt (Bulkhead Mounting)	---	40-60	4.6-6.7
710	B-6616-A4P	Screw, Set, 10-32, Cres (Beta Ring)	---	20	2.3
780, 790	B-3898-12	Nut Hex,Thin, Drilled (Pitch Adjust)	16	192	22
810	A-3439 B-3382	Nut, 3/8-24, Hex, Thin (Beta Rod)	---	96-120	10.9-13.5
1130	B-6655-08	Nut, Hex, Self-Locking	Until Snug		
1420	B-6626-LH5	Bolt (Pitch Change Knob)	16	192	22
1430	B-3820	Screw (Block Mounting)	---	15-20	1.70-2.25
1570	B-3368	Nut, Jam (Preload Plate)	---	120	14
-2010	A-1712	Bolt (Bulkhead/Slug Mounting)	22	264	30
-2020	A-2043-1	Nut, Self-Locking (Slug Mounting)	22	264	30
--	B-6632-04	Hex Head, 10-32, Bolt (De-ice Bracket Mounting)	Until Snug		

Torque Values
Table 8-1



Blade Play
Figure 8-2

2. Blade Tolerances (Rev. 3)

A. Blade Play

(1) Limits for blade play are specified below. Refer to Figure 8-2.

(a)	End Play:	
	Leading Edge to Trailing Edge	None permitted
	Fore-and-Aft (face to camber)	None permitted
(b)	In-and-Out Play	None permitted
(c)	Radial Play (pitch change)	±0.5 degree (1 degree total) measured at reference station

(2) Blades should be tight in the propeller; however, play that is within the allowable limits is acceptable if the blade returns to its original position when released.

(a) If blade play is greater than the allowable limits, or if the blade(s) do not return to their original position when released, there may be internal wear or damage that should be referred to a certified propeller repair station with the appropriate rating.

B. Blade Track

(1)	Blade Track	0.125 inch (3.17 mm) total or 0.25 inch (6.4 mm) total

C. Blade Pitch Tolerance

(1)	Blade pitch setting tolerance between blades at low pitch	0.2 degree

(This page is intentionally blank.)

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT - CONTENTS

(This page is intentionally blank.)

1. Tooling and Facility Requirements (Rev. 1)

   A. Standard Tooling

      (1) Propeller repair stations certified by the FAA or international equivalent to overhaul Hartzell Propeller Inc. propellers are expected to possess precision fixtures, tools, and blade tables for blade inspection and repair.

         (a) Except as specifically required in this manual, locally fabricated tooling is acceptable for most repair and inspection operations.

   B. Special Tooling

      (1) Special tooling may be required for procedures in this manual. For further tooling information, refer to Hartzell Propeller Inc. Illustrated Tool and Equipment Manual 165A (61-00-65).

         (a) Tooling reference numbers appear with the prefix “TE” directly following the tool name to which they apply. For example, a template that is reference number 133 will appear as: template TE133.

         (b) It is the responsibility of the repair station or the technician performing the repair or servicing to use these special tools as required.

   C. Facilities

      (1) Grinding, plating, and painting of propeller components can create health and safety hazards beyond that of other areas of a typical workshop.

         (a) Areas where grinding, plating, and painting are performed should comply with governmental regulations for occupational safety and health, industry standards, and environmental regulations.

      (2) Workshop areas need to be segregated to prevent contamination.

         (a) Separate areas should be designated for cleaning, inspection, painting, plating, and assembly.

         (b) Propeller balancing must be performed in a draft free area.

(This page is intentionally blank.)

ILLUSTRATED PARTS LIST - CONTENTS

PROPELLER PARTS LISTS and FIGURES

SUB-ASSEMBLY PARTS LISTS and FIGURES

1. Introduction (Rev. 1)

WARNING: ANY PART IDENTIFIED AS AN EXPERIMENTAL OR NON-AVIATION PART MUST NOT BE USED IN AN FAA OR INTERNATIONAL EQUIVALENT TYPE CERTIFICATED PROPELLER. A PART IDENTIFIED AS EXPERIMENTAL OR NON-AVIATION DOES NOT HAVE FAA OR INTERNATIONAL EQUIVALENT APPROVAL EVEN THOUGH IT MAY STILL SHOW AN AVIATION TC OR PC NUMBER STAMP. USE ONLY THE APPROVED ILLUSTRATED PARTS LIST PROVIDED IN THE APPLICABLE OVERHAUL MANUAL OR ADDITIONAL PARTS APPROVED BY AN FAA ACCEPTED DOCUMENT FOR ASSEMBLY OF A PROPELLER. THE OPERATOR ASSUMES ALL RISK ASSOCIATED WITH THE USE OF EXPERIMENTAL PARTS. USE OF EXPERIMENTAL PARTS ON AN AIRCRAFT MAY RESULT IN DEATH, SERIOUS BODILY INJURY, AND/OR SUBSTANTIAL PROPERTY DAMAGE.

A. General

CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER 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 IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

(1) This chapter includes the parts lists and applicable illustrations for the propeller models included in this manual.

CAUTION: THE ILLUSTRATIONS IN THIS CHAPTER ARE PROVIDED FOR PART IDENTIFICATION AND LOCATION REFERENCE ONLY. THEY SHOULD NOT BE USED FOR ASSEMBLY.

(a) The illustrations in this chapter use some general views of parts that may not exactly depict every propeller part configuration.

B. Counterweights/Slugs/Mounting Hardware

(1) Counterweights, counterweight slugs, and the applicable mounting hardware are application specific. Refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

C. Spinner Assemblies/Mounting Hardware

(1) Spinner assemblies and the applicable mounting hardware are application specific. Refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

D. Ice Protection System Components

(1) Ice protection systems are application specific. Refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

(a) For components of ice protection systems supplied by Hartzell, refer to Hartzell Propeller Inc. Ice Protection System Manual 180 (30-61-80).

(b) For components of ice protection systems not supplied by Hartzell, refer to the applicable TC or STC holder's Instructions for Continued Airworthiness (ICA).

2. Description of Columns (Rev. 1)

A. Fig./Item Number

(1) Figure Number refers to the illustration where items appear.
Item Numbers refer to the specific part callout in the applicable illustration.

(a) Item Numbers that are listed but not shown in the illustration are identified by a dash to the left of the item number. (example: "-800")

(b) Alpha variants will be used to add additional items. There are two reasons for the use of alpha variants:

1 A part may have an alternate, or may be superseded, replaced, or obsoleted by another part.

a For example, the self-locking nut (A-2043) that is item 20 was superseded by the self-locking nut (A-2043-1) that is item 20A.

2 An Illustrated Parts List may contain multiple configurations. Effectivity codes are used to distinguish different part numbers within the same list.

a For example, one propeller configuration may use a mounting bolt (B-3339-1) that is item 30, yet another propeller configuration uses a mounting bolt (B-3347) that is item 30A. Effectivity codes are very important in the determination of parts in a given configuration.

B. Part Number

(1) The Part Number is the Hartzell Propeller Inc. identification number for the part.

(2) Use the Hartzell Propeller Inc. part number when ordering the part from Hartzell or a Hartzell-approved distributor.

C. Airline Stock Number

(1) This column is reserved for the Airline Stock Number.

D. Description

(1) This column provides the Hartzell Propeller Inc. description of the part.

(2) Bullets and indentations are used to indicate parts that are components of a sub-assembly.

(a) For example, a Fork Assembly that is part of a HC-C2YR-1 propeller assembly will have one bullet (•) before the description. This indicates that the Fork Assembly is part of the propeller assembly.

1 A Fork Bumper that is part of the Fork Assembly will appear directly below the Fork Assembly with two bullets (• •) before the description. This indicates that the Fork Bumper is part of the Fork Assembly - that is part of the Propeller Assembly.

a Example: HC-C2YR-1
• Fork Assembly
• • Fork Bumper

(3) If the description in this column includes a "PCP:" prefix, the part is classified as a Propeller Critical Part.

(4) If applicable, information regarding part alternatives, supersedures, replacements, or obsolescence will appear in the Description column.

(a) Refer to the section, "Description of Terms" in this chapter for definitions and requirements for part "alternates", "supersedures", etc.

(b) When part alternatives, supersedures, replacements, etc. are listed, the service document number related to the change may be included for reference.

(5) If applicable, vendor CAGE codes will be listed in the Description column.

E. Effectivity Code (EFF CODE)

(1) This column is used when additional information about a part is required.

(a) Effectivity codes can be used to identify parts that are only used on a particular model, or to direct the user to additional information in the "Effectivity" box at the bottom of the page.

(b) Whenever an effectivity code is present, refer to the "Effectivity" box at the bottom of the page for the applicable information.

(2) Parts common to all assembly models on the page show no effectivity code.

F. Units Per Assembly (UPA)

(1) Designates the total quantity of an item required for the next higher assembly or subassembly.

G. Overhaul (O/H)

(1) Designates the parts to be replaced at overhaul. A “Y” identifies the parts that must be replaced at overhaul.

NOTE: An overhaul kit may not contain all the parts identified with a "Y" for a particular model propeller. An example of parts that may not be included in the overhaul kit is spinner mounting parts.

H. Propeller Critical Part (PCP)

(1) This column identifies the Propeller Critical Parts (PCP) that are contained in each propeller model.

(a) Refer to the Introduction chapter of this manual for the definition of Propeller Critical Parts (PCP).

3. Description of Terms (Rev. 1)

A. Alternate

(1) Alternate parts are identified by the term "ALTERNATE" in the Description column. Alternate items are considered airworthy for continued flight and existing stock of parts may be used for maintenance and/or repair. The new or alternate part number may be used interchangeably when ordering/stocking new parts.

B. Supersedure

(1) Part changes are identified by the terms “SUPERSEDES ITEM _____” or “SUPERSEDED BY ITEM _____” in the Description column. Superseded items are considered airworthy for continued flight and existing stock of superseded parts may be used for maintenance and/or repair. Once the superseding part has been incorporated/installed into an assembly, the original superseded part may no longer be used. Superseded parts may no longer be available, and the new part number must be used when ordering/stocking new parts.

C. Replacement

(1) Part changes identified by the terms "REPLACES ITEM _____” or “REPLACED BY ITEM _____” in the Description column are considered airworthy for continued flight, but must be replaced with a part with the new part number at overhaul. Existing stock of replaced parts may not be used for maintenance and/or repair of effected assemblies. Replaced parts may no longer be available, and the new part number must be used when ordering/stocking new parts.

D. Obsolete

(1) Obsolete parts are identified by "OBS” in the Units Per Assembly (UPA) column. Obsolete items are considered unairworthy for continued flight.

4. Vendor Supplied Hardware (Rev. 1)

A. Important Information

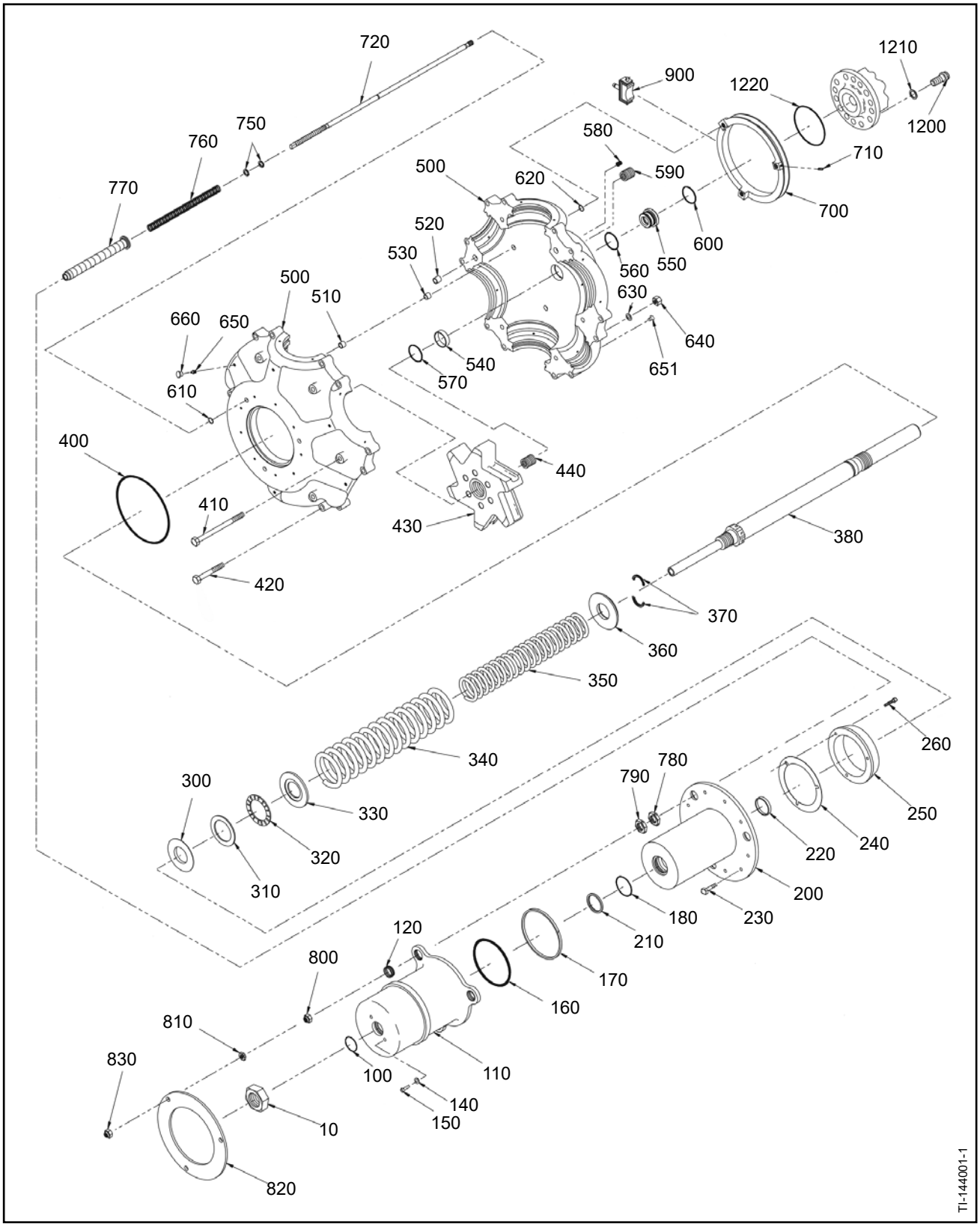
(1) Many O-rings, fasteners, and other vendor supplied hardware listed in Hartzell Propeller Inc. manuals have previously been specified with AN, MS, NAS, or vendor part number. To provide internal controls and procurement flexibility, Hartzell part numbers have been assigned to all O-rings, fasteners, and hardware. Part shipments from Hartzell Propeller Inc. will specify only the Hartzell part numbers.

(2) Some O-rings, fasteners, and hardware manufactured in accordance with established industry specifications (certain AN, MS, NAS items) are acceptable for use in Hartzell Propeller Inc. products without additional standards imposed by Hartzell.

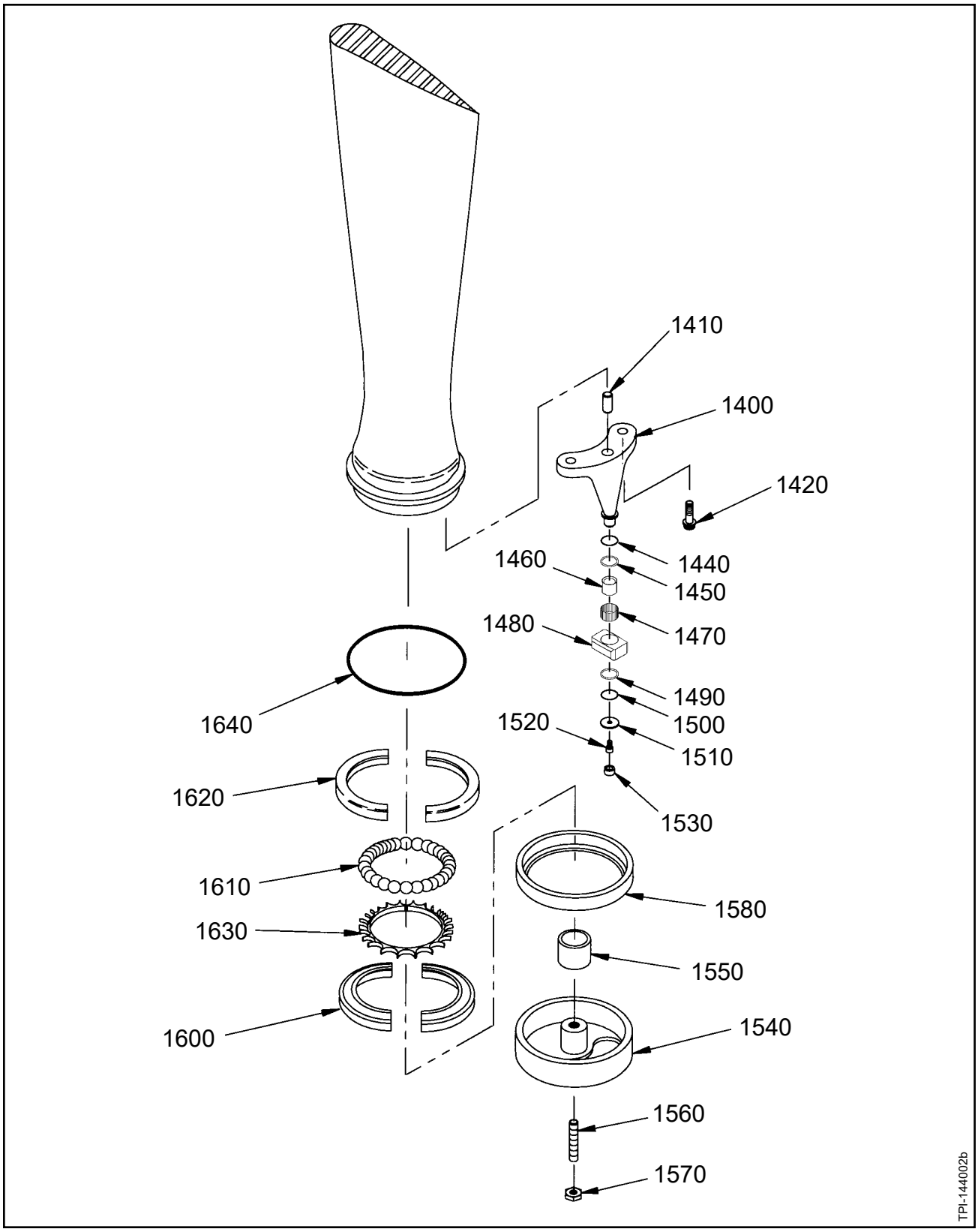
(a) For a listing of part number interchangeability, refer to the Vendor Cross Reference chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(b) Where permitted, both the Hartzell part number item and AN, MS, NAS, and other specified vendor number items can be used interchangeably.

(c) The Hartzell part number must be used when ordering these parts from Hartzell Propeller Inc.



HC-A6A-3( ): Propeller Parts
Figure 10-1



HC-A6A-3( ): Blade Retention Parts
Figure 10-2

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		HC-A6A-3( )				
10-1		**PROPELLER PARTS**				
10	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING REPLACED BY ITEM 10A, PRE SB 163		1	Y	
10A	A-2697	• NUT, 1 1/8-12,HEX,THIN,DRILLED USED WITH ITEM 50 AND ITEM 60 REPLACES ITEM 10, POST SB 163		1	Y	
-20	A-386	• REVERSE STOP MODIFICATION KIT ADDED POST SB162 REMOVED POST SB166 AND SB166A				
-30	B-365	DELETED				
-40	C-376	DELETED				
-50	C-379	DELETED				
-60	A-2043-1	DELETED				
-70	C-3383-2H	DELETED				
-80	B-3851-0363	DELETED				
-90	B-3839-6	DELETED				
100	C-3317-218-2	• O-RING	1	Y		
110	D-1035	• PCP: PISTON UNIT		1		PCP
120	A-1079	• • PISTON INSERT		1		
140	B-3851-0363	• WASHER, USED WITH ITEM 10A AND ITEM 60, POST SB163		2	Y	
150	B-3840-4	• SCREW, 10-32, FILLISTER HEAD USED WITH ITEM 10A AND ITEM 50, POST SB163		2	Y	
160	C-3317-347-2	• O-RING (PISTON ID)		1	Y	
170	B-1843	• SEAL, DUST, PISTON		1	Y	
180	C-3317-221-2	• O-RING		1	Y	
200	D-1036	• CYLINDER UNIT - REPLACED BY ITEM 200A PRE SB 168, MAY BE MODIFIED TO A D-4904 REFER TO THE CHECK CHAPTER AND THE REPAIR CHAPTER FOR INSTRUCTIONS	A	1		
210	A-1799	• • CYLINDER BUSHING, ROD		1	Y	
220	A-1186	• • CYLINDER BUSHING, ROD		1	Y	
200A	D-4904	• PCP: CYLINDER UNIT - REPLACES ITEM 200 USE WITH ITEMS 240, 250, 260, 370A, AND 380A POST SB 168	A	1		PCP
210A	A-1799	• • CYLINDER BUSHING, ROD		1	Y	
220A	A-1186	• • CYLINDER BUSHING, ROD		1	Y	
230	B-6626-LH5	• BOLT, 1/4-28, HEX HEAD		9	Y	
240	C-4902	• SHIM, STOP, PITCH, POST SB 168 USE WITH ITEMS 200A, 250, 260, 370A, AND 380A	A	AR		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
A	WHEN THE D-4904 CYLINDER ASSEMBLY IS USED, THE D-4905 PITCH CHANGE ROD AND THE B-2870 INT REV KIT THAT CONTAINS: C-4901 RING, STOP; C-4902 SHIM, STOP, PITCH; B-6606-LE16P SCREW, 10-32, CAP: AND A-4903 KEEPER, SPLIT, MUST BE USED		

- ITEM NOT ILLUSTRATED

HC-A6A-3( )

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		HC-A6A-3( ), CONTINUED				
10-1		**PROPELLER PARTS**				
250	C-4901	• RING, STOP, POST SB 168 USE WITH ITEMS 200A, 240, 260, 370A, AND 380A	A	1		
260	B-6606-LE16P	• SCREW, 10-32, CAP USE WITH ITEMS 200A, 240, 250, 370A, AND 380A	A	3	Y	
300	A-1183	• GUIDE, BEARING, PLASTIC		1	Y	
310	A-1184	• RACE, BEARING, THRUST, ROLLER		1	Y	
320	A-1182	• BEARING, THRUST, ROLLER		1	Y	
330	A-1181	• RACE, BEARING, THRUST, ROLLER		1	Y	
340	B-1046	• PCP: SPRING, COMP, FEATHERING (LARGER DIA)		1		PCP
350	B-1047	• PCP: SPRING, COMP, FEATHERING (SMALLER DIA)		1		PCP
360	B-1048	• PCP: SPRING RETAINER, REAR		1		PCP
370	B-1049	• KEEPER, SPLIT, REPLACED BY ITEM 370A PRE SB 168	A	1	Y	
370A	A-4903	• KEEPER, SPLIT, REPLACES ITEM 270 USE WITH ITEMS 200A, 240, 250, 260, AND 380A POST SB 168	A	1	Y	
380	D-1059	• ROD, PITCH CHANGE, REPLACED BY ITEM 380A PRE SB 168, MAY BE MODIFIED TO A D-4905 AT HARTZELL PROPELLER INC.	A	1		
380A	D-4905	• PCP: ROD, PITCH CHANGE, REPLACES ITEM 380 USE WITH ITEMS 200A, 240, 250, 260, AND 370A POST SB 168	A	1		PCP
400	B-1070	• O-RING (CYLINDER MOUNTING) SUPERSEDED BY ITEM 400A		1	Y	
400A	C-3317-256-2	• O-RING (CYLINDER MOUNTING) SUPERSEDES ITEM 400		1	Y	
410	A-1037-4	• BOLT, 3/8-24, HEX HEAD		6		
420	A-2431	• BOLT, 3/8-24, HEX HEAD		12		
430	C-1054	• FORK, SIX BLADE - ASSEMBLY		1		
440	B-1072	• • INSERT, FORK		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
A	WHEN THE D-4904 CYLINDER ASSEMBLY IS USED, THE D-4905 PITCH CHANGE ROD AND THE B-2870 INT REV KIT THAT CONTAINS: C-4901 RING, STOP; C-4902 SHIM, STOP, PITCH; B-6606-LE16P SCREW, 10-32, CAP: AND A-4903 KEEPER, SPLIT, MUST BE USED		

- ITEM NOT ILLUSTRATED

HC-A6A-3( )

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		HC-A6A-3( ), CONTINUED				
10-1		**PROPELLER PARTS**				
500	D-1066	• PCP: HUB UNIT, HC-A6A-3 REPLACED BY ITEM 500A, PRE HC-SB-61-354 (REFER TO “D-1066 HUB UNIT”, IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)	B	1		PCP
500A	D-1066-1	• PCP: HUB UNIT, HC-A6A-3 REPLACES ITEM 500, POST HC-SB-61-354 (REFER TO “D-1066-1 HUB UNIT”, IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
600	C-3317-218-2	• O-RING		1	Y	
610	C-3317-012	• O-RING		3	Y	
620	C-3317-012	• O-RING		3	Y	
630	B-3834-0632	• WASHER		18	Y	
640	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		18	Y	
650	A-279	• FITTING, LUBRICATION, PRE HC-SL-61-187, (CYLINDER-SIDE OF HUB)	C	6	Y	
650A	C-6349	• FITTING, LUBRICATION, 45° ALTERNATE FOR ITEM 650 POST HC-SL-61-187 - (CYLINDER-SIDE OF HUB)	C	6	Y	
651	106545	• PLUG, LUBRICATION, (ENGINE-SIDE OF HUB) REPLACES ITEM 650 AND 650A, POST HC-SL-61-354	C	6	Y	
660	B-6544	• CAP, FITTING, LUBRICATION (CYLINDER SIDE OF HUB)		6	Y	
-670	B-6626-LH5	• BOLT, 1/4-28, HEX HEAD		6	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
B	THE D-1066 HUB MAY BE MODIFIED TO THE D-1066-1 HUB TO INCORPORATE THE 105450 PITCH CHANGE ROD HUB BUSHING. REFER TO THE REPAIR CHAPTER IN THIS MANUAL.	C	REFER TO THE PROPELLER LUBRICATION CHAPTER OF HARTZELL PROPELLER INC. STANDARD PRACTICES MANUAL 202A (61-01-02).

- ITEM NOT ILLUSTRATED

HC-A6A-3( )

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		HC-A6A-3( ), CONTINUED				
10-1		**BETA SYSTEM PARTS**				
700	C-1055	• RING, BETA		1		
710	B-6616-A-4P	• SCREW, SET, 10-32, CRES		3	Y	
720	B-1061	• ROD, BETA		3		
-730	A-1065	• BETA SPRING RETAINER, REPLACED BY ITEM 750		3	Y	
-740	A-1064	• BETA SPRING RETAINER, REPLACED BY ITEM 750		3	Y	
750	A-3482	• RING, RETAINING, CRIMPED, REPLACES ITEM 730 AND ITEM 740		6	Y	
760	B-1060	• SPRING, COMPRESSION, BETA		3	Y	
770	C-1062	• SPRING RETAINER, BETA		3		
780	B-3898-12	• NUT HEX, THIN, DRILLED		3	Y	
790	B-3898-12	• NUT HEX, THIN, DRILLED		3	Y	
800	A-2043-1	• NUT, 3/8-24, HEX,SELF-LOCKING		3	Y	
810	A-3439	• NUT, 3/8-24, HEX, THIN		3	Y	
810A	B-3382	• NUT, 3/8-24, HEX, THIN, ALTERNATE POST HC-SL-61-256		3	Y	
820	C-1063	• PCP: SPRING, SUPPORT, ROD, BETA		1		PCP
830	A-2043-1	• NUT, 3/8-24, HEX,SELF-LOCKING		3	Y	
900	A-3044	• BLOCK, BETA FEEDBACK - ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BETA ASSEMBLY”, IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
10A-4		**SYNCHROPHASING TARGET BRACKET PARTS** (REFER TO “SYNCHROPHASING TARGET BRACKET PARTS”, IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)	**P**			
		PROPELLER MOUNTING PARTS				
1200	B-3347	• BOLT, MOUNTING, 9/16-18, 12 POINT		12	Y	
1210	A-2048-2	• WASHER, MOUNTING, 9/16 " CSK		12	Y	
1220	C-3317-239-2	• O-RING (MOUNTING FLANGE)		1	Y	
		BALANCE PARTS				
-1300	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
-1310	A-2424(A)-( )	• BALANCE WEIGHT		AR		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
P	USED IN A PROPELLER THAT HAS AN ICE PROTECTION SYSTEM		

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		HC-A6A-3( ), CONTINUED				
10-1		**PROPELLER PARTS**				
10-2		**BLADE RETENTION SYSTEM**				
1400	B-1033-2	• BRACKET, KNOB, PITCH CHANGE, REPLACED BY ITEM 1400A		6		
1400A	B-1033	• BRACKET, KNOB, PITCH CHANGE, REPLACES ITEM 1400		6		
1410	B-6260	• DOWEL PIN, 3/8 INCH		6		
1420	B-6626-LH5	• BOLT, 1/4-28, HEX HEAD (PITCH CHANGE KNOB)		12	Y	
-1430	B-1034( )	• BLOCK, PITCH ADJUST - UNIT		6		
1440	C-3317-A1275	• • O-RING		2	Y	
1450	106551	• • SPACER, ONLY AVAILABLE AS PART OF ITEM 1430		2		
1460	106553	• • RING, INNER, ONLY AVAILABLE AS PART OF ITEM 1430		1		
1470	106560	• • ROLLER, NEEDLE, ONLY AVAILABLE AS PART OF ITEM 1430		40		
1480	106552( )	• • RING, OUTER, ONLY AVAILABLE AS PART OF ITEM 1430		1		
1490	106551	• • SPACER, ONLY AVAILABLE AS PART OF ITEM 1430			2	
1500	C-3317-A1275	• • O-RING		1	Y	
1510	A-1074	• WASHER, RETAINING, KNOB UNIT		6	Y	
1520	B-3820	• SCREW, 6-32, CAP, CRES		6	Y	
1530	A-397	• CAP, PITCH CHANGE KNOB		6	Y	
1540	C-1042	• PRELOAD PLATE, PRE HC-SB-61-289 REPLACED BY ITEM 1540A, USED WITH ITEMS 1560 AND 1570		6		
1550	A-1272	• RACE, INNER BEARING ONLY AVAILABLE AS PART OF ITEM 1540				
1560	A-3204	• SCREW, SET, 5/16-24 USED WITH ITEMS 1540 AND 1570, POST HC-SB-61-225		6	Y	
1570	B-3368	• NUT, 5/16-24 HEX, THIN, USED WITH ITEMS 1540 AND 1560		6	Y	
1540A	101731	• PRELOAD PLATE ASSEMBLY, POST HC-SB-61-289 REPLACES ITEM 1540		6		
1550	A-1272	• • RACE, INNER BEARING ONLY AVAILABLE AS PART OF ITEM 1540A				
1560	A-3204	• • SCREW, SET, 5/16-24		1	Y	
1570	B-3368	• • NUT, 5/16-24 HEX, THIN		1	Y	
1580	B-7071	• RING, RETAINING, BEARING		6		
-1590	C-792	• BEARING, RETENTION, BLADE		6		
1600	C-792-B	• • RACE, BLADE SIDE		1		
1610	B-6144-1	• • BALL, BEARING, 3/8" DIA		33	Y	
-1610A	B-6144-1-1500	• • BALL, BEARING, 3/8" DIA, 1500 PCS, POST HC-SL-61-177		RF	Y	
1620	C-792-A	• • RACE, HUB SIDE		1		
1630	B-793	• BALL SPACER		6	Y	
1640	C3317-342	• O-RING		6	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

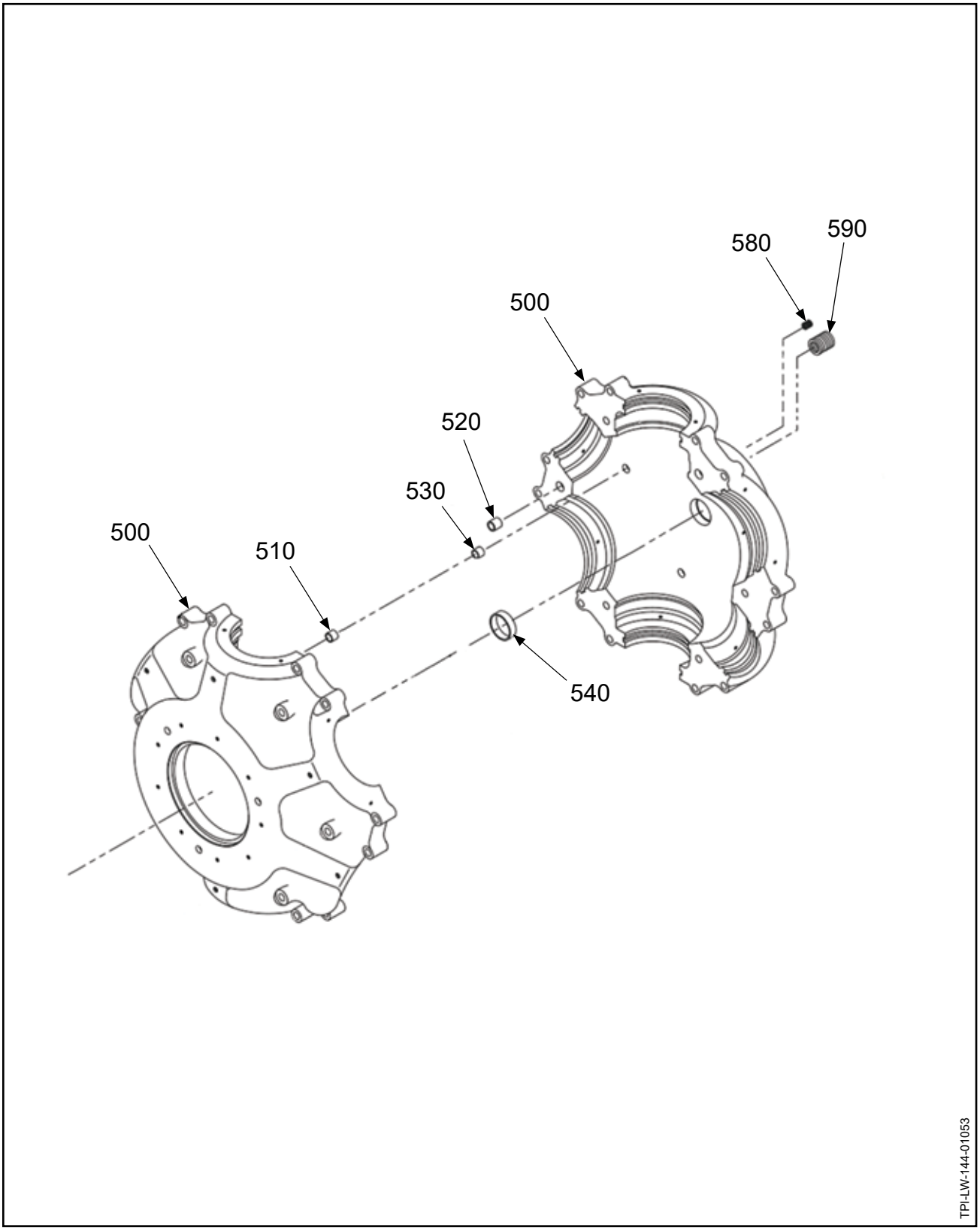
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
		HC-A6A-3( ), CONTINUED				
10-1		**PROPELLER PARTS**				
		COUNTERWEIGHT SLUGS				
-2000	B-1933	• SLUG, COUNTERWEIGHT COUNTERWEIGHT SLUGS ARE APPLICATION SPECIFIC. REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION.				
		COUNTERWEIGHT SLUG MOUNTING HARDWARE				
-2010		• BOLT				
-2020		• NUT COUNTERWEIGHT SLUG MOUNTING HARDWARE IS APPLICATION SPECIFIC. COUNTERWEIGHT SLUG MOUNTING HARDWARE MUST BE REPLACED AT OVERHAUL. REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59).				
		SPINNER PARTS - APPLICATION SPECIFIC				
		REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND HARTZELL PROPELLER INC. SPINNER MANUAL 148 (61-16-48)				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

(This page is intentionally blank.)

SUB-ASSEMBLY
PARTS LISTS and FIGURES



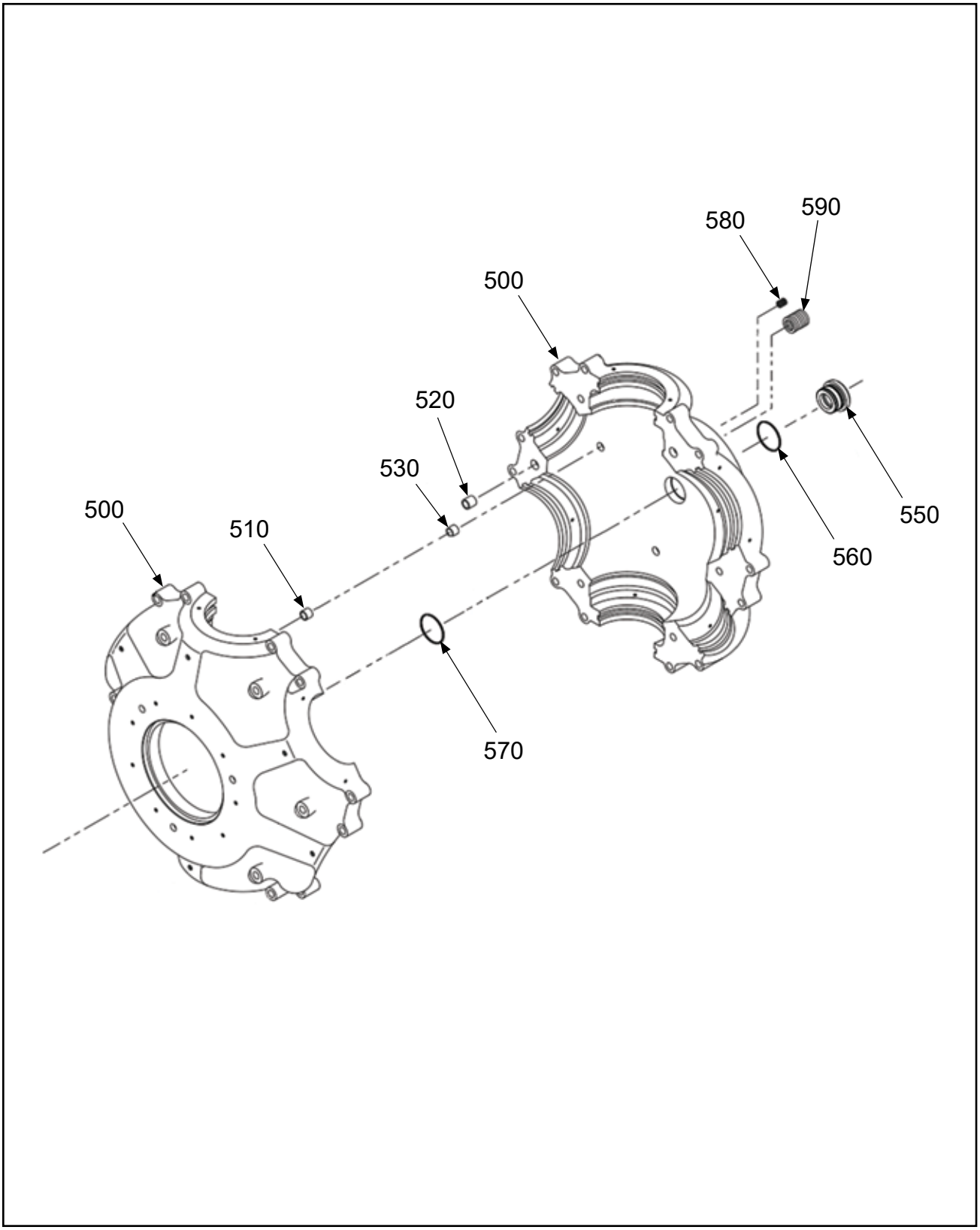
D-1066 Hub Unit
Figure 10A-1

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-1		**D-1066 HUB UNIT PARTS**				
500	D-1066	PCP: HUB UNIT, HC-A6A-3		1		PCP
510	B-6045-6-6	• BUSHING, METAL-POLYMER COMP. (CYLINDER SIDE HUB HALF)		3	Y	
520	A-2249	• HUB BUSHING, GUIDE		2	Y	
530	B-6045-6-6	• BUSHING, METAL-POLYMER COMP. (ENGINE SIDE HUB HALF)		3	Y	
540	A-1937	• BUSHING, HUB		1	Y	
580	B-6142	• INSERT 1/4-28, CRES, COILED		8	Y	
590	B-1243	• INSERT 9/16-18, CRES, STAKED				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

D-1066 Hub Unit



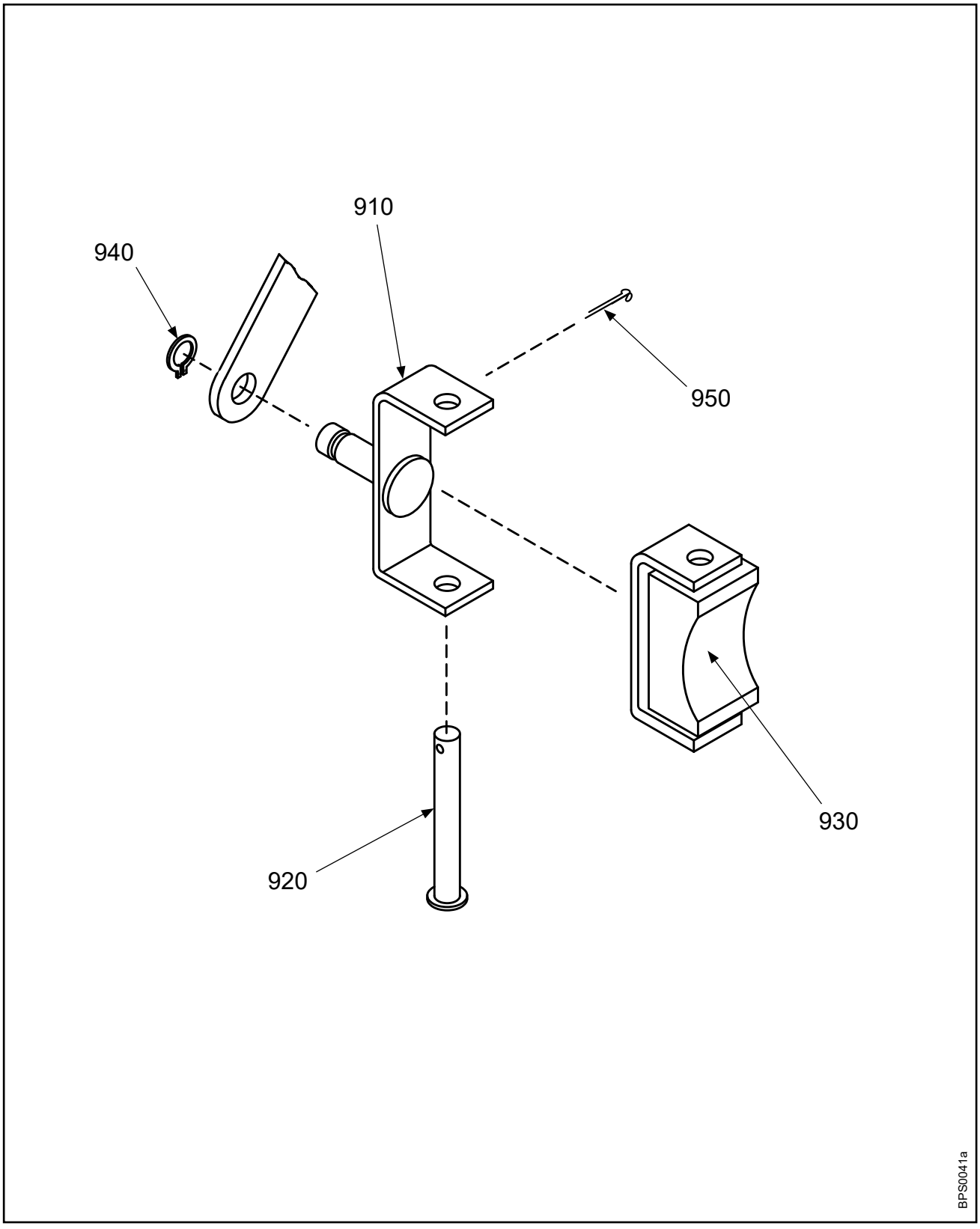
D-1066-1 Hub Unit
Figure 10A-2

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-2		**D-1066-1 HUB UNIT PARTS**				
500	D-1066-1	PCP: HUB UNIT, HC-A6A-3		1		PCP
510	B-6045-6-6	• BUSHING, METAL-POLYMER COMP. (CYLINDER SIDE HUB HALF)		3	Y	
520	A-2249	• HUB BUSHING, GUIDE		2	Y	
530	B-6045-6-6	• BUSHING, METAL-POLYMER COMP. (ENGINE SIDE HUB HALF)		3	Y	
550	105450	• HUB BUSHING, ROD		1		
560	C-3317-129-2	• O-RING		1	Y	
570	A-6153-175	• RING, RETAINING, EXTERNAL SPIRAL		1	Y	
580	B-6142	• INSERT 1/4-28, CRES, COILED		8	Y	
590	B-1243	• INSERT 9/16-18, CRES, STAKED		12	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

D-1066-1 Hub Unit



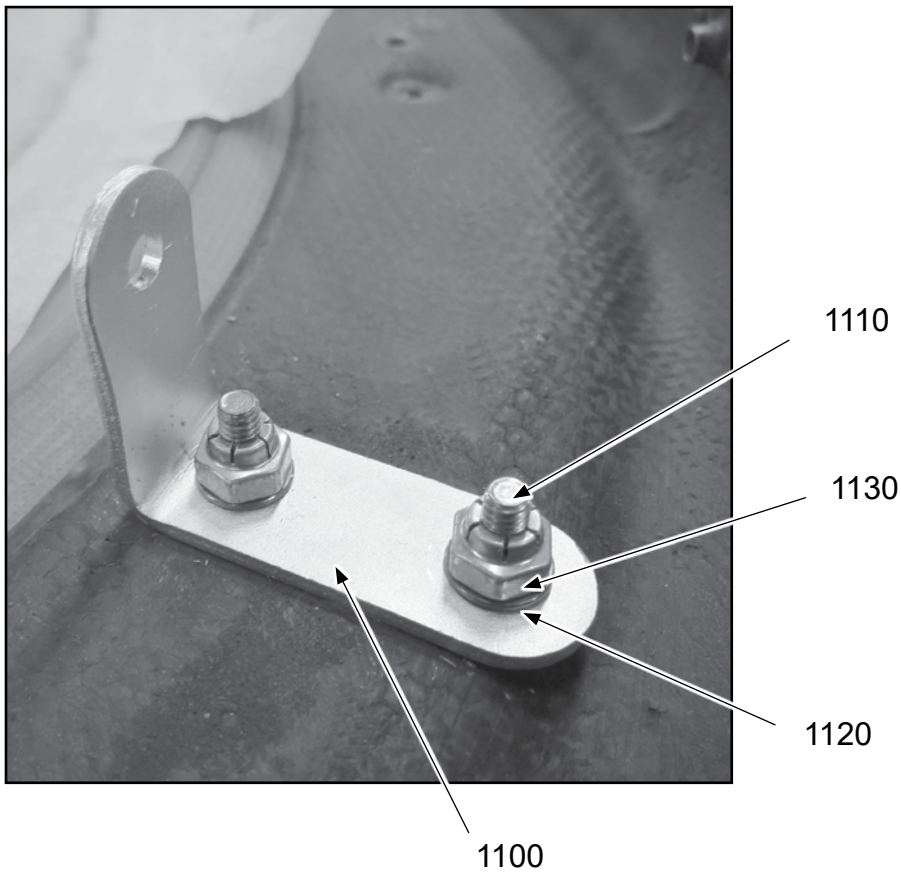
A-3044 Beta Feedback Block Assembly
Figure 10A-3

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-3		**A-3044 BETA FEEDBACK BLOCK ASSEMBLY**				
-900	A-3044	BLOCK, BETA FEEDBACK - ASSEMBLY		1		
910	A-3025	• YOKE UNIT		1		
920	B-3844-53	• CLEVIS PIN		1	Y	
930	A-3026	• CARBON BLOCK - UNIT		1	Y	
940	B-3843-25PP	• SNAP RING, EXTERNAL		1	Y	
950	A-4543	• COTTER PIN, T HEAD				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

A-3044 Beta Feedback Block Assembly



Synchrophasing Target Bracket Assembly
Figure 10A-4

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-4		**SYNCHROPHASING TARGET BRACKET PARTS**				
1100	A-3577	BRACKET, TARGET, SYNCHROPHASING	P	1		
1110	B-3856-247	SCREW, 8-32, FILLISTER HEAD, CRES	P	2	Y	
1120	B-3837-N832	WASHER, CORROSION RESISTANT	P	2	Y	
1130	B-6655-08	NUT, HEX, SELF-LOCKING	P	2	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
P	USED IN A PROPELLER THAT HAS AN ICE PROTECTION SYSTEM		

- ITEM NOT ILLUSTRATED

Synchrophasing Target Bracket Assembly

(This page is intentionally blank.)