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MANUAL REVISION TRANSMITTAL

MANUAL 158A (61-10-58)
Five Blade Lightweight Turbine Propeller Overhaul Manual

REVISION 21 dated February 2024

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

NOTE 1: Record the removal of a Temporary Revision on the Record of Temporary Revisions pages in this manual if applicable.

NOTE 2: When the manual revision has been inserted in the manual, record the information required on the Record of Revisions pages in this manual.

NOTE 3: Pages distributed in this revision may include pages from previous revisions if they are on the opposite side of revised pages. This is done as a convenience to those users who wish to print a two-sided copy of the new revision.

Manual No. 158A
61-10-58
Revision 21
February 2024

Five Blade Lightweight Turbine Propeller Overhaul Manual

HC-E5A-3( )
HC-E5N-3( )
HC-E5P-3( )
HC-E5W-3( )
HC-E5B-5( )
HC-E5N-5( )

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REVISION 21 HIGHLIGHTS

Revision 21, dated February 2024, incorporates the following:

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

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

- TESTING AND FAULT ISOLATION
  - Revised the section, "Troubleshooting Guide"
  * Revised Figure 1-2, "Checking Blade Play"
- DISASSEMBLY
  - Added Figure 3-1, "Beta Feedback Block Disassembly"
  - Added Figure 3-4, "Pitch Change Knob Bracket Unit Disassembly"
- CHECK
  - Revised the section, "Pitch Change Rod" (Item 380)
- FITS AND CLEARANCES
  - Revised Figure 8-2, "Blade Play"
  - Revised the section, "Blade Tolerances"
- ILLUSTRATED PARTS LIST
  - Revised the Counterweights/Mounting Bolts and Counterweight Slugs/Mounting Hardware sections for all propellers

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REVISION 21 HIGHLIGHTS

1. Introduction

A. General

(1) This is a list of current revisions that have been issued against this manual. Please compare to the 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 the revision.

(3) Comments indicates the level of the revision.

(a) New Issue is a new manual distribution. The manual is distributed in its entirety. All the page revision dates are the same and no change bars are used.

(b) Reissue is a revision to an existing manual that includes major content and/or major format changes. The manual is distributed in its entirety. All the page revision dates are the same and no change bars are used.

(c) Major Revision is a revision to an existing manual that includes major content or minor format changes over a large portion of the manual. The manual is distributed in its entirety. All the page revision dates are the same, but change bars are used to indicate the changes incorporated in the latest revision of the manual.

(d) Minor Revision is a revision to an existing manual that includes minor content changes to the manual. Only the revised pages of the manual are distributed. Each page retains the date and the change bars associated with the last revision to that page.

Revision No.	Issue Date	Comments
Original	Feb/95	New Issue
Revision 1	Feb/96	Minor Revision
Revision 2	Mar/01	Minor Revision
Revision 3	Apr/03	Minor Revision
Revision 4	Oct/06	Minor Revision
Revision 5	Aug/07	Minor Revision
Revision 6	Oct/08	Minor Revision
Revision 7	Nov/09	Minor Revision
Revision 8	Feb/12	Reissue
Revision 9	Nov/12	Minor Revision
Revision 10	Sep/13	Minor Revision
Revision 11	May/15	Minor Revision
Revision 12	Jun/15	Minor Revision
Revision 13	Dec/15	Minor Revision
Revision 14	Feb/16	Minor Revision
Revision 15	Dec/16	Minor Revision
Revision 16	Mar/18	Minor Revision
Revision 17	Nov/19	Minor Revision
Revision 18	Jun/21	Major Revision
Revision 19	Nov/22	Minor Revision
Revision 20	Jul/23	Major Revision
Revision 21	Feb/24	Minor Revision

RECORD OF REVISIONS

This is a record of revisions inserted into this manual.
Revision 20 includes all prior revisions.

Revision Number	Issue Date	Date Inserted	Inserted By
20	Jul/23	Jul/23	HPI
21	Feb/24	Feb/24	Hartzell

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RECORD OF TEMPORARY REVISIONS

Update this page to show all Temporary Revisions inserted into this manual.
Revision 20 includes all prior temporary revisions, up to and including TR-024.

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 20 includes all prior temporary revisions, up to and including TR-024.

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. FAILURE TO COMPLY WITH INFORMATION CONTAINED IN A SERVICE DOCUMENT OR THE USE OF OBSOLETE INFORMATION MAY CREATE AN UNSAFE CONDITION THAT MAY RESULT IN DEATH, SERIOUS BODILY INJURY, AND/OR SUBSTANTIAL PROPERTY DAMAGE.

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

Service Document Number	Incorporation Rev./Date
Service Bulletins:	
HC-SB-61-225	Rev. 3 Apr/03
HC-SB-61-248	Rev. 8 Feb/12
HC-SB-61-252, R2	Rev. 8 Feb/12
HC-SB-61-276, R5	Rev. 8 Feb/12
HC-SB-61-289	Rev. 8 Feb/12
HC-SB-61-290	Rev. 8 Feb/12
HC-SB-61-300	Rev. 8 Feb/12
HC-SB-61-320, R1	Rev. 11 May/15
HC-SB-61-320, R3	Rev. 15 Dec/16
HC-SB-61-346	Rev. 10 Sep/13
HC-SB-61-374	Rev. 16, Mar/18
HC-SB-61-392, R1	Rev. 19, Nov/22

Service Document Number	Incorporation Rev./Date
Service Letters:	
HC-SL-61-177	Rev. 8 Feb/12
HC-SL-61-187, R3	Rev. 7 Nov/09
HC-SL-61-241, R2	Rev. 8 Feb/12
HC-SL-61-256	Rev. 8 Feb/12
HC-SL-61-263	Rev. 8 Feb/12
HC-SL-61-271	Rev. 8 Feb/12
HC-SL-61-275	Rev. 6 Oct/08
HC-SL-61-275, R1	Rev. 8 Feb/12
HC-SL-61-282, R1	Rev. 8 Feb/12
HC-SL-61-301	Rev. 8 Feb/12
HC-SL-61-325	Rev. 8 Feb/12
HC-SL-61-339, R1	Rev. 11 May/15
HC-SL-61-352	Rev. 15 Dec/16
HC-SL-61-354, R1	Rev. 15 Dec/16

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. FAILURE TO COMPLY WITH INFORMATION CONTAINED IN A SERVICE DOCUMENT OR THE USE OF OBSOLETE INFORMATION MAY CREATE AN UNSAFE CONDITION THAT MAY RESULT IN DEATH, SERIOUS BODILY INJURY, AND/OR SUBSTANTIAL PROPERTY DAMAGE.

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 Instructions:	
SI 152A	Rev. 8 Feb/12

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 for composite blades, refer to Hartzell Propeller Inc. Owner's Manual 147 (61-00-47).

(3) For airworthiness limitations information for metal blades, refer to Hartzell Propeller Inc. Owner's Manual 149 (61-00-49).

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INTRODUCTION - CONTENTS

LIST OF FIGURES

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 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 127 (61-16-27)	Yes	Metal Spinner Maintenance Manual
Manual 133C (61-13-33)	-	Aluminum Blade Overhaul Manual
Manual 135F (61-13-35)	-	Composite Blade Overhaul Manual
Manual 147 (61-00-47)	Yes	Propeller Owner’s Manual and Logbook for Lightweight Turbine Propeller Models with Composite Blades
Manual 148 (61-16-48)	Yes	Composite Spinner Maintenance Manual
Manual 149 (61-00-49)	Yes	Propeller Owner’s Manual and Logbook for Lightweight Turbine Propeller Models with Aluminum 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	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 physical properties, health, and physical hazards of any 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. "Video" Icon/QR Code

A. Instructions for Use

(1) The "Video" icon/QR code (refer to Figure 1) that appears in this manual allows you to access a video or animated demonstration of the applicable procedure.

CAUTION: THESE VIDEOS/ANIMATIONS ARE INTENDED TO SUPPLEMENT THE APPLICABLE INSTRUCTIONS. THEY SHOULD NOT BE USED WITHOUT FIRST READING AND UNDERSTANDING THE LATEST REVISION OF THE PROCEDURE AND ANY APPLICABLE WARNINGS/CAUTIONS.

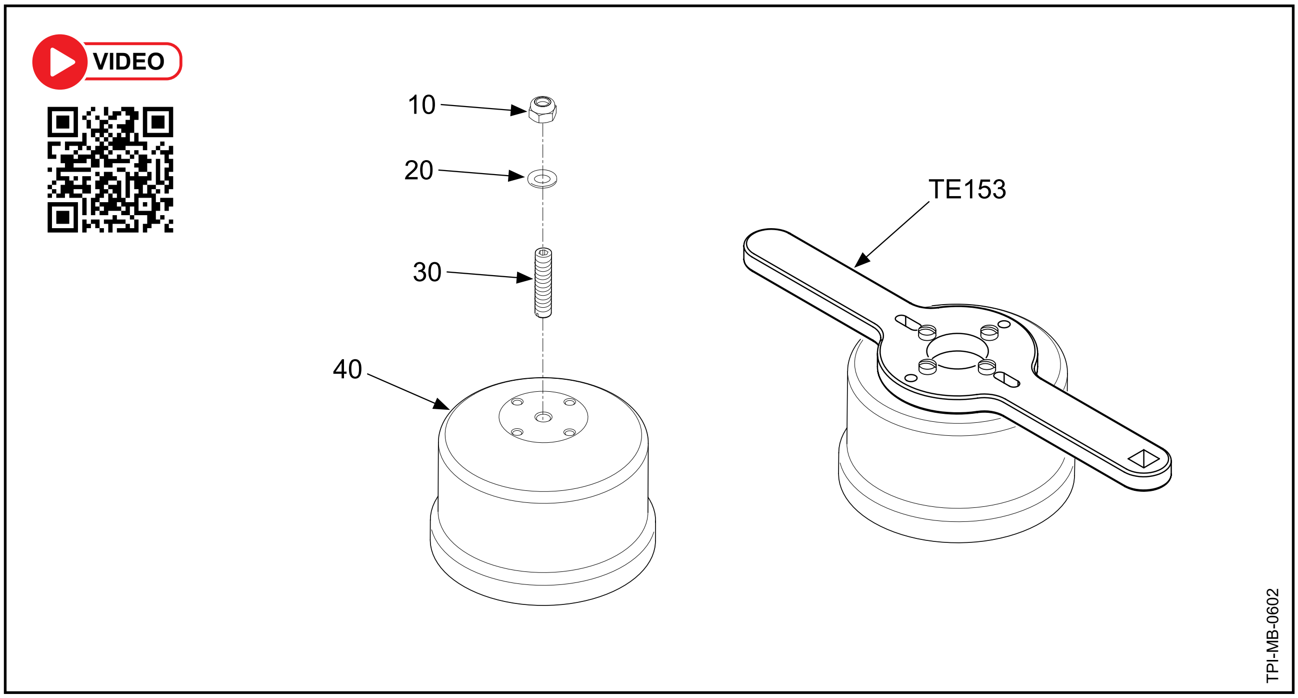
(2) To access the video/animated demonstration:

(a) If viewing the document file digitally:

1 Click on the QR code

(b) From a printed copy of the page:

1 Scan the QR code from any mobile device equipped with a QR reader application.



"Video" Icon/QR Code
Figure 1

13. 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
N	Newtons

Abbreviation	Term
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

DESCRIPTION AND OPERATION - CONTENTS

Page

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1. General (Rev. 2)

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 Blade Overhaul 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

A. HC-E5B-5( )

(1) The series HC-E5B-5( ) propeller is a constant-speed, single acting, hydraulically-actuated type of propeller with feathering and reversing capabilities, designed for use with Honeywell turboprop engines.

(2) The piston and cylinder of the hub assembly provide the pitch travel necessary for reversing and feathering.

(3) The propeller assembly is hydraulically-actuated. Propeller RPM is controlled by a governor that is installed on the engine and supplies oil under pressure to the hub assembly through a beta rod.

(4) The engine oil is forced into a cavity inside the hub between the piston and the cylinder and moves the piston forward from low pitch position into reverse pitch range. This motion is transmitted from the piston to the blade assembly through a pitch change rod, blade pitch change assembly, and slotted fork unit.

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

(6) Increasing oil pressure from 0 psi to approximately 385 psi (27.07 kg/cm^2) causes propeller pitch to decrease in the positive range and to increase in the negative (reversing) range. A loss of oil supply results in feathering the propeller rather than reversing it, because the combined action of feathering spring and blade counterweights force oil from the propeller back through the beta rod and governor into a drain.

(7) In beta mode, the propeller pitch control functions as a variable low pitch stop by metering the flow of oil from the governor into the propeller through the beta rod. The beta valve shuts off the oil supply when the piston reaches a predetermined low pitch setting and prevents the governor from moving the piston beyond the prescribed low pitch position. For ground operations, the prescribed position can be varied by the power lever in the cockpit to permit reversing the propeller.

(8) The hydraulic low pitch stop also prevents the propeller from going below flight idle pitch in flight.

B. HC-E5(A,N,P,W)-3( )

(1) The series HC-E5(A,N,P,W)-3( ) propeller is a constant-speed, single-acting, hydraulically actuated propeller with feathering and reversing capabilities, designed for use with Pratt & Whitney PT6 series turboprop engines.

(2) The propeller is constructed of a two-piece aluminum hub with aluminum or composite blades. The blade has a single piece counterweight bolted directly to the blade shank. A 105 degree pitch range is available with externally adjustable feather angle, reverse angle, and low pitch blade angle.

(3) Propeller RPM is controlled by the governor that is installed on the engine and supplies pressurized engine oil. The governor also functions as a hydraulic low pitch valve and as a beta valve when the propeller is in the reverse mode of operation.

(4) An increase in oil pressure into the propeller from 0 psi to approximately 385 psi (27.07 kg/cm^2) causes the 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 because the combined action of the blade counterweights and feathering spring 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 pitch 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 roller bearing on the end of the knob minimizes friction. The pitch change knob determines blade-to-blade pitch angle adjustment.

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

(8) A beta valve is linked to the propeller piston through external mechanisms. The pitch change fork top plate engages the beta nuts threaded on the beta rods at predetermined low pitch settings. Movement of the blades to a pitch lower than the low pitch setting causes the rods to move the beta ring away from the engine.

(9) If applicable, 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, beta rods, and carbon block assembly.

(10) The carbon block assembly is attached to an engine-supplied lever. This lever is connected to a beta valve governor and to the power lever that is controlled in the cockpit. Blade movement below the preadjusted low pitch angle moves the beta lever and causes the beta valve to interrupt the hydraulic connection between propeller and governor. This prevents further travel of the blade pitch to a lower angle until physically commanded from the cockpit.

C. HC-E5N-5( )

(1) The series HC-E5N-5( ) propeller is a constant-speed, single acting, hydraulically-actuated type of propeller with feathering and reversing capabilities, designed for use with Honeywell turboprop engines.

(2) The piston and cylinder of the hub assembly provide the pitch travel necessary for reversing and feathering.

(3) The propeller assembly is hydraulically-actuated. Propeller RPM is controlled by a governor that is installed on the engine and supplies oil under pressure to the hub assembly through a beta rod.

(4) The engine oil is forced into a cavity inside the hub between the piston and the cylinder and moves the piston forward from low pitch position into reverse pitch range. This motion is transmitted from the piston to the blade assembly through a pitch change rod, blade pitch change assembly, and slotted fork unit.

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

(6) Increasing oil pressure from 0 psi to approximately 385 psi (27.07 kg/cm^2) causes propeller pitch to decrease in the positive range and to increase in the negative (reversing) range. A loss of oil supply results in feathering the propeller rather than reversing it, because the combined action of feathering spring and blade counterweights force oil from the propeller back through the beta rod and governor into a drain.

(7) In beta mode, the propeller pitch control functions as a variable low pitch stop by metering the flow of oil from the governor into the propeller through the beta rod. The beta valve shuts off the oil supply when the piston reaches a predetermined low pitch setting and prevents the governor from moving the piston beyond the prescribed low pitch position. For ground operations, the prescribed position can be varied by the power lever in the cockpit to permit reversing the propeller.

(8) The hydraulic low pitch stop also prevents the propeller from going below flight idle pitch in flight.

D. Feathering the Propeller

(1) The propeller is feathered by releasing the governor oil pressure. This permits 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 permits 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 of up to 15 seconds is typical for feathering with this system.

E. Unfeathering the Propeller

(1) Model HC-E5(A,N,P,W)-3( ) Propellers Without Start Locks

(a) 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.

(b) The propeller is unfeathered by setting the governor control lever in the normal flight range position, starting the engine, and using the governor to pump oil into the propeller.

(c) When the propeller has rotated a few turns, the governor will start to unfeather the blades.

(d) In flight when the propeller is unfeathered, windmilling occurs and reduces the time required to accomplish unfeathering.

(2) Model HC-E5W-3( ), HC-E5B-5( ), and HC-E5N-5( ) Propellers With Start Locks

CAUTION: MAKE SURE THAT THE PROPELLER HUB ASSEMBLY IS ON THE START LOCK AT ZERO (0) DEGREES BEFORE AN ENGINE START IS ATTEMPTED.

(a) The propeller is installed (or removed) with the blades in a feathered position to prevent the feathering spring from distorting the start lock arrangement.

(b) If the propeller is not on the start locks, the power lever must be moved to reverse position and the unfeathering pump turned on to rotate the propeller to full reverse position. When the unfeathering pump is turned off, oil leaves the propeller, and the feathering spring moves the blades toward a higher angle until the start locks are activated.

(c) When the propeller is unfeathered in flight, the governor control is pushed back into the normal flight position, and the unfeathering pump is used to supply oil pressure to move the propeller out of feather. As the propeller moves out of feather, it provides the cranking power needed for an air start. Windmilling occurs and reduces the time required to accomplish unfeathering.

F. Reversing the Propeller

(1) HC-E5(A,N,P,W)-3( )

(a) In reverse mode of operation, the governor operates in an underspeed condition to act strictly as a source of pressurized oil, while attempting to control RPM. Control of the propeller blade angle in reverse is accomplished with the beta valve for propellers with beta feedback block assemblies and with the PCU for propellers with electronic beta sensors.

NOTE: For installations with beta feedback block assemblies, the beta valve is normally built into the base of the governor. For installations with beta sensors, the beta valve function is built into the PCU control system.

(b) For installations with beta feedback block assemblies, the propeller is reversed by manually repositioning the cockpit-control to cause the beta valve to supply oil from the governor pump to the propeller. Several external propeller mechanisms, which include a beta ring and beta feedback block assembly, communicate propeller blade angle position to the beta valve.

(c) When the propeller reaches the desired reverse position, movement of the beta ring and beta feedback block assembly initiated by the propeller piston, causes the beta valve to shut off the flow of oil to the propeller. Any additional unwanted movement of the propeller toward reverse, or any movement of the manually positioned beta valve control toward high pitch position will cause the beta valve to drain oil from the propeller to increase pitch.

(d) For installations with electronic beta sensors, the propeller is reversed by manually repositioning the cockpit-control to cause the PCU to supply oil from the PCU pump to the propeller. The electronic beta sensor reads the position of the specially designed beta ring and communicates propeller blade angle position to the FADEC.

(e) When the propeller reaches the desired reverse position, the electronic beta sensor determines the movement of the specially designed beta ring, initiated by propeller piston, and the FADEC tells the PCU to stop the flow of the oil to the propeller. Any additional unwanted movement of the propeller toward reverse, or any movement of the cockpit control toward the high pitch position will cause the PCU to drain oil from the propeller to increase pitch.

(2) HC-E5B-5( ) and HC-E5N-5( )

(a) Blade movement below the predetermined low pitch angle is manually controlled through the beta valve.

(b) The propeller is reversed by pulling back on the power lever so the beta valve will assume control of blade pitch. The governor then pumps oil through the engine beta rod into the propeller, and the piston moves into reverse range.

(c) Pushing forward on the power lever repositions the low pitch stop at normal low pitch. The beta valve then drains oil from the propeller cylinder, and the blades return to normal pitch.

(d) System operation does not depend on maintaining a pressure or leakproof mechanism to prevent unintended reversal. A loss of oil at low pitch results in feathering, not reversal, because the combined action of the blade counterweights and feathering spring forces oil out of the propeller back through the engine beta rod and into a drain.

TESTING AND FAULT ISOLATION - CONTENTS

LIST OF FIGURES

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1. Troubleshooting Guide

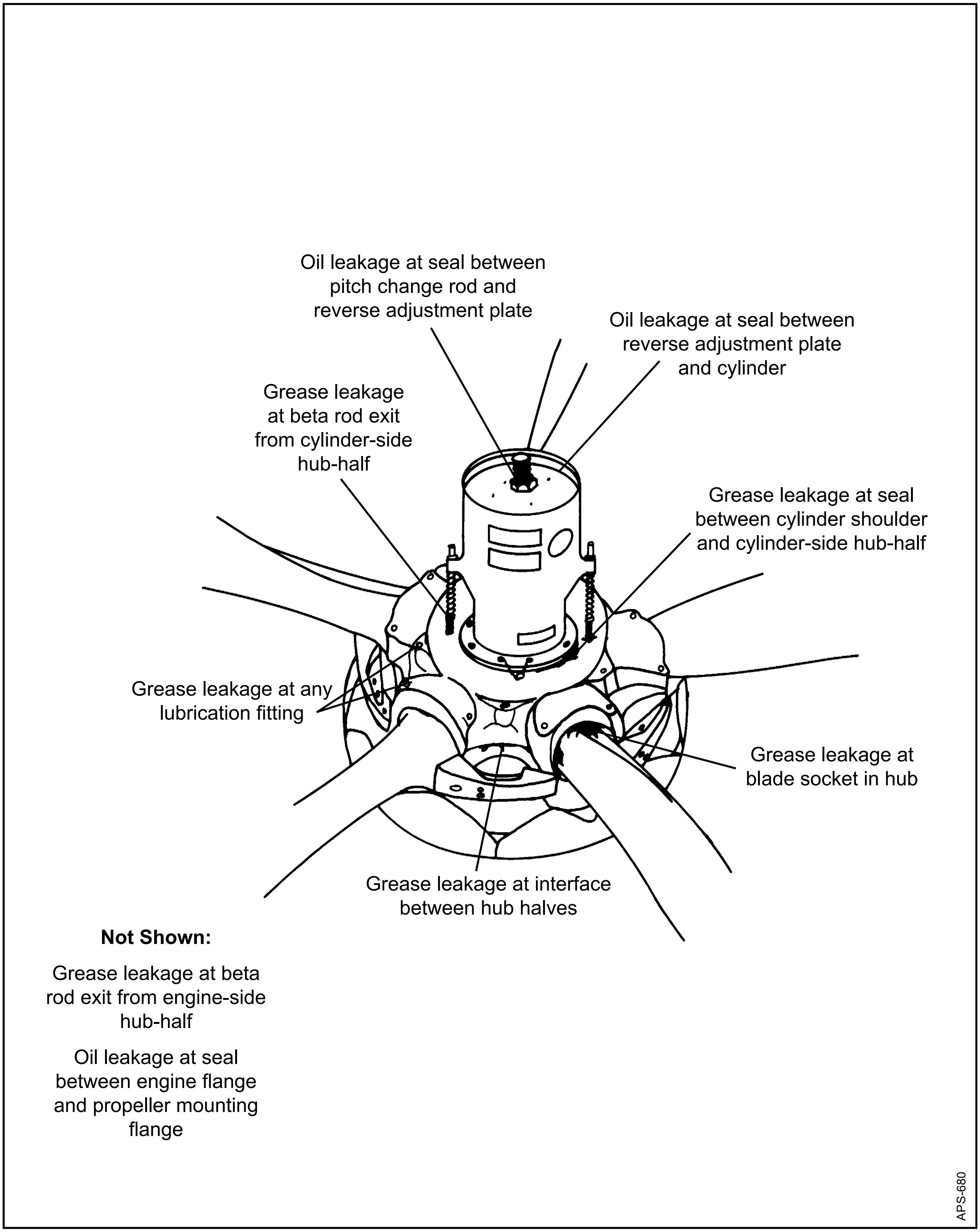
CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

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. Pitch Control Difficulty		Excessive friction in moving parts.	Refer to the problem, "Friction" in this chapter.
	or	Oil passages are not clear and open.	Examine the hydraulic system.
	or	Incorrect governor has been installed.	Refer to the airframe or the engine manufacturer's maintenance manual for installation instructions.
B. Friction		Blade Preload is excessive.	Disassemble the propeller and readjust the blade preload.
	or	Lack of lubrication	Add approved lubricant.
	or	Balls in the blade retention split-bearing are unusually rough, corroded, or chipped.	Replace the blade retention split-bearing assembly.
	or	Insufficient clearance between the various moving parts in the pitch change mechanism.	Examine the moving parts individually. Increase the clearances between the individual parts as necessary to decrease friction in the mechanism.

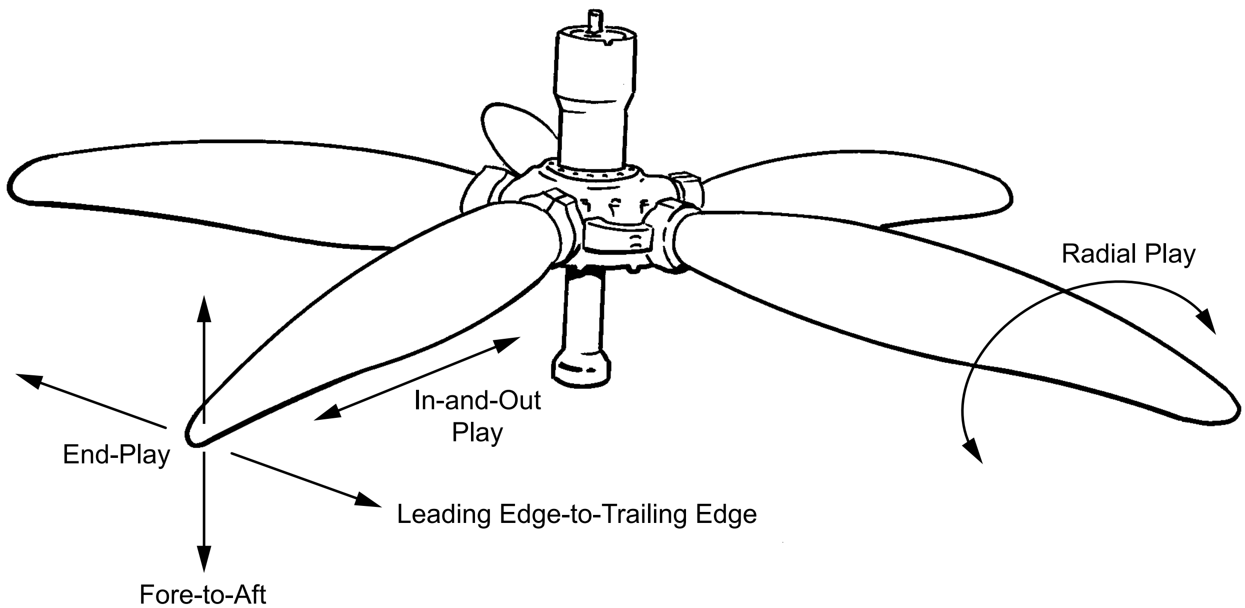
Problem		Probable Cause	Remedy
C. Abnormal Propeller Vibration		Bent, cracked, or damaged blade.	For aluminum blades, refer to Hartzell Propeller Inc. Manual 133C (61-13-33). For composite blades, refer to Hartzell Propeller Inc. Manual 135F (61-13-35).
	or	Cracked or damaged hub.	Refer to the Aluminum Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
	or	Broken blade retention split bearings.	Replace the bearings and inspect the other blade retention components.
	or	Grease leakage.	Refer to the problem, "Grease Leakage" in this chapter.
D. Slight Vibration		Blades not tracking.	Refer to the problem, "Blades Not Tracking" in this chapter.
	or	Static balance incorrect.	Refer to the Static and Dynamic Balance chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
	or	Dynamic balance incorrect.	Refer to the Static and Dynamic Balance chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02.
	or	Blade wear.	For aluminum blades, refer to Hartzell Propeller Inc. Manual 133C (61-13-33). For composite blades, refer to Hartzell Propeller Inc. Manual 135F (61-13-35).
	or	Grease leakage.	Refer to the problem, "Grease Leakage" in this chapter.

Problem		Probable Cause	Remedy
E. Surging RPM or Torque		Excessive friction in the pitch change mechanism.	Refer to the problem, "Friction" in this chapter.
	or	Air is trapped in the propeller actuating piston or in the engine shaft.	After propeller installation and before each flight, exercise the propeller by changing pitch or feathering. The engine should have a provision for trapped air to escape from the system during one-half of the pitch cycle.
	or	Governor problem.	Refer to the airframe or the engine manufacturer's maintenance manual for installation instructions.
	or	Beta ring runout is excessive, causing vibration of the carbon block.	Reset the beta ring run-out to specified limits. Refer to the Assembly chapter in this manual.
	or	Beta ring height or runout is incorrect (PT6 engines).	Reset the beta ring height and run-out in reverse and feather.
	or	Beta system rigging.	Refer to the airframe manufacturer's instructions.



Areas of Leaking Oil or Grease
Figure 1-1

Problem		Probable Cause	Remedy
F. Oil Leakage (Refer to Figure 1-1)		Faulty 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.
	or	Faulty O-ring seal between the cylinder and the hub.	Remove the cylinder and inspect the O-ring and the sealing surface. Replace the defective O-ring.
	or	For HC-E5(A,N,P,W)-3( ) Faulty O-ring seal between the piston and the cylinder, resulting in leakage from openings in the hub for the beta system or between the pitch change rod plug and the cylinder.	Remove the cylinder and inspect the piston O-ring and cylinder sealing surface. Replace the defective O-ring.
	or	For HC-E5B-5( ) and HC-E5N-5( ) Faulty O-ring seal between the piston and the cylinder, resulting in leakage from the start locks on the cylinder or between the beta adjust screw and the cylinder.	Remove the cylinder and inspect the piston O-ring and cylinder sealing surface. Replace the defective O-ring.
	or	Faulty O-ring seal between the pitch change rod plug and the pitch change rod.	Remove the pitch change rod plug and inspect O-ring. Replace the defective O-ring.
	or	Faulty O-ring seal between the pitch change rod and either hub half, resulting in leakage from the hub, beta rod holes and around the blade shanks	Remove the lubrication fitting at the bottom of the hub and insert a wire. If oil runs out, then one or both O-rings are defective. Remove the propeller from the engine and disassemble. Inspect both O-rings and sealing surfaces. Replace the defective O-ring(s).
G. Grease Leakage (Refer to Figure 1-1) A new or newly overhauled propeller may leak slightly during the first several hours of operation. The leakage may be caused by the seating of seals and O-rings, and the slinging of lubricants used during assembly. Such leakage should cease within the first ten hours of operation.		Defective lubrication fitting.	Replace defective lubrication fittings.
	or	Faulty seal at blade socket in hub.	Disassemble the propeller and inspect the seal and the sealing surface. Replace defective seal.
	or	Too much grease was used for lubrication, resulting in leakage from the beta rod holes.	Disassemble the propeller and remove excess grease from the hubs.



NOTE 1: The blade is equipped with a spring loaded device for preload. Excessive force at the end of the blade will result in blade movement once the mechanism force is surpassed.

NOTE 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. If blade play is greater than the allowable limits, or if 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.

TPI-LW-157-01420

Checking Blade Play
Figure 1-2

Problem		Probable Cause	Remedy
H. End-Play (Leading Edge to Trailing Edge) of the Blade Refer to Figure 1-2 and the section, "Blade Tolerances" in the Fits and Clearances chapter of this manual.		Buildup of manufacturing tolerances.	Disassemble the propeller and reset the preload. Replace the preload plate unit (980), if necessary.
	or	Blade retention bearing (1040) is worn.	Follow the Blade Retention Split Bearing Inspection and Replacement Procedures.
	or	Internal blade bearing is worn.	Disassemble the propeller, remove the blade, and inspect the bearing. Replace the worn bearing.
I. End-Play (Fore-to-Aft) of the Blade Refer to Figure 1-2 and the section, "Blade Tolerances" in the Fits and Clearances chapter of this manual.		Buildup of manufacturing tolerances.	Disassemble the propeller and reset the preload. Replace the preload plate unit (980), if necessary.
	or	Blade retention bearing is worn.	Follow Blade Retention Split Bearing Inspection and Replacement Procedures.
	or	Internal blade bearing is worn.	Disassemble the propeller, remove the blade, and inspect the bearing. Replace the worn bearing.
J. In-and-Out Play of the Blade Refer to Figure 1-2 and the section, "Blade Tolerances" in the Fits and Clearances chapter of this manual.		Buildup of manufacturing tolerances.	Disassemble the propeller and reset the preload. Replace the preload plate unit (980), if necessary.
	or	Blade retention bearing is worn.	Follow Blade Retention Split Bearing Inspection and Replacement Procedures.
K. Excessive Radial Play of the Blade (backlash) Refer to Figure 1-2 and the section, "Blade Tolerances" in the Fits and Clearances chapter of this manual.		Pitch change fork is worn.	Disassemble the propeller. Inspect and replace the fork, as required.
	or	Pitch change track roller is worn.	Disassemble the propeller. Inspect and replace the cam follower, as required.

Problem	Probable Cause	Remedy
L. Blades Not Tracking Refer to Figure 1-2 and the section, "Blade Tolerances" in the Fits and Clearances chapter of this manual.	Ground strike damage.	For an aluminum blade, refer to Hartzell Propeller Inc. Manual 133C (61-13-33). For a composite blade, refer to Hartzell Propeller Inc. Manual 135F (61-13-35).
	or Blade twist is not correct.	Refer to Hartzell Propeller Inc. Manual 133C (61-13-33).

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

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 hub or blade, as evidence of where it entered or left the propeller.

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

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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.

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DISASSEMBLY - CONTENTS

LIST OF FIGURES

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 propeller 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. HC-E5(A,N,P,W)-3( ) 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 P.S.I. (13.78 BARS) OF PRESSURE WHEN ACTUATING PROPELLERS INCLUDED IN THIS MANUAL.

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

CAUTION 5: WHILE DISASSEMBLING THE BETA SYSTEM, IT IS POSSIBLE FOR THE THREADED BETA SLEEVE (1340) AND NUT (1350) ON THE BETA ROD ASSEMBLY TO FALL THROUGH THE BETA HOLES ON THE CYLINDER-SIDE OF THE HUB. IF THE PROPELLER IS ACTUATED WHILE THE THREADED BETA SLEEVE AND NUT ARE INSIDE THE HUB, THE PARTS MAY JAM INSIDE THE HUB CAUSING DAMAGE TO THE FORK PLATE (820).

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

B. Beta System Disassembly
Refer to Figure 3-1.

(1) If applicable, disassemble the beta feedback block assembly (1430).

(a) Remove and discard the external snap ring (1470) from the yoke unit (1440).

(b) Remove and discard the cotter pin (1480) from the clevis pin (1450).

(c) Remove and discard the clevis pin (1450) from the yoke unit (1440) and the carbon block unit (1460).

(d) Remove and discard the carbon block unit (1460) from the yoke unit (1440).

(2) If applicable, remove and discard the O-rings (490, 500) from the bulkhead locating ring (320) on the cylinder assembly (280).

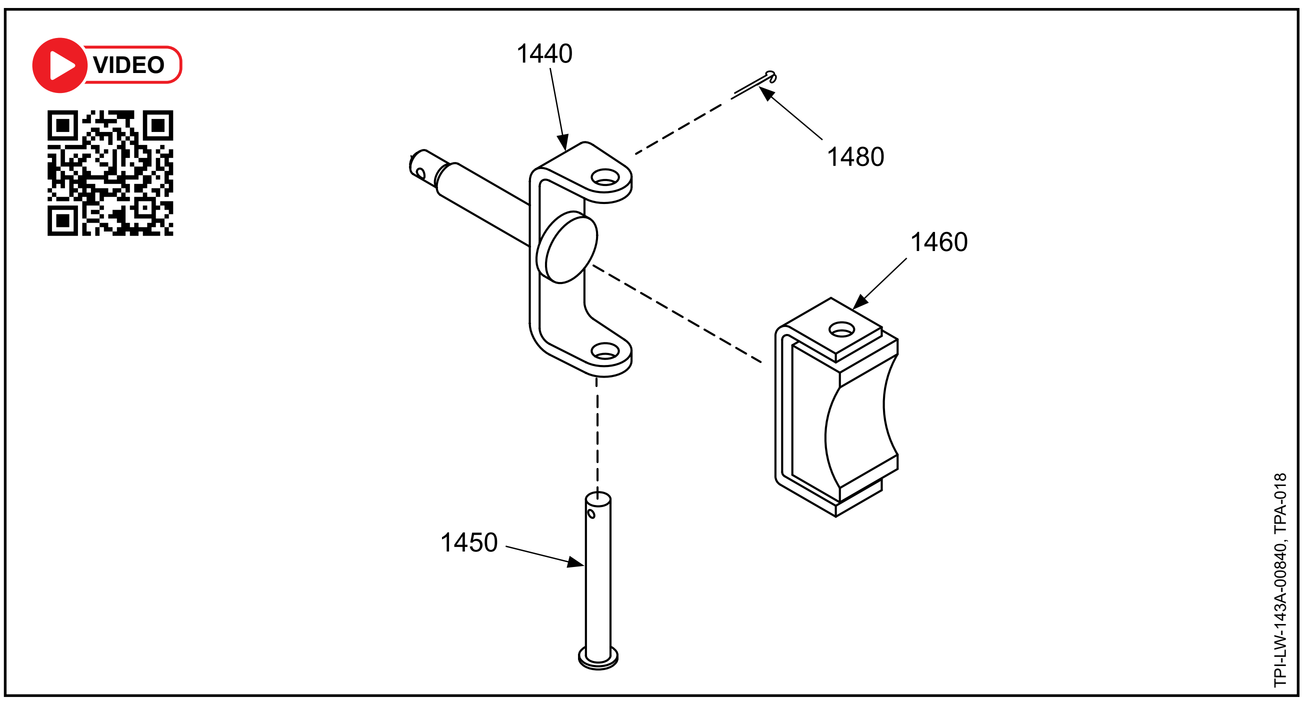
(3) If applicable, remove and discard the self-locking hex nut (540), the washer (530), and the 10-32 hex head bolt (510) from the forward end of the pitch change rod (380).

(4) Remove and discard the drilled thin hex nuts (1420) from each beta rod (1330).

(5) Remove the rod end support ring (1410).

(6) Remove and discard the drilled thin hex nuts (1400) from each beta rod (1330).

(7) Loosen each nut (1350) and threaded beta sleeve (1340) until the threaded beta sleeve is free from the hub unit (590).



Beta Feedback Block Disassembly
Figure 3-1

(8) Pull the beta ring (1310) with the attached beta rods (1330) away from the hub unit (590) until the beta rods are free from the lugs of the cylinder assembly (280).

(9) Remove the spring guide (1390) from each beta rod (1330).

(10) Remove and discard the beta compression springs (1370, 1380) from each beta rod (1330).

(11) Remove the spring retainer (1360) from each beta rod (1330).

(12) Remove and discard the 3/8-24 thin, hex nut (1350) from each beta rod (1330).

(13) Remove the threaded beta sleeve (1340) from each beta rod (1330).

(14) Pull the beta ring (1310) with the attached beta rods (1330) until the beta rods are free from the propeller.

CAUTION: DO NOT DAMAGE THE THREADS OR THE BETA RING (1310) WHEN REMOVING THE SET SCREW (1320).

(15) If applicable, remove and discard each set screw (1320) from the beta ring (1310).

(a) The head of the set screw (1320) may strip during removal.

1 If necessary, a locally procured screw removal tool may be used in accordance with the manufacturer's directions to remove the set screw (1320).

CAUTION: DO NOT TWIST THE BETA RING (1310) OR DAMAGE THE THREADS WHEN REMOVING THE BETA RODS (1330) FROM THE BETA RING (1310).

(16) If applicable, loosen the drilled thin hex nut (1325) on the beta rod (1330).

(17) Using a 5/16 inch wrench on the forward end of the beta rod (1330), turn the beta rod counterclockwise until each beta rod is free from the beta ring (1310).

(18) If applicable, remove and discard the drilled thin hex nut (1325) from the beta rod (1330).

C. Start Lock System, Hydraulic System, and Pitch Adjustment Unit Disassembly

(1) Remove and discard the washers and screws that attach the bulkhead to the hub (590).

(2) Remove the bulkhead from the hub (590).

(3) Install the propeller assembly on the rotatable fixture on the assembly table TE129.

(4) Remove and discard the O-ring (660) from each beta rod hole in the engine-side of the hub.

(5) If applicable, remove the start lock system.

(a) Move the propeller to feather position using the following steps:

1 Apply air pressure to actuate the propeller into reverse pitch.

2 Pull the spring-loaded start lock pin (170) partially out of the start lock housing (150) and put a 0.25 inch (6.3 mm) thick locally fabricated spacer between the head of the start lock pin (170) and the start lock housing (150) to hold the start lock pin (170) in the extracted position.

3 Repeat this process for each start lock pin (170).

4 Release the air pressure to move the propeller to feather position.

5 Remove each 0.25 inch (6.3 mm) thick locally fabricated spacer from between the head of the start lock pin (170) and the start lock housing (150).

(b) Using a 1/16 inch diameter straight punch, drive the spring pin (190) into the bore of the start lock mounting ring (130).

(c) Remove and discard the spring pin (190).

(d) Unscrew and remove the start lock housing (150) from the start lock mounting ring (130).

(e) Remove and discard the cotter pin (180) from each start lock pin (170) in the start lock housing (150).

(f) Remove each start lock pin (170) from the start lock housing (150).

(g) Remove and discard each compression spring (160) from the start lock housing (150).

(h) Remove and discard each 1/4-28 cap screw (140) from the start lock mounting ring (130).

(i) Remove the start lock mounting ring (130).

(6) If applicable, remove the anti-rotation plate (80).

(7) Apply sufficient air pressure to the propeller assembly to raise the feather adjust nuts (10, 20) away from the pitch stop plate (60).

(8) If applicable, remove and discard the self-locking hex nut (540), the washer (530), and the 10-32 hex head bolt (510) from the forward end of the pitch change rod (380).

(9) Remove the drilled, thin, hex feather adjust nuts (10, 20) from the pitch change rod (380).

(10) Release the air pressure from the propeller assembly.

(11) If applicable, remove the pitch change rod plug (30) from the pitch change rod (380).

(12) If applicable, remove and discard the O-ring (50) from the pitch change rod plug (30).

(13) If applicable, remove and discard the screws or bolts (100, 110), and washers (90) from the pitch stop plate (60).

(14) Remove the stop plate (70), if applicable.

CAUTION: DO NOT DAMAGE THE PITCH STOP PLATE (60) OR THE THREADS OF THE CYLINDER (280) WHEN REMOVING THE SEALANT.

(15) Using a plastic scraper, or similar tool, remove the sealant from the pitch stop plate (60) and the threads of the cylinder (280).

(16) Using appropriate screws, attach torque wrench adapter TE153 to the pitch stop plate (60).

(17) Using the attached torque wrench adapter TE153, turn and remove the pitch stop plate (60).

(18) For a hub that uses bushings (450) in the cylinder-side beta rod holes, remove the bolts (420, 430, and/or 440), washers (400, 410), retainers (460) and bushings (450).

(a) Discard the bolts (420, 430, and/or 440) and the washers (400, 410).

(19) For a hub that does not use bushings (450) in the cylinder-side beta rod holes, remove and discard the bolts (420) and the washers (390).

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

(20) Using a crowfoot wrench with a suitable extension on the piston retainer nut (200), loosen the pitch change rod/cylinder assembly from the pitch change fork (810).

(a) If only the piston nut (200) turns, instead of the entire pitch change rod/ cylinder assembly, temporarily reinstall and jam together the drilled, thin, hex (feather adjust) nuts (10, 20).

(b) After torquing the drilled, thin, hex feather adjust nuts (10, 20) together, use a wrench on the inboard feather adjust nut (20) to loosen the pitch change rod/cylinder assembly from the pitch change fork (810).

(c) Rotate the cylinder (280) counterclockwise by hand until the pitch change rod/cylinder assembly disengages from the pitch change fork (810).

(21) Carefully lift out the pitch change rod (380) with the cylinder (280) and the feathering spring assembly attached.

(22) Carefully set aside the cylinder/spring assembly pack for later disassembly.

(23) Remove and discard the cylinder mounting O-ring (470) from the hub (590).

(24) Remove each anti-rotation rod (720) from the hub (590).

(25) Remove and discard the two back-up rings (580) from each beta rod (1330) hole in the cylinder-side of the hub (590).

CAUTION: DO NOT SEPARATE THE HUB HALVES UNTIL ALL OF THE BLADES ARE SUPPORTED BY STANDS. IF NOT SUPPORTED, THE BLADES MAY FALL OUT OF THE HUB (590) AFTER THE HUB HALVES ARE SEPARATED.

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

(27) Remove and discard the self-locking nuts (690) and washers (680) from the hex head bolts (670) that clamp together the halves of the hub (590).

(28) Remove the hex head hub clamping bolts (670) from the hub (590).

(29) Loosen the lock nut (1110) on the preload plate set screw (1100).

(30) Turn out the preload plate set screw (1100) in each blade preload plate (1180).

CAUTION 1: DO NOT DAMAGE THE BLADE WHEN TRYING TO SEPARATE THE HUB HALVES.

CAUTION 2: IF THE PROPELLER IS EQUIPPED WITH A DE-ICE SYSTEM, DO NOT TAP THE BLADE IN THE BOOT AREA.

(31) Using a soft mallet, lightly tap the end of alternating opposite blades to loosen the seal between the hub halves.

CAUTION: DO NOT USE A SCREWDRIVER OR OTHER SHARP TOOL TO SEPARATE THE HUB HALVES.

(32) Using a plastic wedge, or similar tool, gently pry apart the halves of the hub (590).

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

(33) Remove the cylinder-side half of the hub (590).

(34) Remove and discard the screws (830) that attach the fork top plate (820) to the fork (810).

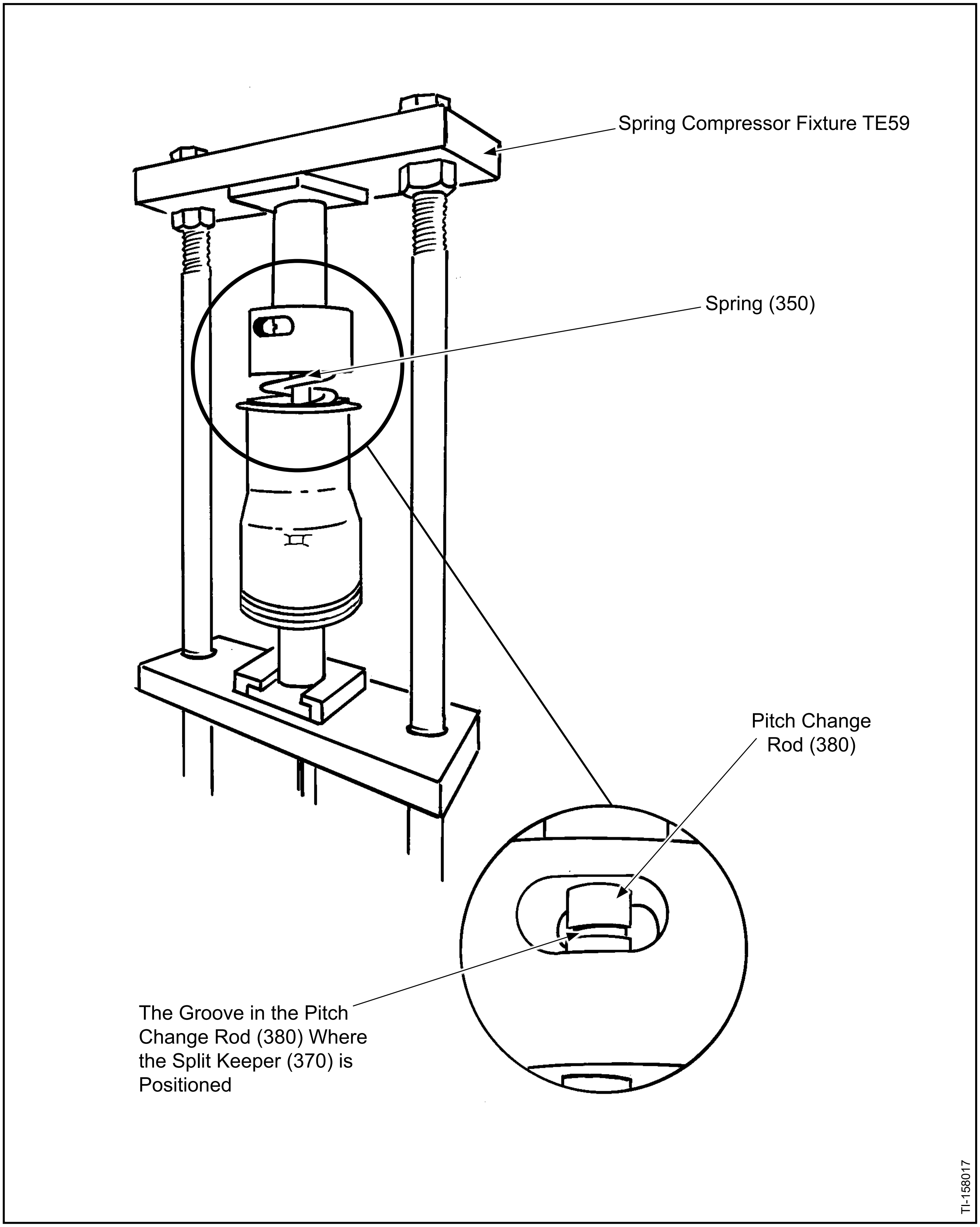
(35) Remove the fork top plate (820).

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

(37) Remove the fork (810) from the hub (590).

(38) If applicable, remove and discard the screws (814) that attach the bumper (812) to the fork (810).

(39) If applicable, remove the bumper (812).



Disassembly of the Feathering Compression Spring
Figure 3-2

D. Cylinder/Spring Assembly Pack Disassembly - HC-E5(A,N,P,W)-3( ) Propeller

WARNING: USE EXTREME CAUTION DURING DISASSEMBLY OF THE FEATHERING COMPRESSION SPRING ASSEMBLY. WHEN COMPRESSED, THE FEATHERING COMPRESSION SPRING ASSEMBLY IS LOADED TO APPROXIMATELY 800 POUNDS (363 kg) FORCE. MAKE SURE OF THE SAFETY OF PERSONNEL IN THE VICINITY DURING THE DISASSEMBLY PROCEDURES.

(1) Disassemble the feather compression spring. Refer to Figure 3-2.

(a) Put the cylinder/spring pack in the spring compressor fixture TE59, or equivalent.

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

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

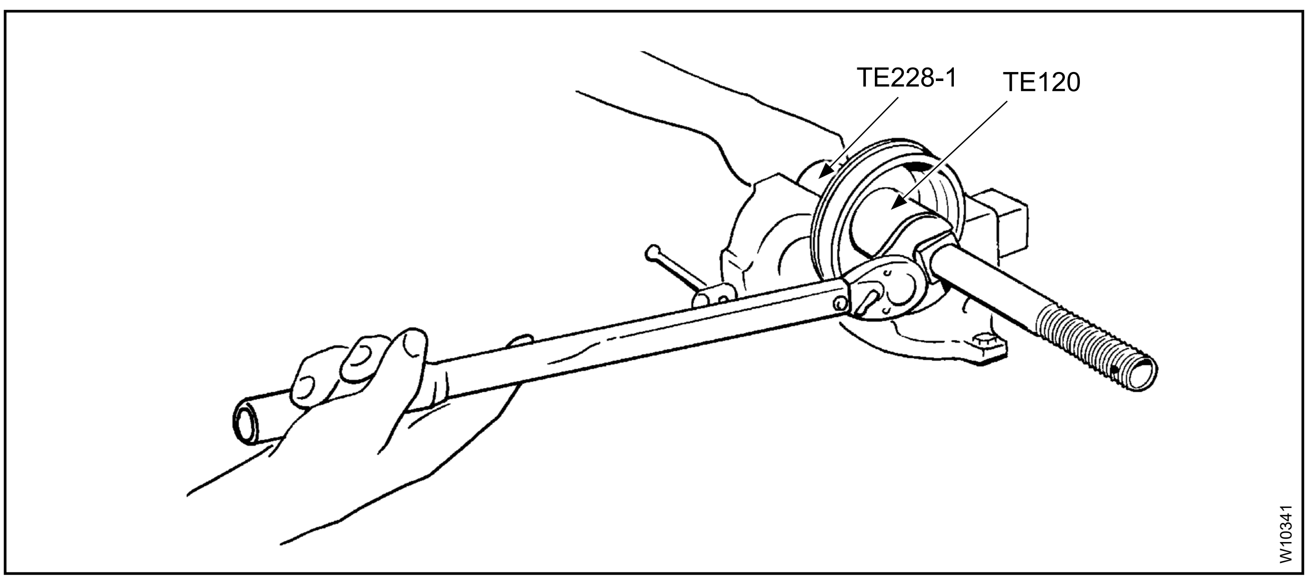
(d) Permit the cylinder/spring pack to slowly decompress.

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

(f) Remove the rear spring retainer (360), the feathering compression spring (350), and spring seat (340).

(g) Remove the pitch change rod/piston assembly from the cylinder (280).

(2) Using a piston installation socket TE228-1, a modified deep well socket TE120, and an applicable crowfoot adapter, remove and discard the large pitch change rod nut (200) from the pitch change rod/piston assembly. Refer to Figure 3-3.



Removing the Piston Nut
Figure 3-3

(3) Remove the piston (210) from the pitch change rod/piston assembly.

(4) Remove and discard the back-up ring (230) and the O-ring (240) from the OD of the piston (210).

(5) Remove and discard the piston O-ring (220) from the ID of the piston (210).

(6) Remove and discard the O-ring (480) from the cylinder bushing (300).

CAUTION: DO NOT REMOVE THE BUSHING BEFORE COMPLETING ALL INSPECTIONS THAT ARE REQUIRED BEFORE THE CYLINDER BUSHING (300) IS REMOVED.

(7) After all of the required inspections are complete, remove the cylinder bushing (300) using the following steps:

NOTE: During the initial installation in the cylinder, the inside diameter and O-ring grooves in the bushings are machined after the bushing is installed (necessary to maintain close dimensional tolerances). This results in bushings that are uniquely mated to a cylinder. During overhaul, removal of the bushing is required for inspection and O-ring replacement. Subsequent reuse of the original bushings may be possible if the bushings are not excessively worn or damaged.

(a) Refer to the Check chapter in this manual for inspections that must be completed before the cylinder bushing (300) is removed.

(b) Using a round bottom stamp, stamp the cylinder (280) with a period "." next to the cylinder bushing (300).

(c) Using paint or other marking method that will not damage the cylinder bushing, make a mark on the cylinder bushing (300).

NOTE: These marks are matched to identify "clocking" of the cylinder bushing with respect to the cylinder.

(d) Remove and discard the internal retaining ring (310) from the cylinder bushing (300).

(e) Press the cylinder bushing (300) from the cylinder (280).

(f) Remove and discard the O-ring (290) from the ID of the cylinder (280) where the cylinder bushing (300) was removed.

(8) Remove and discard the O-ring (560) and the back-up rings (550, 570), if applicable, from the engine-side half of the hub (590).

E. Blade Retention Parts Disassembly - HC-E5(A,N,P,W)-3( ) Propeller

(1) Remove and discard the two-piece seal energizer ring (1210) and the blade seal (1200) or the blade O-ring (1200), as applicable.

(2) Remove the hub-side bearing race (1180) from each blade.

(3) Remove and discard the bearing balls (1170) from each blade.

(4) Remove and discard the ball spacer (1190) from each blade.

(5) Remove the preload plate (1080) from each blade.

(6) Remove and discard the thin hex nut (1110) and set screw (1100) from the preload plate (1080).

(7) For an N-shank and NC-shank blades only:

(a) Remove and discard the ball bearing (1220).

(b) Remove the blade plug (1230).

1 Plug Puller TE454 is available for use when removing the blade plug (1230).

(c) Remove and discard the O-ring (1240) from the blade plug (1230).

(8) Remove the blade seal (1130) from the butt of the blade, if applicable.

(9) Remove and discard the blade seal O-ring (1140), if applicable.

(10) Remove and discard the bolts (1060) and, if applicable, the washers (1070) that attach the pitch change knob bracket (1020) to the blade.

(11) Remove the pitch change knob bracket (1020) from the blade using the following steps and Figure 3-4:

(a) If the dowel pin (1050) remains in the blade, remove and discard the dowel pin.

(b) If the dowel pin (1050) remains in the pitch change knob bracket (1020), removal of the dowel pin from the pitch change knob bracket is not required.

(12) For a pitch change knob bracket (1020) that uses a swaged washer to retain the cam follower (1040), remove the cam follower from the pitch change knob bracket, using the following steps:

(a) Install puller TE98, or equivalent, so that the center post pushes on the pitch change knob bracket (1020).

(b) Put the arms of the puller TE98, or equivalent, on the back of the cam follower (1040).

(c) Turn in the handle of the puller TE98, or equivalent, to pull off the cam follower (1040) and the washer (1030).

(d) Discard the cam follower (1040) and the washer (1030).

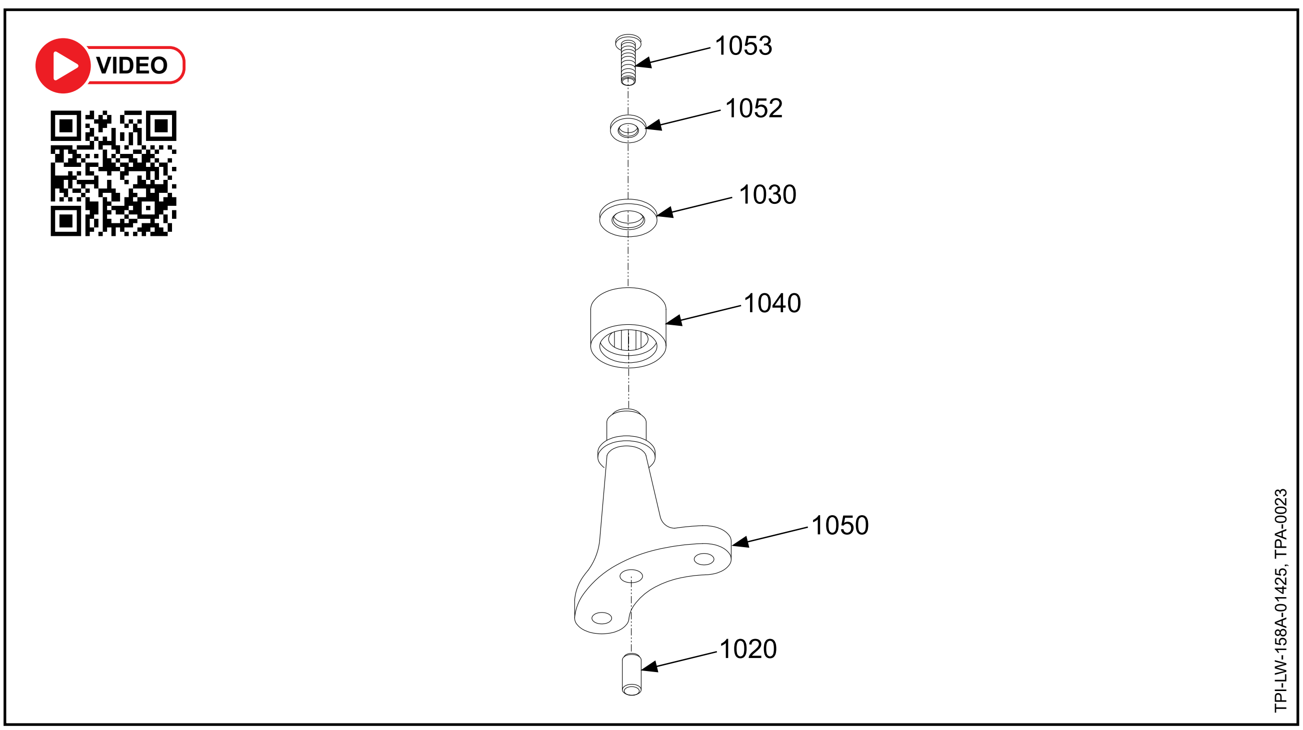
(13) For a pitch change knob bracket that uses a screw to retain the cam follower, remove the cam follower (1040) from the pitch change knob bracket (1020), using the following steps and Figure 3-4:

(a) Remove and discard the screw (1053) from the end of the pitch change knob bracket (1020).

(b) Remove and discard the dimpled washer (1052).

(c) Remove the knob unit retaining washer (1030).

(d) Remove and discard the cam follower (1040).



Pitch Change Knob Bracket Unit Disassembly
Figure 3-4

(14) Using a suitable gear puller, brass drift, or bearing press remove the bearing retaining ring (1120).

(15) Remove the blade-side blade bearing race (1160) from the blade.

(16) Repeat this Blade Retention Parts Disassembly procedure for each blade assembly.

F. Blade Disassembly - HC-E5(A,N,P,W)-3( ) Propeller

(1) For aluminum blade overhaul procedures, counterweight disassembly, and balance weight disassembly, refer to Hartzell Propeller Inc. Aluminum Blade Overhaul Manual 133C (61-13-33).

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

G. Hub Disassembly - HC-E5(A,N,P,W)-3( ) Propeller

(1) For Propeller Models HC-E5(A,N)-3( )

(a) Remove the mounting bolts (1600) and washers (1610).

(b) Remove the hub half (590) from the mounting fixture.

(c) For a hub that uses a Hartzell Propeller Inc. part number 104903 rod hub bushing (612), remove the 104903 rod hub bushing from the hub bore, using the following steps.

1 Remove and discard the external spiral retaining ring (615) from the OD of the rod hub bushing (612).

2 Remove the rod hub bushing (612) from the bore of the hub.

CAUTION: DO NOT USE A METAL PICK WHEN REMOVING THE O-RING. A METAL PICK CAN CAUSE DAMAGE TO THE HUB THAT MAY REQUIRE THE HUB TO BE REPLACED.

3 Remove and discard the O-ring (613) from the OD of the rod hub bushing (612).

(2) For Propeller Models HC-E5W-3( )

(a) Remove and discard the mounting nuts (1640) and washers (1610).

(b) Remove the hub half (590) from the mounting fixture.

(c) Remove and discard the screws (1670).

(d) Remove the mounting spacer (1650) with dowel pins (1660) and O-rings (1630) from the propeller flange.

(e) Remove and discard the mounting studs (1600) from the hub (590).

(f) Remove and discard the two O-rings (1630) from the mounting spacer (1650).

(g) Remove and discard the two dowel pins from the mounting spacer (1650).

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

(3) For Propeller Models HC-E5P-3( )

(a) Remove the bolts (654) from the mounting bolt ring (652).

(b) Remove the rod hub bushing (612) from the hub bore, using the following steps:

1 Remove and discard the external spiral retaining ring (615) from the OD of the rod hub bushing (612).

CAUTION: DO NOT USE A METAL PICK WHEN REMOVING THE O-RING. A METAL PICK CAN CAUSE DAMAGE TO THE HUB BUSHING THAT MAY REQUIRE THE BUSHING TO BE REPLACED.

2 Remove the rod hub bushing (612) from the bore of the hub.

3 Remove and discard the O-ring (613) from the OD of the rod hub bushing (612).

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

3. HC-E5B-5( ) Disassembly

A. General

WARNING: THE USE OF BLADE PADDLES TO MOVE BLADES CAN RESULT IN THE OVERLOAD AND DAMAGE OF BLADE PITCH CHANGE KNOBS. THIS DAMAGE IS NOT REPAIRABLE AND CAN RESULT IN SEPARATION BETWEEN THE BLADE AND THE PITCH CHANGE KNOB, 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 P.S.I. (13.78 BARS) OF PRESSURE WHEN ACTUATING PROPELLERS INCLUDED IN THIS MANUAL.

CAUTION 4: USE SUFFICENT 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.

B. Start Lock System, Hydraulic System, and Pitch Adjustment Unit Disassembly

(1) Install the propeller assembly on the rotatable fixture on the assembly table TE129.

(2) Move the propeller to feather position using the following steps:

(a) Apply air pressure to actuate the propeller into reverse pitch.

(b) Pull the spring-loaded start lock pin (170) partially out of the start lock housing (150) and put a 0.25 inch (6.3 mm) thick locally fabricated spacer between the head of the start lock pin (170) and the start lock housing (150) to hold the start lock pin (170) in the extracted position.

(c) Repeat this process for each start lock pin (170).

(d) Release the air pressure to move the propeller to feather position.

(e) Remove each 0.25 inch (6.3 mm) thick locally fabricated spacer from between the head of the start lock pin (170) and the start lock housing (150).

(3) Using a 1/16 inch diameter straight punch, drive the spring pin (190) into the bore of the start lock mounting ring (130).

(4) Remove and discard the spring pin (190).

(5) Unscrew and remove the start lock housing (150) from the start lock mounting ring (130).

(6) Remove and discard the cotter pin (180) from each start lock pin (170) in the start lock housing (150).

(7) Remove each start lock pin (170) from the start lock housing (150).

(8) Remove and discard each compression spring (160) from the start lock housing (150).

(9) Remove and discard each 1/4-28 cap screw (140) from the start lock mounting ring (130).

(10) Remove the start lock mounting ring (130).

(11) If applicable, remove the anti-rotation plate (80)

(12) Apply sufficient air pressure to the propeller assembly to raise the feather adjust nuts (10, 20) away from the pitch stop plate (60).

(13) Remove and discard the self-locking hex nut (540), the washer (530), and the 10-32 hex head bolt (510) from the forward end of the pitch change rod (380).

(14) Remove the feather adjust nuts (10, 20) from the pitch change rod (380).

(15) Release the air pressure from the propeller assembly.

(16) Remove the beta adjust screw (40) from the pitch change rod (380).

(17) If applicable, remove and discard the screws (100) holding the stop pitch plate (60) in place.

(18) Using appropriate screws, attach torque wrench adapter TE153 to the pitch stop plate (60).

(19) Using the attached torque wrench adapter TE153, turn and remove the pitch stop plate (60).

(20) Remove and discard the bolts (420) and washers (390) used to attach the cylinder (280) to the hub (590).

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

(21) Using a crowfoot wrench and a suitable extension on the piston retainer nut (200), loosen the pitch change rod/cylinder assembly from the pitch change fork (810).

(a) If only the piston nut (200) turns, instead of the entire pitch change rod/cylinder assembly, temporarily reinstall and jam together the feather nuts (10, 20).

(b) After torquing the feather nuts (10, 20) together, use a wrench on the inboard feather nut (20) to loosen the pitch change rod/cylinder assembly from the pitch change fork (810).

(c) Rotate the cylinder (280) counterclockwise by hand until the pitch change rod/cylinder assembly disengages from the pitch change fork (810).

(22) Carefully lift out the pitch change rod (380) with the cylinder (280) and the feathering spring assembly attached.

(23) Carefully set the cylinder/spring assembly pack aside for later disassembly.

(24) Remove and discard the cylinder mounting O-ring (470) from the hub (590).

(25) Remove each anti-rotation rod (720) from the hub (590).

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

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

(27) Remove and discard the washers (680) and self-locking nuts (690) from the hex head hub clamping bolts (670)

(28) Remove the hex head hub clamping bolts (670) from the hub (590).

(29) Loosen the lock nut (1110) on the preload plate set screw (1100).

(30) Turn out the preload set screw (1100) in each blade preload plate (1080).

CAUTION 1: DO NOT DAMAGE THE BLADE WHEN TRYING TO SEPARATE THE HUB HALVES.

CAUTION 2: IF THE PROPELLER IS EQUIPPED WITH A DE-ICE SYSTEM, DO NOT TAP THE BLADE IN THE DE-ICE BOOT AREA.

(31) Using a soft mallet, lightly tap the end of alternating opposite blades to loosen the seal between the hub halves.

CAUTION: DO NOT USE A SCREWDRIVER OR OTHER SHARP TOOL TO SEPARATE THE HUB HALVES.

(32) Using a plastic wedge, or similar tool, gently pry apart the hub halves (590).

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

(33) Remove the cylinder-side half of the split-hub unit (590).

(34) Remove and discard the screws (830) that attach the fork top plate (820) to the fork (810).

(35) Remove the fork top plate (820).

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

(37) Remove the fork (810) from the split-hub unit (590).

C. Cylinder/Spring Assembly Pack Disassembly - HC-E5B-5( ) Propeller

WARNING: USE EXTREME CAUTION DURING DISASSEMBLY OF THE FEATHERING COMPRESSION SPRING ASSEMBLY. WHEN COMPRESSED, THE FEATHERING COMPRESSION SPRING ASSEMBLY IS LOADED TO APPROXIMATELY 800 POUNDS (363 kg) FORCE. MAKE SURE OF THE SAFETY OF PERSONNEL IN THE VICINITY DURING THE DISASSEMBLY PROCEDURES.

(1) Disassemble the feather compression spring. Refer to Figure 3-2.

(a) Put the cylinder/spring pack in the spring compressor fixture TE59, or equivalent.

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

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

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

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

(f) Remove the rear spring retainer (360), the feathering compression spring (350), and the spring seat (340).

(g) Remove the pitch change rod/piston assembly from the cylinder (280).

(2) Using a piston installation socket TE228-1, a modified deep well socket TE120, and an applicable crowfoot adapter, remove and discard the large pitch change rod nut (200) from the pitch change rod/piston assembly. Refer to Figure 3-3.

(3) Remove the piston (210) from the pitch change rod/piston assembly.

(4) Remove and discard the back up ring (230) and the O-ring (240) from the OD of the piston (210).

(5) Remove and discard the piston O-ring (220) from the ID of the piston (210).

(6) Remove the O-ring (480) from the cylinder bushing (300).

CAUTION: DO NOT REMOVE THE CYLINDER BUSHING (300) UNTIL ALL REQUIRED INSPECTIONS ARE COMPLETE.

(7) After all of the required inspections are complete, remove the cylinder bushing (300) using the following steps.

NOTE: During the initial installation in the cylinder, the inside diameter and O-ring grooves in the bushings are machined after the bushing is installed (necessary in order to maintain close dimensional tolerances). This results in bushings that are uniquely mated to a cylinder. During overhaul, removal of the bushings is required for inspection and O-ring replacement. Subsequent reuse of the original bushings may be possible if the bushings are not excessively worn or damaged.

(a) Refer to the Check chapter in this manual for inspections that must be completed before the cylinder bushing (300) is removed.

(b) Using a round bottom stamp, stamp the cylinder (310) with a period "." next to the cylinder bushing (300).

(c) Using paint or other marking method that will not damage the cylinder bushing, make a mark on the cylinder bushing (300).

NOTE: These marks are matched to identify "clocking" of the cylinder bushing with respect to the cylinder.

(d) Remove and discard the internal retaining ring (310) from the cylinder bushing (300).

(e) Press the cylinder bushing (300) from the cylinder (280).

(f) Remove and discard the O-ring (290) from the ID of the cylinder (280) where the cylinder bushing (300) was removed.

(8) Remove and discard the O-ring (560) and the back-up rings (550, 570) from the engine-side half of the hub (590).

D. Blade Retention Parts Disassembly - HC-E5B-5( ) Propeller

(1) Remove and discard the blade O-ring (1200) or the energizer ring seal (1210) and blade seal (1200), as applicable.

(2) Remove the hub-side bearing race (1180) from each blade.

(3) Remove and discard the bearing balls (1170) from each blade.

(4) Remove and discard the ball spacer (1190) from each blade.

(5) Remove the preload plate (1080) from each blade.

(6) Remove and discard the thin hex nut (1110) and set screw (1100) from the preload plate (1080).

(7) Remove the blade seal (1130) from the butt of the blade, if applicable.

(8) Remove and discard the blade seal O-ring (1140), if applicable.

(9) Remove and discard the bolts (1060) that attach the pitch change knob unit (1020) to the blade.

(10) Remove the pitch change knob unit (1020) from the blade using the following steps and Figure 3-4.

(a) If the dowel pin (1050) remains in the blade, remove and discard the dowel pin (1050).

(b) If the dowel pin (1050) remains in the pitch change knob bracket (1020), removal of the dowel (1050) from the pitch change knob bracket (1020) is not required.

(11) For a pitch change knob bracket (1020) that uses a swaged washer to retain the cam follower (1040), remove and discard the washer (1030) and the cam follower (1040) from the pitch change knob bracket (1020), using the following steps:

(a) Install puller TE98, or equivalent, so that the center post pushes on the pitch change knob bracket (1020).

(b) Put the arms of the puller TE98, or equivalent, on the back of the cam follower (1040).

(c) Turn in the handle of the puller TE98, or equivalent, to pull off the cam follower (1040) and the washer (1030).

(d) Discard the cam follower (1040) and the washer (1030).

(12) For a pitch change knob bracket that uses a screw to retain the cam follower, remove the cam follower (1040) from the pitch change knob bracket (1020), using the following steps and Figure 3-4:

(a) Remove and discard the screw (1053) from the end of the pitch change knob bracket (1020).

(b) Remove and discard the dimpled washer (1052).

(c) Remove the knob unit retaining washer (1030).

(d) Remove and discard the cam follower (1040).

(13) Using a suitable gear puller or brass drift, remove the bearing retaining ring (1120).

(14) Remove the blade-side blade bearing race (1160) from the blade.

(15) Repeat this Blade Retention Parts Disassembly procedure for each blade assembly.

E. Blade Disassembly - HC-E5B-5( ) Propeller

(1) For composite blade overhaul procedures, refer to Hartzell Propeller Inc. Composite Blade Overhaul Manual 135F (61-13-35).

F. Hub Disassembly - HC-E5B-5( ) Propeller

(1) Remove the mounting bolts (1600) and washers (1610).

(2) Remove the hub half (590) from the mounting fixture.

(3) For a hub that uses a Hartzell Propeller Inc. part number 104903 rod hub bushing (612), remove the 104903 rod hub bushing (612) from the hub bore, using the following steps.

(a) Remove and discard the external spiral retaining ring (615) from the OD of the rod hub bushing (612).

(b) Remove the rod hub bushing (612) from the bore of the hub.

(c) Remove and discard the O-ring (613) from the OD of the rod hub bushing (612).

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

4. HC-E5N-5( ) Disassembly

A. General

WARNING: THE USE OF BLADE PADDLES TO MOVE BLADES CAN RESULT IN THE OVERLOAD AND DAMAGE OF BLADE PITCH CHANGE KNOBS. THIS DAMAGE IS NOT REPAIRABLE AND CAN RESULT IN SEPARATION BETWEEN THE BLADE AND THE PITCH CHANGE KNOB, 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 P.S.I. (13.78 BARS) OF PRESSURE WHEN ACTUATING PROPELLERS INCLUDED IN THIS MANUAL.

CAUTION 4: USE SUFFICENT 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.

B. Start Lock System, Hydraulic System, and Pitch Adjustment Unit Disassembly

(1) Install the propeller assembly on the rotatable fixture on the assembly table TE129.

(2) Move the propeller to feather position using the following steps:

(a) Apply air pressure to operate the propeller into reverse pitch.

(b) Pull the spring-loaded start lock pin (170) partially out of the start lock housing (150) and put a 0.25 inch (6.3 mm) thick locally fabricated spacer between the head of the start lock pin (170) and the start lock housing (150) to hold the start lock pin (170) in the extracted position.

(c) Do this process again for each start lock pin (170).

(d) Release the air pressure to move the propeller to feather position.

(e) Remove each 0.25 inch (6.3 mm) thick locally fabricated spacer from between the head of the start lock pin (170) and the start lock housing (150).

(3) Using a 1/16 inch diameter straight punch, drive the spring pin (190) into the bore of the start lock mounting ring (130).

(4) Remove and discard the spring pin (190).

(5) Unscrew and remove the start lock housing (150) from the start lock mounting ring (130).

(6) Remove and discard the cotter pin (180) from each start lock pin (170) in the start lock housing (150).

(7) Remove each start lock pin (170) from the start lock housing (150).

(8) Remove and discard each compression spring (160) from the start lock housing (150).

(9) Remove and discard each 1/4-28 cap screw (140) from the start lock mounting ring (130).

(10) Remove the start lock mounting ring (130).

(11) If applicable, remove the anti-rotation plate (80).

(12) Apply sufficient air pressure to the propeller assembly to raise the feather adjust nuts (10, 20) away from the pitch stop plate (60).

(13) Remove and discard the hex nut (545) and the set screw (535) from the forward end of the pitch change rod (380).

(14) Remove the pin (515) from the forward end of the pitch change rod (380).

(15) Remove the feather adjust nuts (10, 20) from the pitch change rod (380).

(16) Release the air pressure from the propeller assembly.

(17) Remove the beta adjust screw (40) from the pitch change rod (380).

(18) Using appropriate screws, attach torque wrench adapter TE153 to the pitch stop plate (60).

(19) Using the attached torque wrench adapter TE153, turn and remove the pitch stop plate (60).

(20) Remove and discard the bolts (420) and washers (390) used to attach the cylinder (280) to the hub (590).

(21) Lift the cylinder (280) and pitch change fork (810) up a sufficient amount to add two 0.313 inch (7.95 mm) to 0.500 inch (12.70 mm) delrin spacers under the cylinder mounting surface.

(22) Put two 0.313 inch (7.95 mm) to 0.500 inch (12.70 mm) delrin spacers under the cylinder (280) mounting surface that will permit the cylinder to spin above the anti-rotation rod (720) head.

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

(23) Using a crowfoot wrench and an applicable extension on the piston retainer nut (200), loosen the pitch change rod/cylinder assembly from the pitch change fork (810).

(a) If only the piston nut (200) turns, instead of the entire pitch change rod/ cylinder assembly, temporarily reinstall and jam together the feather nuts (10, 20).

(b) After torquing the feather nuts (10, 20) together, use a wrench on the inboard feather nut (20) to loosen the pitch change rod/cylinder assembly from the pitch change fork (810).

(c) Rotate the cylinder (280) counterclockwise by hand until the pitch change rod/cylinder assembly disengages from the pitch change fork (810).

(24) Carefully lift out the pitch change rod (380) with the cylinder (280) and the feathering spring assembly attached.

(a) Carefully set the cylinder/spring assembly pack aside for later disassembly.

(25) Remove and discard the cylinder mounting O-ring (470) from the hub (590).

(26) Remove each anti-rotation rod (720) from the hub (590).

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

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

(28) Remove and discard the washers (680) and self-locking nuts (690) from the hex head hub clamping bolts (670).

(29) Remove the hex head hub clamping bolts (670) from the hub (590).

(30) Loosen the lock nut (1110) on the preload plate set screw (1100).

(31) Turn out the preload plate set screw (1100) in each blade preload plate (1080).

CAUTION 1: DO NOT DAMAGE THE BLADE WHEN TRYING TO SEPARATE THE HUB HALVES (590).

CAUTION 2: IF THE PROPELLER IS EQUIPPED WITH A DE-ICE SYSTEM, DO NOT TAP THE BLADE IN THE DE-ICE BOOT AREA.

(32) Using a soft mallet, lightly tap the end of alternating opposite blades to loosen the seal between the hub halves.

CAUTION: DO NOT USE A SCREWDRIVER OR OTHER SHARP TOOL TO SEPARATE THE HUB HALVES.

(33) Using a plastic wedge, or similar tool, gently pry apart the hub halves (590).

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

(34) Remove the cylinder-side half of the split-hub unit (590).

(35) Remove and discard the screws (830) that attach the fork top plate (820) to the fork (810).

(36) Remove the fork top plate (820).

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

(38) Remove the fork (810) from the split-hub unit (590).

(a) Remove and discard the screws (814) that attach the bumper (812) to the fork (810).

(b) Remove the bumper (812).

C. Cylinder/Spring Assembly Pack Disassembly - HC-E5N-5( ) Propeller

WARNING: USE EXTREME CAUTION DURING DISASSEMBLY OF THE FEATHERING COMPRESSION SPRING ASSEMBLY. WHEN COMPRESSED, THE FEATHERING COMPRESSION SPRING ASSEMBLY IS LOADED TO APPROXIMATELY 800 POUNDS (363 kg) FORCE. MAKE SURE OF THE SAFETY OF PERSONNEL IN THE VICINITY DURING THE DISASSEMBLY PROCEDURES.

(1) Remove the two feathering compression springs (350 and 355).
Refer to Figure 3-2.

(a) Put the cylinder/spring pack in the spring compressor fixture TE59, or equivalent.

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

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

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

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

(f) Remove the rear spring retainer (360), the two feathering compression springs (350 and 355), and the two spring seats (340 and 345).

(g) Discard the feathering compression spring (355).

(h) Remove the pitch change rod/piston assembly from the cylinder (280).

(2) Using a piston installation socket TE228-1, a modified deep well socket TE120, and an applicable crowfoot adapter, remove and discard the large pitch change rod nut (200) from the pitch change rod/piston assembly. Refer to Figure 3-3.

(3) Remove the piston (210) from the pitch change rod/piston assembly.

(4) Remove and discard the back-up ring (230) and the O-ring (240) from the OD of the piston (210).

(5) Remove and discard the piston O-ring (220) from the ID of the piston (210).

(6) Remove the O-ring (480) from the cylinder bushing (300).

CAUTION: DO NOT REMOVE THE CYLINDER BUSHING (300) UNTIL ALL REQUIRED INSPECTIONS ARE COMPLETE.

(7) After all of the required inspections are complete, remove the cylinder bushing (300) using the following steps.

NOTE: During the initial installation in the cylinder, the inside diameter and O-ring grooves in the bushings are machined after the bushing is installed (necessary in order to maintain close dimensional tolerances). This results in bushings that are uniquely mated to a cylinder. During overhaul, removal of the bushings is required for inspection and O-ring replacement. Subsequent reuse of the original bushings may be possible if the bushings are not excessively worn or damaged.

(a) Refer to the Check chapter in this manual for inspections that must be completed before the cylinder bushing (300) is removed.

(b) Using a round bottom stamp, stamp the cylinder (310) with a period "." next to the cylinder bushing (300).

(c) Using paint or other marking method that will not damage the cylinder bushing, make a mark on the cylinder bushing (300).

NOTE: These marks are matched to identify "clocking" of the cylinder bushing with respect to the cylinder.

(d) Remove and discard the internal retaining ring (310) from the cylinder bushing (300).

(e) Press the cylinder bushing (300) from the cylinder (280).

(f) Remove and discard the O-ring (290) from the ID of the cylinder (280) where the cylinder bushing (300) was removed.

(8) Remove and discard the O-ring (560) from the engine-side half of the hub (590).

(9) Remove the beta rod seal components from the pitch change rod (380).

(a) Remove and discard the retaining ring (385) and washer (384).

(b) Remove the beta tube bushing (383).

(c) Remove and discard the O-ring (382).

(d) Remove the beta tube bushing (381).

D. Blade Retention Parts Disassembly - HC-E5N-5( ) Propeller

(1) Remove and discard the blade O-ring (1200) and blade seal (1130), if applicable.

(2) Remove the hub-side bearing race (1180) from each blade.

(3) Remove and discard the bearing balls (1170) from each blade.

(4) Remove and discard the ball spacer (1190) from each blade.

(5) Rembetove the preload plate (1080) from each blade.

(6) Remove and discard the thin hex nut (1110) and set screw (1100) from the preload plate (1080).

(7) Remove and discard the ball bearing (1220).

(8) Remove the blade plug (1230).

(a) Plug Puller TE454 is available for use when removing the blade plug (1230).

(9) Remove and discard the O-ring (1240) from the blade plug (1230).

(10) Remove the blade seal (1130) from the butt of the blade, if applicable.

(11) Remove and discard the blade seal O-ring (1140), if applicable.

(12) Remove and discard the bolts (1060) that attach the pitch change knob unit (1020) to the blade.

(13) Remove the pitch change knob unit (1020) from the blade using the following steps and Figure 3-4.

(a) If the dowel pin (1050) remains in the blade, remove and discard the dowel pin (1050).

(b) If the dowel pin (1050) remains in the pitch change knob bracket (1020), removal of the dowel pin (1050) from the pitch change knob bracket is not required.

(14) Remove the cam follower (1040) from the pitch change knob bracket (1020), using the following steps and Figure 3-4:

(a) Remove and discard the screw (1053) from the end of the pitch change knob bracket (1020).

(b) Remove and discard the dimpled washer (1052).

(c) Remove the knob unit retaining washer (1030).

(d) Remove and discard the cam follower (1040).

(15) Using a suitable gear puller or brass drift, remove the bearing retaining ring (1120).

(16) Remove the blade-side blade bearing race (1160) from the blade.

(17) Do this Blade Retention Parts Disassembly procedure again for each blade assembly.

E. Blade Disassembly - HC-E5N-5( ) Propeller

(1) For composite blade overhaul procedures, refer to Hartzell Propeller Inc. Composite Blade Overhaul Manual 135F (61-13-35).

F. Hub Disassembly - HC-E5N-5( ) Propeller

(1) Remove the mounting nuts (1640) and washers (1610).

(2) Remove the hub half (590) from the mounting fixture.

(3) Remove and discard the bolts (654) from the mounting bolt ring (652).

(4) Remove the rod hub bushing (612) from the bore of the hub (590) using the following steps:

(a) Remove and discard the external spiral retaining ring (615) from the OD of the rod hub bushing (612).

(b) Remove the rod hub bushing (612) from the bore of the hub (590).

CAUTION: DO NOT USE A METAL PICK TO REMOVE THE O-RING (613). A METAL PICK CAN DAMAGE THE HUB BUSHING (612)

(c) Remove and discard the O-ring (613) from the OD of the rod hub bushing (612).

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

CLEANING - CONTENTS

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1. Cleaning Procedures (Rev. 4)

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)

(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.

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

(2) Use plastic media in accordance with the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02) to remove the sealant from the cylinder threads.

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LIST OF TABLES

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. 3)

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) Aluminum Blades: Refer to Hartzell Propeller Inc. Aluminum Blade Overhaul Manual 133C (61-13-33).

(2) Composite Blades: Refer to Hartzell Propeller Inc. Composite Blade Overhaul 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) Metal Spinners: Refer to Hartzell Propeller Inc. Metal Spinner Maintenance Manual 127 (61-16-27).

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

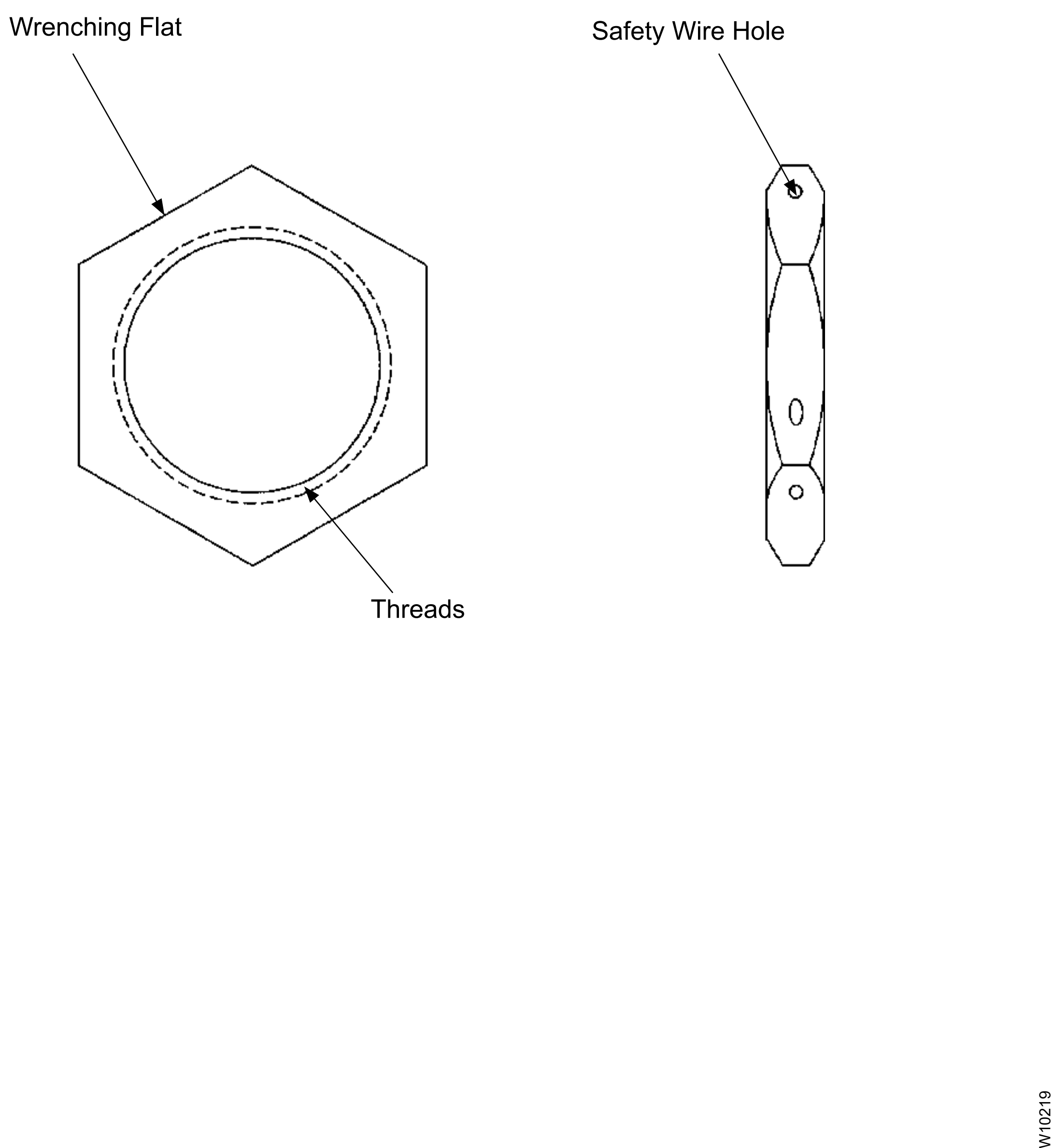
F. Special Inspections (Lightning Strike, Foreign Object Strike, etc.)

(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.

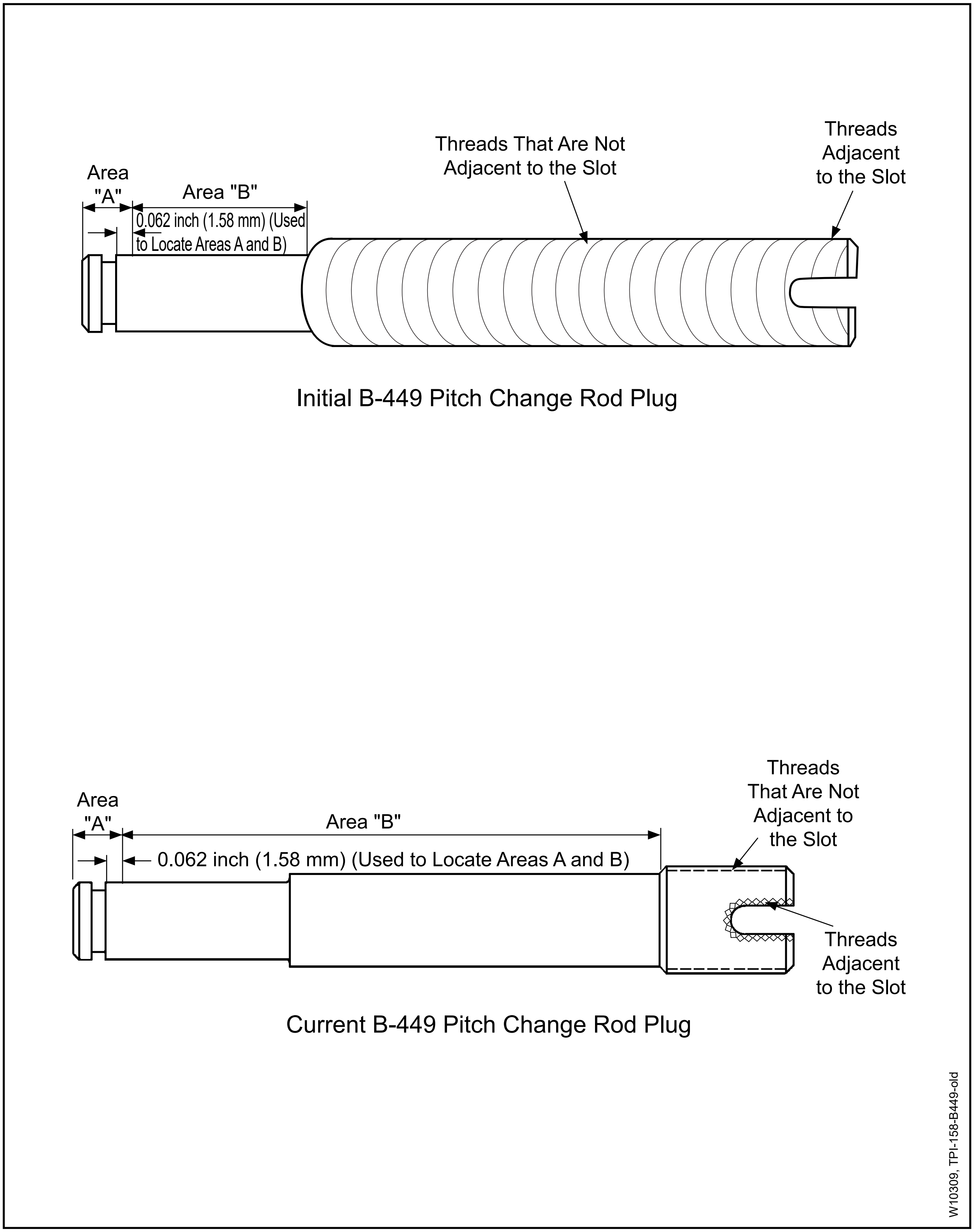
Refer to Table 5-1, "Component Inspection Criteria" in this chapter.



Drilled Thin Hex Nut
Figure 5-1

Component Inspection Criteria
Table 5-1

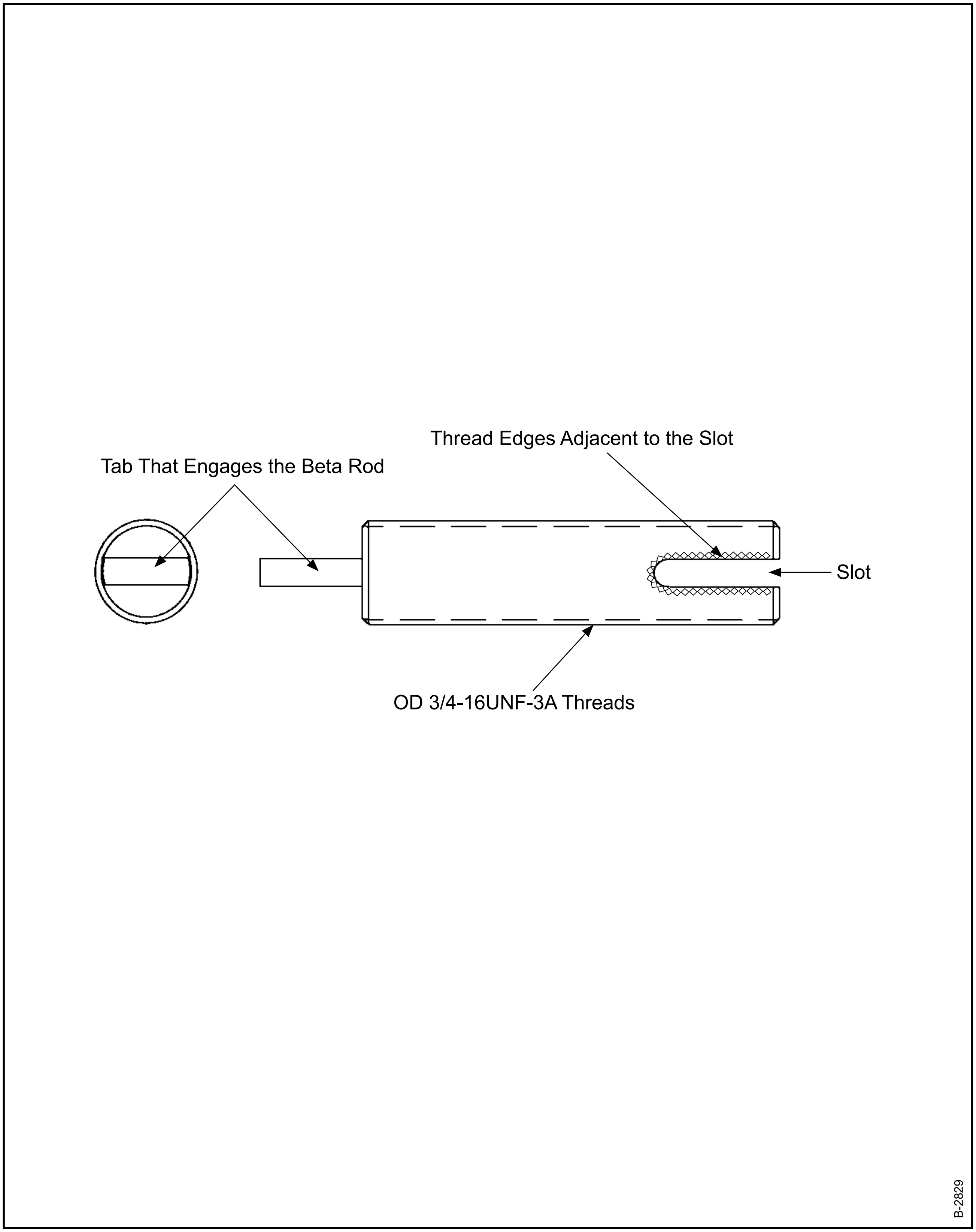
Inspect	Serviceable Limits	Corrective Action
A. DRILLED THIN HEX NUT (Item 10, 20) (Refer to Figure 5-1)		
(1) Visually examine each drilled thin hex nut for damage to the wrenching flats.	Corners between the wrenching flats may be rounded. Two wrenching flats must be sufficiently undamaged to withstand installation torque. Material may not be displaced above or below the nut that could result in interference with the mating parts.	File away unwanted displaced material. If a minimum of two (2) flats will not withstand installation torque, replace the drilled thin hex nut.
(2) Visually examine each drilled thin hex nut for corrosion product and pitting on all surfaces.	Corrosion product is not permitted. 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 Standard Practices Manual 202A (61-01-02). If the depth of pitting is greater than the permitted serviceable limits, replace the drilled thin hex nut.
(3) Visually examine each drilled thin hex nut for wear on surfaces other than the wrenching flats.	If there is wear, measure the wear. The maximum permitted depth of material loss is 0.005 inch (0.12 mm).	If the wear is greater than the permitted serviceable limits, replace the drilled thin hex nut.
(4) Visually examine the safety wire holes of the drilled thin hex nut.	Wrenching flat damage must not expose the holes and prevent retention of safety wire.	If the damage is greater than the permitted serviceable limits, replace the drilled thin hex nut.
(5) Visually examine the threads of the drilled thin hex nut.	A maximum of 1/4 of one thread total accumulated damage is permitted.	If the damage is greater than the permitted serviceable limits, replace the drilled thin hex nut.
(6) Visually examine the drilled thin hex nut for cadmium plating coverage.	Cadmium plating must be on all surfaces of the drilled thin hex nut.	If the cadmium plating coverage is less than the permitted serviceable limits, cadmium replate the drilled thin hex nut in accordance with the Cadmium Replating chapter of Hartzell Standard Practices Manual 202A (61-01-02).



Pitch Change Rod Plug
Figure 5-2

Component Inspection Criteria
Table 5-1

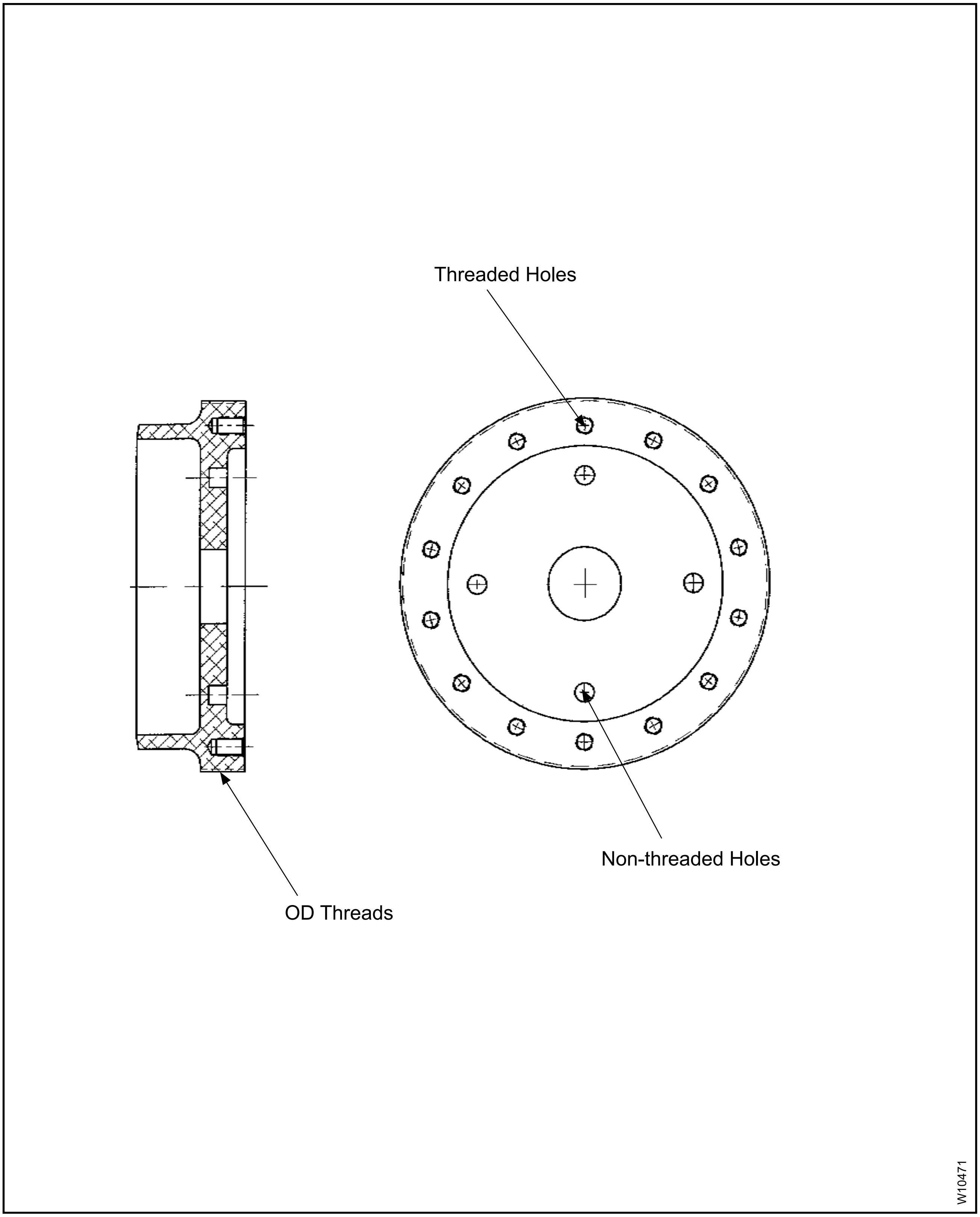
Inspect	Serviceable Limits	Corrective Action
B. PITCH CHANGE ROD PLUG (Item 30) (Refer to Figure 5-2)		
(1) Visually examine the pitch change rod plug for corrosion product and pitting.	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Standard Practices Manual 202A (61-01-02). If the depth of pitting is greater than the permitted serviceable limits, replace the pitch change rod plug.
(2) Visually examine the threads that are not adjacent to the slot for damage.	A maximum of 1/2 of one thread total accumulated damage is permitted. Damage must not prevent correct threading into the pitch change rod.	If damage is greater than the permitted serviceable limits, replace the pitch change rod plug.
(3) Visually examine the threads adjacent to the slot for damage.	Damage must not prevent correct threading into the pitch change rod.	Thread edges adjacent to the slot only may be filed to remove damage. If damage is greater than the permitted serviceable limits, replace the pitch change rod plug.
(4) Visually examine the non-threaded areas for damage, Area "A" and Area "B".	The maximum permitted depth of damage in Area "A" is 0.005 inch (0.12 mm). The maximum permitted depth of damage in Area "B" is 0.015 inch (0.38 mm).	If damage is greater than the permitted serviceable limits, replace the pitch change rod plug.
(5) Visually examine the pitch change rod plug for cadmium plating coverage.	A few random scratches are permitted; otherwise, cadmium plating must completely cover the pitch change rod plug.	If coverage is less than the permitted serviceable limits, replate the pitch change rod plug in accordance with the Cadmium Replating chapter of Hartzell Standard Practices Manual 202A (61-01-02).



Beta Adjust Screw
Figure 5-3

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
C. BETA ADJUST SCREW (Item 40) (Refer to Figure 5-3)		
(1) Visually examine the beta adjust screw for corrosion product and pitting.	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.008 inch (0.20 mm). The maximum permitted area of total accumulated damage, that includes pitting, is 0.5 sq. inch (322.5 sq. mm).	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Standard Practices Manual 202A (61-01-02). If pitting is greater than the permitted serviceable limits, replace the beta adjust screw.
(2) Visually examine the slot and the thread edges adjacent to the slot of the beta adjust screw for damage.	The maximum permitted depth of damage is 0.040 inch (1.01 mm). Damage must not prevent correct threading into the pitch change rod or the correct attachment to the pitch change rod by a bolt and nut.	The thread edges that are adjacent to the slot may be filed to remove damage. Raised material in the slot may be filed or polished. If damage is greater than the permitted serviceable limits, replace the beta adjust screw.
(3) Visually examine all other areas of the beta adjust screw for damage.	The maximum permitted depth of damage is 0.040 inch (1.01 mm). The maximum permitted area of total accumulated damage is 0.5 sq. inch (322.5 sq. mm). Damage must not interfere with the correct threading of the beta adjust screw into the pitch change rod or interfere with the correct engagement of the beta rod.	Filing of threads is permitted, but must be considered as damage. Filing or polishing of raised damage is permitted in unthreaded areas and is not considered as damage unless it introduces additional depth. If damage is greater than the permitted serviceable limits, replace the beta adjust screw.
(4) Visually examine the OD 3/4-16UNF-3A threads for wear.	General wear that changes the thread form shape is not permitted.	If wear is greater than the permitted serviceable limits, replace the beta adjust screw.
(5) Visually examine the beta adjust screw for cadmium plating coverage.	A few scratches and corners with cadmium plating missing is permitted. Minor abrading of the cadmium plating on the threads is permitted. Minor abrading of the cadmium plating to the tab that engages the beta rod is permitted. Minor abrading of the cadmium plating in the slot is permitted. In all other areas, complete coverage of the cadmium plating is required.	If coverage is less than the permitted serviceable limits, replate the beta adjust screw in accordance with the Cadmium Replating chapter of Hartzell Standard Practices Manual 202A (61-01-02).



C-7420-1 Pitch Stop Plate
Figure 5-4

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
D. C-7420-1 PLATE, STOP, PITCH (Item 60) (Refer to Figure 5-4)		
(1) Except for the OD threads and the threaded holes, visually examine the pitch stop plate for wear or damage.	If there is wear or damage, measure the pitch stop plate. The maximum permitted depth of wear or damage is 0.005 inch (0.12 mm).	Repair using an abrasive pad CM47 or equivalent to a depth of 0.010 inch (0.25 mm). The maximum permitted total area of repair is 2 sq. inches (1290 sq. mm). If the wear or damage is greater than the permitted serviceable limits or the corrective action limits, replace the pitch stop plate.
(2) Except for the OD threads and the threaded holes, visually examine the pitch stop plate for corrosion product and pitting.	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.005 inch (0.12 mm). The maximum permitted diameter of an individual pit is 0.062 inch (1.57 mm). A maximum of 10 non-linear pits less than 0.062 inch (1.57 mm) diameter within a 1 sq. inch (645 sq. mm) area are permitted. Pits can be no closer than 2 diameters [0.064 inch (1.62 mm)]. Linear pitting is not permitted.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Repair using an abrasive pad CM47 or equivalent is permitted to a depth of 0.010 inch (0.25 mm). The maximum permitted total area of repair is 2 sq. inches (1290 sq. mm). If repair is greater than the permitted serviceable limits or the corrective action limits, replace the pitch stop plate.
(3) Using a 10X magnifying glass, visually examine the pitch stop plate OD threads for corrosion product, pitting, or damage.	Corrosion product is not permitted. A maximum of 1/2 of one thread total accumulated damage is permitted. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Using an abrasive pad CM47 or equivalent, spot polish to remove corrosion product or pitting. Repair is permitted to a depth of 0.010 inch (0.25 mm). If the damage or repair is greater than the permitted serviceable limits or the corrective action limits, replace the pitch stop plate.
(4) Visually examine the 14 pitch stop plate threaded holes for corrosion product, pitting, or damage.	Corrosion product is not permitted. One thread of total accumulated damage is permitted for each threaded hole. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Repair is not permitted. If the corrosion product, pitting, or damage is greater than the permitted serviceable limits, replace the pitch stop plate.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
D. C-7420-1 PLATE, STOP, PITCH, CONTINUED (Item 60) (Refer to Figure 5-4)		
(5) Visually examine the four flat bottom, non-threaded holes for corrosion product or damage.	Corrosion product is not permitted. Some displaced material is permitted. The maximum permitted hole ID is 0.300 inch (7.62 mm) at the widest place. The maximum permitted depth is 0.290 inch (7.36 mm).	Using an abrasive pad CM47 or equivalent, spot polishing to remove corrosion product is permitted. If the damage or repair is greater than the permitted serviceable limits, replace the pitch stop plate.
(6) Penetrant inspect the pitch stop plate in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Locally etch repaired areas to avoid covering any cracks. CAUTION: DO NOT REMOVE THE ANODIZE COATING BEFORE PENETRANT INSPECTION.	A relevant indication is not permitted. "Pin-point" penetrant indications (from pitting) are permitted. A crack is not permitted.	If there is a relevant indication that cannot be removed within the permitted serviceable limits or corrective action limits for the pitch stop plate in this section, replace the pitch stop plate.
(7) Visually examine the pitch stop plate for anodize coverage.	Except for a few scratches and corners with anodize missing, complete coverage is required.	If the anodize coverage is less than the permitted serviceable limits, anodize the pitch stop plate in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

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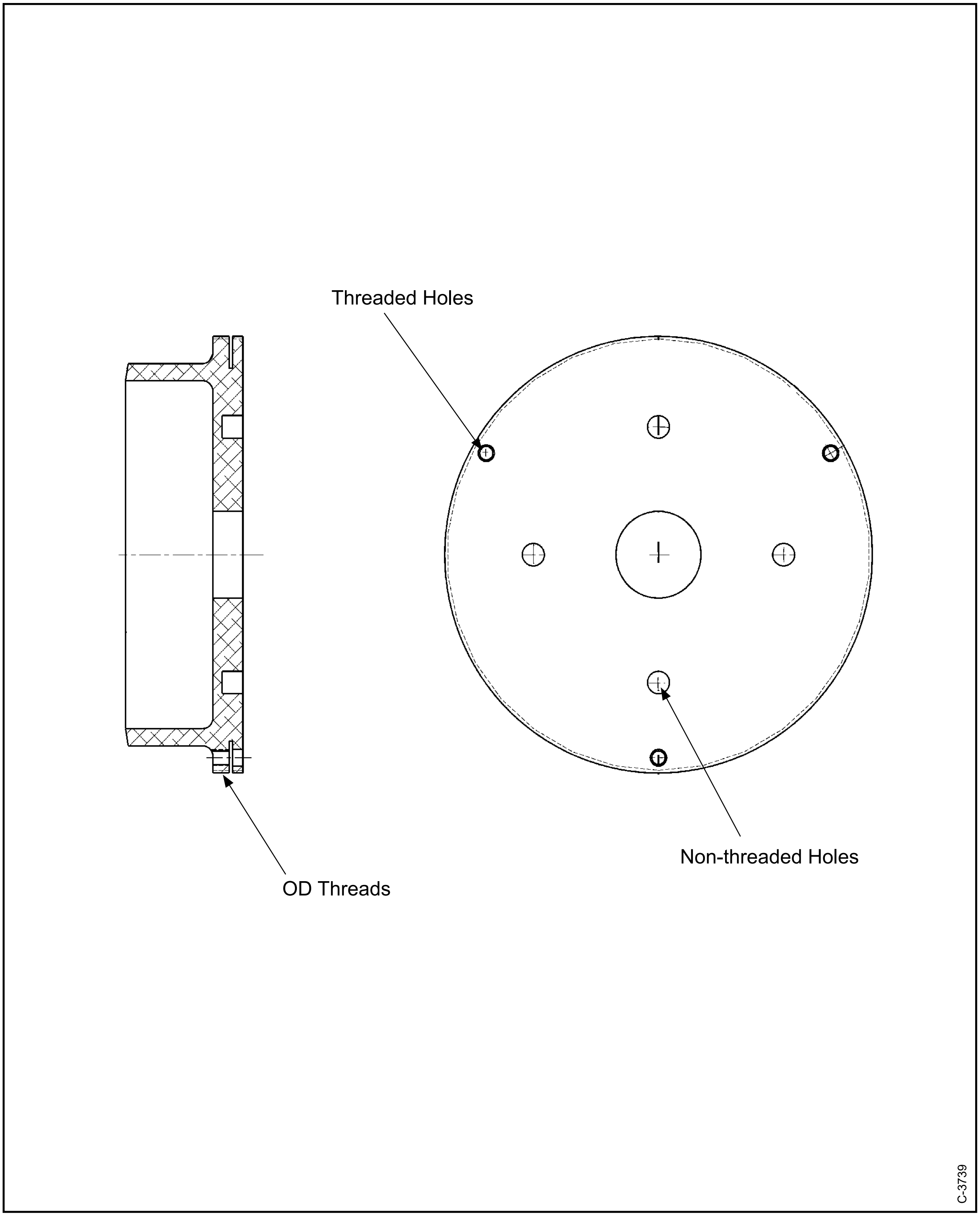

C-3739 Pitch Stop Plate
Figure 5-5

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
E. C-3739 PLATE, STOP, PITCH (Item 60) (Refer to Figure 5-5)		
(1) Except for the OD threads and the threaded holes, visually examine the pitch stop plate for wear or damage.	If there is wear or damage, measure the pitch stop plate. The maximum permitted depth of wear or damage is 0.005 inch (0.12 mm).	Repair using an abrasive pad CM47 or equivalent to a depth of 0.010 inch (0.25 mm). The maximum permitted total area of repair is 2 sq. inches (1290 sq. mm). If the wear or damage is greater than the permitted serviceable limits or the corrective action limits, replace the pitch stop plate.
(2) Except for the OD threads and the threaded holes, visually examine the pitch stop plate for corrosion product and pitting.	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.005 inch (0.12 mm). The maximum permitted diameter of an individual pit is 0.062 inch (1.57 mm). A maximum of 10 non-linear pits less than 0.062 inch (1.57 mm) diameter within a 1 sq. inch (645 sq. mm) area are permitted. Pits can be no closer than 2 diameters [0.064 inch or (1.62 mm)]. Linear pitting is not permitted.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Repair using an abrasive pad CM47 or equivalent is permitted to a depth of 0.010 inch (0.25 mm). The maximum permitted total area of repair is 2 sq. inches (1290 sq. mm). If repair is greater than the permitted serviceable limits or the corrective action limits, replace the pitch stop plate.
(3) Using a 10X magnifying glass, visually examine the pitch stop plate OD threads for corrosion product, pitting, or damage.	Corrosion product is not permitted. A maximum of 1/3 of one thread total accumulated damage is permitted. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Using an abrasive pad CM47 or equivalent, spot polish to remove corrosion product or pitting. Repair is permitted to a depth of 0.010 inch (0.25 mm). If the damage or repair is greater than the permitted serviceable limits or the corrective action limits, replace the pitch stop plate.
(4) Visually examine the three pitch stop plate threaded holes for corrosion product, pitting, or damage.	Corrosion product is not permitted. A maximum of 1/3 of one thread total accumulated damage is permitted for each threaded hole. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Repair is not permitted. If the damage is greater than the permitted serviceable limits, replace the pitch stop plate.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
E. C-3739 PLATE, STOP, PITCH, CONTINUED (Item 60) (Refer to Figure 5-5)		
(5) Visually examine the four flat bottom non-threaded holes for corrosion product or damage.	Corrosion product is not permitted. Some displaced material is permitted. The maximum permitted hole ID is 0.300 inch (7.62 mm) at the widest place. The maximum permitted depth is 0.290 inch (7.36 mm).	Using an abrasive pad CM47 or equivalent, spot polishing to remove corrosion product is permitted. If the damage or repair is greater than the permitted serviceable limits, replace the pitch stop plate.
(6) Penetrant inspect the pitch stop plate in accordance with Hartzell Propeller Inc Standard Practices Manual 202A (61-01-02). Locally etch repaired areas to avoid covering any cracks. CAUTION: DO NOT REMOVE THE ANODIZE COATING BEFORE PENETRANT INSPECTION.	A relevant indication is not permitted. "Pin-point" penetrant indications (from pitting) are permitted. A crack is not permitted.	If a there is a relevant indication that cannot be removed within the permitted serviceable limits or corrective action limits for the pitch stop plate in this section, replace the pitch stop plate.
(7) Visually examine the pitch stop plate for anodize coverage.	Except for a few scratches and corners with anodize missing, complete coverage is required.	If the anodize coverage is less than the permitted serviceable limits, anodize the pitch stop plate in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

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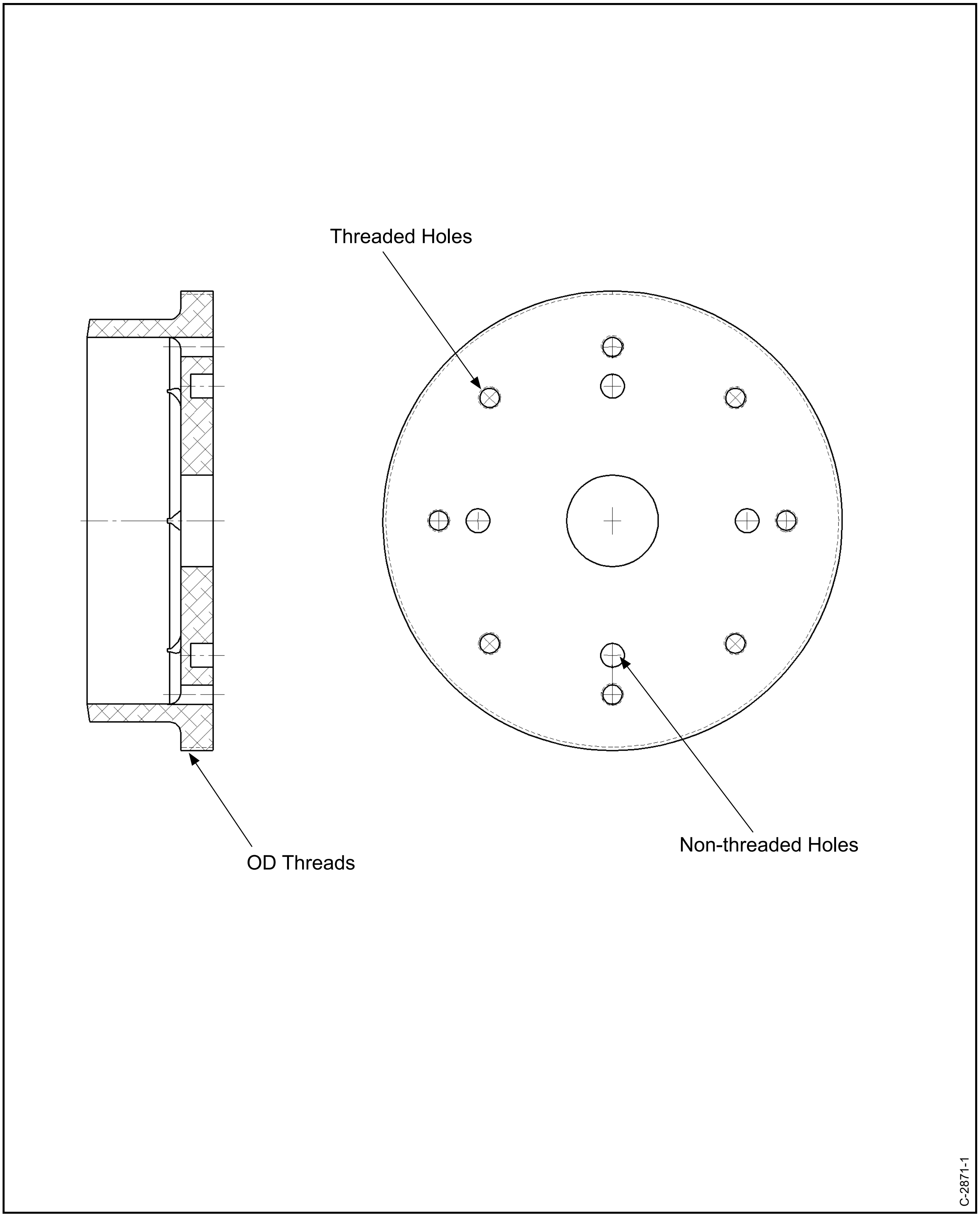

C-2871-( ) and 106893 Pitch Stop Plate
Figure 5-6

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
F. C-2871-( ) and 106893 PLATE, STOP, PITCH (Item 60) (Refer to Figure 5-6)		
(1) Except for the OD threads and the threaded holes, visually examine the pitch stop plate for wear or damage.	If there is wear or damage, measure the pitch stop plate. The maximum permitted depth of wear or damage is 0.005 inch (0.12 mm).	Repair using an abrasive pad CM47 or equivalent is permitted to a depth of 0.010 inch (0.25 mm). The maximum permitted total area of repair is 2 sq. inches (1290 sq. mm). If the wear or damage is greater than the permitted serviceable limits or the corrective action limits, replace the pitch stop plate.
(2) Except for the OD threads and the threaded holes, visually examine the pitch stop plate for corrosion product and pitting.	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.005 inch (0.12 mm). The maximum permitted diameter of an individual pit is 0.062 inch (1.57 mm). A maximum of 10 non-linear pits less than 0.062 inch (1.57 mm) diameter within a 1 sq. inch (645 sq. mm) area are permitted. Pits can be no closer than 2 diameters [0.064 inch or (1.62 mm)]. Linear pitting is not permitted.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Repair using an abrasive pad CM47 or equivalent is permitted to a depth of 0.010 inch (0.25 mm). The maximum permitted total area of repair is 2 sq. inches (1290 sq. mm). If repair is greater than the permitted serviceable limits or the corrective action limits, replace the pitch stop plate.
(3) Using a 10X magnifying glass, visually examine the pitch stop plate OD threads for corrosion product, pitting, or damage.	Corrosion product is not permitted. A maximum of 1/2 of one thread total accumulated damage is permitted. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Using an abrasive pad CM47 or equivalent, spot polish to remove corrosion product or pitting. Repair is permitted to a depth of 0.010 inch (0.25 mm). If the damage or repair is greater than the permitted serviceable limits or the corrective action limits, replace the pitch stop plate.
(4) Visually examine the pitch stop plate for eight pitch stop plate threaded holes.	There must be eight threaded holes.	If there are fewer than eight threaded holes, repair to add the additional threaded holes in accordance with the section "Modification of the D-2827 Cylinder and the C-2871 Pitch Stop Plate" in the Repair chapter of this manual.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
F. C-2871-( ) and 106893 PLATE, STOP, PITCH, CONTINUED (Item 60) (Refer to Figure 5-6)		
(5) Visually examine the eight pitch stop plate threaded holes for corrosion product, pitting, or damage.	Corrosion product is not permitted. A maximum of 1/3 of one thread total accumulated damage is permitted for each threaded hole. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Repair is not permitted. If the damage is greater than the permitted serviceable limits, replace the pitch stop plate.
(6) Visually examine the four flat bottom non-threaded holes for corrosion product or damage.	Corrosion product is not permitted. Some displaced material is permitted. The maximum permitted hole ID is 0.300 inch (7.62 mm) at the widest place. The maximum permitted depth is 0.290 inch (7.36 mm).	Using an abrasive pad CM47 or equivalent, spot polishing to remove corrosion product is permitted. If the damage or repair is greater than the permitted serviceable limits, replace the pitch stop plate.
(7) Penetrant inspect the pitch stop plate in accordance with Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Locally etch repaired areas to avoid covering any cracks. CAUTION: DO NOT REMOVE THE ANODIZE COATING BEFORE PENETRANT INSPECTION.	A relevant indication is not permitted. "Pin-point" penetrant indications (from pitting) are permitted. A crack is not permitted.	If a there is a relevant indication that cannot be removed within the permitted serviceable limits or corrective action limits for the pitch stop plate in this section, replace the pitch stop plate.
(8) Visually examine the pitch stop plate for anodize coverage.	Except for a few scratches and corners with anodize missing, complete coverage is required.	If the anodize coverage is less than the permitted serviceable limits, anodize the pitch stop plate in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

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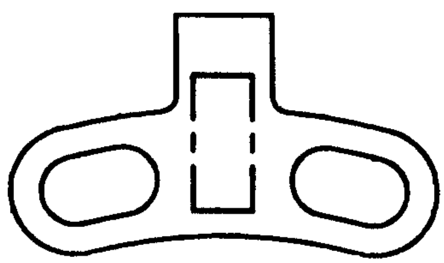
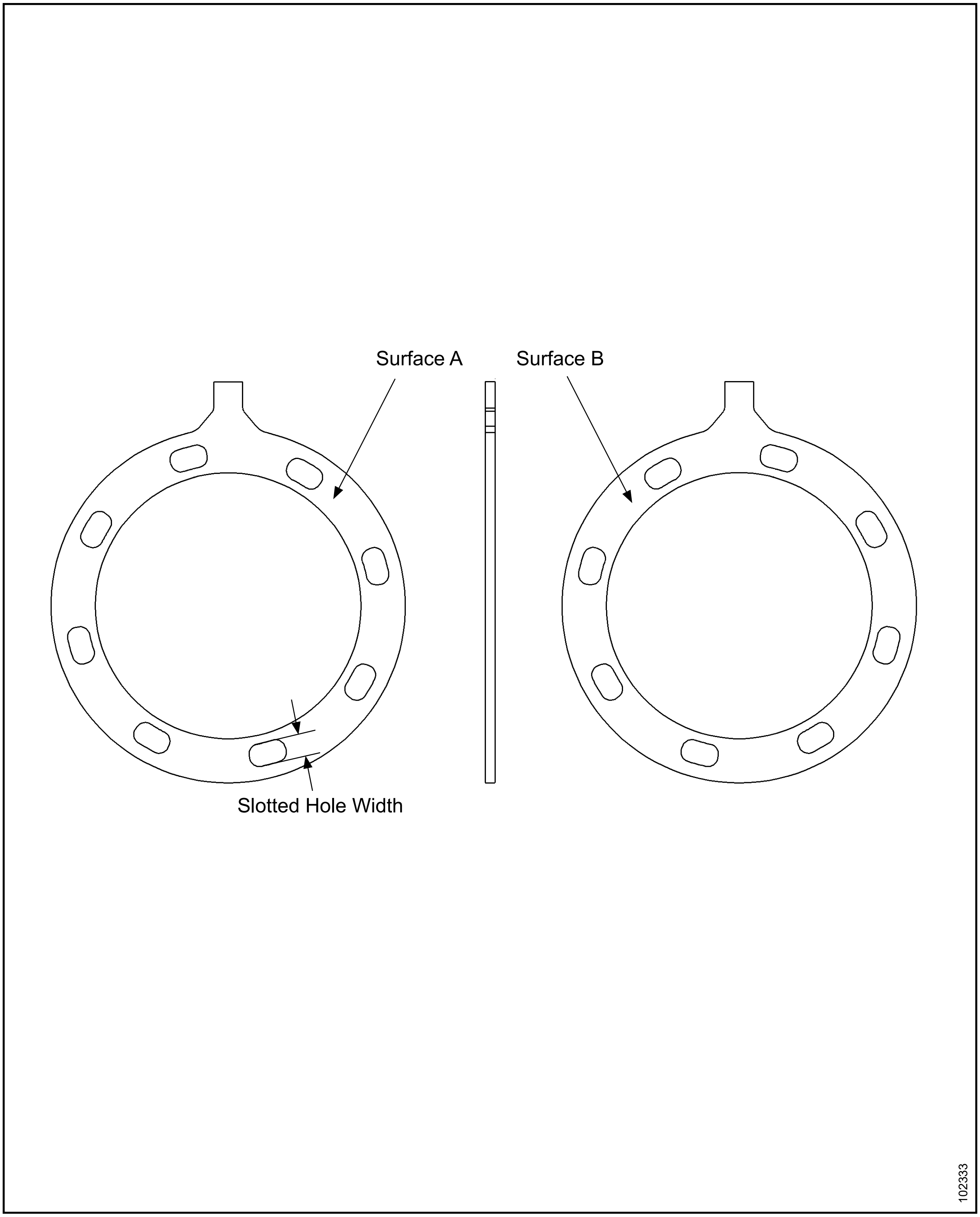


Stop Plate
Figure 5-7

Component Inspection Criteria
Table 5-1

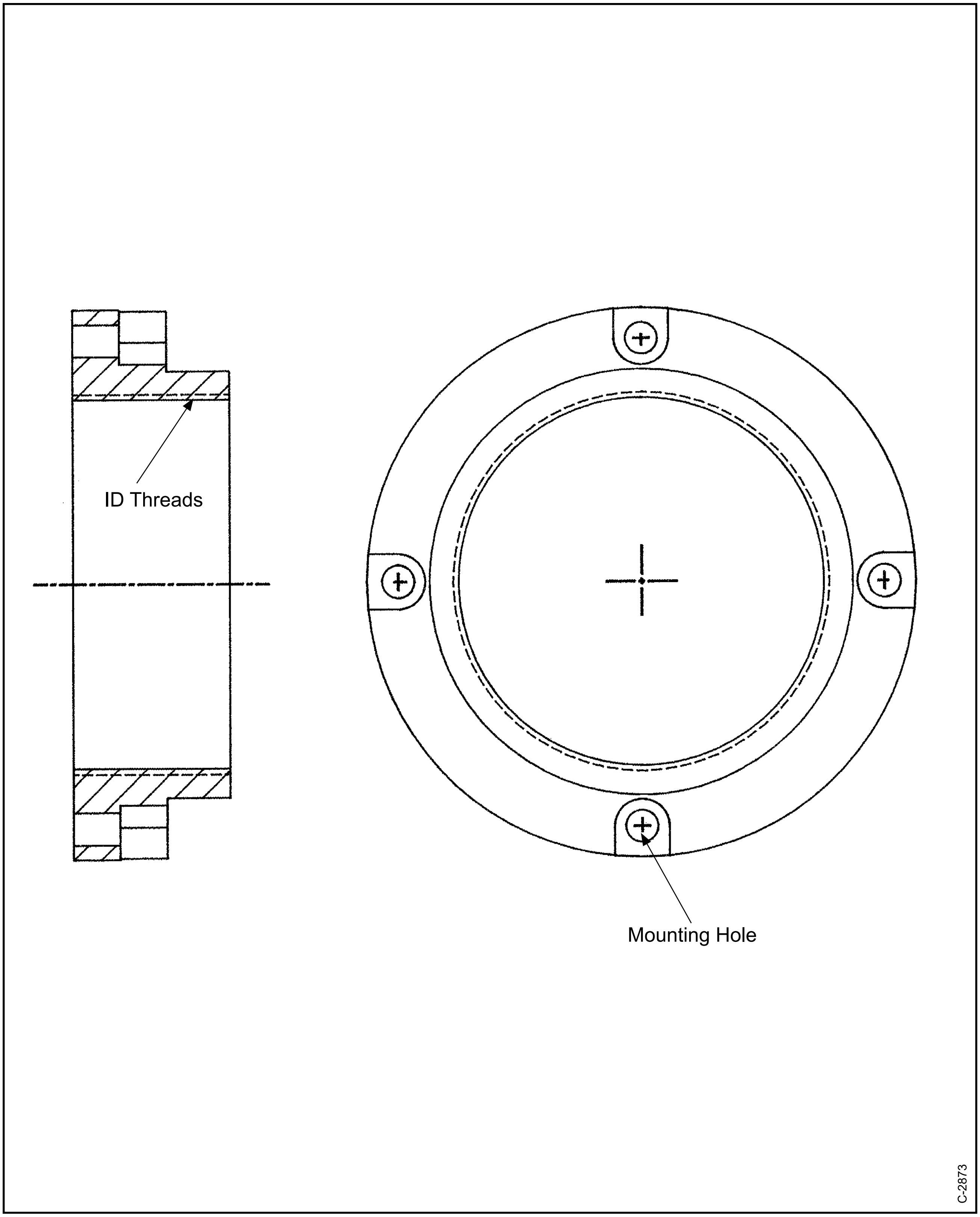
Inspect	Serviceable Limits	Corrective Action
G. PLATE, STOP (Item 70) (Refer to Figure 5-7)		
(1) Visually examine the stop plate for corrosion product, pitting, wear, or damage.	Corrosion product is not permitted. If the stop plate is pitted, worn, or damaged, measure the pitting, wear, or damage. The maximum permitted depth of pitting, wear, or damage is 0.008 inch (0.20 mm).	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Standard Practices Manual 202A (61-01-02). If the pitting, wear, or damage is greater than the permitted serviceable limits, replace the stop plate.
(2) Visually examine the stop plate for cadmium plating coverage.	A maximum of 10% of the base metal visible is permitted.	If the cadmium plating coverage is less than the permitted serviceable limits, cadmium replate the stop plate in accordance with the Cadmium Replating chapter of Hartzell Standard Practices Manual 202A (61-01-02).



Anti-rotation Plate
Figure 5-8

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
H. ANTI-ROTATION PLATE (Item 80) (Refer to Figure 5-8)		
(1) Visually examine the anti-rotation plate for corrosion product pitting, nicks, scratches, or other damage.	Corrosion product is not permitted. If the anti-rotation plate is damaged, measure the damage. The maximum permitted depth of pitting, nicks, scratches, or other damage is 0.008 inch (0.20 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 pits, nicks, scratches, or other damage is 10% of the total area. Pits, nicks, scratches, or other damage are 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. Refer to the Cleaning chapter of Hartzell Standard Practices Manual 202A (61-01-02). If the pitting, nicks, scratches, or other damage is greater than the permitted serviceable limits, replace the anti-rotation plate.
(2) Visually examine each slotted hole for wear.	If there is wear, measure the slotted hole. The maximum permitted radial slotted hole width is 0.305 inch (7.74 mm).	If the slotted hole width is greater than the permitted serviceable limits, replace the anti-rotation plate.
(3) Visually examine the anti-rotation plate for cadmium plating coverage.	Loss of cadmium plating, caused by interference with the clamping fastener threads, around each slotted hole 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 anti-rotation plate in accordance with the Cadmium Replating chapter of Hartzell Standard Practices Manual 202A (61-01-02).
(4) Visually examine the anti-rotation plate surfaces for flatness.	Each anti-rotation plate surface must be flat to within 0.003 inch (0.07 mm) when put on a flat surface.	If flatness is not within the permitted serviceable limits, replace the anti-rotation plate.



Start Lock Mounting Ring
Figure 5-9

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
I. RING, MOUNTING, START LOCK (Item 130) (Refer to Figure 5-9)		
(1) Except for the ID threads and the four mounting holes, visually examine the start lock mounting ring for wear and damage.	If there is wear or damage, measure the wear or damage. The maximum permitted depth of wear or damage is 0.004 inch (0.10 mm). Wear or damage within the serviceable limits must not affect fit or performance.	If the wear or damage is greater than the permitted serviceable limits, replace the start lock mounting ring. Repair using an abrasive pad CM47 or equivalent is permitted to a depth of 0.010 inch (0.25 mm). The maximum permitted total area of repair is 2 sq. inches (1290 sq. mm). If repair is greater than the permitted serviceable limits or corrective action limits, replace the start lock mounting ring. If the repair affects the fit or performance, replace the start lock mounting ring.
(2) Except for the ID threads and the four mounting holes, visually examine the start lock mounting ring for corrosion product and pitting.	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.004 inch (0.10 mm). The maximum permitted diameter of an individual pit is 0.062 inch (1.57 mm). A maximum of 10 non-linear pits within a 1 sq. inch (645 sq. mm) area are permitted. Linear pitting is not permitted. Wear or damage within the serviceable limits must not affect fit or performance.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Repair using an abrasive pad CM47 or equivalent is permitted to a depth of 0.010 inch (0.25 mm). The maximum permitted total area of repair is 2 sq. inches (1290 sq. mm). If the repair is greater than the permitted serviceable limits or the corrective action limits, replace the start lock mounting ring. If the repair affects the fit or performance, replace the start lock mounting ring.
(3) Visually examine each mounting hole of the start lock mounting ring for wear, damage, corrosion product, and pitting.	Corrosion product is not permitted. The maximum permitted depth of pitting, wear, or damage is 0.004 inch (0.10 mm). If there is pitting, wear, or damage, measure the ID of the mounting hole. The maximum permitted diameter of the mounting hole is 0.276 inch (7.01 mm).	Repair is permitted to a depth of 0.004 inch (0.10 mm) if desired. If the pitting, wear, damage, repair, or maximum diameter is greater than the permitted serviceable limits, replace the start lock mounting ring.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
I. <u>RING, MOUNTING, START LOCK, CONTINUED</u> (Item 130) (Refer to Figure 5-9)		
(4) Visually examine the ID threads of the start lock mounting ring for corrosion product, pitting, wear, or damage.	Corrosion product is not permitted. A maximum of 1/2 thread of total accumulated damage (pitting, wear, or other damage) is permitted.	If the damage is greater than the permitted serviceable limits, replace the start lock mounting ring.
(5) Visually examine each mounting hole of the start lock mounting ring for wear.	If there is wear or damage, measure the wear or damage. The maximum permitted depth of wear or damage is 0.010 inch (0.25 mm).	If the wear or damage is greater than the permitted serviceable limits, replace the start lock mounting ring.
(6) Visually examine the start lock mounting ring for anodize coverage.	Except for a few scratches and corners with anodize coating missing, complete coverage is required.	If the anodize coverage is less than the permitted serviceable limits, anodize the start lock mounting ring in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

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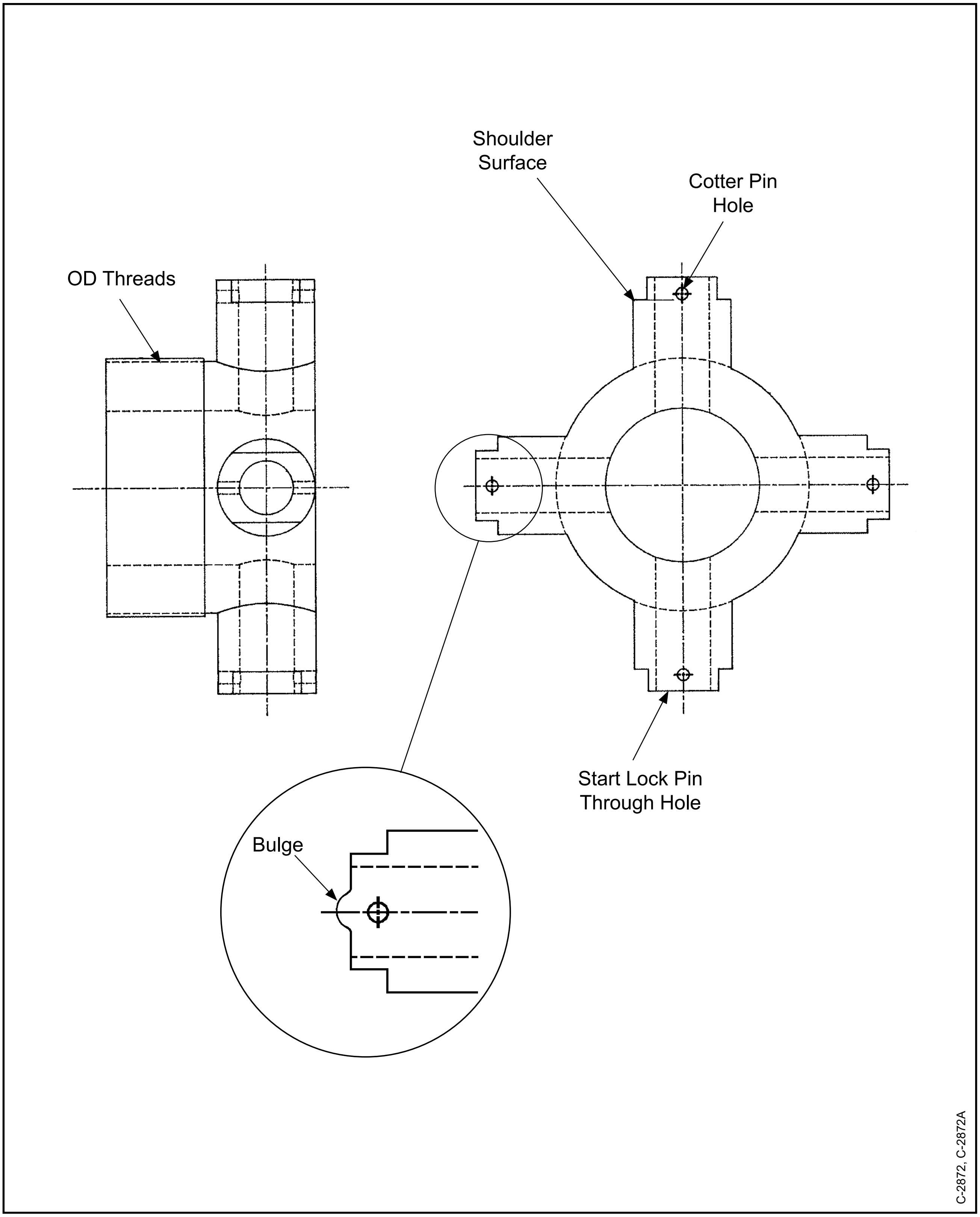

Start Lock Housing
Figure 5-10

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
J. HOUSING, START LOCK (Item 150) (Refer to Figure 5-10)		
(1) Except for the OD threads, eight cotter pin holes, and the four start lock pin through holes, visually examine the start lock housing for wear and damage.	If there is wear or damage, measure the wear or damage. The maximum permitted depth of wear or damage is 0.004 inch (0.10 mm). Wear or damage within the serviceable limits must not affect fit or performance.	If the wear or damage is greater than the permitted serviceable limits, replace the start lock housing. Repair using an abrasive pad CM47 or equivalent is permitted to a depth of 0.010 inch (0.25 mm). The maximum permitted total area of repair is 2 sq. inches (1290 sq. mm). If the repair is greater than the permitted serviceable limits or corrective action limits, replace the start lock housing. If the repair affects the fit or performance, replace the start lock housing.
(2) Except for the OD threads, eight cotter pin holes, and the four start lock pin through holes, visually examine the start lock housing for corrosion product and pitting.	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.004 inch (0.10 mm). The maximum permitted diameter of an individual pit is 0.062 inch (1.57 mm). A maximum of 10 non-linear pits within a 1 sq. inch (645 sq. mm) area are permitted. Linear pitting is not permitted. Wear or damage within the serviceable limits must not affect fit or performance.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller inc. Standard Practices Manual 202A (61-01-02). Repair using an abrasive pad CM47 or equivalent is permitted to a depth of 0.010 inch (0.25 mm). The maximum permitted total area of repair is 2 sq. inches (1290 sq. mm). If the repair is greater than the permitted serviceable limits or the corrective action limits, replace the start lock housing. If the repair affects the fit or performance, replace the start lock housing.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
J. HOUSING, START LOCK, CONTINUED (Item 150) (Refer to Figure 5-10)		
(3) Visually examine each start lock pin through hole for wear, damage, corrosion product, and pitting.	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.004 inch (0.10 mm). For each hole, the maximum permitted total area of pitting is 0.25 sq. inch (161.2 sq. mm). Raised material that will interfere with the movement of the start lock pin is not permitted. If there is pitting, wear, damage, or repair, measure the ID of the start lock pin through hole. The maximum permitted diameter of the start lock pin through hole is 0.6262 inch (15.905 mm).	If the damage is greater than the permitted serviceable limits, replace the start lock housing.
(4) Visually examine the OD threads of the start lock housing for corrosion product, pitting, wear, or damage.	Corrosion product is not permitted. A maximum of 1/2 thread of total accumulated damage (pitting, wear, or other damage) is permitted.	If the damage is greater than the permitted serviceable limits, replace the start lock housing.
(5) Visually examine each cotter pin hole for corrosion product, pitting, wear, and damage.	Corrosion product is not permitted. If there is wear, pitting, or damage, measure the diameter of the cotter pin hole. The maximum permitted diameter of the cotter pin hole is 0.154 inch (3.91 mm). A bulge in the outer surface of the start lock housing adjacent to each cotter pin hole is not permitted.	If the damage is greater than the permitted serviceable limits, replace the start lock housing.
(6) Visually examine the start lock housing for anodize coverage.	Except for a few random scratches and corners that have anodize missing, complete coverage is required.	If the anodize coverage is less than the permitted serviceable limits, anodize the start lock housing in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

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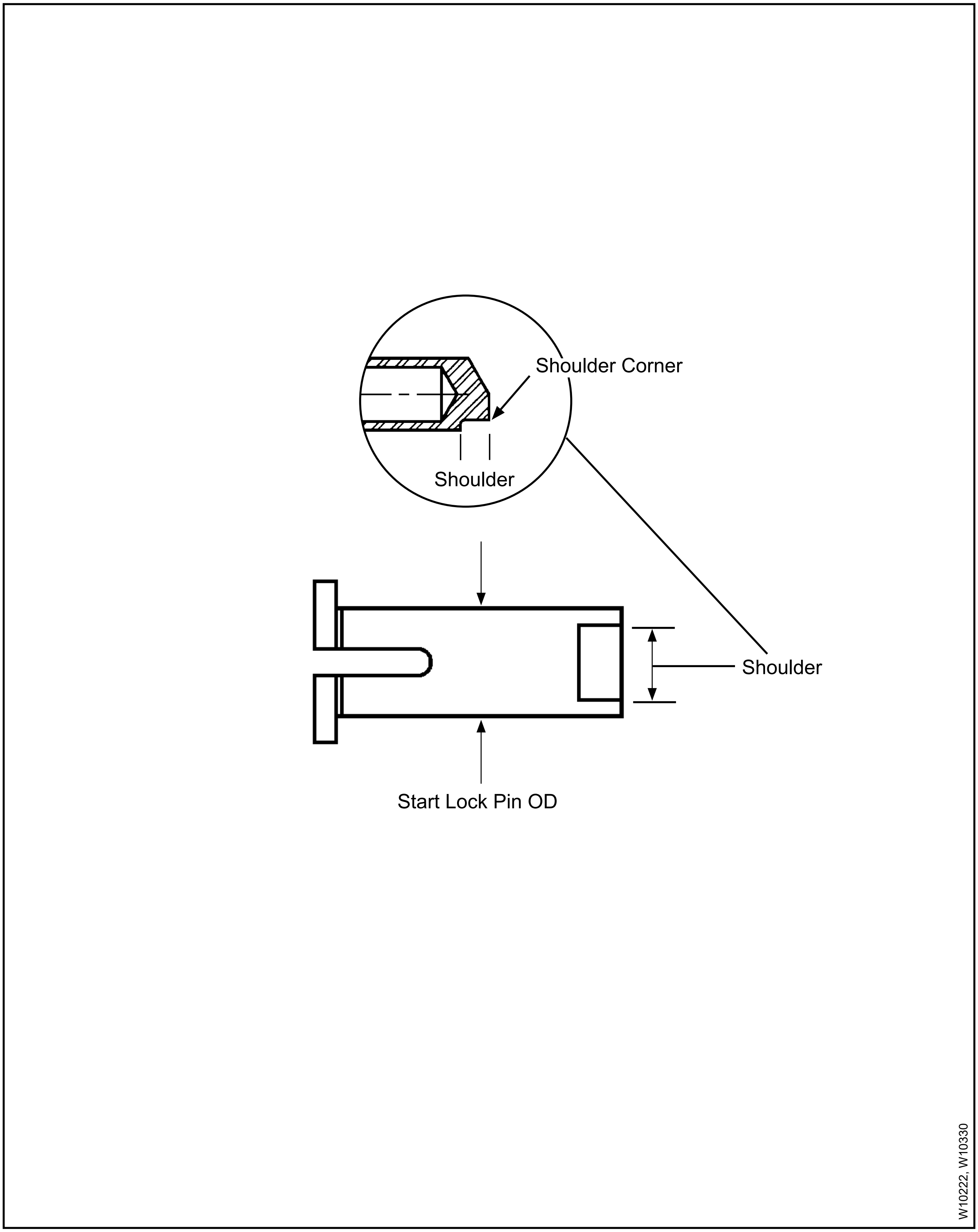
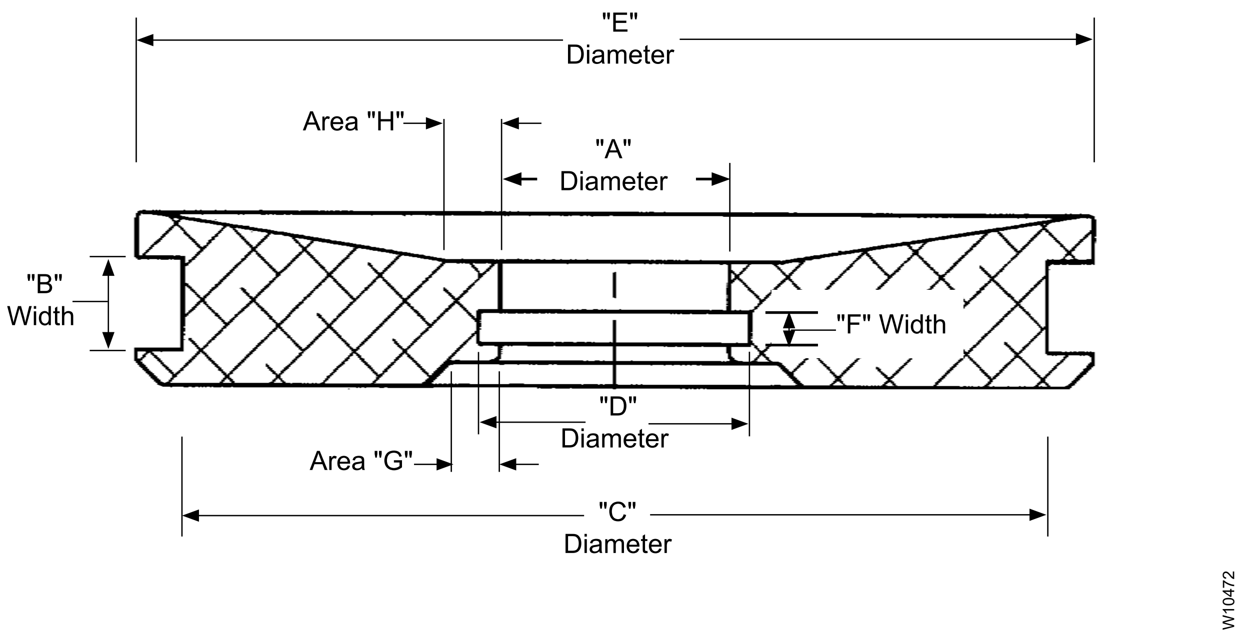


Start Lock Pin
Figure 5-11

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
K. PIN, START LOCK (Item 170) (Refer to Figure 5-11)		
(1) Visually examine the start lock pin for corrosion product or damage.	Corrosion product or damage is not permitted.	Light corrosion product may be removed with glass bead cleaning; otherwise, replace the start lock pin.
(2) Visually examine the start lock pin shaft OD for wear.	If there is wear, measure the start lock pin ID. The minimum permitted shaft OD is 0.620 inch (15.75 mm).	If the OD is less than the permitted serviceable limits, replace the start lock pin.
(3) Visually examine the shoulder corner for wear.	If there is wear, measure the shoulder corner. The maximum permitted shoulder corner radius is 0.032 inch (0.81 mm).	If the shoulder corner radius is greater than serviceable limits, replace the start lock pin.



PART NUMBER	"A" MAXIMUM DIAMETER	"B" MAXIMUM WIDTH	"C" MINIMUM DIAMETER	"D" MAXIMUM DIAMETER	"E" MINIMUM DIAMETER	"F" MAXIMUM WIDTH
B-3678	1.191 (30.25 mm)	0.492 (12.49 mm)	4.490 (114.05 mm)	1.416 (35.96 mm)	4.963 (126.07 mm)	0.180 (4.57 mm)
106892	1.191 (30.25 mm)	0.492 (12.49 mm)	5.240 (133.10 mm)	1.416 (35.96 mm)	5.713 (145.12 mm)	0.180 (4.57 mm)

Piston Inspection Criteria
Figure 5-12

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
L. PISTON (Item 210) (Refer to Figure 5-12)		
(1) Visually examine all surfaces of the piston, not including O-ring grooves, area "G", and area "H", for wear, nicks, scratches, or other damage.	If the piston is worn or damaged, measure the wear or damage. The maximum permitted depth of wear or damage is 0.005 inch (0.12 mm).	If the wear or damage is greater than the permitted serviceable limits, replace the piston.
(2) Visually examine all surfaces of the piston for corrosion product and pitting.	Corrosion product is not permitted. If the piston is pitted, measure the of pitting. The maximum permitted diameter of an individual pit is 0.062 inch (1.57 mm). The maximum permitted depth of an individual pit is 0.005 inch (0.12 mm). Pin-point penetrant indications (during penetrant inspection) from corrosion product pitting are permitted. A maximum of 10 non-linear pits within a 1 sq. inch (645 sq. mm) area are permitted. Pitting is not permitted in the O-ring groove ID or OD, but pitting in the O-ring groove side walls is permitted. Linear pitting is not permitted.	Except on O-ring grooves, O-ring groove side walls, diameter "E" OD, or diameter "A" ID, corrosion product may be removed using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Standard Practices Manual 202A (61-01-02). If corrosion product or pitting is greater than the permitted serviceable limits, replace the piston.
(3) Visually examine the piston features "A", "B", "C", "D", "E", and "F".	If there is wear, measure the piston in accordance with Figure 5-12.	If wear is greater than the permitted serviceable limits, replace the piston.
(4) Visually examine the piston for anodize coverage.	A maximum of 10% of the base metal visible is permitted.	If the anodize coverage is less than the permitted serviceable limits, anodize the piston in accordance with the Chromic Acid Anodizing chapter of Hartzell Standard Practices Manual 202A (61-01-02).

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
L. PISTON, CONTINUED (Item 210) (Refer to Figure 5-12)		
(5) Visually examine area "G" around the entire circumference of the center hole for scoring and gouging caused by pitch change rod wrenching flats.	The maximum permitted depth of damage is 0.020 inch (0.50 mm). Sufficient flat surface must remain to correctly support the pitch change rod shoulder.	If damage is greater than the permitted serviceable limits, replace the piston.
(6) Visually examine area "H" around the entire circumference for scoring and gouging caused by the hex nut.	The maximum permitted depth of damage is 0.020 inch (0.50 mm). Sufficient flat surface must remain to correctly support the hex nut.	If damage is greater than the permitted serviceable limits, replace the piston.
(7) Penetrant inspect the piston in accordance with the Hartzell Standard Practices Manual 202A (61-01-02). CAUTION: DO NOT REMOVE THE ANODIZE COATING BEFORE PENETRANT INSPECTION.	A relevant indication is not permitted.	If a relevant indication cannot be removed within the permitted serviceable limits, replace the piston.

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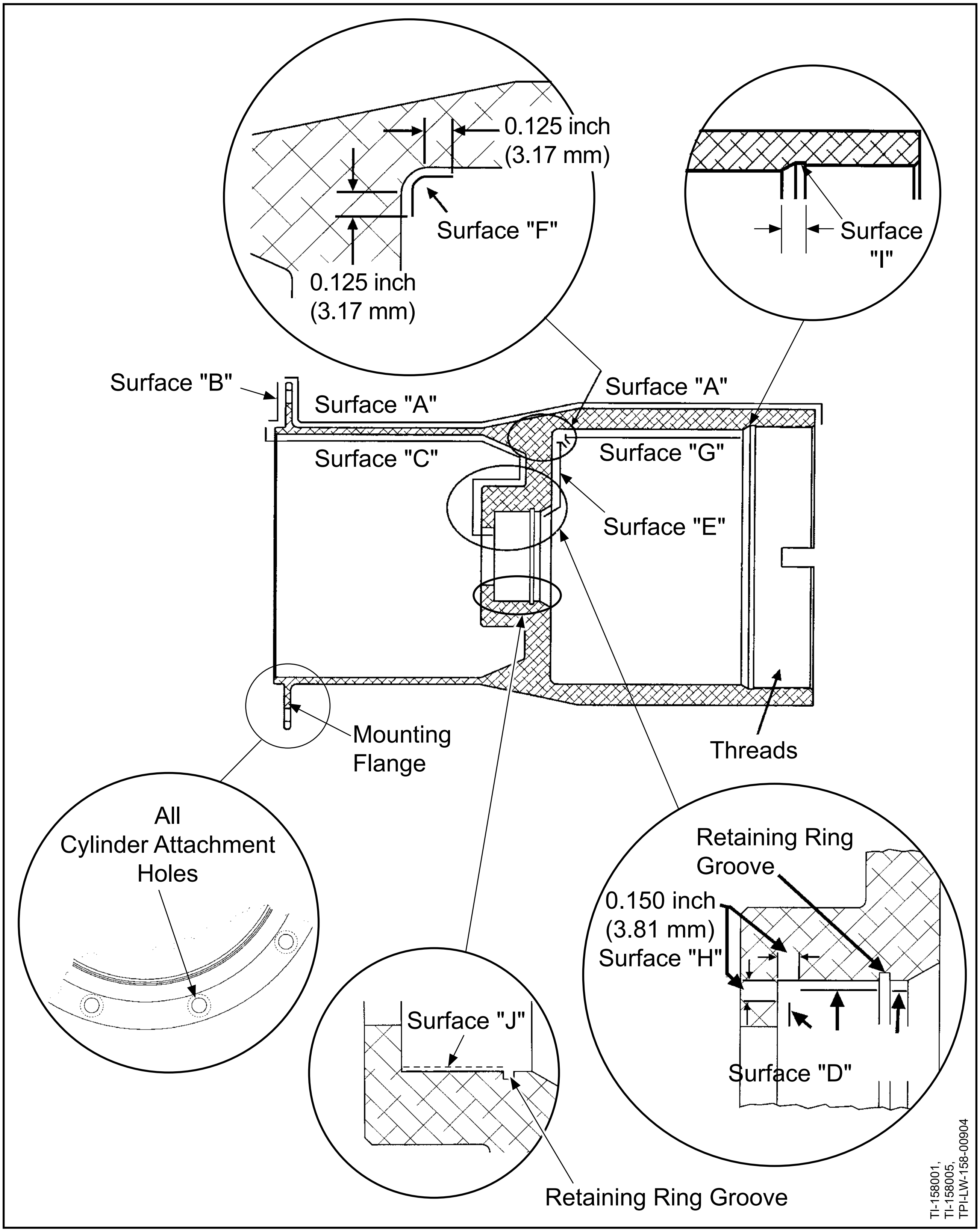


Cylinder Dimensional Inspection Criteria
Figure 5-13

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
M. CYLINDER - D-3738(-) and 102345(-1) (Item 280) (Refer to Figure 5-13)		
(1) Visually examine surface "A" for corrosion product, pitting, nicks, scratches, or other damage.	Corrosion product is not permitted. If the cylinder is damaged, measure the damage. The maximum depth of damage permitted is 0.003 inch (0.07 mm). The maximum permitted total area of damage is 1 sq. inch (645 sq. 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 sq. inch (645 sq. mm) area are permitted. Linear pitting is not permitted.	Using abrasive pad CM47 or equivalent, polish to remove damage. The maximum permitted depth of repair is 0.005 inch (0.12 mm). The maximum permitted area of repair is 2 sq. inches (1290 sq. mm). If base aluminum is exposed, chemical conversion coat in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). To improve the appearance or corrosion product protection surface "A" may be painted with a polane paint. Refer to the Paint and Finish chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If damage is greater than the permitted serviceable or repair limits, replace the cylinder.
(2) Visually examine surface "B" for corrosion product, pitting, nicks, scratches, or other damage.	Corrosion product is not permitted. If the cylinder is damaged, measure the damage. The maximum depth of damage permitted is 0.003 inch (0.07 mm). The maximum permitted total area of damage is 0.5 sq. inch (322 sq. 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 sq. inch (645 sq. mm) area are permitted. Linear pitting is not permitted. High spots or edges above surrounding machined surfaces are not permitted. Pitting, nicks, scratches, or other damage must not affect the attachment of the cylinder to the hub.	Using abrasive pad CM47 or equivalent, polish to remove damage. The maximum permitted depth of repair is 0.005 inch (0.12 mm). The maximum permitted area of damage and repair is 1 sq. inch (645 sq. mm). If the base aluminum is exposed, chemical conversion coat in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Repair must not affect the attachment of the cylinder to the hub. If damage is greater than the permitted serviceable or repair limits, replace the cylinder.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
M. CYLINDER - D-3738(-) and 102345(-1), CONTINUED (Item 280) (Refer to Figure 5-13)		
(3) Using white light, visually examine the immediate area encircling each cylinder mounting hole for cracks on both sides of the mounting flange.	A crack is not permitted.	If there is a crack, replace the cylinder.
(4) Using white light, visually examine surface "F" and surface "I" for cracks.	A crack is not permitted.	If there is a crack, replace the cylinder.
(5) Visually examine surface "F" for corrosion product, pitting, nicks, scratches, or other damage.	Corrosion product, pitting, nicks, scratches, or other damage is not permitted.	If there is corrosion product, pitting, nicks, scratches, or other damage, replace the cylinder.
(6) Visually examine surface "C" for corrosion product, pitting, nicks, scratches, or other damage.	Corrosion product is not permitted. If the cylinder is damaged, measure the damage. The maximum depth of damage permitted is 0.003 inch (0.07 mm). The maximum permitted total area of damage is 0.75 sq. inch (483 sq. 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 sq. inch (645 sq. mm) area are permitted. Linear pitting is not permitted.	Using abrasive pad CM47 or equivalent, polish to remove damage. The maximum permitted depth of repair is 0.005 inch (0.127 mm). The maximum permitted area of repair is 1.5 sq. inch (967 sq. mm). If base aluminum is exposed, chemical conversion coat in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). To improve the appearance or corrosion protection surface "C" may be painted with a polane paint. Refer to the Paint and Finish chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If damage is greater than permitted serviceable or repair limits, replace the cylinder.

Component Inspection Criteria
Table 5-1

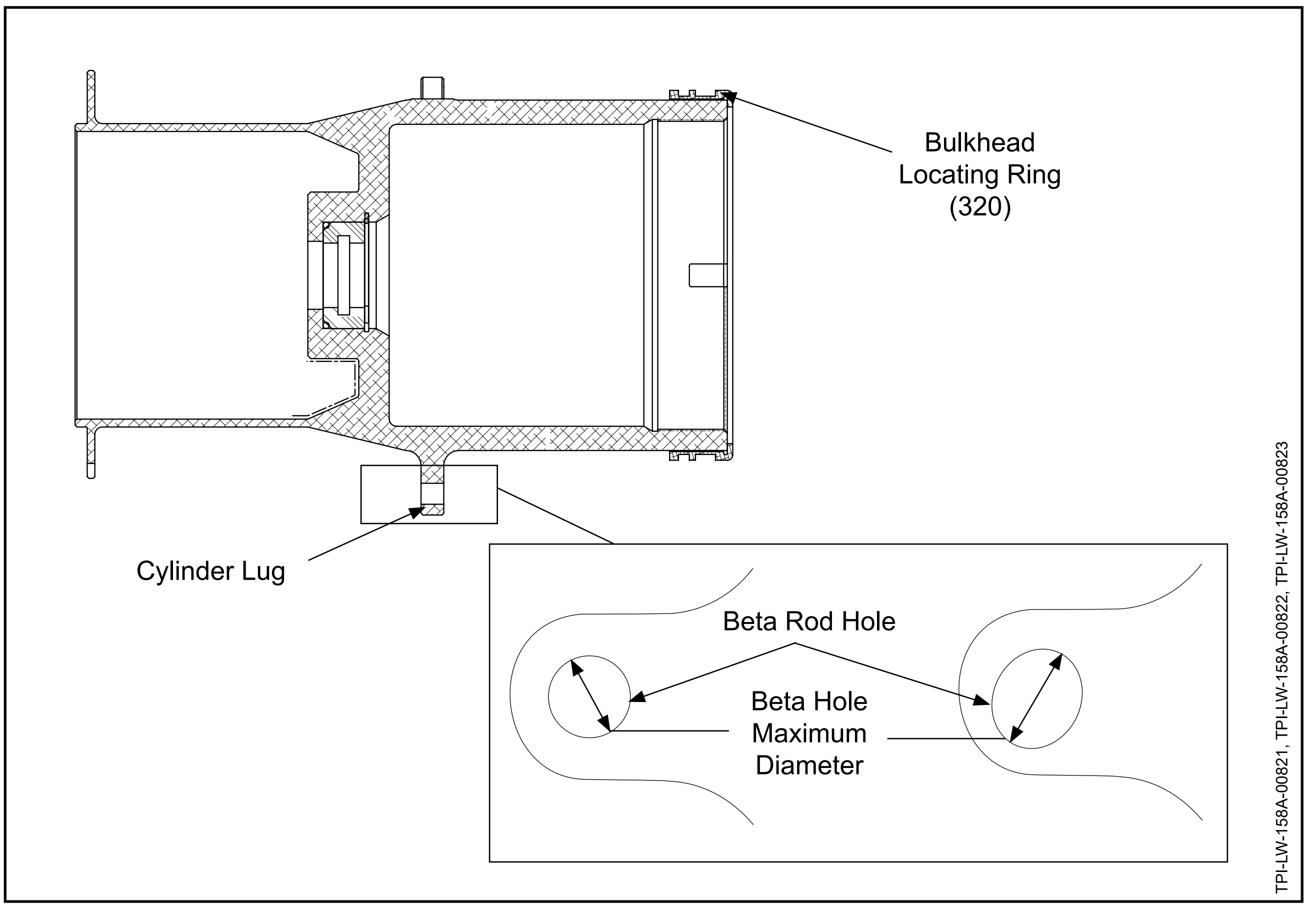
Inspect	Serviceable Limits	Corrective Action
M. CYLINDER - D-3738(-) and 102345(-1), CONTINUED (Item 280) (Refer to Figure 5-13)		
(7) Visually examine the cylinder ID, surface "G" where the piston O-ring seals to the cylinder for wear, corrosion product, pitting, and damage such as nicks and scratches.	If surface "G" shows wear, measure the wear. The maximum permitted ID is 4.979 inches (126.46 mm). Wear through the anodize to the base aluminum is not permitted. Corrosion, pitting, nicks, scratches, or other damage is not permitted.	If there is corrosion product, pitting, nicks, scratches, or damage, replace the cylinder. If the wear is greater than the permitted serviceable limits, replace the cylinder.
(8) Visually examine surface "D" for corrosion product, pitting, nicks, scratches, or other damage.	Corrosion product is not permitted. If the cylinder is damaged, measure the damage. High spots or edges above surrounding machined surfaces are not permitted. The maximum permitted depth of damage is 0.003 inch (0.07 mm) for scratches or nicks. Pitting or other damage must be removed. High spots or edges above surrounding machined surfaces are not permitted. Pitting, nicks, scratches, or other damage must not affect the fit or the positioning of the plastic bushing.	Using abrasive pad CM47 or equivalent, polish to remove damage. The maximum permitted depth of repair is 0.008 inch (0.20 mm). The maximum permitted total area of repair is 0.5 sq. inch (322 sq. mm). Repair is not permitted to intersect with the retaining ring groove. Repair must not affect the fit or the positioning of the plastic bushing. If base aluminum is exposed, chemical conversion coat in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If damage is greater than permitted serviceable or repair limits, replace the cylinder.

Component Inspection Criteria
Table 5-1

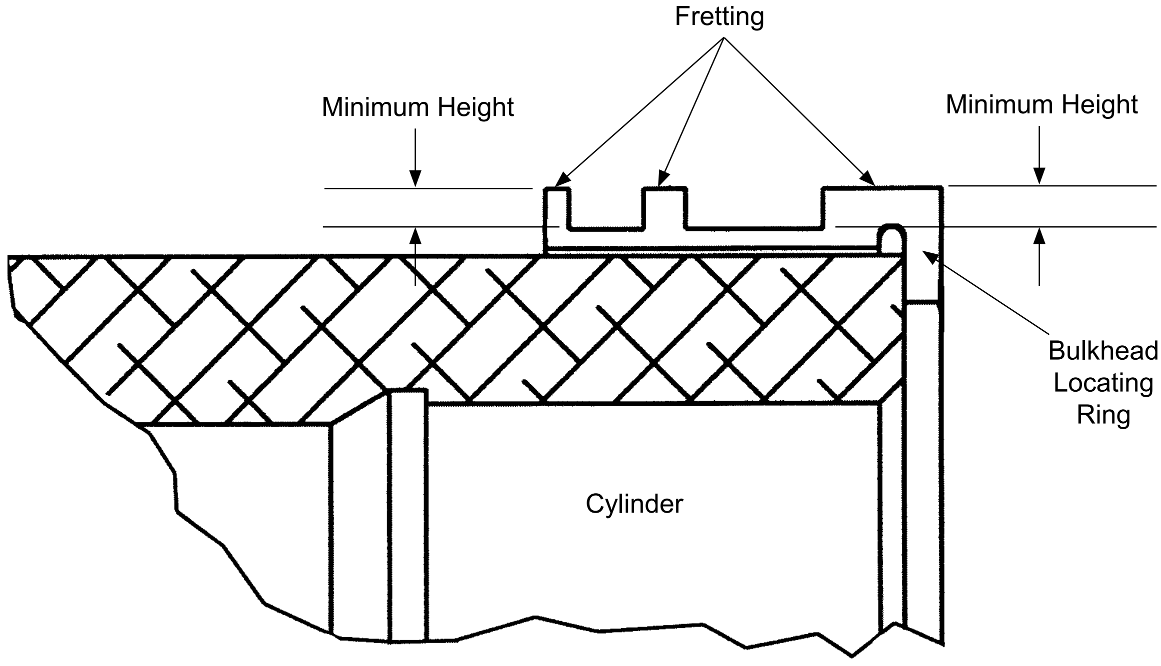
Inspect	Serviceable Limits	Corrective Action
M. CYLINDER - D-3738(-) and 102345(-1), CONTINUED (Item 280) (Refer to Figure 5-13)		
(9) Visually examine the retaining ring groove for wear or damage.	If the retaining ring groove is worn or damaged, measure the damage. The maximum permitted groove width is 0.074 inch (1.87 mm). The maximum permitted ID is 1.867 inches (47.42 mm).	If the wear or damage is greater than the permitted serviceable limits, replace the cylinder.
(10) Visually examine surface "H" for corrosion product, pitting, nicks, scratches and other damage.	Corrosion product, pitting, nicks, scratches, or other damage is not permitted.	If there is corrosion product, pitting, nicks, scratches, or other damage, replace the cylinder.
(11) Visually examine surface "E" for corrosion product, pitting, nicks, scratches or other damage.	Corrosion product is not permitted. If the cylinder is damaged, measure the damage. The maximum depth of damage permitted is 0.003 inch (0.07 mm). The maximum permitted total area of damage is 0.5 sq. inch (322 sq. 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 sq. inch (645 sq. mm) area are permitted. Linear pitting is not permitted.	Using abrasive pad CM47 or equivalent, lightly polish to remove damage. The maximum permitted depth of repair is 0.005 inch (0.127 mm). The maximum permitted area of repair is 1 sq. inch (645 sq. mm). If base aluminum is exposed, chemical conversion coat in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If damage is greater than permitted serviceable or repair limits, replace the cylinder.
(12) For cylinder 102345-1 only, using a Profilometer TE436-2 or equivalent, examine the finish on Surface "J".	The maximum permitted surface finish is 32Ra.	If the surface finish is greater than the permitted serviceable limits, polish Surface "J" using 3M microfinishing film (373L), or equivalent. The maximum permitted diameter of Surface "J" after repair is 1.7560 inch (44.602 mm).

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
M. CYLINDER - D-3738(-) and 102345(-1), CONTINUED (Item 280) (Refer to Figure 5-13)		
(13) Visually examine the threads of the cylinder for damage.	Damage to 1/2 of one thread total accumulated damage is permitted.	If the damage is greater than the permitted serviceable limits, replace the cylinder.
(14) Visually examine each beta rod hole (3) in the cylinder lug for wear. Refer to Figure 5-14.	If there is wear, measure the beta rod hole ID. The maximum permitted diameter is 0.410 inch (10.41 mm). NOTE: The hole typically wears in an oval shape.	If the ID measurement is greater than the permitted serviceable limits, replace the cylinder.



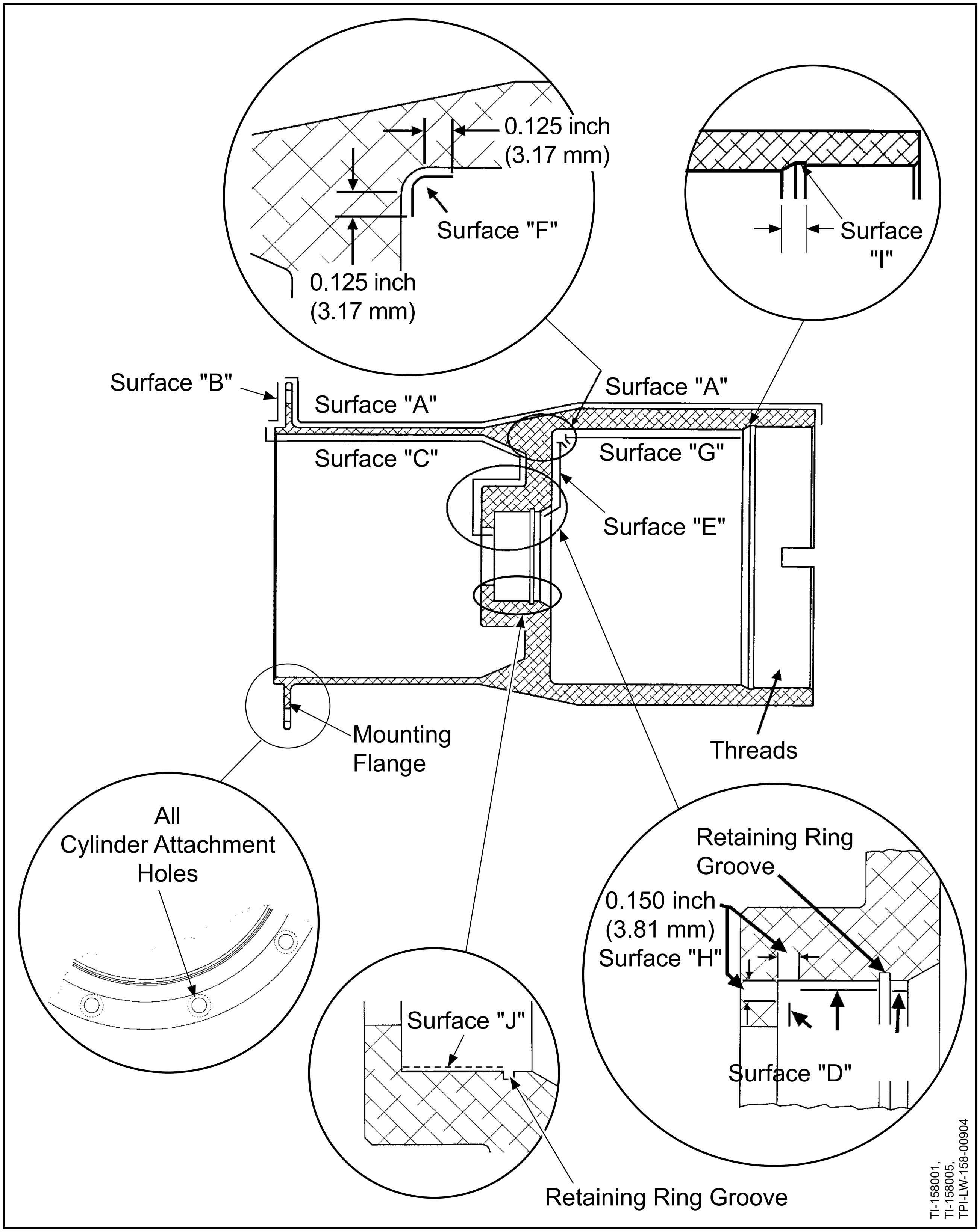
Cylinder Lug and Locating Ring Inspection
Figure 5-14



Bulkhead Locating Ring
Figure 5-15

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
M. CYLINDER - D-3738(-) and 102345(-1), CONTINUED (Item 280) (Refer to Figure 5-13)		
(15) For cylinders D-3738-1 and 102345-1 only, visually examine the bulkhead locating ring (320) for corrosion product and pitting.	Corrosion product is not permitted. Pitting must not affect the ability of the O-rings to pilot the spinner or cause accelerated O-ring wear.	Corrosion product may be removed using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If pitting is greater than the permitted serviceable limits, replace the cylinder.
(16) For cylinders D-3738-1 and 102345-1 only, visually examine the outside diameter of the bulkhead locating ring (320) for fretting damage (caused by the spinner).	The maximum permitted depth of fretting damage is when a minimum O-ring groove height of 0.075 inch (1.91 mm) is obtained when measured from the bottom of the O-ring groove to the OD of the bulkhead locating ring. Refer to Figure 5-15.	If the damage is greater than the permitted serviceable limits, replace the cylinder.
(17) For cylinders D-3738-1 and 102345-1 only, visually examine the bulkhead locating ring (320) for scratches, nicks, gouges, or other damage.	A minor scratch or nick that has no pushed-up material and does not affect the ability of the spinner to fit over the bulkhead locating ring or does not cause accelerated O-ring wear is permitted. Material that is pushed-up above the surrounding material on the OD or in the O-ring grooves is not permitted. Damage that affects the ability of the spinner to fit over the bulkhead locating ring or that causes accelerated O-ring wear is not permitted.	Minor pushed-up material may be removed by polishing. Apply chemical conversion coating to the repaired area in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If scratches, nicks, gouges, or other damage are greater than the permitted serviceable limits or the corrective action limits, replace the cylinder.
(18) For cylinders D-3738-1 and 102345-1 only, visually examine the bulkhead locating ring (320) for attachment to the cylinder.	The bulkhead locating ring must be tightly attached to the cylinder.	If the bulkhead locating ring is not tightly attached to the cylinder, replace the cylinder.



Cylinder Dimensional Inspection Criteria
Figure 5-16

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
N. CYLINDER - D-2827, 102346, and 107189 (Item 280) (Refer to Figure 5-16)		
(1) Visually examine surface "A" for corrosion product, pitting, nicks, scratches, or other damage.	Corrosion product is not permitted. If the cylinder is damaged, measure the damage. The maximum depth of damage permitted is 0.003 inch (0.07 mm). The maximum permitted total area of damage is 1 sq. inch (645 sq. 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 sq. inch (645 sq. mm) area are permitted. Linear pitting is not permitted.	Using an abrasive pad CM47 or equivalent, lightly polish to remove corrosion product, pitting, nicks, scratches, or other damage. The maximum permitted depth of repair is 0.005 inch (0.127 mm). The maximum permitted area of repair is 2 sq. inches (1290 sq. mm). If base aluminum is exposed, chemical conversion coat in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). To improve the appearance or corrosion protection surface "A" may be painted with a polane paint. Refer to the Paint and Finish chapter of Hartzell Standard Practices Manual 202A (61-01-02). If damage is greater than the permitted serviceable or repair limits, replace the cylinder.
(2) Visually examine surface "B" for corrosion product, pitting, nicks, scratches, 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 cylinder is damaged, measure the damage. The maximum depth of damage permitted is 0.003 inch (0.07 mm). The maximum permitted total area of damage is 0.5 sq. inch (322 sq. 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 sq. inch (645 sq. mm) area are permitted. Linear pitting is not permitted. High spots or edges above surrounding machined surfaces are not permitted. Pitting, nicks, scratches, or other damage must not affect the attachment of the cylinder to the hub.	Using an abrasive pad CM47 or equivalent, lightly polish to remove corrosion product, pitting, nicks, scratches, or other damage. The maximum permitted depth of repair is 0.005 inch (0.127 mm). The maximum permitted area of damage and repair is 1 sq. inch (645 sq. mm). If the base aluminum is exposed, chemical conversion coat in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Repair must not affect the attachment of the cylinder to the hub. If damage is greater than the permitted serviceable or repair limits, replace the cylinder.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
N. CYLINDER - D-2827, 102346, and 107189, CONTINUED (Item 280) (Refer to Figure 5-16)		
(3) Using white light, visually examine the immediate area encircling each cylinder mounting hole for cracks on both sides of the mounting flange.	A crack is not permitted.	If there is a crack, replace the cylinder.
(4) Using white light, visually examine surface "F" and surface "I" for cracks.	A crack is not permitted.	If there is a crack, replace the cylinder.
(5) Visually examine surface "F" for corrosion product, pitting, nicks, scratches, or other damage.	Corrosion product, pitting, nicks, scratches, or other damage is not permitted.	If there is corrosion product, pitting, nicks, scratches, or other damage, replace the cylinder.
(6) Visually examine surface "C" for corrosion product, pitting, nicks, scratches, 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 cylinder is damaged, measure the damage. The maximum permitted depth of damage is 0.003 inch (0.07 mm). The maximum permitted total area of damage is 0.75 sq. inch (483 sq. 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 sq. inch (645 sq. mm) area are permitted. Linear pitting is not permitted.	Using an abrasive pad CM47 or equivalent, lightly polish to remove corrosion product, pitting, nicks, scratches, or other damage. The maximum permitted depth of repair is 0.005 inch (0.12 mm). The maximum permitted area of repair is 1.5 sq. inch (967 sq. mm). If base aluminum is exposed, chemical conversion coat in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). To improve the appearance or corrosion protection, surface "C" can be painted with a polane paint. Refer to the Paint and Finish chapter of Hartzell Propeller Inc Standard Practices Manual 202A (61-01-02). If damage is greater than permitted serviceable or repair limits, replace the cylinder.

Component Inspection Criteria
Table 5-1

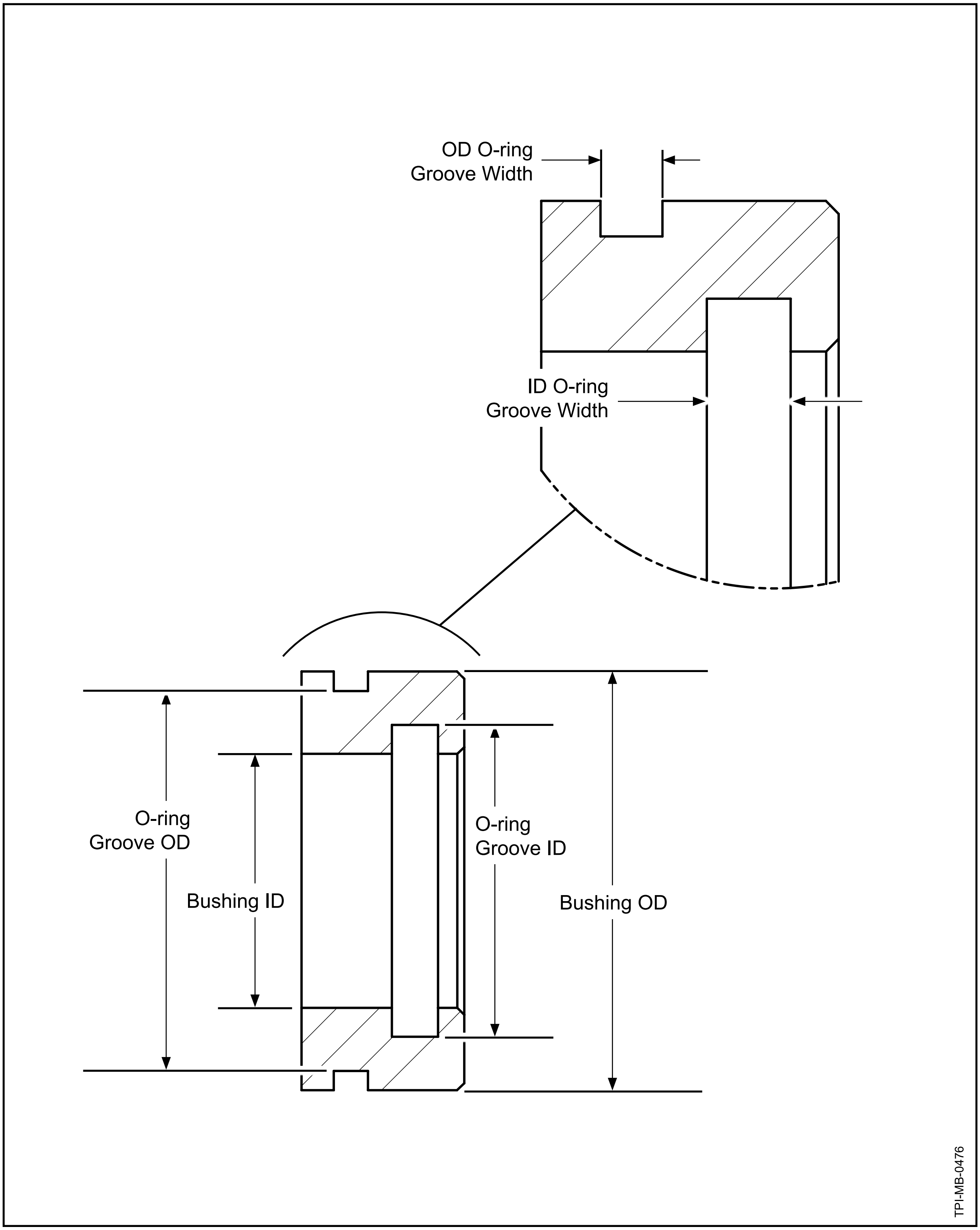
Inspect	Serviceable Limits	Corrective Action
N. CYLINDER - D-2827, 102346, and 107189, CONTINUED (Item 280) (Refer to Figure 5-16)		
(7) Visually examine the cylinder ID, surface "G" where the piston O-ring seals to the cylinder for wear, corrosion product, pitting, and damage such as nicks and scratches.	If surface "G" shows wear, measure the wear. The maximum permitted ID is 4.979 inches (126.46 mm), except for the 107189 cylinder. The maximum permitted ID for the 107189 cylinder is 5.729 inches (145.51 mm). Wear through the anodize to the base aluminum is not permitted. Corrosion product, pitting, nicks, scratches, or other damage is not permitted.	If there is corrosion product, pitting, nicks, scratches, or damage, replace the cylinder. If the wear is greater than the permitted serviceable limits, replace the cylinder.
(8) Visually examine surface "D" for corrosion product, pitting, nicks, scratches, 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 cylinder is damaged, measure the damage. High spots or edges above surrounding machined surfaces are not permitted. The maximum permitted depth of damage is 0.003 inch (0.07 mm) for scratches or nicks. Pitting or other damage must be removed. High spots or edges above surrounding machined surfaces are not permitted. Pitting, nicks, scratches, or other damage must not affect the fit or the positioning of the plastic bushing.	Using an abrasive pad CM47 or equivalent, lightly polish to remove corrosion product, pitting, nicks, scratches, or other damage. The maximum permitted depth of repair is 0.008 inch (0.20 mm). The maximum permitted total area of repair is 0.5 sq. inch (322 sq. mm). Repair is not permitted to intersect with the retaining ring groove. Repair must not affect the fit or the positioning of the plastic bushing. If base aluminum is exposed, chemical conversion coat in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If damage is greater than permitted serviceable or repair limits, replace the cylinder.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
N. CYLINDER - D-2827, 102346, and 107189, CONTINUED (Item 280) (Refer to Figure 5-16)		
(9) Visually examine the retaining ring groove for wear or damage.	If the retaining ring groove is worn or damaged, measure the wear or damage. The maximum permitted groove width is 0.074 inch (1.87 mm). The maximum permitted ID is 1.867 inches (47.42 mm).	If the wear or damage is greater than the permitted serviceable limits, replace the cylinder.
(10) Visually examine surface Visually examine surface "H" for corrosion product, pitting, nicks, scratches and other damage.	Corrosion product, pitting, nicks, scratches, or other damage is not permitted.	If there is corrosion product, pitting, nicks, scratches, or other damage, replace the cylinder.
(11) Visually examine surface "E" for corrosion product, pitting, nicks, scratches, 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 cylinder is damaged, measure the damage. The maximum depth of damage permitted is 0.003 inch (0.07 mm). The maximum permitted total area of damage is 0.5 sq. inch (322 sq. 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 sq. inch (645 sq. mm) area are permitted. Linear pitting is not permitted.	Using an abrasive pad CM47 or equivalent, lightly polish to remove corrosion product, pitting, nicks, scratches, or other damage. The maximum permitted depth of repair is 0.005 inch (0.127 mm). The maximum permitted area of repair is 1 sq. inch (645 sq. mm). If base aluminum is exposed, chemical conversion coat in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If damage is greater than permitted serviceable or repair limits, replace the cylinder.
(12) Visually examine the threads of the cylinder for damage.	Damage to 1/2 of one thread total accumulated damage is permitted.	If the damage is greater than the permitted serviceable limits, replace the cylinder.
(13) Visually examine the cylinder for anti-rotation plate slots.	The cylinder must have two anti-rotation plate slots.	If the cylinder does not have two anti-rotation plate slots, modify the cylinder in accordance with the section "Modification of the D-2827 Cylinder and the C-2871 Pitch Stop Plate" in the Repair chapter of this manual.

Component Inspection Criteria
Table 5-1

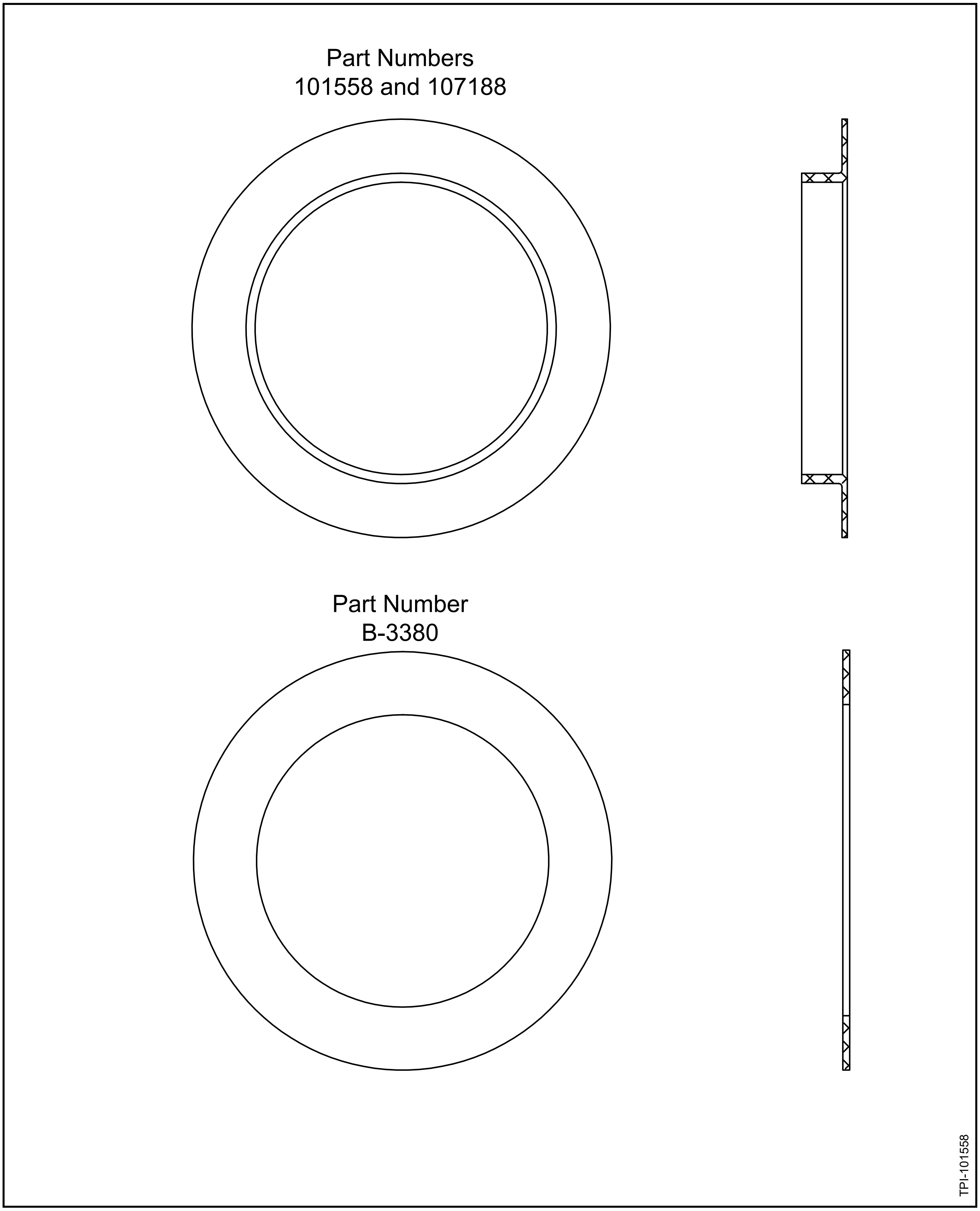
Inspect	Serviceable Limits	Corrective Action
N. CYLINDER - D-2827, 102346, and 107189, CONTINUED (Item 280) (Refer to Figure 5-16)		
(14) Visually examine the two anti-rotation plate slots for corrosion product, pitting, nicks, scratches, and other damage.	Corrosion product is not permitted. If there is corrosion product, remove it in accordance with the corrective action repair limits. If the cylinder is damaged, measure the damage. The maximum permitted depth of pitting is 0.005 inch (0.12 mm). The maximum permitted depth of nicks, scratches, or other damage is 0.10 inch (2.54 mm). Damage that has a sharp corner is not permitted.	Using an abrasive pad CM47 or equivalent, locally polish to remove corrosion product. Abrupt or extremely rough damage can be repaired by locally polishing the damaged area using an abrasive pad CM47 or equivalent. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). The maximum permitted depth of repair is 0.030 inch (0.76 mm). If the base aluminum is exposed, apply chemical conversion coating in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the damage is greater than the corrective action limits, replace the cylinder.
(15) Using a Profilometer TE436-2 or equivalent, examine the finish on Surface "J".	The maximum permitted surface finish is 32Ra.	If the surface finish is greater than the permitted serviceable limits, polish Surface "J" using 3M microfinishing film (373L), or equivalent. The maximum permitted diameter of Surface "J" after repair is 1.7560 inch (44.602 mm).



Cylinder Bushing
Figure 5-17

Component Inspection Criteria
Table 5-1

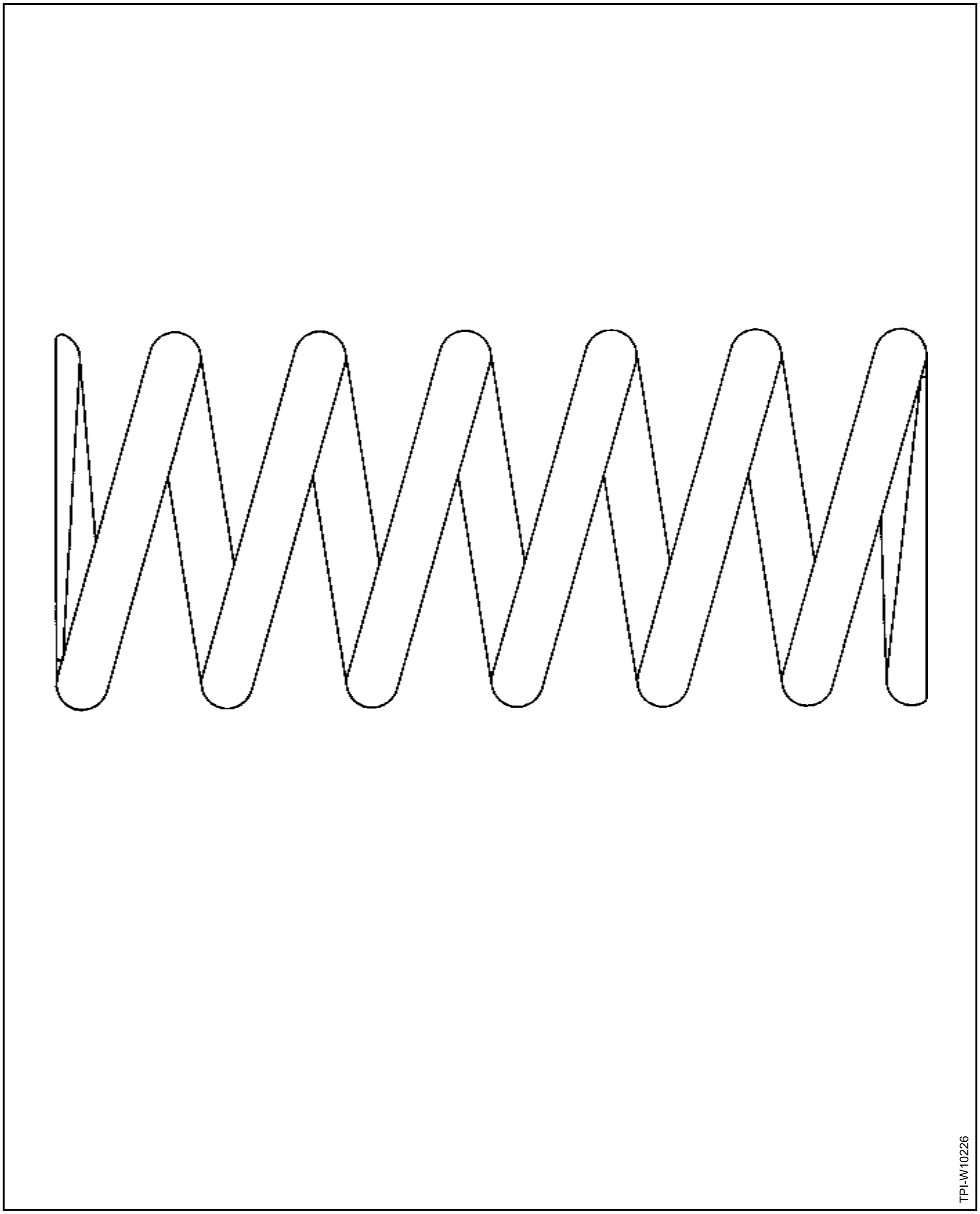
Inspect		Serviceable Limits	Corrective Action
O.	BUSHING, CYLINDER (Item 300) (Refer to Figure 5-17)		
(1)	Visually examine both sides of the cylinder bushing for wear, damage, and distortion.	Wear, damage, or distortion is not permitted.	If there is wear, damage, or distortion, replace the cylinder bushing.
(2)	Measure the cylinder bushing OD.	The minimum permitted bushing OD is 1.750 inches (44.45 mm).	If the bushing OD is less than the permitted serviceable limit, replace the cylinder bushing.
(3)	Measure the cylinder bushing ID and examine the surface finish.	The maximum permitted ID is 1.064 inches (27.02 mm). A smooth surface is required.	If the bushing ID is greater than the permitted serviceable limit, or if the surface finish is not smooth, replace the cylinder bushing.
(4)	Measure the cylinder bushing O-ring groove ID and examine the surface finish.	The maximum permitted O-ring groove ID is 1.306 inches (33.17 mm). A smooth surface is required.	If the O-ring groove ID is greater than the permitted serviceable limit, or if the surface finish is not smooth, replace the cylinder bushing.
(5)	Measure the cylinder bushing O-ring groove OD and examine the surface finish.	The minimum permitted O-ring groove OD is 1.586 inches (40.29 mm). A smooth surface is required.	If the O-ring groove OD is less than the permitted serviceable limit, or if the surface finish is not smooth, replace the cylinder bushing.
(6)	Measure the width of the ID O-ring groove and examine the groove for wear, damage, and distrotion.	The maximum permitted width of the ID O-ring groove is 0.170 inch (4.31 mm). Wear, damage, or distortion is not permitted.	If the width of the ID O-ring groove is greater than the permitted serviceable limit, or if there is wear, damage, or distortion, replace the the cylinder bushing.
(7)	Measure the width of the OD O-ring groove and examine the groove for wear, damage, and distortion.	The maximum permitted width of the OD O-ring groove is 0.146 inch (3.70 mm). Wear, damage, or distortion is not permitted.	If the width of the OD O-ring groove is greater than the permitted serviceable limit, or if there is wear, damage, or distortion, replace the the cylinder bushing.



Spring Seat
Figure 5-18

Component Inspection Criteria
Table 5-1

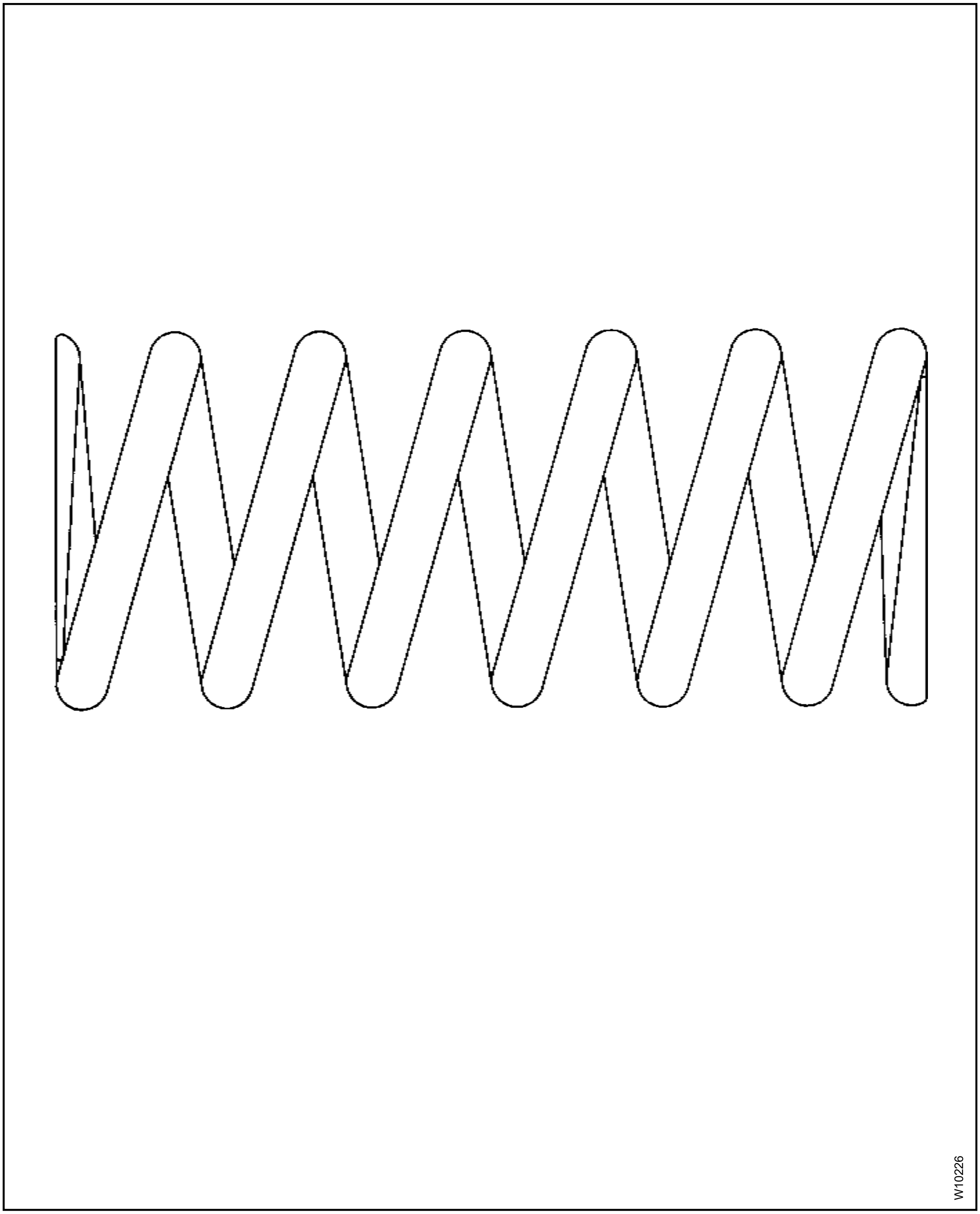
Inspect	Serviceable Limits	Corrective Action
P. <u>SPRING SEAT</u> (Items 340 and 345) (Refer to Figure 5-18)		
(1) Visually examine the spring seat for wear.	If the spring seat is worn, measure the depth of wear. The maximum depth of wear permitted is 0.020 inch (0.50 mm).	If the wear is greater than the permitted serviceable limits, replace the spring seat.
(2) Visually examine the spring seat for nicks, scratches, and gouges.	The maximum permitted total area of accumulated damage is 0.5 sq. inch (322 sq. mm) area. Damage that extends all the way through the part is not permitted.	If the damage is greater than the permitted serviceable limits, replace the spring seat.



102224 Feathering Compression Springs
Figure 5-19

Component Inspection Criteria
Table 5-1

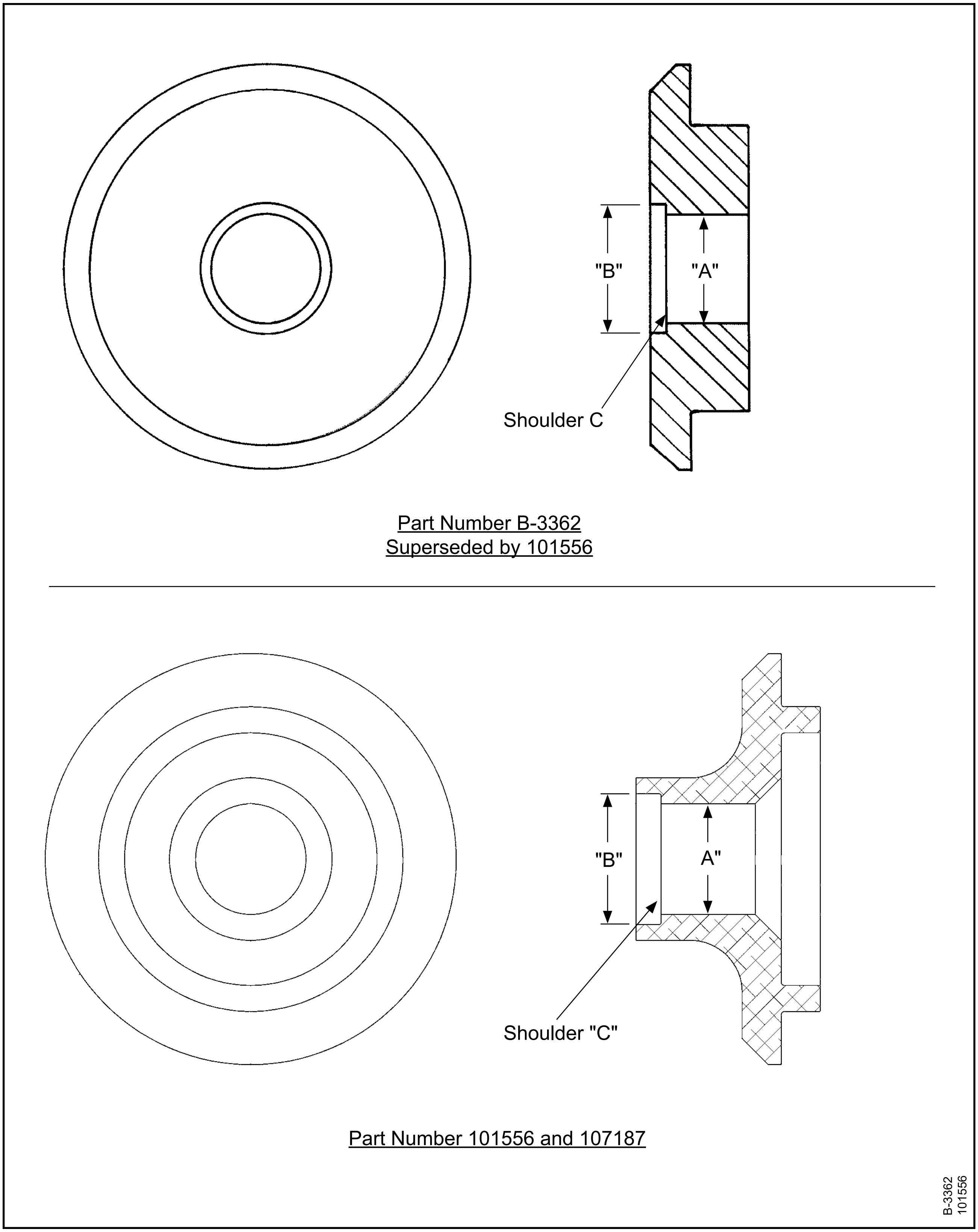
Inspect	Serviceable Limits	Corrective Action
Q. 102224 SPRING, COMPRESSION, FEATHERING (Item 350) (Refer to Figure 5-19)		
(1) Visually examine the feathering compression spring for corrosion product and pitting.	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.005 inch (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 depth of pitting is greater than the permitted serviceable limits, replace the feathering compression spring.
(2) Visually examine the feathering compression spring for wear, nicks, or other damage.	The maximum permitted depth of damage is 0.005 inch (0.12 mm).	If damage is greater than the permitted serviceable limits, replace the feathering compression spring.
(3) Magnetic particle inspect the feathering compression spring in accordance with the Magnetic Particle Inspection chapter of Hartzell Standard Practices Manual 202A (61-01-02). CAUTION: DO NOT STRIP THE ORIGINAL ZINC PLATING OR ZINC CHROMATE PRIMER.	A relevant indication is not permitted.	If there is a relevant indication that cannot be removed within the permitted serviceable limits, replace the feathering compression spring.
(4) After magnetic particle inspection, visually examine the feathering compression spring for zinc plate or zinc chromate primer coverage.	A few random scratches are permitted, otherwise, complete coverage of zinc plate or zinc chromate primer on all surfaces of the feathering compression spring is required.	Apply a layer of zinc chromate primer CM67, or equivalent, to the feathering compression spring in accordance with the Repair chapter of this manual. Do not apply zinc chromate primer before magnetic particle inspection.
(5) Measure the free length of the feathering compression spring.	The minimum permitted free length is 8.50 inches (215.09 mm).	If the free length is less than the permitted serviceable limits, replace the feathering compression spring.



B-3361 Feathering Compression Spring
Figure 5-20

Component Inspection Criteria
Table 5-1

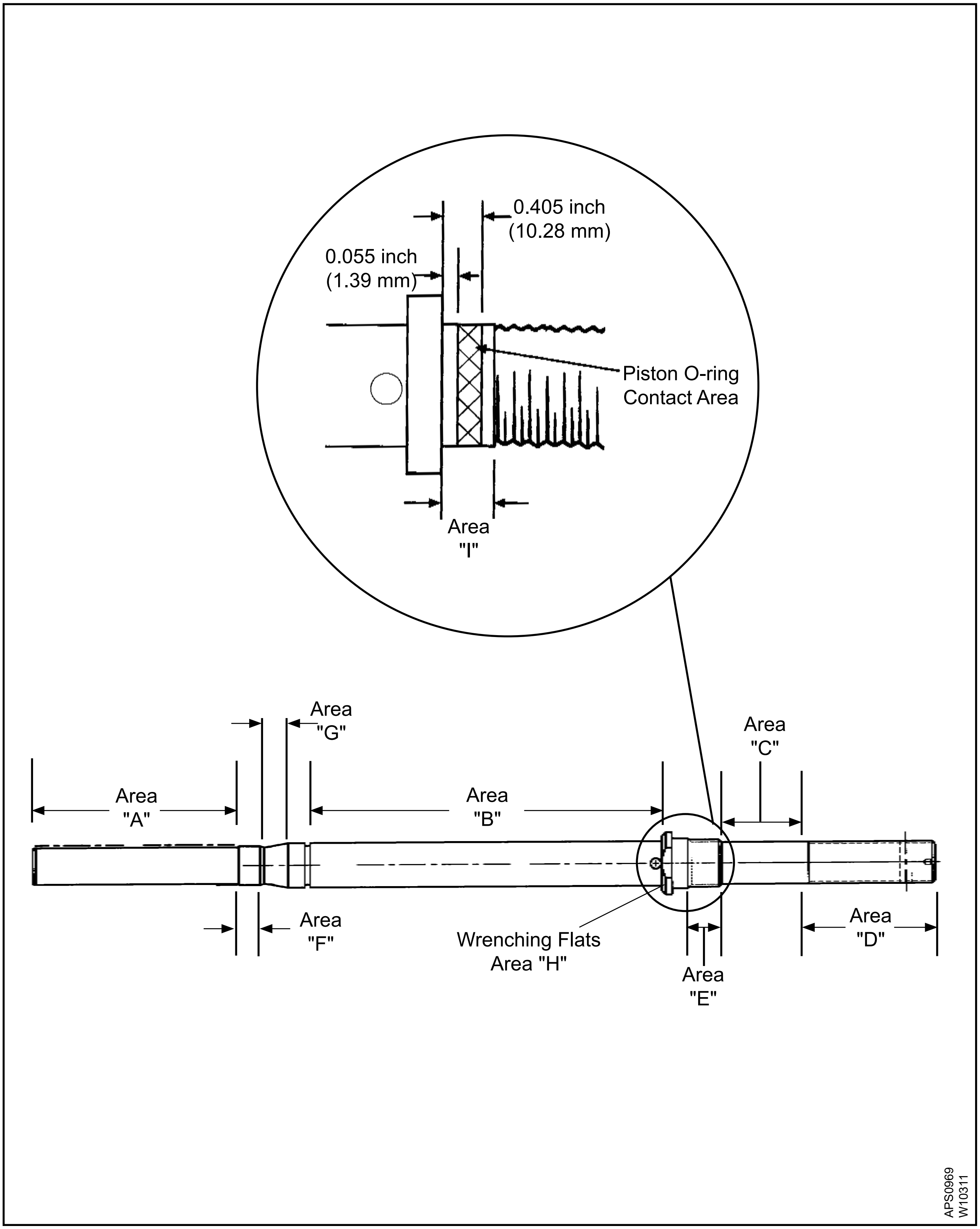
Inspect	Serviceable Limits	Corrective Action
R. B-3361 SPRING, COMPRESSION FEATHERING (Item 350) (Refer to Figure 5-20)		
(1) Visually examine the feathering compression spring and identify all surfaces where the nylon coating has wear through to the titanium spring material. If no nylon coating is missing, 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 the feathering compression spring is damaged, measure the depth of damage. The maximum permitted depth of damage to the titanium surface permitted 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. Refer to the Cleaning chapter of Hartzell Standard Practices Manual 202A (61-01-02). Apply masking material to the nylon surfaces to protect them from abrasion by the glass bead. If the wear or damage is greater than the permitted serviceable limits, replace the feathering compression spring.



Flanged Spring Retainer
Figure 5-21

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
S. SPRING RETAINER, FLANGED (Item 360) (Refer to Figure 5-21)		
(1) Visually examine the rear spring retainer for corrosion product and pitting.	Corrosion product is not permitted. If there is pitting, measure the depth of pitting. 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 Standard Practices Manual 202A (61-01-02). If the damage is greater than the permitted serviceable limits, replace the rear spring retainer.
(2) Visually examine the rear spring retainer for damage caused by the feathering spring.	The maximum permitted depth of damage is 0.010 inch (0.25 mm).	Remove material that is raised above the normal machined surface. If the depth of damage is greater than the permitted serviceable limits, replace the rear spring retainer.
(3) Visually examine the rear spring retainer for mechanically caused damage.	The maximum permitted depth of damage is 0.010 inch (0.25 mm).	If the depth of damage is greater than the permitted serviceable limits, replace the rear spring retainer.
(4) Visually examine bore "A" for wear.	If there is wear, measure the ID of the bore. The maximum permitted ID is 1.066 inch (27.07 mm).	If the wear is greater than the permitted serviceable limits, replace the rear spring retainer.
(5) Visually examine bore "B" for wear.	If there is wear, measure the ID of the bore. The maximum permitted ID is 1.260 inch (32.00 mm).	If the wear is greater than the permitted serviceable limits, replace the rear spring retainer.
(6) 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 retainer.	If the damage or wear is greater than the permitted serviceable limits, replace the rear spring retainer.
(7) Penetrant inspect the flanged spring retainer 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 flanged spring retainer.



Pitch Change Rod - External Inspection Areas
Figure 5-22

Component Inspection Criteria
Table 5-1

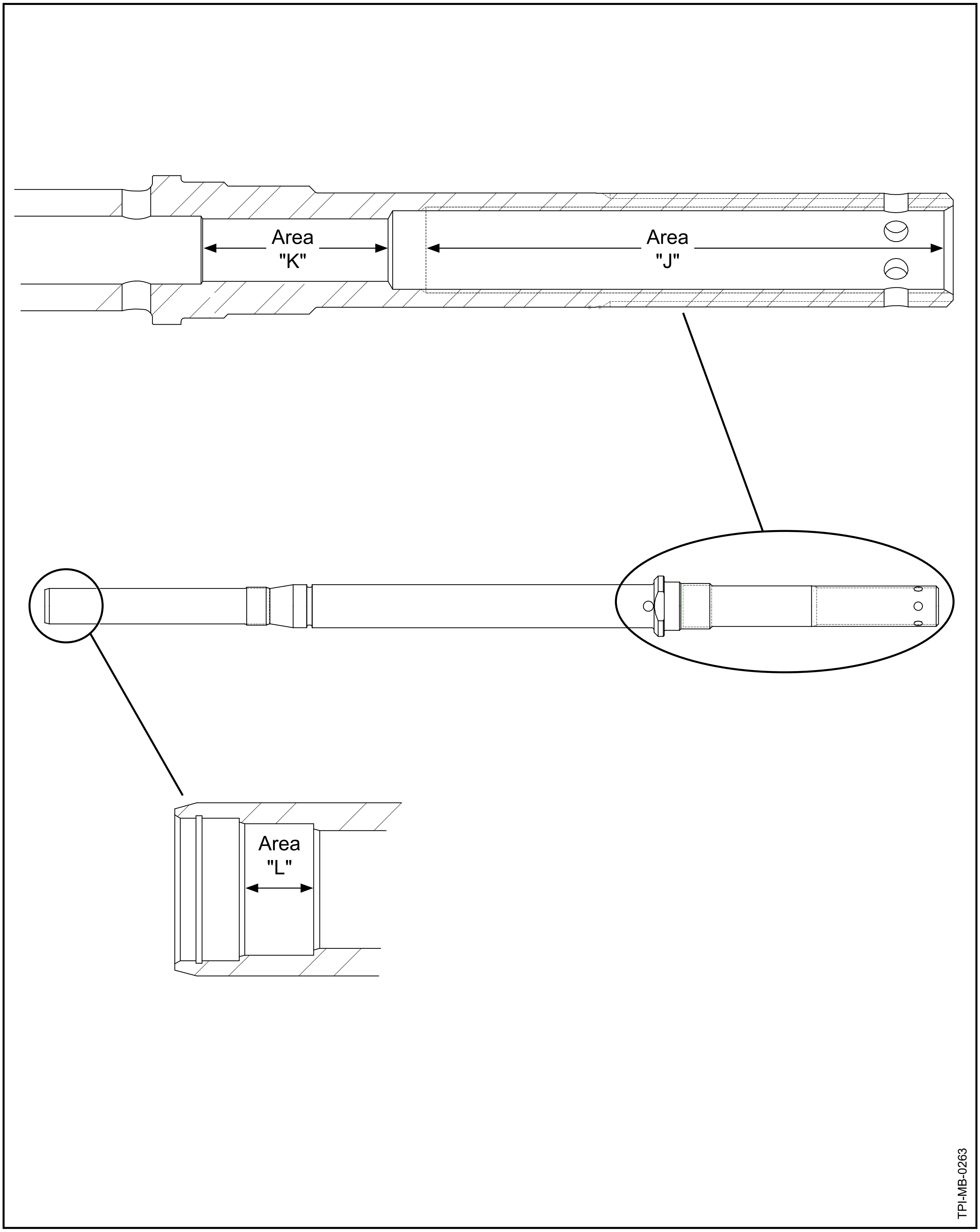
Inspect		Serviceable Limits	Corrective Action
T.	PITCH CHANGE ROD (Item 380) (Refer to Figure 5-22)		
	(1) Visually examine the pitch change rod for corrosion product.	Corrosion product is not permitted.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Standard Practices Manual 202A (61-01-02). See inspection (8) in this section for the corrosion product removal technique for Area "I". If the damage is greater than the permitted serviceable limits, replace the pitch change rod.
	(2) 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.	Using an abrasive pad CM47 or equivalent, lightly hand polish to remove high spots as necessary. If the wear or damage is greater than the permitted serviceable limits, replace the pitch change rod or return to Hartzell Propeller Inc.
	(3) Visually examine the external threaded areas "D" and "E" for cadmium plating coverage.	Minor wear on corners and random light scratches are permitted; otherwise, complete coverage is required.	If cadmium plating coverage is less than the permitted serviceable limits, cadmium replate the threaded areas of the pitch change rod and bake in accordance with the Cadmium Replating chapter of Hartzell Standard Practices Manual 202A (61-01-02).
	(4) Visually examine the external threads in areas "D", "E", and "F" 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 mating part threads.	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
T.	PITCH CHANGE ROD, CONTINUED (Item 380) (Refer to Figure 5-22)		
(5)	Visually examine the taper area "G" 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 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. 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, replace the pitch change rod.
(7)	Visually examine the two wrenching flats "H" on the pitch change rod shoulder for displaced material.	Displaced material caused by open-end wrench engagement must not protrude above or below the pitch change rod shoulder surfaces.	Remove the protruding displaced material to be flush with the pitch change rod shoulder thickness.
		Sufficient flat surfaces "H" must remain to support an applied open end wrench torque.	If the damage is greater than the permitted serviceable limits, replace the pitch change rod.
(8)	Visually examine the area "I" between the pitch change rod wrenching shoulder and the threads where the piston O-ring contacts for pitting or damage.	Pitting or damage is not permitted in the O-ring contact area. The remaining area "I" outside of the O-ring contact area may have a maximum pitting or damage depth of 0.007 inch (0.17 mm).	If pitting or damage is in the O-ring contact area, replace the pitch change rod. Remove corrosion product by polishing only in the remaining area "I" outside the O-ring contact area. If repair is greater than the permitted serviceable limit, replace the pitch change rod.
(9)	Measure the diameter in area "A" of the pitch change rod.	The minimum diameter permitted is 0.870 inch (22.10 mm).	If the diameter is less than the permitted serviceable limits, replace the pitch change rod.

Component Inspection Criteria
Table 5-1

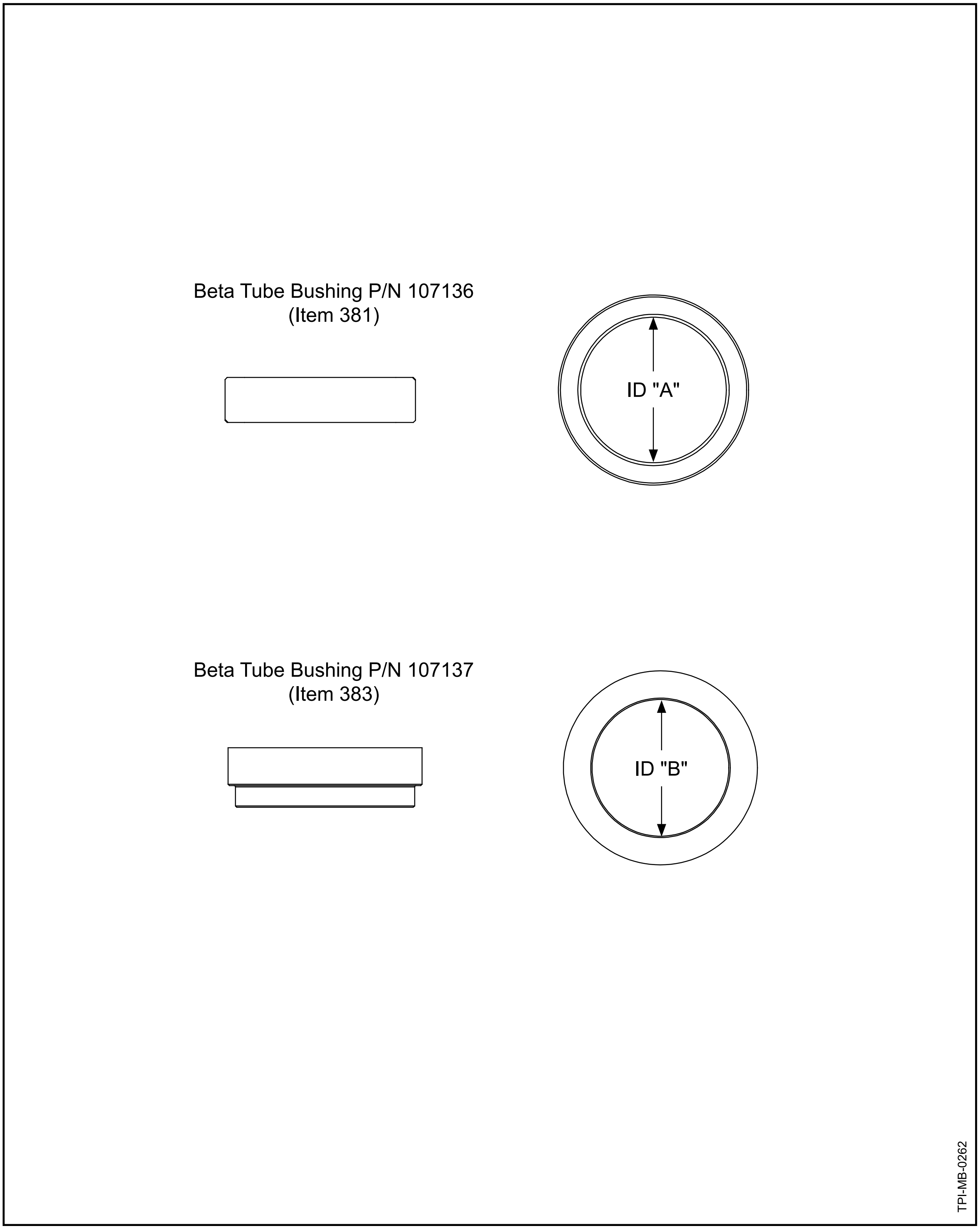
Inspect	Serviceable Limits	Corrective Action
T. PITCH CHANGE ROD, CONTINUED (Item 380) (Refer to Figure 5-22)		
(10) Measure the diameter in area "B" of the pitch change rod.	The minimum diameter permitted is 1.058 inches (26.88 mm).	If the diameter is less than the permitted serviceable limits, replace the pitch change rod.
(11) Measure the diameter in area "C" of the pitch change rod.	The minimum diameter permitted is 0.994 inch (25.25 mm).	If the diameter is less than the permitted serviceable limits, replace the pitch change rod.



Pitch Change Rod - Internal Inspection Areas
Figure 5-23

Component Inspection Criteria
Table 5-1

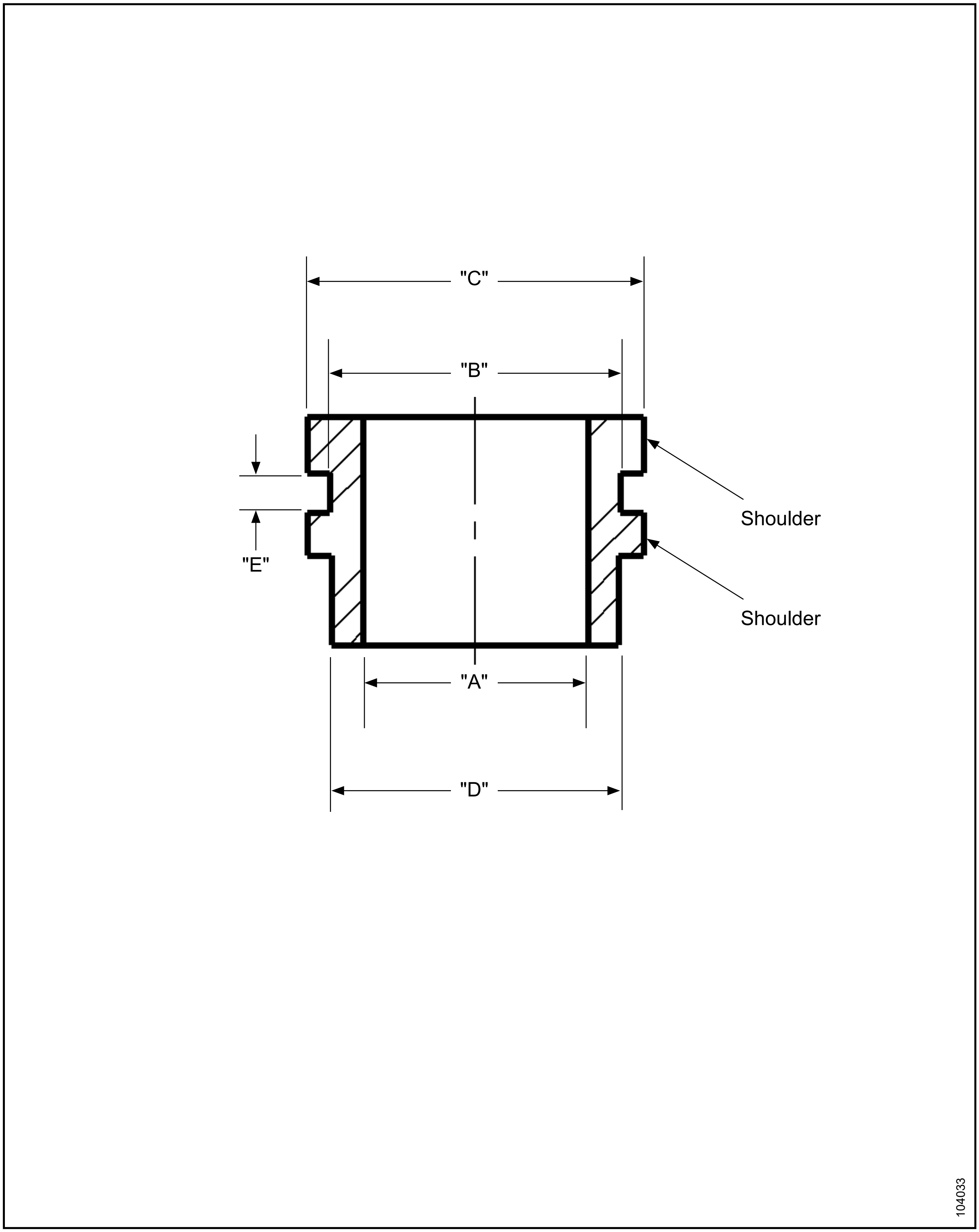
Inspect	Serviceable Limits	Corrective Action
T. PITCH CHANGE ROD, CONTINUED (Item 380) (Refer to Figure 5-23)		
(12) If the pitch change rod has internal threads, visually examine the internal threads in the internal Area "J" for damage.	Damage to two threads of total accumulation is permitted. The damaged threads must not interfere with the mating part threads.	If the damage is greater than the permitted serviceable limits, replace the pitch change rod.
(13) If the pitch change rod has internal threads, visually examine the pitch change rod ID adjacent to the internal threads, in the 1.625 inches (41.27 mm) area for wear or damage (Area "K").	If there is wear or damage, measure the ID. Damage is not permitted. The maximum permitted ID is 0.550 inch (13.97 mm).	If wear or damage is greater than the permitted serviceable limits, replace the pitch change rod.
(14) 107135 Pitch Change Rod Only: Examine the internal Area "L" for wear or damage.	If there is wear or damage, measure the ID. Damage is not permitted. The maximum permitted ID is 0.665 inch (16.89 mm).	If wear or damage is greater than the permitted serviceable limits, replace the pitch change rod.
(15) Magnetic particle inspect the pitch change rod in accordance with Hartzell Standard Practices Manual 202A (61-01-02).	A relevant indication is not permitted.	A relevant indication may be repaired if it is within the permitted serviceable limits for the affected area. If the relevant indication cannot be repaired within the serviceable limits, replace the pitch change rod.



Beta Tube Bushings
Figure 5-24

Component Inspection Criteria
Table 5-1

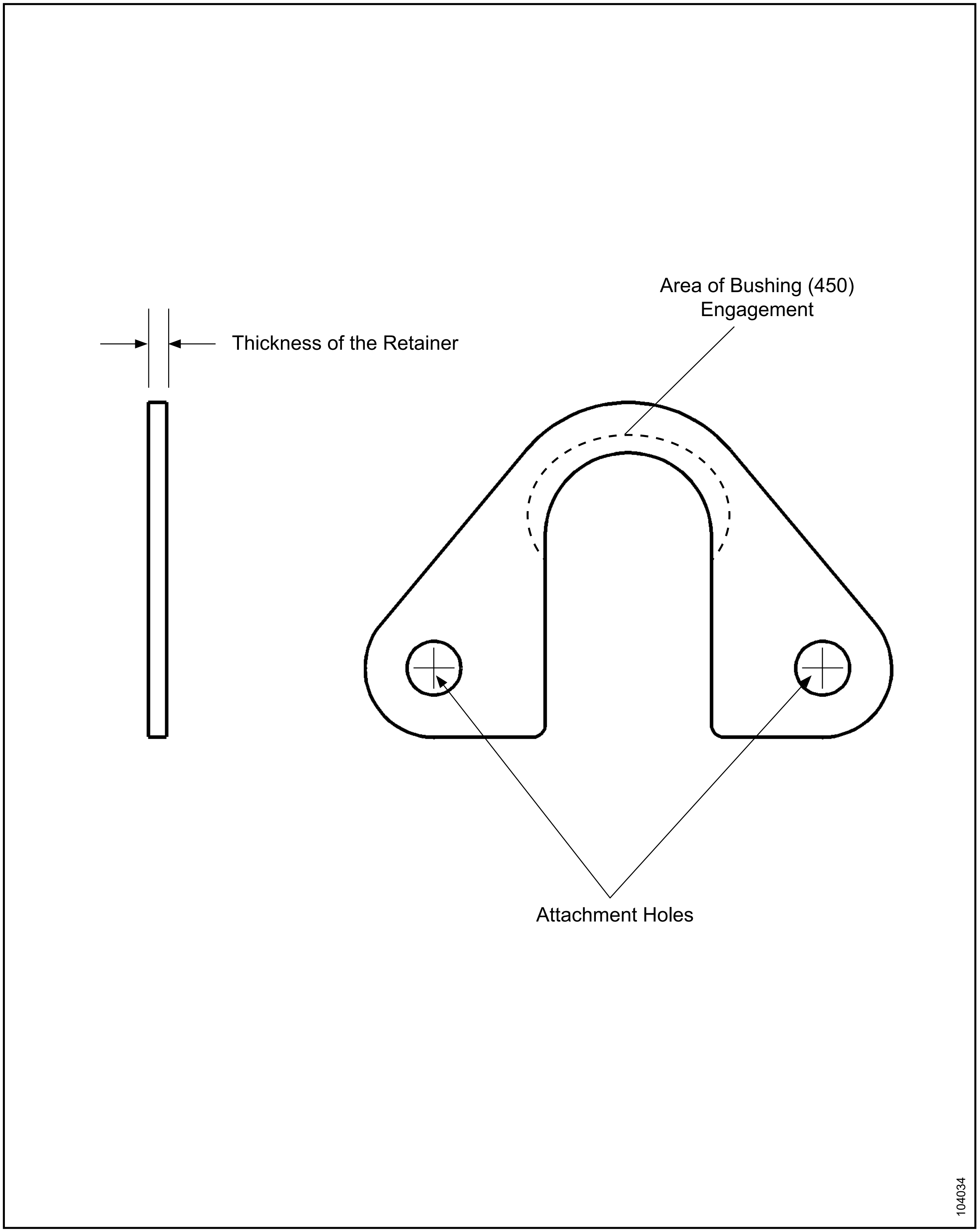
Inspect	Serviceable Limits	Corrective Action
U. BETA TUBE BUSHINGS (Item 381 and 383) (Refer to Figure 5-24)		
(1) Beta Tube Bushing P/N.107136 (item 381): Measure the ID "A" of the bushing.	The maximum permitted ID "A" of the beta tube bushing P/N 107136 (item 381) is 0.509 inch (12.92 mm).	If the ID "A" of the beta tube bushing P/N 107136 (item 381) is greater than the permitted serviceable limit, replace the bushing.
(2) Beta Tube Bushing P/N.107137 (item 383): Measure the ID "B" of the bushing.	The maximum permitted ID "B" of the beta tube bushing P/N 107137 (item 383) is 0.507 inch (12.92 mm).	If the ID "B" of the beta tube bushing P/N 107137 (item 383) is greater than the permitted serviceable limit, replace the bushing.



Bushing
Figure 5-25

Component Inspection Criteria
Table 5-1

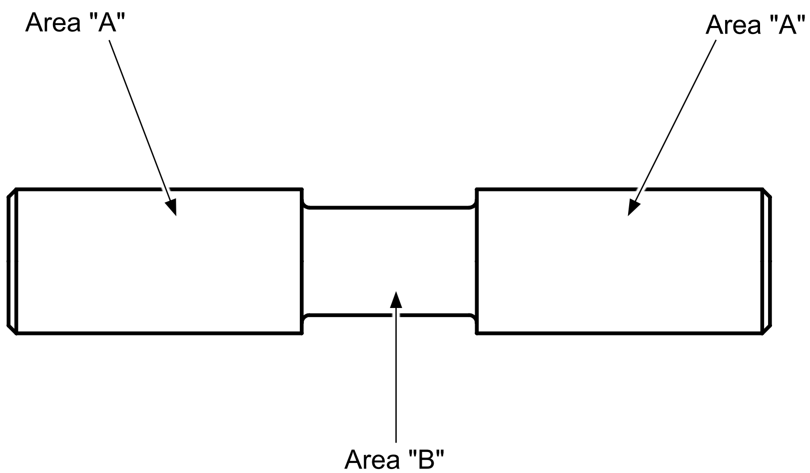
Inspect		Serviceable Limits	Corrective Action
V. BUSHING (Item 450) (Refer to Figure 5-25)			
(1)	Visually examine the bushing for damage.	The damage must not prevent the correct installation of the bushing in the hub or the correct installation of the retainer in the bushing groove.	If the damage is greater than the permitted serviceable limits, replace the bushing.
(2)	Visually examine the ID of the bushing ("A") for wear.	If there is wear, measure the ID of the bushing. The maximum permitted ID is 0.629 inch (15.97 mm).	If the ID of the bushing is greater than the permitted serviceable limits, replace the bushing.
(3)	Visually examine the OD of the bushing groove ("B") for wear.	If there is wear, measure the OD of the bushing groove. The minimum permitted OD is 0.806 inch (20.48 mm).	If the OD of the bushing groove is less than the permitted serviceable limits, replace the bushing.
(4)	Visually examine the OD of each bushing shoulder ("C") for wear.	If there is wear, measure the OD of the bushing shoulder. The minimum permitted OD is 0.929 inch (23.60 mm).	If the OD of the bushing shoulder is less than the permitted serviceable limits, replace the bushing.
(5)	Visually examine the OD of the bushing between the shoulder and the end of the bushing ("D") for wear.	If there is wear, measure the OD of the bushing between the shoulder and the end of the bushing. The minimum permitted OD is 0.798 inch (20.27 mm).	If the OD of the bushing between the shoulder and the end of the bushing is less than the permitted serviceable limits, replace the bushing.
(6)	Visually examine the width of the bushing groove ("E") for wear.	If there is wear, measure the width of the bushing groove. The maximum permitted width is 0.115 inch (2.92 mm).	If the width of the bushing groove is greater than the permitted serviceable limits, replace the bushing.



Retainer
Figure 5-26

Component Inspection Criteria
Table 5-1

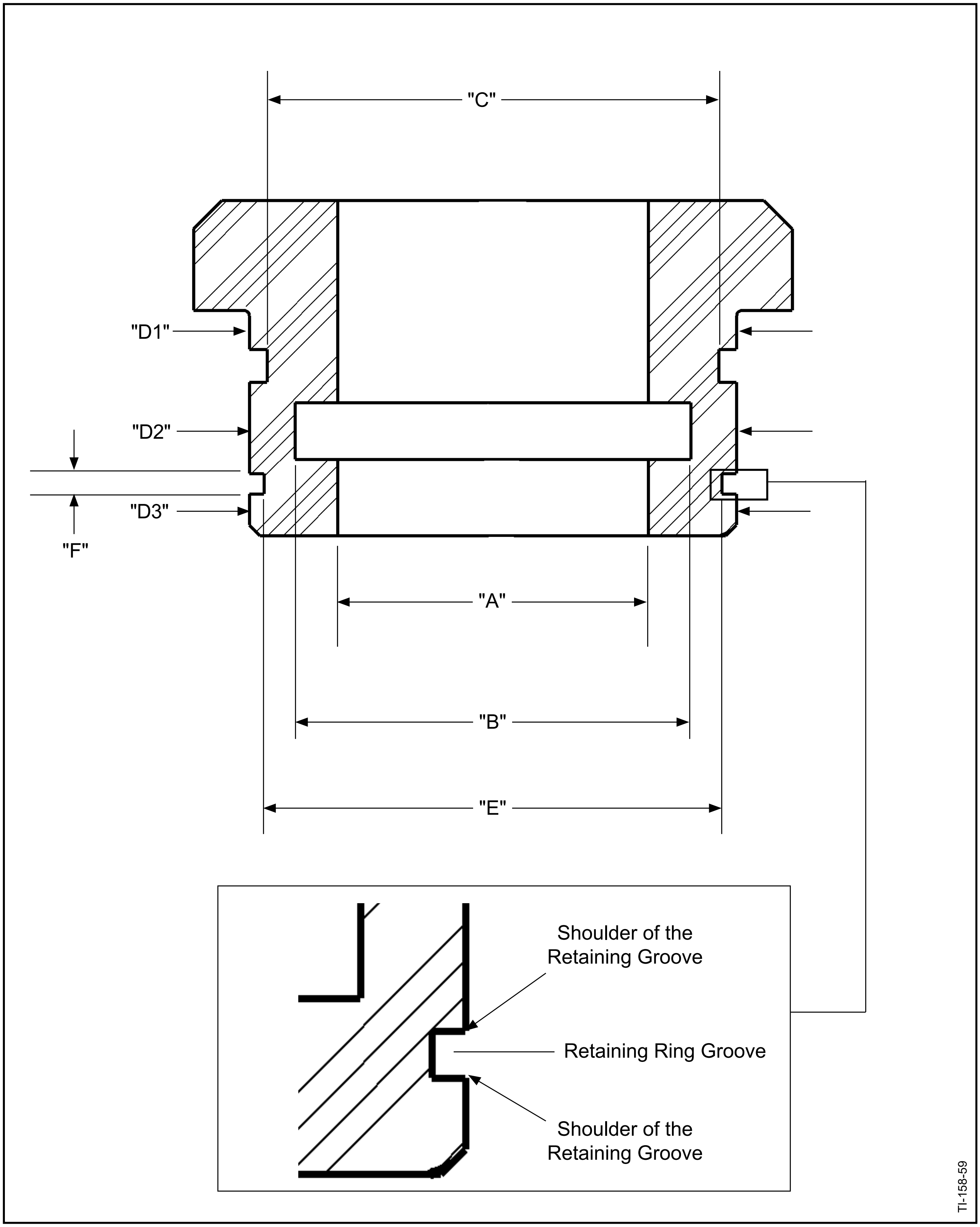
Inspect		Serviceable Limits	Corrective Action
W. RETAINER (Item 460) (Refer to Figure 5-26)			
(1)	Visually examine the retainer for damage or wear.	The damage or wear must not prevent the correct installation of the retainer in the groove of the bushing (450), or cause damage to the cylinder (280).	If the damage or wear is greater than the permitted serviceable limits, replace the retainer.
(2)	Visually examine the retainer for flatness.	The retainer must be flat in accordance with a visual examination. Dimensional measurement of flatness is not required.	If the flatness of the retainer is not within the permitted serviceable limits, replace the retainer.
(3)	Visually examine the ID of each attachment hole (2) in the retainer for wear.	If there is wear, measure the ID of the hole. The maximum permitted diameter of the attachment hole is 0.280 inch (7.11 mm).	If the ID is greater than the permitted serviceable limits, replace the retainer.
(4)	In the area of bushing engagement, visually examine the retainer for wear.	If there is wear, measure the thickness of the retainer. The minimum permitted thickness of the retainer is 0.081 inch (2.06 mm).	If the thickness of the retainer is less than the permitted serviceable limits, replace the retainer.



Beta Screw Safety Pin
Figure 5-27

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
X. PIN, SAFETY, BETA SCREW (Item 515) (Refer to Figure 5-27)		
(1) Visually examine Area "A" on each side of the pin for corrosion product and pitting.	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.005 inch (0.13 mm). No more than 10% of the total surface may be pitted. The maximum allowable diameter of an individual pit is 0.062 Inch (1.57 mm). Pitting must not affect the fit or function of the pin.	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 or pitting is greater than the permitted serviceable limits replace the pin.
(2) Visually examine Area "A" on each side of the pin for scratches.	The maximum permitted depth of a scratch is 0.005 inch (0.13 mm). Scratches must not affect the fit or function of the safety pin.	If the scratches are not within the permitted serviceable limits, replace the pin.
(3) Visually examine Area "B" for wear or damage	The maximum permitted depth of wear or damage is 0.010 inch (0.25 mm).	Remove pushed-up material by polishing with an abrasive pad CM47 or equivalent. If wear or damage is greater than the permitted serviceable limits, replace the pin.
(4) Measure the OD of Area "B".	The minimum permitted OD of Area "B" is 0.125 inch (3.17 mm).	If the OD of Area "B" is less than the permitted serviceable limit, replace the pin.
(5) Visually examine the pin for straightness.	Bending is not permitted.	If the pin is bent, replace the pin.
(6) Visually examine the entire pin for cadmium plate coverage.	A few random scratches are permitted; otherwise, cadmium plate must completely cover the pin.	Cadmium replate and bake the pin in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Rod Hub Bushing
Figure 5-28

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
Y. 108346 HUB BUSHING, ROD (Item 612) (Refer to Figure 5-28)		
(1) Measure the ID of the rod hub bushing ("A").	The maximum permitted ID is 0.878 inch (22.30 mm). A smooth surface finish is required.	If the ID is greater than the permitted serviceable limits or the surface finish is not smooth, replace the rod hub bushing.
(2) Measure the ID of the rod hub bushing O-ring groove ("B").	The maximum permitted ID is 1.121 inches (28.47 mm). A smooth surface finish is required.	If the ID is greater than the permitted serviceable limits or the surface finish is not smooth, replace the rod hub bushing.
(3) Measure the OD of the rod hub bushing O-ring groove ("C").	The minimum permitted OD is 1.211 inches (30.76 mm).	If the OD is less than the permitted serviceable limits, replace the rod hub bushing.
(4) Measure the OD of the rod hub bushing at two locations ("D1") and ("D2").	The minimum permitted OD at each location is 1.373 inches (34.88 mm).	If the OD is less than the permitted serviceable limits, replace the rod hub bushing.
(5) Measure the OD of the rod hub bushing at location ("D3").	The minimum permitted OD is 1.368 inches (34.75 mm).	If the OD is less than the permitted serviceable limits, replace the rod hub bushing.
(6) Measure the OD of the retaining ring groove ("E").	The minimum permitted OD is 1.284 inches (32.62 mm).	If the OD is less than the permitted serviceable limits, replace the rod hub bushing.
(7) Visually examine each shoulder of the retaining ring groove for damage.	The maximum permitted total accumulated damage for each shoulder is 25% of the circumference.	If the damage for either shoulder is greater than the permitted serviceable limits, replace the rod hub bushing.
(8) Measure the width of the retaining ring groove ("F").	The maximum permitted width is 0.062 inch (1.57 mm).	If the width is greater than the permitted serviceable limits, replace the rod hub bushing.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
Z. HUB UNIT (Item 590)		

Inspect the hub in accordance with the Aluminum Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

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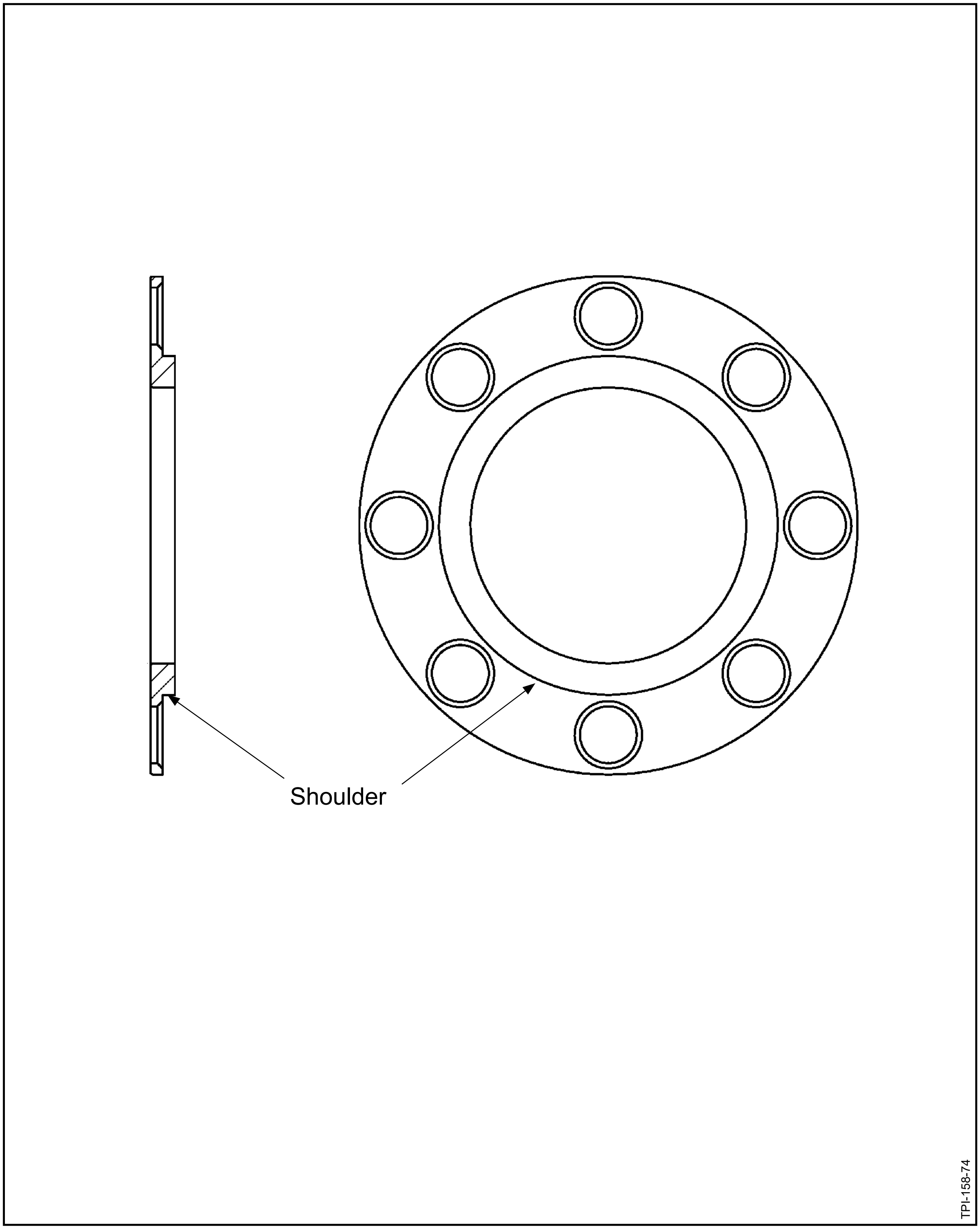
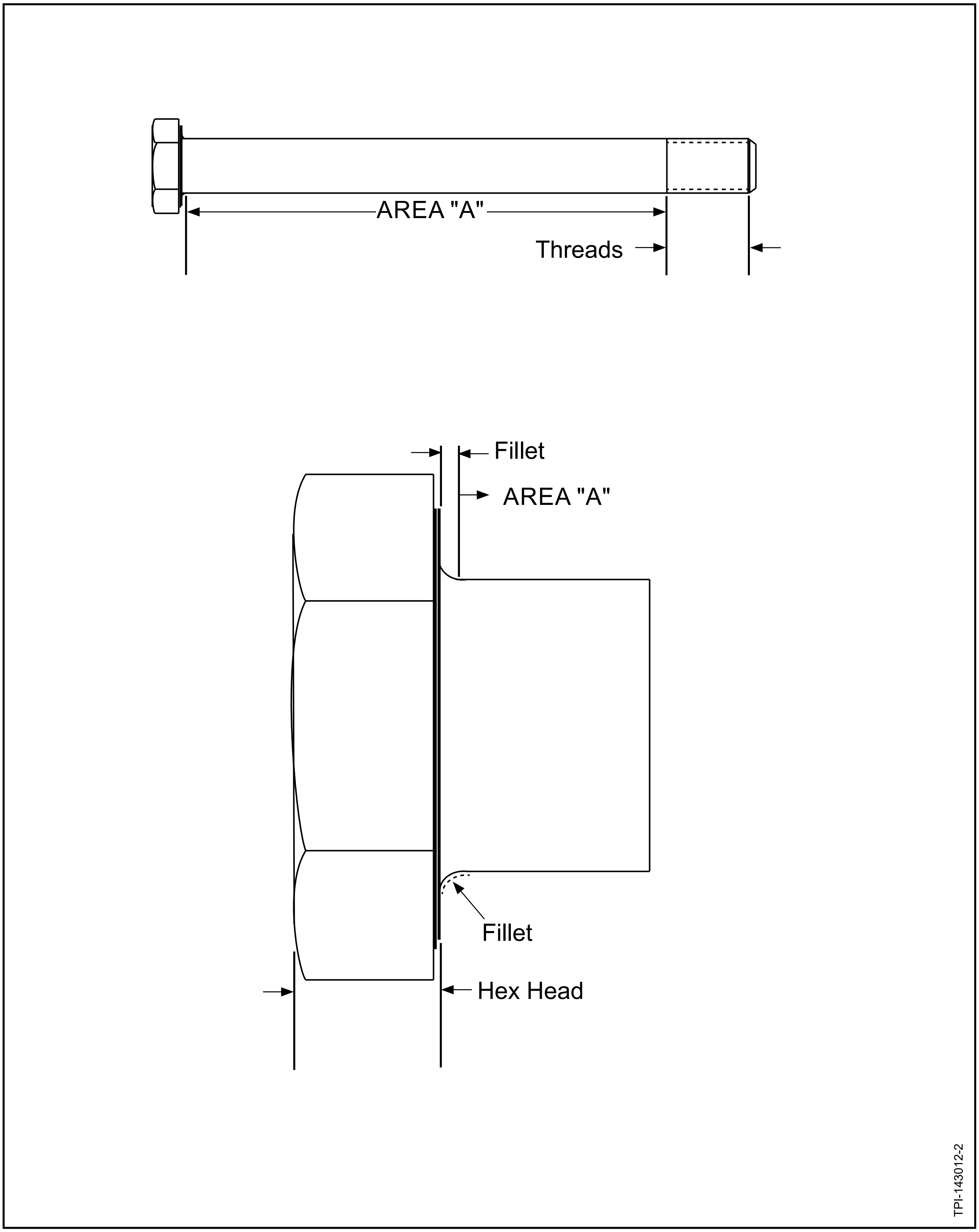


Mounting Bolt Ring
Figure 5-29

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AA. RING, MOUNTING BOLT (Item 652) (Refer to Figure 5-29)		
(1) Visually examine the mounting bolt ring for corrosion product, pitting, nicks, scratches, or other damage.	Corrosion product is not permitted. If the mounting bolt ring is damaged, measure the damage. The maximum permitted depth of pitting, nicks, scratches, or other damage is 0.005 inch (0.13 mm). Dimpling of the shoulder due to rotation of the bolt (654) head is permitted. High spots or edges above the surrounding machined surfaces are not permitted. The total permitted amount of damage is 1 sq. inch (645 sq. mm). The maximum permitted diameter of an individual pit is 0.032 inch (0.81 mm). The maximum permitted number of non-linear pits within a 1 sq. inch (645 sq. mm) area is 10. Linear pitting is not permitted.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Standard Practices Manual 202A (61-01-02). Remove high spots by polishing with an abrasive pad CM47 or equivalent. If the corrosion product, pitting, nicks, scratches or other damage is greater than the permitted serviceable limits, replace the mounting bolt ring.
(2) Magnetic particle inspect the mounting bolt ring in accordance with Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A relevant indication is not permitted.	If the damage is within the permitted serviceable limits, cadmium replate and bake the mounting bolt ring in accordance with the Cadmium Replating chapter of Hartzell Standard Practices Manual 202A (61-01-02). If there is a relevant indication, replace the mounting bolt ring.

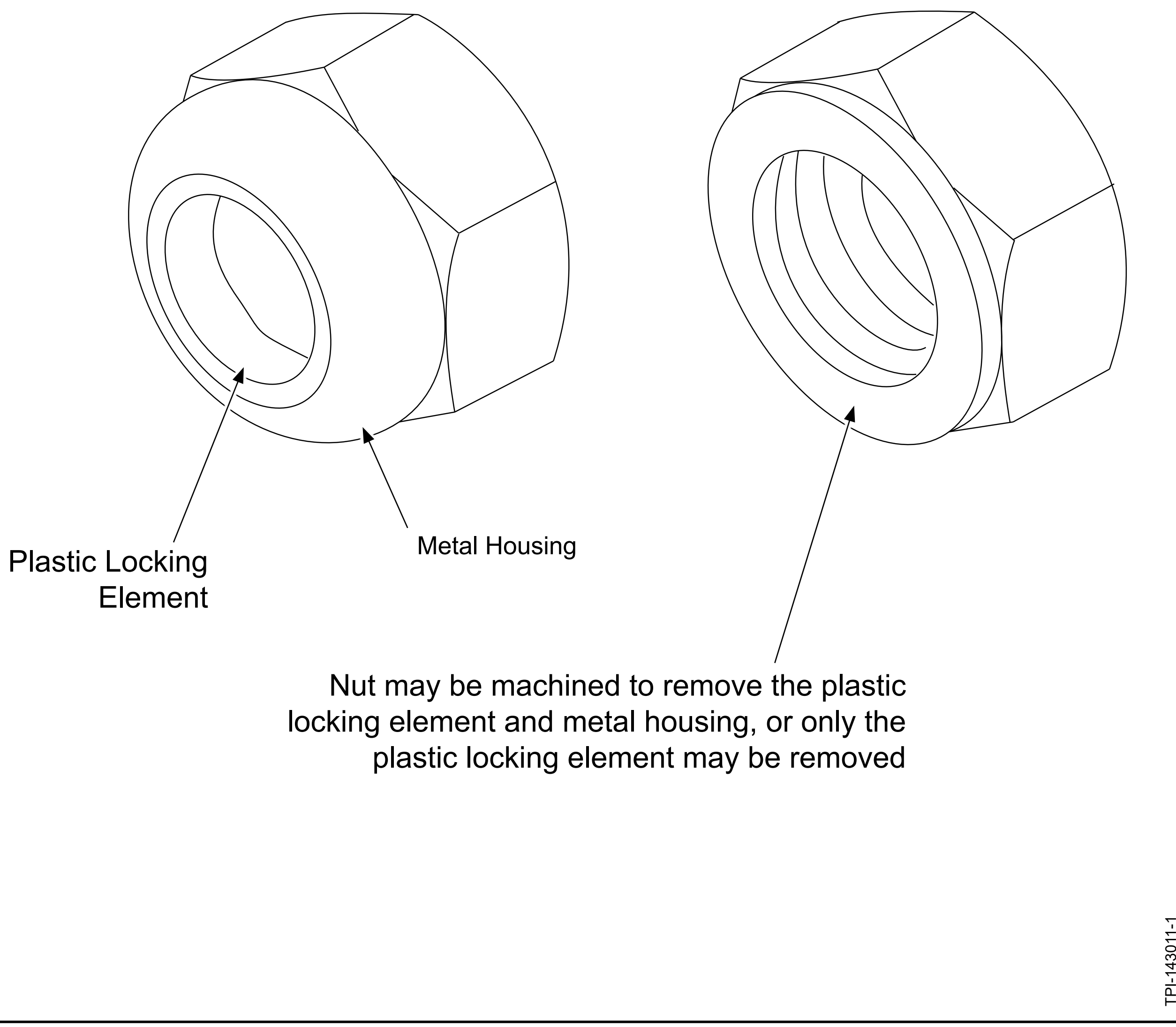


Hex Head Bolt
Figure 5-30

Component Inspection Criteria
Table 5-1

Inspect		Serviceable Limits	Corrective Action
AB.	HEX HEAD BOLT (Items 670, 690) Refer to Figure 5-30 and Figure 5-31		
(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 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.

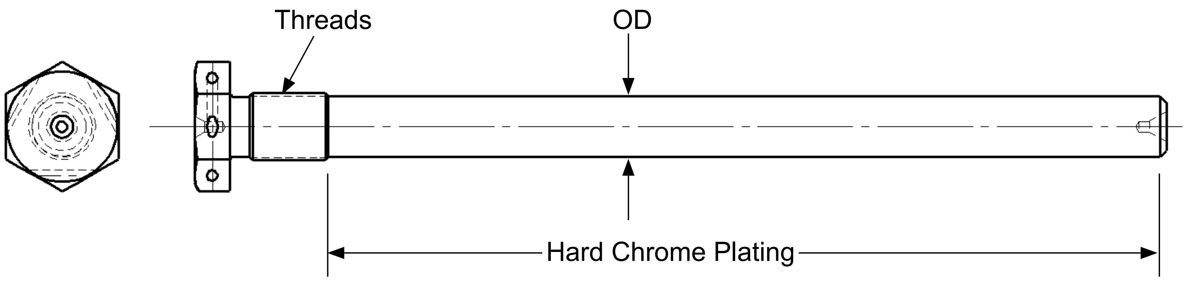
CAUTION: DO NOT USE MODIFIED A-2043-1 NUTS ON THE PROPELLER ASSEMBLY. A-2043-1 NUTS THAT HAVE BEEN MODIFIED ARE TO BE USED ONLY FOR THE HEX HEAD BOLT THREAD CHECK.



A-2043-1 Nut Modification
Figure 5-31

Component Inspection Criteria
Table 5-1

Inspect		Serviceable Limits	Corrective Action
AB.	HEX HEAD BOLT (Items 670, 690) Refer to Figure 5-30 and Figure 5-31		
(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 5-31.	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 and bake for a minimum of 23 hours within four hours after plating the hex head bolt in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



NOTE: Cadmium plating is on all areas that are not hard chrome plated.

W10536

Anti-rotation Rod
Figure 5-32

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AC. ROD, ANTI-ROTATION (Item 720) (Refer to Figure 5-32)		
(1) Not including the threads, visually examine the anti-rotation rod for damage.	Damage that affects the fit and function of the anti-rotation rod is not permitted.	If the damage is greater than the permitted serviceable limits, replace the anti-rotation rod.
(2) Visually examine the anti-rotation rod for bending.	Bending is not permitted.	If there is bending, replace the anti-rotation rod.
(3) Visually examine the anti-rotation rod for corrosion product and pitting.	Corrosion product or pitting is not permitted.	If there is corrosion product or pitting, replace the anti-rotation rod.
(4) Visually examine the OD of each anti-rotation rod for wear.	If there is wear, measure the wear. The minimum OD permitted is 0.363 inch (9.23 mm). Wear through the hard chrome plating is not permitted.	If the wear is greater than the permitted serviceable limits, replace the anti-rotation rod.
(5) Visually examine the threads of the anti-rotation rod for damage.	A maximum of 1/2 of one thread total accumulated damage is permitted.	If the damage is greater than the permitted serviceable limits, replace the anti-rotation rod.
(6) Visually examine the cadmium plating coverage on the anti-rotation rod in the areas that are not hard chrome coated.	Cadmium plating must completely cover the hub anti-rotation rod in the areas that are not hard chrome coated.	If cadmium plating coverage is less than the permitted serviceable limits, apply masking material to the hard chrome coating, cadmium replate, and bake the anti-rotation rod in accordance with the Cadmium Replating chapter of Hartzell Standard Practices Manual 202A (61-01-02).
(7) Visually examine the hard chrome plating coverage on the anti-rotation rod.	Hard chrome plating must completely cover the hub anti-rotation rod OD in the location specified in Figure 5-32.	If the hard chrome plating coverage is less than the permitted serviceable limits, replace the anti-rotation rod.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AC. ROD, ANTI-ROTATION, CONTINUED (Item 720) (Refer to Figure 5-32)		
(8) Magnetic particle inspect the anti-rotation rod in accordance with the Hartzell Standard Practices Manual 202A (61-01-02). NOTE: It is not necessary to remove the chrome plating from the anti-rotation rod before magnetic particle inspection	A relevant indication is not permitted.	If a relevant indication cannot be removed within the permitted serviceable limits, replace the anti-rotation rod.

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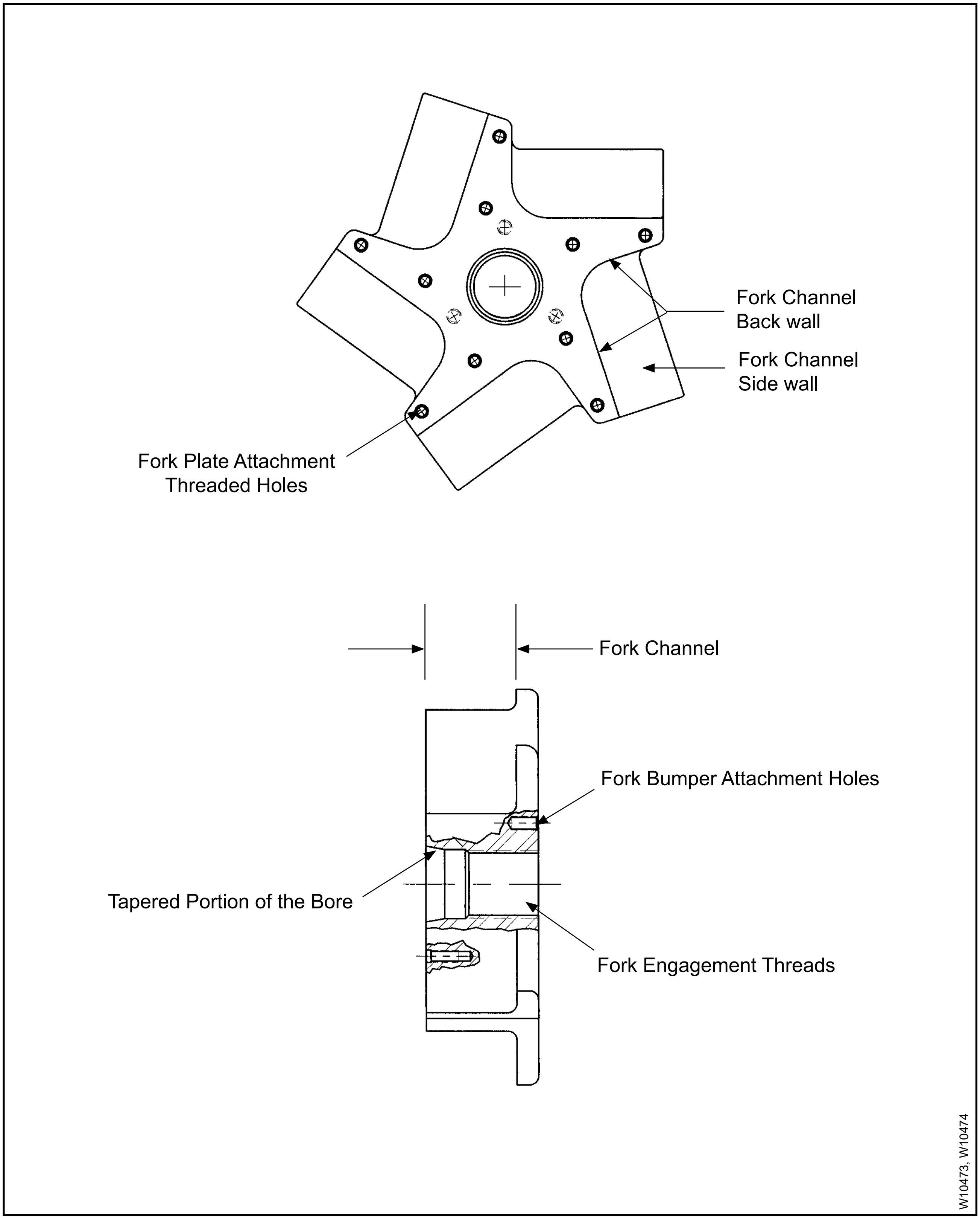

Fork
Figure 5-33

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AD. FORK (Item 810) (Refer to Figure 5-33)		
(1) Visually examine the fork for corrosion product or pitting.	Corrosion product is not permitted. If there is pitting, measure the pitting. The maximum depth of pitting is 0.005 inch (0.12 mm). The maximum permitted total area of damage is 0.5 sq. inch (322 sq. 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 sq. inch (645 sq. mm) area are permitted. Linear pitting is not permitted.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Standard Practices Manual 202A (61-01-02). If damage is greater than the permitted serviceable limits, replace the fork.
(2) Visually examine the pitch change rod engagement threads of the fork bore for damage.	One thread of total accumulated damage is permitted.	If the damage is greater than the permitted serviceable limits, replace the fork.
(3) Visually examine the fork plate attachment threaded holes (10) for damage.	One thread of total accumulated damage in each hole is permitted.	If the damage is greater than the permitted serviceable limits, replace the fork.
(4) Visually examine the fork bumper attachment threaded holes (3) for damage.	One thread of total accumulated damage in each hole is permitted.	If the damage is greater than the permitted serviceable limits, replace the fork.
(5) Visually examine the tapered portion of the fork bore for wear, nicks, fretting, or other damage.	If the fork is worn or damaged, measure the depth of damage. The maximum permitted depth of damage is 0.003 inch (0.07 mm).	If the damage is greater than the permitted serviceable limits, replace the fork.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AD. FORK, CONTINUED (Item 810) (Refer to Figure 5-33)		
(6) Visually examine the fork channel side wall and fork channel back wall for wear or damage.	If the fork is worn or damaged, measure the wear or damage. The maximum permitted depth of wear or damage is 0.008 inch (0.20 mm) compared with the adjacent undamaged surface.	If the damage is greater than the permitted serviceable limits, replace the fork.
(7) Visually examine the external surfaces, not including the fork channel surfaces and pitch change rod bore, for wear, nicks, scratches, or other damage.	If the fork is worn or damaged, measure the wear or damage. The maximum permitted depth of damage is 0.005 inch (0.12 mm).	If the damage is greater than the permitted serviceable limits, replace the fork.
(8) Visually examine the pitch change fork for a serial number.	A Hartzell part number C-3656 fork that has a serial number that is within the range S1 through S17 and S74 through S78 is not permitted. A Hartzell part number C-3392 fork that has a serial number that is within the range S1 through S17 is not permitted.	If the fork has a serial number that is within the ranges specified, replace the fork.
(9) Magnetic particle inspect the fork in accordance with the Hartzell Standard Practices Manual 202A (61-01-02).	A relevant indication is not permitted.	If a relevant indication can be repaired and is within the permitted serviceable limits, cadmium replate and bake the fork in accordance with the Cadmium Replating chapter of Hartzell Standard Practices Manual 202A (61-01-02). If the relevant indication cannot be repaired within the permitted serviceable limits, replace the fork.

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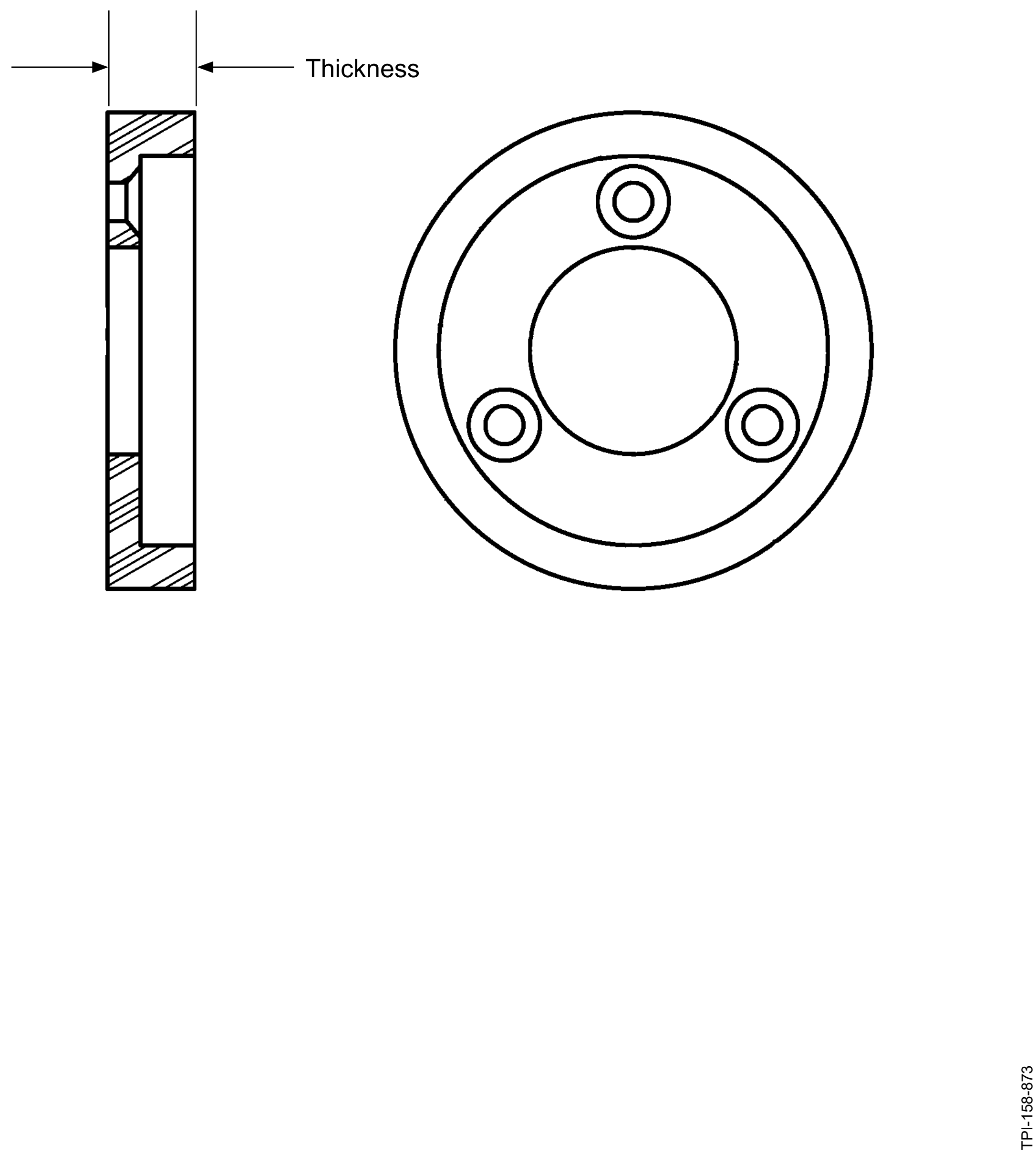
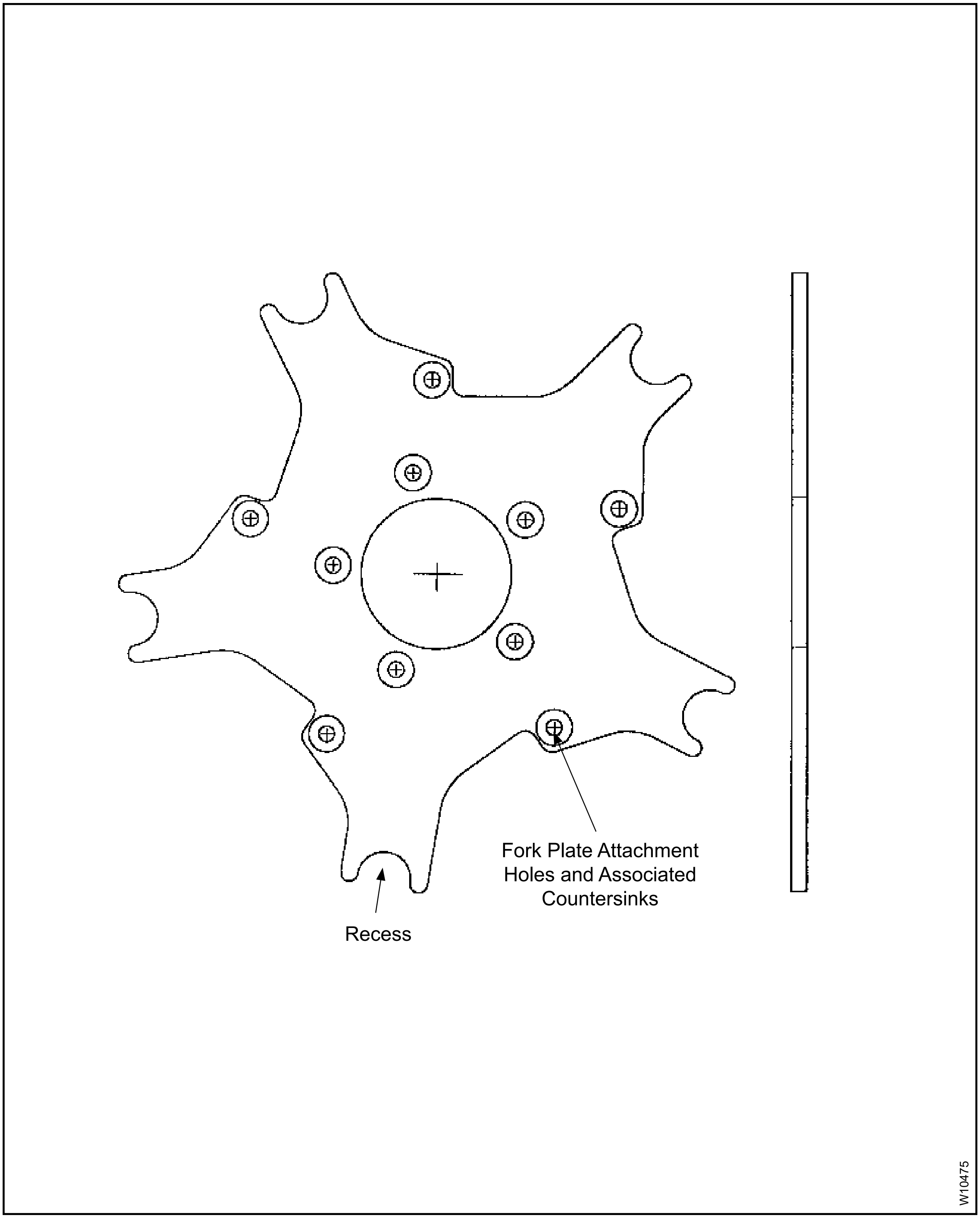


Bumper
Figure 5-34

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AE. BUMPER (Item 812) (Refer to Figure 5-34)		
(1) Visually examine the bumper for wear that reduces the thickness.	If there is wear, measure the thickness. The minimum permitted thickness of the bumper is 0.462 inch (11.74 mm).	If the thickness is less than the permitted serviceable limits, replace the bumper.



Plate, Fork
Figure 5-35

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AF. PLATE, FORK (Item 820) (Refer to Figure 5-35)		
(1) Visually examine the fork plate for corrosion product, pitting, nicks, scratches, or other damage.	Corrosion product is not permitted. If the fork plate is damaged, measure the damage. The maximum permitted depth of damage is 0.005 inch (0.12 mm). The maximum permitted total area of damage is 1 sq. inch (645 sq. 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 sq. inch (645 sq. mm) area are permitted. Linear pitting is not permitted.	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If damage is greater than the permitted serviceable limits, replace the fork plate.
(2) Visually examine the fork plate for wear from the cam follower.	If the fork plate is worn or damaged, measure the depth of damage. The maximum permitted depth of damage is 0.003 inch (0.07 mm).	If the damage is greater than the permitted serviceable limits, replace the fork plate.
(3) Visually examine the fork plate attachment holes and associated countersinks (10) for wear or damage.	If the fork plate is worn or damaged, measure the depth of damage. The maximum permitted depth of damage is 0.003 inch (0.07 mm).	If the damage is greater than the permitted serviceable limits, replace the fork plate.
(4) Visually examine the fork plate for cadmium plating coverage.	A maximum of 10% of the base metal visible is permitted.	If cadmium plating coverage is less than the permitted serviceable limits, cadmium replate and bake the fork plate in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(5) Visually examine the fork plate recess diameters (5) for wear.	If the fork plate is worn, measure the wear. The maximum permitted diameter that will fit into each recess is 0.580 inch (14.73 mm) diameter.	If the wear is greater than the permitted serviceable limits, replace the fork plate.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AF. PLATE, FORK, CONTINUED (Item 820) (Refer to Figure 5-35)		
(6) Visually examine the fork plate for the identifying mark "A" indicating the fork arms that ride on the anti-rotation rods.	There must be identifying marks on the applicable fork arms.	If there are no identifying marks, modify the fork plate in accordance with the section "Modification of the Fork Plate" in the Repair chapter of this manual.
(7) Magnetic particle inspect the fork plate in accordance with the Hartzell Standard Practices Manual 202A (61-01-02).	A relevant indication is not permitted.	If a relevant indication can be repaired and is within the permitted serviceable limits, cadmium replate and bake the fork in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the relevant indication cannot be repaired within the permitted serviceable limits, replace the fork.

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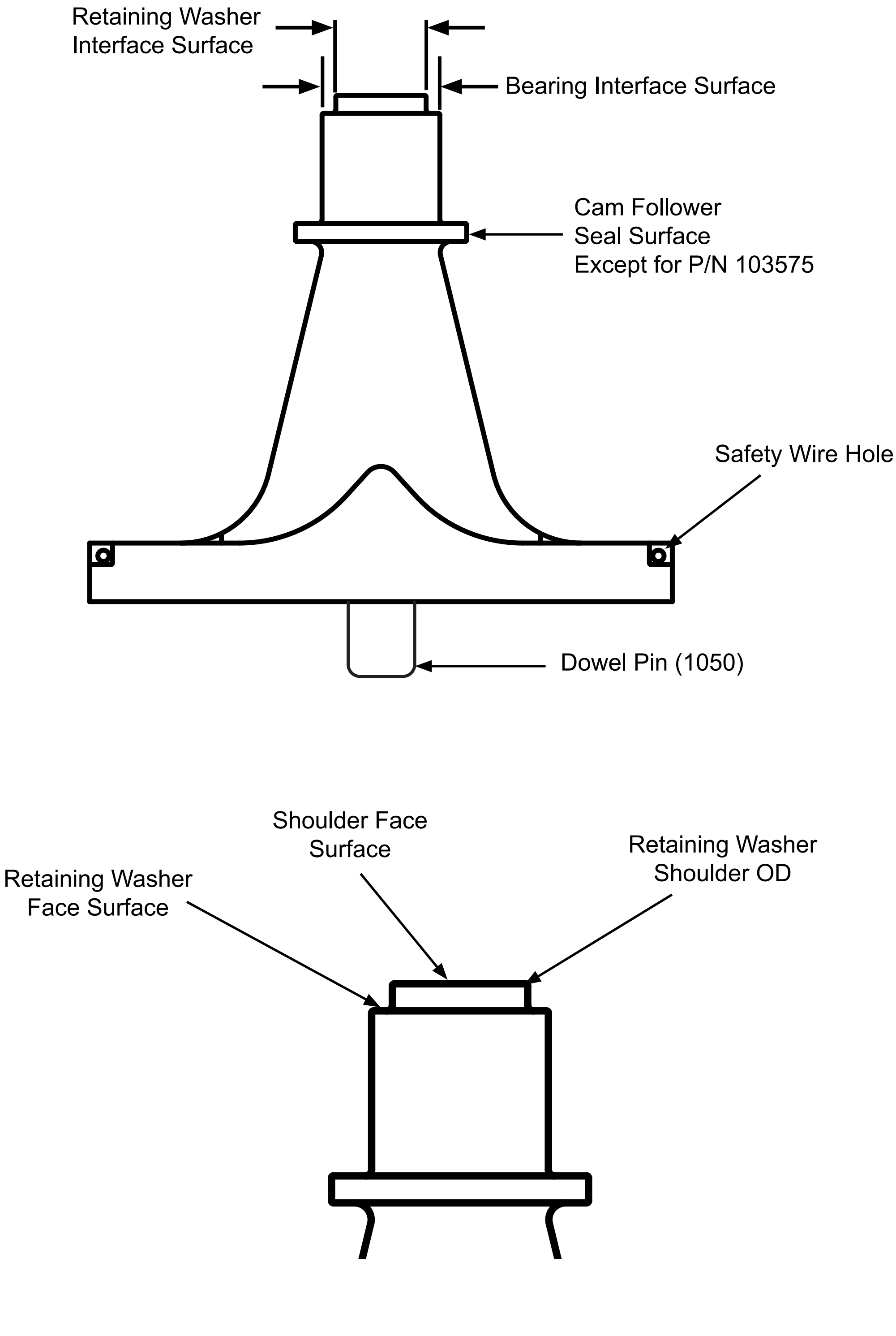
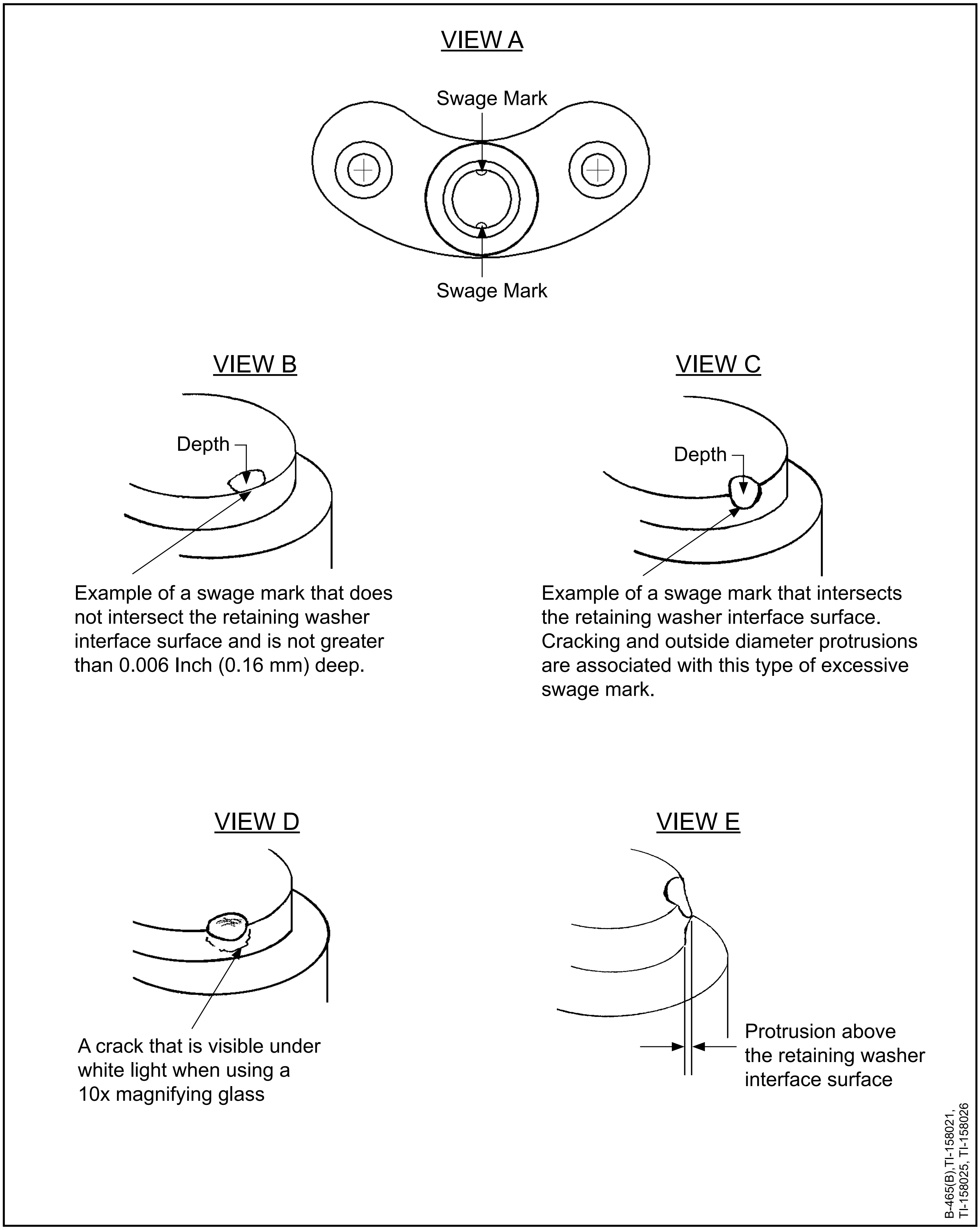
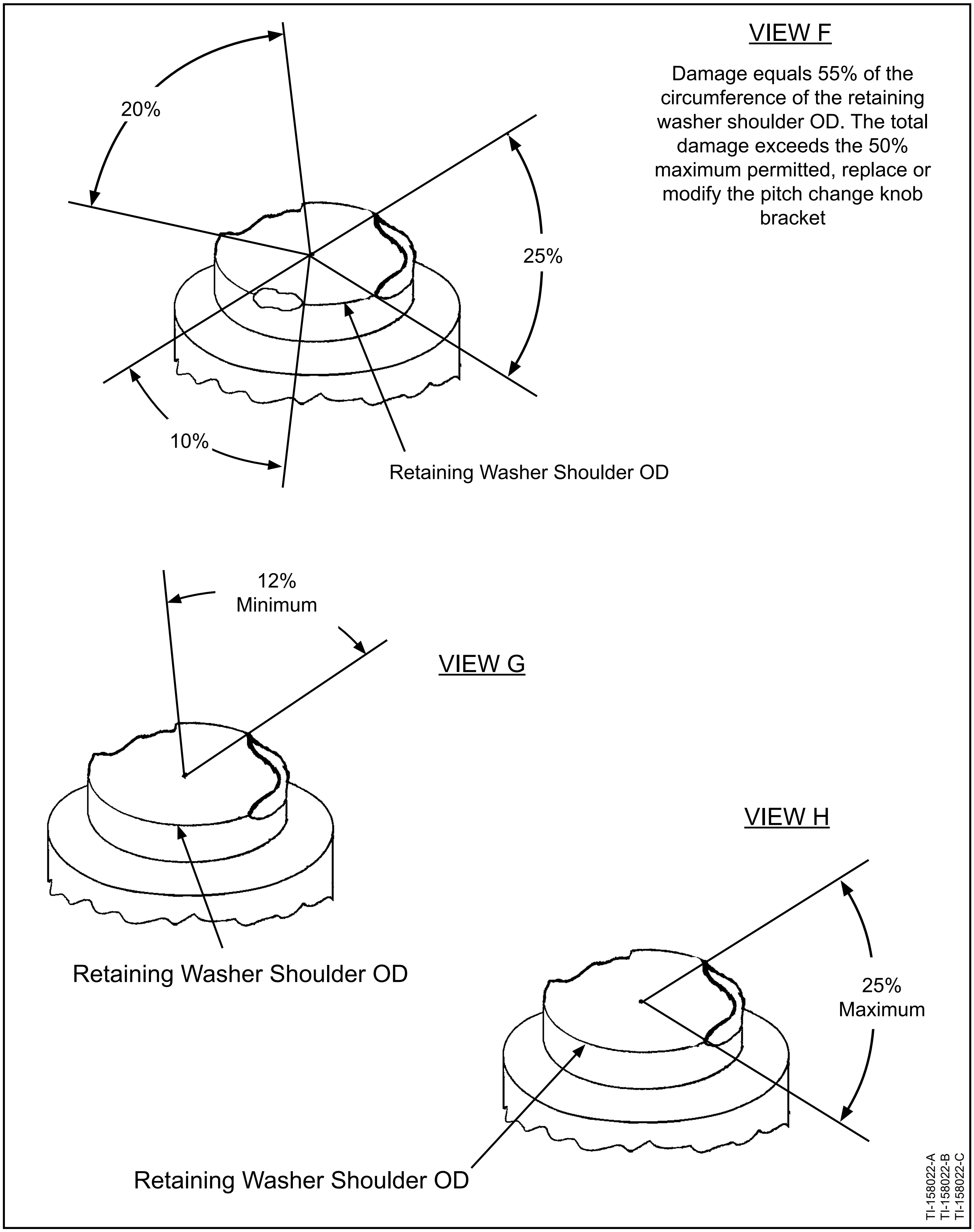


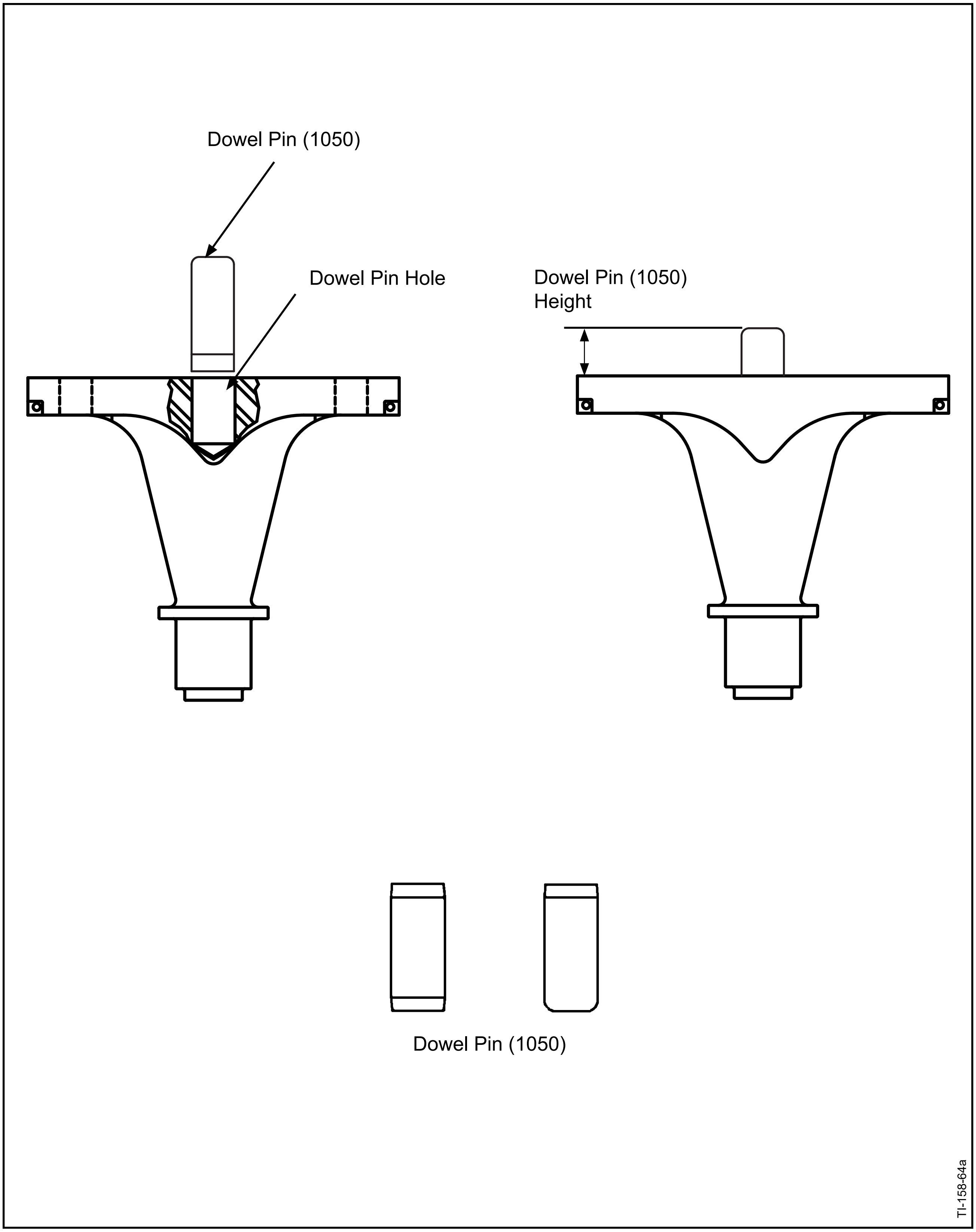
Pitch Change Knob Bracket That Uses a Swaged Washer to Retain the Cam Follower
Figure 5-36



Pitch Change Knob Bracket That Uses a Swaged Washer to Retain the Cam Follower
Figure 5-37



Pitch Change Knob Bracket That Uses a Swaged Washer to Retain the Cam Follower
Figure 5-38



Pitch Change Knob Bracket That Uses a Swaged Washer to Retain the Cam Follower
Figure 5-39

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action

AG. PITCH CHANGE KNOB BRACKET THAT USES A SWAGED WASHER TO RETAIN THE CAM FOLLOWER
(Item 1020)
(Refer to Figure 5-36 through Figure 5-39)

(1) Before inspection, remove cadmium plating in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(2) If dowel pin removal is not required, apply masking material to protect the dowel pin from stripping materials. Dowel pin extension from the pitch change knob bracket base must meet the permitted Serviceable Limits for this part that are specified in this section.

(3) An example of correct swaging is shown in Figure 5-37, View B. An example of incorrect swaging is shown in Figure 5-37, View C.

(4) A pitch change knob bracket that does not meet the Serviceable Limits specified in step AG.(5), AG.(6), AG.(7), AG.(8), or AG.(9) may be modified in accordance with the section "Pitch Change Knob Bracket Modification" in the Repair chapter of this manual.

Inspect	Serviceable Limits	Corrective Action
(5) Using white light and a 10X magnifying glass, visually examine each swage mark on the retaining washer shoulder OD of the pitch change knob bracket for cracks.	A crack is not permitted. Refer to Figure 5-37, View D.	A crack may be removed by spot polishing using an emery cloth or abrasive pad CM47. Crack removal must not interfere with the retaining washer face surface or be greater than 25% of the retaining washer shoulder OD in one location. Refer to Figure 5-36 and Figure 5-38, View H. Total accumulated damage or repair must not be greater than 50% of the circumference of the retaining washer shoulder OD. Refer to Figure 5-38, View F. If the damage or repair is greater than the limits given, replace the pitch change knob bracket or modify the pitch change knob bracket to use a screw to retain the cam follower in accordance with the section "Pitch Change Knob Bracket Modification" in the Repair chapter of this manual.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AG.	PITCH CHANGE KNOB BRACKET THAT USES A SWAGED WASHER TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 1020) (Refer to Figure 5-36 through Figure 5-39)		
(6)	Visually examine each swage mark on the retaining washer shoulder OD and the retaining washer interface surface for material protrusion. Refer to Figure 5-37 View E.	Material protrusion above the retaining washer interface surface is not permitted.	If there is material protrusion, using an emery cloth remove the material protrusion to flush or below the surface of the retaining washer interface surface modify the pitch change knob bracket to use a screw to retain the cam follower in accordance with the section "Pitch Change Knob Bracket Modification" in the Repair chapter of this manual.
(7)	Visually examine the retaining washer shoulder OD for two undamaged swaging sites to secure the retention washer. Refer to Figure 5-38, View G.	Two unswaged areas that are a minimum width of 12% or 0.188 inch (4.78 mm) of circumference positioned 120 to 180 degrees apart from each other are required.	If the available swaging sites are not within the permitted serviceable limits, replace the pitch change knob bracket or modify the pitch change knob bracket to use a screw to retain the cam follower in accordance with the section "Pitch Change Knob Bracket Modification" in the Repair chapter of this manual.
(8)	Measure the OD of the unplated retaining washer interface surface. Refer to Figure 5-36.	The minimum permitted OD of the unplated retaining washer interface surface is 0.5005 inch (12.713 mm).	If the OD of the unplated retaining washer interface surface is less than the serviceable limits, replace the pitch change knob bracket or modify the pitch change knob bracket to use a screw to retain the cam follower in accordance with the section "Pitch Change Knob Bracket Modification" in the Repair chapter of this manual.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AG. PITCH CHANGE KNOB BRACKET THAT USES A SWAGED WASHER TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 1020) (Refer to Figure 5-36 through Figure 5-39)		
(9) Visually examine the retaining washer interface surface for damage, corrosion product, or pitting. Refer to Figure 5-36.	Minor scratches less than 0.001 inch (0.025 mm) deep are permitted. A sharp edge, material protrusion, or raised material from scratches or swaging are not permitted. Corrosion product or pitting is not permitted.	Using an emery cloth or abrasive pad CM47, lightly polish to remove a sharp edge, material protrusion, or raised material and blend into machined surfaces. If the damage, corrosion product, or pitting is greater than the permitted serviceable limits, replace the pitch change knob bracket or modify the pitch change knob bracket to use a screw to retain the cam follower in accordance with the section "Pitch Change Knob Bracket Modification" in the Repair chapter of this manual.
(10) Visually examine the bearing interface surface for damage, corrosion product, or pitting. Refer to Figure 5-36.	Bearing roller 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. Corrosion product or pitting is not permitted.	If the damage, corrosion product, or pitting is greater than the permitted serviceable limits, replace the pitch change knob bracket.
(11) Measure the OD of the unplated bearing interface surface. Refer to Figure 5-36.	The minimum permitted OD of the unplated bearing interface surface is 0.653 inch (16.59 mm).	If the OD of the unplated bearing interface surface is less than the serviceable limits, replace the pitch change knob bracket.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AG. PITCH CHANGE KNOB BRACKET THAT USES A SWAGED WASHER TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 1020) (Refer to Figure 5-36 through Figure 5-39)		
(12) Visually examine the cam follower seal surface for scratches, corrosion product, or pitting. Refer to Figure 5-36.	Minor scratches less than 0.001 inch (0.025 mm) deep are permitted. Sharp or pushed up edges from scratches are not permitted. Corrosion product or pitting is not permitted.	If the scratches, corrosion product, or pitting are greater than the permitted serviceable limits, replace the pitch change knob bracket.
(13) Measure the OD of the cam follower seal surface. Refer to Figure 5-36.	The minimum permitted unplated OD of the cam follower seal surface is 0.098 inch (24.90 mm).	If the OD of the cam follower seal surface is less than the permitted serviceable limits, replace the pitch change knob bracket.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AG. PITCH CHANGE KNOB BRACKET THAT USES A SWAGED WASHER TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 1020) (Refer to Figure 5-36 through Figure 5-39)		
(14) Visually examine the pitch change knob bracket for corrosion product and pitting. NOTE: This inspection and repair does not include the bearing interface surface, the cam follower seal surface, or the retaining washer interface surface.	Corrosion product is not permitted. If the pitch change knob bracket has pitting, measure the pitting. The maximum permitted depth of pitting is 0.003 inch (0.07 mm). The maximum permitted total area of pitting is 0.500 sq. inch (322 sq. mm) area. The maximum permitted diameter of an individual pit is 0.032 inch (0.81 mm). A maximum of 10 non-linear pits within 1 sq. inch (645 sq. mm) area are permitted. Linear pitting is not permitted.	Do not glass bead clean the bearing interface surface, the cam follower seal surface, or the retaining washer 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. Using an emery cloth or abrasive pad CM47, lightly polish to remove raised material or pushed up edge and blend into machined surfaces. If pitting or repair is greater than the permitted serviceable limits or Corrective Action repair limits, replace the pitch change knob bracket.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AG.	PITCH CHANGE KNOB BRACKET THAT USES A SWAGED WASHER TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 1020) (Refer to Figure 5-36 through Figure 5-39)		
(15)	Visually examine the pitch change knob bracket for nicks, scratches, or other damage. NOTE: This inspection and repair does not include the bearing interface surface, the retaining washer interface surface, or the cam follower seal surface.	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 sq. inch (322 sq. 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 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. Using an emery cloth or abrasive pad CM47, lightly polish to remove raised material or pushed up edge and blend into machined surfaces. If the nicks, scratches, other damage, or repair is greater than the permitted serviceable or Corrective Action repair limits, replace the pitch change knob bracket.
(16)	Examine the dowel pin for movement in the pitch change knob bracket.	Using firm hand pressure, try to move the dowel pin. Movement is not permitted.	If there is movement of the dowel pin, replace the dowel pin.
(17)	Measure the height of the dowel pin from the pitch change knob bracket base. Refer to Figure 5-39.	The maximum permitted height is 0.440 inch (11.17 mm).	If the height of the dowel pin is greater than the permitted height, press the pin into the bracket to the correct height.
		The minimum permitted height is 0.390 inch (9.91 mm).	If the height of the dowel pin is less than the permitted serviceable limits, replace the pin. The replacement pin must fit tightly.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AG. PITCH CHANGE KNOB BRACKET THAT USES A SWAGED WASHER TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 1020) (Refer to Figure 5-36 through Figure 5-39)		
(18) Visually examine the OD of the exposed portion of the dowel pin for damage or corrosion product.	Damage or corrosion product is not permitted.	If there is damage or corrosion product, replace the dowel pin.
(19) If the dowel pin is removed, visually examine the dowel pin hole for corrosion product or pitting. Refer to Figure 5-39.	Corrosion product or pitting is not permitted.	If there is corrosion product or pitting, replace the pitch change knob bracket.
(20) If applicable, visually examine the two safety wire holes for damage.	The safety wire hole must be able to secure the safety wire.	If the damage is greater than the permitted serviceable limits, replace the pitch change knob bracket.
(21) Magnetic particle inspect the pitch change knob bracket in accordance with the Magnetic Particle Inspection chapter of Hartzell Standard Practices Manual 202A (61-01-02). NOTE: It is not necessary to remove the dowel pin.	A relevant indication is not permitted.	If there is a relevant indication, replace the pitch change knob bracket.

(22) If removal of the dowel pin is not required, apply masking material to protect the dowel pin from cadmium plating materials.

(23) If the pitch change knob has successfully passed all inspections, apply masking material to the Bearing Interface Surface, reapply cadmium plating, and bake in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

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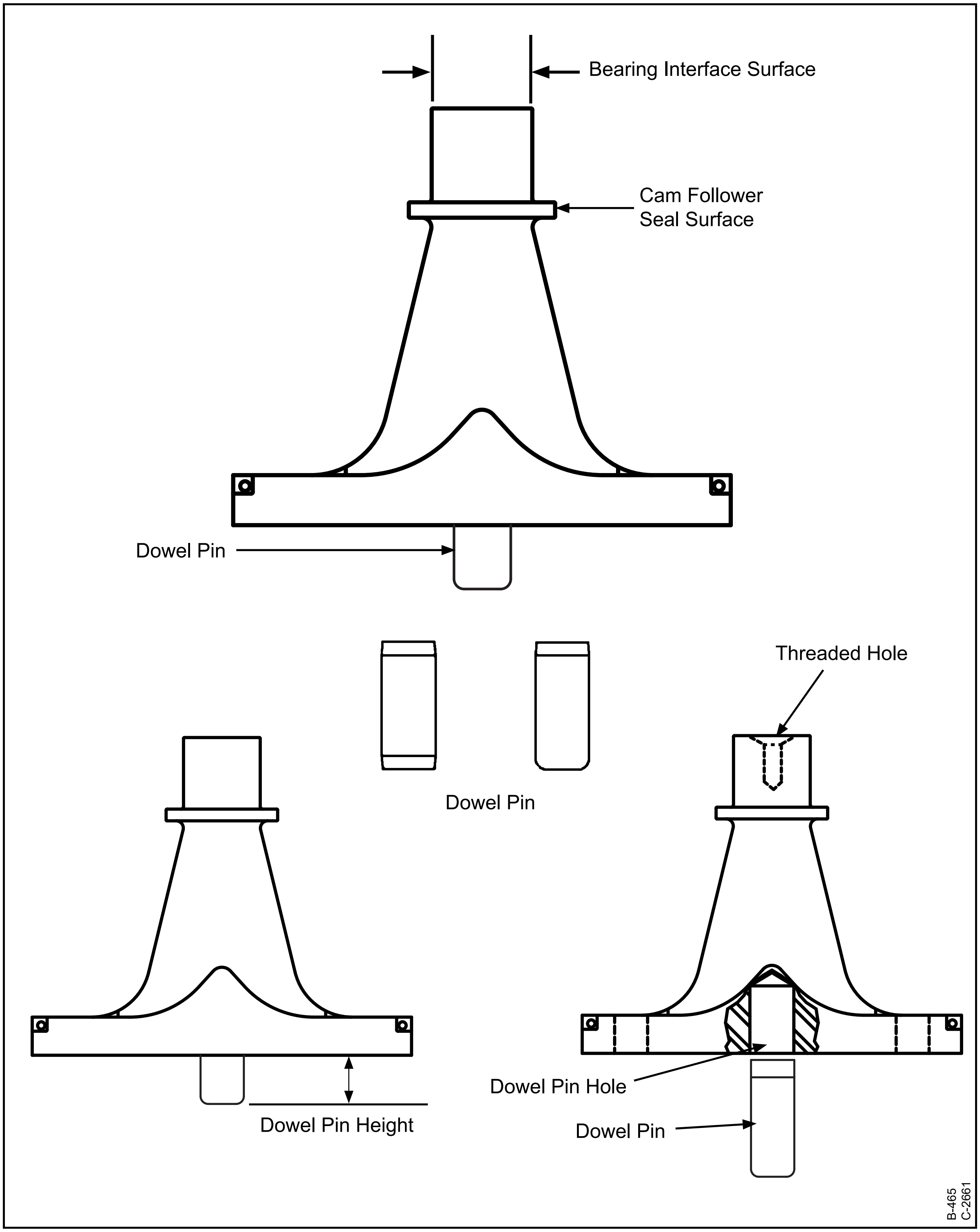

Pitch Change Knob Bracket that Uses a Screw to Retain the Cam Follower
Figure 5-40

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AH.	<u>PITCH CHANGE KNOB BRACKET THAT USES A SCREW TO RETAIN THE CAM FOLLOWER</u> (Item 1020) (Refer to Figure 5-40)		
(1)	Before inspection, remove cadmium plating in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).		
(2)	If dowel pin removal is not required, apply masking material to protect the dowel pin from stripping materials. Dowel pin extension from the pitch change knob bracket base must meet the permitted Serviceable Limits for this part given in this section.		
(3)	Visually examine the bearing interface surface for damage, corrosion product, or pitting.	Bearing roller 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. Corrosion product or pitting is not permitted.	If the damage, corrosion product, or pitting is greater than the permitted serviceable limits, replace the pitch change knob bracket.
(4)	Measure the OD of the unplated bearing interface surface.	The minimum permitted OD of the unplated bearing interface surface is 0.653 inch (16.59 mm).	If the OD of the unplated bearing interface surface is less than the serviceable limits, replace the pitch change knob bracket.
(5)	Visually examine the cam follower seal surface for scratches, corrosion product, or pitting. <u>NOTE</u>: Not applicable for the P/N 103575 pitch change knob bracket that does not have a cam follower seal surface.	Minor scratches less than 0.001 inch (0.025 mm) deep are permitted. Sharp or pushed up edges from scratches are not permitted. Corrosion product or pitting is not permitted.	If the scratches, corrosion product, or pitting is greater than the permitted serviceable limits, replace the pitch change knob bracket.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AH. PITCH CHANGE KNOB BRACKET THAT USES A SCREW TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 1020) (Refer to Figure 5-40)		
(6) Measure the OD of the cam follower seal surface. NOTE: Not applicable for the P/N 103575 pitch change knob bracket. The OD surface does not peform as a cam follower seal surface.	The minimum permitted unplated OD of the cam follower seal surface is 0.949 inch (24.11 mm).	If the OD of the cam follower seal surface is less than the permitted serviceable limits, replace the pitch change knob bracket.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AH. PITCH CHANGE KNOB BRACKET THAT USES A SCREW TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 1020) (Refer to Figure 5-40)		
(7) Visually examine the pitch change knob bracket for corrosion product and pitting. NOTE: This inspection and repair does not include the bearing interface surface, the cam follower seal surface, or the threaded hole.	Corrosion product is not permitted. If the pitch change knob bracket has pitting, measure the pitting. The maximum permitted depth of pitting is 0.003 inch (0.07 mm). The maximum permitted total area of pitting is 0.500 sq. inch (322 sq. mm) area. The maximum permitted diameter of an individual pit is 0.032 inch (0.81 mm). A maximum of 10 non-linear pits within 1 sq. inch (645 sq. mm) area are permitted. Linear pitting is not permitted.	Do not glass bead clean the bearing interface surface, the cam follower seal surface, or the threaded hole. 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 of 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. Using an emery cloth or abrasive pad CM47, lightly polish to remove raised material or pushed up edge and blend into machined surfaces. If pitting or repair is greater than the permitted serviceable limits or Corrective Action repair limits, replace the pitch change knob bracket.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AH. PITCH CHANGE KNOB BRACKET THAT USES A SCREW TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 1020) (Refer to Figure 5-40)		
(8) Visually examine the pitch change knob bracket for nicks, scratches, or other damage. NOTE: This inspection and repair does not include the bearing interface surface, the threaded hole, or the cam follower seal surface.	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 sq. inch (322 sq. 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 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. Using an emery cloth or abrasive pad CM47, lightly polish to remove raised material or pushed up edge and blend into machined surfaces. If the nicks, scratches, other damage, or repair are greater than the permitted serviceable or Corrective Action repair limits, replace the pitch change knob bracket.
(9) Examine the dowel pin for movement in the pitch change knob bracket.	Using firm hand pressure, try to move the dowel pin. Movement is not permitted.	If there is movement of the dowel pin, replace the dowel pin.

Component Inspection Criteria
Table 5-1

Inspect		Serviceable Limits	Corrective Action
AH.	PITCH CHANGE KNOB BRACKET THAT USES A SCREW TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 1020) (Refer to Figure 5-40)		
(10)	Measure the height of the dowel pin from the pitch change knob bracket base.	The maximum permitted height is 0.440 inch (11.17 mm).	If the height of the dowel pin is greater than the permitted height, press the pin into the bracket to the correct height.
		The minimum permitted height is 0.390 inch (9.91 mm).	If the height of the dowel pin is less than the permitted serviceable limits, replace the pin. The replacement pin must fit tightly.
(11)	Visually examine the OD of the exposed portion of the dowel pin for damage or corrosion product.	Damage or corrosion product is not permitted.	If there is damage or corrosion product, replace the dowel pin.
(12)	If the dowel pin is removed, visually examine the dowel pin hole for corrosion product or pitting.	Corrosion product or pitting is not permitted.	If there is corrosion product or pitting, replace the pitch change knob bracket.
(13)	Visually examine the pitch change knob bracket threaded hole for corrosion product or damage.	Corrosion product is not permitted. A maximum of 3/4 of one thread total accumulated damage is permitted.	If the corrosion product or damage is greater than the permitted serviceable limits, replace the pitch change knob bracket.
(14)	If present, visually examine the pitch change knob bracket safety wire holes.	The safety wire hole must be able to secure the safety wire.	If the damage is greater than the permitted serviceable limits, replace the pitch change knob bracket.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AH. PITCH CHANGE KNOB BRACKET THAT USES A SCREW TO RETAIN THE CAM FOLLOWER, CONTINUED (Item 1020) (Refer to Figure 5-40)		
(15) For HC-E5N-3( ) and HC-E5B-5( ) propellers only: Visually examine the pitch change knob bracket for safety wire holes.	There must be a safety wire hole for each bolt hole.	If there are no safety wire holes, add the safety wire holes in accordance with the section "Modification of the Pitch Change Knob Bracket for the Addition of Safety Wire Holes" in the Repair chapter of this manual.
(16) Magnetic particle inspect the pitch change knob bracket in accordance with the Magnetic Particle Inspection chapter of Hartzell Standard Practices Manual 202A (61-01-02). NOTE: It is not necessary to remove the dowel pin.	A relevant indication is not permitted.	If there is a relevant indication, replace the pitch change knob bracket.

(17) If removal of the dowel pin is not required, apply masking material to protect the dowel pin from cadmium plating materials.

(18) If the pitch change knob has successfully passed all inspections, apply masking material to the Pitch Change Knob Bearing OD Interface Surface, reapply cadmium plating, and bake in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

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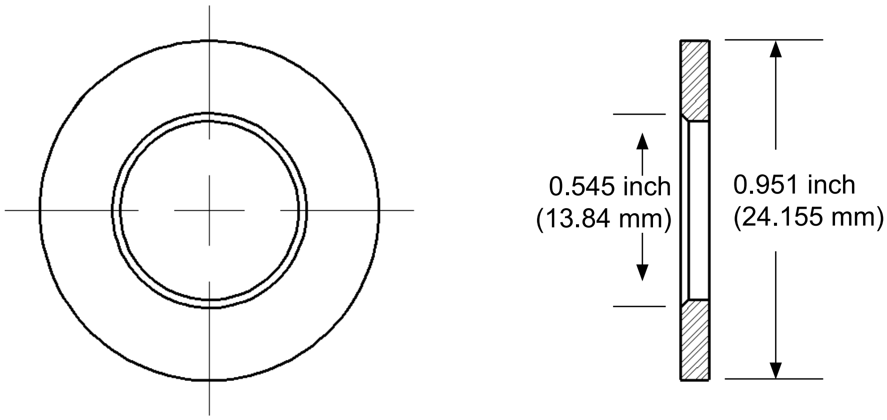
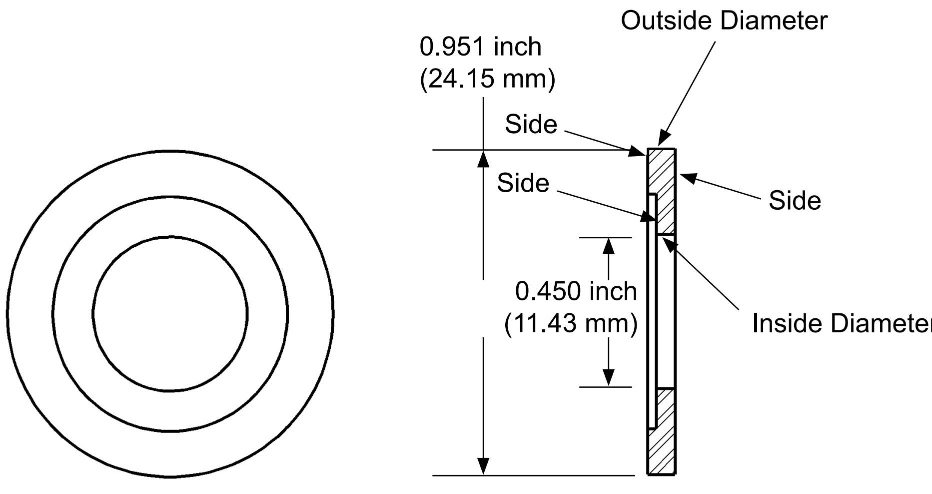


B-475 Knob Unit Retaining Washer
(Used Only With the Swaged Washer Method
for Retention of the Cam Follower
and is Required to be Replaced at Overhaul)



103395 Knob Unit Retaining Washer
(Used Only With the Screw Method
for Retention of the Cam Follower
and is Not Required to be Replaced at Overhaul)

Dimensions are for identification purposes only.

B-475
103395

103395 Knob Unit Retaining Washer
Figure 5-41

Component Inspection Criteria
Table 5-1

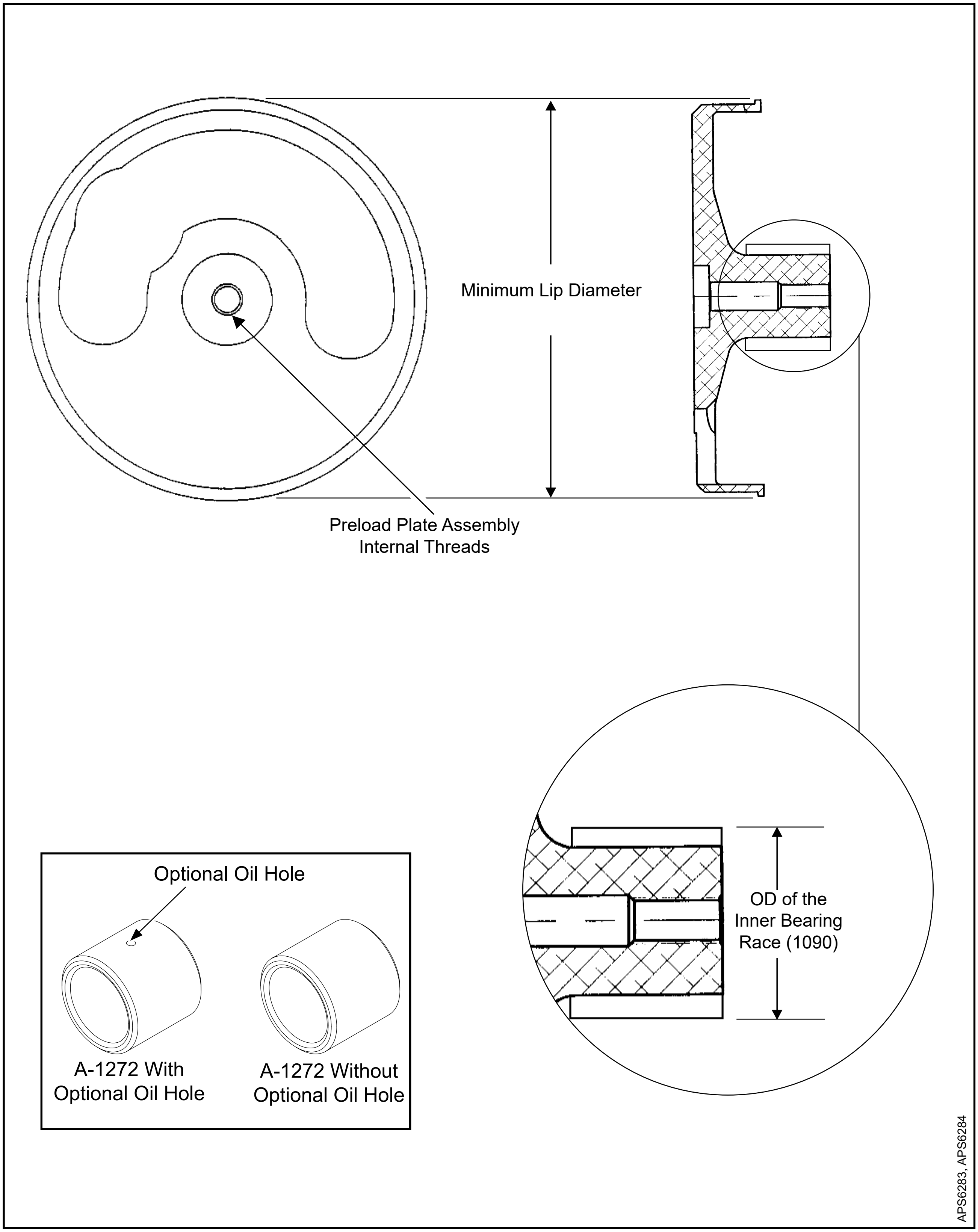
Inspect		Serviceable Limits	Corrective Action
AI.	103395 KNOB UNIT RETAINING WASHER (Item 1030) (Refer to Figure 5-41)		
(1)	Visually examine the sides and inside diameter of the knob unit retaining washer for corrosion product and pitting.	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.002 inch (0.05 mm). The maximum permitted total surface area that may have pitting is 5%. The maximum permitted diameter of an individual pit is 0.062 inch (1.57 mm). Pitting must not affect the fit or function of the knob unit retaining washer.	After applying masking material to the outside diameter of the knob unit retaining washer, corrosion product may be removed using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product or pitting is greater than the serviceable limits, replace the knob unit retaining washer.
(2)	Visually examine the sides and inside diameter of the knob unit retaining washer for scratches.	The maximum permitted depth of a scratch is 0.002 inch (0.05 mm). Scratches must not affect the fit or function of the knob unit retaining washer.	If scratches are greater than the serviceable limits replace the knob unit retaining washer.
(3)	Visually examine the knob unit retaining washer for wear or damage.	Wear or damage is not permitted.	If there is wear or damage, replace the knob unit retaining washer.
(4)	Visually examine the outside diameter of the knob unit retaining washer for corrosion product and pitting.	Corrosion product or pitting is not permitted.	If there is corrosion product or pitting, replace the knob unit retaining washer.
(5)	Visually examine the outside diameter of the knob unit retaining washer for scratches.	A scratch is not permitted.	If there is a scratch, replace the knob unit retaining washer.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AI.	103395 KNOB UNIT RETAINING WASHER, CONTINUED (Item 1030) (Refer to Figure 5-41)		
(6)	Visually examine the outside diameter of the knob unit retaining washer for wear or damage.	Wear or damage is not permitted in the base metal. If the sides or inside diameter were glass bead cleaned to remove corrosion product, examine the outside diameter for a rough surface from the glass bead cleaning. The maximum permitted surface finish is 16 Ra.	If wear or damage is greater than the serviceable limits, replace the knob unit retaining washer.
(7)	Measure the outside diameter of the knob unit retaining washer.	The minimum permitted outside diameter after or over cadmium plate is 0.950 inch (24.13 mm).	If the outside diameter is less than the serviceable limits, replace the knob unit retaining washer.
(8)	Visually examine the knob unit retaining washer for cadmium plate coverage.	A few random scratches are acceptable on the sides and inside diameter; otherwise, cadmium plate must completely cover the sides and inside diameter of the knob unit retaining washer. Cadmium plate must completely cover the outside diameter without scratches, although slight cadmium loss on the corners between sides and outside diameter is permitted.	Replate and bake the knob unit retaining washer in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

Component Inspection Criteria
Table 5-1

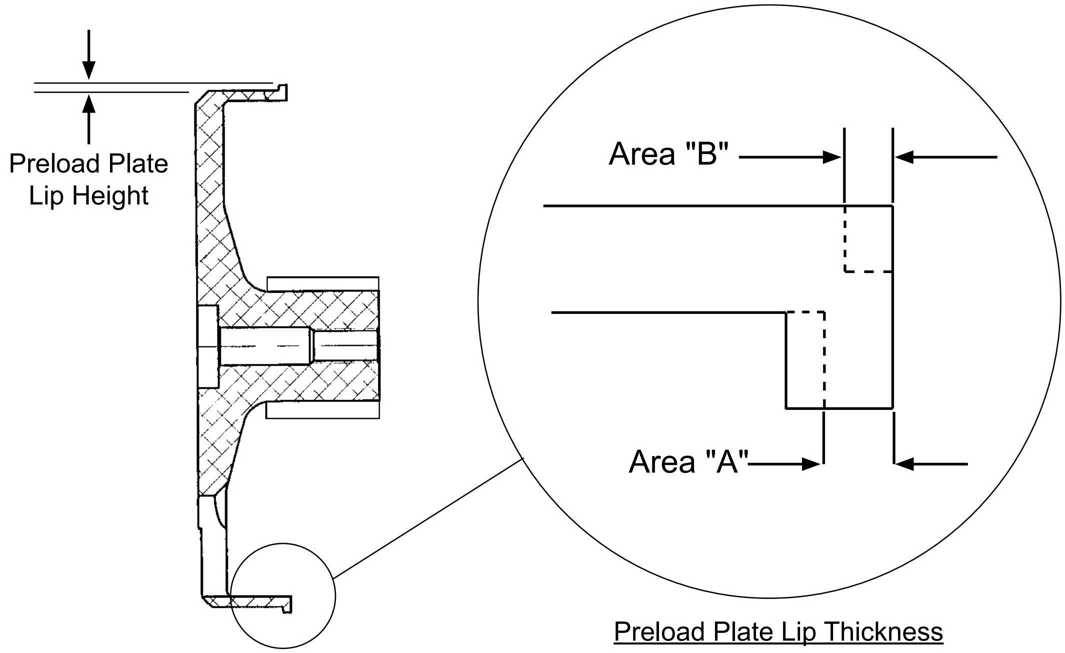
Inspect	Serviceable Limits	Corrective Action
AJ. DOWEL PIN (Item 1050) (Refer to Figure 5-39)		
(1) Visually examine the OD of the exposed portion of the dowel pin for damage or corrosion product.	Damage or corrosion product is not permitted.	If damage or corrosion product is greater than the permitted serviceable limits, replace the dowel pin.
(2) Measure the exposed portion of the dowel pin OD.	The minimum permitted diameter is 0.3751 inch (9.528 mm).	If the dowel pin OD is less than the permitted serviceable limits, replace the dowel pin.
(3) Examine the fit of the dowel pin in the pitch change knob bracket.	Movement is not permitted.	If the dowel pin movement is greater than the permitted serviceable limits, replace the dowel pin.



Preload Plate Assembly With the A-1272 Inner Bearing Race
Figure 5-42

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AK.	PRELOAD PLATE ASSEMBLY WITH THE A-1272 INNER BEARING RACE (Item 1080) (Refer to Figure 5-42)		
(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.	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 the depth of 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.
(4)	Visually examine the inner bearing race (1090) OD for brinelling, pitting, and damage.	The maximum permitted depth of brinelling is 0.003 inch (0.07 mm). Raised material is not permitted. 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%.	Polish raised material using abrasive pad CM47 or equivalent. 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)	Visually examine the inner bearing race (1090) OD 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 threads. 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.



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 greater than the permitted serviceable limits, replace the preload plate.

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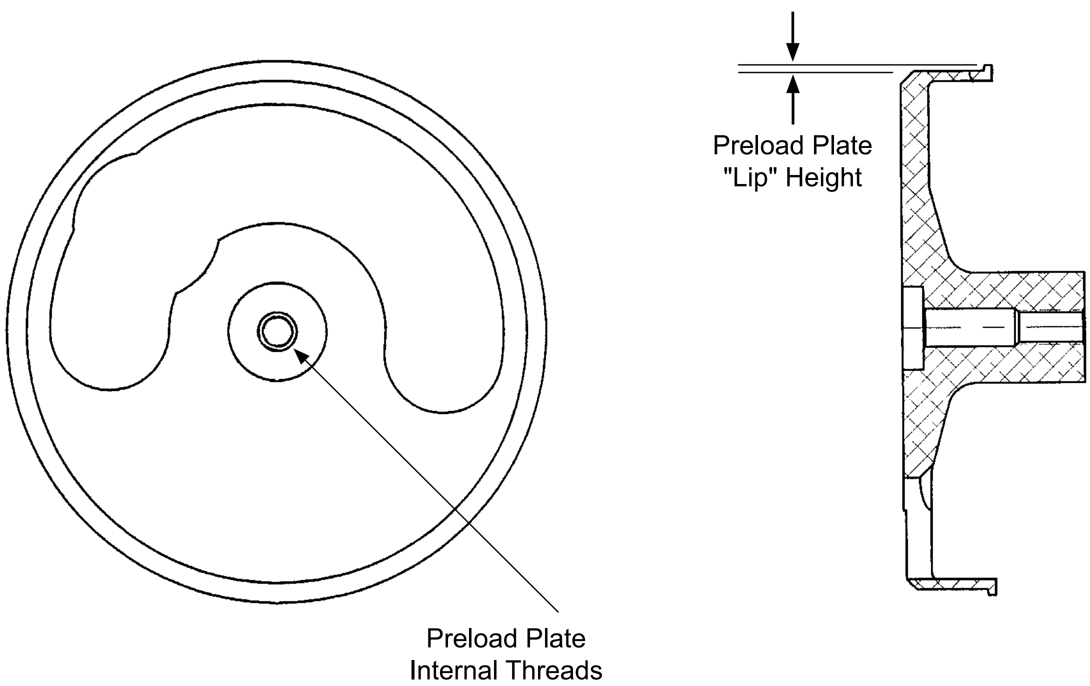
Lip of Preload Plate Assembly With the A-1272 Inner Bearing Race
Figure 5-43

Component Inspection Criteria
Table 5-1

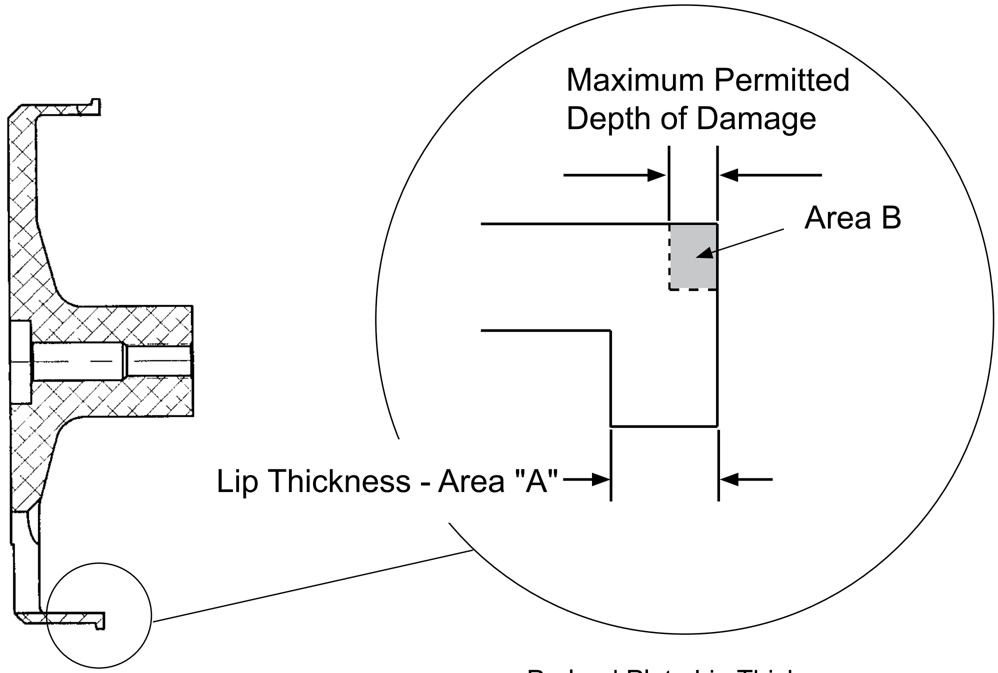
	Inspect	Serviceable Limits	Corrective Action
AK.	PRELOAD PLATE ASSEMBLY WITH THE A-1272 INNER BEARING RACE, CONTINUED (Item 1080) (Refer to Figure 5-42 and Figure 5-43)		
(6)	Measure the OD of the inner bearing race (1090).	The minimum permitted OD of the inner bearing race is 1.124 inches (28.55 mm).	If the OD is less than the permitted serviceable limits, replace the preload plate assembly.
(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 5-43 to find the maximum permitted depth of damage in Area "B" when the lip thickness in Area "A" is equal to or greater than the dimension specified in Figure 5-43.	If the lip thickness in Area "A" is less than the permitted serviceable limits, replace the preload plate. If the depth of damage in Area "B" is greater than the permitted serviceable limits, replace the preload assembly.
(9)	Penetrant inspect the preload plate 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 preload plate assembly.



Preload Plate Assembly Without the Inner Bearing Ring
Figure 5-44

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AL.	PRELOAD PLATE WITHOUT THE INNER BEARING RING (Item 1080) (Refer to Figure 5-44)		
(1)	Visually examine the preload plate 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 threads. 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.
(2)	Visually examine the preload plate for pitting.	The maximum permitted depth of pitting is 0.004 inch (0.10 mm).	Using an abrasive pad CM47 or equivalent, pitting may be removed by polishing up to 0.007 inch (0.17 mm) deep. If the pitting or polishing is greater than the permitted serviceable limits, replace the preload plate.
(3)	Visually examine the internal threads for damage.	A maximum of two (2) threads of total accumulated damage are permitted.	If the damage is greater than the permitted serviceable limits, replace the preload plate.
(4)	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, replace the preload plate.



Preload Plate Lip Thickness

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.

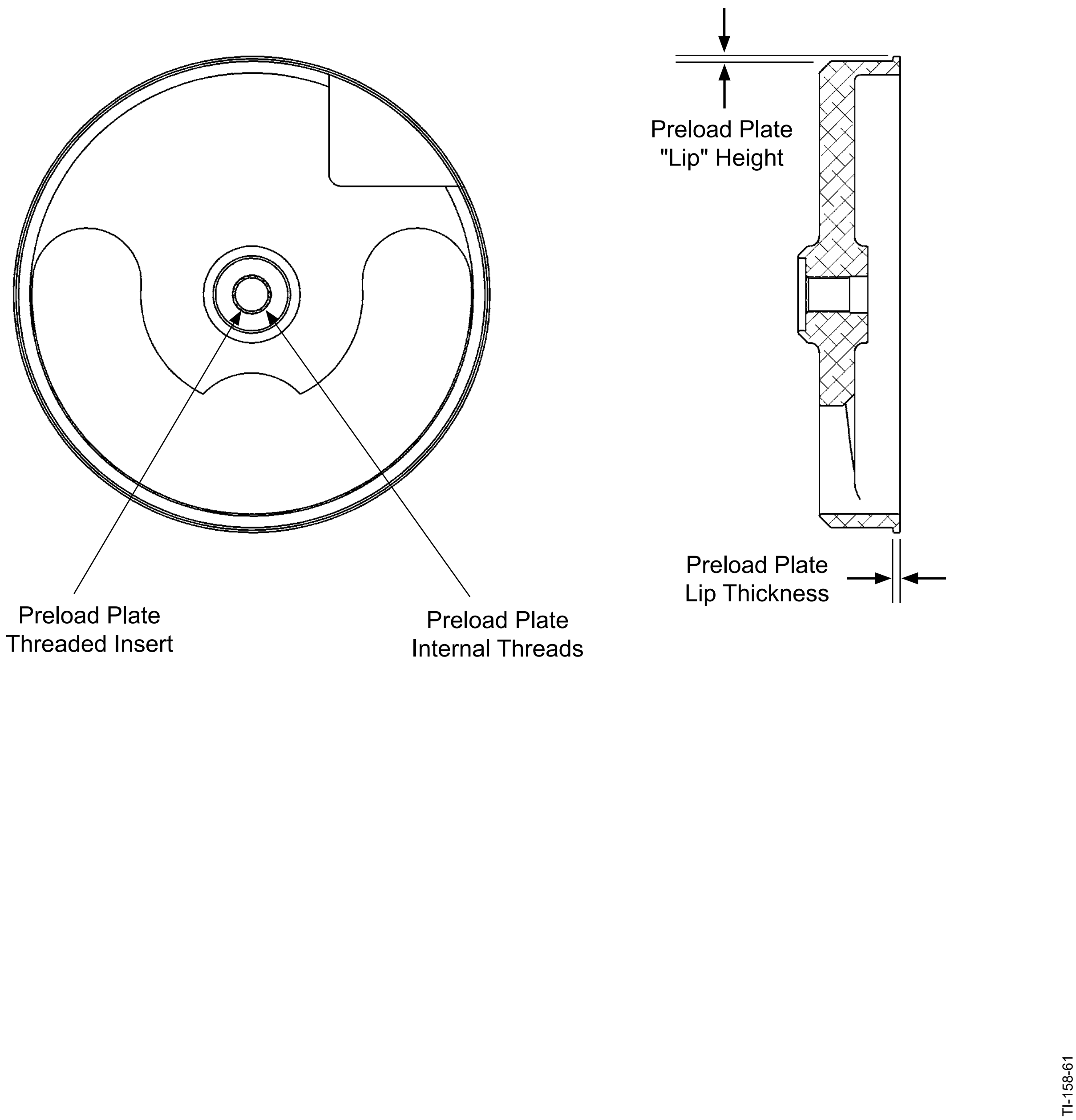
Example 2: Lip thickness in Area "A" is less than 0.063 inch (1.61 mm).
Depth of damage in Area "B" is 0.018 inch (0.45 mm).
Damage is greater than permitted serviceable limits,
replace the preload plate.

APS6283
APS6284

Lip of Preload Plate Assembly Without the Inner Bearing Ring
Figure 5-45

Component Inspection Criteria
Table 5-1

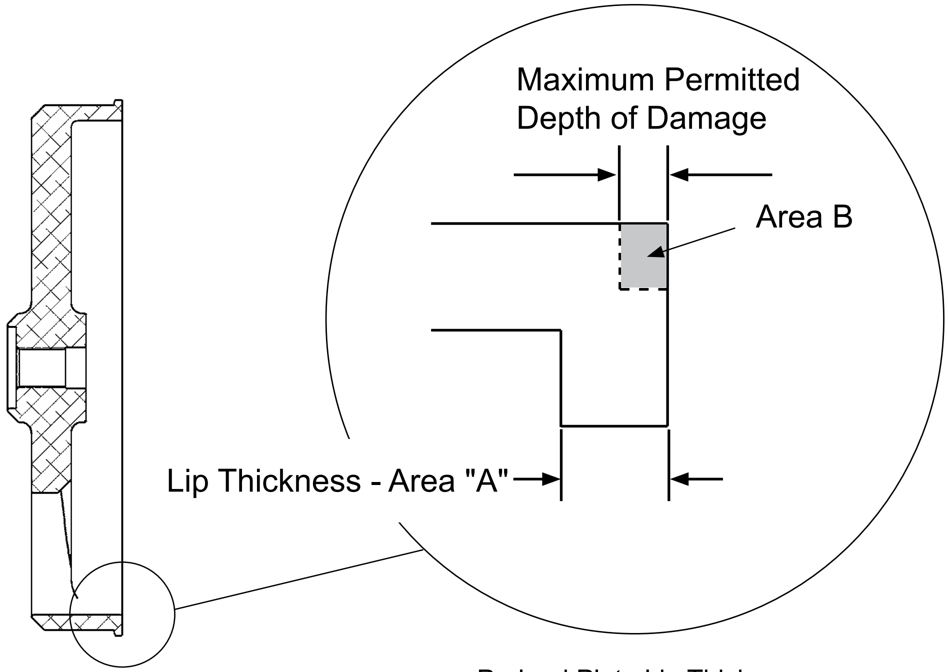
Inspect	Serviceable Limits	Corrective Action
AL. PRELOAD PLATE WITHOUT THE INNER BEARING RING, CONTINUED (Item 1080) (Refer to Figure 5-45)		
(5) Visually examine the preload plate "lip" for damage. If the lip is damaged, measure the lip thickness.	The minimum lip thickness in Area "A" is 0.060 inch (1.53 mm). The maximum permitted depth of damage in Area "B" is 0.020 inch (0.50 mm). The permitted depth of damage in Area "B" of the lip of the preload plate is dependent on the minimum thickness in Area "A" of the lip of the preload plate. Use the information and examples in Figure 5-45 to determine 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 5-45.	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.
(6) Penetrant inspect the preload plate 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 that cannot be removed within the permitted serviceable limits, replace the preload plate assembly.



Preload Plate Assembly Without an Inner Bearing Race
Figure 5-46

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AM. PRELOAD PLATE WITHOUT AN INNER BEARING RACE (Item 1080) (Refer to Figure 5-46)		
(1) Visually examine the preload plate 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 threads. 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.
(2) Visually examine the preload plate for pitting.	The maximum permitted depth of pitting is 0.004 inch (0.10 mm).	Using an abrasive pad CM47 or equivalent, pitting may be removed by polishing up to 0.007 inch (0.17 mm) deep. If the pitting or polishing is greater than the permitted serviceable limits or the corrective action limits, replace the preload plate.
(3) Visually examine the threaded insert for thread damage.	Thread damage is not permitted.	If the damage is greater than the permitted serviceable limits, replace the threaded insert in accordance with the section "Replacement of a Preload Plate Threaded Insert" in the Repair chapter of this manual.
(4) Visually examine the preload plate threads for damage if the threaded insert is removed for any reason.	A maximum 1/4 of one thread of total accumulated damage is permitted. Damage must not interfere with the threaded insert.	If the damage is greater than the permitted serviceable limits, replace the preload plate.
(5) Visually examine the lip of the preload plate for damage.	If the lip is damaged, measure the lip height. The minimum permitted lip height is 0.40 inch (1.02 mm).	If the damage is greater than the permitted serviceable limits, replace the preload plate.



Preload Plate Lip Thickness

Lip Thickness in Area "A"	Maximum Permitted Depth of Damage in Area "B"
0.060 inch (1.52 mm)	0.013 inch (0.33 mm) or less
0.061 inch (1.55 mm)	0.014 inch (0.35 mm)
0.062 inch (1.57 mm)	0.015 inch (0.38 mm)
0.063 inch (1.60 mm)	0.016 inch (0.40 mm)
0.064 inch (1.62 mm)	0.017 inch (0.43 mm)
0.065 inch (1.65 mm)	0.018 inch (0.45 mm)
0.066 inch (1.67 mm)	0.019 inch (0.48 mm)
0.067 inch (1.70 mm) or greater	0.020 inch (0.50 mm)

Example 1: Lip thickness in Area "A" is greater than 0.063 inch (1.60 mm).
Depth of damage in Area "B" is 0.016 inch (0.41 mm).
Preload plate is within permitted serviceable limits.

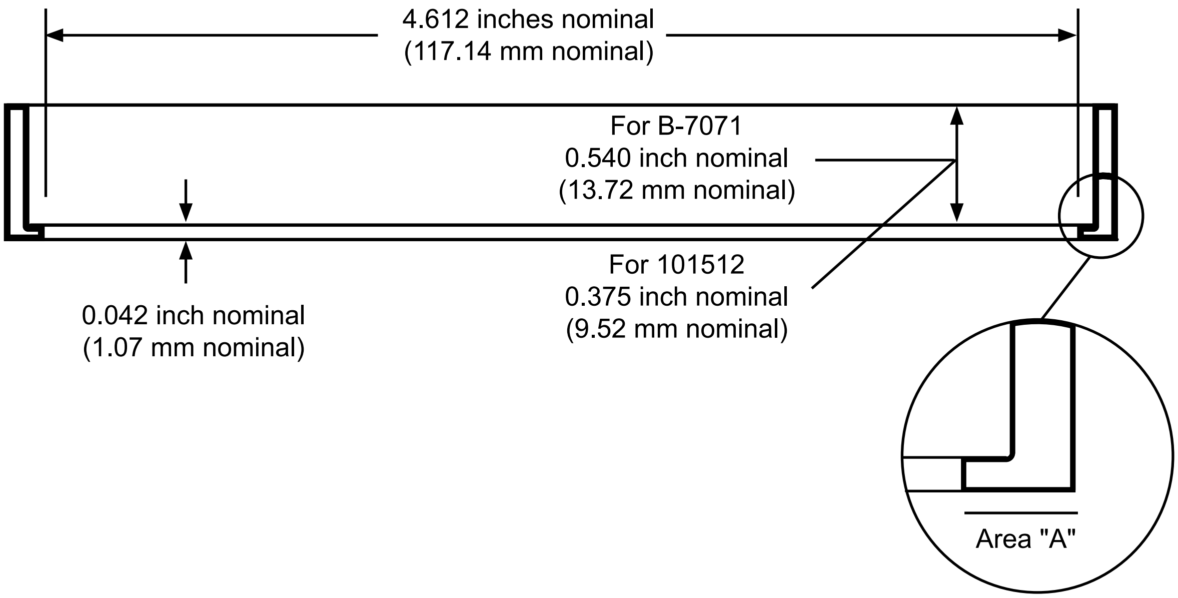
Example 2: Lip thickness in Area "A" is less than 0.063 inch (1.60 mm).
Depth of damage in Area "B" is 0.018 inch (0.46 mm).
Damage is greater than permitted serviceable limits,
replace the preload plate.

TI-158-61

Lip of Preload Plate Assembly Without an Inner Bearing Race
Figure 5-47

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AM. PRELOAD PLATE WITHOUT AN INNER BEARING RACE, CONTINUED (Item 1080) (Refer to Figure 5-47)		
(6) 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" is 0.020 inch (0.50 mm). The permitted depth of damage in Area "B" of the lip of the preload plate is dependent on the minimum thickness in Area "A" of the lip of the preload plate. Use the information and examples in Figure 5-47 to determine 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 5-47.	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.
(7) Penetrant inspect the preload plate in accordance with the Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). NOTE: The threaded insert does not need to be removed for this inspection. Pre-penetrant etch is not required if the threaded insert is not removed.	A relevant indication is not permitted.	If there is a relevant indication, replace the preload plate assembly.



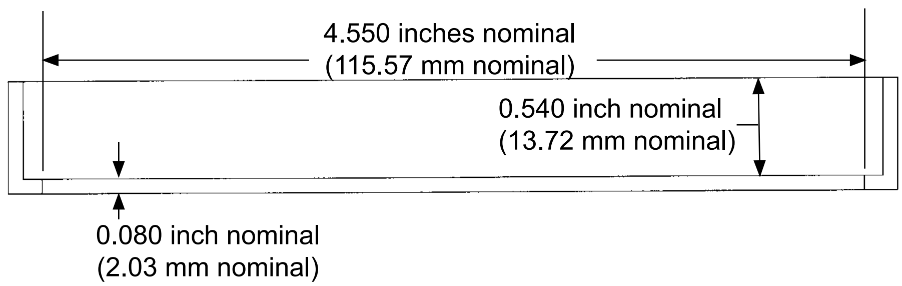
NOTE: Dimensions are for identification purposes only.

B-7071

B-7071 and 101512 Bearing Retaining Ring
Figure 5-48

Component Inspection Criteria
Table 5-1

Inspect		Serviceable Limits	Corrective Action
AN.	B-7071 AND 101512 BEARING RETAINING RING (Item 1120) (Refer to Figure 5-48)		
(1)	Not including Area "A", visually examine the bearing retaining ring for corrosion product and pitting.	Corrosion product is not permitted. 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 or 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 the corrosion product, pitting, or wear is greater than the permitted serviceable limits, 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).



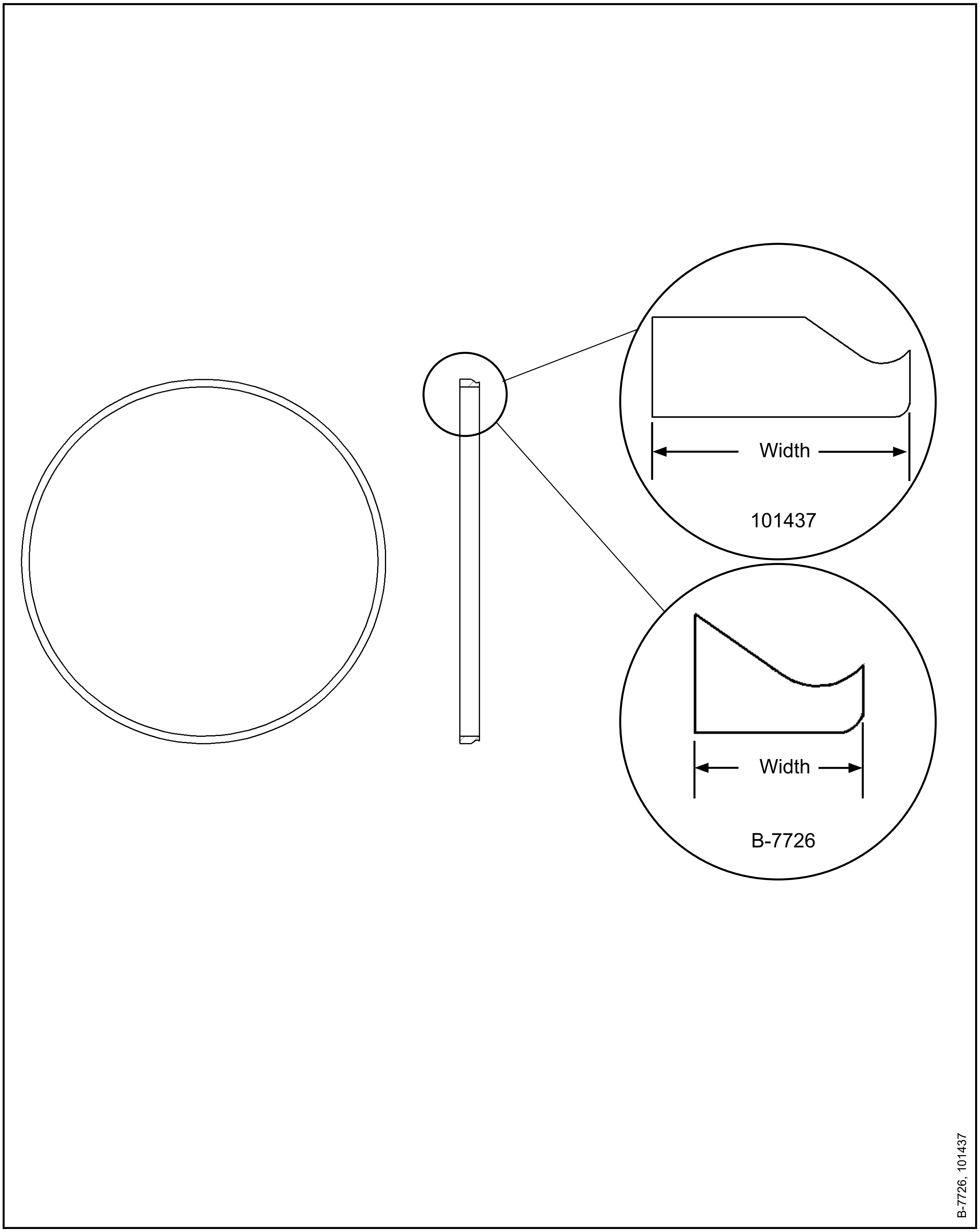
NOTE: Dimensions are for identification purposes only

B-1041

B-1041 Bearing Retaining Ring
Figure 5-49

Component Inspection Criteria
Table 5-1

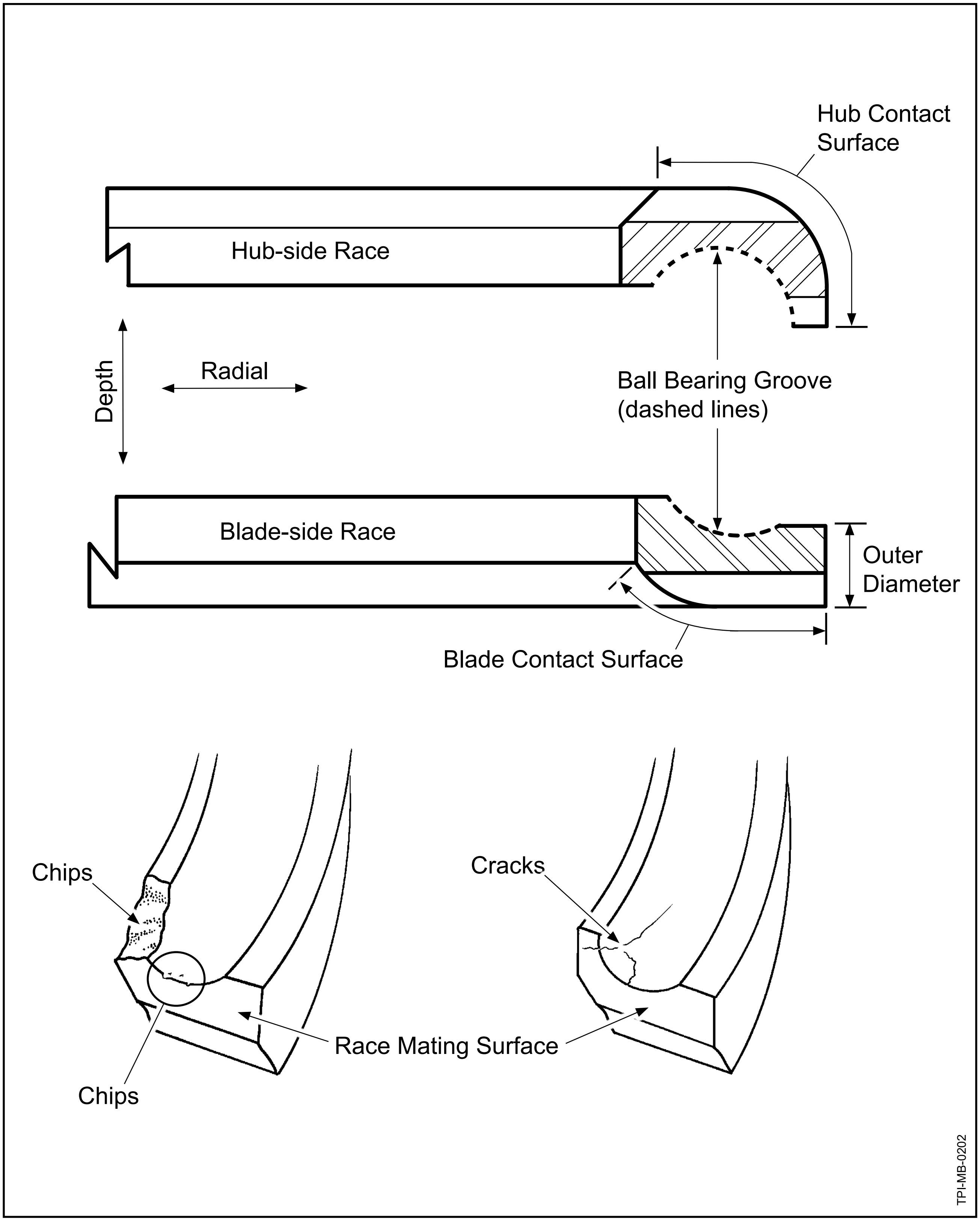
Inspect		Serviceable Limits	Corrective Action
AO. B-1041 BEARING RETAINING RING (Item 1120) (Refer to Figure 5-49)			
(1)	Visually examine the bearing retaining ring for corrosion product and pitting.	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.005 inch (0.12 mm). 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 or pitting is greater than the permitted serviceable limits, replace the bearing retaining ring.
(2)	Visually examine the bearing retaining ring for wear, damage, or fretting.	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.
(3)	Visually examine the entire bearing retaining ring for cadmium plating coverage.	A few random scratches and corners with anodize coating 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 Standard Practices Manual 202A (61-01-02).



Blade Seal
Figure 5-50

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AP. BLADE SEAL (Item 1130) (Refer to Figure 5-50)		
(1) Using 10X magnification and an appropriate light source, visually examine the blade seal for damage, missing material, separation, or form irregularities of the continuous ring.	Damage, missing material, separation, or irregularities are not permitted.	If the damage or other conditions are greater than the permitted serviceable limits, replace the blade seal.
(2) Visually examine the width of the blade seal for wear.	If there is wear, measure the width of the blade seal. The minimum permitted width is: B-7726 - 0.090 inch (2.29 mm), 101437 - 0.230 inch (5.84 mm).	If the width is less than the permitted serviceable limits, replace the blade seal.



Bearing Race
Figure 5-51

Component Inspection Criteria
Table 5-1

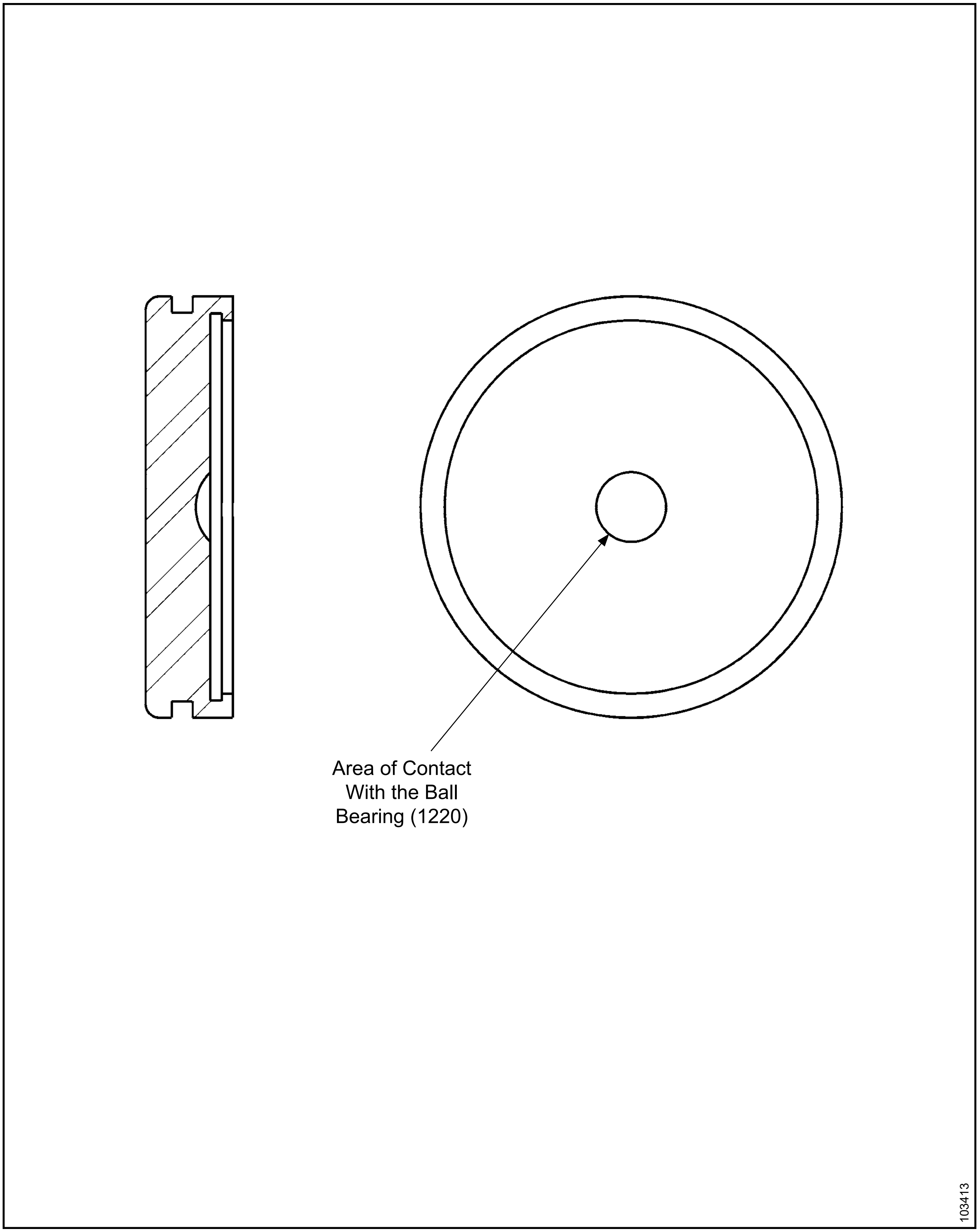
Inspect	Serviceable Limits	Corrective Action
AQ. BEARING RACE (Item 1160, 1180) (Refer to Figure 5-51)		
(1) Visually examine the ball bearing groove in each bearing race for corrosion product.	Corrosion product is not permitted. If there is corrosion, remove it in accordance with the corrective action 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 sq. inch (77.4 sq. 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 or fretting, 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
AQ. BEARING RACE, CONTINUED (Item 1160, 1180) (Refer to Figure 5-51)		
(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 sq. inch (161.2 sq. 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 (1120). Fretting must not loosen the tight fit with the bearing retaining ring (1120).	Clean the fretted area thoroughly using an abrasive pad CM47 or equivalent to decrease fretting damage to a minimum. If the fit of the bearing retaining ring (1120) to the bearing race is not tight, replace the bearing race.
	Wear is not permitted.	If there is wear, replace the r bearing ace.
	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

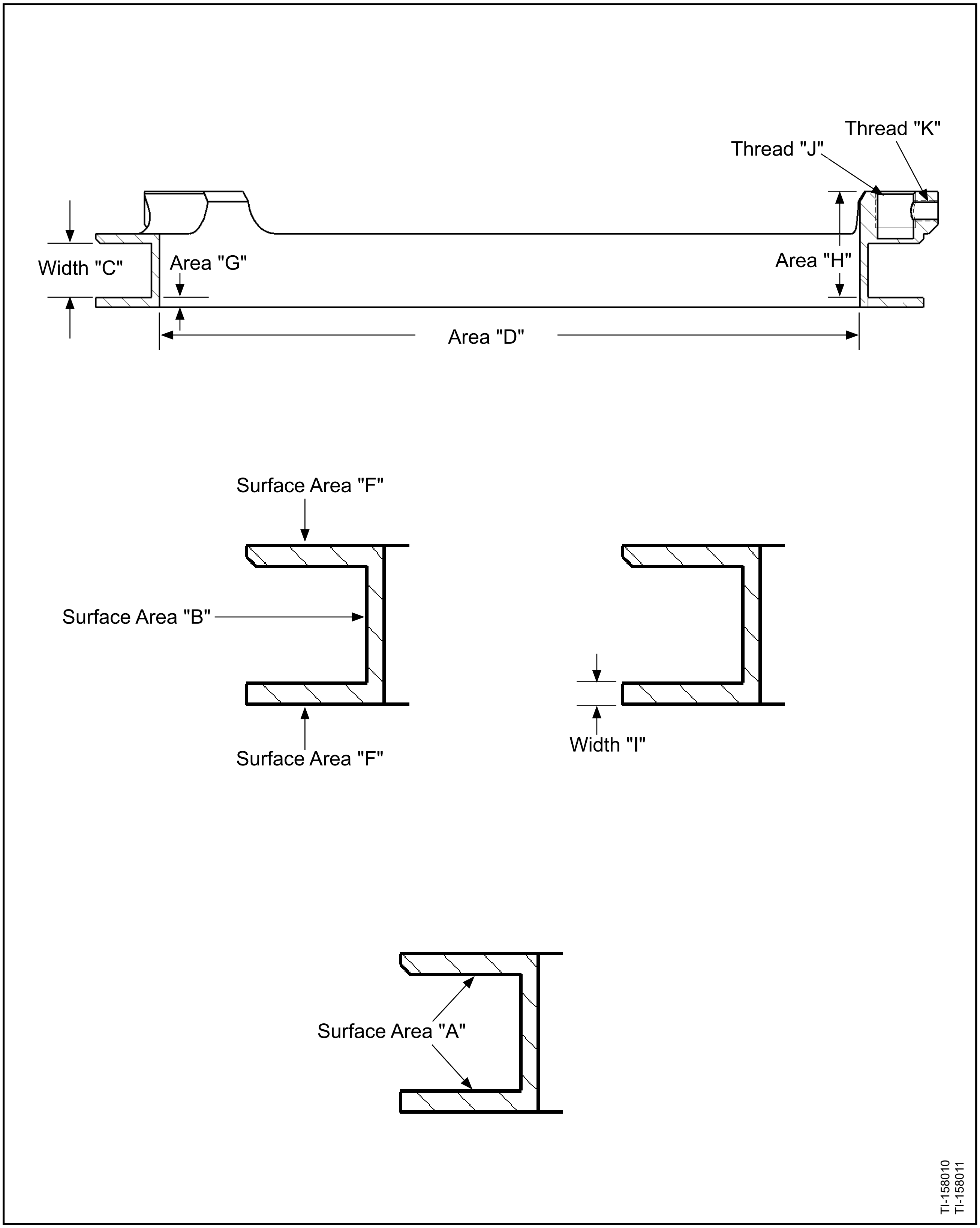
Inspect	Serviceable Limits	Corrective Action
AQ. BEARING RACE, CONTINUED (Item 1160, 1180) (Refer to Figure 5-51)		
(5) Visually examine the bearing race for chips or cracks that are adjacent to the mating surfaces of the race.	Chips or cracks that are adjacent to the mating surfaces of the bearing race are not permitted.	If there are chips or cracks that are 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.



Blade Plug Inspection Area
Figure 5-52

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AR. BLADE PLUG (Item 1230) (Refer to Figure 5-52)		
(1) Visually examine the blade plug for corrosion product and pitting.	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.005 inch (0.12 mm). Pitting is not permitted where it would interface with the bearing ball. Pitting may not cover more than 10% of the blade plug surface.	Remove corrosion product to a maximum depth of 0.005 inch (0.12 mm) using glass bead cleaning. Do not glass bead clean the area of contact with the ball bearing. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product or pitting is greater than the permitted serviceable limits, replace the blade plug.
(2) Visually examine the blade plug for wear or scoring damage in the area of contact with the ball bearing.	If the blade plug is worn or damaged, measure the depth of wear or damage. The maximum permitted depth of wear or damage is 0.004 inch (0.10 mm) beyond the surrounding undamaged surface. The surface finish in the area of contact with the ball bearing must be 32 Ra or smoother.	Using an abrasive pad CM47 or equivalent, polish to remove wear or damage and maintain a surface finish of 32 Ra or smoother. The maximum permitted depth of repair is 0.004 inch (0.10 mm) beyond the surrounding unrepaired surface. If wear or damage is greater than the permitted serviceable limits, replace the blade plug.
(3) Visually examine the blade plug for scratches, gouges, or other damage, outside of the area of contact with the ball bearing.	The maximum permitted depth of damage is 0.005 inch (0.12 mm). Damage must not interfere with the blade plug fit into the blade bore.	Using an abrasive pad CM47 or equivalent, polish pushed up material to blend with the surrounding surfaces. If damage is greater than the permitted serviceable limits or the repair is greater than the correction action limits, replace the blade plug.
(4) Visually examine the blade plug for cadmium plating coverage.	Minor wear on corners and a few light random scratches are permitted; otherwise, cadmium plating must completely cover the blade plug.	If the cadmium plating coverage is less than the permitted serviceable limits, replate and bake (for a minimum of 23 hours) the blade plug in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



C-2689 and 105885 Beta Ring
Figure 5-53

Component Inspection Criteria
Table 5-1

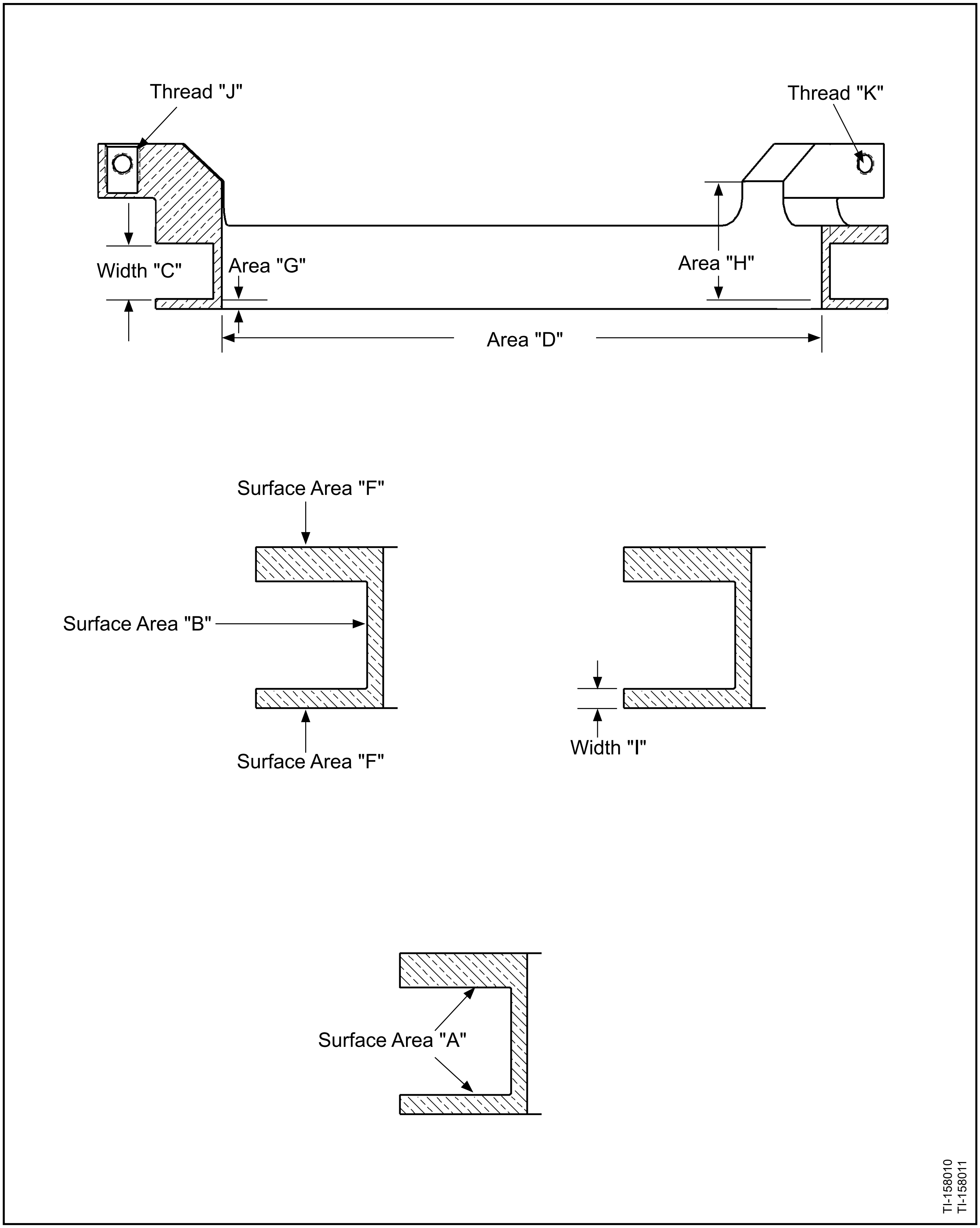
Inspect		Serviceable Limits	Corrective Action
AS.	C-2689 and 105885 BETA RING (Item 1310) (Refer to Figure 5-53)		
(1)	Visually examine the beta ring for a crack.	A crack is not permitted.	If there is a crack, replace the beta ring.
(2)	Visually examine the bottom of the threaded holes for impressions 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 groove of the beta ring 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
AS.	C-2689 and 105885 BETA RING, CONTINUED (Item 1310) (Refer to figure 5-53)		
(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). Refer to step (6) of this component inspection criteria. 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 "AJ.(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.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AS. C-2689 and 105885 BETA RING, CONTINUED (Item 1310) (Refer to figure 5-53)		
(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.



104633 Beta Ring
Figure 5-54

Component Inspection Criteria
Table 5-1

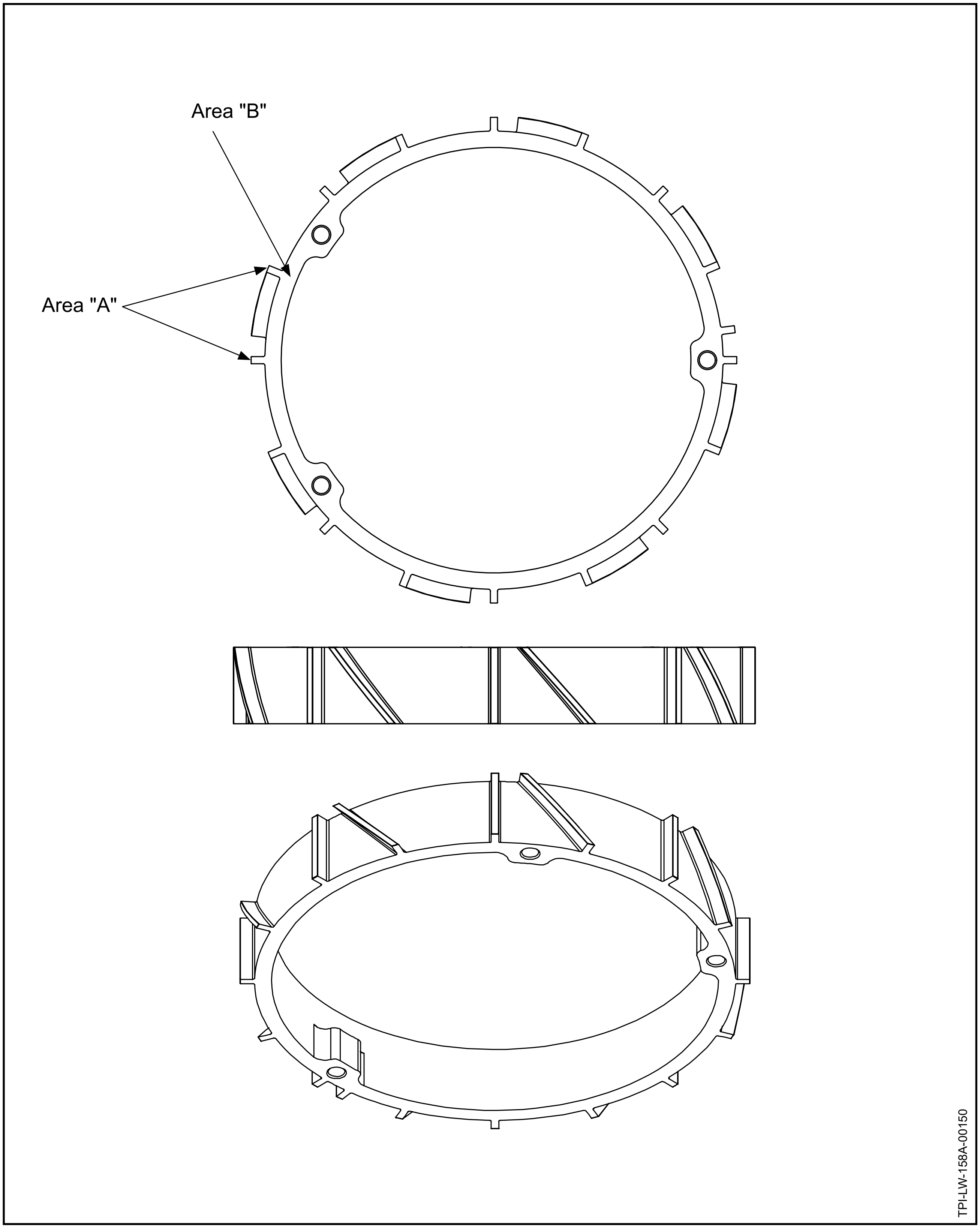
Inspect		Serviceable Limits	Corrective Action
AT.	104633 BETA RING (Item 1310) (Refer to Figure 5-54)		
(1)	Visually examine the beta ring for a crack.	A crack is not permitted.	If there is a crack, replace the beta ring.
(2)	Visually examine the bottom of the threaded holes for impressions made by the 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 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 groove of the beta ring for 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).	Using emery cloth, blend a scratch 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.
(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 5.427 inches (137.84 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
AT. 104633 BETA RING, CONTINUED (Item 1310) (Refer to Figure 5-54)		
(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 5.427 inches (137.84 mm). Refer to step (6) of this component inspection criteria. 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 5.427 inches (137.84 mm). Refer to step (6) of this component inspection criteria. 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.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AT. 104633 BETA RING, CONTINUED (Item 1310) (Refer to Figure 5-54)		
(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.



106849 Beta Ring
Figure 5-55

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AU.	106849 BETA RING (Item 1310) (Refer to Figure 5-55)		

NOTE: Beta rings identified as 106849 (Rev. A or before), must be replaced with beta rings identified as 106849 (Rev. B or later).

	Inspect	Serviceable Limits	Corrective Action
(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 0.010 inch (0.25 mm).	If the depth of an impression is greater than the permitted serviceable limits, replace the beta ring.
(3)	Visually examine the three threaded holes 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.
(4)	Visually examine the beta ring for corrosion product and pitting on the ID.	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Using an emery cloth, spot polish to remove corrosion product or pitting. Repair is permitted to a depth of 0.015 inch (0.39 mm). If the damage or repair is greater than the permitted serviceable limits or the corrective action limits, replace the beta ring.
(5)	Visually examine the OD and the teeth protrusions on each side for corrosion product, pitting, damage, and scratches (Area "A").	Corrosion product, pitting, damage, or scratches are not permitted.	If there is corrosion product, pitting, damage, or scratches in the OD or teeth protrusions, replace the beta ring.
(6)	Visually examine each end inboard of the teeth for corrosion product and pitting (Area "B").	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	Using an emery cloth, spot polish to remove corrosion product or pitting. Repair is permitted to a depth of 0.005 inch (0.12 mm). If the damage or repair is greater than the permitted serviceable limits or the corrective action limits, replace the beta ring.

Component Inspection Criteria
Table 5-1

	Inspect	Serviceable Limits	Corrective Action
AU.	106849 BETA RING CONTINUED (Item 1310) (Refer to Figure 5-55)		
(7)	Magnetic particle inspect the beta ring 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 ring.
(8)	Degauss the beta ring.	A gauss of 0 ±2 is permitted.	If the gauss does not meet the serviceable limits, replace the beta ring.

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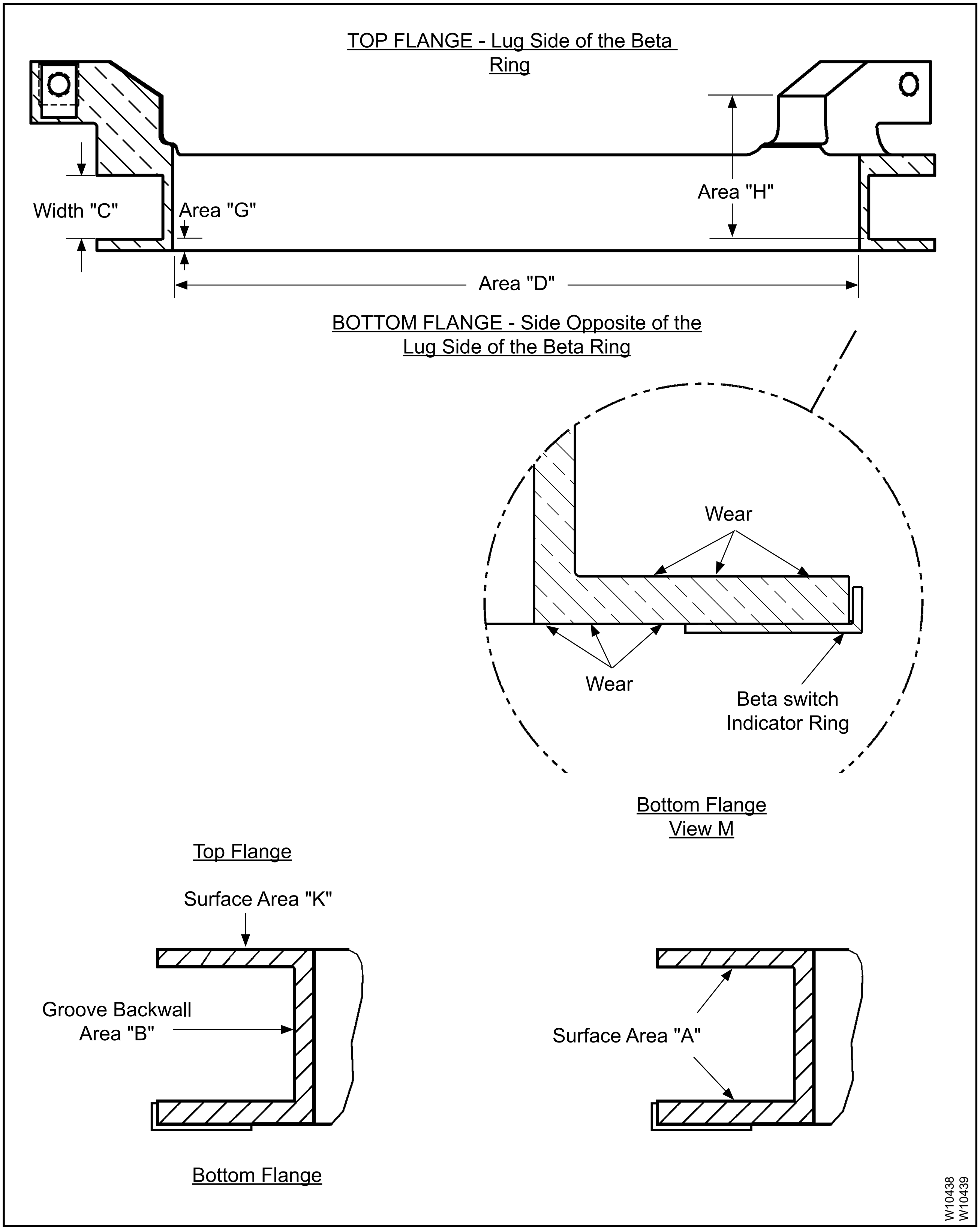


105909 Beta Ring Unit
Figure 5-56

Component Inspection Criteria
Table 5-1

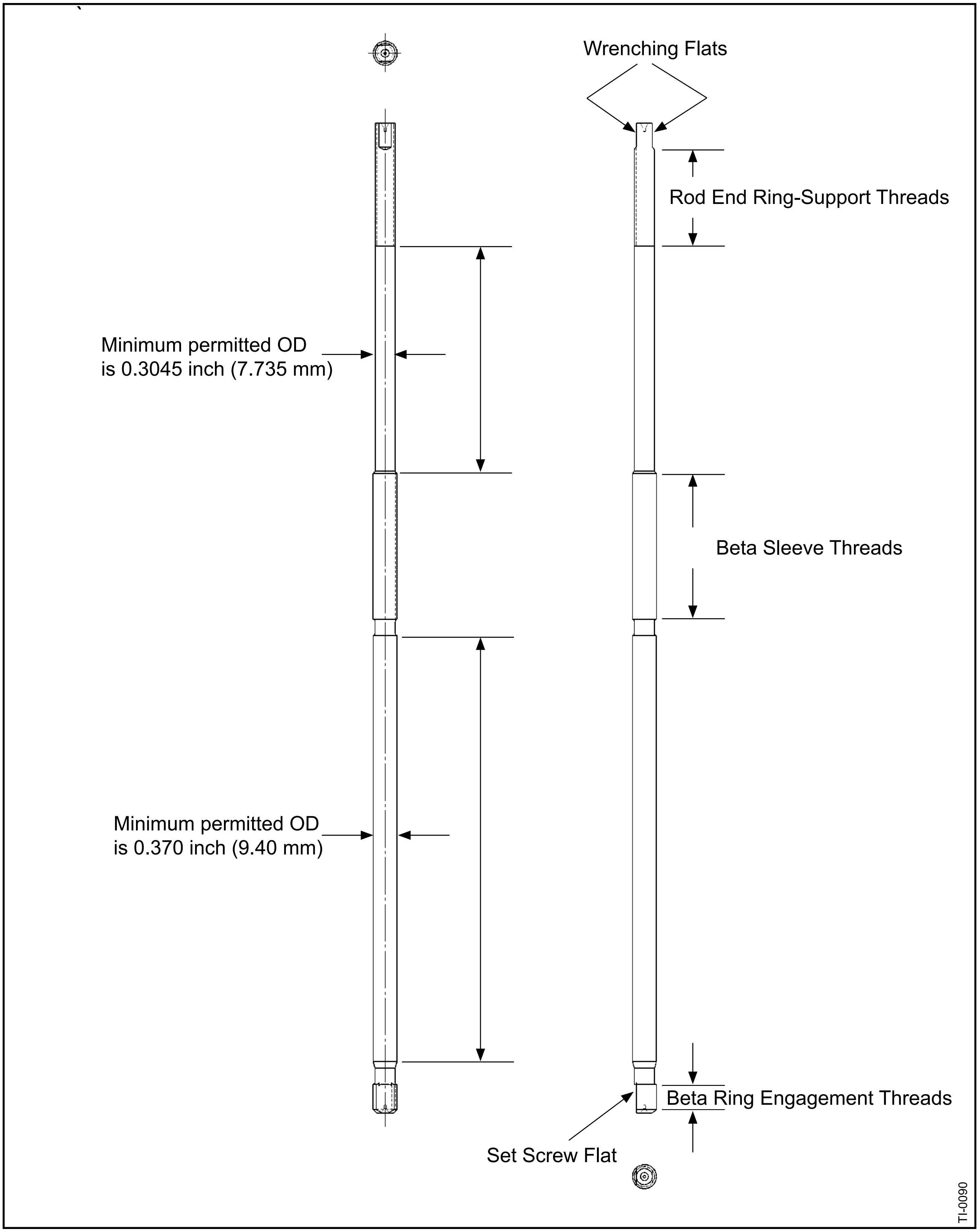
	Inspect	Serviceable Limits	Corrective Action
AV.	105909 BETA RING UNIT (Item 1310) (Refer to Figure 5-56)		
(1)	Visually examine the beta ring unit for a crack.	A crack is not permitted.	If there is a crack, replace the beta ring unit.
(2)	Visually examine the bottom of the threaded holes for impressions 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 unit.
(3)	Visually examine the sidewalls of the groove for 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.	Using an abrasive pad CM47 or equivalent, polish 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 unit.
(4)	Visually examine the groove backwall of the beta ring unit for any scratches or gouges (Area "B").	The maximum permitted depth for a scratch or gouge that may be repaired is 0.007 inch (0.17 mm). A scratch or gouge is not permitted.	If the damage is within the permitted repair limits, refer to the section "Beta Ring Repair" in the Repair chapter of this manual for the repair procedure. If damage or repair is greater than the permitted repair limits, replace the beta ring unit.
(5)	Measure the width of the groove in the beta ring unit (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 unit.
(6)	Measure the ID of the beta ring unit (Area "D").	The maximum permitted ID of the beta ring is 5.427 inches (137.84 mm).	If the ID is greater than the permitted serviceable limits, replace the beta ring unit.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AV. 105909 BETA RING UNIT, CONTINUED (Item 1310) (Refer to figure 5-56)		
(7) Visually examine the bottom flange of the beta ring unit, for wear. Refer to View M.	Wear that reduces the flange thickness is not permitted.	If there is wear that is greater than the permitted serviceable limits, replace the beta ring unit.
(8) Measure any depression or gouge on the outside surface of the beta ring unit (Area "K").	A depression or gouge must be removed. The maximum permitted depth for a depression or repair is 0.010 inch (0.25 mm).	If the damage is within the permitted limits, refer to the section "Beta Ring Repair" in the Repair chapter of this manual for the repair procedure. If the damage or repair is greater than the permitted serviceable limits, replace the beta ring unit.
(9) Visually examine the ID area beginning on the side opposite the lugs and 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 unit.	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 5.426 inches (137.82 mm). Refer to the inspection in step (6) of this component inspection criteria. If the damage is greater than the permitted serviceable limits or corrective action, replace the beta ring unit.
(10) Excluding "Area G", above, but including the inner surface of the lug areas, visually inspect the inner surface for grooves or 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 5.426 inches (137.82 mm). Refer to the inspection in step (6) of this component inspection criteria. If the damage is greater than the permitted serviceable limits or corrective action, replace the beta ring unit.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AV. 105909 BETA RING UNIT, CONTINUED (Item 1310) (Refer to figure 5-54)		
(11) Visually examine the B-3333 beta switch indicator ring that is bonded to the 105909 beta ring unit.	The B-3333 beta switch indicator ring must be bonded tightly to the 105909 beta ring unit.	If the B-3333 beta switch indicator ring is not tightly bonded to the 105909 beta ring unit, remove and discard the B-3333 beta switch indicator ring and install a new B-3333 beta switch indicator ring in accordance with the section "Bonding the Beta Switch Indicator Ring to the Beta Ring Unit" in the Special Adhesive and Bonding Procedures chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(12) 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.



104632, 105559, 105910, 106946, and C-3667 Beta Rod
Figure 5-57

Component Inspection Criteria
Table 5-1

Inspect		Serviceable Limits	Corrective Action
AW.	104632, 105559, 105910, 106946, and C-3667 BETA ROD (Item 1330) (Refer to Figure 5-57)		
(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 beta sleeve threads for damage or wear.	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 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.
(6)	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).
(7)	Measure the OD of each beta rod.	Refer to Figure 5-57 for the applicable limits.	If the OD is less than the permitted serviceable limits, replace the beta rod.
(8)	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
AW.	104632, 105559, 105910, and C-3667 BETA ROD, CONTINUED (Item 1330) (Refer to Figure 5-57)		
(9)	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.
(10)	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 HARD CHROME TO PERFORM THIS INSPECTION.	A crack is not permitted.	If there is a crack, replace the beta rod.

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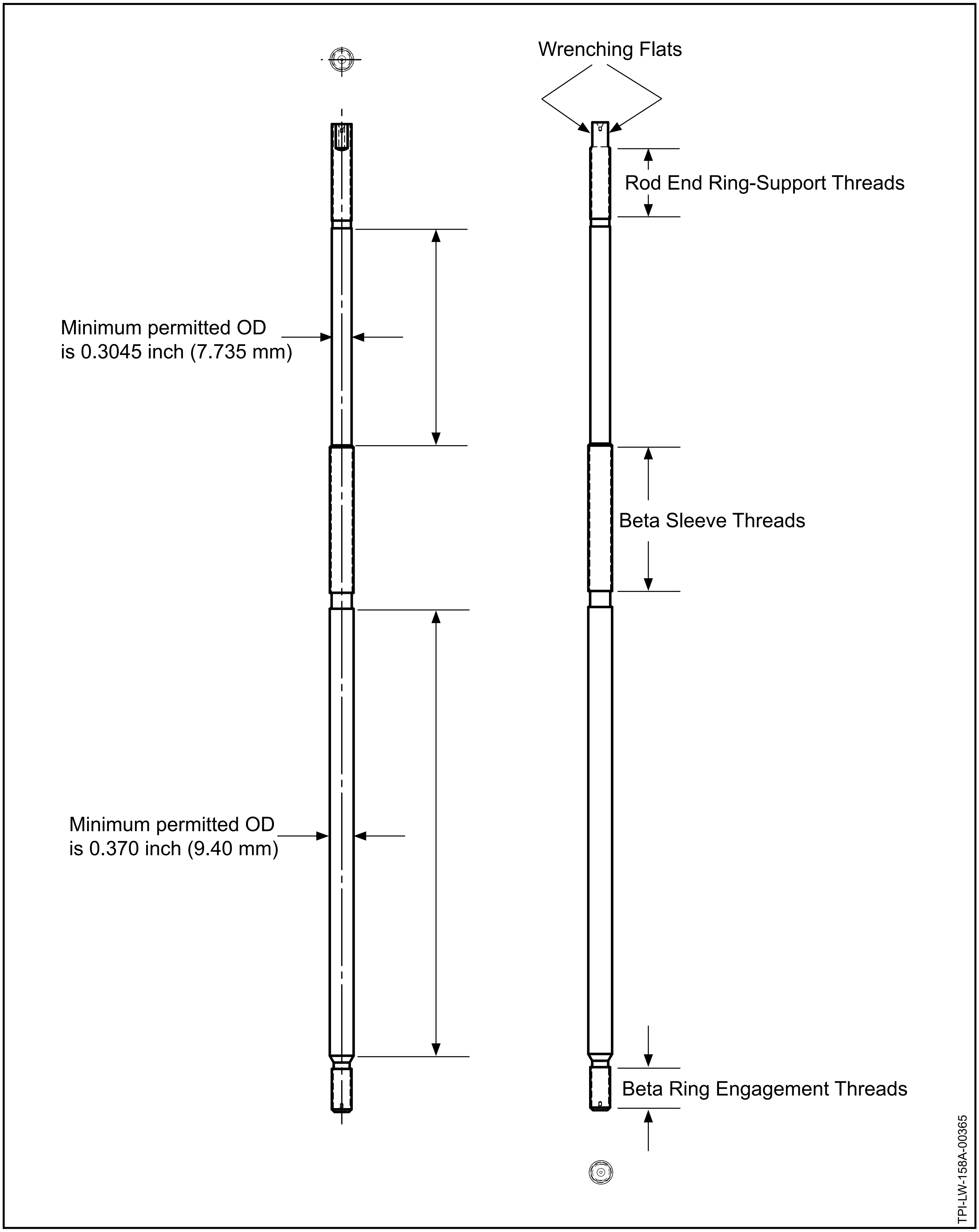

106865 Beta Rod
Figure 5-58

Component Inspection Criteria
Table 5-1

Inspect		Serviceable Limits	Corrective Action
AX.	106865 BETA ROD (Item 1330) (Refer to Figure 5-58)		
(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 beta sleeve threads for damage or wear.	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 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.
(6)	Measure the OD of each beta rod.	Refer to Figure 5-58 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
AX. <u>106865 BETA ROD, CONTINUED</u> (Item 1330) (Refer to Figure 5-58)		
(8) Fluorescent penetrant inspect each beta rod in accordance with the fluorescent penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). <u>CAUTION</u>: DO NOT REMOVE HARD CHROME TO PERFORM THIS INSPECTION.	A crack is not permitted.	If there is a crack, replace the beta rod.

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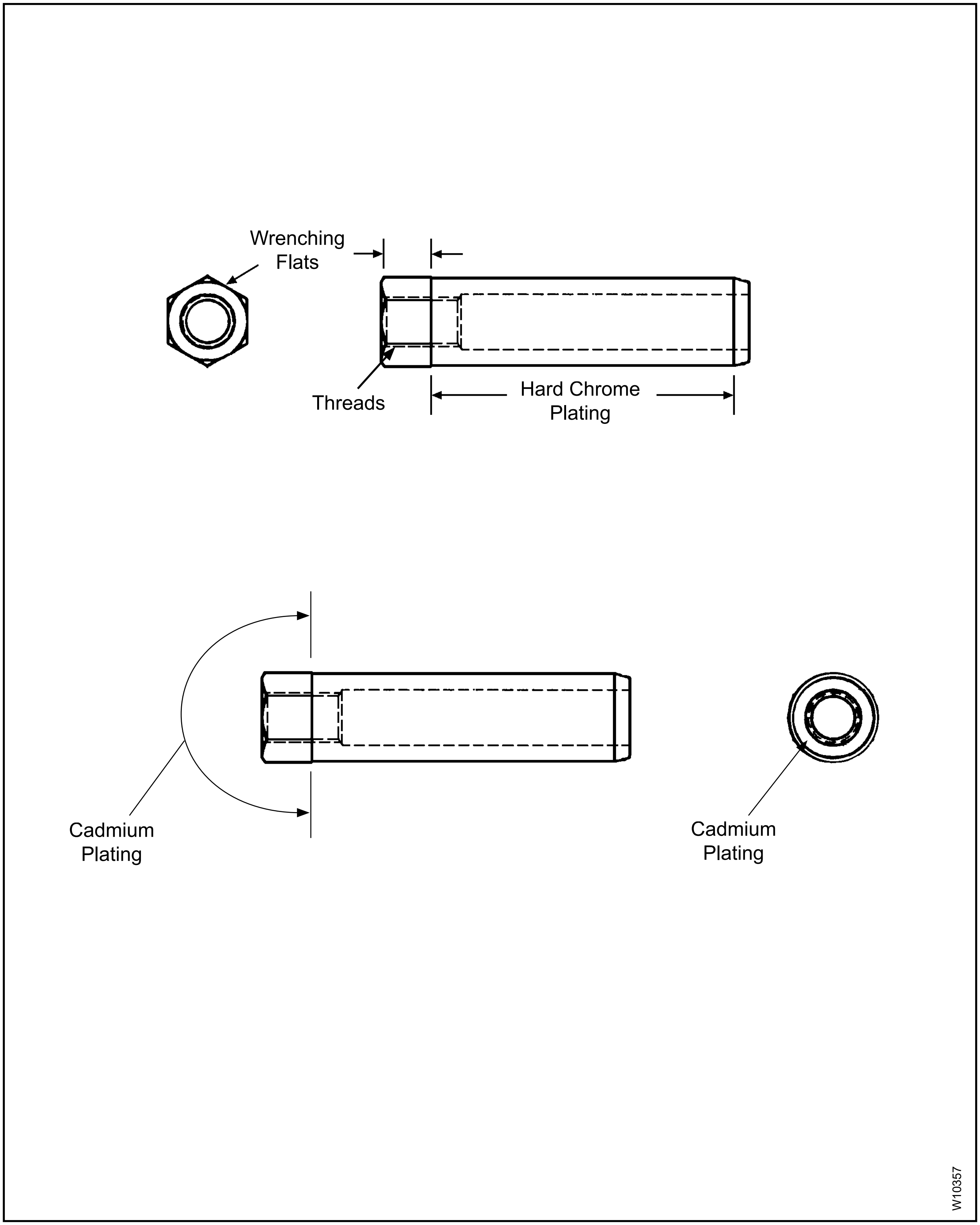
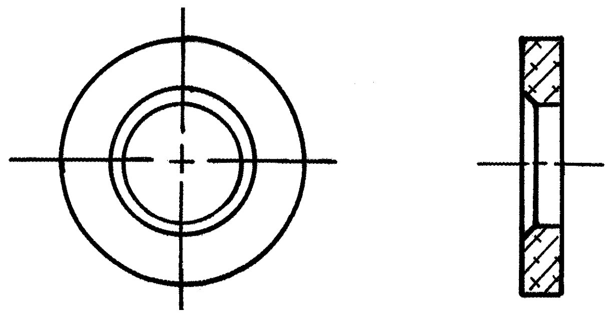


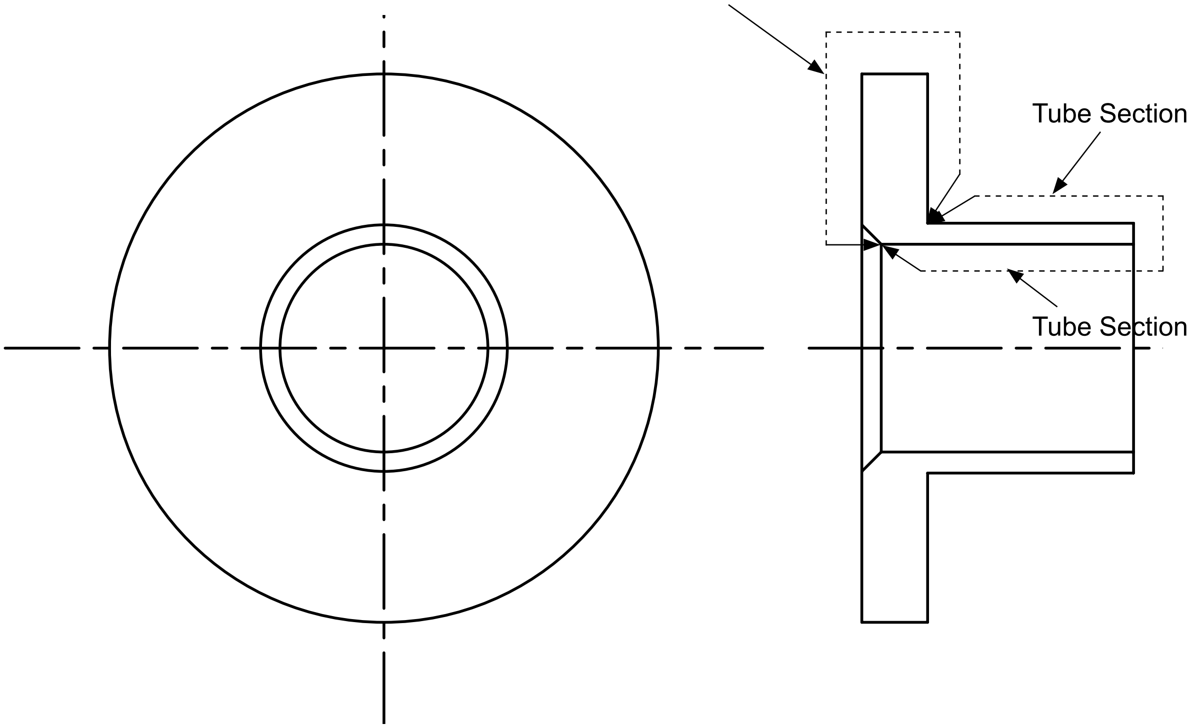
Threaded Beta Sleeve
Figure 5-59

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
AY. THREADED BETA SLEEVE (Item 1340) (Refer to Figure 5-59)		
(1) Visually examine the beta sleeve for corrosion product and pitting.	In areas of cadmium plating, corrosion product is not permitted. The maximum permitted depth of pitting is 0.005 inch (0.12 mm). In areas of hard chrome plating, corrosion product or pitting is not permitted.	Remove corrosion product with glass bead cleaning. Refer to the Cleaning chapter of Hartzell Standard Practices Manual 202A (61-01-02). If corrosion product or the depth of pitting is greater than the permitted serviceable limits, replace the threaded beta sleeve.
(2) Visually examine the threads for damage.	One thread total accumulated damage is permitted.	If the damage is greater than the permitted serviceable limits, replace the threaded beta sleeve.
(3) Visually examine the wrenching flats for damage.	Sufficient flat surface must remain on two opposing flats to permit an open-end wrench to engage.	If a wrench will not engage, replace the threaded beta sleeve.
(4) Visually examine the threaded beta sleeve for hard chromium coverage.	Except for a few scratches and corners with hard chromium coating missing, complete coverage is required.	If the coverage is less than the permitted serviceable limits, replace the threaded beta sleeve.
(5) Visually examine the threaded beta sleeve for cadmium plating coverage.	Except for a few minor scratches and corners with cadmium plating missing, complete coverage is required in the area indicated in Figure 5-59.	If the coverage is less than the permitted serviceable limits, replate the threaded beta sleeve in accordance with the Cadmium Replating chapter of Hartzell Standard Practices Manual 202A (61-01-02).
(6) Visually examine the beta sleeve 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 or operation of the beta adjust nut.	If the depth of damage is greater than the permitted serviceable limits, replace the threaded beta sleeve.



A-3668 - Replaced by B-6267



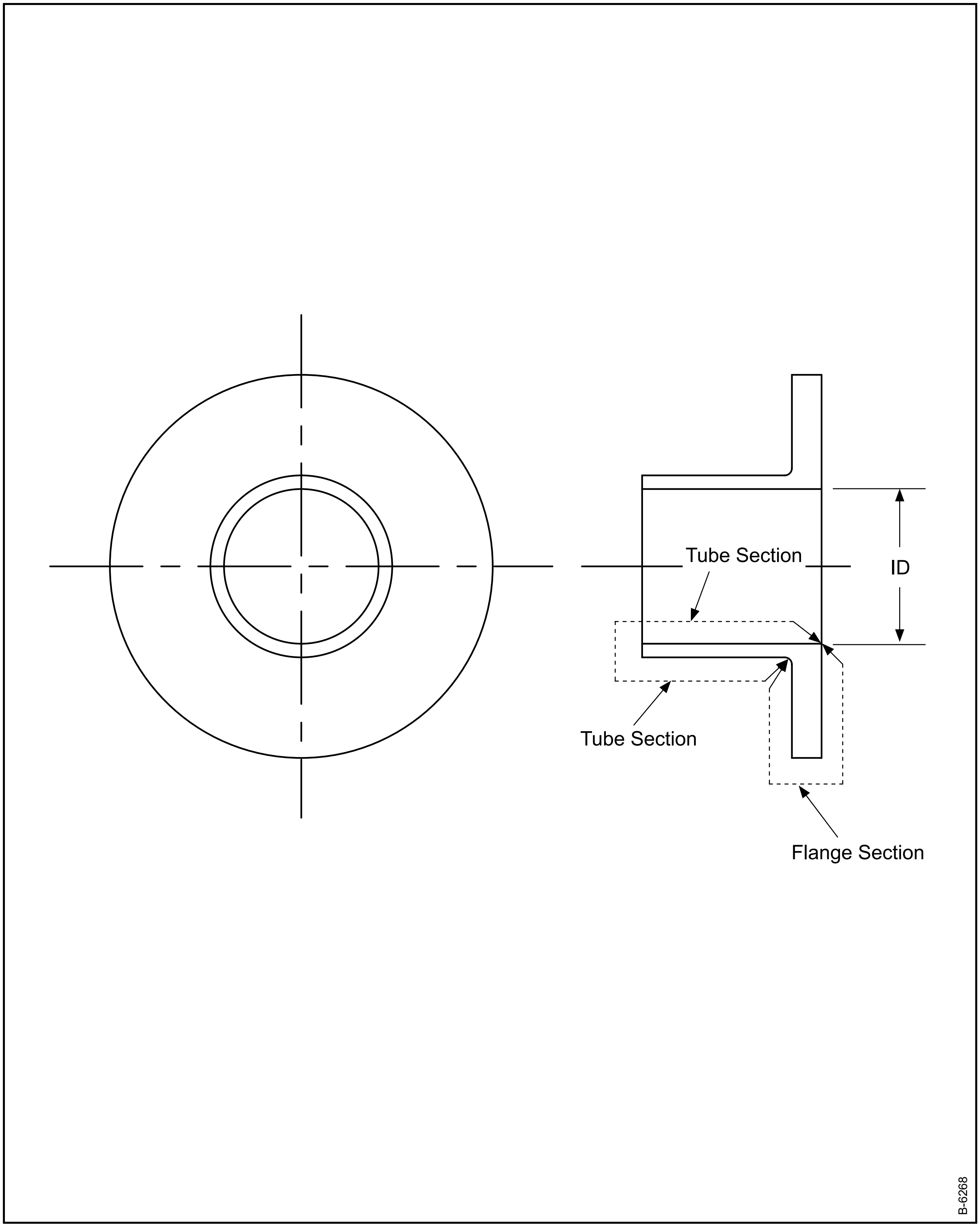
B-6267- Replaces A-3668

A-3668, B-6267

Flanged Spring Retainer
Figure 5-60

Component Inspection Criteria
Table 5-1

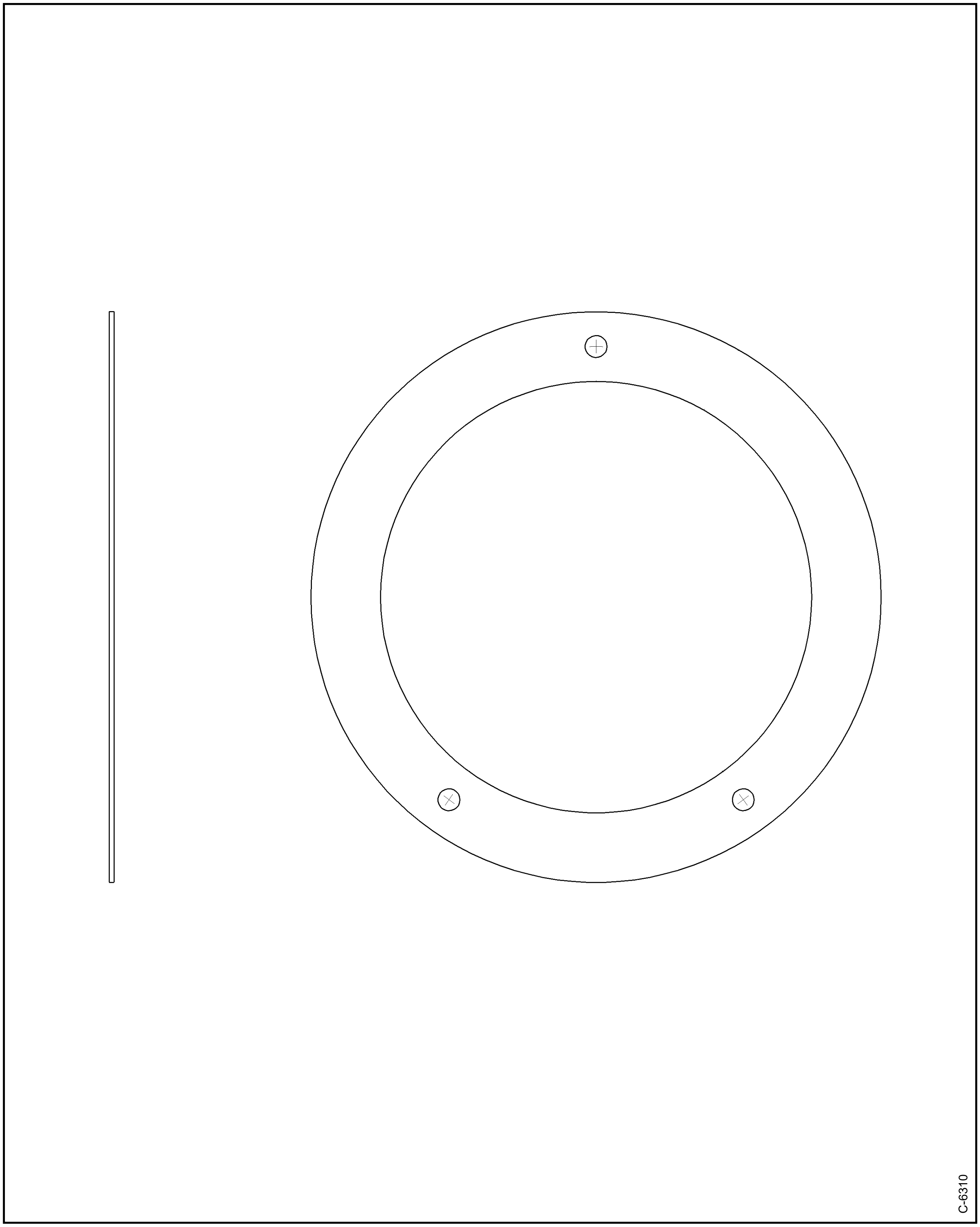
Inspect	Serviceable Limits	Corrective Action
AZ. FLANGED SPRING RETAINER (Item 1360) (Refer to Figure 5-60)		
(1) Identify the part number of the spring retainer.	The part must be the B-6267 flanged spring retainer.	If the part is not the B-6267 flanged spring retainer, replace the with the B-6267 flanged spring retainer.
(2) Visually examine each flanged spring retainer for corrosion product and pitting.	Corrosion product is not permitted. If there is pitting, measure the pitting. 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 Standard Practices Manual 202A (61-01-02). If corrosion product or the depth of pitting is greater than the permitted serviceable limits, replace the flanged spring retainer.
(3) Visually examine each flanged spring retainer for wear.	If the flanged spring retainer has wear, measure the wear. In the tube section, the maximum permitted depth of material loss is 0.003 inch (0.07 mm). In the flange section, the maximum permitted depth of material loss is 0.005 inch (0.12 mm)	If the wear is greater than the permitted serviceable limits, replace the flanged spring retainer.
(4) Visually examine the flanged spring retainer for cadmium plating coverage.	A maximum of 10% of the base metal visible is permitted.	If the cadmium plating coverage is less than the permitted serviceable limits, cadmium replate and bake the flanged spring retainer in accordance with the Cadmium Replating chapter in Hartzell Standard Practices Manual 202A (61-01-02).



Spring Guide
Figure 5-61

Component Inspection Criteria
Table 5-1

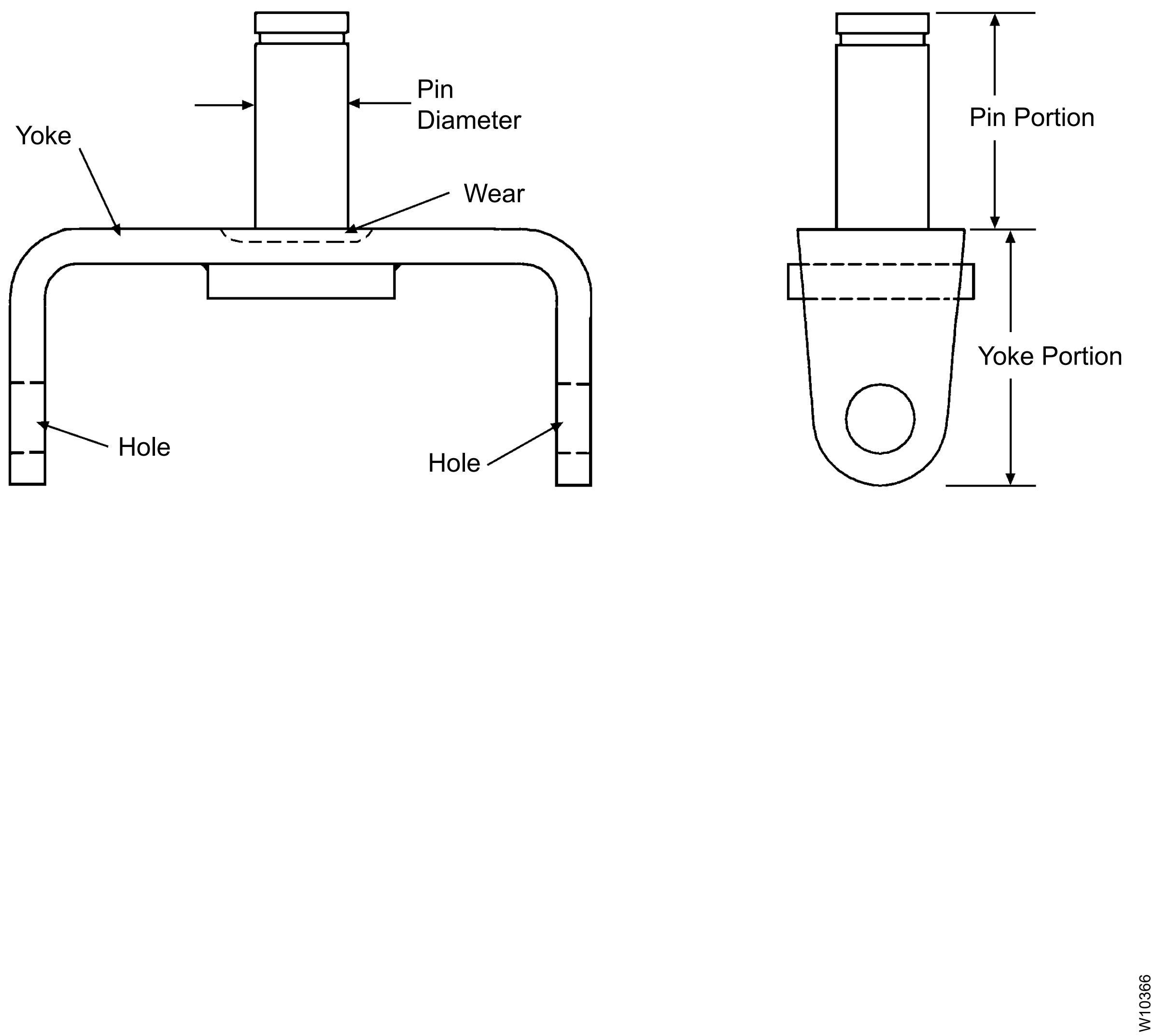
Inspect		Serviceable Limits	Corrective Action
BA.	SPRING GUIDE (Item 1390) (Refer to Figure 5-61)		
(1)	Visually examine each beta spring guide for corrosion product, damage, and pitting.	Corrosion product is not permitted. If the spring guide is damaged, meassure the damage. The maximum permitted depth of damage or pitting is 0.005 inch (0.12 mm).	Remove corrosion product using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Standard Practices Manual 202A (61-01-02). If the corrosion product or the depth of damage or pitting is greater than the permitted serviceable limits, replace the spring guide.
(2)	Visually examine each spring guide for wear.	If there is wear, measure the wear. In the tube section, the maximum permitted depth of material loss is 0.003 inch (0.07 mm). In the flange section, the maximum permitted depth of material loss is 0.005 (0.12 mm).	If the wear is greater than the permitted serviceable limits, replace the spring guide.
(3)	Visually examine the ID of the spring guide.	If there is wear, measure the ID of the spring guide The maximum permitted ID is 0.334 inch (8.48 mm).	If the ID is greater than the permitted serviceable limits, replace the spring guide.
(4)	Visually examine the spring guide for cadmium plating coverage.	A maximum of 10% of the base metal visible is permitted.	If the cadmium plating coverage is less than the permitted serviceable limits, cadmium replate and bake the spring guide in accordance with the Cadmium Replating chapter in Hartzell Standard Practices Manual 202A (61-01-02).



Beta Rod Support Ring
Figure 5-62

Component Inspection Criteria
Table 5-1

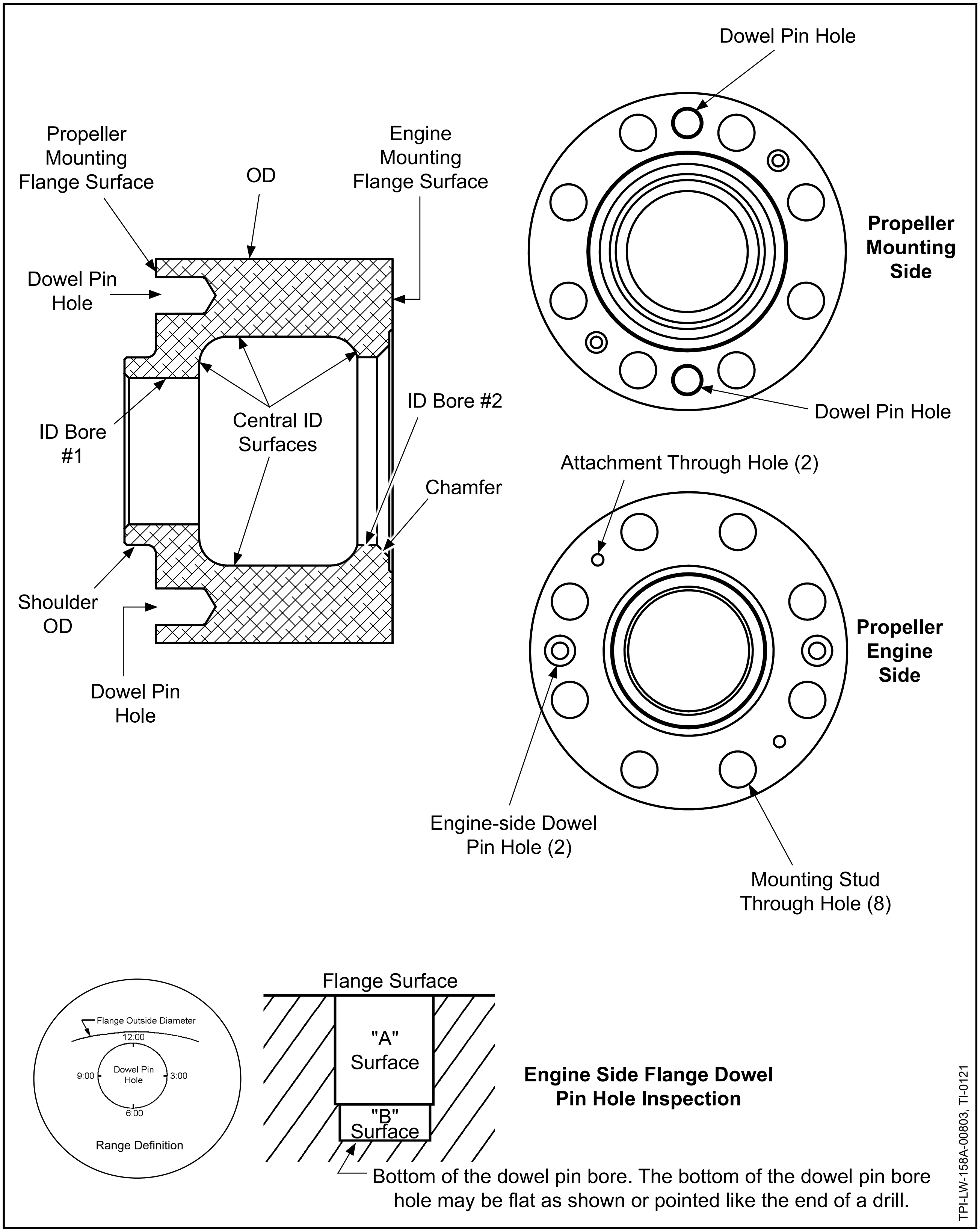
Inspect		Serviceable Limits	Corrective Action
BB.	BETA ROD SUPPORT RING (Item 1410) (Refer to Figure 5-62)		
(1)	Visually examine the beta rod support ring for corrosion product and pitting.	Corrosion product is not permitted. Pitting may not cover more than 10% of the beta rod support ring surface. 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 Standard Practices Manual 202A (61-01-02). If the corrosion product or 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 wear. The maximum permitted depth of material loss 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. Dimensional measurement of flatness is not required.	If the flatness of the beta support ring is not within the serviceable limits, replace the beta rod support ring.
(4)	Visually examine the beta rod support ring for cadmium plating coverage.	Loss of cadmium plating that is caused by the clamping nuts around each of the three holes is permitted. Sparse and light, random scratches 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 the beta rod support ring in accordance with the Cadmium Replating chapter in Hartzell Standard Practices Manual 202A (61-01-02).



Yoke Unit
Figure 5-63

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
BC. YOKE UNIT (Item 1440) (Refer to Figure 5-63)		
(1) Visually examine the yoke unit for corrosion product and pitting.	Corrosion product is not permitted. 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 or 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. Damage must not interfere with the mating part.	Remove raised material that is above the normal diameter of the pin. If the damage is greater than the permitted serviceable limits, replace the yoke unit.
(3) Measure the pin diameter.	The minimum permitted diameter is 0.2475 inch (6.287 mm)	If the diameter is less than the permitted serviceable limits, replace the yoke unit.
(4) Measure the two holes in the yoke portion.	The maximum permitted diameter is 0.1895 inch (4.813 mm).	If the diameter is greater than the permitted serviceable limits, replace the yoke unit.
(5) Visually examine the yoke portion where the pin and yoke meet for wear.	The maximum permitted depth of wear is 0.005 inch (0.12 mm).	If the depth of wear is greater than the 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.	Replate the yoke unit in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Mounting Spacer and Flange Dowel Pin Hole
Figure 5-64

Component Inspection Criteria
Table 5-1

Inspect		Serviceable Limits	Corrective Action
BD. MOUNTING SPACER (Item 1650) (Refer to Figure 5-64)			
(1)	Remove the dowel pins and visually examine the mounting spacer for corrosion product.	Corrosion product is not permitted.	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 mounting spacer.
(2)	Visually examine the OD of the mounting spacer for nicks, scratches, gouges, pitting, or other damage.	The maximum permitted depth of a nick, scratch, gouge, pitting, or damage is 0.004 inch (0.10 mm). The maximum permitted diameter of an individual pit is 0.062 inch (1.58 mm). Linear pitting is not permitted. The maximum permitted total area of all described damage is 1 sq. inch (645 sq. mm).	Repair is permitted to a depth of 0.010 inch (0.25 mm). The maximum permitted total area of damage and repair is 1 sq. inch (645 sq. mm). If the damage or repair is greater than the permitted serviceable limits or the corrective action limits, replace the mounting spacer.
(3)	Visually examine both mounting flange surfaces of the mounting spacer for nicks, scratches, gouges, pitting, or other damage.	The maximum permitted depth of a nick, scratch, gouge, pitting, or damage is 0.002 inch (0.05 mm). Material may not be pushed up above the undamaged adjacent surfaces. The maximum permitted diameter of an individual pit is 0.062 inch (1.58 mm). Linear pitting is not permitted.	Repair is permitted to a depth of 0.005 inch (0.12 mm). The maximum permitted total area of damage and repair is 1 sq. inch (645 sq. mm). The maximum permitted area of an individual repair is 0.25 sq. inch and must be at least 0.250 inch (6.35 mm) from any other repaired area. If the damage or repair is greater than the permitted serviceable limits or the corrective action limits, replace the mounting spacer.
(4)	Visually examine for wear on the shoulder OD of the mounting spacer that interfaces with the propeller hub.	If there is wear, measure the OD of the shoulder. The minimum permitted diameter is 2.559 inch (65.00 mm).	If the OD is less than the permitted serviceable limits, replace the mounting spacer.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
BD. MOUNTING SPACER, CONTINUED (Item 1650) (Refer to Figure 5-64)		
(5) Visually examine the ID bore #1 of the mounting spacer for nicks, scratches, gouges, pitting, or other damage.	The maximum permitted depth of a nick, scratch, gouge, pitting, or damage is 0.002 inch (0.05 mm). The maximum permitted diameter of an individual pit is 0.062 inch (1.58 mm). Linear pitting is not permitted. The maximum permitted total area of all described damage is 1 sq. inch (645 sq. mm).	Repair is permitted to a depth of 0.005 inch (0.12 mm). The maximum permitted total area of damage and repair is 0.5 sq. inch (322 sq. mm). If the damage or repair is greater than the permitted serviceable limits or the corrective action limits, replace the mounting spacer.
(6) Visually examine the central ID surfaces of the mounting spacer for nicks, scratches, gouges, pitting, or other damage.	The maximum permitted depth of a nick, scratch, gouge, pitting, or damage is 0.004 inch (0.10 mm). The maximum permitted diameter of an individual pit is 0.062 inch (1.58 mm). Linear pitting is not permitted. The maximum permitted total area of all described damage is 1 sq. inch (645 sq. mm).	Repair is permitted to a depth of 0.010 inch (0.25 mm). The maximum permitted total area of damage and repair is 1 sq. inch (645 sq. mm). If the damage or repair is greater than the permitted serviceable limits or the corrective action limits, replace the mounting spacer.
(7) Visually examine each dowel pin hole on the propeller mounting side of the mounting spacer for nicks, scratches, damage, or pitting.	The maximum permitted depth of a nick, scratch, damage, or pitting is 0.002 inch (0.05 mm). The maximum permitted diameter of an individual pit is 0.062 inch (1.58 mm). Linear pitting is not permitted.	Repair is permitted to a depth of 0.005 inch (0.12 mm). Damage or repair must not affect the tight fit of the dowel pin. If the mounting spacer is not within the permitted serviceable limits or the corrective action limits, replace the mounting spacer.
(8) Examine the dowel pin holes on the propeller mounting side of the mounting spacer for the fit of a dowel pin.	A dowel pin must not be able to be inserted or removed from the dowel pin hole without using tools.	If a dowel pin can be inserted or removed from the dowel pin hole without using tools, replace the mounting spacer.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
BD. MOUNTING SPACER, CONTINUED (Item 1650) (Refer to Figure 5-64)		
(9) Visually examine the dowel pin hole on the engine side of the mounting spacer for damage at surface "A" between the 10:30 to 1:30 range and the 4:30 to 7:30 range.	Damage or pits are permitted to a maximum depth of 0.002 inch (0.05 mm). The maximum permitted diameter of an individual pit is 0.062 inch (1.57 mm). Pushed-up material is not permitted. The maximum permitted amount of damage or pitting is 20% of the surface. Linear pitting is not permitted.	The maximum depth of repair permitted is 0.005 inch (0.12 mm). The repair and serviceable limits combined must not be greater than 50% of either the 10:30 to 1:30 range or 50% of the 4:30 to 7:30 range. If the serviceable limits or the repair limits are exceeded, replace the mounting spacer.
(10) Visually examine the dowel pin hole on the engine side of the mounting spacer for damage at surface "A" between the 1:30 to 4:30 range and the 7:30 to 10:30 range.	Damage or pits are permitted to a maximum depth of 0.002 inch (0.05 mm). The maximum permitted diameter of an individual pit is 0.062 inch (1.57 mm). Pushed-up material is not permitted. The maximum permitted amount of damage or pitting is 20% of the surface. Linear pitting is not permitted.	The maximum depth of repair permitted is 0.005 inch (0.12 mm). The repair and serviceable limits combined must not be greater than 20% of either the 1:30 to 4:30 range or 20% of the 7:30 to 10:30 range. If the serviceable limits or the repair limits are exceeded, replace the mounting spacer.
(11) Visually examine the dowel pin hole on the engine side of the mounting spacer for damage at Surface "B" (this surface does not contact the dowel pin).	The maximum permitted depth of damage or pitting is 0.002 inch (0.05 mm). The maximum permitted diameter of an individual pit is 0.062 inch (1.57 mm). Linear pitting is not permitted.	The maximum depth of repair permitted is 0.007 inch (0.17 mm). If the serviceable limits or the repair limits are exceeded, replace the mounting spacer.
(12) Visually examine the bottom surface of the dowel pin hole on the engine side of the mounting spacer for damage.	The maximum permitted depth of damage or a pit is 0.002 inch (0.05 mm). The maximum permitted diameter of an individual pit is 0.062 inch (1.57 mm). Linear pitting is not permitted. .	The maximum permitted depth of repair is 0.007 inch (0.17 mm). If the serviceable limits or the repair limits are exceeded, replace themounting spacer.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
BD. MOUNTING SPACER, CONTINUED (Item 1650) (Refer to Figure 5-64)		
(13) Visually examine the ID of each mounting through hole of the mounting spacer for nicks, scratches, damage, or pitting.	The maximum permitted depth of a nick, scratch, damage, or pitting is 0.002 inch (0.05 mm). The maximum permitted diameter of an individual pit is 0.062 inch (1.58 mm). Linear pitting is not permitted.	Repair is permitted to a depth of 0.004 inch (0.10 mm). Damage or repair must not affect the fit of the mounting spacer with the mating part. If the mounting spacer is not within the permitted serviceable limits or the corrective action limits, replace the mounting spacer.
(14) Measure the ID of each through hole of the mounting spacer.	The maximum permitted ID is 0.615 inch (15.62 mm).	If the ID is greater than the permitted serviceable limits, replace the mounting spacer.
(15) Visually examine ID bore #2 of the mounting spacer for nicks, scratches, damage, or pitting.	The maximum permitted depth of a nick, scratch, damage, or pitting is 0.002 inch (0.05 mm). The maximum permitted diameter of an individual pit is 0.062 inch (1.58 mm). Linear pitting is not permitted.	Repair is permitted to a depth of 0.003 inch (0.07 mm). The maximum total damage or repair is 25% of the circumference. If the mounting spacer is not within the permitted serviceable limits or the corrective action limits, replace the mounting spacer.
(16) Visually examine the chamfer of the mounting spacer for nicks, scratches, damage, or pitting.	Nicks, scratches, damage, and pitting are not permitted.	If there are nicks, scratches, damage, or pitting, replace the mounting spacer.
(17) Visually examine the ID of the attachment through holes for nicks, scratches, damage, or pitting.	The maximum permitted depth of a nick, scratch, damage, or pitting is 0.002 inch (0.05 mm). The maximum permitted diameter of an individual pit is 0.062 inch (1.58 mm). Linear pitting is not permitted.	Repair is permitted to a depth of 0.004 inch (0.10 mm). If beyond limits, replace the mounting spacer.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
BD. MOUNTING SPACER, CONTINUED (Item 1650) (Refer to Figure 5-64)		
(18) Penetrant inspect the mounting spacer in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). NOTE: Pre-penetrant etch is not required. Do not remove the anodize.	A relevant indication is not permitted.	If there is a relevant indication, replace the mounting spacer.
(19) Visually examine the mounting spacer for anodize coverage.	A minimum of 95% anodize coverage is required.	Re-anodize the mounting spacer or repair by applying chemical conversion coating to bare aluminum in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). A maximum of 5% of bare aluminum may be covered with chemical conversion coating. If using anodizing, complete the penetrant inspection before reanodizing the mounting spacer.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
BE. BALANCE WEIGHT (Item 4010)		
(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 permitted 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 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).

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
BF. COUNTERWEIGHT SLUG A-1713 OR 104706 (STEEL BASE METAL) (Item 5040)		
(1) Visually examine each counterweight slug for corrosion product.	Corrosion product is not permitted.	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.		
(2) 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, wear, or repair that interferes with installation, fit, or function of the counterweight slug is not permitted.	Using an abrasive pad CM47 or equivalent, polish to a maximum depth of 0.010 inch (0.25 mm). If the depth of pitting, wear, or repair is greater than the permitted serviceable limits or the corrective action limits, replace the counterweight slug.
(3) Visually examine each counterweight slug for scratches, gouges, or other damage.	The maximum permitted depth of a scratch, gouge, or other damage is 0.035 inch (0.88 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.
(4) Visually examine each counterweight slug for cadmium plating coverage.	Except for a few scratches and corners with cadmium plating missing, complete coverage is required.	If the coverage is less than the permitted serviceable limits, replate the counterweight slug in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

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REPAIR - CONTENTS

LIST OF FIGURES

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 HARTZELL PROPELLER INC. 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 MUST 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 by 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. 3)

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) Aluminum Blades: Refer to Hartzell Propeller Inc. Aluminum Blade Overhaul Manual 133C (61-13-33).

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

D. Spinner Assemblies

(1) Metal Spinners: Refer to Hartzell Propeller Inc. Metal Spinner Maintenance Manual 127 (61-16-27).

(2) 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).

3. Specific Repair Requirements

A. Repair of a Damaged Balance Weight Attachment Holes

(1) For requirements and procedures for repair of a balance weight attachment hole, refer to the Aluminum Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

B. Repair of a Damaged Lubrication Fitting Hole

(1) For requirements and procedures for repair of damaged lubrication fitting hole, refer to the Aluminum Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

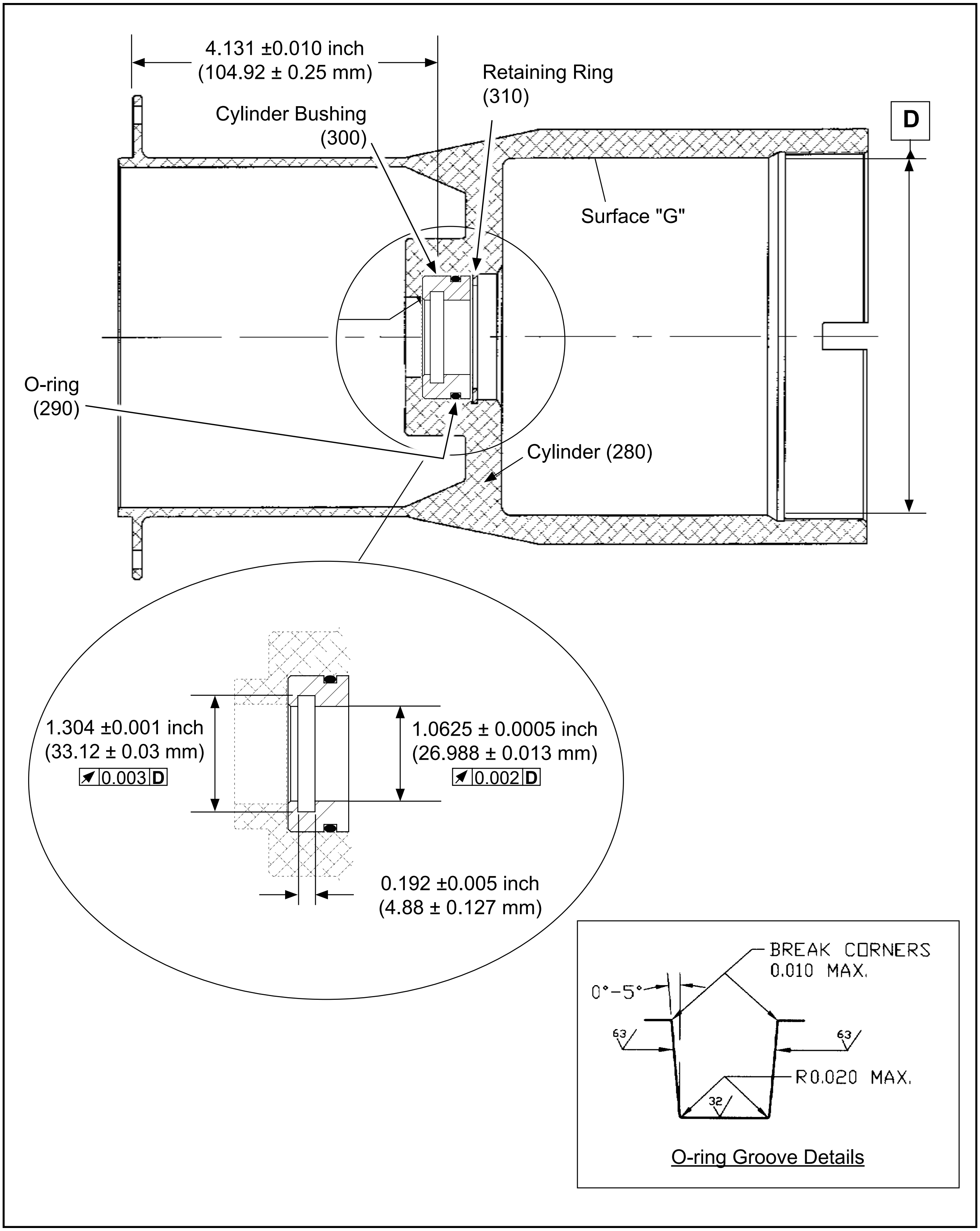
C. Cylinder Bushing Installation Procedure for a Previously Removed Bushing

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) Apply lubricant CM60 to the O-ring (290).

(2) Install the O-ring (290) in the small bore of the cylinder (280), positioning the O-ring against the back wall.

(3) Apply lubricant CM60 to the ID of the cylinder (280) bore and the OD of the cylinder bushing (300)



Installing a New Cylinder Bushing
Figure 6-1

<u>CAUTION</u>: THE INDEXING MARK ON THE BUSHING MUST ALIGN WITH THE INDEXING MARK ON THE CYLINDER. IF EITHER INDEXING MARK IS MISSING, THE BUSHING MUST BE REPLACED.

(4) Align the indexing mark on the cylinder bushing with the indexing mark on the cylinder.

(5) Press the cylinder bushing (300) into the cylinder (280).

(6) Install the retaining ring (310) in the groove in the cylinder (280) to retain the bushing (300).

(7) Dimensionally inspect the bushing ID bore and the O-ring groove OD in accordance with the serviceable limits specified for the cylinder bushing (300) in the Check chapter of this manual.

(8) If the dimensional inspection of the bushing ID bore and the O-ring groove OD is not within serviceable limits, replace the bushing (300) in accordance with the section "Installation of a New Cylinder Bushing" in this chapter.

D. Installation of a New 108298 Cylinder Bushing

(1) General

(a) These instructions provide a procedure to install a new 108298 bushing in a cylinder.

(2) Procedure

(a) Apply grease CM12 to the O-ring (290).

(b) Install the O-ring (290) in the O-ring groove on the OD of the cylinder bushing (300).

(c) Apply grease CM12 to the cylinder (280) bore.

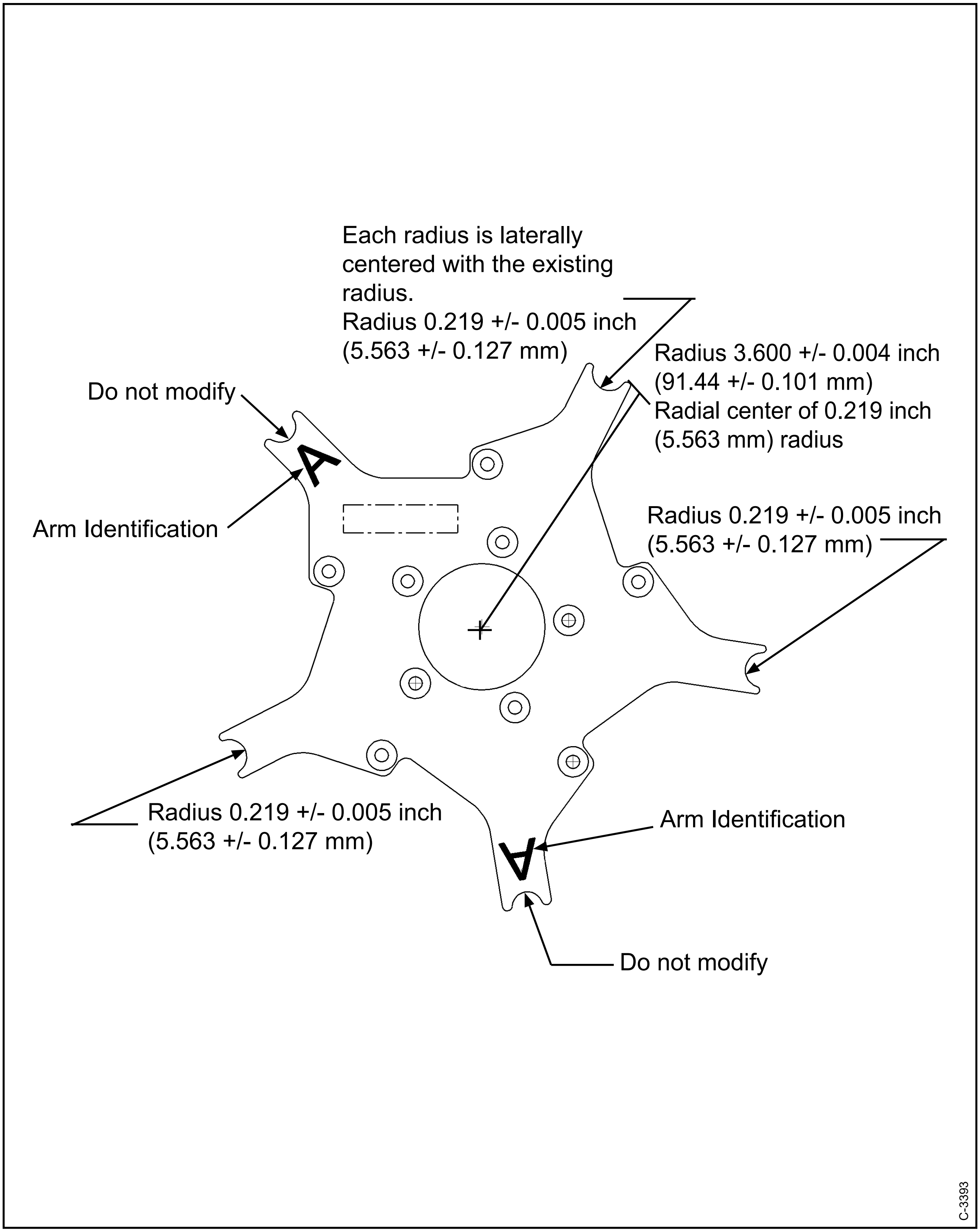
(d) Position the new cylinder bushing (300) with the O-ring (290) closest to the retaining ring groove as shown in Figure 6-1, then press the cylinder bushing into the bore of the cylinder.

(e) Install the retaining ring (310) in the retaining ring groove of the cylinder (280) to retain the cylinder bushing (300).

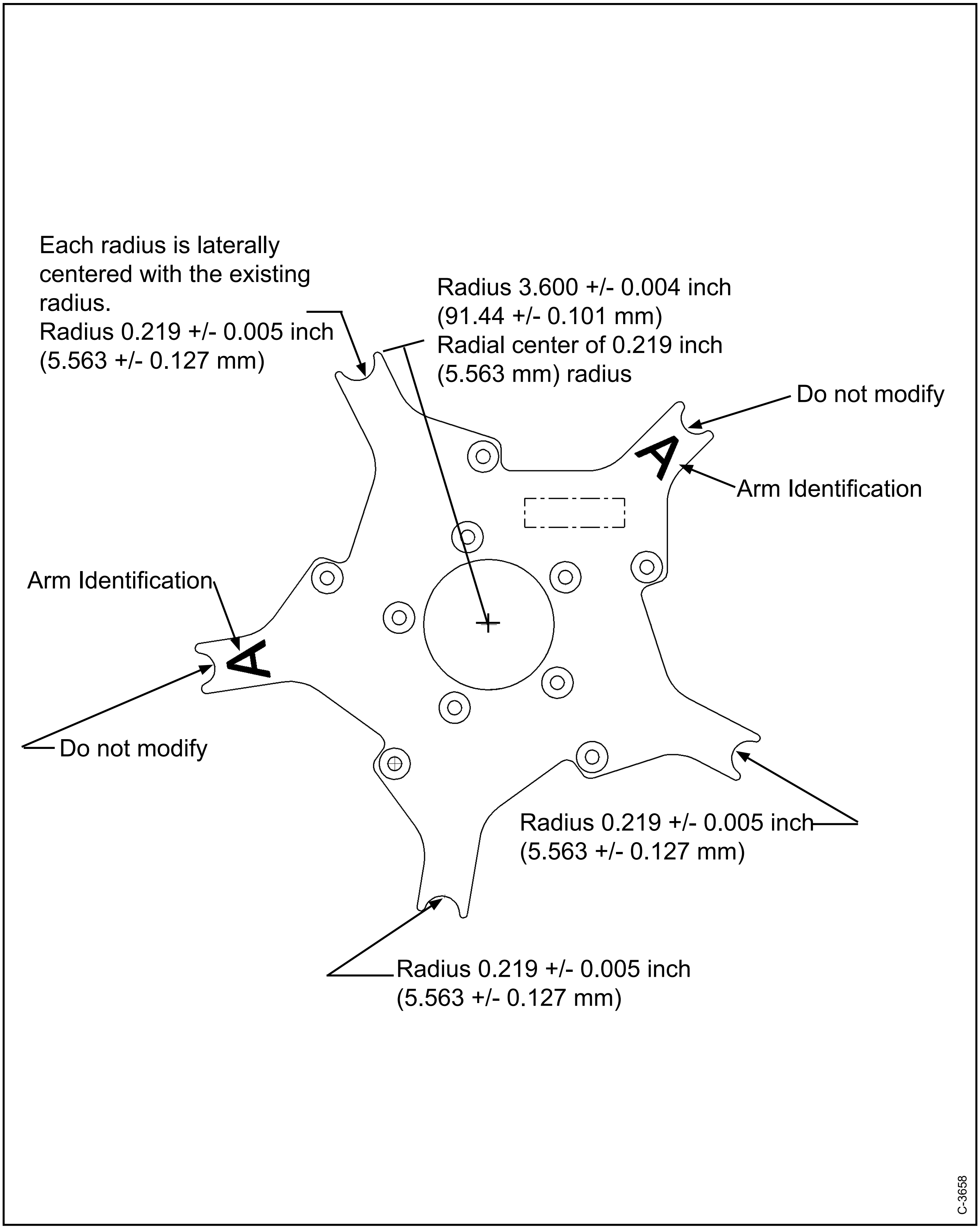
<u>CAUTION</u>: THE O-RING GROOVE DETAILS SHOWN IN FIGURE 6-1 THAT CONTROL SHAPE, CORNER RADII, AND SURFACE FINISH MUST BE INCLUDED IN THE MACHINED O-RING GROOVE.

(f) Bore the ID of the cylinder bushing (300) to the dimensions and position controls specified in Figure 6-1.

(g) Bore the O-ring groove in the cylinder bushing (300) to the dimension and position controls specified in Figure 6-1.



C-3393, Fork Plate, Left-Hand
Figure 6-2



C-3658, Fork Plate, Right-Hand
Figure 6-3

E. Modification of the Fork Plate

(1) Modify the radius of the arm of the fork plate to the dimensions shown in Figure 6-2 or Figure 6-3.

(a) The radius of the arms that ride on the beta rods is increased to provide clearance for the beta rods.

(b) The radius of the arms that ride on the anti-rotation rods does not change.

(2) When modified in conjunction with a propeller overhaul, strip, replate, and bake the fork plate in accordance with Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(3) When modified at other than propeller overhaul, clean the fork plate after modification with solvent CM106) and apply a thin layer of primer CM67 to the modified areas.

(4) Using a dot peen or vibro tool, permanently mark the letter "A" on each arm of the fork plate that rides on an anti-rotation rod.

(a) The letter "A" must be approximately 0.50 inch (12.70 mm) in height so that it is visible when the fork plate is installed in the hub.

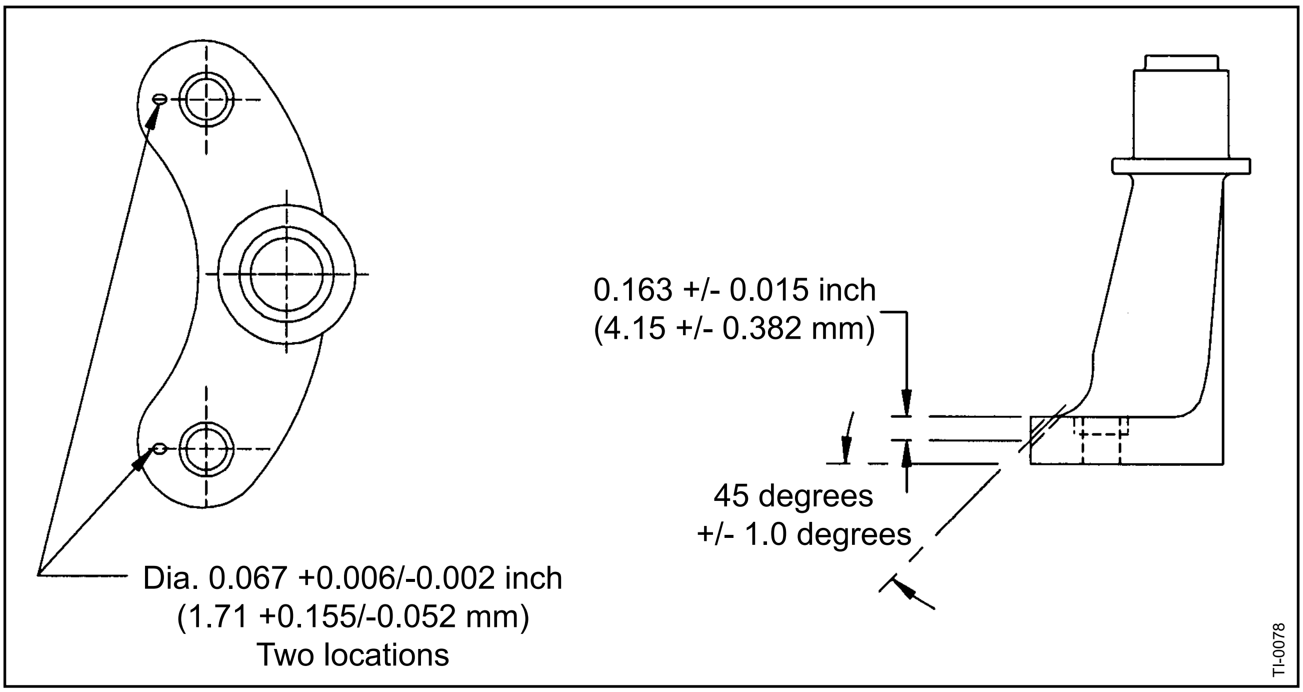
F. Modification of the Pitch Change Knob Bracket for the Addition of Safety Wire Holes

(1) Modify the pitch change knob bracket to the dimensions shown in Figure 6-4.

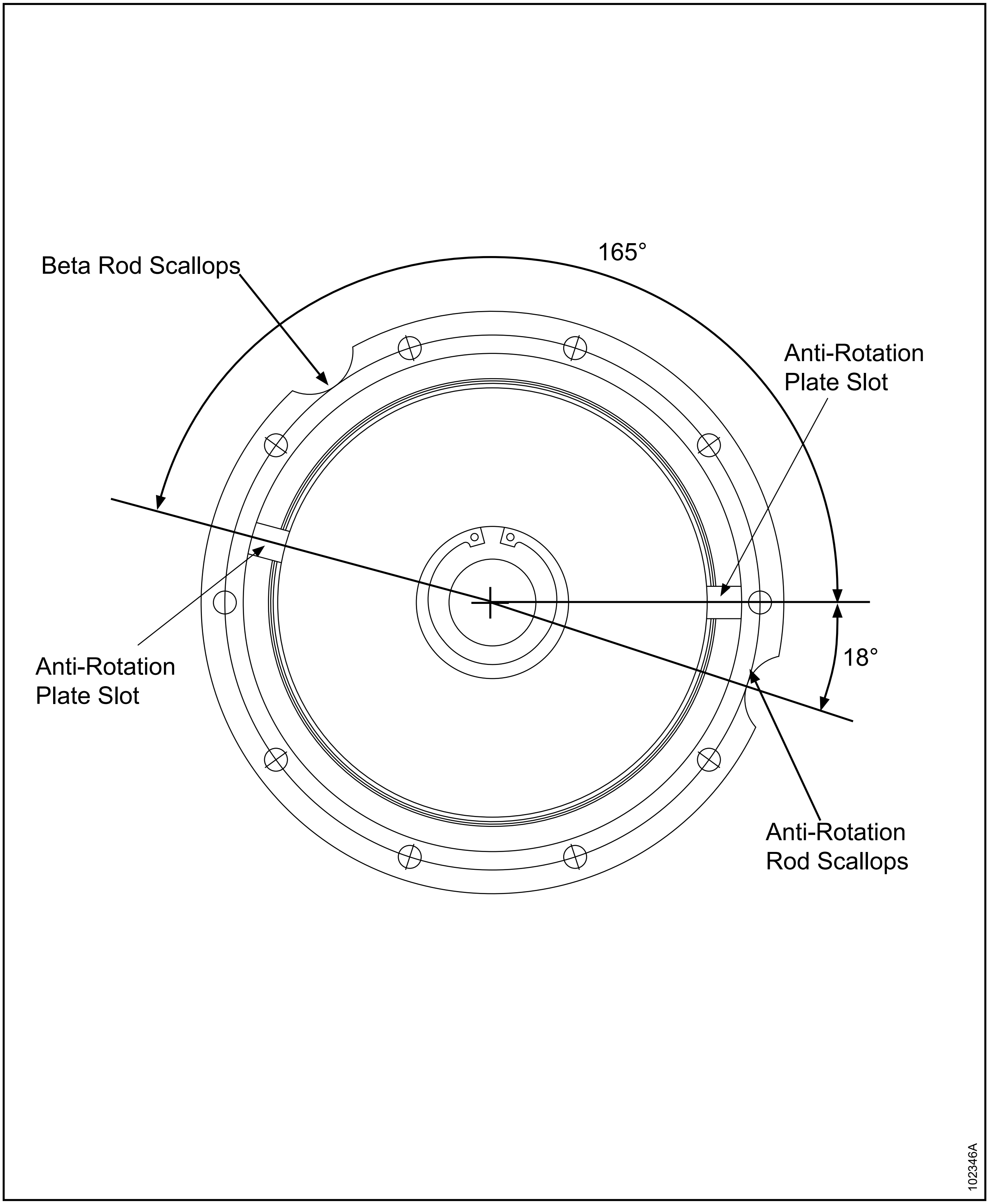
(2) Deburr the edges of the newly drilled holes.

(3) Using solvent CM106, clean the pitch change knob bracket.

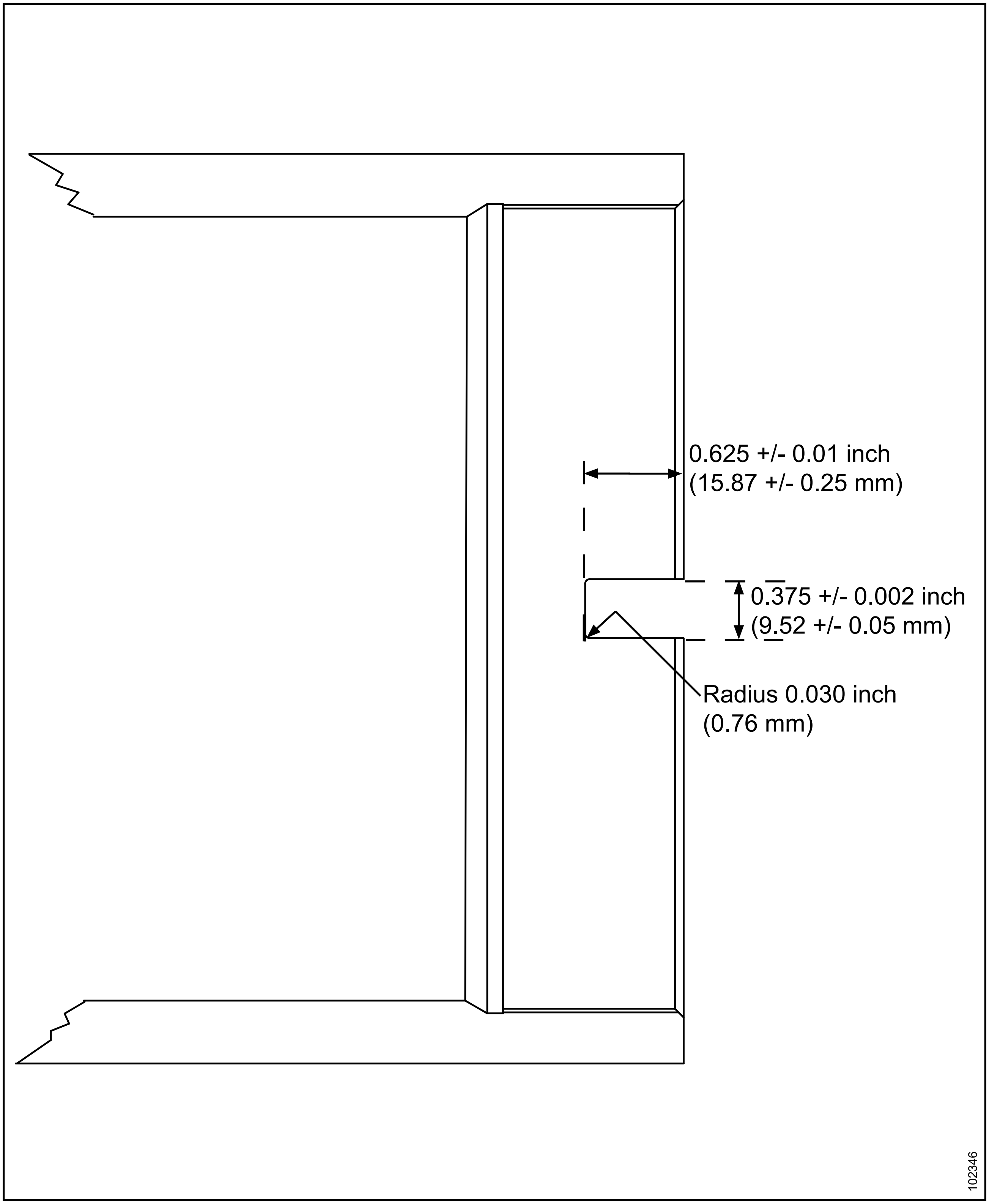
(4) Apply a thin layer of primer CM67 to the newly drilled holes.



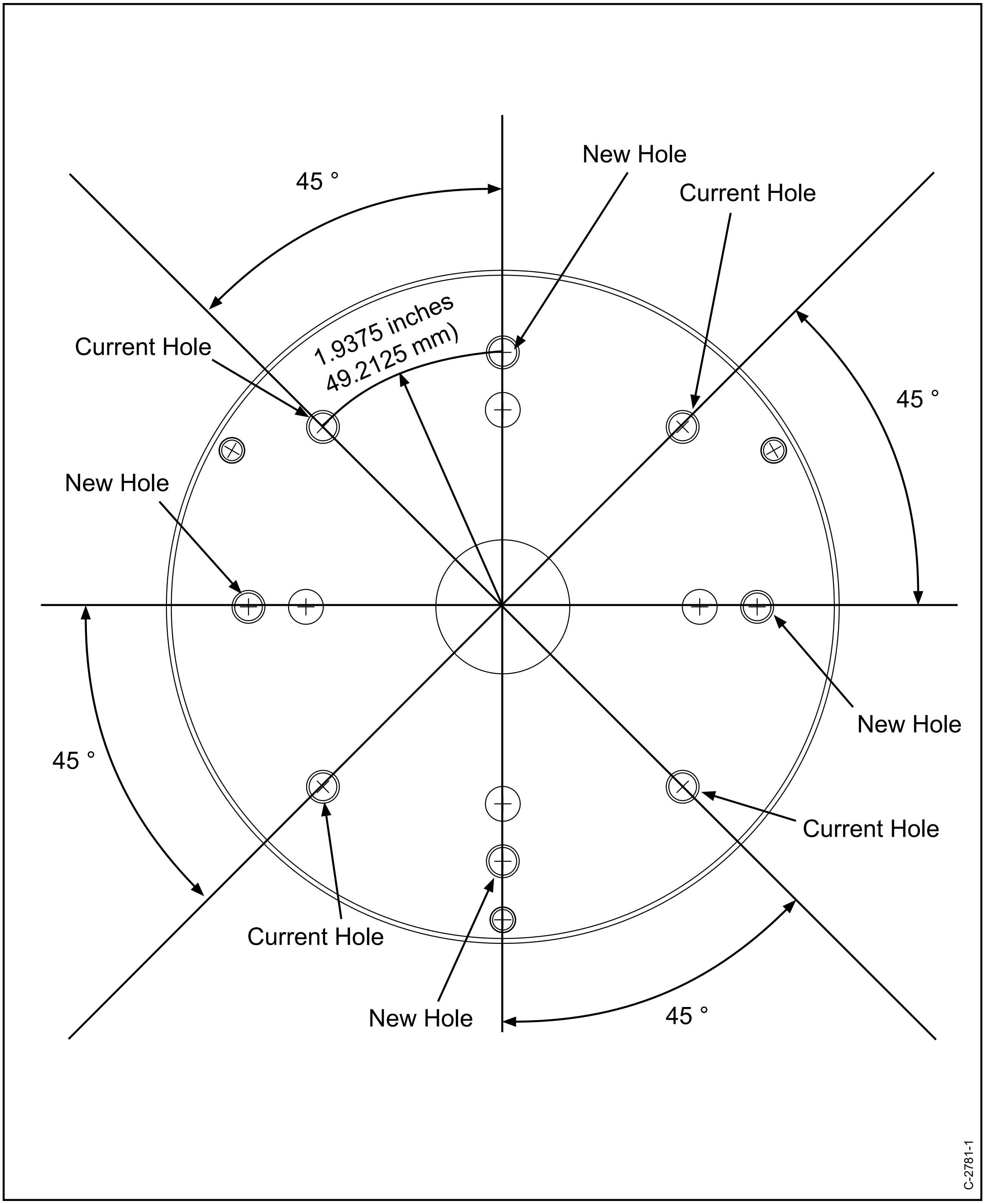
Modification of the Pitch Change Knob Bracket
Figure 6-4



Locating Slots for Anti-rotation Plate
with Reference to Center of Anti-rotation Rod Scallops
Figure 6-5



Dimensional Specifications for Cylinder Anti-rotation Plate Slots
Figure 6-6



Modification of the C-2871 Pitch Stop Plate
Figure 6-7

G. Modification of the D-2827 Cylinder and the C-2871 Pitch Stop Plate

(1) General

(a) These instructions provide a procedure for modification of the D-2827 cylinder and the C-2871 pitch stop plate.

(b) The cylinder is modified to incorporate two slots in the outboard end of the cylinder.

(c) The pitch stop plate is modified to incorporate four new holes for attachment of the anti-rotation plate.

(d) The modification of the cylinder and the pitch stop plate and the installation of the new anti-rotation plate prevent movement of the pitch stop plate.

(2) Modification Procedures

(a) Cylinder Modification

1 Perform inspections of the cylinder in accordance with the Check chapter of this manual.

2 Identify the location for the slots on the cylinder, as shown in Figure 6-5.

3 Modify the cylinder to the dimensional specifications specified in Figure 6-6.

4 Apply chemical conversion coating to the edges of the slots in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(b) Pitch Stop Plate Modification

1 Perform inspections of the pitch stop plate in accordance with the Check chapter of this manual.

2 Identify and make a mark indicating the locations for the new holes on the pitch stop plate as shown in Figure 6-7.

3 At the locations marked for the new holes, modify the pitch stop plate to add four new holes for attachment of the anti-rotation plate. The limits are as follows:

a Minor diameter 0.2110 - 0.2190 inch (5.359 - 5.563 mm).

b Thread - 1/4-28UNF-3B

c Thread depth - minimum 0.400 inch (10.16 mm)

d Maximum hole depth 0.507 inch (12.878 mm)

4 Perform an etch and penetrant inspection of the pitch stop plate in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

5 Apply chemical conversion coating to the edges of the slots and the four new holes in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

H. Feathering Compression Spring Zinc Chromate Primer Repair

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) Cleaning

(a) For procedures for cleaning the feathering compression spring (350), refer to Cleaning of Steel Parts in the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(b) Inspect the feathering compression spring (350) for scratches, corrosion, and zinc plate coverage in accordance with the Check chapter of this manual.

(c) Remove any loose material and feather the existing coating with 120 to 180 grit sandpaper.

(d) Using solvent CM106, clean the entire feathering compression spring (350).

(e) Permit the solvent CM106 to air dry.

(2) Painting

NOTE: For general information about finishing procedures, refer to the Paint and Finish chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(a) Apply a layer of zinc chromate primer, CM67, or equivalent, to the entire surface of the feathering compression spring (350).

(b) Permit the primer to dry for a minimum of 24 hours before handling.

(c) Examine the feathering compression spring (350) for complete primer coverage.

I. Replacement of the Preload Plate Threaded Insert

(1) General

(a) Preload plate model Hartzell Propeller Inc. part number 104882. incorporates a threaded insert (1095) in the set screw threaded hole.

1 Replace the threaded insert (1095), as required, in accordance with the following procedure.

(b) TE111 and TE409 are necessary tools to replace the preload plate threaded insert (1095).

(2) Insert Removal

(a) Align the tapered end of the 1227-6 Removal Tool TE111 with the bore of the threaded insert (1095).

(b) Lightly tap TE111 into the threaded insert (1095).

(c) Turn the T-handle end of TE111 counterclockwise to break loose the adhesive.

(d) Remove the threaded insert (1095) from the preload plate (1080).

(3) Thread Inspection

(a) Inspect the threaded hole of the preload plate (1080) in accordance with the check section in this manual.

(4) Threaded Insert Installation

(a) Using solvent CM106 or CM11, clean the threaded hole of the preload plate (1080) and exterior threads of the threaded insert (1095).

(b) Permit the solvent CM106 or CM11 to air dry completely.

(c) Apply a layer of primer CM127 to the threaded hole of the preload plate (1080) and to the exterior threads of the insert (1095).

(d) Permit the primer CM127 to air dry for 3 to 5 minutes.

(e) Apply a layer of retaining compound CM74 to the threaded hole of the preload plate (1080) and to the exterior threads of the insert (1095).

(f) Using installation tool TE389-1, install the insert (1095) into the threaded hole of the preload plate (1080) so that the end of the threaded insert (1095) is flush to one thread below the hole chamfer of the preload plate (1080). This is the side opposite of the counterbore.

(g) Using a clean, dry cloth, remove any excess retaining compound CM74.

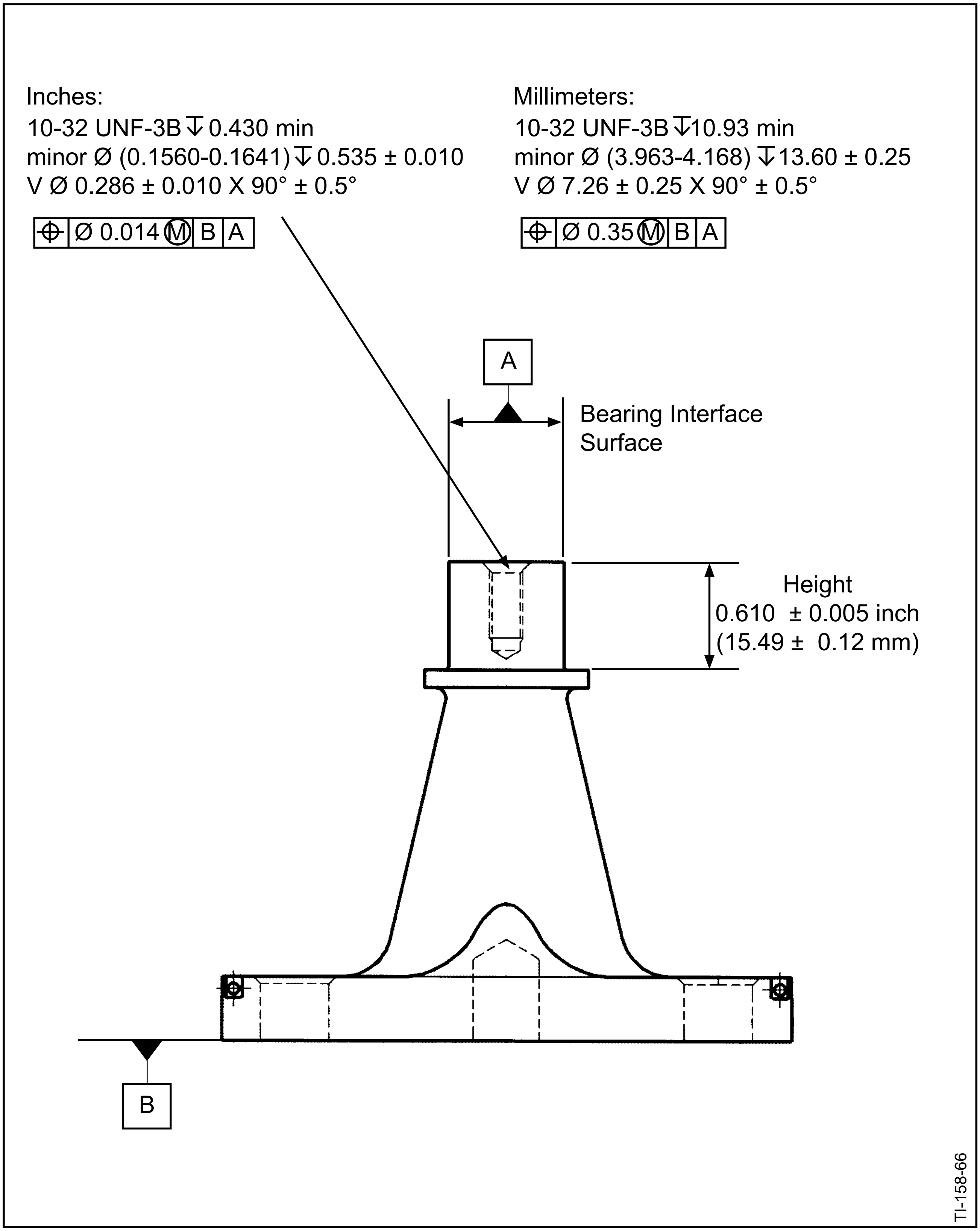
(h) Using a 0.50 inch (1.27 mm) diameter locally procured peening tool, peen the threaded insert in from the counterbored side of the preload plate (1080).

(i) Permit the retaining compound CM74 to air dry for 12 hours.

(j) Apply chemical conversion coating to the machined surface areas near either end of the threaded insert (1095) in accordance with Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(k) Using a 3/8-24UNF-3B thread plug gage, inspect the internal threads of the threaded insert to make sure that the threads of the threaded insert (1095) are not damaged.

1 If the threads of the threaded insert (1095) are damaged, remove the threaded insert and install a new threaded insert in accordance with applicable steps in this section



Pitch Change Knob Bracket Modification
Figure 6-8

J. Pitch Change Knob Bracket Modification - Refer to Figure 6-8

(1) General

(a) Inspect the pitch change knob bracket in accordance with Table 1, Component Inspection Requirements in this Service Bulletin.

1 Only inspection criteria that is associated with the retaining washer shoulder is permitted to fail inspection.

(2) Modification Procedure

(a) Mill off the retaining washer shoulder of the pitch change knob bracket to the height given in Figure 6-8.

(b) Drill, thread, and countersink/chamfer to the dimensional and true position requirement as specified in Figure 6-8.

(c) Using solvent CM106 MEK or CM219 MPK, clean the threaded hole and permit the threads to dry.

(d) Apply masking material to the pitch change knob bearing interface surface.

(e) Reapply cadmium plating and bake in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(f) Inspect all machined dimensions and true position requirements in Figure 6-8 to make sure that all specified modification requirements have been met.

(g) Using a go-no-go thread gauge, inspect the 10-32UNF-3B threaded hole to make sure that it meets the pitch diameter requirements for the specified thread.

(h) Use metal impression stamping or vibra engraving to mark the modified pitch change knob bracket with the letter "A" at the end of the part number in accordance with the Parts Identification and Marking chapter of Hartzell Standard Practices Manual 202A (61-01-02).

NOTE: A part number with an A suffix will identify that it is a modified pitch change knob bracket unit.

K. Beta Ring Repair

(1) General Repair

(a) Using a soft cotton wheel, polish the beta ring (840).

(2) Interior Surface Repair

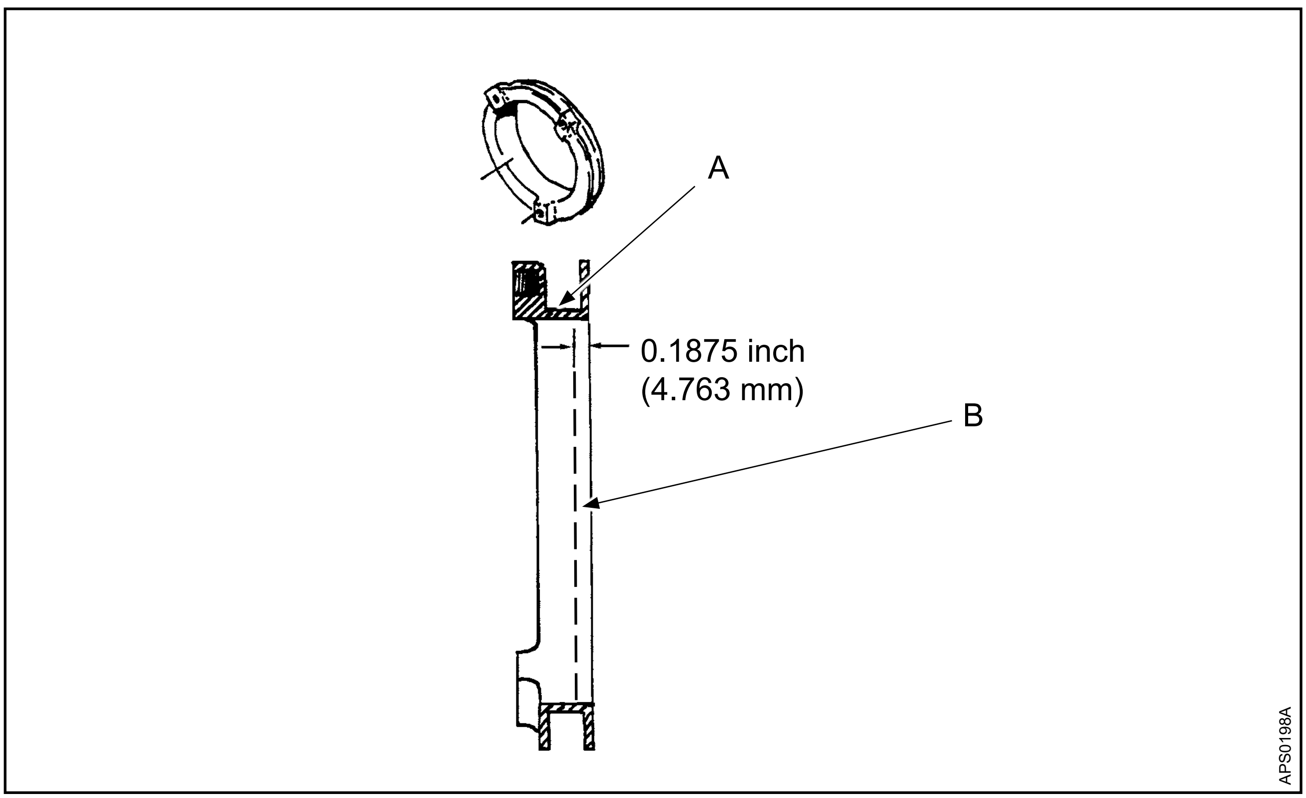
(a) The surface of the beta ring groove may be repaired if it is worn or scratched:

1 Remove grooves or scratches in areas A and B of Figure 6-9. Refer to the serviceable limits found in the Check chapter of this manual.

2 Using 80 to 120 grit emery cloth and finishing with 240 grit polishing compound, make the surfaces of the beta ring smooth.

L. Bonding the B-3333 Beta Switch Indicator Ring to the 105909 Beta Ring Unit

(1) For requirements and procedures for bonding the B-3333 beta switch indicator ring to the 105909 beta ring unit, refer to the section, "Bonding the Beta Switch Indicator Ring to the Beta Ring Unit" in the Special Adhesive and Bonding Procedures chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Beta Ring Interior Surface Repair
Figure 6-9

ASSEMBLY - CONTENTS

ASSEMBLY - CONTENTS, CONTINUED

LIST OF FIGURES

LIST OF FIGURES, CONTINUED

LIST OF FIGURES, CONTINUED

LIST OF TABLES

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1. General (Rev. 6)

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.

CAUTION 3: WHEN ACTUATING A PROPELLER, USE COMPRESSED AIR THAT HAS BEEN FILTERED FOR MOISTURE OR NITROGEN.

CAUTION 4: DO NOT EXCEED A PRESSURE OF 200 PSI (13.78 BARS) WHEN ACTUATING PROPELLERS INCLUDED IN THIS MANUAL.

CAUTION 5: USE SUFFICIENT PRESSURE TO MAKE SURE THAT THE PROPELLER ACTUATES AGAINST EACH POSITIVE STOP.

CAUTION 6: USE GREASE CM12-4 WHEN ASSEMBLING HC-E5N-3, HC-E5N-3L, OR HC-E5N-A(L) PROPELLERS. THE ONLY GREASE APPROVED FOR USE IN THE PIAGGIO P-180 AIRCRAFT IS GREASE CM12-4, WITH THE EXCEPTION OF THE CAM FOLLOWER, WHICH MAY USE EITHER GREASE CM12-2 OR CM12-4.

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 clamp 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 grease 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 aluminum blades, refer to Hartzell Propeller Inc. Aluminum Blade Overhaul Manual 133C (61-13-33).

(2) For composite blades, refer to Hartzell Propeller Inc. Composite Blade Overhaul 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).

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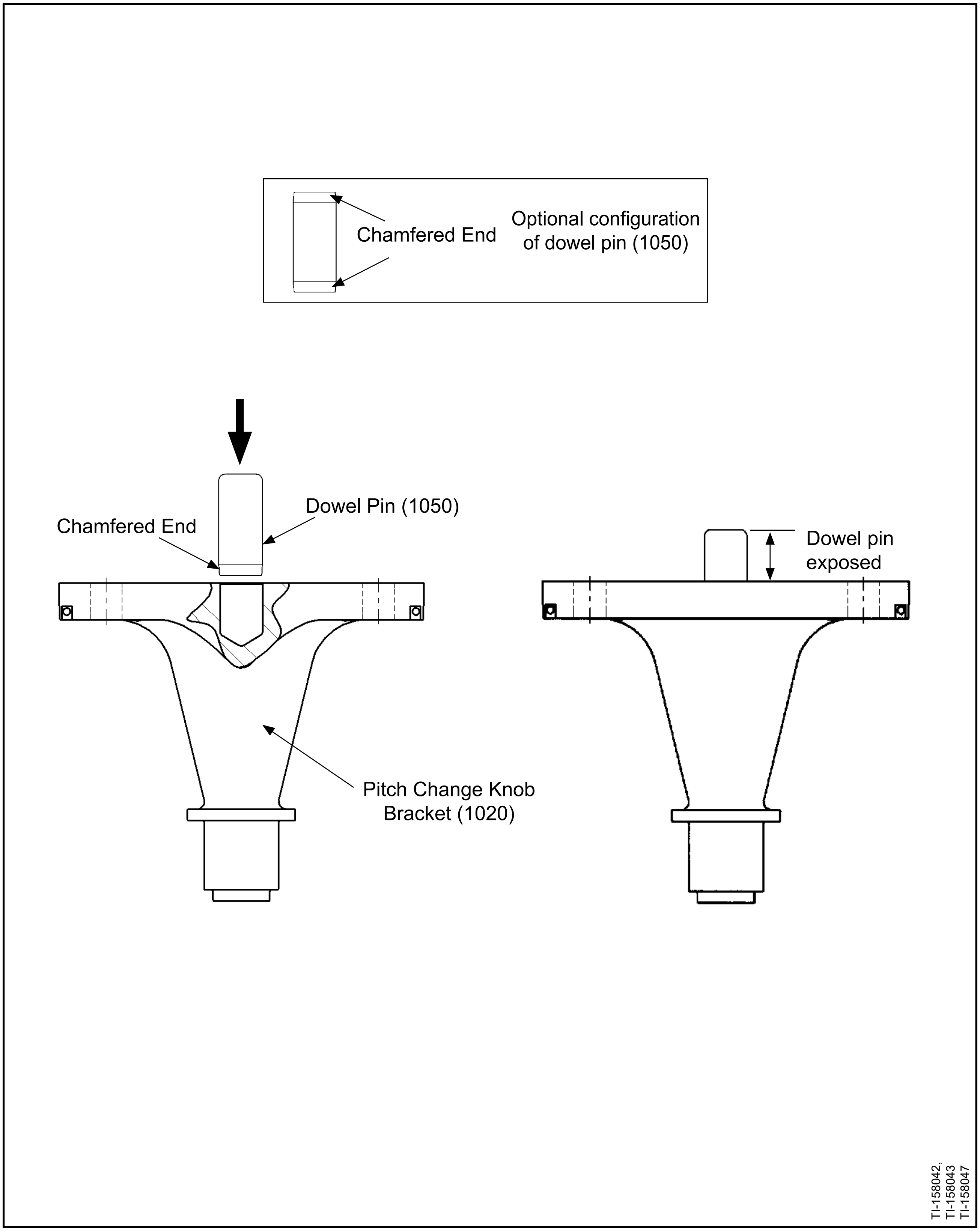


Installing the Dowel Pin into the Pitch Change Knob Bracket
Figure 7-1

2. Blade Unit Assembly Procedures

A. General

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

(2) A pitch change knob bracket unit with the retaining washer and a pitch change knob bracket unit with the screw, dimpled washer, and washer for retention of the cam follower may be used in the same propeller assembly.

B. Dowel Pin (1050) Installation

(1) Install the dowel pin (1050), if applicable.

(a) Press the chamfered end of the dowel pin (1050) into the pitch change knob bracket (1020), leaving 0.415 ± 0.025 inch (10.54 ± 0.63 mm) of the dowel pin exposed. Refer to Figure 7-1.

C. Cam Follower (1040) Installation

(1) Lubricate each cam follower (1040).

NOTE: The cam followers (1040) are shipped from Hartzell Propeller Inc. greased with approved lubricant.

(a) It is not necessary to lubricate the cam follower (1040) if one of the following two criteria is met:

1 It has been less than two years from the date marked on the packaging by Hartzell Propeller Inc.

2 It has been less than one year from the date of receipt if there is no date marked on the packaging.

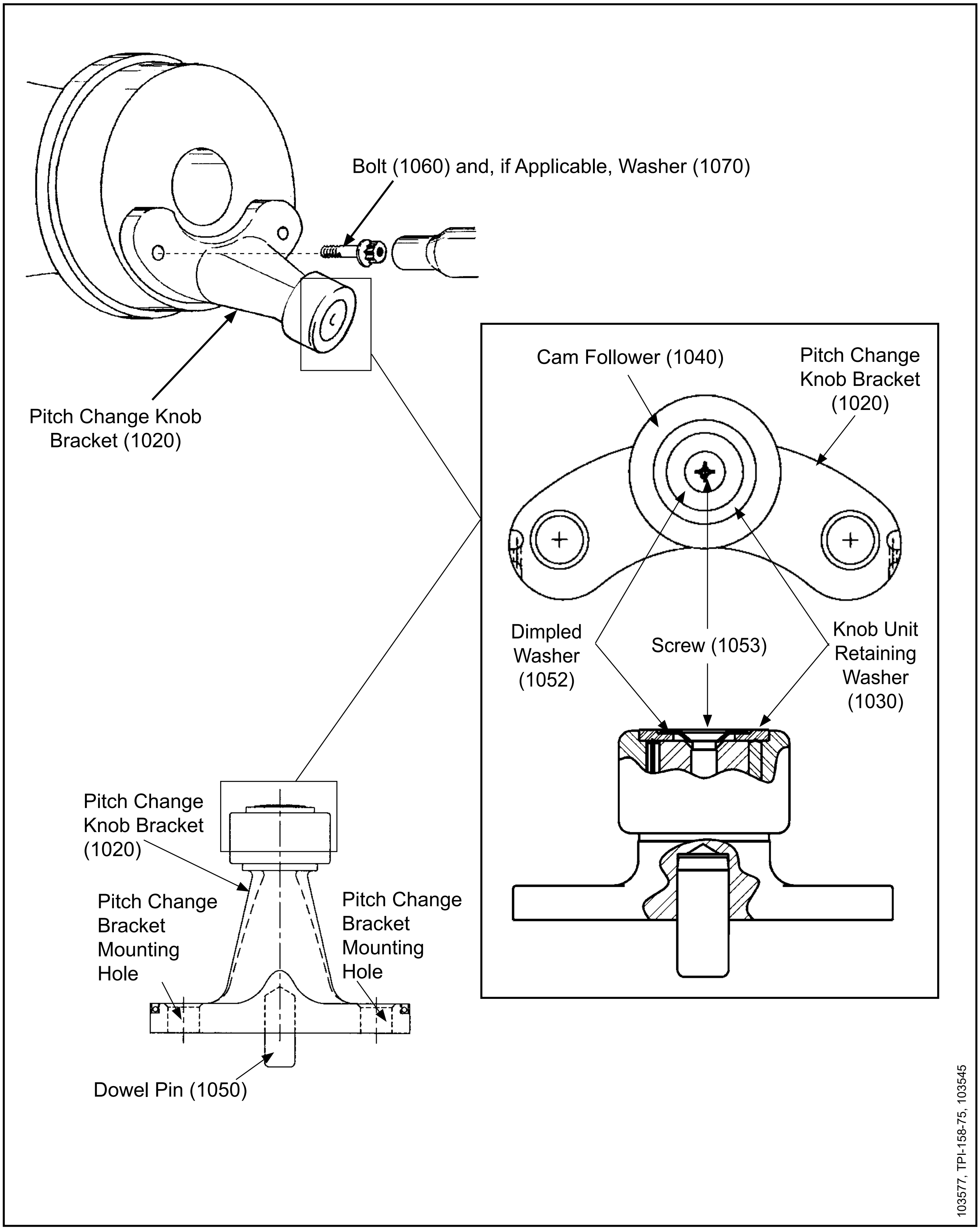
(b) If neither of the above criteria is met, complete the following lubrication procedure:

1 Using solvent CM23, flush the grease from the cam follower (1040).

2 Lubricate the cam follower (1040).

a For propeller models HC-E5N-3, HC-E5N-3L, and HC-E5N-3A(L), use grease CM12-2 or grease CM12-4 only.

b For all other propeller models, use grease CM12.



Assembly of the Pitch Change Knob Unit That Uses a Screw
Figure 7-2

(2) For a pitch change knob bracket (1020) that uses a screw to retain the cam follower (1040), install the cam follower on the pitch change knob bracket, using the following steps. Refer to Figure 7-2.

(a) Using solvent CM106 or CM219, clean the threads of the screw (1053) and the threads of the pitch change knob bracket (1020).

(b) Permit the solvent CM106 or CM219 to dry.

(c) Apply threadlocker CM21 to the clean, dry threads in the top of the pitch change knob bracket (1020).

(d) Put the cam follower (1040) onto the pitch change knob bracket (1020).

(e) With the counterbored side up, put the knob unit retaining washer (1030) on the end of the pitch change knob bracket (1020).

(f) With the raised side down, put the dimpled washer (1052) on the knob unit retaining washer (1030).

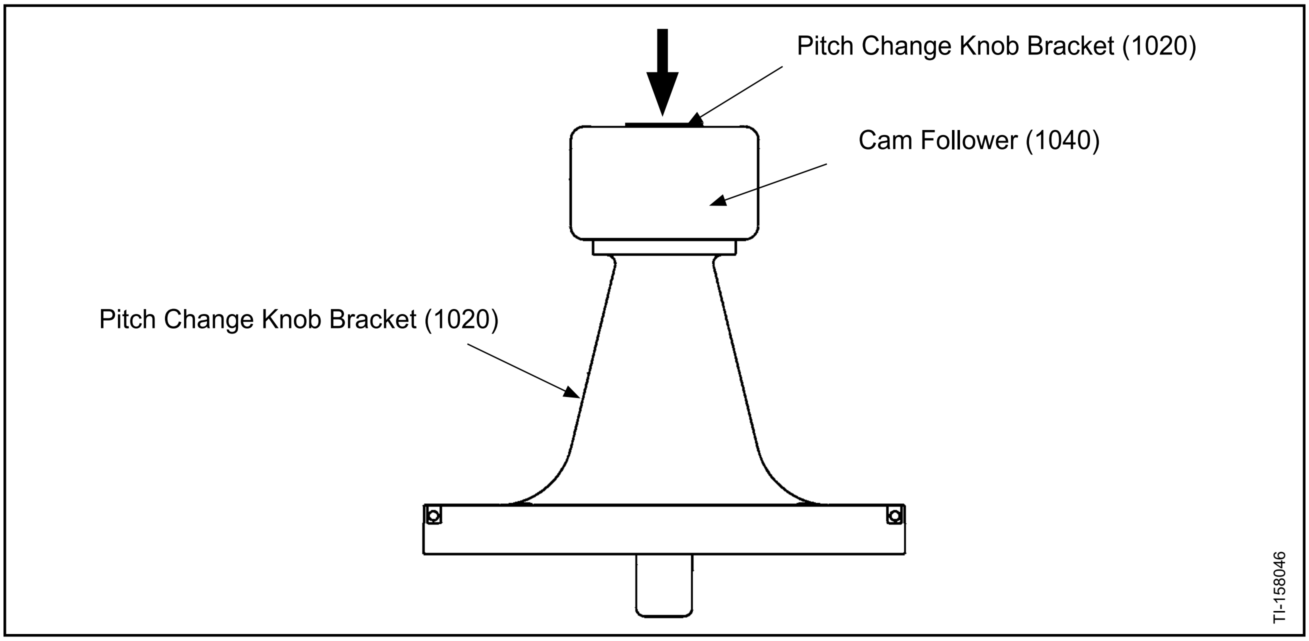
(g) Examine the knob unit retaining washer (1030) and the dimpled washer (1052) on the pitch change knob bracket (1020) to make sure that the parts are seated correctly.

(h) Apply threadlocker CM21 to the clean, dry threads of the screw (1053).

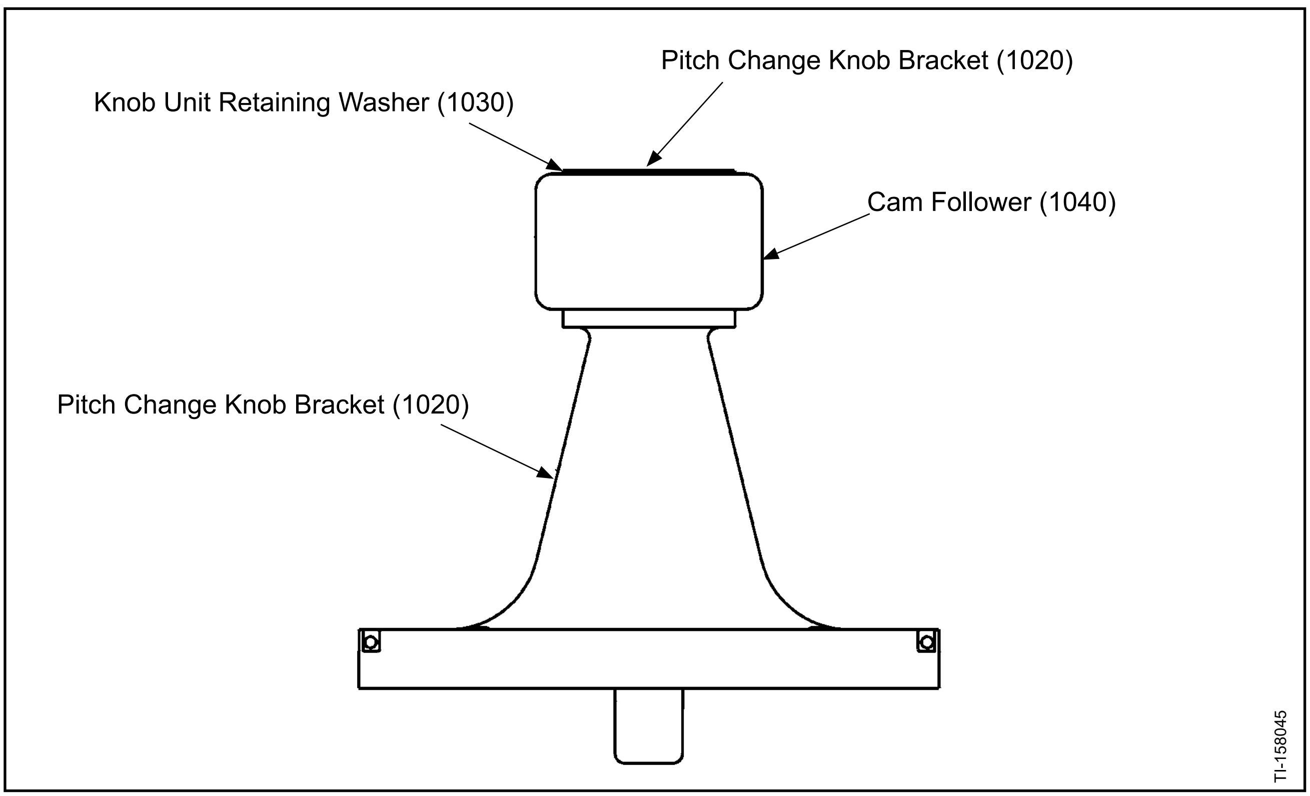
(i) Using the screw (1053), attach the knob unit retaining washer (1030) and the dimpled washer (1052) to the pitch change knob bracket (1020).

(j) Torque the screw (1053) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.

(k) Repeat step (2)(a) through (2)(j) in this section for each of the remaining pitch change knob brackets (1020).



Assembly of the Pitch Change Knob Unit That Uses a Swaged Washer
Figure 7-3



Installing the Knob Unit Retaining Washer
Figure 7-4

(3) For a pitch change knob bracket (1020) that uses a swaged washer to retain the cam follower (1040), install the cam follower on the pitch change knob bracket, using the following steps.

(a) Put the cam follower (1040) onto the pitch change knob bracket (1020). Refer to Figure 7-3.

CAUTION: PUSH THE KNOB UNIT RETAINING WASHER (1030), COUNTERSUNK SIDE DOWN, EVENLY AGAINST THE SHOULDER OF THE PITCH CHANGE KNOB BRACKET (1020). THE KNOB UNIT RETAINING WASHER MUST BE COMPLETELY SEATED ON THE PITCH CHANGE KNOB BRACKET.

(b) Push the knob unit retaining washer (1030), bevel down, on the top of the pitch change knob bracket (1020). Refer to Figure 7-4.

1 The knob unit retaining washer (1030) is completely seated on the pitch change knob bracket (1020) when the pitch change knob bracket extends slightly through the top of the knob unit retaining washer. Refer to Figure 7-4.

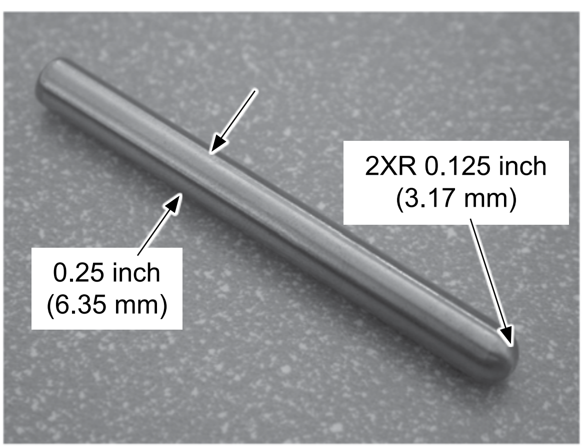
CAUTION: DO NOT USE EXCESSIVE FORCE OR USE A SWAGE TOOL THAT DOES NOT MEET THE REQUIREMENTS SPECIFIED WHEN SWAGING THE PITCH CHANGE KNOB BRACKET (1020) BECAUSE DAMAGE MAY RESULT THAT WILL SCRAP THE PITCH CHANGE KNOB BRACKET.

(c) Swage the end of the pitch change knob bracket (1020).

1 Locally procure a swage tool that meets the specifications given in Figure 7-5.

CAUTION: DIMPLES CAUSED BY SWAGING MUST NOT CONTACT PREVIOUS DIMPLES. THERE MUST BE AN UNSWAGED AREA BETWEEN THE CENTER OF PREVIOUS SWAGE HITS.

2 Using sufficient force and a locally fabricated swage tool, swage the end of the pitch change knob bracket (1020) in two places 180 degrees apart to force a small amount of material over the edge of the knob unit retaining washer (1030). Refer to Figure 7-5 and Figure 7-6.



Locally Fabricated Swage Tool

Description:
Dowel Pin with a spherical radius tip. Refer to the illustration in this Figure.

Material:
A2 tool steel
hardened to 55-62 HRC
(recommended)

TI-00100

Swage Tool
Figure 7-5

(d) After assembly of the parts, perform the following pull test:

1 Hold the pitch change knob bracket (1020) firmly in one hand.

2 Grip the cam follower (1040) firmly in the other hand.

3 Firmly pull on the cam follower (1040) to test the interference fit between the knob unit retaining washer (1030) and the swaging to the pitch change knob bracket (1020).

4 If the knob unit retaining washer (1030) remains firmly in position on the pitch change knob bracket (1020), perform the turn test in step (3)(e) in this section.

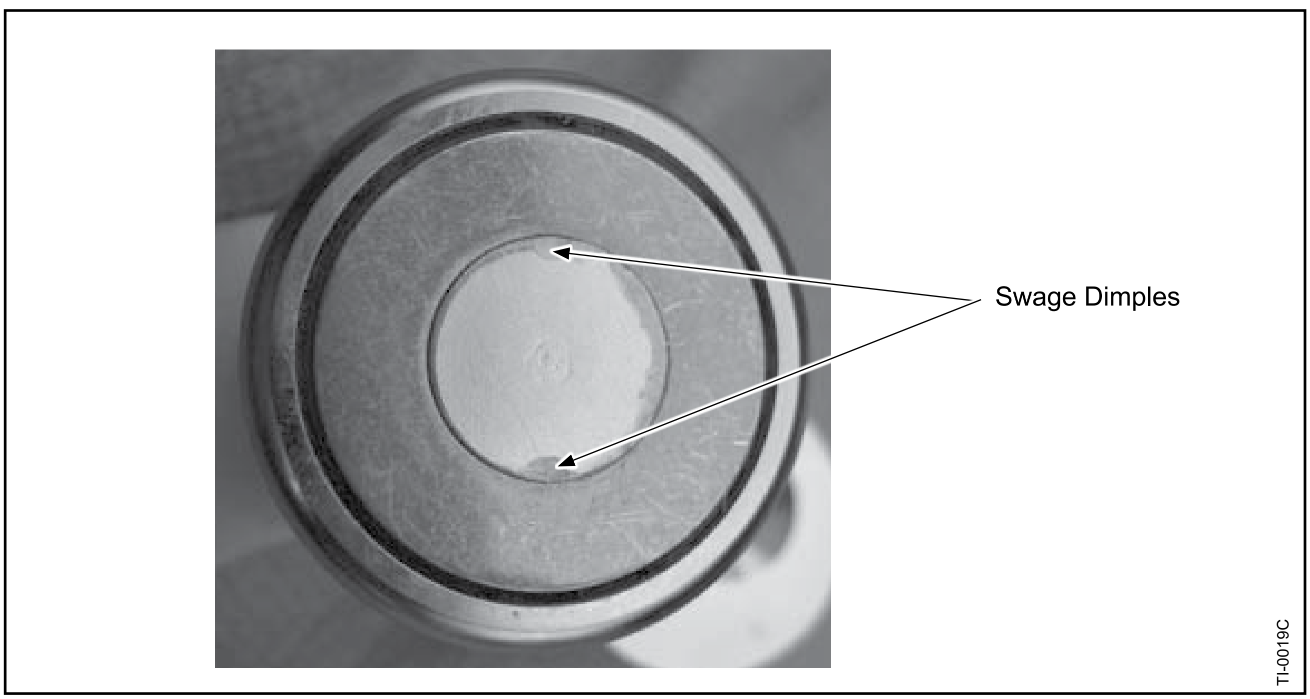
5 If the knob unit retaining washer (1030) does not remain firmly in position on the pitch change knob bracket (1020), perform the following:

a Discard the knob unit retaining washer (1030).

b Reassemble a pitch change knob bracket (1020), a cam follower (1040), and a new knob unit retaining washer (1030), using new or overhauled parts as necessary, in accordance with the applicable steps in this manual.

c Swage the pitch change knob bracket (1020) in accordance with step (3)(c) in this section.

d Repeat the pull test in accordance with step (3)(d) in this section.



Swaged Pitch Change Knob Bracket
Figure 7-6

e If the knob unit retaining washer (1030) does not remain firmly in position on the pitch change knob bracket (1020), measure the diameter of the pitch change knob unit retaining surface of the pitch change knob bracket. If the OD is less than the serviceable limits as specified in the Check chapter of this manual, discard the pitch change knob bracket and replace it.

(e) After assembly of the parts, perform the following turn test:

1 Grip and turn the cam follower (1040) on the pitch change knob bracket (1020).

a If the cam follower (1040) turns freely on the pitch change knob bracket (1020), continue the propeller assembly process.

b If the cam follower (1040) does not turn freely on the pitch change knob bracket (1020), replace the cam follower in accordance with steps (3)(a) through (3)(d) in this section.

(f) Repeat the pull test and the turn test until the results are satisfactory.

(g) Repeat steps (3)(a) through (3)(f) in this section for each remaining pitch change knob bracket (1020).

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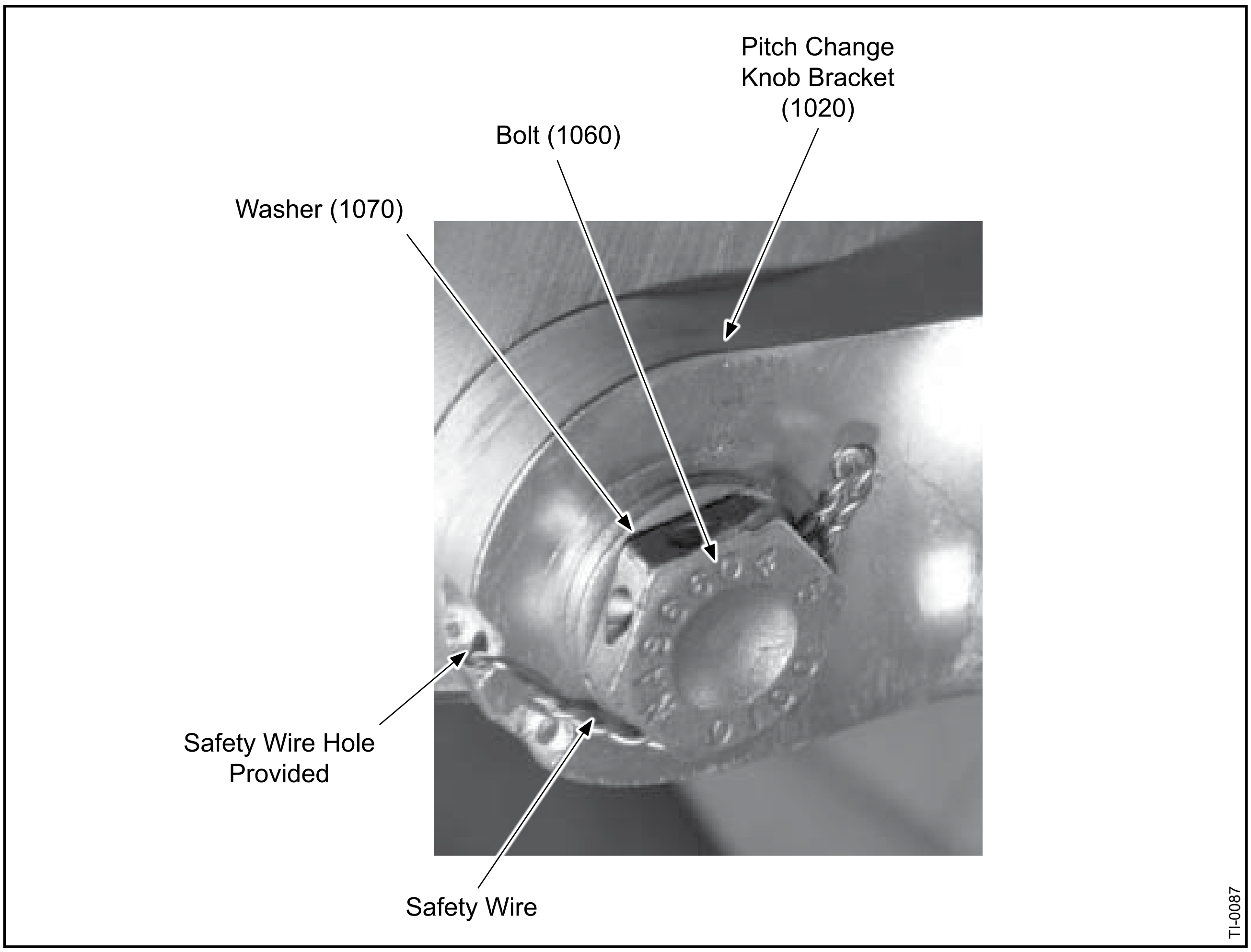
HC-E5(N,P,A,B,W)-( ) PROPELLER MODELS		
Pitch Change Bracket Dash No.	Direction of Blade Angles Change When Changing From a ( )-2 Bracket	
	Right Hand Blade	Left Hand Blade
( )-1	Lower	Higher
( )-2	---	---
( )-3	Higher	Lower
NOTE: The direction of blade angle change is the same regardless of whether the blade is used in a Pusher or Tractor configuration.		

Blade Pitch Change Knob Unit Selection
Table 7-1



Attaching the Pitch Change Knob Bracket
Figure 7-7

D. Pitch Change Knob Unit Installation
Refer to Figure 7-7

(1) Make sure that the surfaces of the butt of the blade and the pitch change knob bracket unit (1010) are clean and free of oil, dirt, and other unwanted materials. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(2) Put the pitch change knob bracket unit (1010) on the butt of the blade.

(3) Align the holes in the pitch change knob bracket unit (1010) with the threaded holes in the butt of the blade.

(4) Using a mallet, tap the pitch change knob bracket unit (1010) until it is firmly in position against the butt of the blade.

(a) Use the alternate pitch change knob bracket (1020) choices as necessary to bring the blade-to blade pitch angle of all five blades within the specified tolerance of ± 0.1 degree. Refer to the pitch change knob bracket selection data in Table 7-1.

(5) Install a bolt (1060) and, if applicable, a washer (1070) in each hole in the pitch change knob bracket (1020).

(6) Torque each bolt (1060) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.

(7) Safety wire each bolt (1060) to the hole provided for it in the pitch change knob bracket (1020) in accordance with NASM33540.

(a) If there are no safety wire holes in the pitch change bracket (1020), add safety wire holes in accordance with the section, "Modification of the Pitch Change Knob Bracket for the Addition of Safety Wire Holes" in the Repair chapter of this manual.

(8) For all composite blades, except the N-shank composite blade:

(a) Install the O-ring (1240) in the groove on the OD of the blade plug (1230).

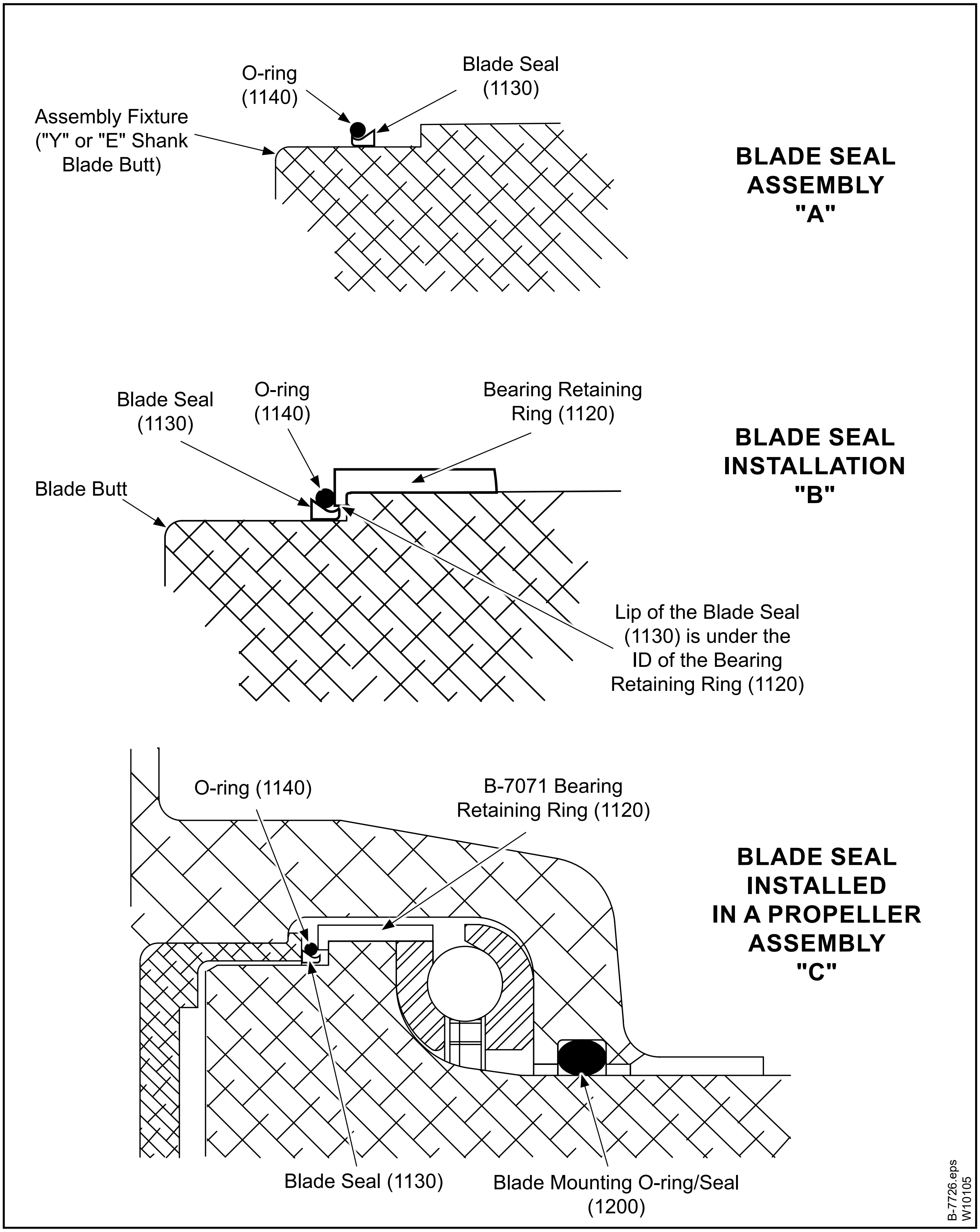
(b) With the dimple in the blade plug (1230) facing away from the shank of the blade, install the blade plug in the bore of the blade.

(9) For N-shank composite blades only:

(a) Install the O-ring (1240) on the OD of the blade plug (1230) in the groove provided for it.

(b) With the dimple in the blade plug (1230) facing away from the shank of the blade, install the blade plug in the bore of the blade.

(10) Repeat steps (1) through (9) in this section for the remaining blades.



Blade Seal Installation
Figure 7-8

E. Optional Blade Seal Assembly Installation

CAUTION 1: WHEN THE BLADE SEAL ASSEMBLY IS INCLUDED FOR ANY BLADE IN A PROPELLER, ALL BLADES IN THE PROPELLER MUST BE INSTALLED WITH THE BEARING RETAINING RING (1120), BLADE SEAL (1130), AND O-RING (1140).

CAUTION 2: THE B-7071 BEARING RETAINING RING (1120) MUST BE INSTALLED WHEN USING THIS BLADE SEALING METHOD.

(1) Assemble the blade seal (1130) and O-ring (1140). Refer to Figure 7-8, "A".

CAUTION: DO NOT OVER-STRETCH OR TWIST THE BLADE SEAL (1130) DURING INSTALLATION.

(a) Install the blade seal (1130) on the butt of the blade with the recessed area of the blade seal pointing away from the bearing retaining ring (1120). If the blade seal stretches, replace the blade seal.

NOTE: Initial installation of the blade seal (1130) with the recessed area pointing away from the bearing retaining ring (1120) will make it easier to install the O-ring (1140) onto the blade seal. An optional method is to pre-assemble the blade seal assembly on an unserviceable blade butt or an equivalent fixture.

(b) Install the O-ring (1140) into the recessed area of the blade seal (1130).

1 If the O-ring (1140) does not stay in position, replace the blade seal (1130).

(c) Remove the blade seal assembly from the butt of the blade.

CAUTION 1: DO NOT DEFORM THE BLADE SEAL/O-RING ASSEMBLY WHEN INSTALLING IT ONTO THE BLADE.

CAUTION 2: THE CORRECT INSTALLATION OF THE BLADE SEAL/O-RING ASSEMBLY IS CRITICAL TO THE SEAL FUNCTION AND BLADE ROTATION.

(2) Reinstall the blade seal/O-ring assembly onto the butt of the blade with the recessed area facing the bearing retaining ring (1120). Refer to Figure 7-8, "B".

(a) The blade seal assembly must move easily into position on the blade butt.

(3) Install the blade seal or O-ring (1200). Refer to Figure 7-8, "C".

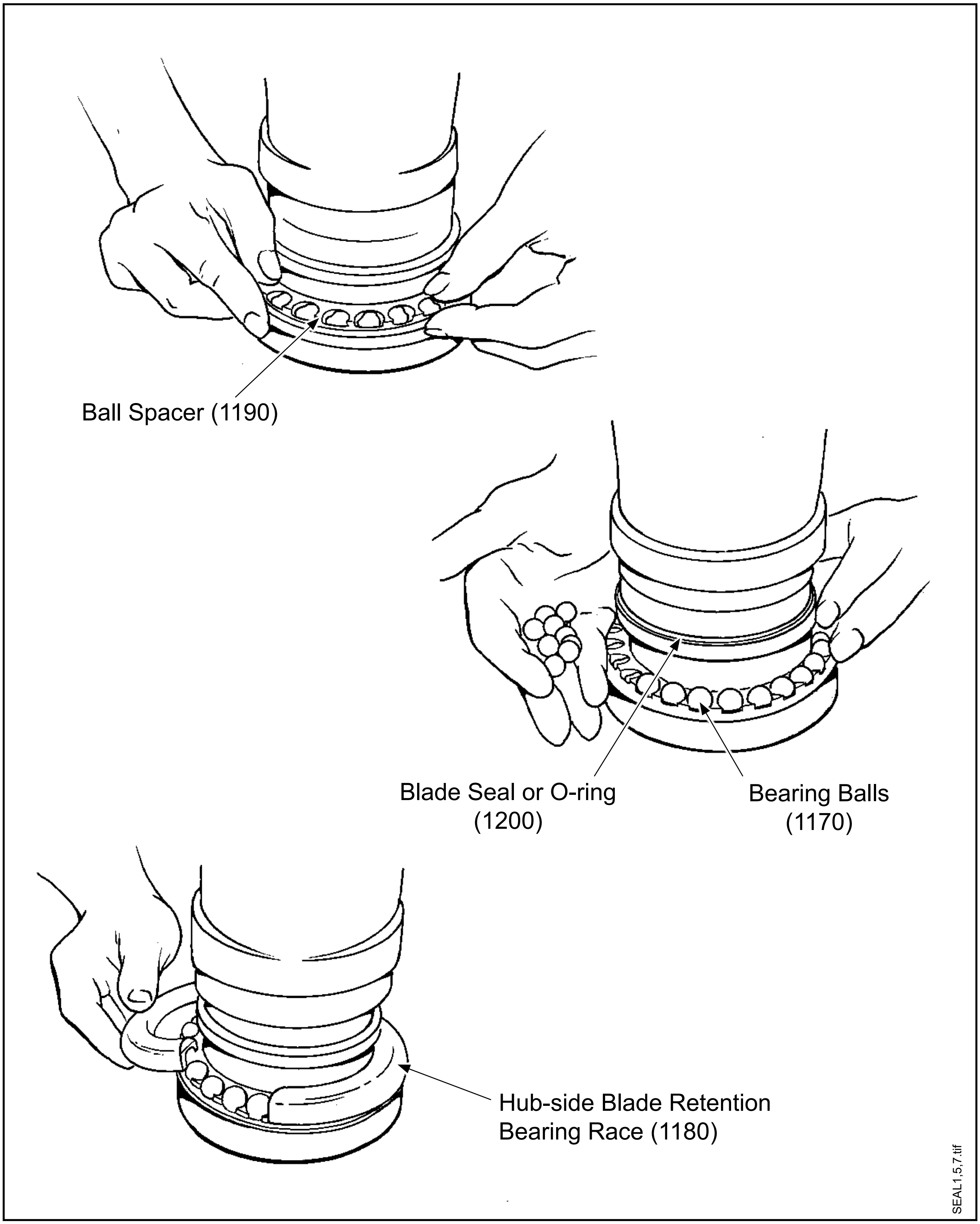
(a) Lubricate the blade O-ring (1200).

1 For propeller models HC-E5N-3, HC-E5N-3L, and HC-E5N-3A(L) use grease CM12-4 only.

2 For all other propeller models, use grease CM12.

(b) Install the blade O-ring (1200) over the base of the blade shank.

(c) Install the seal energizer ring (1210) in the blade seal (1200) if applicable.



Installing the Hub-Side Bearing Race and Blade Bearing Balls
Figure 7-9

F. Hub-Side Bearing Race (1180) and Bearing Ball (1170) Installation
Refer to Figure 7-9.

(1) Lubricate the blade-side bearing race (1160).

(a) For propeller models HC-E5N-3, HC-E5N-3L, and HC-E5N-3A(L) use grease CM12-4 only.

(b) For all other propeller models, use grease CM12.

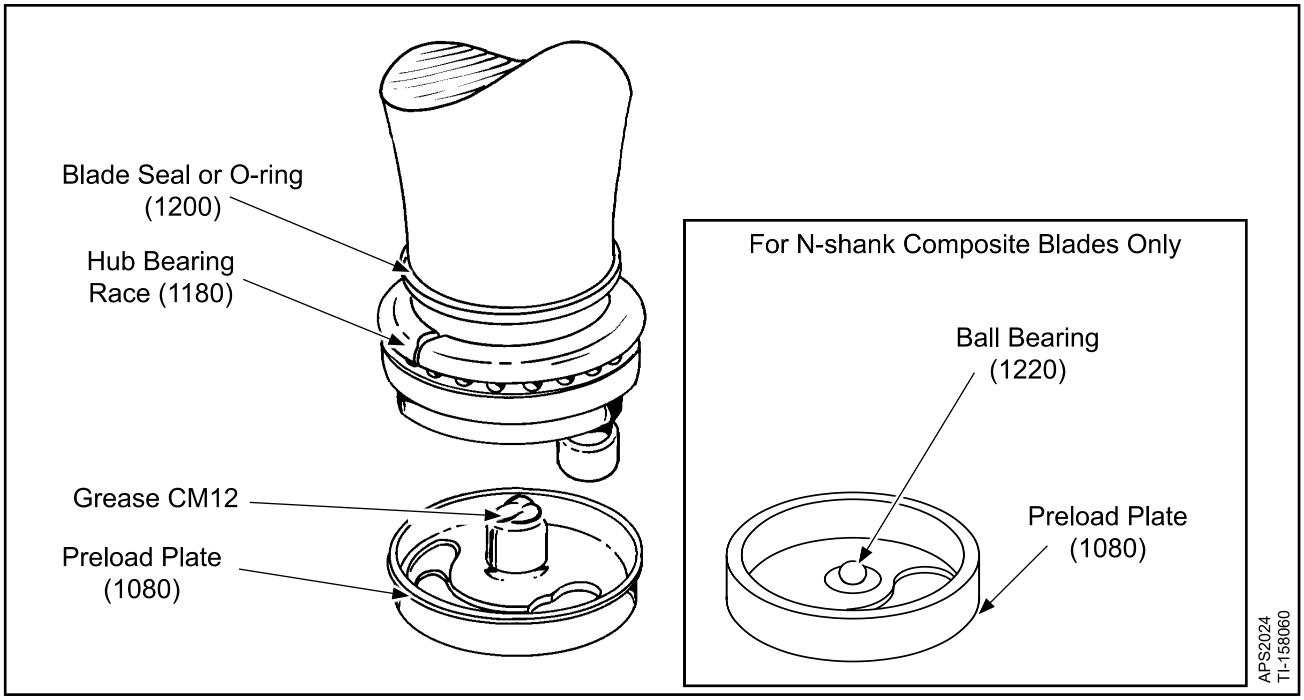
(2) Put the ball spacer (1190) on the blade-side bearing race (1160).

CAUTION: ALL BEARING BALLS (1170) INSTALLED IN A SINGLE BEARING MUST BE OF THE SAME GAUGE. BEARING BALLS SUPPLIED BY HARTZELL PROPELLER INC. ARE OF THE SAME GAUGE.

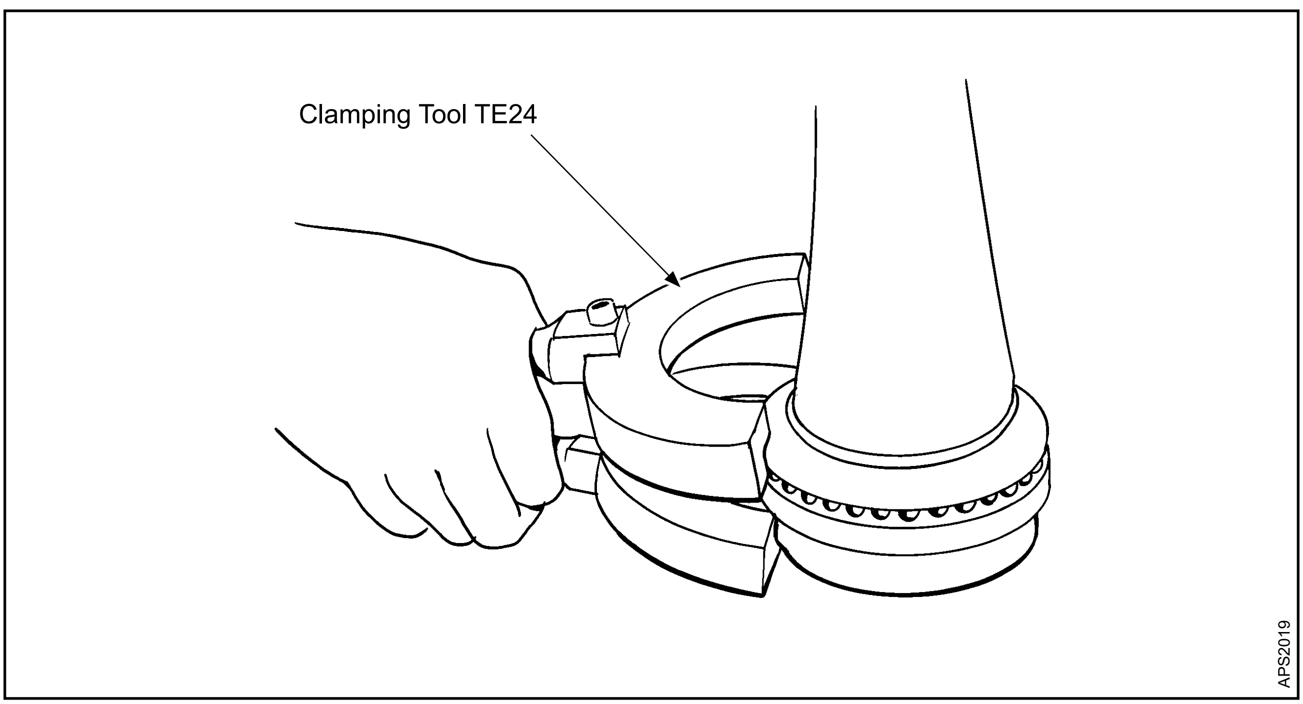
(3) Put the bearing balls (1170) in the openings of the ball spacer (1190) on the blade-side bearing race (1160).

CAUTION: THE BEARING RACE HALVES MUST HAVE MATCHING SERIAL NUMBERS.

(4) Put the hub-side bearing race halves (1180) on the bearing balls (1170).



Installing the Preload Plate on the Blade Shank
Figure 7-10



Applying the Clamping Tool TE24 to the Blade Assembly
Figure 7-11

G. Preload Plate Assembly

(1) For propellers that use a ball bearing (1220):

(a) Grease the ball bearing (1220).

(b) On the inside of the preload plate (1080), put the ball bearing (1220) in the counterbored hole. Refer to Figure 7-10.

(c) Install the set screw (1100) in the preload plate (1080) so the set screw touches the ball bearing (1220).

NOTE: The set screw (1100) will be repositioned later to set the blade preload.

(2) For propellers that do not use a ball bearing (1220):

(a) Install the set screw (1100) in the preload plate (1080).

(b) Install the set screw (1100) in the preload plate (1080) so the end of the set screw that is toward the blade butt is flush with the preload plate.

NOTE: The set screw (1100) will be repositioned later to set the blade preload.

(3) Install the nut (1110) on the set screw (1100) and position the nut a short distance from the preload plate (1080).

NOTE: Thread locking compound will be applied to the set screw (1100) between the nut (1110) and the preload plate (1080) later in the build process.

(4) For all propeller models that use a bearing inner ring (1090):

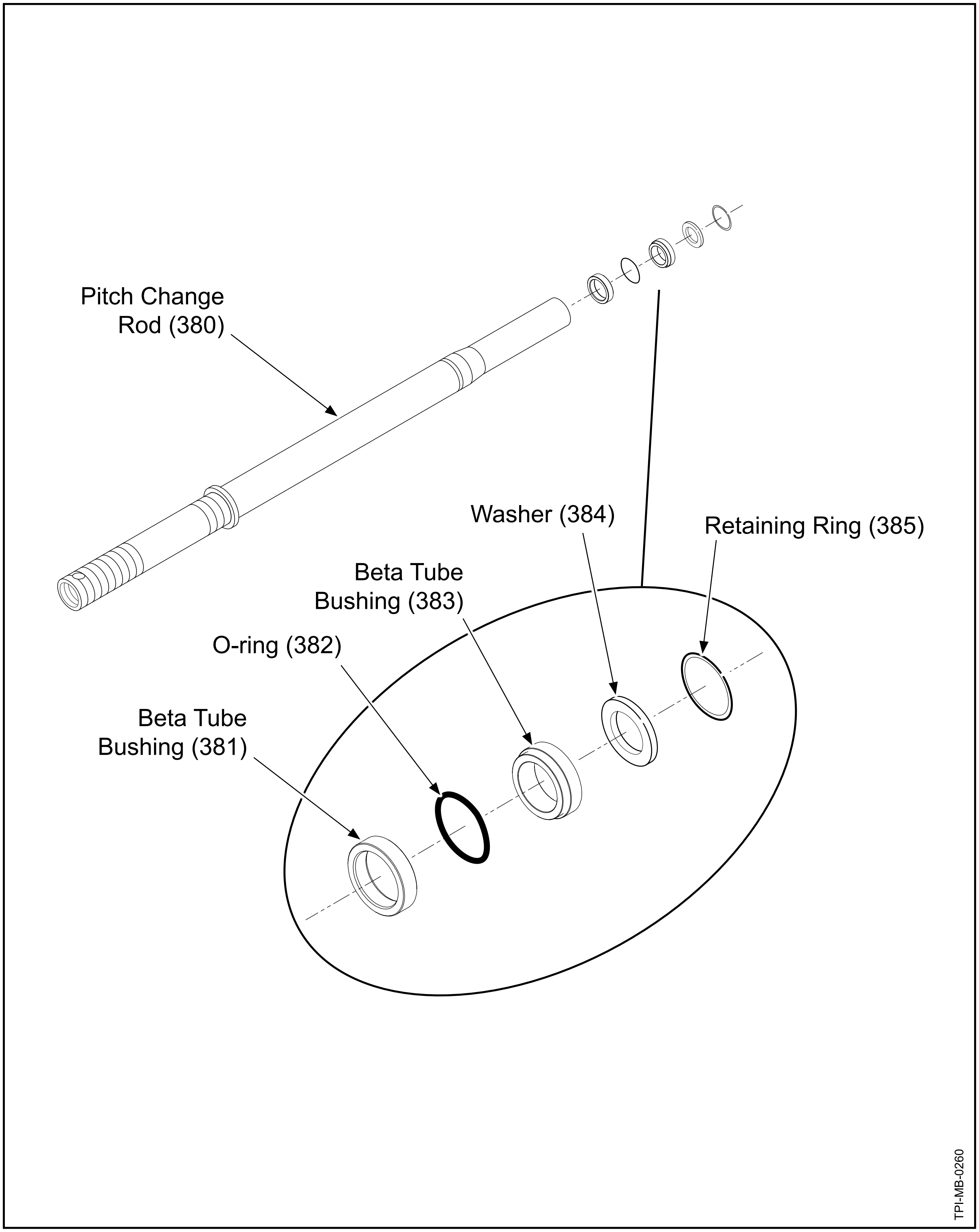
(a) Put approximately one tablespoon of grease CM12 on top of the preload plate inner bearing ring (1090) to lubricate the blade bore bearing. Refer to Figure 7-10.

NOTE: Using this amount of lubricant will force lubrication into the blade bore bearing when the preload plate (1080) is installed on the blade.

(5) Install the preload plate (1080) on the butt of the blade. Refer to Figure 7-10.

NOTE: If desired, to ease installation of the blade into the hub, hold the split bearing and preload plate assembly to the blade butt with the clamping tool TE24. Refer to Figure 7-11.

(6) Repeat the Blade Unit Assembly Procedures and Preload Plate Assembly procedures for the remaining blades.



Installing the Beta Rod Seal Components
Figure 7-12

3. Pitch Change Rod and Piston Assembly

A. For HC-E5N-5( ) Propeller Models only

(1) Install the beta rod seal components in the pitch change rod (380).

(a) Apply a thin layer of grease CM12 to the ID and OD of the beta tube bushings (381 and 383).

(b) Install the beta tube bushing (381), O-ring (382), beta tube bushing (383), washer (384) and retaining ring (385) in the pitch change rod (380) in accordance with Figure 7-12.

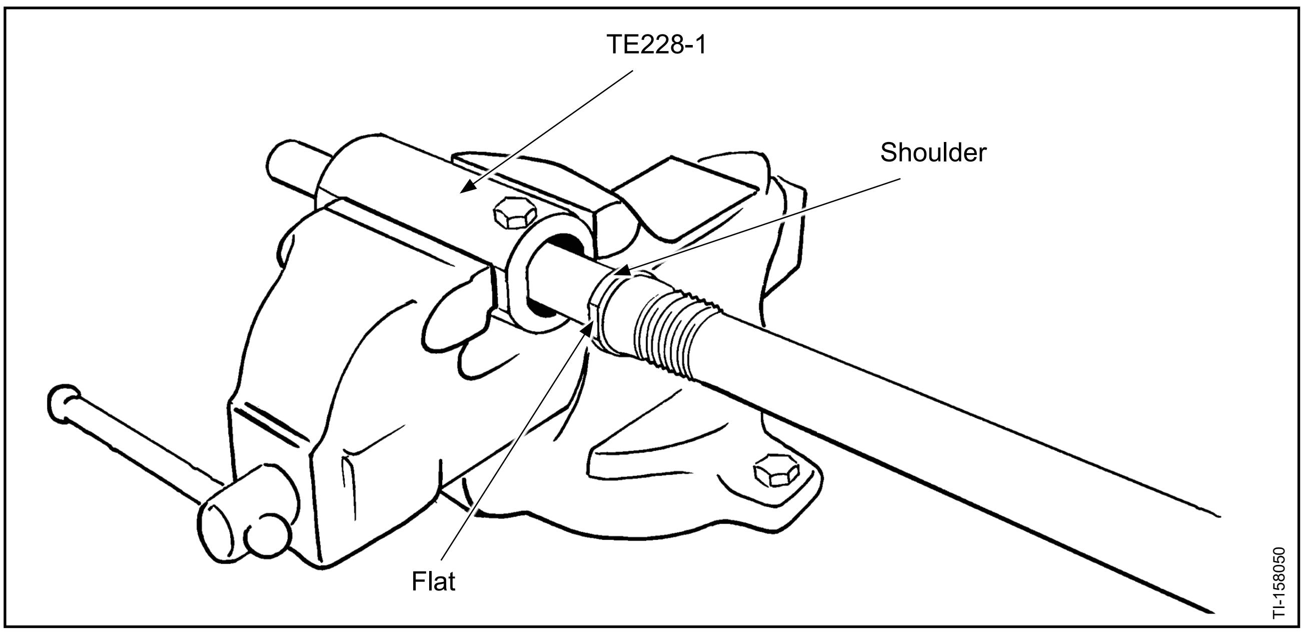
B. For all Propeller Models except the HC-E5N-5( ) Propeller Models

(1) Install an O-ring (220) in the groove provided for it in the ID bore of the piston (210).

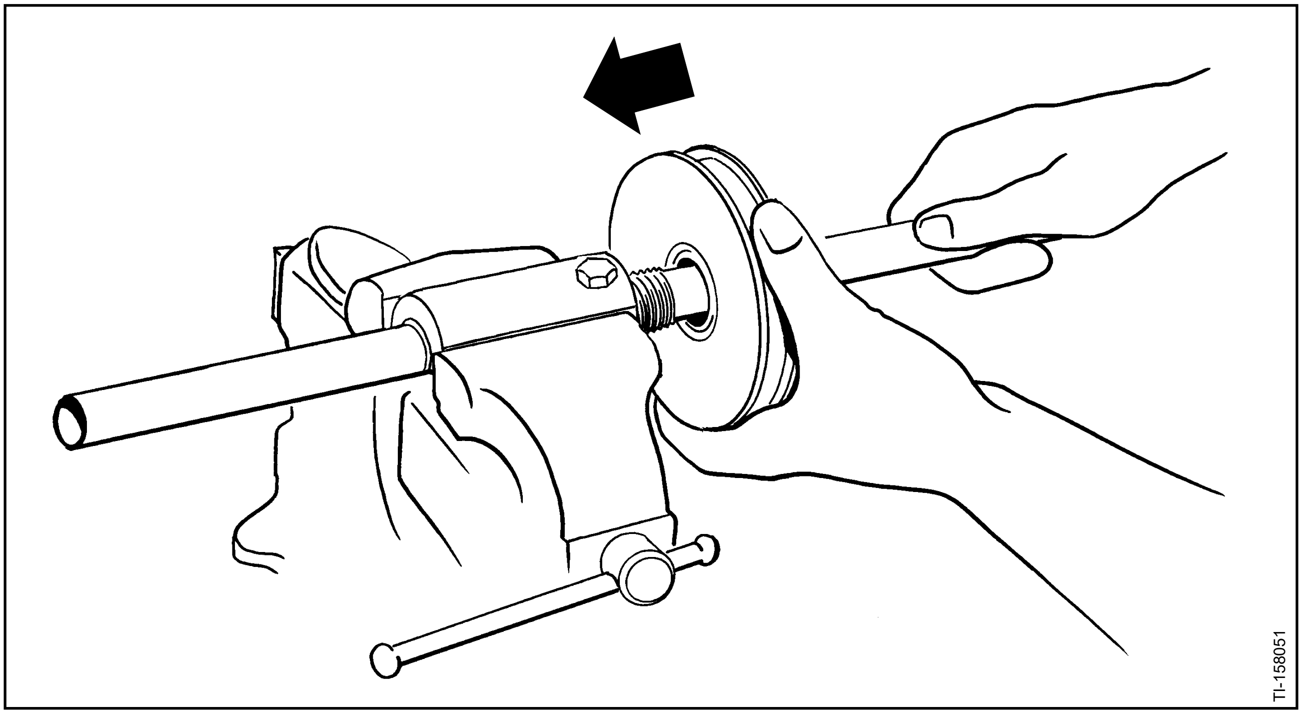
(2) With the cupped side of the piston (210) pointing away from the flats on the pitch change rod (380), install the piston on the pitch change rod.

(a) Put the piston unit installation socket TE228-1 in a vise. Refer to Figure 7-13.

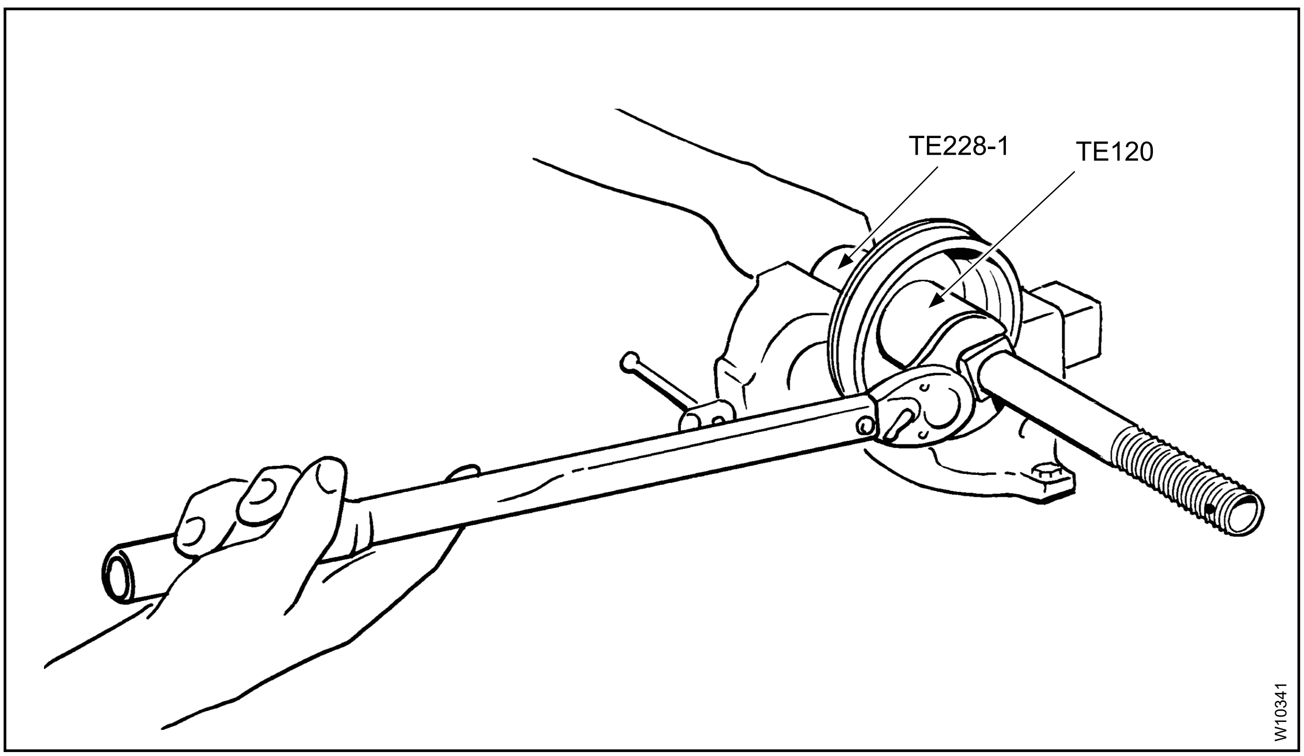
(b) Insert the pitch change rod (380) through the piston unit installation socket TE228-1, fitting the socket over the shoulder flats on the pitch change rod, as shown in Figure 7-13.



Using the TE228-1 Tool on the Pitch Change Rod
Figure 7-13



Installing the Piston
Figure 7-14



Torquing the Piston Nut
Figure 7-15

(c) Put the piston (210) into position against the shoulder on the pitch change rod (380). Refer to Figure 7-14.

(d) Turn the piston self-locking nut (200) onto the pitch change rod (380) until the self-locking nut locking mechanism engages the pitch change rod threads.

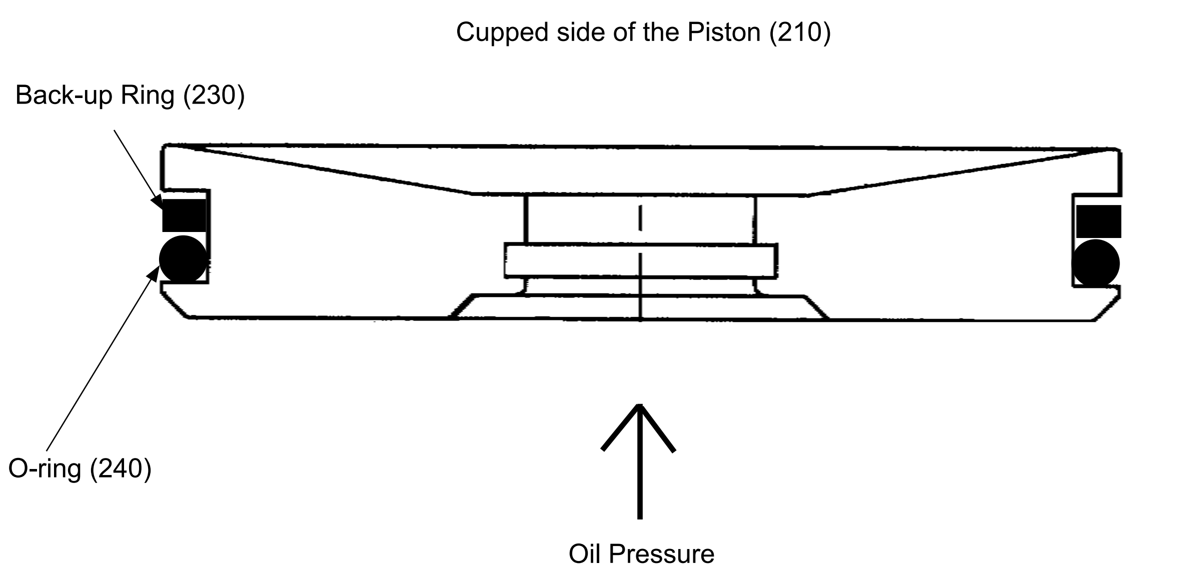
(3) Using the modified deep well socket TE120, torque the piston self-locking nut (200) against the piston (210) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual. Refer to Figure 7-15.

(4) Remove the installation socket TE228-1 from the pitch change rod (380).

(5) Install the O-ring (240) on the OD of the piston (210).

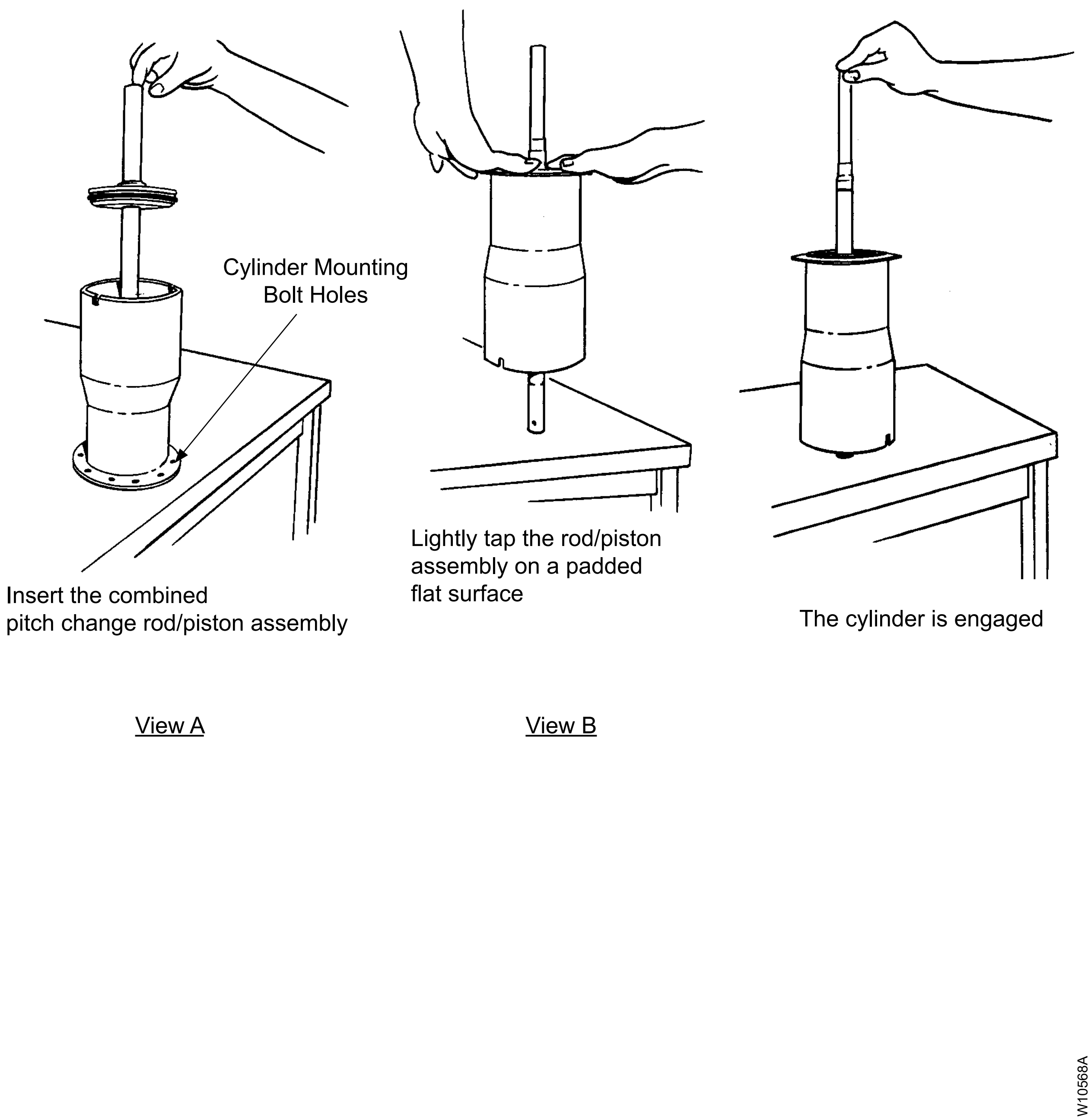
CAUTION: THE BACK-UP RING (230) MUST BE POSITIONED ON THE SIDE AWAY FROM THE OIL PRESSURE OR SEVERE OIL LEAKAGE WILL OCCUR.

(6) With the back-up ring (230) on the side toward the cupped side of the piston, install the back-up ring on the piston (210). Refer to Figure 7-16.



NOTE: Illustration is for the location of the back-up ring (230) and the O-ring (240) only

Installing the Back-up Ring
Figure 7-16



Installing the Rod/Piston Assembly in the Cylinder
Figure 7-17

C. Installing the Pitch Change Rod and Piston Assembly in the Cylinder
Refer to Figure 7-17

(1) If the cylinder bushing (300) has been removed, install the cylinder bushing (300) in accordance with the section, "Cylinder Bushing Installation Procedure for a Previously Removed Bushing" in the Repair chapter of this manual.

(2) Install an O-ring (480) in the groove provided for it in the cylinder bushing (300) in the small diameter of the cylinder (280).

(3) Apply lubricant to the inner walls of the cylinder (280).

(a) For propeller models HC-E5N-3, HC-E5N-3L, and HC-E5N-3A(L), use grease CM12-4 only.

(b) For all other propeller models use grease CM12.

(c) Apply a very thin layer of grease CM12 to the cylinder (280) walls, sufficient to minimize O-ring (240) friction during piston (210) installation.

1 Using too much grease can cause external cylinder (280) leakage during propeller operation.

(4) Turn the cylinder assembly (280) so that the cylinder mounting bolt hole openings point down, as shown in Figure 7-17, View A.

CAUTION: DO NOT PERMIT THE PISTON OD O-RING (240) TO BECOME PINCHED BETWEEN THE CYLINDER (280) WALL AND THE PISTON (210). SEVERE OIL LEAKAGE WILL RESULT.

(5) Insert the combined pitch change rod/piston assembly in the top of the cylinder (280).

(6) Turn the rod/piston/cylinder assembly so that the cylinder mounting bolt hole openings point up, as shown in Figure 7-17, View B.

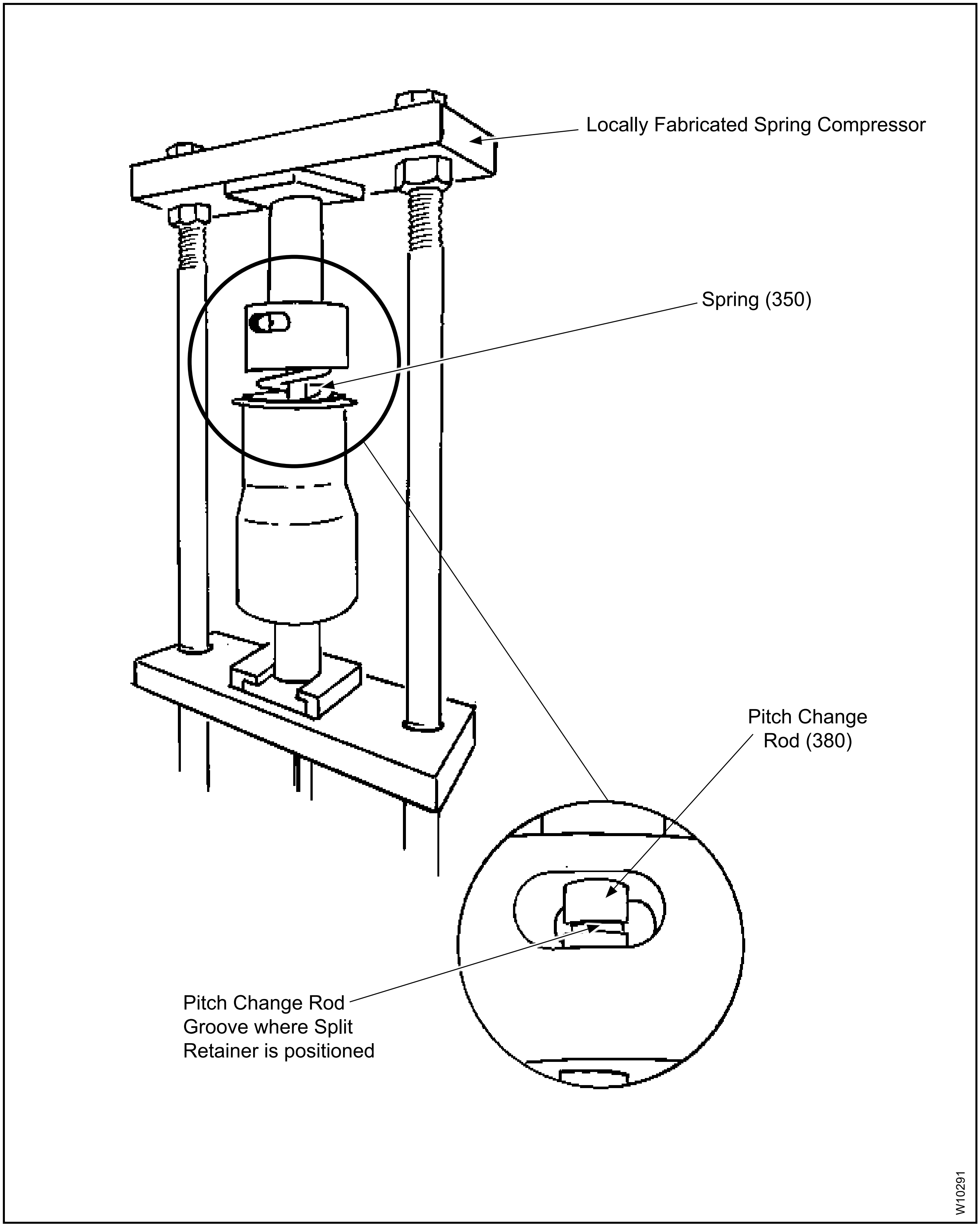
CAUTION: DO NOT DAMAGE THE ROD/PISTON ASSEMBLY OR THE CYLINDER (280) WHEN ENGAGING THE ROD/PISTON ASSEMBLY.

(7) Lightly tap the rod/piston assembly on a padded flat surface, as necessary, to engage the cylinder (280).

NOTE: There is a chamfer cut on the ID of the cylinder (280) wall to assist in the installation of the piston (210).

(8) Put the applicable spring seat(s) (340, 345) over the pitch change rod (380) against the cylinder (280).

(9) Put the applicable feathering spring(s) (350)/(350/355) over the pitch change rod (380).



Compressing the Feathering Compression Spring
Figure 7-18

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

(11) Prepare the split keeper (370).

(a) Using an applicable 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).

(12) Put the combined pitch change rod (380) and cylinder (280) into the locally fabricated spring compressor fixture. Refer to Figure 7-18.

WARNING: MAKE SURE OF THE SAFETY OF PERSONS IN THE AREA DURING THE ASSEMBLY PROCEDURE. THE FEATHERING SPRING ASSEMBLY IS PRELOADED TO APPROXIMATELY 800 LBS (362.4 KG) FORCE. HANDLE THE CYLINDER/ FEATHERING SPRING PACK WITH EXTREME CARE.

(13) Compress the feathering spring(s) (350)/(350/355) until the split keeper (370) can be installed.

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

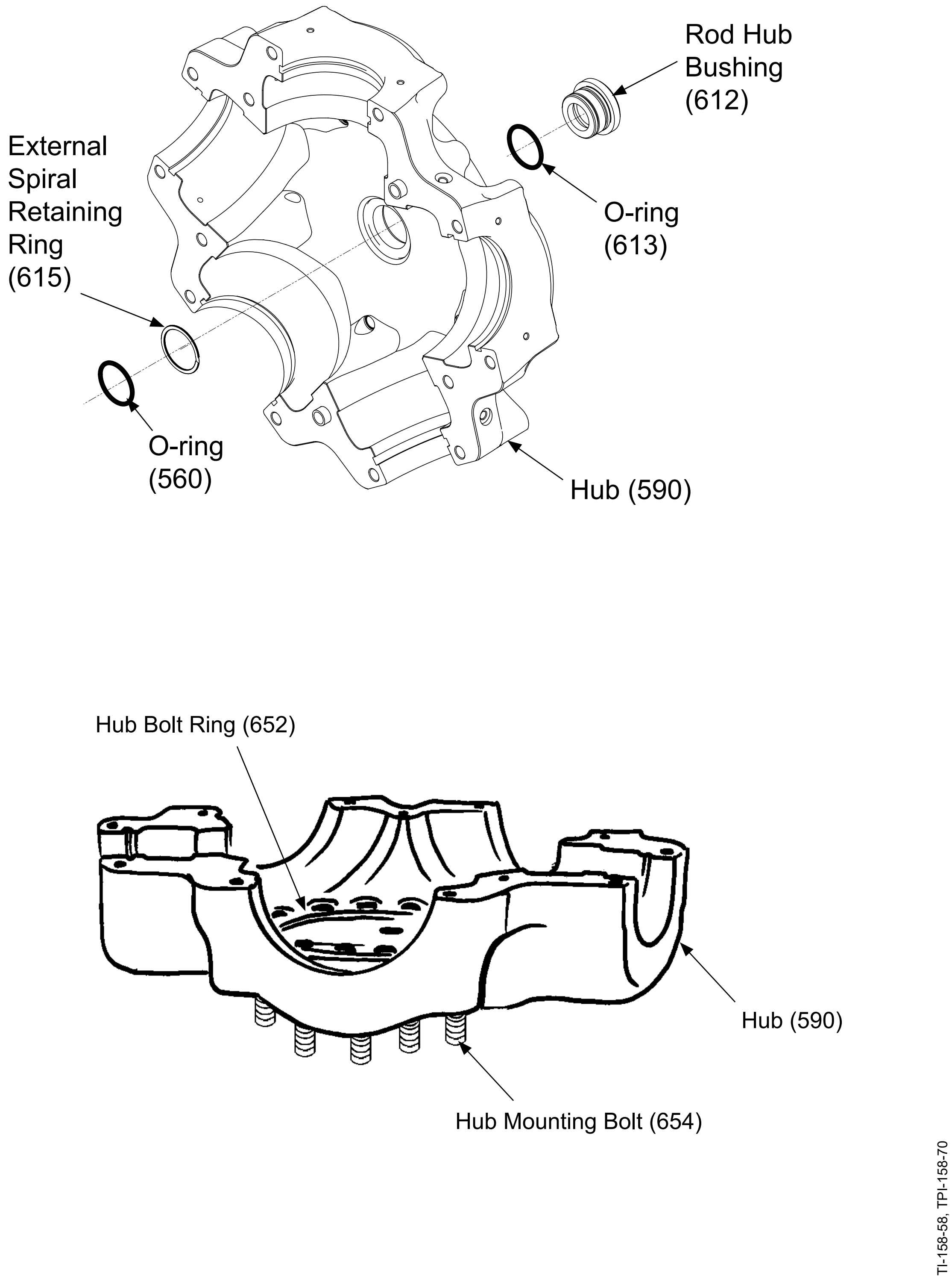
CAUTION: MAKE SURE THAT THE TWO PIECES OF THE SPLIT KEEPER (370) ARE COMPLETELY ENGAGED IN THE SPRING RETAINER (360) AND DO NOT DISLODGE FROM THE GROOVE IN THE PITCH CHANGE ROD (380) DURING DECOMPRESSION OF THE CYLINDER/SPRING PACK.

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

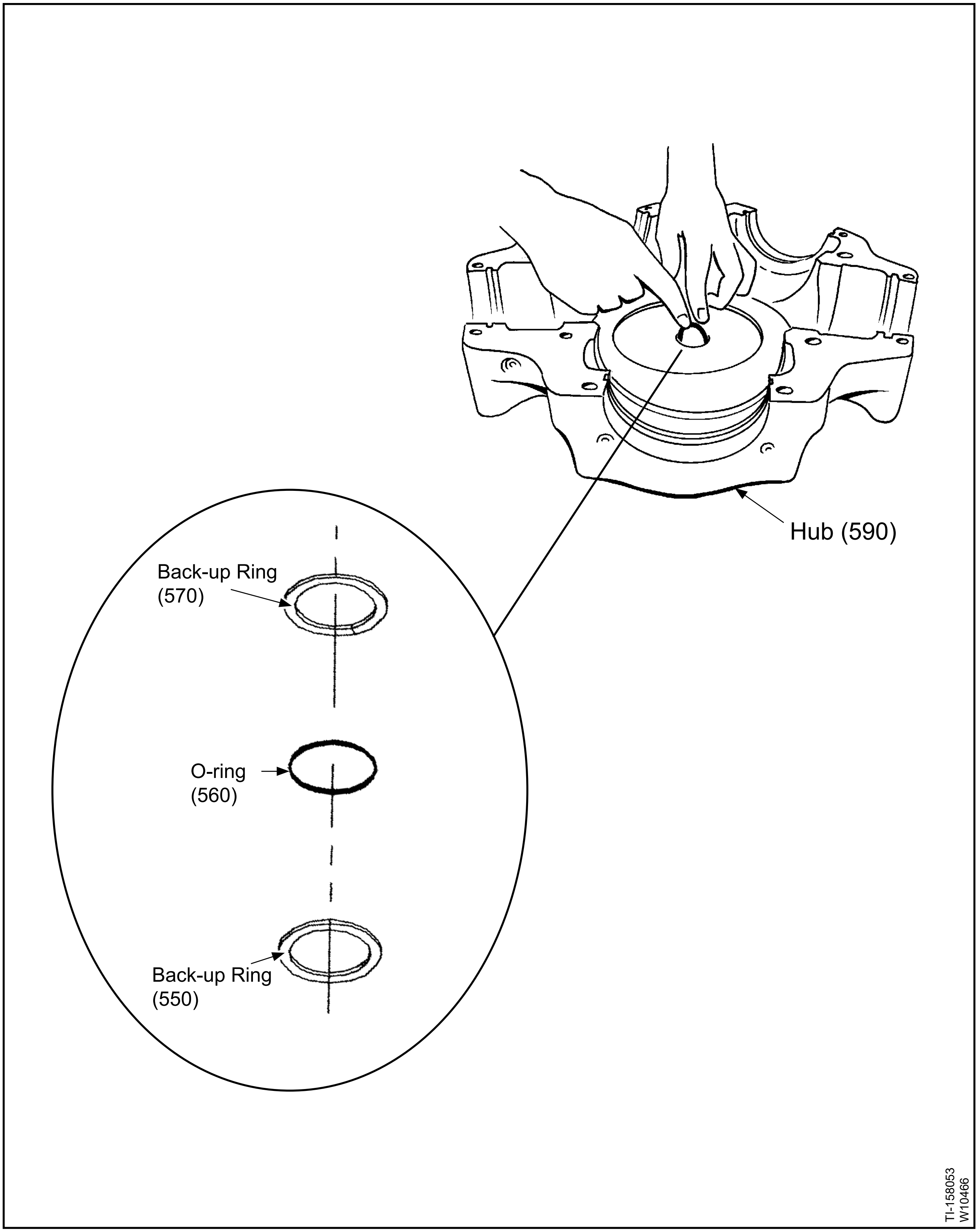
WARNING: USE CARE WHEN HANDLING A CYLINDER (280) CONTAINING A COMPRESSED SPRING (350).

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

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



Installing the Rod Hub Bushing and O-Ring in the Engine-side Hub Half
Figure 7-19



Installing the Pitch Change Rod Back-up Rings and O-Ring in the Engine-side Hub Half
Figure 7-20

4. Hub Assembly

A. Hub Assembly Procedures

(1) For assembly procedures of the hub unit (590) before following the propeller assembly procedures in this manual, refer to the Aluminum Hub Overhaul chapter of the Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(2) Install the rod hub bushing (612). Refer to Figure 7-19.

(a) Install the O-ring (613) on the OD of the rod hub bushing (612).

(b) From the outside of the engine-side hub half (590), install the rod hub bushing (612) in the pitch change rod hub bore.

(c) From the inside of the engine-side hub half (590), install the external spiral retaining ring (615).

(d) In the groove provided for it in the ID of the rod hub bushing (612), install an O-ring (560).

(3) Install the pitch change rod back-up rings (570) and O-ring (560) in the engine-side hub half. Refer to Figure 7-20.

(a) Install an O-ring (560) in each beta rod hole in the engine-side hub half (590).

NOTE: For the cylinder-side hub beta ring holes, the two back-up rings (580) will be installed when the bushings are installed.

(b) For Propeller Assembly Models HC-E5N-3(L), HC-E5N-3A(L), and HC-E5B-5( ) Only.

1 Install a back-up ring (550) in the engine-side hub half (590).

2 Install an O-ring (560) in the engine-side hub half (590).

3 Install the second back-up ring (570) in the engine-side hub half (590) with the split in the second back-up ring turned 180 degrees from the split in the first back-up ring (550).

NOTE: The O-ring (560) is positioned between the back-up rings (550, 570).

(4) Install the mounting bolt ring (652), if applicable.

(a) For HC-E5P-3( ) and HC-E5N-5K( ) Propeller Models only - Refer to Figure 7-21

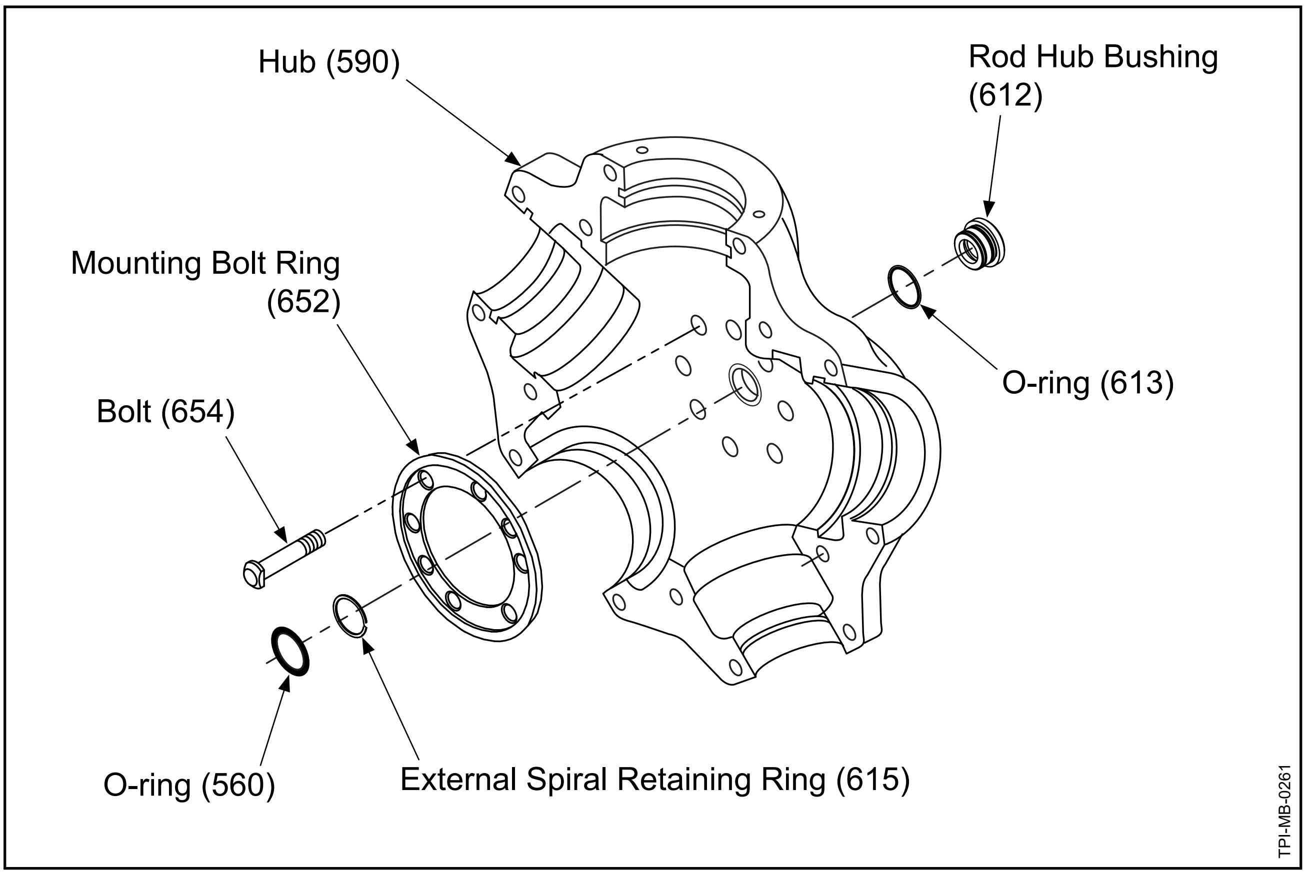
1 Put the mounting bolt ring (652) on the inside of the engine-side half of the hub (590).

2 Align the mounting holes in the mounting bolt ring (652) with the mounting holes in the engine-side half of the hub (590).

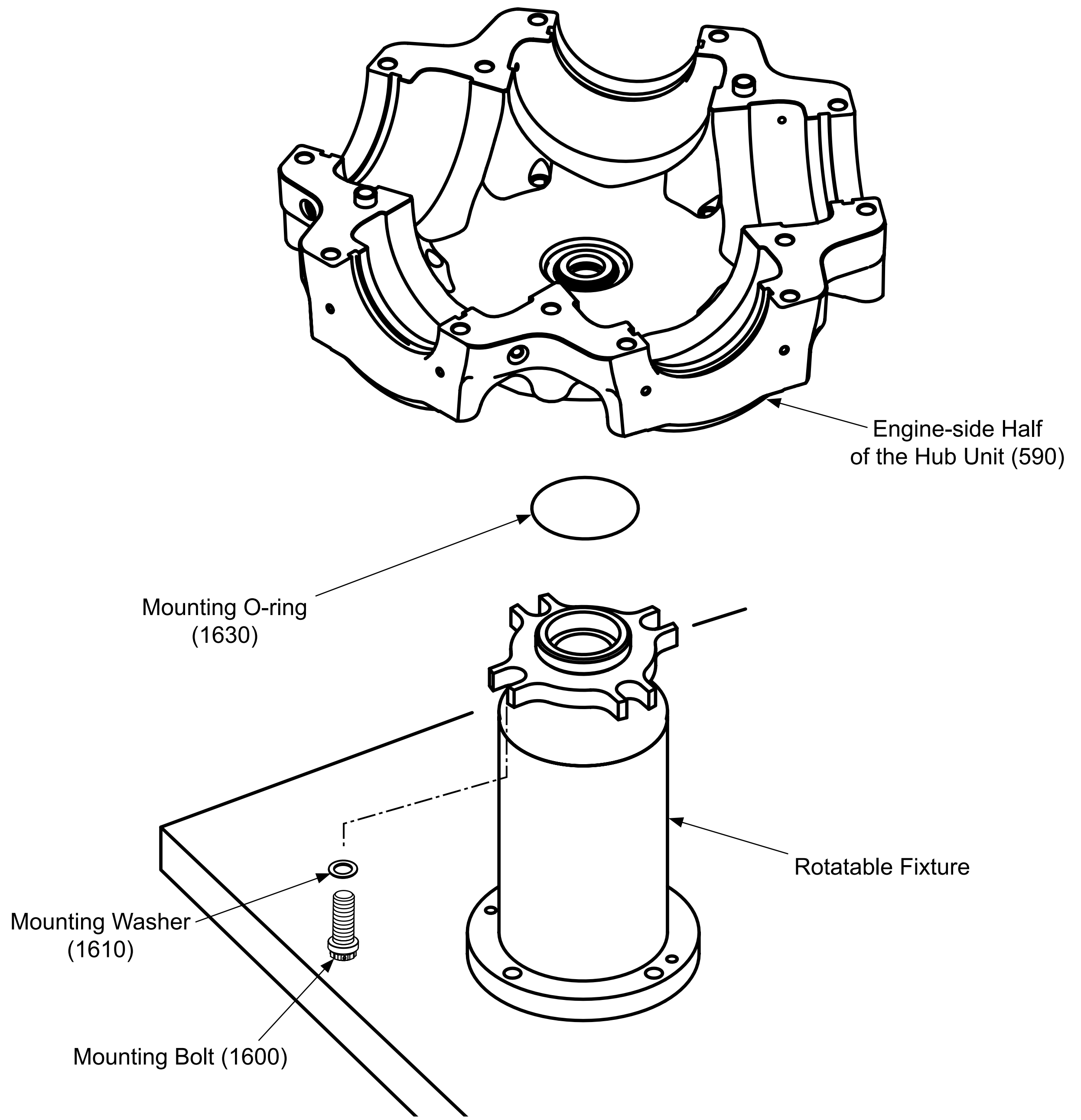
CAUTION: DO NOT DAMAGE THE HUB (590) WHEN INSTALLING THE MOUNTING BOLTS (654).

3 While holding the mounting bolt ring (652) in position, install the mounting bolts (654) through the mounting bolt ring into the hub (590) until the flat on the bolt head aligns with the raised lip on the mounting bolt ring.

a A 0.002 inch (0.05 mm) feeler gauge must not fit between the head of the mounting bolts (654) and the mounting bolt ring (652).

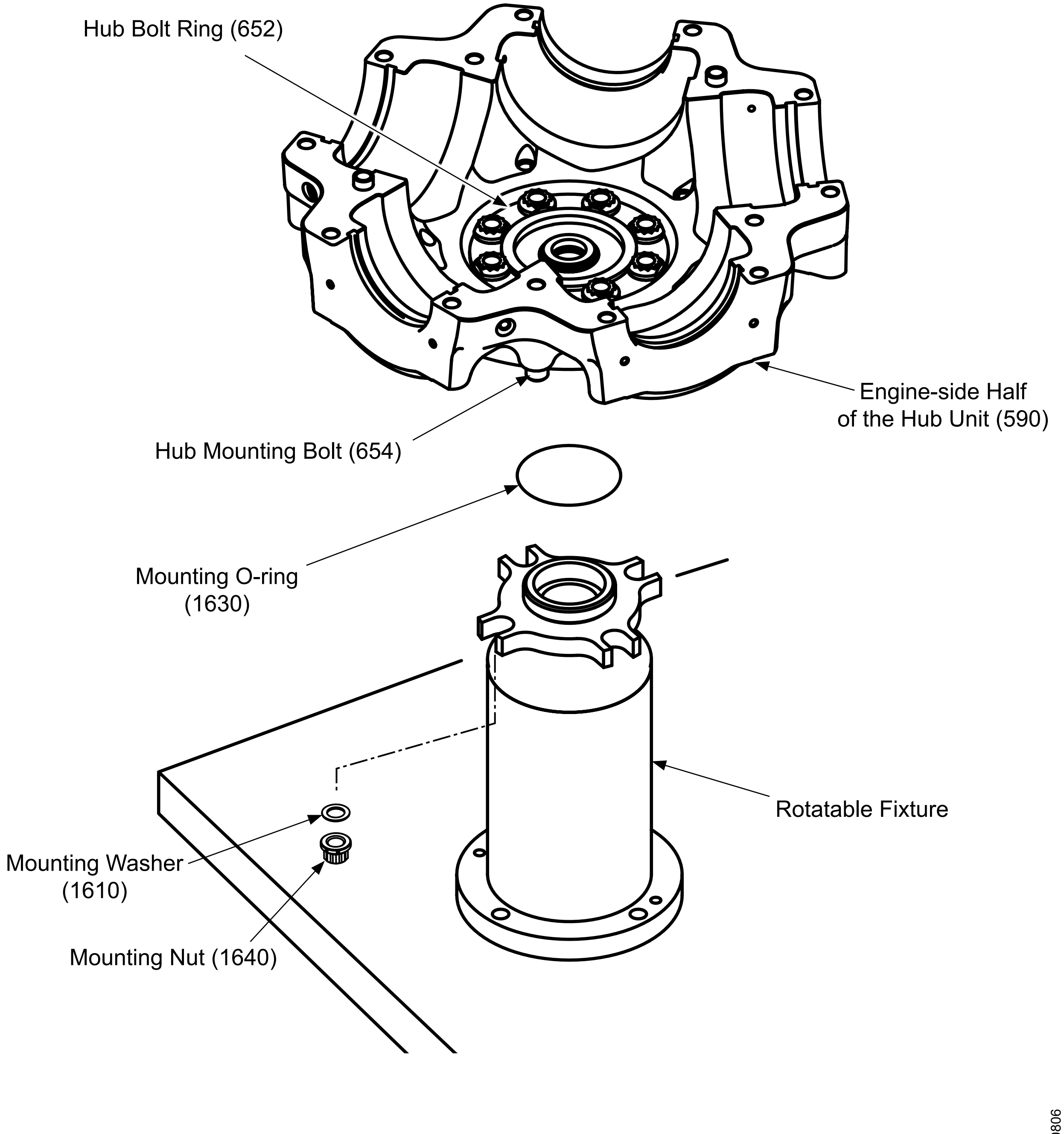


Installing the Rod Hub Bushing and Mounting Bolt Ring
Figure 7-21



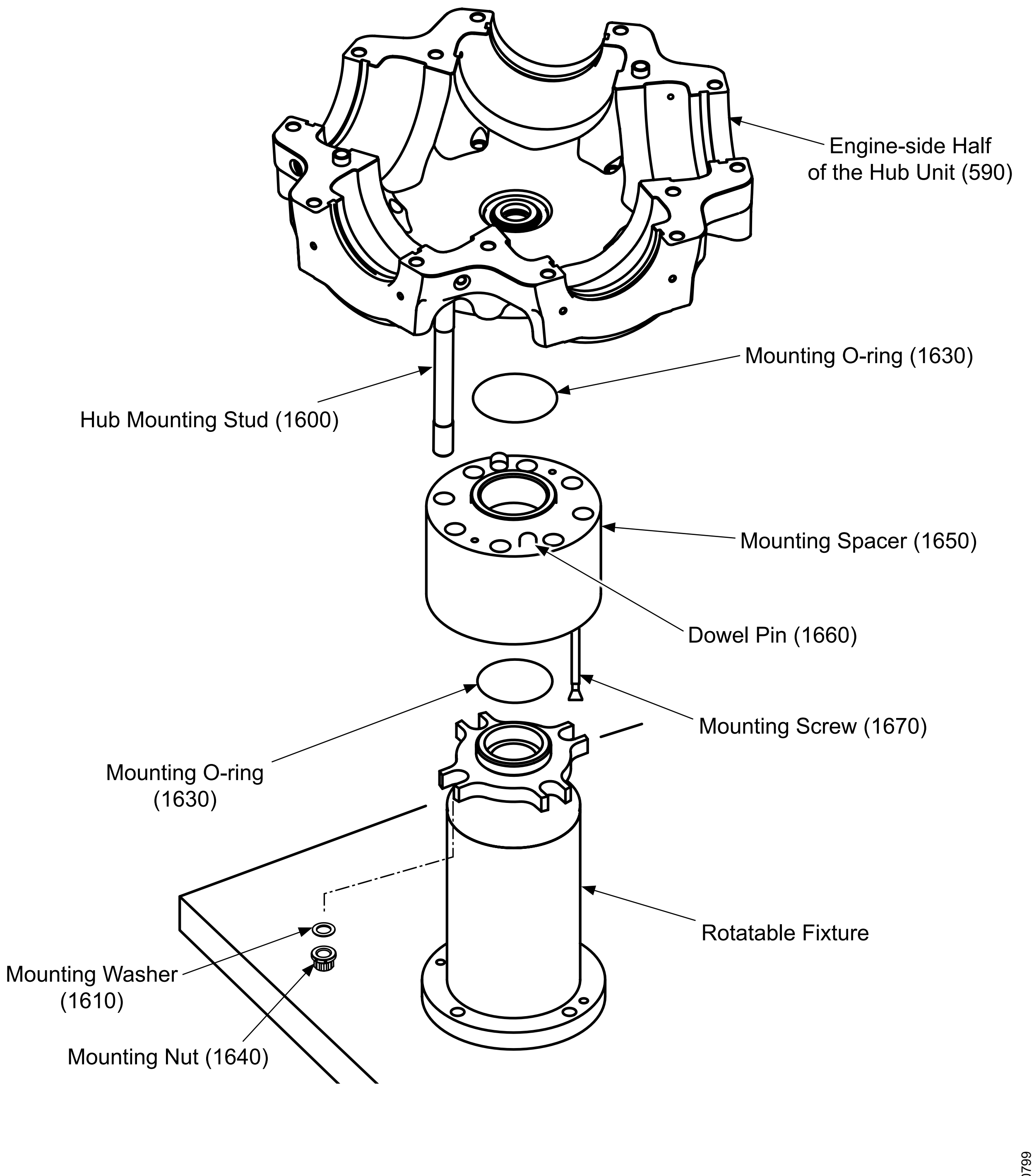
NOTE: Fixture adapter not shown. For adapter use with the rotatable fixture, refer to Hartzell Propeller Inc. Manual 165A (61-00-65).

Installing the Engine-side Hub Half on the Rotatable Fixture - All Propellers Except HC-E5P-3( ), HC-E5N-5K( ), and HC-E5W-3( )
Figure 7-22



NOTE: Fixture adapter not shown. For adapter use with the rotatable fixture, refer to Hartzell Propeller Inc. Manual 165A (61-00-65).

Installing the Engine-side Hub Half on the Rotatable Fixture - HC-E5P-3( ) and HC-E5N-5K( ) Only
Figure 7-23



NOTE: Fixture adapter not shown. For adapter use with the rotatable fixture, refer to Hartzell Propeller Inc. Manual 165A (61-00-65).

Installing the Engine-side Hub Half on the Rotatable Fixture - HC-E5W-3( )
Figure 7-24

(5) Install the back-up rings (580) in the beta rod holes in the cylinder-side hub half, if applicable.

(a) For a hub that <u>does not</u> use bushings (450) in the cylinder-side beta rod holes, install two back-up rings (580) in the each of the beta rod holes in the cylinder-side hub half (590).

(b) For a hub that <u>does</u> use bushings (450) in the cylinder-side beta rod holes, the two back-up rings (580) will be installed when the bushings are installed.

(6) Install an O-ring (660) in each beta rod hole in the engine-side hub half (590), if applicable.

<u>NOTE</u>: For the cylinder-side hub beta ring holes, the two back-up rings (580) will be installed when the bushings are installed.

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

(7) With the threaded holes showing, put the beta ring (1310) over the rotatable fixture of the assembly table TE129 or equivalent, if applicable.

(a) Put the beta ring (1310) on the assembly table TE129 or equivalent.

(8) With the inboard-side of the bulkhead showing, put the bulkhead over the rotatable fixture of the assembly table TE129 or equivalent.

(a) Put the bulkhead on top of the beta ring (1310) on the assembly table TE129 or equivalent, if applicable.

(9) Install the mounting O-ring (1630) on the rotatable fixture.

(a) For all propeller models except HC-E5W-3( ) Propeller Models - Refer to Figure 7-22 and Figure 7-23, as applicable.

<u>1</u> Install the mounting flange O-ring (1630) on the rotatable fixture to seal between the hub (590) and the rotatable fixture.

(b) For HC-E5W-3( ) Propeller Models only - Refer to Figure 7-24.

<u>1</u> Install the two dowel pins (1660) in the mounting spacer (1650).

<u>a</u> Make sure the dowel pins (1660) protrude 0.360 ±0.020 inch (9.14 ±0.50 mm) from the mounting spacer (1650) surface.

<u>2</u> Install one mounting flange O-ring (1630) on the mounting spacer (1650).

<u>3</u> Attach the mounting spacer (1650) on the hub (590) using mounting screws (1670).

<u>a</u> Tighten the mounting screws (1670) until snug, but do not over-torque.

<u>4</u> Install one mounting flange O-ring (1630) on the rotatable fixture.

(10) Install the engine-side hub half (590) on the rotatable fixture on the propeller assembly table TE129 or equivalent.

(a) For all Propeller Models except the HC-E5P-3( ), HC-E5N-5K( ), and HC-E5W-3( ) - Refer to Figure 7-22.

1 Using one washer (1610) and one hub mounting bolt (1600) in each of two mounting holes 180 degrees apart, install the engine-side hub half (590) on the rotatable fixture on the propeller assembly table TE129 or equivalent.

(b) For HC-E5P-3( ) and HC-E5N-5K( ) Propeller Models only - Refer to Figure 7-23.

1 Using one washer (1610) and one hub mounting nut (1640) on each of two hub mounting bolts (654) 180 degrees apart, install the engine-side hub half (410) on the rotatable fixture on the propeller assembly table TE129 or equivalent.

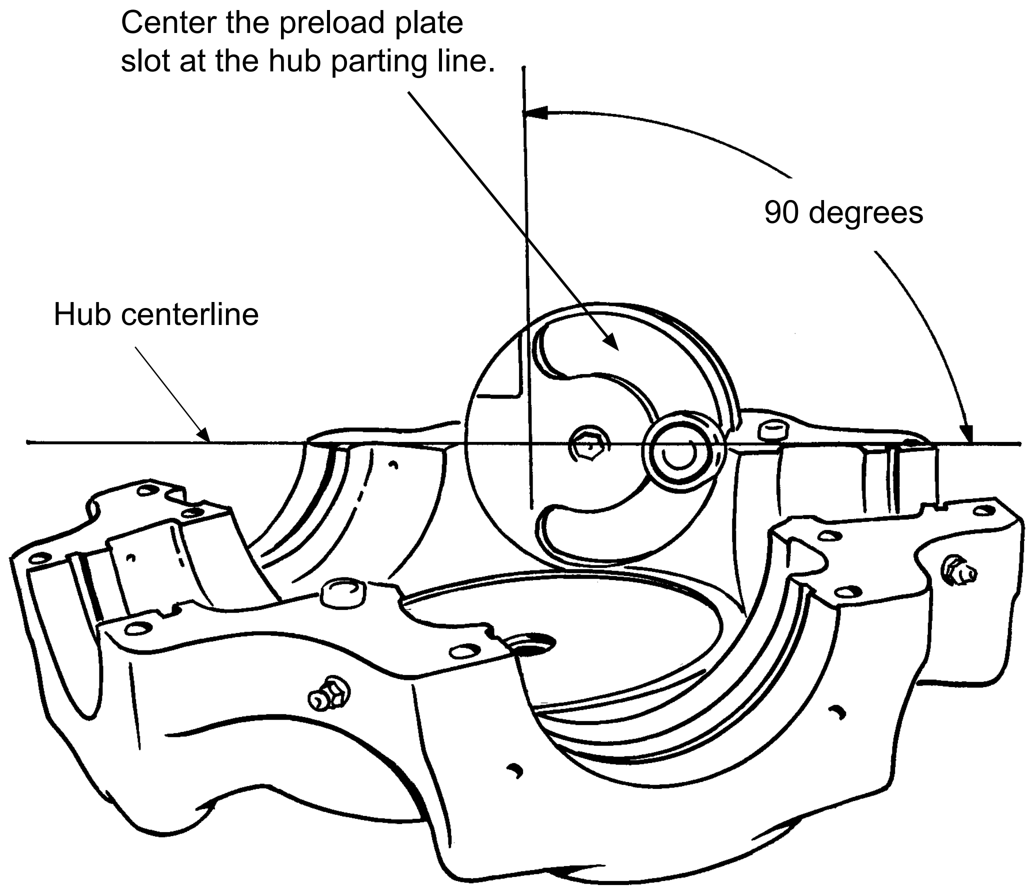
(c) For HC-E5W-3( ) Propeller Models only - Refer to Figure 7-24.

1 Using one washer (1610) and one hub mounting nut (1640) on each of two hub mounting studs (1600) 180 degrees apart, install the engine-side hub half with mounting spacer (1650) to the rotatable fixture on the propeller assembly table TE129 or equivalent.

(11) Tighten the hub mounting bolts/nuts (1600/1640) until tight.

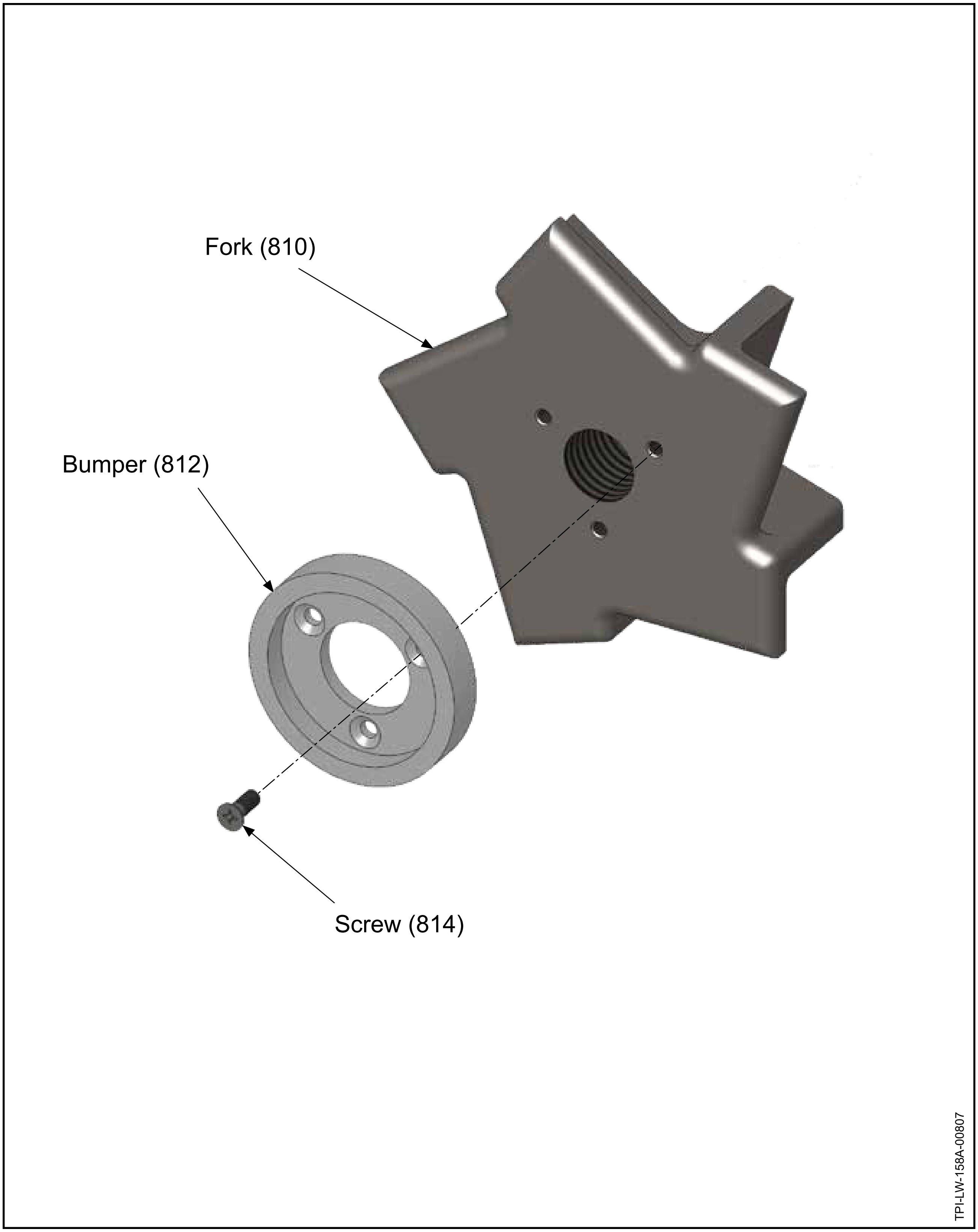
(a) For the mounting hardware and the mounting torque values, refer to the applicable owner's manual.

(12) Using solvent CM11, CM23, CM106, or CM173, clean the inside surface of the hub (590), the parting line face, and the O-ring grooves.



NOTE: Fork has been removed for illustration purposes.
Preload plate orientation of slot is model dependent.

Installing a Blade in the Hub Socket
Figure 7-25



Installing the Bumper on the Fork
Figure 7-26

5. Blade Assembly

A. Blade Installation in the Hub

(1) Apply a thin layer of grease CM12, (except propeller models HC-E5N-3, HC-E5N-3L, and HC-E5N-3A[L]) to the hub blade retention radii of the engine-side hub half (590) and the hub O-ring grooves.

(a) For propeller models HC-E5N-3, HC-E5N-3L, and HC-E5N-3A(L), use grease CM12-4 only.

(2) For the HC-E5P-3( ) and HC-E5N-5KL propeller models only, attach the bumper (812) to the flat-side of the fork (810). Refer to Figure 7-26.

(a) Put the flat-side of the bumper (812) against the flat side of the fork (810).

(b) Align the holes in the bumper (812) with the holes in the fork (810).

(c) Put threadlocker CM21 on the threads of three 8-32 100° head screws (814).

(d) Using the three screws (814), attach the bumper (812) to the fork (810).

(e) Torque each screw in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.

(3) With the flange-side pointing down, put the fork (810) in the engine-side hub half (590).

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

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

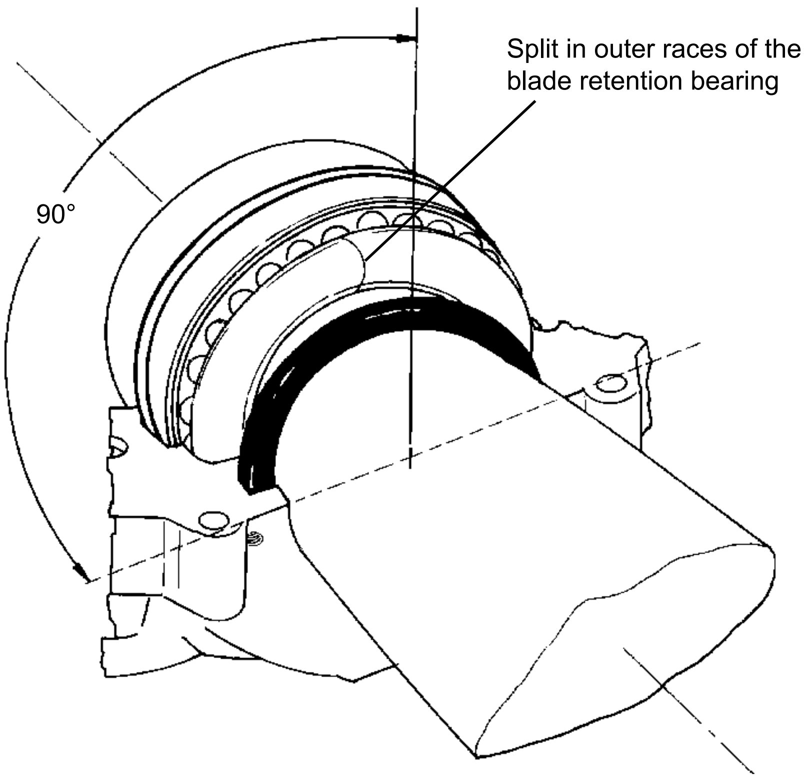
NOTE: Blade retention components clamp TE25 may be used to hold the parts together when installing a blade.

(a) Making sure that the cam follower (1040) is in the slot of the pitch change fork (810), install a blade assembly into the socket of the engine-side hub half (590).

(b) Turn the blade to make sure that the blade turns freely in the hub (590) blade socket. Refer to Figure 7-25.

1 If the blade does not turn freely, examine the blade seal or O-ring (1200) for correct fit in the hub O-ring groove.

2 If the blade turns freely, continue to the next step.



Position of the Split in the Blade Retention Bearing Races
Figure 7-27

CAUTION: MAKE SURE THAT THE BLADE KNOB SLOT OF THE PRELOAD PLATE (1080) PERMITS THE BLADE TO TRAVEL THE FULL BLADE ANGLE RANGE WITHOUT RESTRICTION.

(c) Center the blade knob slot of the preload plate (1080) at the hub parting line. Refer to Figure 7-25.

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

(d) Align the split in the outer races of the blade retention bearing 90 degrees from the hub parting line. Refer to Figure 7-27.

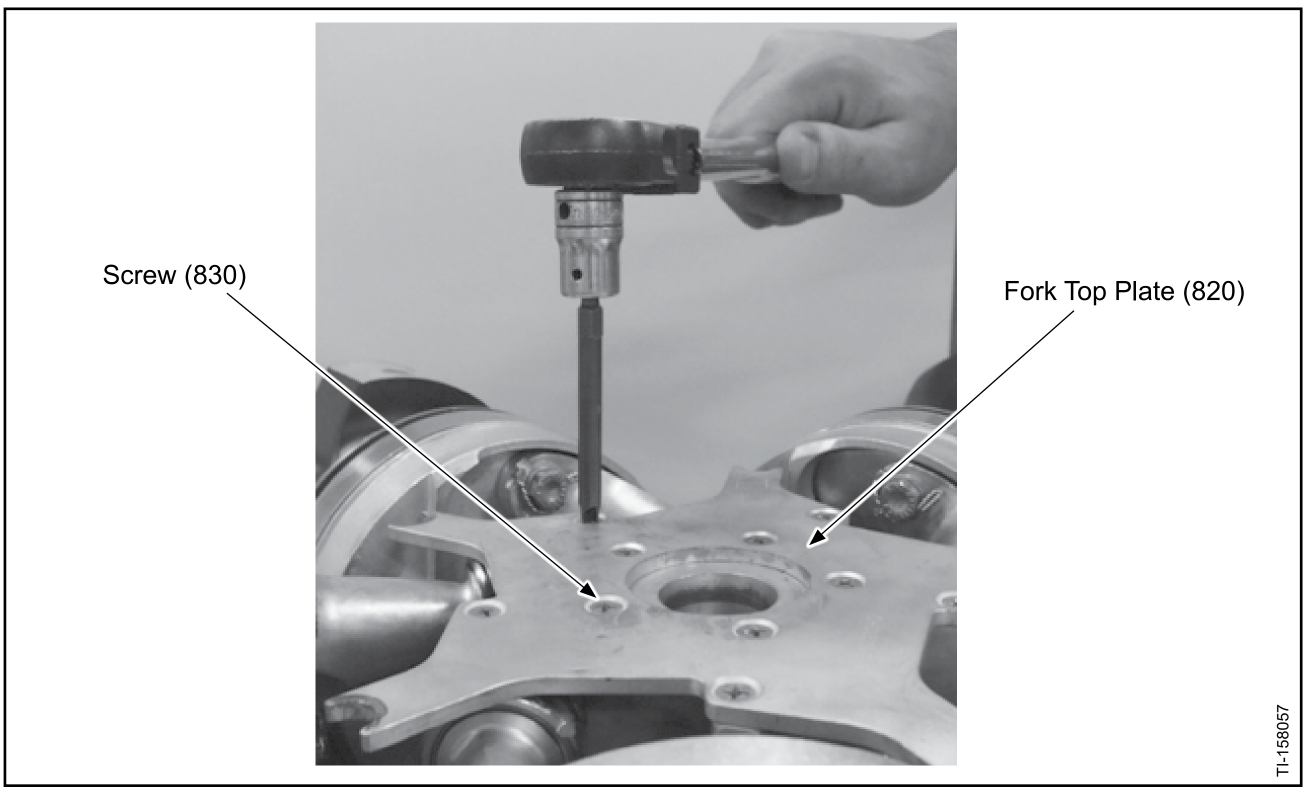
(e) Repeat steps (1) through (5)(d) in this section for the remaining blades.

(6) While aligning the identifying mark "A" on each arm of the fork top plate (820) with the anti-rotation rod holes in the hub, put the fork top plate on the fork (810).

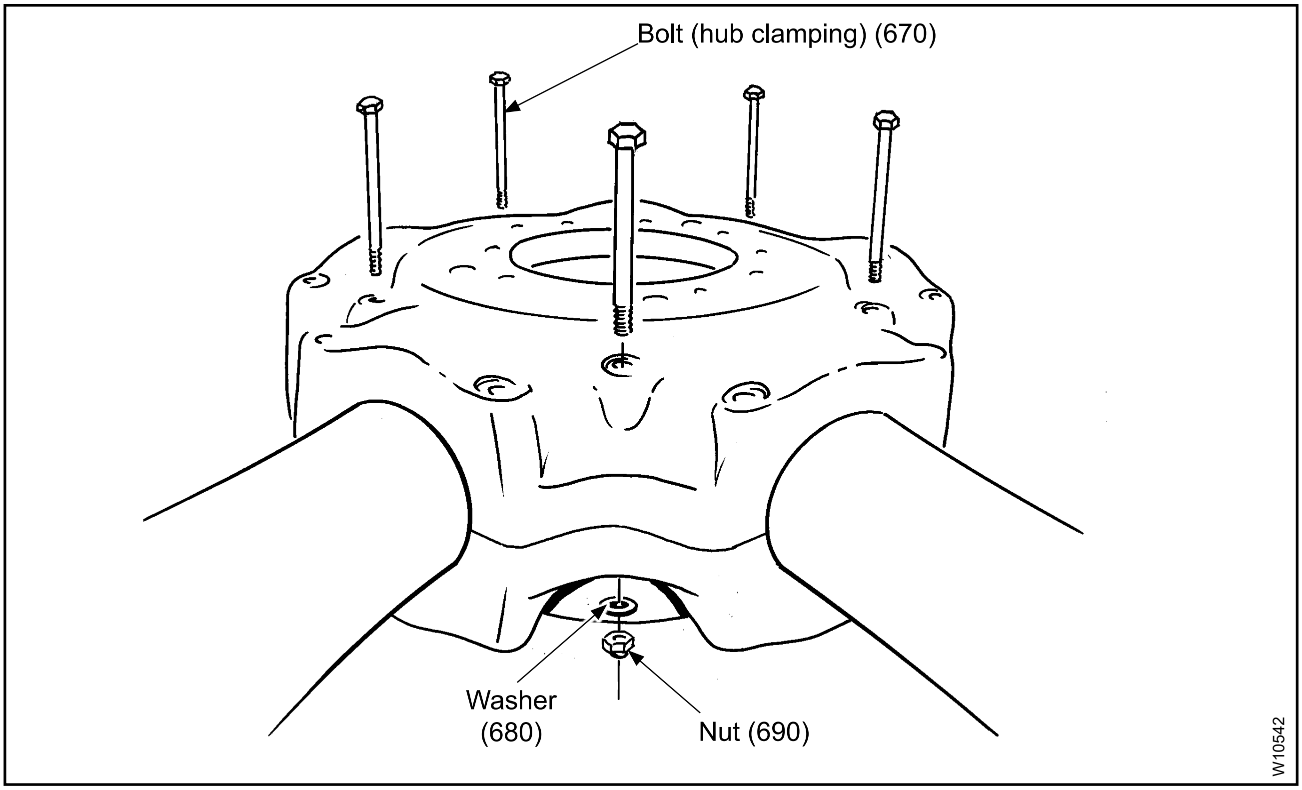
(a) If there are no "A" identifying marks on the fork plate, refer to the applicable section in the Check chapter of this manual.

(7) Install a screw (830) in each of the threaded holes in the fork top plate (820).

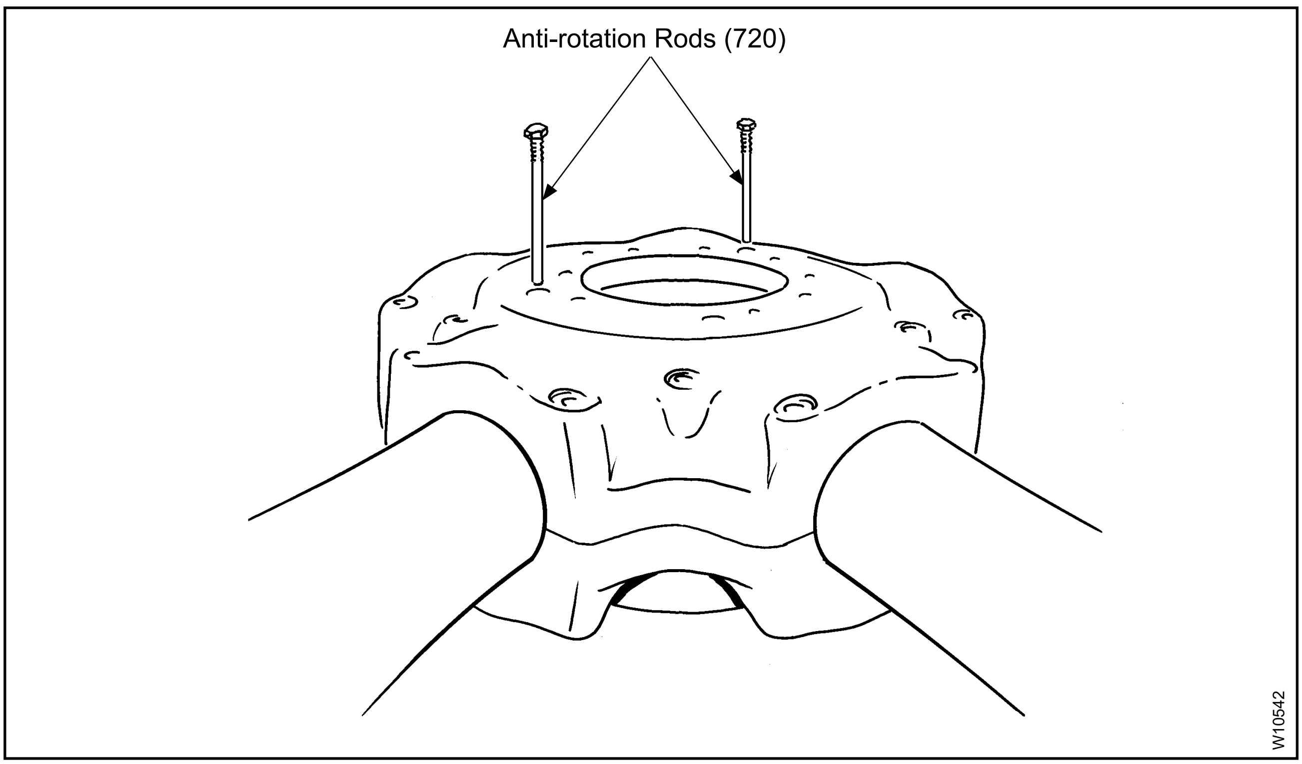
(8) Torque each screw (820) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual. Refer to Figure 7-28.



Torquing the Fork Top Plate Screws
Figure 7-28



Installing the Cylinder-side Hub Half
Figure 7-29



Installing the Anti-rotation Rods
Figure 7-30

(9) Install each guide bushing (620) in each hole provided for it in the hub (590).

(10) Using the hub guide bushings (620), align the hub halves.

(11) Making sure the blade O-rings (1200) are in the hub blade O-ring grooves, put the cylinder-side hub-half in position on the engine-side hub-half (590).

(12) Midway between each of the five blade sockets, install a bolt (670), washer (680), and nut (690). Refer to Figure 7-29.

NOTE: A soft mallet may be used to help install the hub bolts (670) in the holes in the hub halves.

CAUTION: USE A STAGGERED SEQUENCE WHEN TORQUING THE HUB NUTS (690) TO MAKE SURE OF UNIFORM PULL-DOWN OF THE HUB HALVES.

(13) Using a staggered sequence, torque each nut (690) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.

(14) Remove the blade stand TE126 or equivalent, from each blade.

CAUTION: DO NOT TURN THE BLADES UNTIL THE ANTI-ROTATION RODS (720) ARE INSTALLED.

(15) Apply a thin layer of anti-seize compound CM118 to the threads of each anti-rotation rod (720).

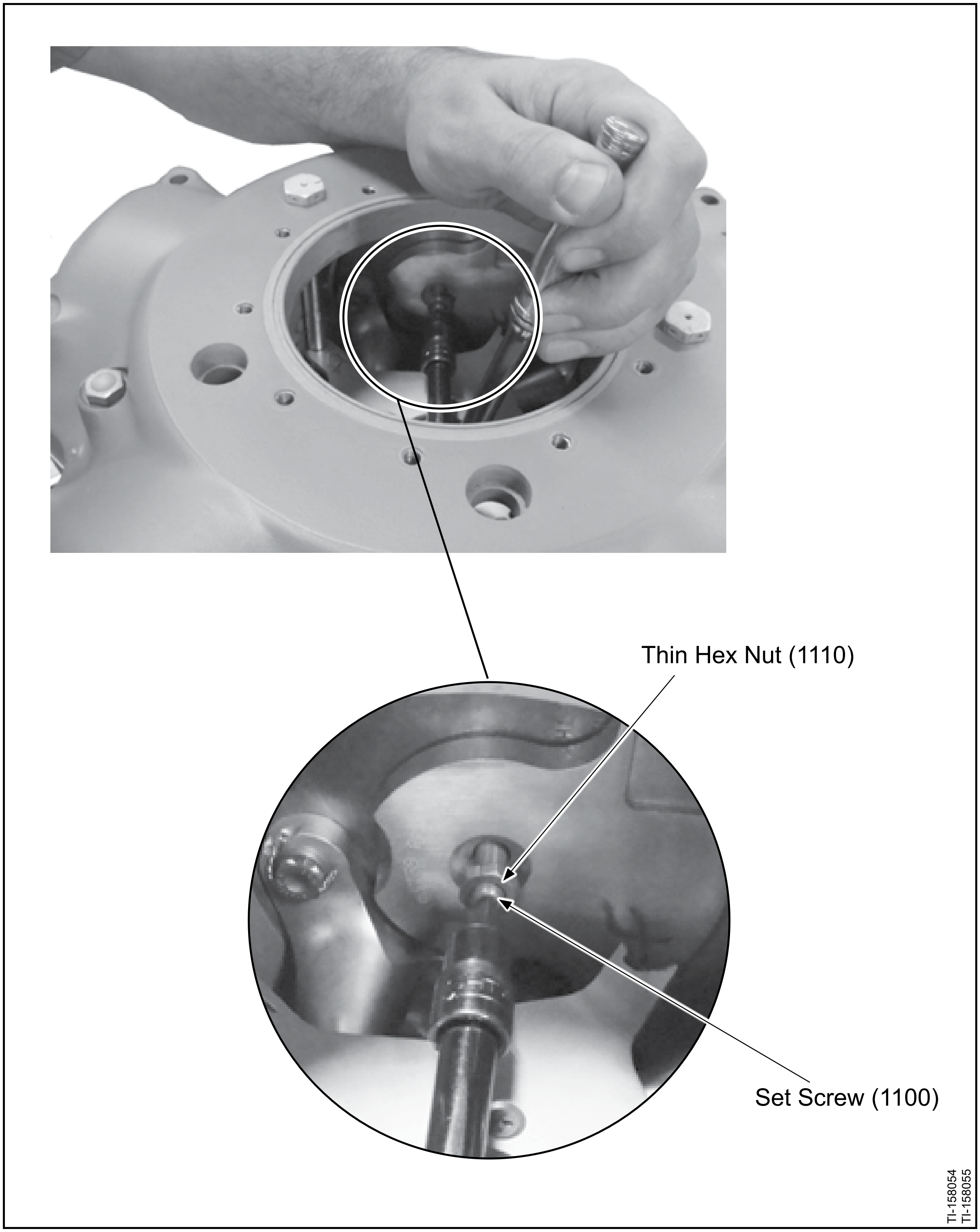
(16) Put an anti-rotation rod (720) in each hole provided for it in the cylinder-side hub half (590), through the cutout provided for it in the fork (810), and into the blind hole in the flange-side hub half. Refer to Figure 7-30.

(17) Torque each anti-rotation rod (720) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.

(18) 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 (670), nuts (690), and washers (680) and slightly separate the hub (590) halves to permit rotation of the preload plate (1080).

(b) Repeat the hub-clamping bolt installation procedure after the preload plate (1080) has been correctly positioned.



Tightening Preload Plate Hex Head Screw and Jam Nut
Figure 7-31

B. Setting the Blade Preload

(1) Tighten the preload set screw (1100) until the tip of the blade stops moving vertically. Refer to Figure 7-31.

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

(3) Loosen the set screw (1100) and retighten until the blade tip stops moving, then turn the set screw an additional 1/4 turn into the preload plate (1080).

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

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

1 The blade seal or O-ring (1200) for correct fit in the hub groove.

2 If applicable, the needle rollers in the blade bore bearing may be skewed. Position the needle rollers parallel to the axis of blade pitch change.

3 The blade preload may be too tight.

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

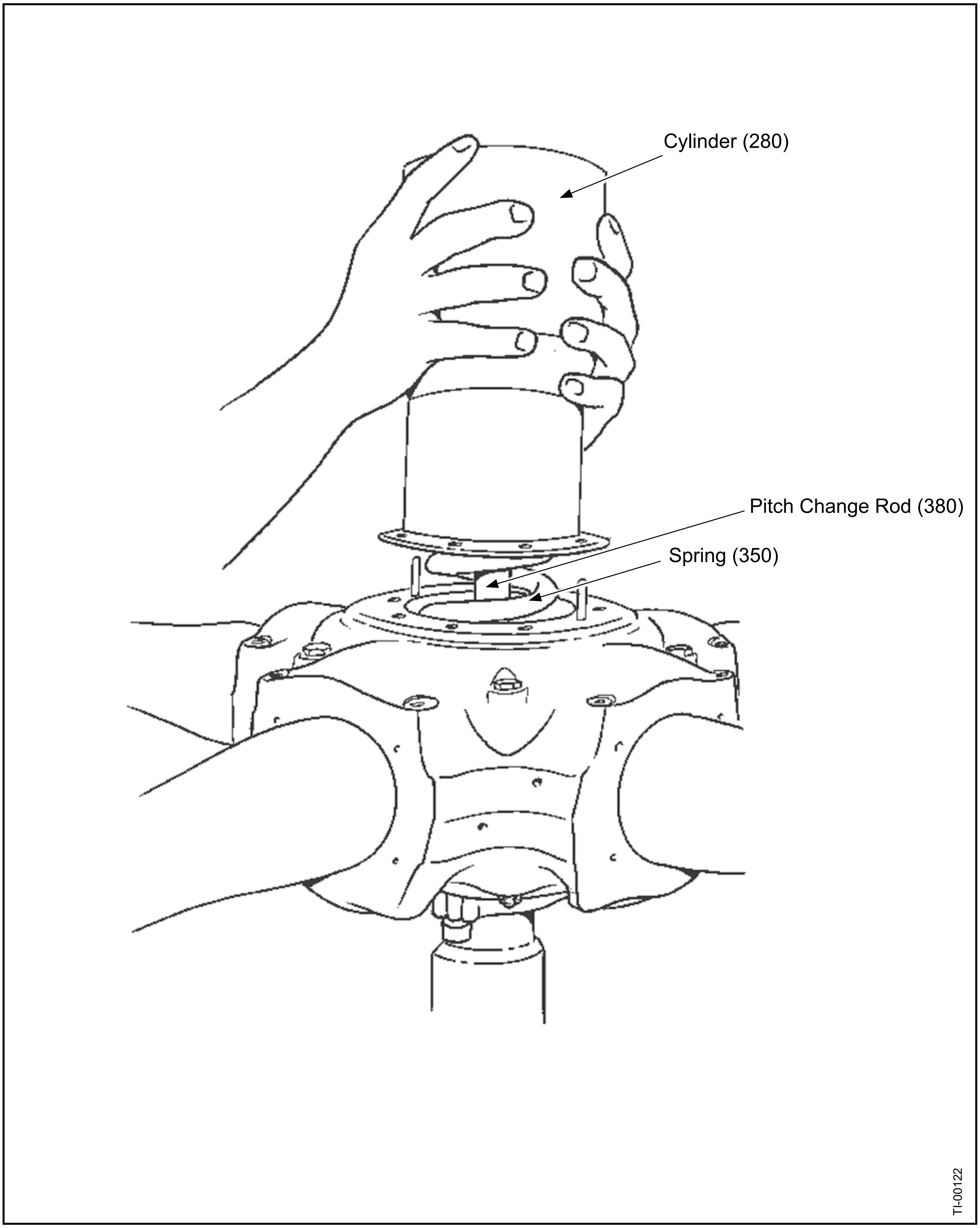
(b) If the blade turns freely, continue to the next step.

(5) Apply one drop of threadlocker CM21 on the threads of each preload set screw (1100) between the thin hex nut (1110) and the preload plate (1080).

CAUTION: DO NOT PERMIT THE SET SCREW (1100) TO ROTATE WHEN TORQUING THE THIN HEX NUT (1110).

(6) Torque the thin hex nut (1110) against the preload plate (1080) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual. Refer to Figure 7-31.

(7) Repeat steps (1) through (6) in this section for the remaining blades.



Installing the Pitch Change Rod into the Fork
Figure 7-32

C. Installation of the Pitch Change Rod/Cylinder Unit Assembly - Refer to Figure 7-32

(1) Move the blades to reverse pitch position.

(2) Install the cylinder mounting O-ring (470) in the groove provided for it on the top of the cylinder-side hub half (590).

WARNING: USE CARE WHEN HANDLING A CYLINDER (280) CONTAINING A COMPRESSED SPRING.

(3) 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.

(4) Apply a thin layer of grease CM12, (except propeller models HC-E5N-3, HC-E5N-3L, and HC-E5N-3A[L]) to the end of the pitch change rod (380) that will be installed in the hub (590).

(a) For propeller models HC-E5N-3, HC-E5N-3L, and HC-E5N-3A(L), use grease CM12-4 only.

(5) Carefully turn the pitch change rod (380) into the fork (810) by turning the cylinder (280) as far as possible by hand.

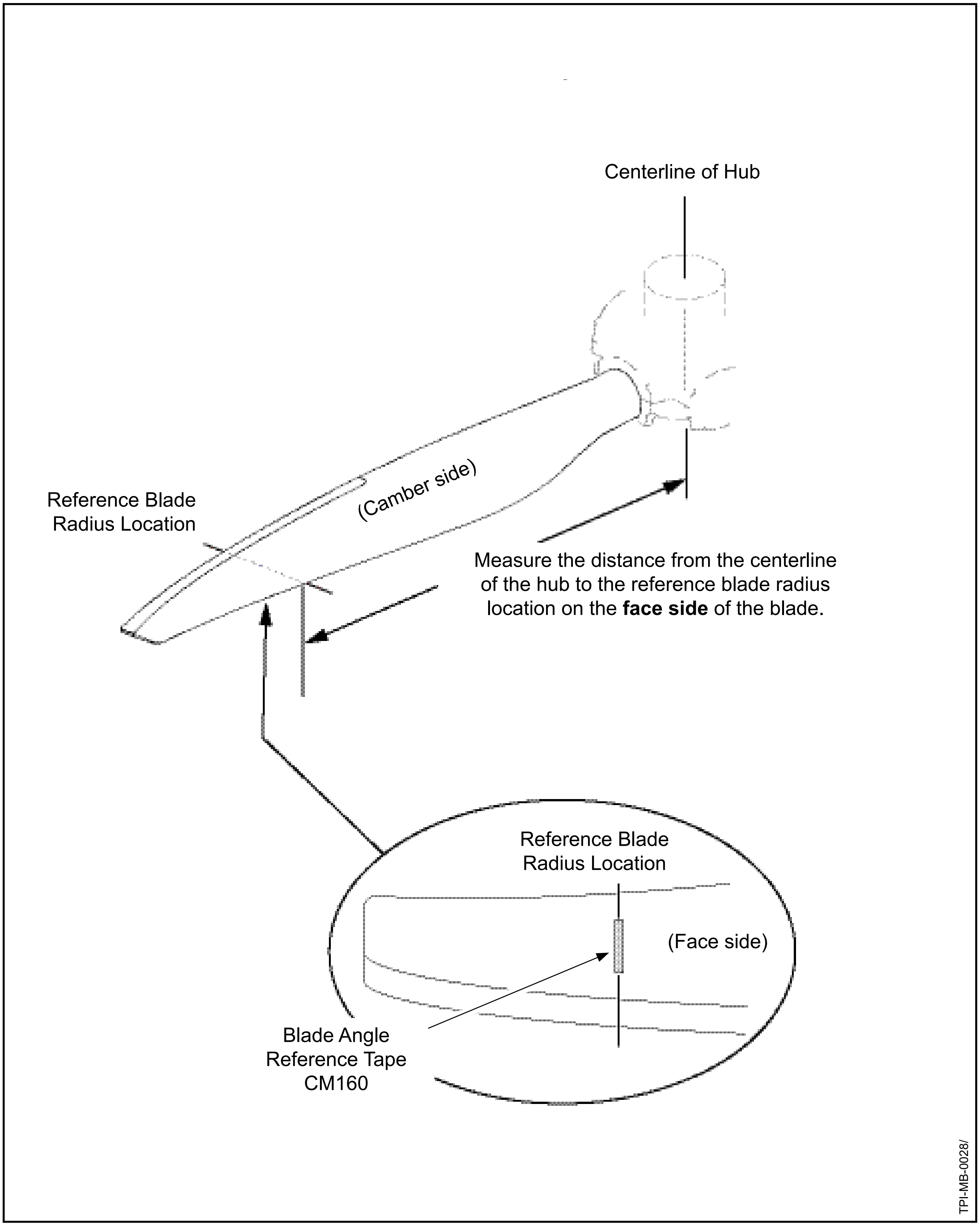
(6) Using a 1-5/8 inch deep well socket or a crowfoot wrench and a suitable extension on the piston nut (200), tighten the pitch change rod/cylinder assembly to the fork (810).

(a) Torque the pitch change rod/cylinder assembly in accordance with the torque given for the pitch change rod (380) in Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.

(7) When using a D-3657 or 107135 Pitch Change Rod (380):

(a) Install an O-ring (50) in the groove provided for it in the pitch change rod plug (30).

(b) Turn the pitch change rod plug (30) in the end of the pitch change rod (380) until the holes in the pitch change rod align with the slot in the pitch change rod plug.



Blade Angle Reference Tape
Figure 7-33

D. 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 7-33.

(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 7-33.

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.

E. Blade-to-Blade Angle Tolerance Check

(1) Refer to the applicable aircraft specifications manual or Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59) for specific blade angles required.

(a) Make sure that the reference includes both the angle and the radius station.

(2) Manually turn the blades in the direction of feather blade angle to seat all of the parts.

(3) Temporarily install two bolts (420) with washers (400) in the cylinder mounting holes of the cylinder (280).

NOTE: The bolts (420) with washers (400) will hold the cylinder (280) in position during the required blade measurements.

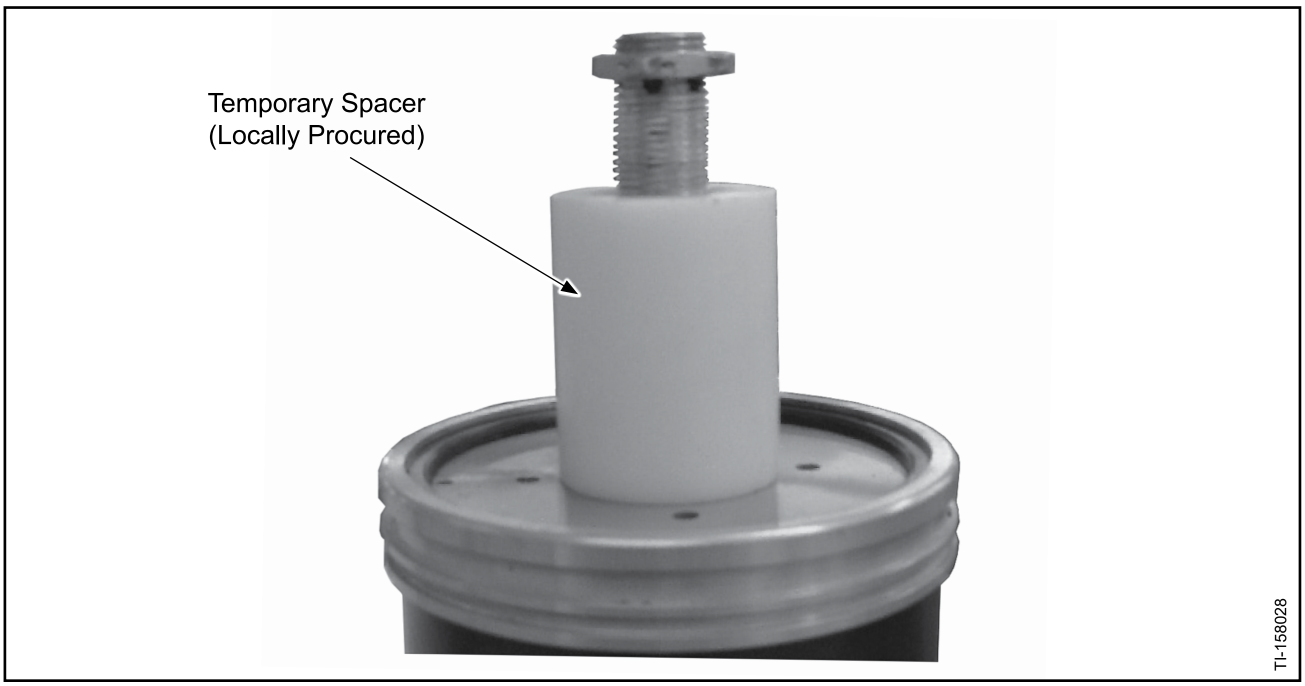
CAUTION: DO NOT DAMAGE THE THREADS OF THE CYLINDER (280) WHEN INSTALLING THE PITCH STOP PLATE (60).

(4) Manually turn the pitch stop plate (60) in the top of the cylinder (280) until a few cylinder threads are showing.

(5) Install a locally procured temporary spacer on the pitch change rod (380). Refer to Figure 7-34.

(a) The temporary spacer must be approximately 3 inches (76.2 mm) tall and must have a center hole with a diameter that is larger than the pitch change rod (380).

(6) Turn a feathering nut (20) on the end of the pitch change rod (380).



Installing a Temporary Spacer
Figure 7-34

(7) Rotate the propeller until the nut (20) touches the temporary spacer.

(8) Using a bench top protractor TE96, 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. Refer to Figure 7-35 and the Fits and Clearances chapter of this manual.

(a) Measure the blade angle at the reference blade radius location.

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

1 Replace the pitch change unit(s) on the blade(s) in accordance with the section, "Pitch Change Unit Installation" in this chapter.

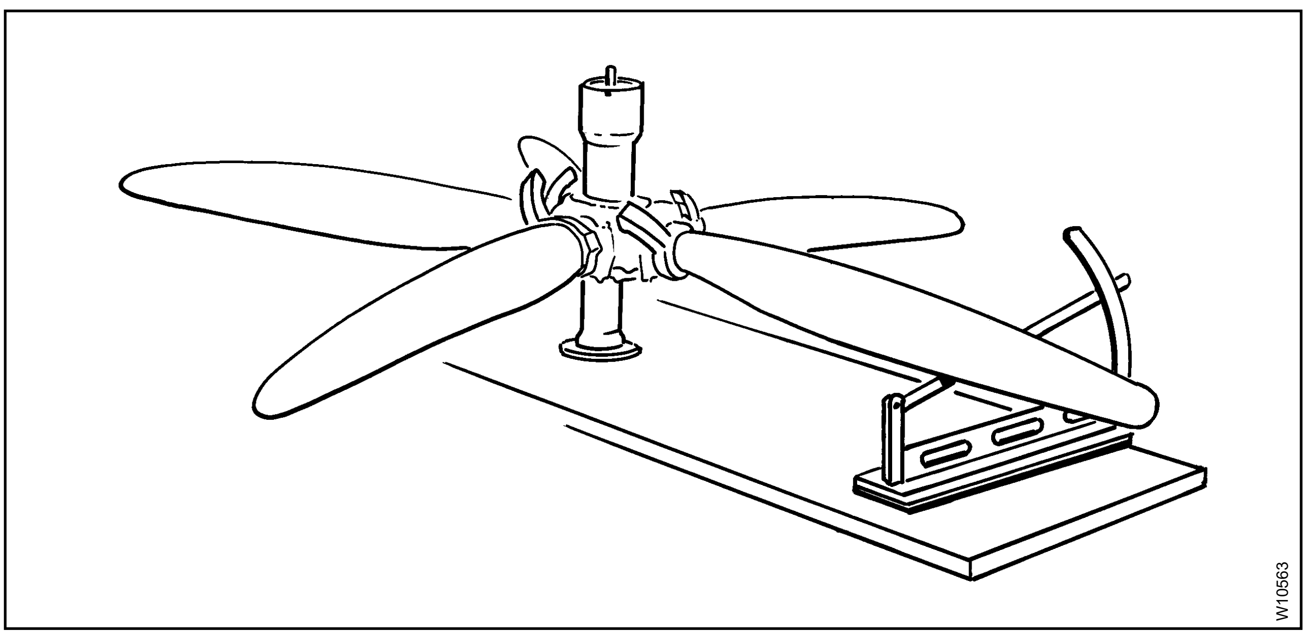
a Refer to Table 7-1, "Blade Pitch Change Unit Selection" to select the applicable pitch change knob bracket (1020) to increase or decrease the blade angle.

2 Measure the blade-to-blade angle tolerance until all five blades are within tolerance.

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

(10) Move the blades in the direction of low pitch until the blade tips are approximately parallel to the bench surface.

(11) Examine the propeller for fore-and-aft or end play movement in each blade. Refer to the Fits and Clearances chapter of this manual for the blade tolerances.



Measuring Blade Angles with the Bench Top Protractor TE96
Figure 7-35

(12) Using a height gage, measure the blade track at the tip of each blade. Refer to the Fits and Clearances chapter of this manual for the blade tolerances.

(13) When the blade tolerances are within the permitted limits of the Fits and Clearances chapter of this manual, continue to the next step.

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 hub half, to install the remaining hex head bolts (570, 580), washers (590) and self-locking nuts (600), or to apply CM66, CM92, CM257 to the hub mating surfaces.

(14) Remove the pitch change rod/cylinder unit assembly.

(15) Remove the anti-rotation rods (720).

(16) Remove the bolts (670), washers (680), and nuts (690).

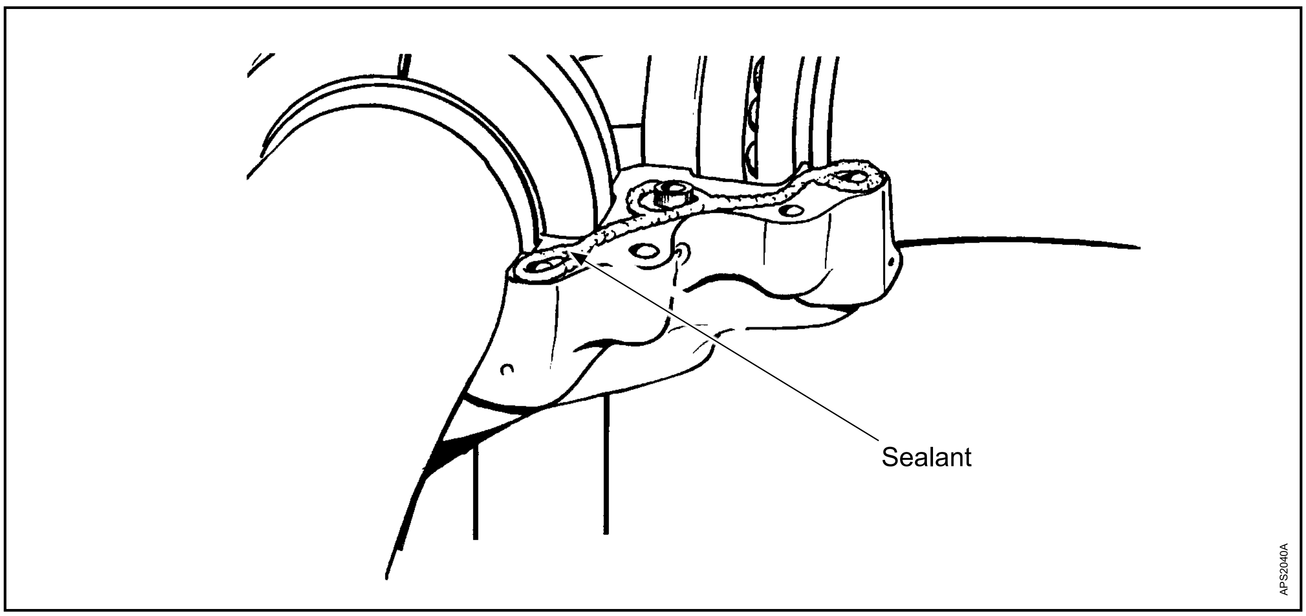
(17) Remove the cylinder-side half of the hub (590).

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

(18) Put a bead of sealant CM66, CM92, or CM257 on the hub mating surfaces. Refer to Figure 7-36.

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

(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 hub nuts are properly torqued.



Applying Sealant Between the Hub Halves
Figure 7-36

(19) Using the hub guide bushings (620), align the hub halves.

(20) Making sure the blade O-rings (1200) are in the hub (590) blade O-ring grooves, put the cylinder-side hub-half in position on the engine-side hub-half.

(21) Midway between each of the five blade sockets, install a bolt (670), washer (680), and nut (690). Refer to Figure 7-29.

NOTE: A soft mallet may be used to help install the hub bolts (670) in the holes in the hub (590) halves.

CAUTION: USE A STAGGERED SEQUENCE WHEN TORQUING THE HUB NUTS (690) TO MAKE SURE OF UNIFORM PULL-DOWN OF THE HUB (590) HALVES.

(22) Using a staggered sequence, torque each nut (690) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.

(23) Remove the blade stand TE126 or equivalent, from each blade.

CAUTION: DO NOT TURN THE BLADES UNTIL THE ANTI-ROTATION RODS (720) ARE INSTALLED.

(24) Apply a thin layer of anti-seize compound CM118 to the threads of each anti-rotation rod (720).

(25) Put an anti-rotation rod (720) in each hole provided for it in the cylinder-side hub (590) half, through the cutout provided for it in the fork (810), and into the blind hole in the flange-side hub half. Refer to Figure 7-30.

(26) Torque each anti-rotation rod (720) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.

(27) 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 (670), nuts (690), and washers (680) and slightly separate the hub (590) halves to permit rotation of the preload plate (1080).

(b) Repeat the hub-clamping bolt installation procedure after the preload plate (1080) has been correctly positioned.

(28) Install the pitch change rod/cylinder unit assembly in accordance with the section, "Installation of the Pitch Change rod/Cylinder Unit Assembly" in this manual.

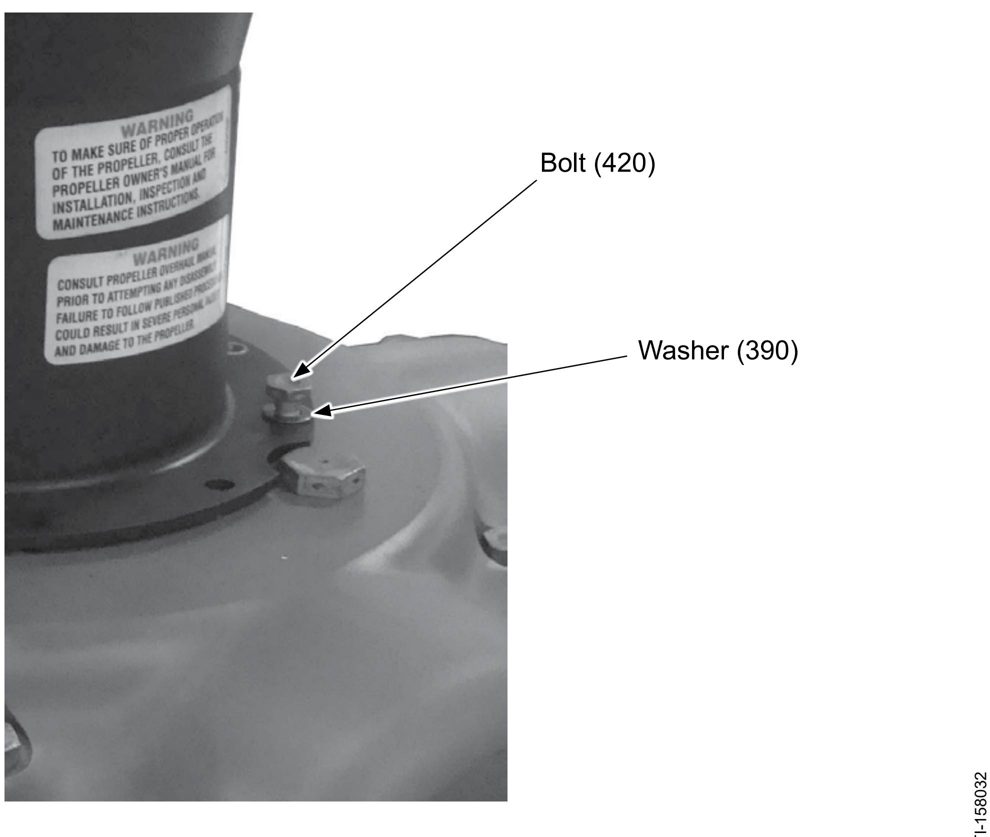
(29) For the HC-E5B-5( ) and HC-E5N-5( ) propeller models only:

(a) Turn the blades to move the cylinder (280) to touch the hub (590).

(b) Turn the cylinder (280) to align the cylinder mounting holes in the hub (590) with the mounting holes in the cylinder (280).

(c) Using a washer (390) and a bolt (420) in each cylinder mounting hole, attach the cylinder (280) to the hub (590). Refer to Figure 7-37.

(d) Torque each bolt (420) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.



Installing the Cylinder Mounting Bolts
Figure 7-37

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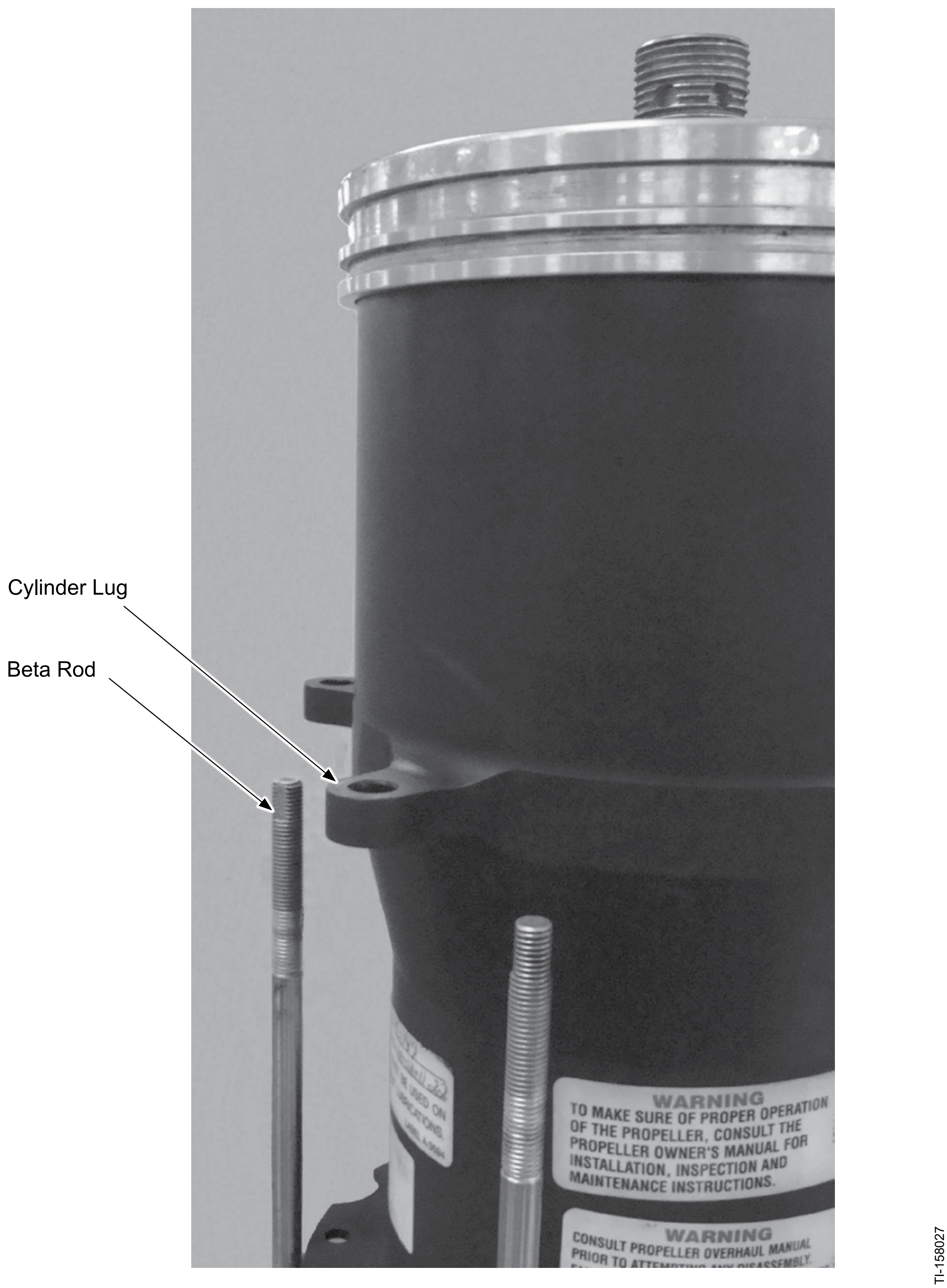


Cylinder Lugs Misaligned with the Beta Rods
Figure 7-38

6. Beta System Assembly

CAUTION: WHILE ASSEMBLING THE BETA SYSTEM, IT IS POSSIBLE FOR THE THREADED BETA SLEEVE (1340) AND NUT (1350) ON THE BETA ROD ASSEMBLY TO FALL THROUGH THE BETA HOLES ON THE CYLINDER-SIDE OF THE HUB. IF THE PROPELLER IS ACTUATED WHILE THE THREADED BETA SLEEVE AND NUT ARE INSIDE THE HUB, THE PARTS MAY JAM INSIDE THE HUB CAUSING DAMAGE TO THE FORK PLATE (820).

A. Installation of the Beta System

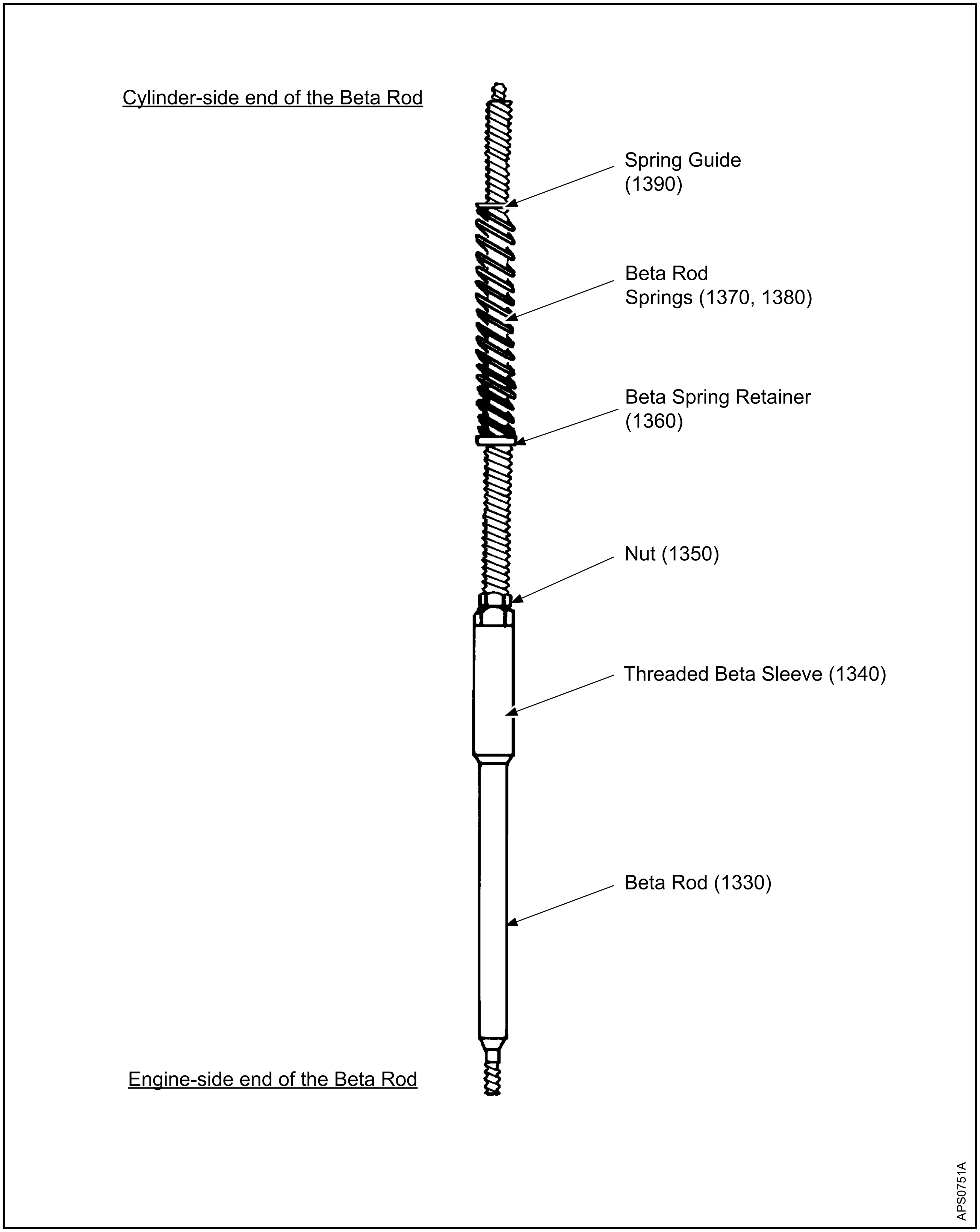
(1) Using the washers and screws provided, install the spinner bulkhead on the engine-side of the propeller hub.

(2) To permit the installation of the beta rods (1330), the lugs on the cylinder (280) and the beta rod holes in the hub (590) must not be aligned. Refer to Figure 7-38.

(a) If the lugs on the cylinder (280) and the beta rod holes in the hub (590) are aligned:

1 Using a locally procured strap wrench, turn the cylinder (280) until the lugs on the cylinder and the beta rod holes in the hub (590) are misaligned enough to permit installation of the beta rods (1330).

(b) If the lugs on the cylinder (280) and the beta rod holes in the hub (590) are misaligned enough to permit installation of the beta rods (1330), go to the next step.



Beta Rod Assembly
Figure 7-39

CAUTION: AT DISASSEMBLY OR OVERHAUL, MAKE SURE THAT DUAL BETA SPRINGS (1370, 1380) AND THE APPLICABLE SPRING RETAINERS ARE INSTALLED ON EACH BETA ROD (1330).

(3) Assemble each beta rod (1330). Refer to Figure 7-39.

(a) The original HC-E5N-3( ) propellers had a single beta spring. At first overhaul or disassembly, install dual beta springs (1370, 1380) (with different spring retainers) on each beta rod (1330). Refer to the Illustrated Parts List chapter of this manual.

(b) Install the threaded beta sleeve (1340) on the beta rod (1330).

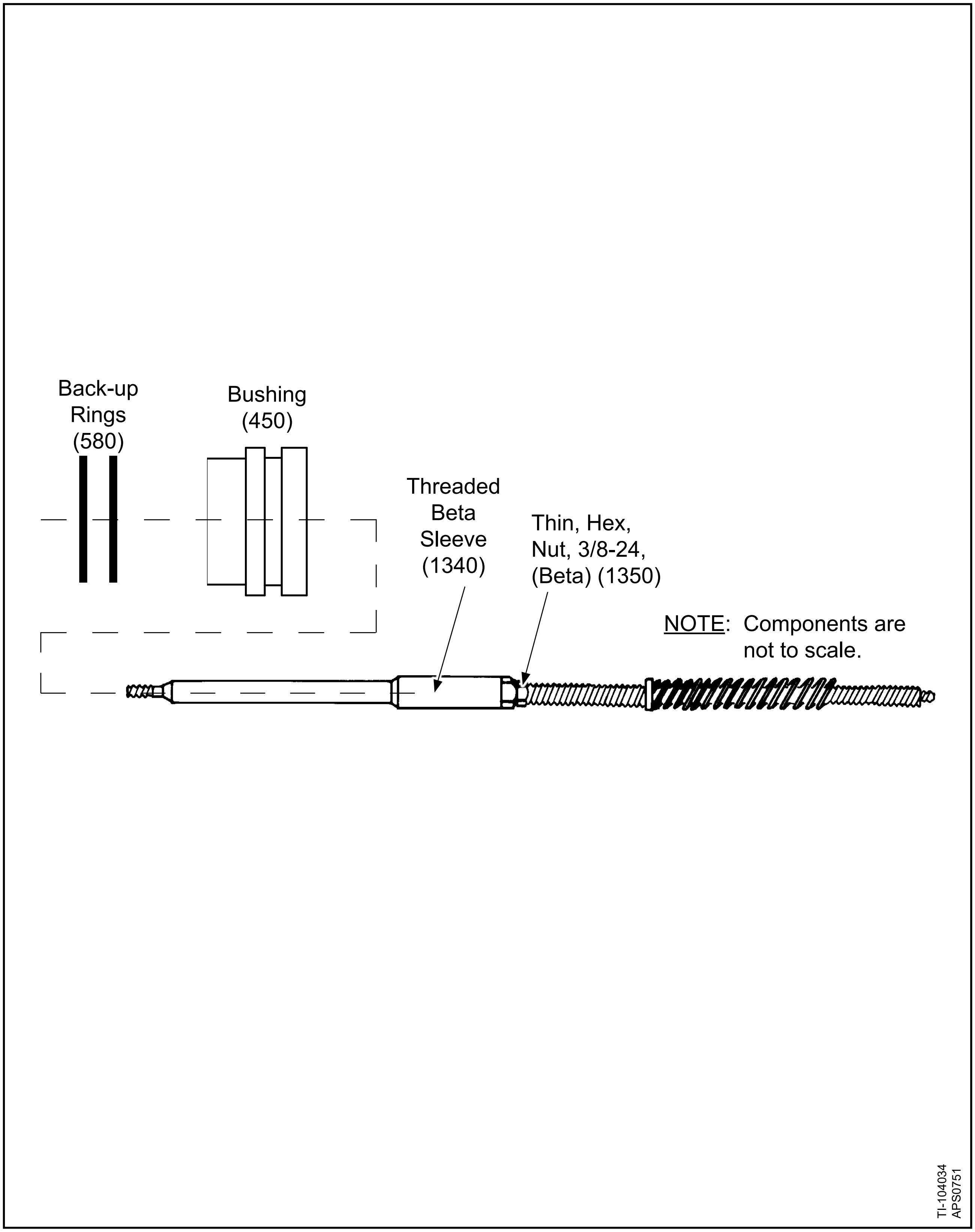
(c) Install the nut (1350) on the beta rod (1330).

(d) With the flat side of the spring retainer (1360) toward the threaded beta sleeve (1340), put a spring retainer on each beta rod (1330).

(e) Put a smaller spring (1370) on each beta rod (1330).

(f) Put a larger spring (1380) over the smaller spring (1370) on each beta rod (1330).

(g) With the flat side of the spring guide (1390) pointing away from the springs (1370, 1380), put a spring guide on each beta rod (1330).



Beta Rod Bushing Assembly
Figure 7-40

(4) For a hub (590) that uses bushings (450) in the cylinder-side beta rod holes, install the assembled beta rods (1330) using the following steps. Refer to Figure 7-40.

(a) Install two back-up rings (580) onto each threaded beta sleeve (1340), under the bushing (450).

(b) Install one bushing (450) onto each threaded beta sleeve (1340).

(c) Apply grease CM12, (except propeller models HC-E5N-3, HC-E5N-3L, and HC-E5N-3A[L]) to the engine-side end of each beta rod (1330).

1 For propeller models HC-E5N-3, HC-E5N-3L, and HC-E5N-3A(L), use grease CM12-4 only.

CAUTION: DO NOT DAMAGE THE BACK-UP RINGS (580) WHEN INSTALLING THE BETA RODS (1330) OR WHEN MOVING THE BETA RODS. THE BACK-UP RINGS CAN BE EASILY DAMAGED BECAUSE OF THE LOOSE FIT BETWEEN THE BUSHING (450) AND THE HUB (590).

(d) Install an assembled beta rod (1330) in the hole provided for it in the cylinder-side hub half (590).

1 Push the beta rod (1330) through the assembled hub halves and out the bottom of the engine-side hub half.

2 Repeat for the remaining assembled beta rods (1330).

(5) For a hub (590) that does not use bushings (450) in the cylinder-side beta rod holes, install the assembled beta rods (1330) using the following steps.

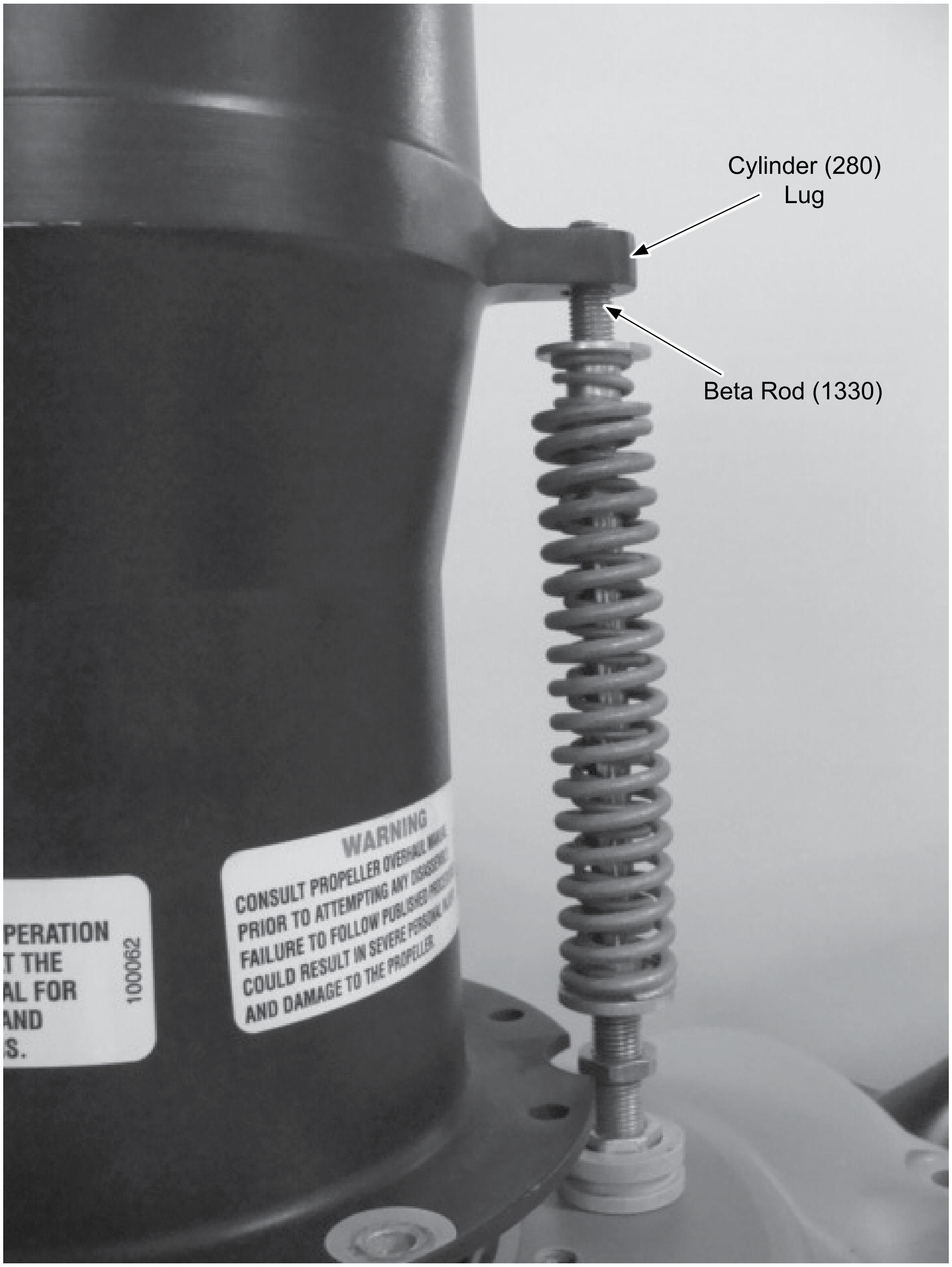
(a) Apply grease CM12, (except propeller models HC-E5N-3, HC-E5N-3L, and HC-E5N-3A[L]) to the engine-side end of each beta rod (1330).

1 For propeller models HC-E5N-3, HC-E5N-3L, and HC-E5N-3A(L), use grease CM12-4 only.

(b) Install an assembled beta rod (1330) in the hole provided for it in the cylinder-side hub half (590).

1 Push the beta rod (1330) through the assembled hub halves and out the bottom of the engine-side hub half.

2 Repeat for the remaining assembled beta rods (1330).



Installing the Beta Rods through the Cylinder Lugs
Figure 7-41

(6) Using a locally procured strap wrench, turn the cylinder (280) and align the holes in the cylinder lugs with the beta rods (1330).

CAUTION: DO NOT DAMAGE THE BETA RODS (1330) OR THE CYLINDER (500) WHEN INSTALLING THE BETA RODS THROUGH THE CYLINDER LUGS.

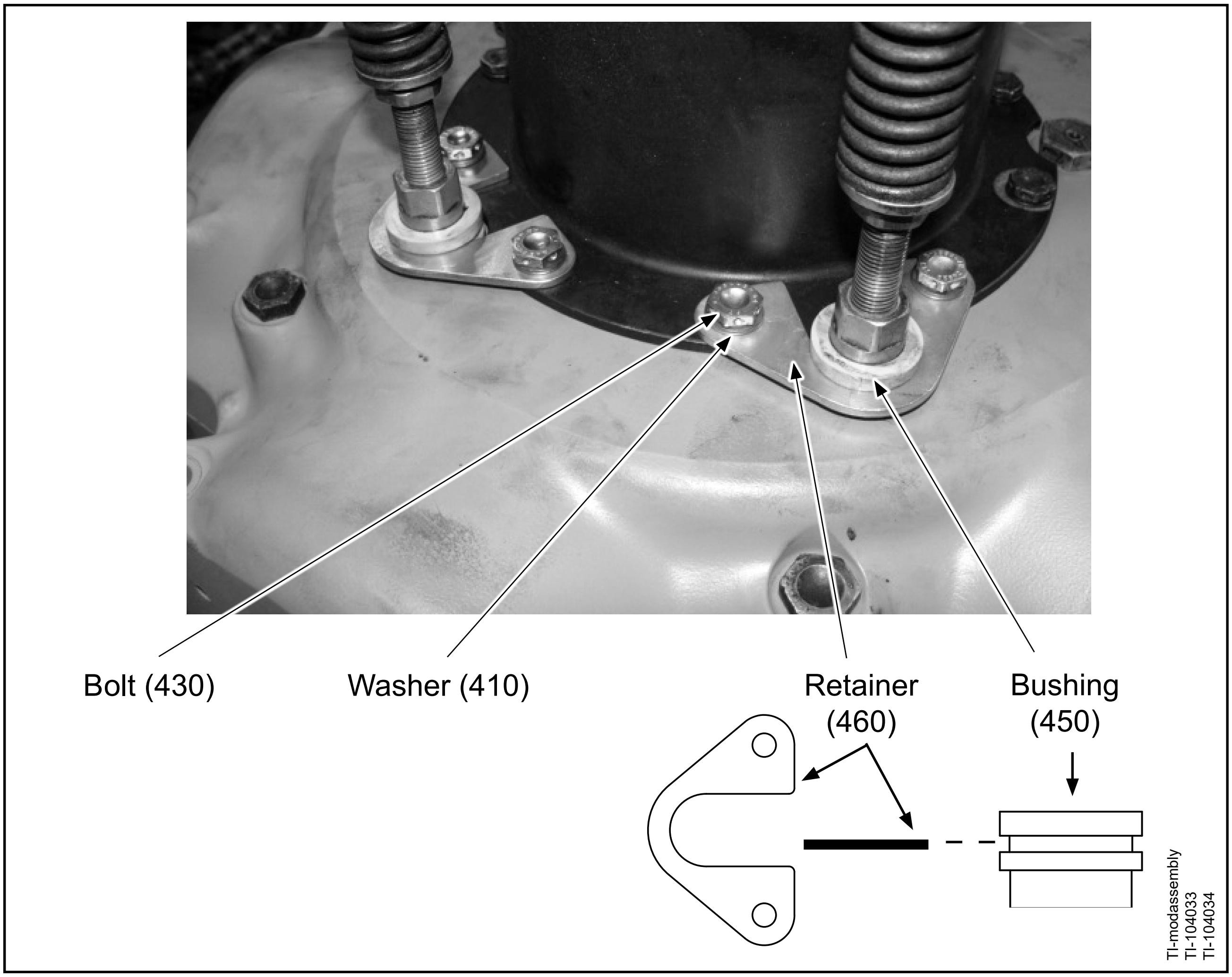
(7) Slowly turn the blades, making sure that the beta rods (1330) go through the holes in the cylinder (280) lugs. Refer to Figure 7-41.

(8) Turn the blades to move the cylinder (280) to touch the hub (590).

(9) For a hub that uses bushings (450) in the cylinder-side beta rod holes, complete the following steps. Refer to Figure 7-42.

(a) Install one retainer (460) into each bushing (450).

(b) Using a washer (410) and a bolt (430) in each hole in the retainer, attach the cylinder (280) to the hub (590).



Installing the Bolts in the Retainer
Figure 7-42

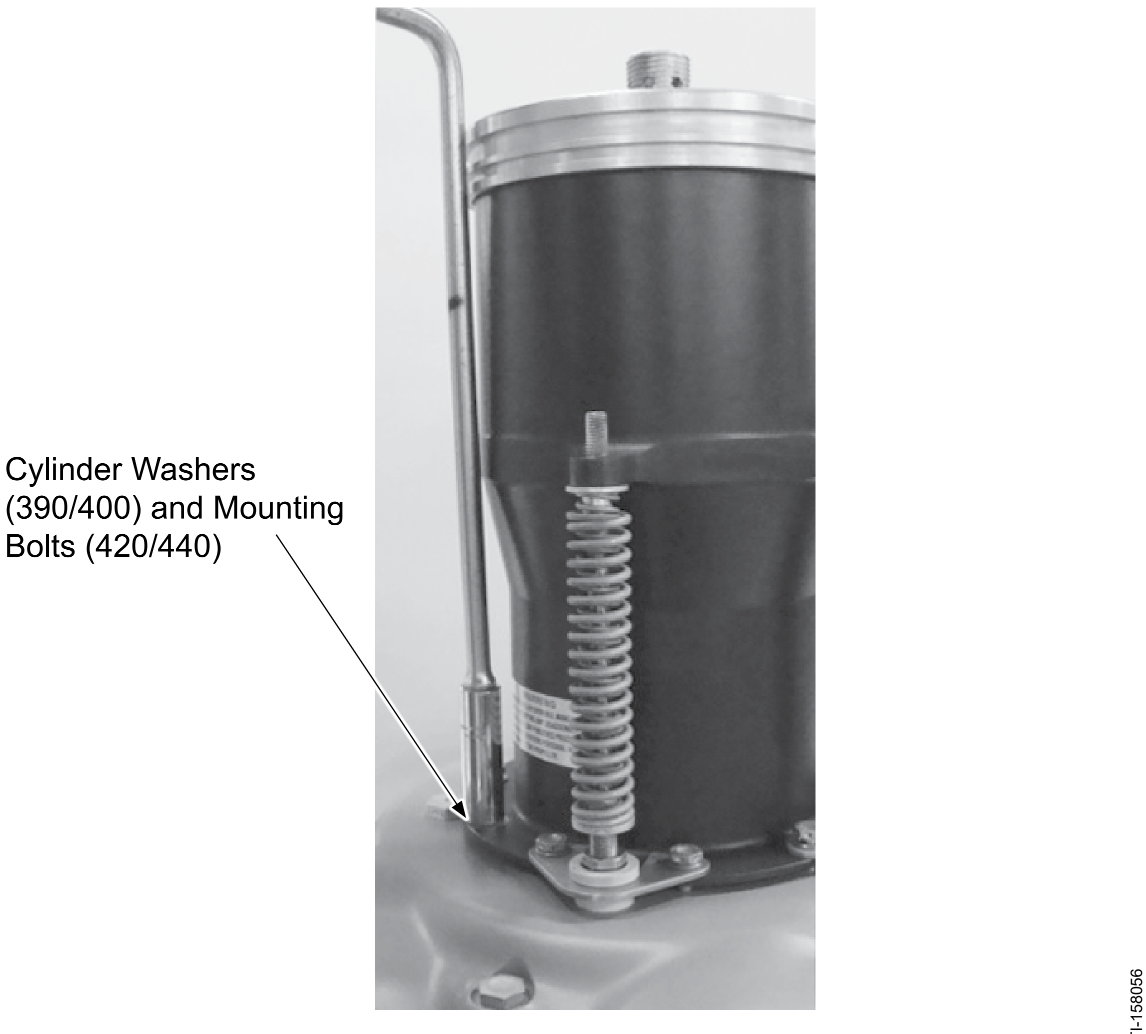
(c) Using a washer (400) and a bolt (420/440) in each remaining cylinder mounting hole, attach the cylinder (280) to the hub (590). Refer to Figure 7-43.

(d) Torque each bolt (430, 420/440) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.

(10) For a hub that does not use bushings (450) in the cylinder-side beta rod holes, complete the following steps.

(a) Using a washer (390) and a bolt (420) in each cylinder mounting hole, attach the cylinder (280) to the hub (590). Refer to Figure 7-43.

(b) Torque each bolt (420) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.



Installing the Cylinder Mounting Bolts
Figure 7-43

CAUTION: DO NOT TURN THE DRILLED THIN HEX NUT (1400) MORE THAN TWO TURNS IN SUCCESSION. WARPING OF THE BETA RING (1310) COULD RESULT.

(11) For all propeller models except the HC-E5A-31A. Refer to Figure 7-44.

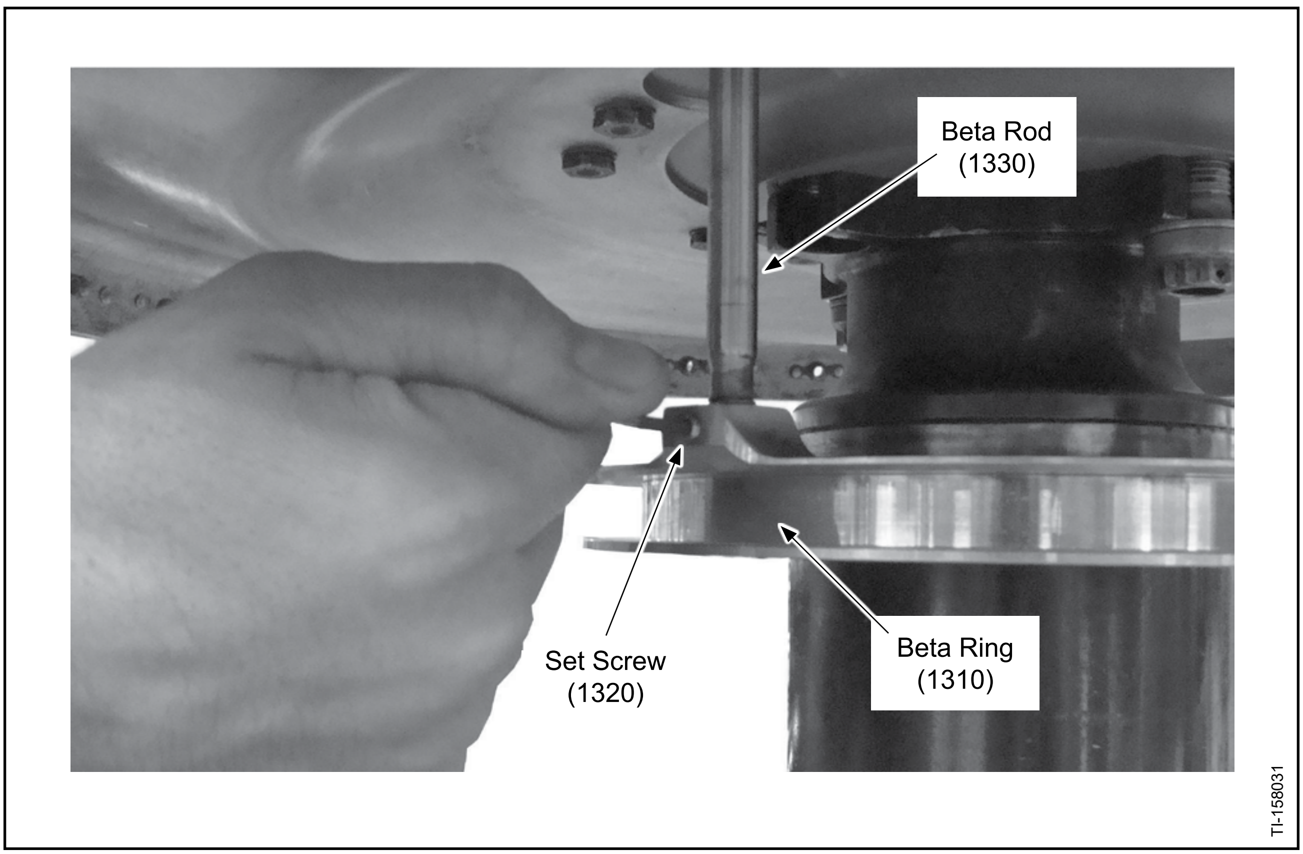
(a) Install the beta ring (1310) on the engine-side ends of the beta rods (1330), using the following steps.

1 Start each beta rod (1330) in a threaded hole in the beta ring (1310).

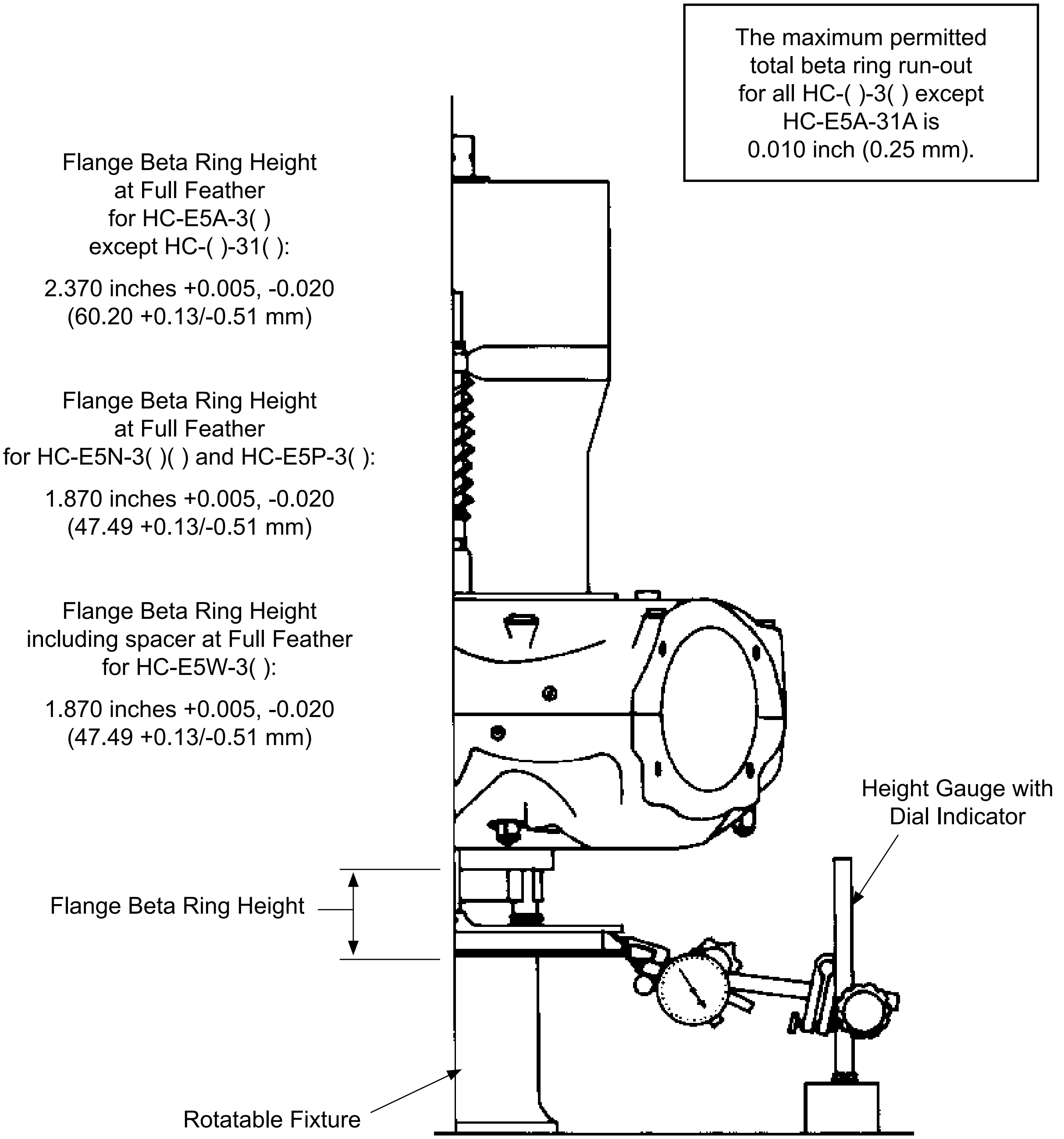
2 Turn the beta rod (1330) in the threaded hole of the beta ring (1310) until it bottoms out.

3 Back out the beta rod (1330) until the flat on the beta rod aligns with the set screw (1320) in the beta ring (1310).

4 Torque each beta rod set screw (1320) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.

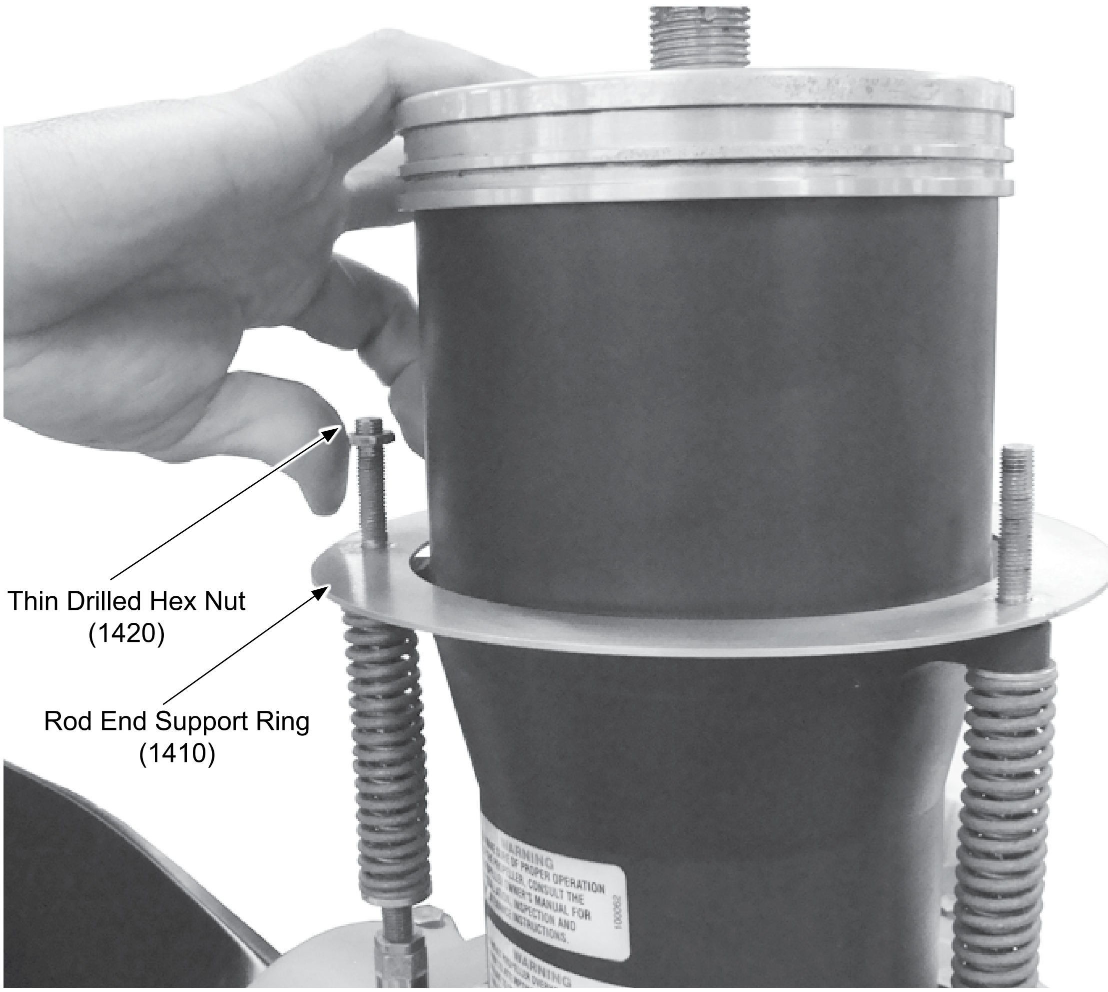


Attaching the Beta Ring and Beta Rods
Figure 7-44



NOTE: For propeller model HC-E5W-3( ), beta ring height dimension is from spacer-to-propeller flange interface to engine side of beta ring.

Beta Ring Height and Run-Out Except for the HC-( )-31( ) Propeller Model
Figure 7-45



Rod End Support Ring
Figure 7-46

CAUTION: THE MAXIMUM PERMITTED TOTAL BETA RING RUN-OUT FOR ALL HC-( )-3( ) EXCEPT THE HC-E5A-31A PROPELLER MODEL IS 0.010 INCH (0.25 mm).

(b) Set the beta ring (1310) height and run-out. Refer to Figure 7-45.

1 Move the propeller to full feather position.

2 Using a depth micrometer, measure the height of the beta ring (1310).

a For propeller model HC-E5W-3( ):

(1) Install the mounting spacer (1650) before checking the run-out.

b Adjust the height by rotating the beta rods (1330) clockwise to decrease or counterclockwise to increase.

3 Install a nut (1400) on the end of each beta rod (1330).

4 Turn each nut (1400) as necessary, until the beta ring height measurement is correct in accordance with the permitted limits shown in Figure 7-45.

5 Using a dial indicator, measure the run-out of the beta ring (1310).

6 When the beta ring (1310) height and the beta ring run-out measurements are correct in accordance with the permitted limits shown in Figure 7-45, install the rod end support ring (1410) on the beta rods (1330). Refer to Figure 7-46.

7 Turn a thin drilled hex nut (1420) on each beta rod (1330) until it touches the rod end support ring (1410). Refer to Figure 7-46.

8 While keeping the thin drilled hex nut (1400) from turning, torque the thin drilled hex nut (1420) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.

9 Measure the hub flange-to-beta ring height and the beta ring height run-out.

a If the hub flange-to-beta ring height or the beta ring run-out is not correct in accordance with the permitted limits shown in Figure 7-45, repeat steps (a)3 and (a)4 in this section until both measurements are correct.

b When the hub flange-to-beta ring height and the beta ring run-out are correct in accordance with the permitted limits shown in Figure 7-45, continue to the section, "Setting Reverse Angle".

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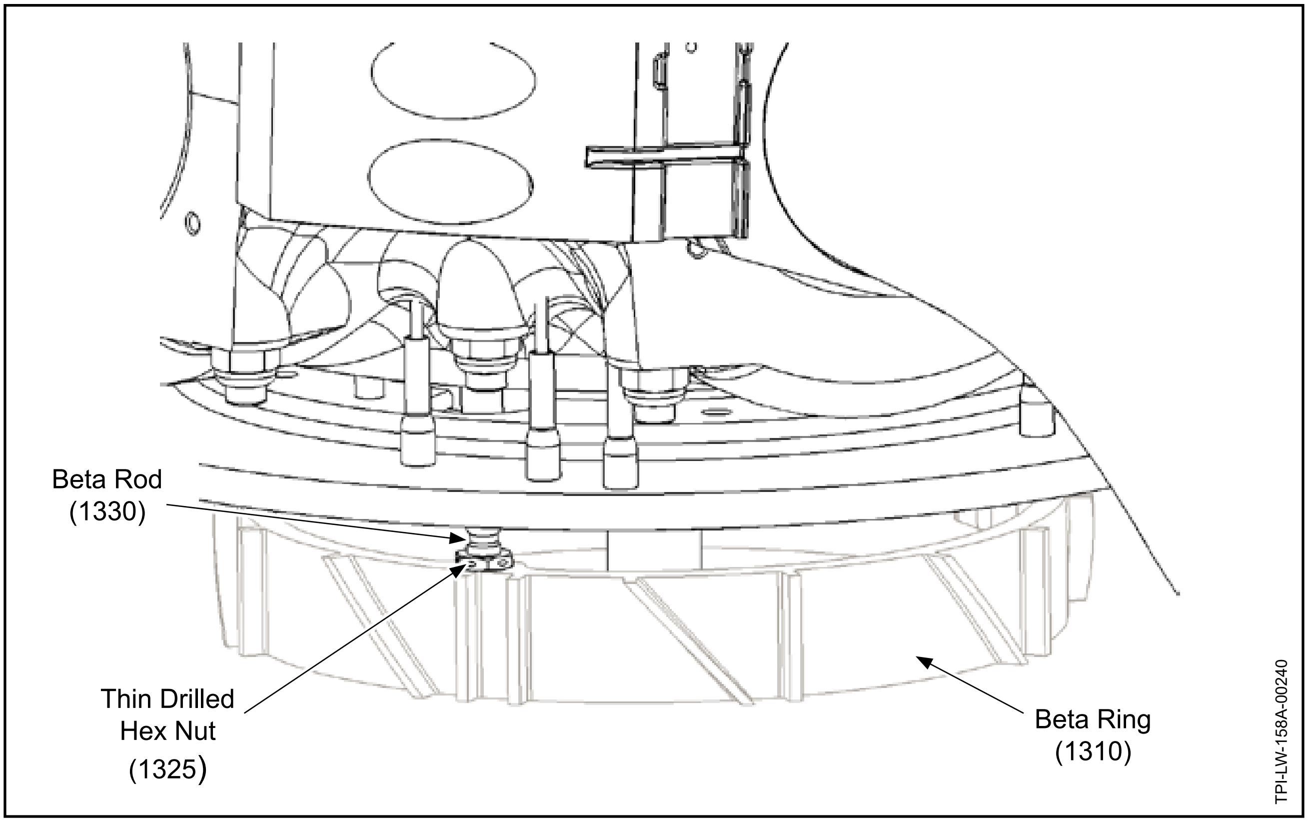
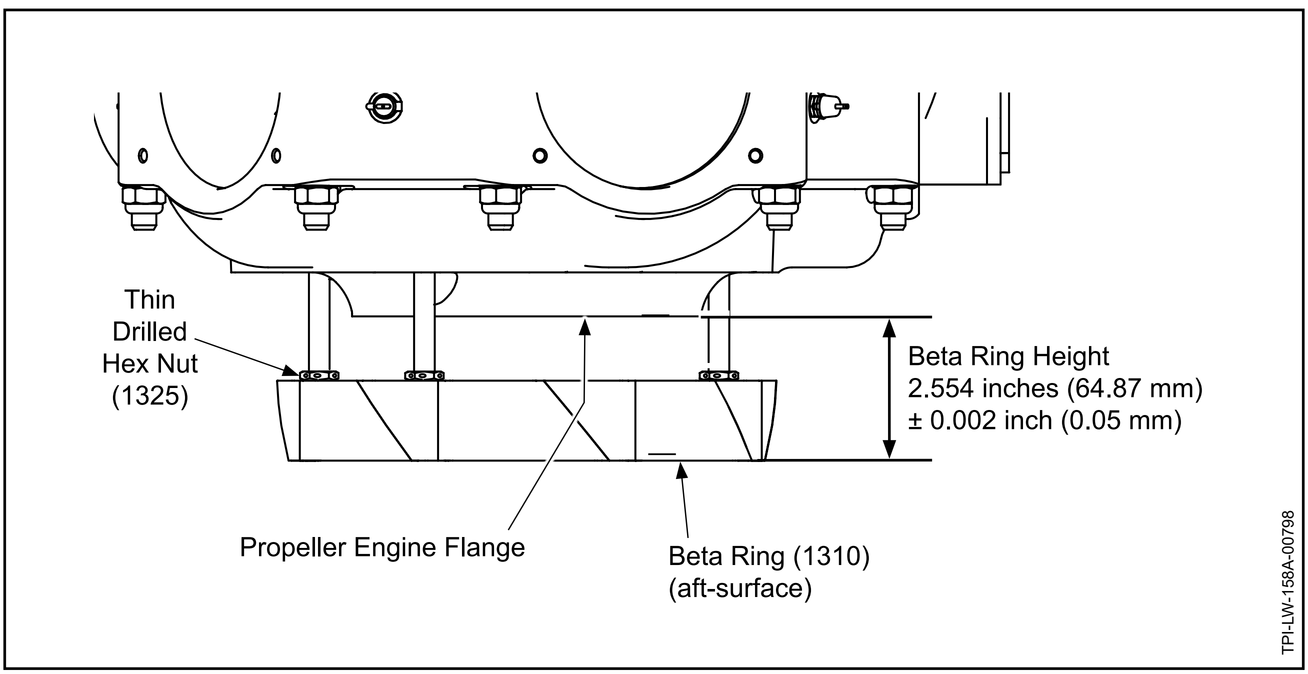
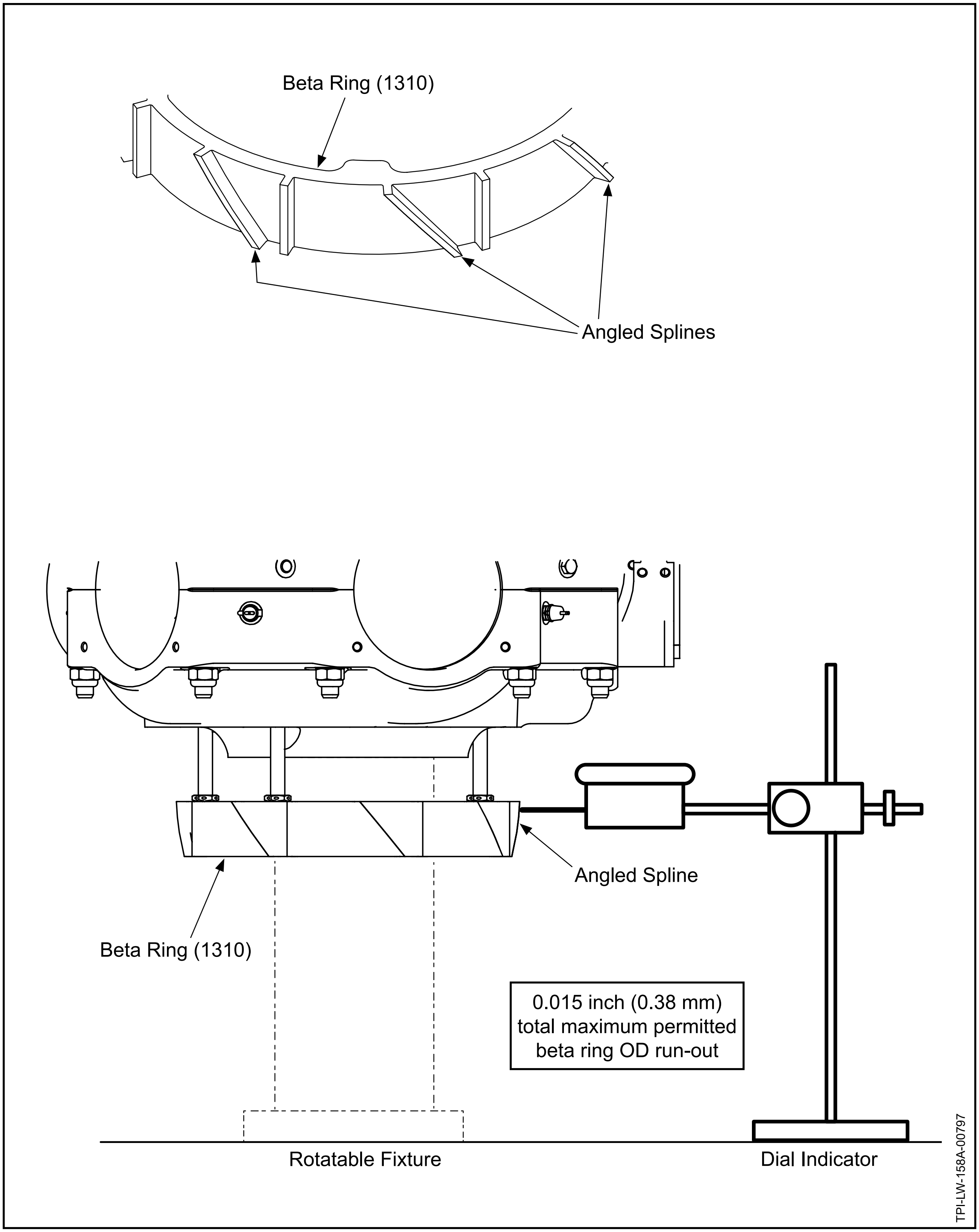


Attaching the Beta Ring and Beta Rods for the HC-E5A-31A
Figure 7-47



Beta Ring Height
Figure 7-48



Beta Ring OD Run-out
Figure 7-49

(12) For the HC-E5A-31A

(a) Install the beta ring (1310) on the engine-side ends of the beta rods (1330), using the following steps.

1 Check the revision of the 106849 beta ring (1310) being installed.

a If the 106849 beta ring is revision A or before (1310), replace the beta ring with revision B or later.

b If installing the 106849 beta ring (1310), set the aft edge of the beta ring from the propeller engine flange surface in accordance with Figure 7-47.

2 Install the drilled thin hex nut (1325) on the beta rod (1330), making sure there is enough room to install the beta rod completely into the beta ring (1310).

3 Install the beta rods (1330) into the beta ring (1310) until the beta rods bottom out in the beta ring.

4 Back each beta rod (1330) out of the beta ring (1310) by one turn.

5 To set the height of the beta ring (1310), install three beta rod support ring nuts (1400).

6 Using a depth micrometer, measure the height of the beta ring (1310).

a The beta ring (1310) height is measured from the aft edge of the beta ring to the propeller engine flange surface. Refer to Figure 7-48.

b Set the initial height of the beta ring (1310) in accordance with Figure 7-48.

c Adjust the height by rotating the beta rod support ring nuts (1400) clockwise to decrease or counterclockwise to increase.

7 Install the beta rod support ring (1410).

8 Install the remaining beta rod support ring nuts (1420).

9 Using a dial indicator on the angled splines of the beta ring (1310), check the OD run-out of the beta ring. Refer to Figure 7-49.

a The OD run-out of the beta ring (1310) must be within the dimensions given in Figure 7-49.

10 Torque the drilled thin hex nut (1325) against the beta ring (1310) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.

11 Measure the OD run-out. Refer to Figure 7-48 and Figure 7-49.

a If run-outs do not meet requirements, loosen the hex nuts (1325) and torque each hex nut 50% and then 100% of the specified torque.

12 Measure the beta ring (1310) height. Refer to Figure 7-48.

13 Torque the beta rod support ring nuts (1420) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.

14 Safety wire the beta rod support ring nuts (1420) to beta rod support ring nuts (1400).

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

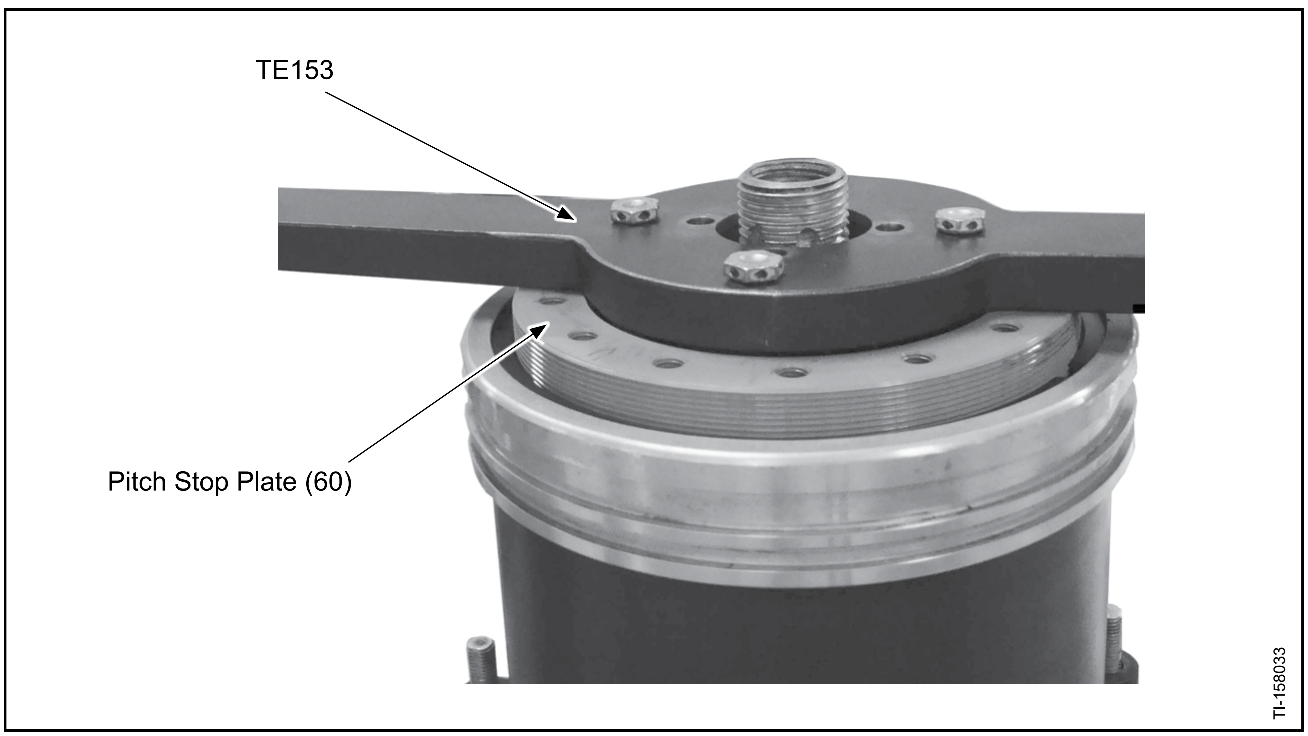
B. Setting Reverse Angle

(1) Apply anti-seize compound CM118 to the threads of the pitch stop plate (60).

(2) By hand, turn the pitch stop plate (60) in the top of the cylinder (280). Refer to Figure 7-50.

(a) If necessary, the special wrench TE153 may be used to install the pitch stop plate (60).

(3) Apply air pressure to move the propeller to reverse pitch angle.



Installing the Pitch Stop Plate
Figure 7-50

(4) Using a bench-top protractor TE96 and riser fixture TE48 or equivalent, measure the reverse angle of each blade at the applicable station. Refer to Figure 7-51.

CAUTION: DO NOT ADJUST THE REVERSE BLADE ANGLE WITH THE PROPELLER PRESSURIZED, BECAUSE IT MAY DAMAGE THE PROPELLER.

(5) If the reverse blade angle is not correct, relieve pressure from the propeller.

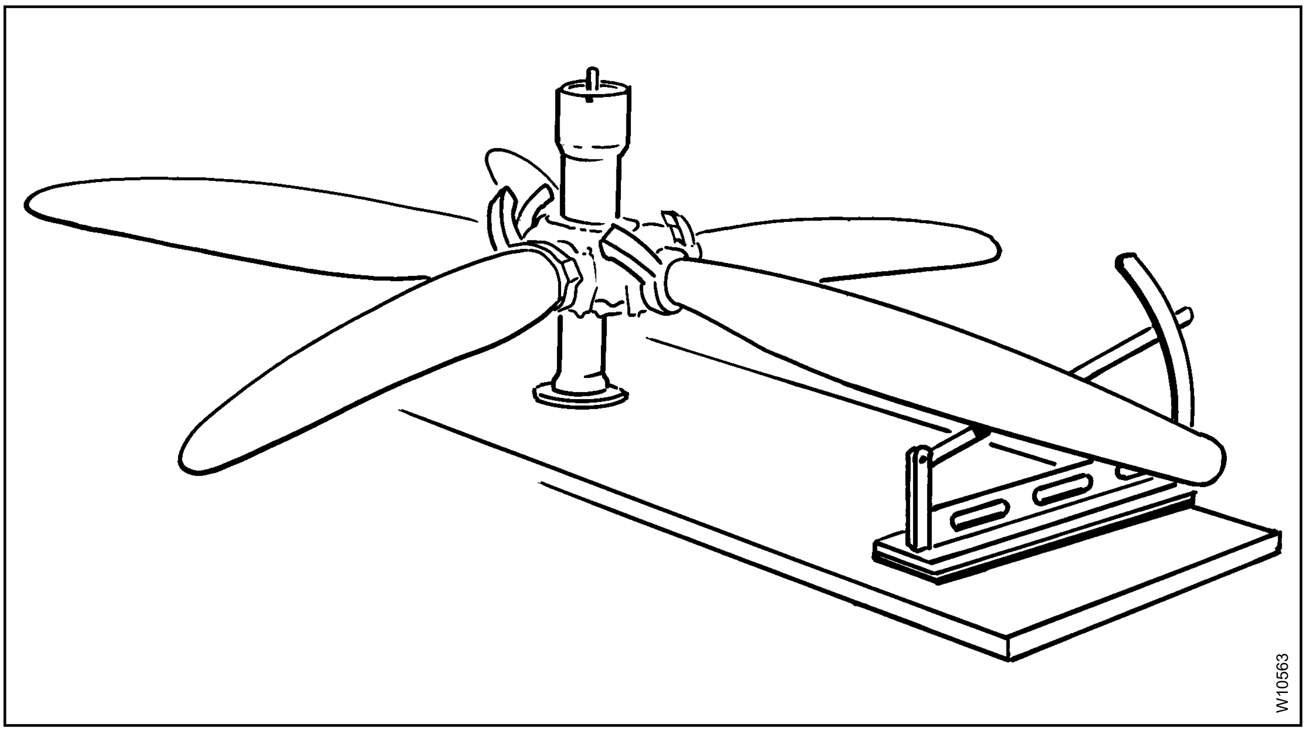
(a) Turn the pitch stop plate (60) clockwise to decrease the reverse blade angle.

(b) Turn the pitch stop plate (60) counterclockwise to increase the reverse blade angle.

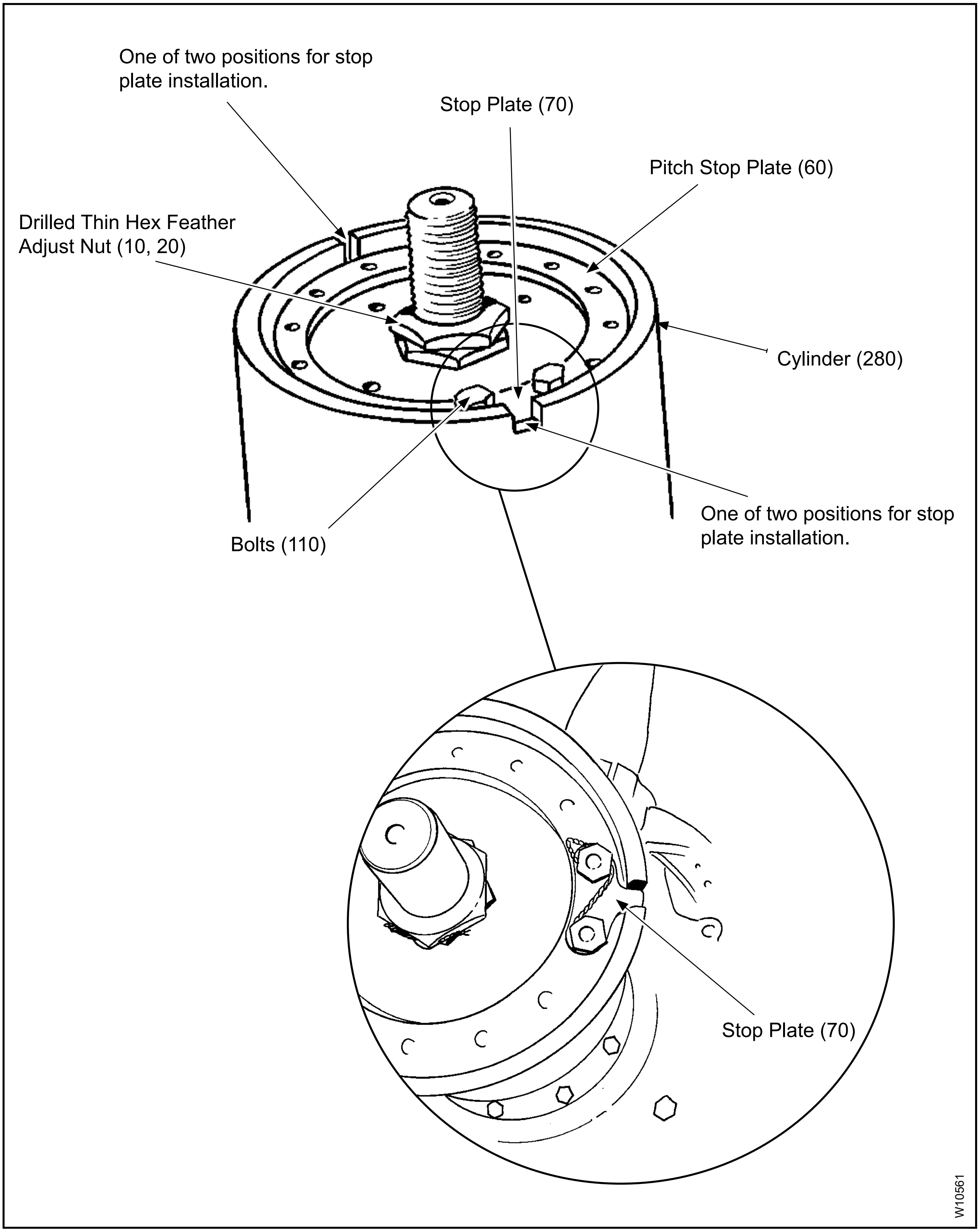
NOTE: One full turn of the adjustment plate equals approximately 1.5 degrees of angle.

(6) After correction, repressurize the propeller, and measure the reverse angle.

(7) Repeat steps B.(3) through B.(6) in this section until the reverse angle is correct.



Measuring Blade Angles with the Bench Top Protractor TE96
Figure 7-51



Installing the Stop Plate in the Pitch Stop Plate
Figure 7-52

(8) When the reverse angle is correct for all blades without an anti-rotation plate, complete the following steps as applicable.

(a) If using cylinder (280) except the D-3738-( ) cylinder:

1 Put the stop plate (70) on top of the pitch stop plate (60) with the tab of the stop plate in one of the slots provided for it in the cylinder (280). Refer to Figure 7-52.

2 Using a washer (90) and a bolt (110) in each of the two holes in the stop plate (70), attach the stop plate to the pitch stop plate (60).

3 Torque each bolt (110) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.

4 Safety wire the bolts (110).

5 Optionally, apply a small bead of sealant CM93 to the threads of the cylinder (280) that are visible above the pitch stop plate (60).

NOTE: The sealant CM93 protects the exposed threads of the cylinder (280) from damage.

(b) If using the D-3738-( ) cylinder (280):

1 Install a cap screw (100) in each of the three holes provided for them in the pitch stop plate (60).

CAUTION: DO NOT USE EXCESSIVE FORCE OR MOVEMENT WHEN TORQUING THE CAP SCREW (100), OR THE CAP SCREW COULD BREAK OFF.

2 Torque each cap screw (100) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.

3 Safety wire the cap screws (100).

4 Apply a small bead of sealant CM93 to the threads of the cylinder (280) that are visible above the pitch stop plate (60).

NOTE: The sealant CM93 protects the exposed threads of the cylinder (280) from damage.

NOTE: When assembling a propeller that will be disassembled for shipping, it is not necessary to install safety wire to the cylinder mounting bolts (420) and the anti-rotation rods (720).

(9) Safety wire the cylinder mounting bolts (420, 430) and the anti-rotation rods (720).

(10) When the reverse angle is correct for all the blades with an anti-rotation plate, complete the following steps:

(a) Put the anti-rotation plate (80) on top of the pitch stop plate (60) with the tab of the anti-rotation plate (80) in one of the slots provided for it in the cylinder (280). Refer to Figure 7-53.

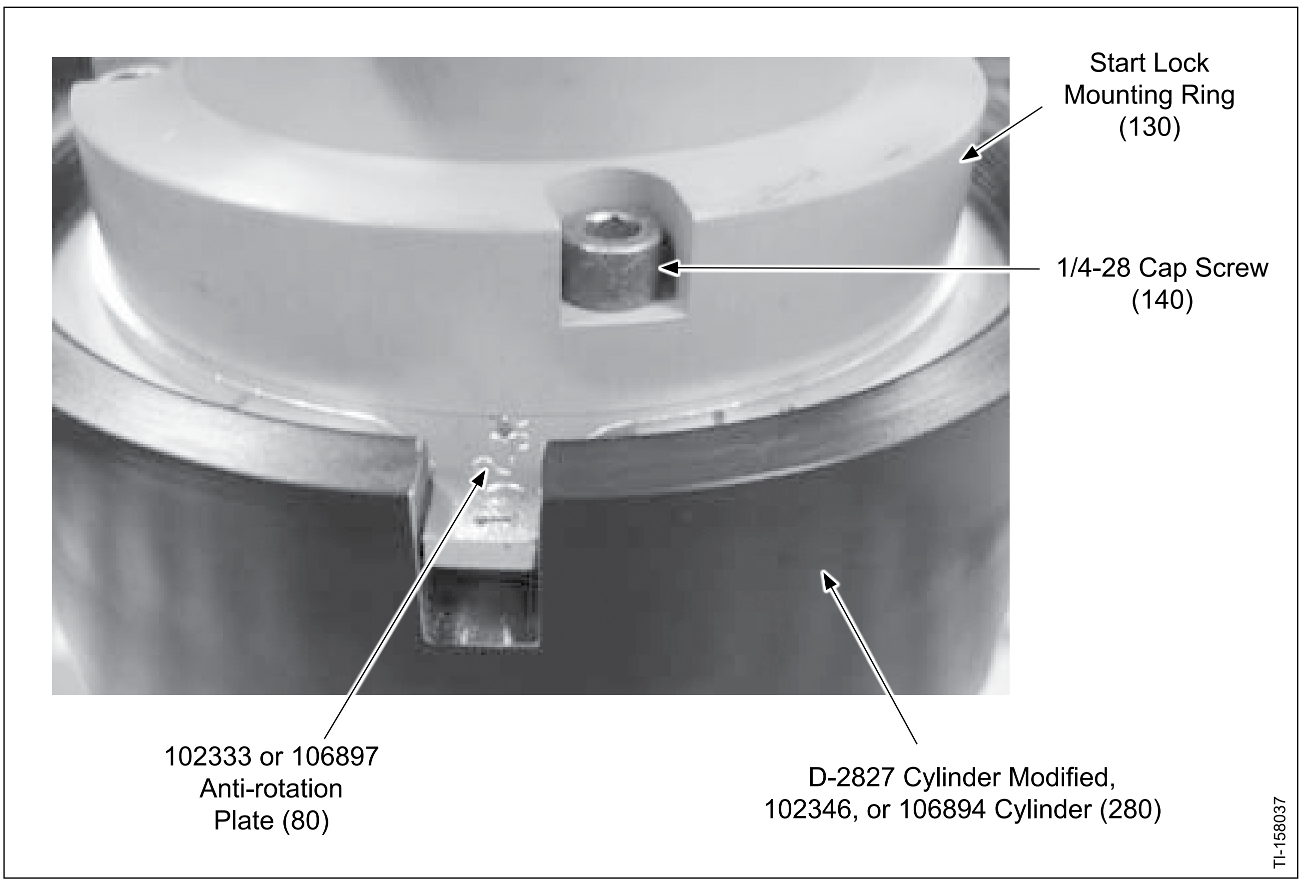
1 If there are no slots in the cylinder (280) for the tab of the stop plate (70), refer to the applicable section for the cylinder in the Check chapter of this manual.

(b) Align the holes in the anti-rotation plate (80) with the screw holes in the pitch stop plate (60).

1 If the holes in the anti-rotation plate (80) do not align with the screw holes in the pitch stop plate (60), complete one or more of the following steps to get the correct alignment:

a Turn the anti-rotation plate (80) over.

b Put the anti-rotation plate (80) on top of the pitch stop plate (60) with the tab of the anti-rotation plate (80) in the other slot provided for it in the cylinder (280).



Installing the Anti-rotation Plate and Start Lock Assembly
Figure 7-53

C. Setting Low Pitch Blade Angle, if applicable - Refer to Figure 7-54

(1) Move the propeller to the approximate low pitch blade angle.

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

(2) Turn each threaded beta sleeve (1340) clockwise until it touches the fork top plate (820).

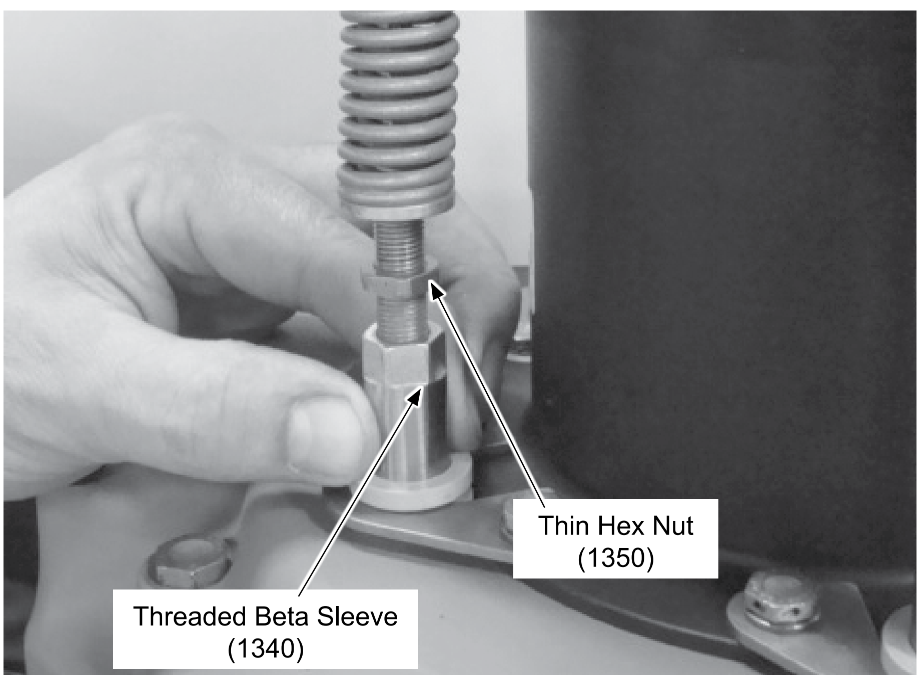
(3) Using a protractor TE97, TE96, or equivalent, measure the low pitch blade angle at the applicable blade station.

(4) If the low pitch blade angle is not correct, relieve pressure from the propeller and turn the threaded beta sleeve (1340) and the thin hex nut (1350) to change the blade angle.

NOTE: One full turn of the threaded beta sleeve (1340) and the thin hex nut (1350) equals approximately 1 degree of pitch angle.

(a) Turning the threaded beta sleeve (1340) and the thin hex nut (1350) clockwise will increase the low pitch blade angle.

(b) Turning the threaded beta sleeve (1340) and the thin hex nut (1350) counterclockwise will decrease the low pitch blade angle.



Low Pitch Blade Angle
Figure 7-54

(5) When the low pitch angle and the beta ring run-out are correct for all blades, torque each thin hex nut (1350) against each threaded beta sleeve (1340) in accordance with Table 8-1, "Torque Values". Refer to Figure 7-55.

(6) Move the propeller to reverse blade angle.

(7) Remeasure the run-out of the beta ring (1310).

(a) If the run-out of the beta ring (1310) is not correct in accordance with the permitted limits shown in Figure 7-47 or Figure 7-48, loosen the applicable nut(s) (1350) and adjust the beta adjust nut(s).

(b) Repeat steps (3) through (8)(a) in this section until both the low pitch blade angle and the run-out of the beta ring (1310) are correct.

(c) When both the low pitch blade angle and the run-out of the beta ring (1310) are correct, go to the next step.

Setting Low Pitch Blade Angle and Beta Ring Run-out
Figure 7-55

7. Start Lock System Assembly

A. Installing the Start Lock System, if applicable

CAUTION: MAKE SURE THAT REVERSE BLADE ANGLE IS SET BEFORE INSTALLING THE START LOCK SYSTEM.

(1) Put the start lock mounting ring (130) on the pitch stop plate (60), aligning the holes in the start lock mounting ring (130) with the holes in the anti-rotation plate (80) and the holes in the pitch stop plate (60). Refer to Figure 7-52.

(2) Using four 1/4-28 cap screws (140), attach the start lock mounting ring (130) to the pitch stop plate (60).

(3) Torque each 1/4-28 cap screw (140) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.

(4) Safety wire together the four 1/4-28 cap screws (140).

(5) Apply a small bead of sealant CM93 to the threads of the cylinder (280) that are visible above the pitch stop plate (60).

NOTE: The sealant CM93 protects the exposed threads of the cylinder (280) from damage.

(6) Put the spring (160) on the start lock pin (170).

(7) Install the start lock pin (170) with the spring (160) in the start lock housing (150).

(8) With the flat side of the cotter pin (180) pointing away from the hub, install a cotter pin in the hole provided for it in each arm of the start lock housing (150).

(9) Repeat steps A.(6) through A.(8) in this section for the three remaining start lock arms.

(10) Turn the start lock housing (150) in the start lock mounting ring (130) several turns, aligning the previously drilled roll pin holes if applicable.

B. Adjustment of the Start Lock Angle, if applicable

(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 blade angle and blade radius required.

(2) Apply pressure to move the propeller until the feather adjust drilled thin hex nuts (10, 20) fully pass the start lock pins (170).

(3) Release the pressure to the propeller.

(4) Using a bench-top protractor TE96 and riser fixture TE48 or equivalent, measure the low pitch blade angle.

(a) If the low pitch blade angle is correct, continue to step (5) in this section.

(b) If the low pitch blade angle is not correct, adjust using the following steps:

1 Apply pressure to the propeller.

2 Turn the start lock housing (150) in the start lock mounting ring (130).

3 Release pressure to the propeller.

4 Measure the low pitch blade angle.

5 Repeat steps (4)(b)1 through (4)(b)4 in this section until the low pitch blade angle is correct.

6 When the low pitch blade angle is correct, continue to step (5) in this section.

(5) Install the spring pin (190).

(a) If there are previously drilled spring pin holes in the start lock mounting ring (130) and the start lock housing (150) and they are aligned, install the spring pin (190) in the previously drilled holes.

(b) If there are no holes drilled in the start lock mounting ring (130) or the previously drilled spring pin holes do not align in the start lock mounting ring (130) and the start lock housing (150), install the spring pin (190) using the following steps:

1 Move the propeller to the low pitch blade angle that was previously set.

2 Determine where the hole for the spring pin (190) will be drilled at approximately 0.5 inch (12.7 mm) radially from any previously drilled holes.

CAUTION: DO NOT PERMIT METAL SHAVINGS TO ENTER THE HUB ASSEMBLY WHEN DRILLING THE START LOCK MOUNTING RING AND THE START LOCK HOUSING (150).

3 Using a 0.125-0.129 inch (3.17-3.27 mm) drill bit, drill through the start lock mounting ring (130) and the start lock housing (150) at the location determined.

4 Remove any metal shavings that remain from the drilling process.

(c) Put the spring pin (190) in the aligned holes or the newly drilled hole, as applicable, until it is flush with the surface of the start lock mounting ring (130).

(d) Using a customer procured peening tool, lightly peen the hole to hold the spring pin (190) in position.

8. Feather Angle

A. Setting Feather Angle for HC-E5A-3( ), HC-E5N-3( )( ), HC-EP5-3( ), and HC-E5W-3( ) Propeller Models

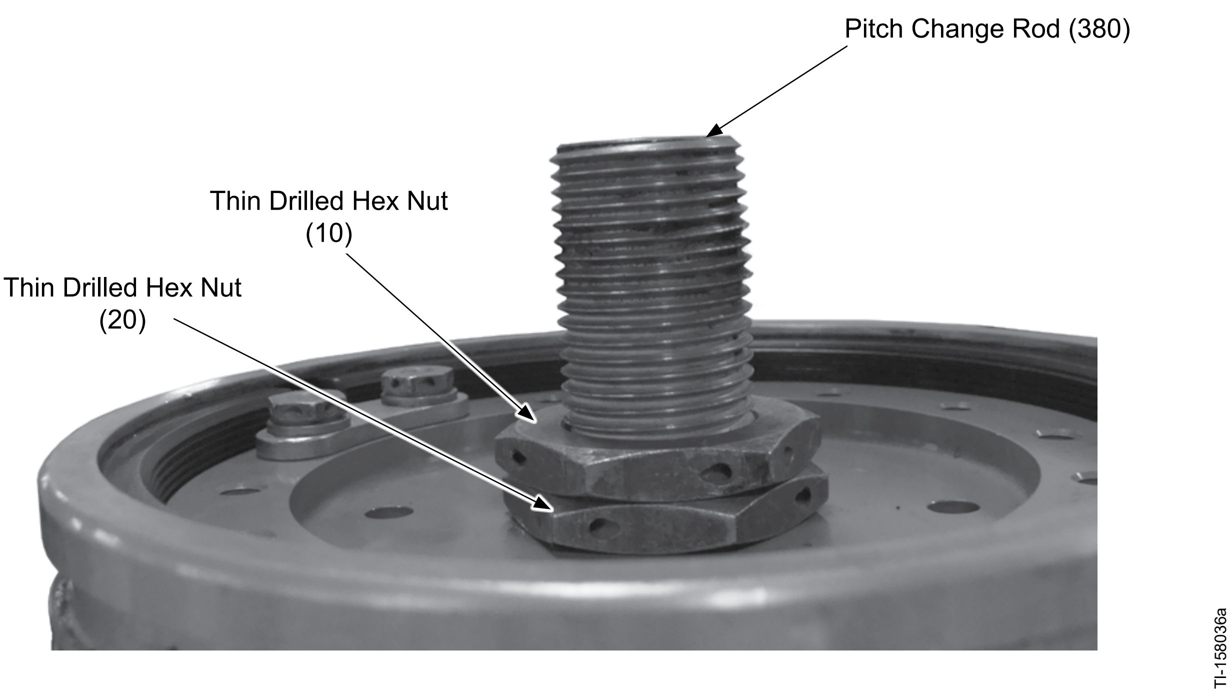
(1) Install the feather adjust thin drilled hex nut (20) on the pitch change rod (380). Refer to Figure 7-56.

(2) Release the pressure from the propeller.

(3) Using a digital protractor TE97 or equivalent, measure the feather angles of each blade at the applicable blade station. Refer to Figure 7-51.

CAUTION: DO NOT ADJUST THE FEATHER ANGLE OF THE BLADES WITH THE PROPELLER DEPRESSURIZED AND THE FEATHER ADJUST THIN DRILLED HEX NUT (20) TOUCHING THE PITCH STOP PLATE (60) BECAUSE DAMAGE TO THE PROPELLER COULD RESULT.

(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 feather adjust thin drilled hex nut (20).



Setting Feather Angle
Figure 7-56

(5) Change the blade feather angle by turning the feather adjust thin drilled hex nut (20). Refer to Figure 7-56.

NOTE: One full turn of the feather adjust thin drilled hex nut (20) equals approximately 1.5 degrees of blade angle.

(a) Turn the feather adjust thin drilled hex nut (20) clockwise to decrease the blade feather angle.

(b) Turn the feather adjust thin drilled hex nut (20) counterclockwise to increase the blade feather angle.

(6) Turn the feather adjust thin drilled hex nut (10) on the pitch change rod until it touches the feather adjust thin drilled hex nut (20).

(7) Holding the feather adjust thin drilled hex nut (20) in position, torque the feather adjust thin drilled hex nut (10) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.

(8) Remeasure the blade feather angle 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 feather adjust thin drilled hex nuts (10, 20).

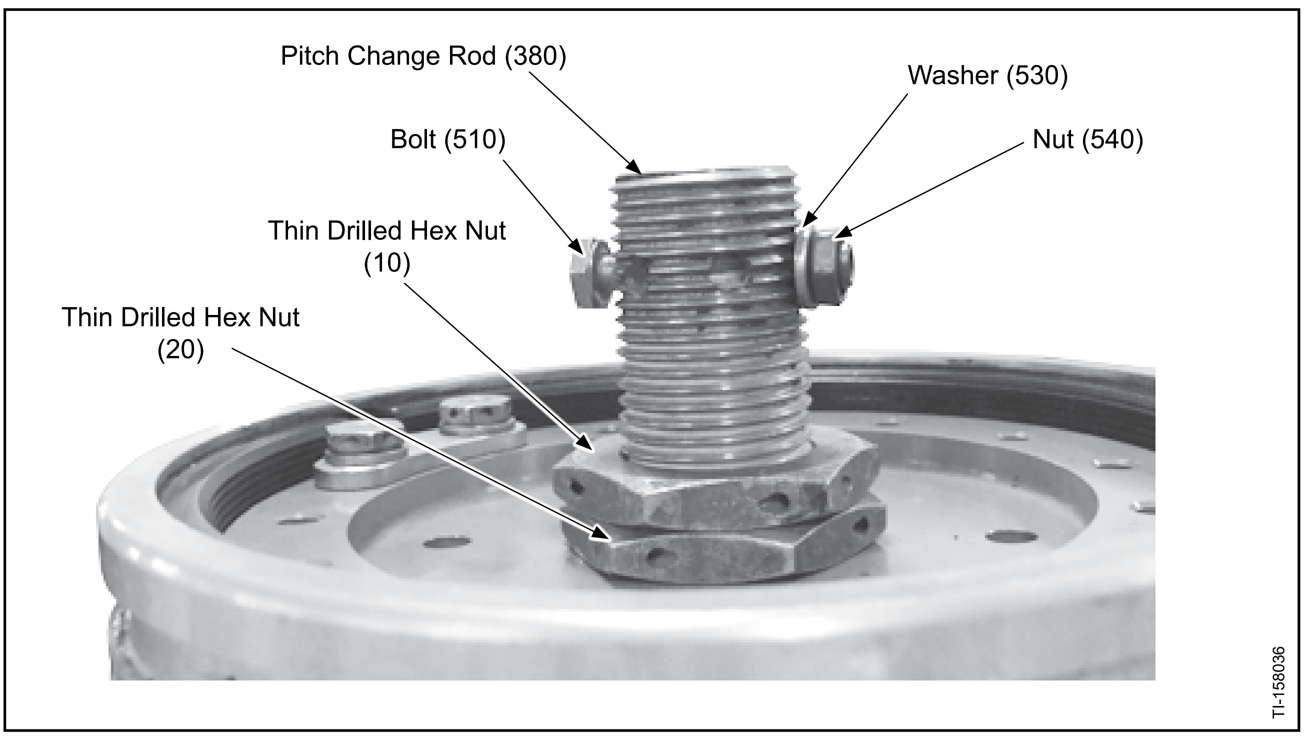
(10) When the blade feather angles are correct, safety wire the two feather adjust thin drilled hex nuts (10, 20) together.

(11) For propeller models using the D-3657 pitch change rod (380) only:

(a) Install the bolt (510) through the hole in the pitch change rod (380) and the slot in the pitch change rod plug (30). Refer to Figure 7-57.

(b) Install the washer (530) and the self locking nut (540) on the bolt (510).

(c) Torque the self locking nut (540) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.



Setting Feather Angle for Propeller Models using the D-3657 Pitch Change Rod
Figure 7-57

B. Setting Feather Angle for HC-E5B-5( ) and HC-E5N-5( ) Propeller Models

(1) Pull the spring-loaded start lock pin (170) partially out of the start lock housing (150) and put a 0.25 inch (6.3 mm) thick locally fabricated spacer between the head of the start lock pin (170) and the start lock housing (150) to hold the start lock pin (170) in the extracted position.

(2) Install the feather adjust thin drilled hex nut (20) on the pitch change rod (380). Refer to Figure 7-57.

NOTE: The area where the feather adjust thin drilled hex nut (20) was previously installed is usually discernible on the threads of the pitch change rod (380). Turn the feather adjust thin drilled hex nut to that area of the pitch change rod as a starting point for setting the blade feather angle.

(3) Release the air pressure from the propeller.

(4) Using a bench-top protractor TE96 and riser fixture TE48 or equivalent, measure the feather angle of each blade at the applicable blade station.

CAUTION: DO NOT ADJUST THE FEATHER ANGLE OF THE BLADES WITH THE PROPELLER DEPRESSURIZED AND THE FEATHER ADJUST THIN DRILLED HEX NUT (20) TOUCHING THE PITCH STOP PLATE (60), BECAUSE DAMAGE TO THE PROPELLER COULD RESULT.

(5) 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 feather adjust thin drilled hex nut (20).

(6) Change the blade feather angle by turning the feather adjust thin drilled hex nut (20). Refer to Figure 7-57.

NOTE: One full turn of the feather adjust thin drilled hex nut (20) equals approximately 1.5 degrees of angle.

(a) Turn the feather adjust thin drilled hex nut (20) clockwise to decrease the blade feather angle.

(b) Turn the feather adjust thin drilled hex nut (20) counterclockwise to increase the blade feather angle.

(7) When the blade feather angle is correct for all blades, install the feather adjust thin drilled hex nut (10).

(8) Turn the feather adjust thin drilled hex nut (10) until it touches the feather adjust thin drilled hex nut (20).

(9) Holding the feather adjust thin drilled hex nut (20) in position, torque the feather adjust thin drilled hex nut (10) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.

(10) Safety together the feather adjust thin drilled hex nuts (10, 20).

(11) For HC-E5B-5( ) Propeller Models only

(a) Install the bolt (510) through the hole in the pitch change rod (380) and the slot in the pitch change rod plug (30). Refer to Figure 7-57.

(b) Install the washer (530) and the self locking nut (540) on the bolt (510).

(12) For HC-E5N-5( ) Propeller Models only

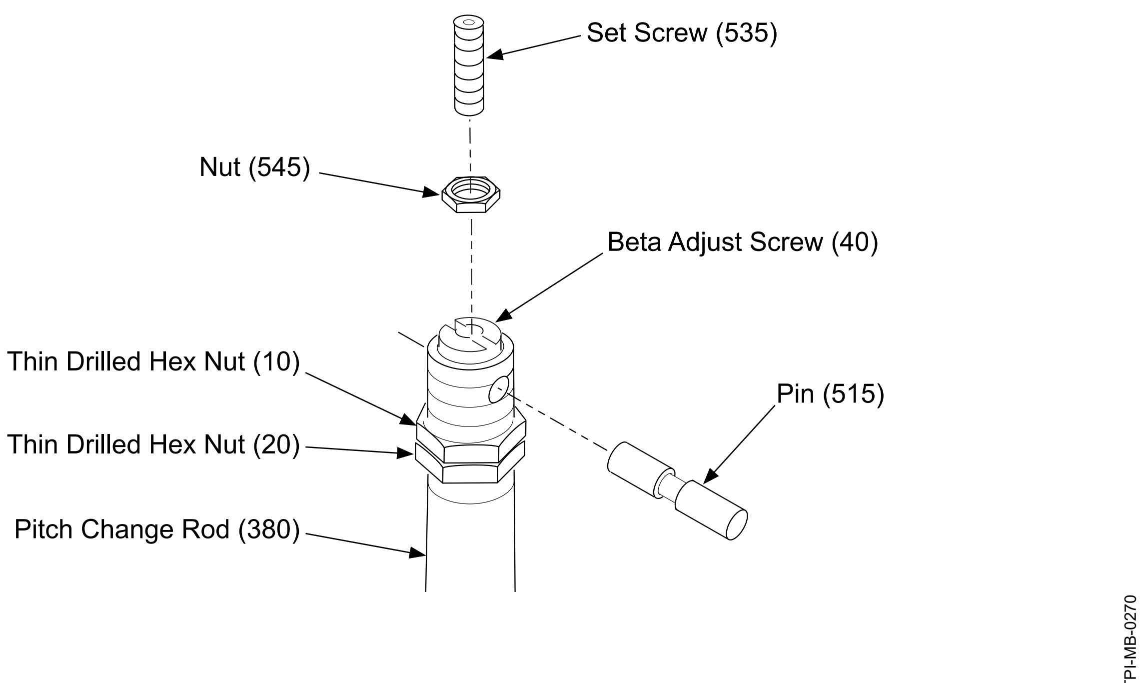
(a) Install the pin (515) through the hole in the pitch change rod (380) and the slot in the beta adjust screw (40). Refer to Figure 7-58.

NOTE: Removable threadlocker CM116 will be applied to the threads of the set screw (535) when the propeller is installed on the aircraft.

(b) Install the set screw (535) into hole in the end of the beta adjust screw (40) and tighten until it touches the pin (515).

(13) Install the hex nut (545) onto the set screw (535).

(14) While holding the set screw (535) in position, torque the hex nut (545) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.



Installing the Pin through the Pitch Change Rod
Figure 7-58

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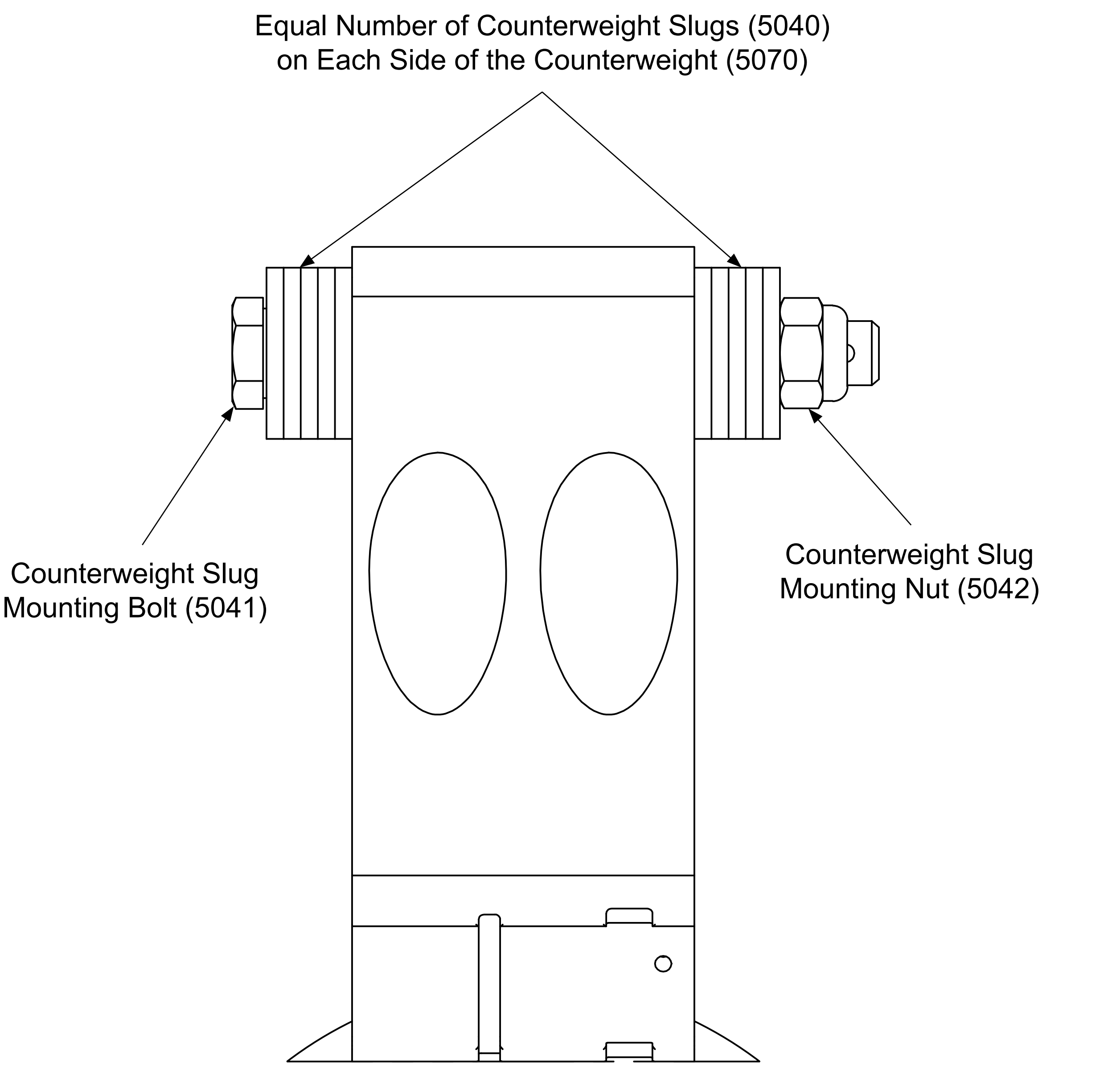


NOTE: Counterweight slugs are application specific. For the number of counterweight slugs to be used, refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

**Counterweight Slugs Placement HC-E5A-3( ),
HC-E5N-3( )( ) except HC-E5N-3C, HC-E5P-3( ), and HC-E5W-3( ) Propeller Models
Figure 7-59**

9. Counterweight Slug Assembly

A. Installation of Counterweight Slugs for HC-E5A-3( ), HC-E5N-3( )( ) except HC-E5N-3C, HC-E5P-3( ), and HC-E5W-3( ) Propeller Models

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

CAUTION: MAKE SURE THAT THE HEAD OF THE BOLT THAT ATTACHES THE COUNTERWEIGHT SLUGS TO THE COUNTERWEIGHT IS ON THE ENGINE FLANGE OR BULKHEAD SIDE OF THE BLADE.

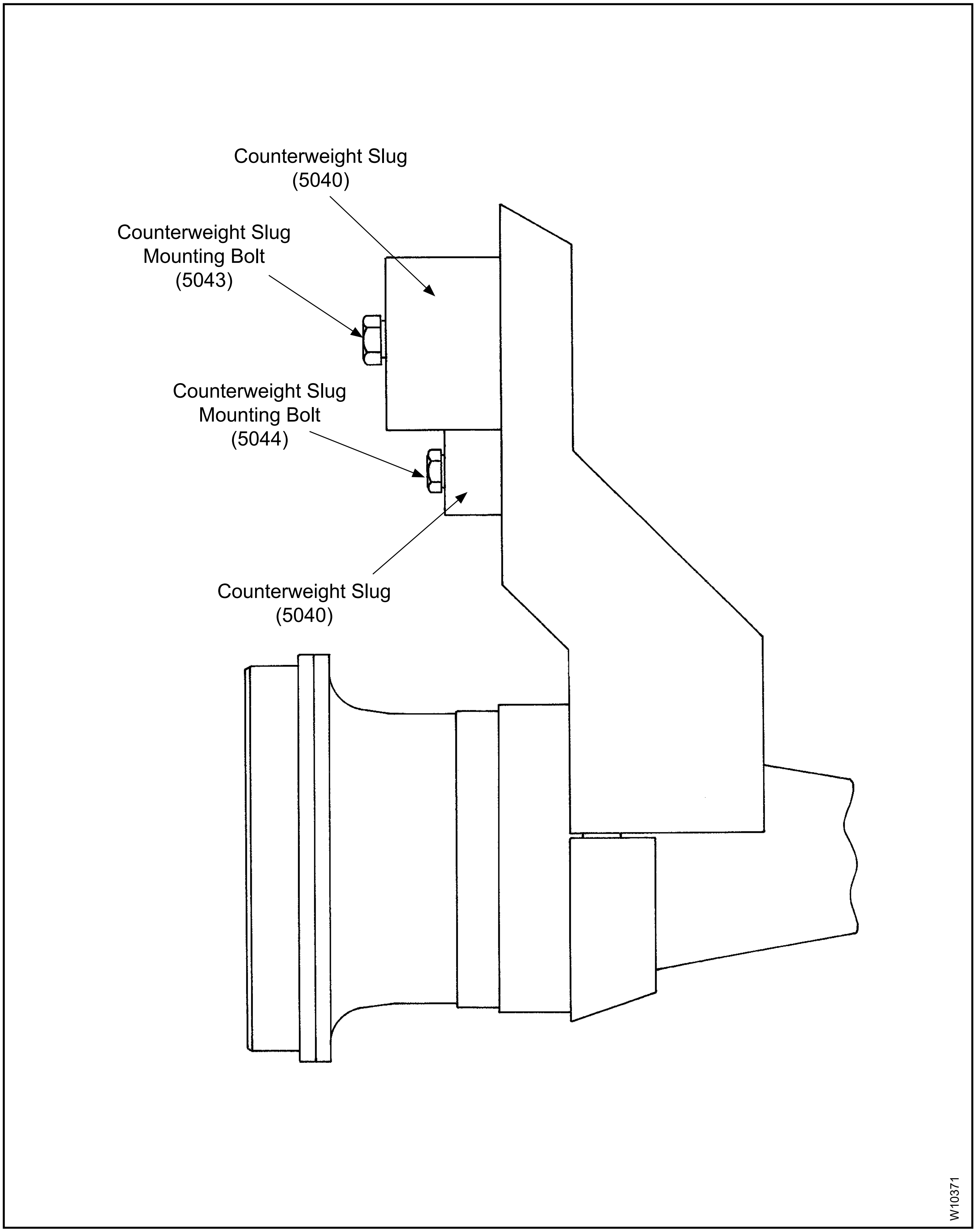
(2) Using new counterweight slug mounting bolts (5041) and counterweight slug mounting nuts (5042), install the counterweight slugs (5040).

(a) With the head of the counterweight slug mounting bolt (5041) on the engine flange or bulkhead side of the blade, install the applicable number of counterweight slugs (5040) on each side of the blade counterweight, as shown in Figure 7-59.

1 For the number of counterweight slugs to be used, refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

(b) Install a counterweight slug mounting nut (5042) on each counterweight slug mounting bolt (5041).

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



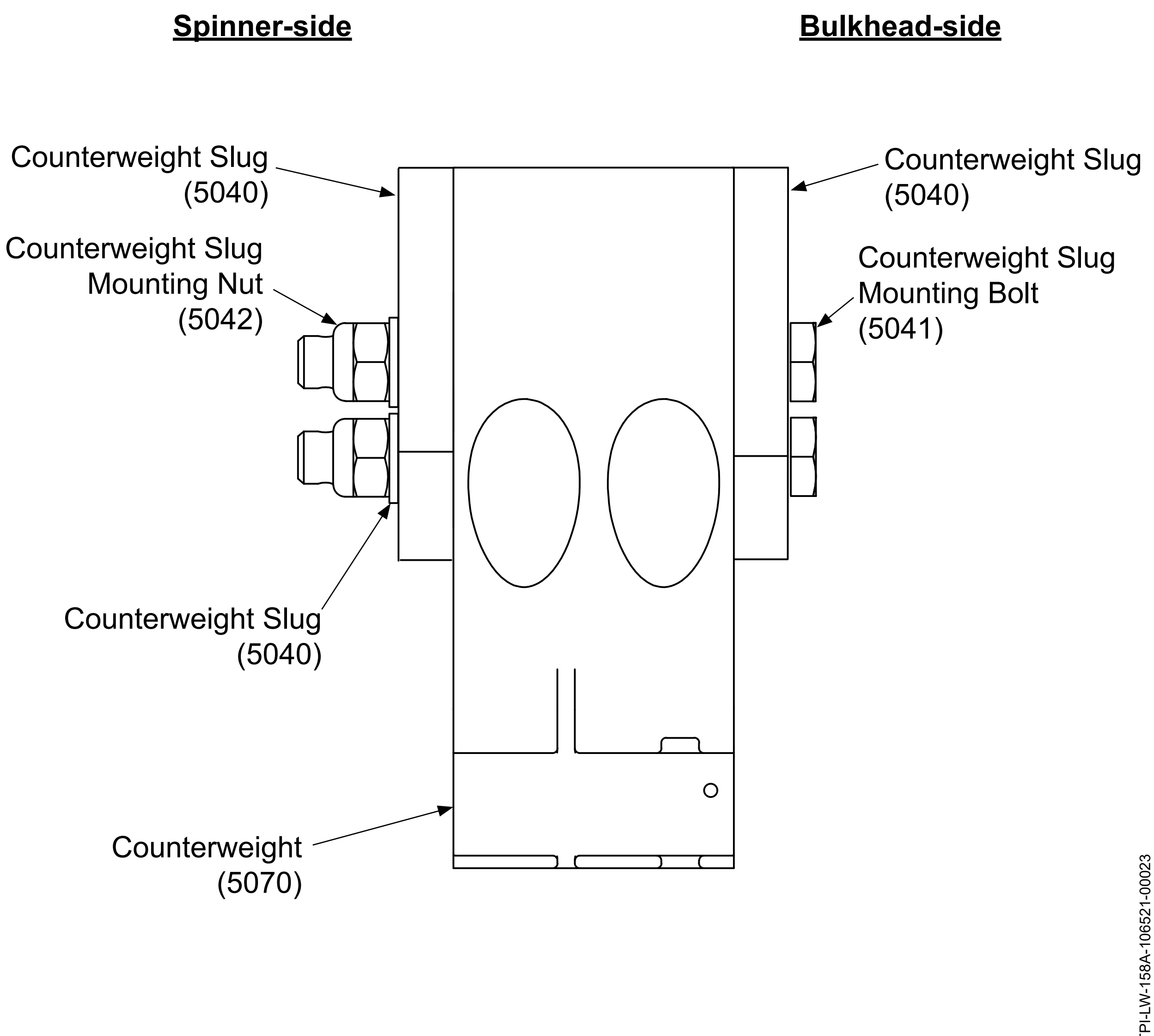
Installing the Counterweight Slugs for HC-E5B-5( ) Propeller Models
Figure 7-60

B. Installation of Counterweight Slugs for HC-E5B-5( ) Propeller Models

(1) For the applicable blade counterweight slugs (5040) to be installed on each propeller model, refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

(2) Using new counterweight slug mounting bolts (5043/5044), install the counterweight slugs (5040), as shown in Figure 7-60.

(3) Torque each counterweight slug mounting bolt (5043/5044) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.



NOTE: Counterweights (5070), counterweight slugs (5040), counterweight slug mounting bolts (5041), and counterweight slug mounting nuts (5042) are application specific. Refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

Counterweight Slug Placement for HC-E5N-5( ) Propeller Models
Figure 7-61

C. Installation of Counterweight Slugs for HC-E5N-5( ) Propeller Models

(1) For the applicable blade counterweight slugs (5040) to be installed on each propeller model, refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

(2) Using new counterweight slug mounting bolts (5041) and counterweight mounting nuts (5042), install the counterweight slugs (5040) as shown in Figure 7-61.

(3) Torque each counterweight slug mounting nut (5042) in accordance with Table 8-1, "Torque Values" in the Fits and Clearances chapter of this manual.

10. Carbon Block Reassembly

A. Carbon Block Reassembly for HC-E5A-3( ), HC-E5N-3( )( ), HC-E5P-3( ), and HC-E5W-5( ) Propeller Models

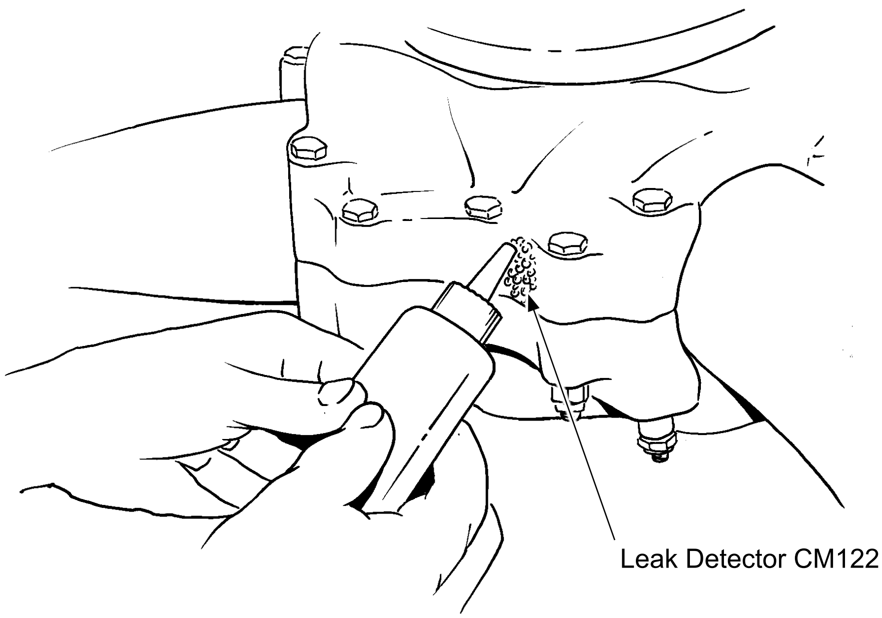
(1) Put the carbon block unit (1460) in the yoke unit (1440) and align the holes in the yoke unit with the through hole in the carbon block unit.

(2) Install the clevis pin (1450) through one hole in the yoke unit (1440), through the carbon block unit (1460), and out the hole in the opposite side of the yoke unit.

(3) Install the cotter pin (1480) through the hole in the clevis pin (1450).

(4) For a carbon block assembly that uses an external snap ring (1470), the external snap ring will be installed at the installation of the carbon block assembly onto the aircraft.

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



Hub Leak Test
Figure 7-62

11. 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 (700) in the applicable side of the hub.

(a) Tighten each lubrication fitting (700) until finger-tight, then tighten one additional 360 degree turn.

(2) Install the lubrication plugs (701) in the applicable side of the hub.

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

(b) Tighten each lubrication plug (701) 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:

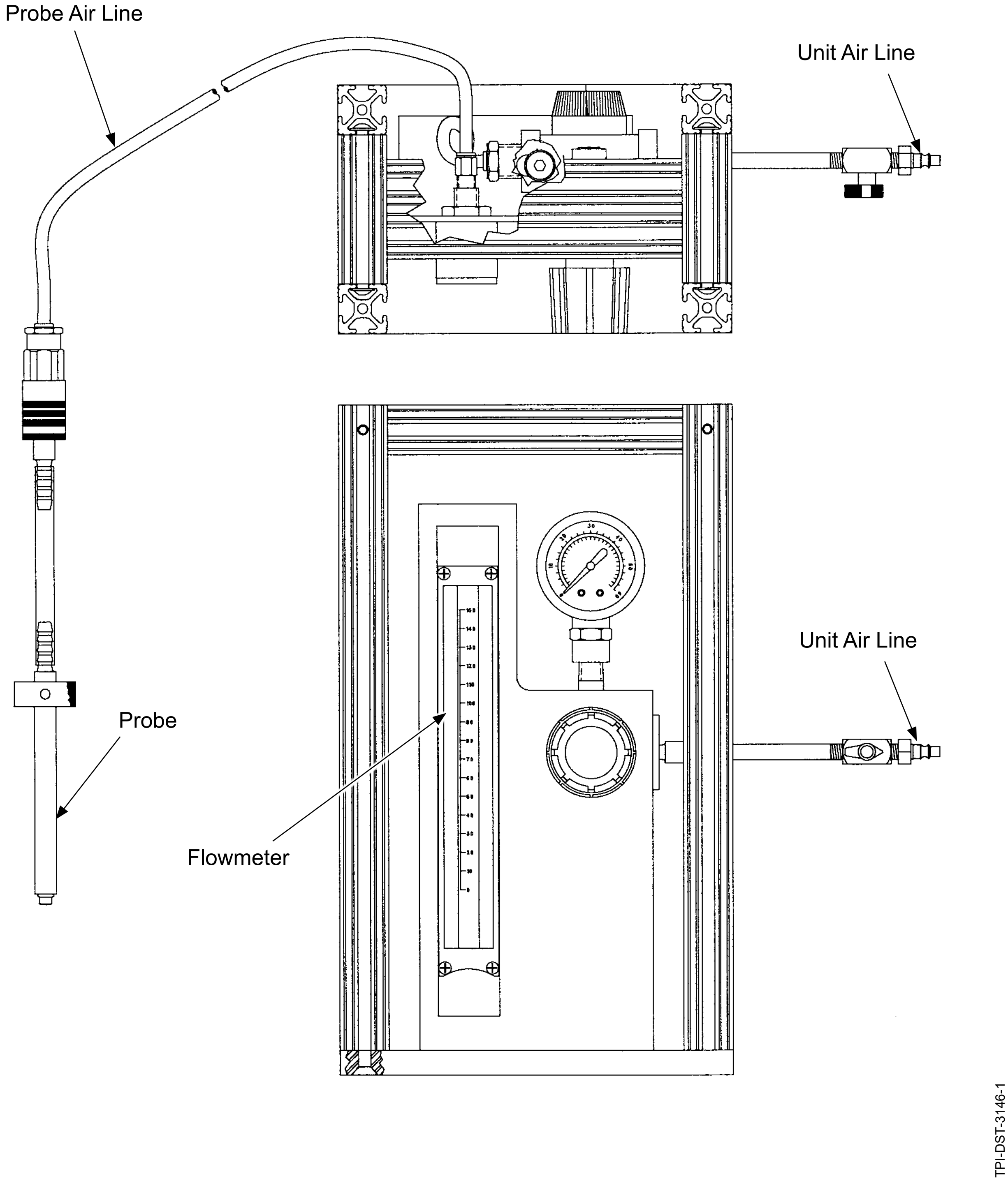
(a) Move the propeller to low pitch.

(b) Apply leak detector CM122 to the open lubrication plug hole. Refer to Figure 7-62.

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 (701) in the applicable side of the hub.

(a) Tighten the lubrication plug (701) until finger-tight, then tighten one additional 360 degree turn.



Blade Seal Effectiveness Check
Figure 7-63

B. Blade Seal Effectiveness Test, if applicable

NOTE: Alternate blade seal 1200A eliminates the energizer ring (1210), thus preventing damage to the blade seal during installation.

(1) For a propeller model that uses the blade seal (1200) and the energizer ring (1210), test for leaks by completing the Blade Seal Effectiveness Check in the following steps:

(a) To perform the blade seal effectiveness check, use Blade Seal Effectiveness Kit DST-3146-1 (TE382). Refer to Figure 7-63.

CAUTION: MAKE SURE THAT THE ONE LUBRICATION FITTING HOLE THAT DOES NOT HAVE AN AIRFLOW PLUG IN IT IS ACCESSIBLE PAST THE COUNTERWEIGHT WHEN THE PROPELLER IS IN FEATHER POSITION.

(b) Install an airflow plug that has a metal spacer and an O-ring in all except one lubrication fitting hole in the hub.

(c) Make a check of the flowmeter by obstructing the air flow.

1 If the flowmeter moves to the "0" position, indicating no airflow, continue to step (d) in this section.

2 If the flowmeter does not move to the "0" position, indicating airflow, troubleshoot the flowmeter.

(d) If not using the BT-3838-1 probe, install the BT-3838 fitting in the open lubrication fitting hole.

NOTE: The BT-3838-1 probe does not require an adaptor. If the BST-3117 Probe Assembly is used, adaptor BT-3838 (TE443) must be used.

(e) Connect a shop air line to the unit air line.

(f) Adjust the regulator until the gauge reads 1 bar.

(g) Connect the probe air line to the probe.

(h) Perform the blade seal effectiveness check.

1 Initially the ball in the flowmeter will rise in the gauge and then should slowly return to the "0" position.

2 If the ball in the flowmeter returns to the "0" position, indicating no air flow, the blade seal effectiveness check has been satisfactorily completed.

3 If the ball in the flowmeter does not return to the "0" position, indicating an air flow, troubleshoot the leak, repair, and perform the blade seal effectiveness check until the check is satisfactory.

12. Post-Assembly Procedures

A. Propeller Lubrication

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

B. Static Balance

NOTE: When assembling a propeller to be disassembled for shipping, it is not necessary to install safety wire to the static balance weight screws (4000).

(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).

(2) After the propeller has been lubricated and balanced, if applicable do the following:

(a) Remove the customer procured 3/4-16 UNF-2A threaded plug and O-ring or the B-449 pitch change rod plug and C-3317-013 O-ring.

(b) Turn the beta adjust screw (40) in the end of the pitch change rod (380).

C. 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.

13. 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 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.

(1) Before removal, make a mark to indicate alignment of each blade assembly, fork unit, spinner bulkhead and balance weight location with the hub unit. 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 and bulkhead to show alignment of the bulkhead to the hub, before removing the bulkhead from the hub.

(3) Remove all balance weight screws (4000) and balance weights (4010).

(4) Disconnect the electric de-ice lead wires from the hub and bulkhead, if applicable.

(5) For HC-E5N-3( )(L), HC-E5A-3( ), HC-E5P-3( ), and HC-E5W-5( ) propeller models, disassemble the beta system. Refer to the Beta System Disassembly section in the Disassembly chapter of this manual.

(6) Disassemble the hydraulic system and pitch adjustment unit. Refer to the Hydraulic System and Pitch Adjustment Unit Disassembly section for the applicable propeller model in the Disassembly chapter of this manual.

NOTE: It is not necessary to remove the cylinder or the piston (210) and hex nut (200) from the pitch change rod.

(7) 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 for the applicable propeller model in this chapter.

(8) 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 blades for shipping.

(c) Pack the blades for shipping with the preload plate, thrust bearing, blade seal and grease on each blade shank.

14. <u>Reassembly of a Propeller Disassembled for Shipping</u>

A. Unpacking the Propeller and Blades

(1) Carefully unpack the propeller and blades from shipping.

(2) Visually examine all propeller components for shipping damage. If damage is found, refer to the Check chapter of this manual for specific inspection, serviceable limits, and corrective action criteria.

B. Preparing Propeller for Reassembly

<u>NOTE 1</u>: 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.

<u>NOTE 2</u>: 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 unit, the spinner bulkhead, and each balance weight has been marked for alignment with the hub unit.

(2) Remove all balance weight screws (4000) and balance weights (4010).

(3) For HC-E5N-3( )(L), HC-E5A-3( ), HC-E5P-3( ), and HC-E5W-5( ) propeller models, disassemble the beta system. Refer to the Beta System Disassembly section in the Disassembly chapter of this manual.

(4) Disassemble the hydraulic system and pitch adjustment unit. Refer to the Hydraulic System and Pitch Adjustment Unit Disassembly section in the Disassembly chapter of this manual.

NOTE: It is not necessary to remove the cylinder or the piston (210) and hex nut (200) from the pitch change rod.

C. Propeller Reassembly

(1) Reassemble the propeller in accordance with the applicable procedures in this chapter.

(2) Reconnect the electric de-ice lead wires to the bulkhead, if applicable.

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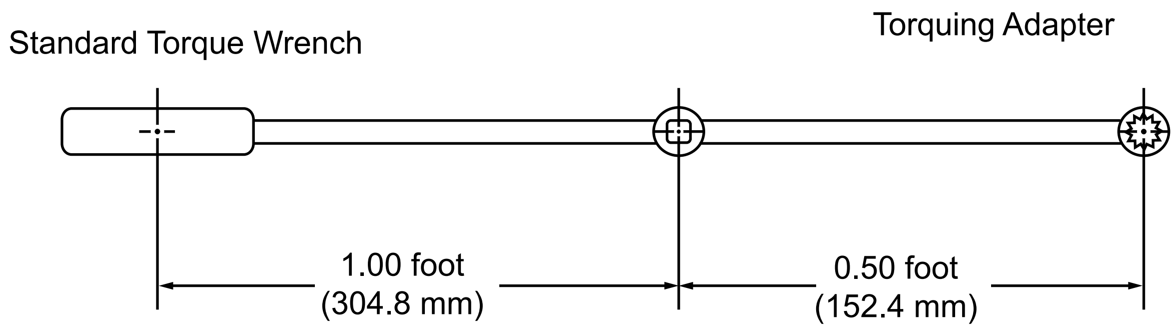
FITS AND CLEARANCES - CONTENTS

LIST OF FIGURES

LIST OF TABLES



$$\frac{\text{(actual torque required) x (torque wrench length)}}{\text{(torque wrench length) + (length of adapter)}} = \begin{array}{l}\text{torque wrench reading}\\ \text{to achieve required}\\ \text{actual torque}\end{array}$$

EXAMPLE:

$$\frac{\text{100 Ft-Lb (136 N•m) x 1 ft (304.8 mm)}}{\text{1 ft (304.8 mm) + 0.50 ft (152.4 mm)}} = \begin{array}{l}\text{66.7 Ft-Lb}\\ \text{(90.4 N•m)}\end{array}$$

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. 2)

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. Wet torque denotes use of anti-seize compound CM118.

Item No.	Part Number	Description	Torque		
			Ft-Lb	In-Lb	N•m
10	B-3839-16	Nut, Hex, Thin, Drilled (Feather adjust)	120	1440	163
20	B-3839-16	Nut, Hex, Thin, Drilled (Feather adjust)	120	1440	163
100	B-3819	Screw, 10-32, Cap (Pitch Stop Plate)	---	50-55	5.7-6.2
110	B-3384-2H	Bolt, 1/4-28, Hex Head (Stop Plate)	---	108-132	12.3-14.9
140	A-2038-6	Screw, 1/4-28, Cap (Start Lock)		108-132	12.3-14.9
200	B-474	Nut, 1 1/8-12, Hex, Self-locking (Piston)	100	1200	136
380	D-3657	Rod, Pitch Change	80 wet	960 wet	109 wet
	106212	Rod, Pitch Change	80 wet	960 wet	109 wet
	107135	Rod, Pitch Change	80 wet	960 wet	109 wet
420	B-3384-2H	Bolt, 1/4-28, Hex Head (Cylinder Mounting)	13	156	18
430	B-3384-3H	Bolt, 1/4-28, Hex Head (Cylinder Mounting)	13	156	18
440	B-3384-2H	Bolt, 1/4-28, Hex Head (Cylinder Mounting/Bushing Retainer)	13	156	18
540	B-3808-3	Nut, Hex, Self-locking (Pitch Change Rod Plug)	---	40	2.4
545	B-3368	Nut, 5/16-24, Hex, Thin	5	60	6.7
690	A-2043-1	Nut, 3/8-24, Hex, Self-locking	20-22	240-264	28-30
720	B-3786	Rod, Anti-rotation	20	240	27
814	102612-S50	Screw, 10-32, 100° Head	---	35-41	4.0-4.6
830	B-3824	Screw, 8-32, 100° Head	--	48-60	5.4-6.7
1053	B-3867-272	Screw, 8-32, 100° Head, Cres	--	8-10	0.90-1.13
1060	B-3830	Bolt, 5/16-24, 12 Point (Pitch Change Knob)	18-22	216-264	25-29
	B-6626-H5	Bolt, 1/4-28, Hex Head (Pitch Change Knob)	12.5-13.5	150-162	17-18
	B-6626-LH5	Bolt, 1/4-28, Hex Head (Pitch Change Knob)	12.5-13.5	150-162	17-18

Torque Values
Table 8-1, page 1 of 2

CAUTION 1: TORQUE VALUES ARE BASED ON NON-LUBRICATED THREADS, UNLESS SPECIFIED IN TABLE 8-1.

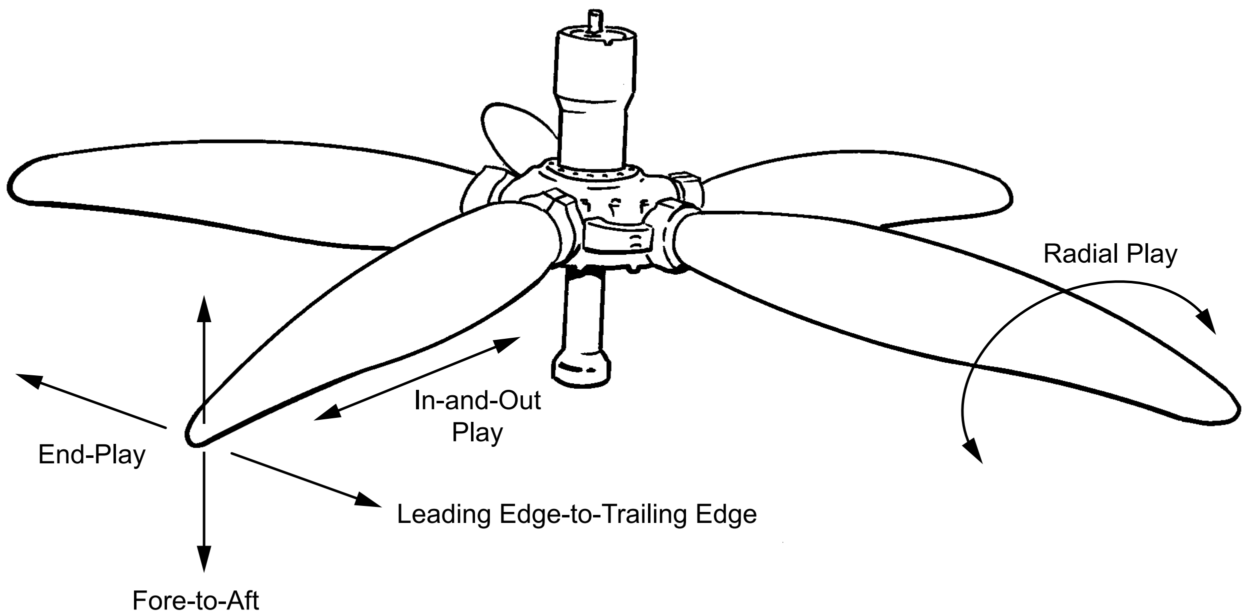
CAUTION 2: FOR TORQUE READING WHEN USING A TORQUE WRENCH ADAPTER, REFER TO FIGURE 8-1.

NOTE: Torque tolerance is ± 10 percent unless otherwise noted. Wet torque denotes use of anti-seize compound CM118.

Item No.	Part Number	Description	Torque		
			Ft-Lb	In-Lb	N•m
1110	B-3368	Nut, 5/16-24, Hex, Thin (Preload Plate)	---	120	14
1320	B-6616-A4P	Screw, Set, 10-32, Cres (Beta Ring)	---	20	2.7
1325	B-3898-5	Nut, Hex, Thin, Drilled	12	144	17
1350	A-3439	Nut, 3/8-24, Hex, Thin (Beta)	12	144	17
	B-3382	Nut, 3/8-24, Hex, Thin (Beta)	12	144	17
1400	B-3839-5	Nut, Hex, Thin, Drilled (Beta)	12	144	17
1450	B-3839-5	Nut, Hex, Thin, Drilled (Beta)	12	144	17
1670	B-3868-S60	Screw, 8-32, 100 Deg Head	Tighten until snug.		
5043	***	Bolt, 3/8-24, Hex Head (Counterweight Slug Attachment)	36	432	49
5044	***	Bolt, 1/4-28, Hex Head (Counterweight Slug Attachment)	---	120	13.5
-	A-2070-10	Bolt, 1/4-28, Hex Head (Bulkhead Mounting)		96-120	10.9-13.5
-	B-3384-( )	Bolt, 1/4-28, Hex Head (Bulkhead Mounting)		96-120	10.9-13.5
-	A-2070-10	Bolt, 1/4-28, Hex Head (Bulkhead Mounting)	---	96-120	10.9-13.5
-	B-3384-( )	Bolt, 1/4-28, Hex Head (Bulkhead Mounting)	---	96-120	10.9-13.5
5042	***	Nut, 3/8-24, Hex, Self Locking (Counterweight Slug Attachment)	20-22	240-264	28-30

*** Counterweight slug mounting hardware is application specific. Refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

Torque Values
Table 8-1, page 2 of 2



Blade Play
Figure 8-2

2. Blade Tolerances (Rev. 6)

A. Blade Play

(1) Limits for aluminum blade play are specified below. Refer to Figure 8-2.

(a) End Play:

1	Leading Edge-to-Trailing Edge	± 0.0625 inch (1.58 mm) Total: 0.125 inch (3.17 mm)
2	Fore-to-Aft (face to camber)	± 0.0625 inch (1.58 mm) Total: 0.125 inch (3.17 mm)

(b) In-and-Out Play — None permitted

(c) Radial Play (pitch change) — ±0.5 degree (1 degree total) measured at reference station

(2) Limits for composite blade play are specified below. Refer to Figure 8-2.

(a) End Play:

1	Leading Edge-to-Trailing Edge	± 0.125 inch (3.17 mm) Total: 0.250 inch (6.35 mm)
2	Fore-to-Aft (face to camber)	± 0.125 inch (3.17 mm) Total: 0.250 inch (6.35 mm)

(c) In-and-Out Play — None permitted

(d) Radial Play (pitch change) — ±0.5 degree (1 degree total) measured at reference station

(3) 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)	Aluminum Blades	± 0.0625 inch (1.58 mm) Total: 0.125 inch (3.17 mm)
(2)	Composite Blades:	± 0.125 inch (3.17 mm) Total: 0.250 inch (6.35 mm)

C. Blade Pitch Tolerance

(1) Blade pitch setting tolerance between blades at low pitch — 0.2 degree

3. Clearance Between the Carbon Block Unit and the Beta Ring

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.

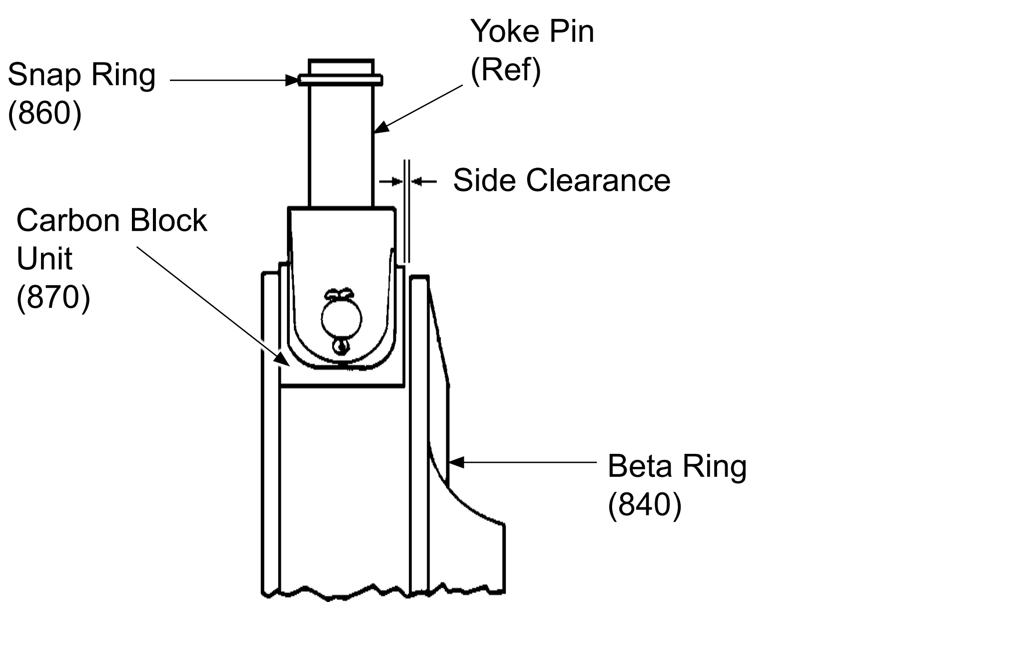
A. The carbon block unit (870) must be replaced at overhaul.

B. Check the following clearance dimension upon installation of the carbon block assembly in the beta ring, and whenever unusual conditions exist that could create excessive wear. Refer to Figure 8-3.

(1) The minimum permitted side clearance between a new carbon block unit (870) and the beta ring (840) when installed is 0.001 inch (0.03 mm).

(2) The maximum permitted side clearance between the carbon block unit and the beta ring (840) is 0.010 inch (0.25 mm).

(3) If the side clearance between the carbon block unit and the beta ring (840) is not within the permitted limits, replace the carbon block unit (870).



Carbon Block and Beta Ring Clearance
Figure 8-3

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT - CONTENTS

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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.

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ILLUSTRATED PARTS LIST - CONTENTS

PROPELLER PARTS LISTS and FIGURES

PROPELLER PARTS LISTS and FIGURES, CONTINUED

SUB-ASSEMBLY PARTS LISTS and FIGURES

SUB-ASSEMBLY PARTS LISTS and FIGURES, CONTINUED

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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).

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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. 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-asssembly.

(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.

D. 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.

E. Units Per Assembly (UPA)

(1) Designates the total quantity of an item required for the next higher assembly or subassembly.

F. 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.

G. 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

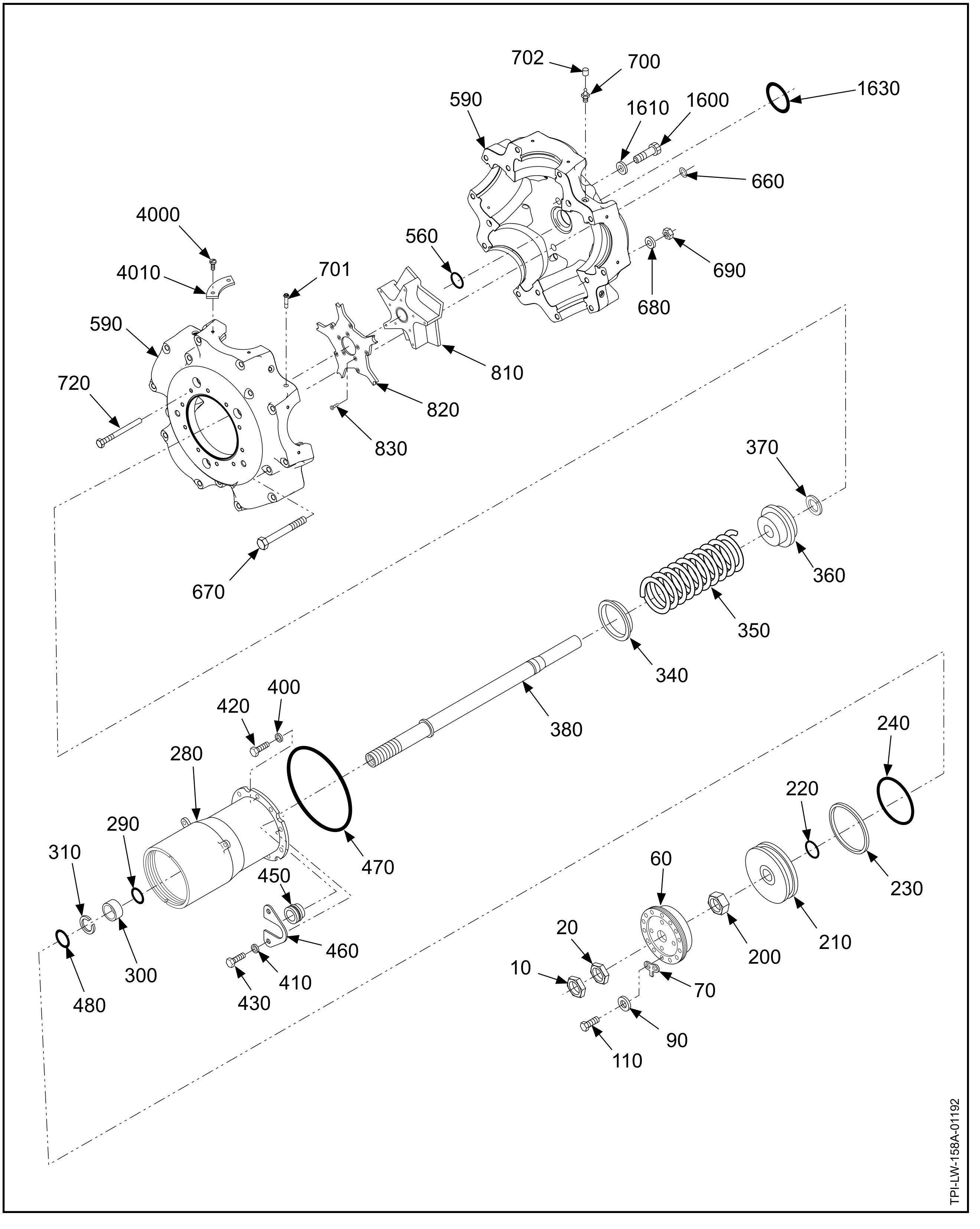
(1) Many O-rings, fasteners, and other vendor supplied hardware listed in Hartzell Propeller Inc. manuals have previously been specified with AN, MS, NAS, or vendor part number. To provide internal controls and procurement flexibility, Hartzell part numbers have been assigned to all O-rings, fasteners, 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.

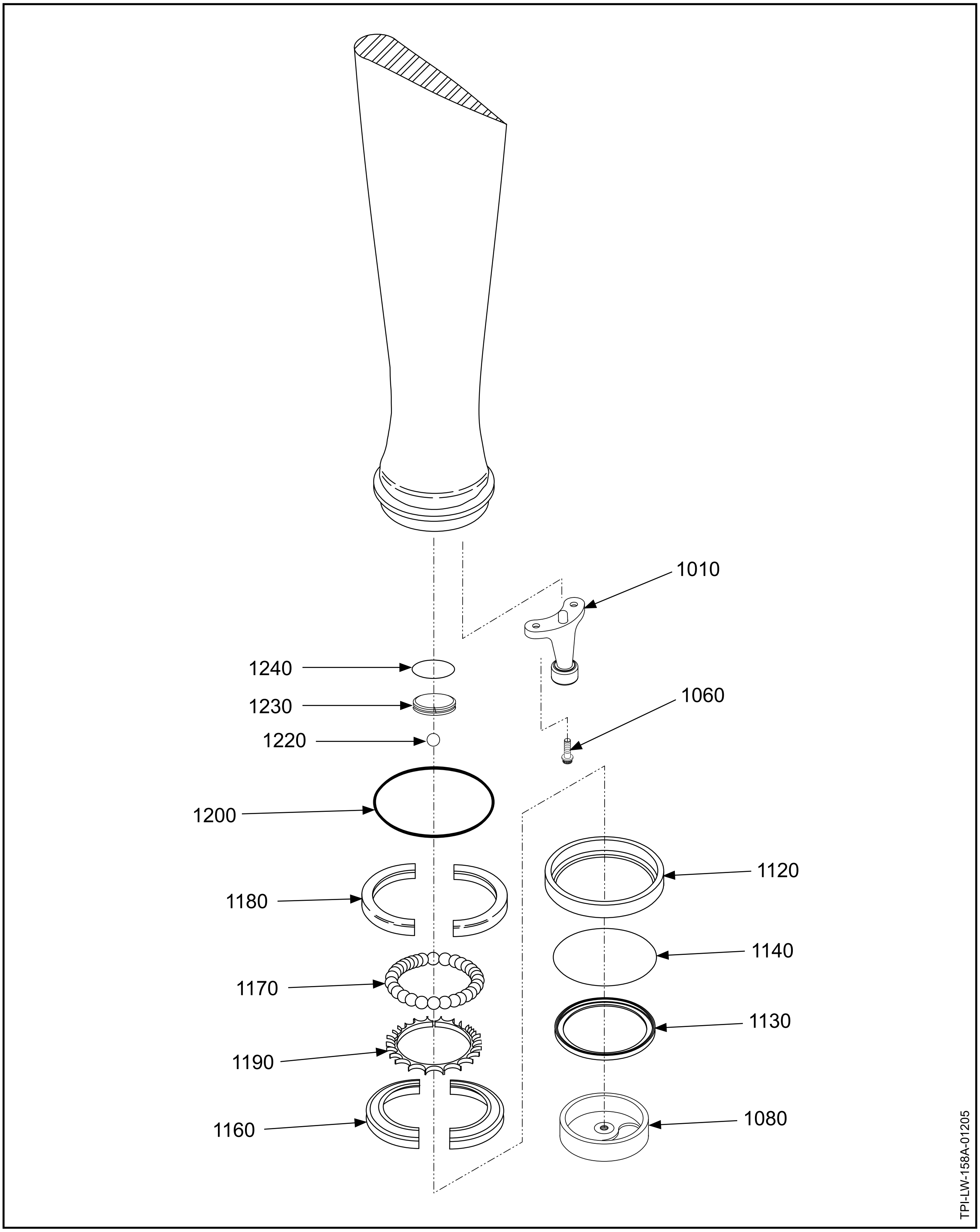
(a) For a listing of part number interchangeability, refer to the Vendor Cross Reference chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(b) Where permitted, both the Hartzell part number item and AN, MS, NAS, and other specified vendor number items can be used interchangeably.

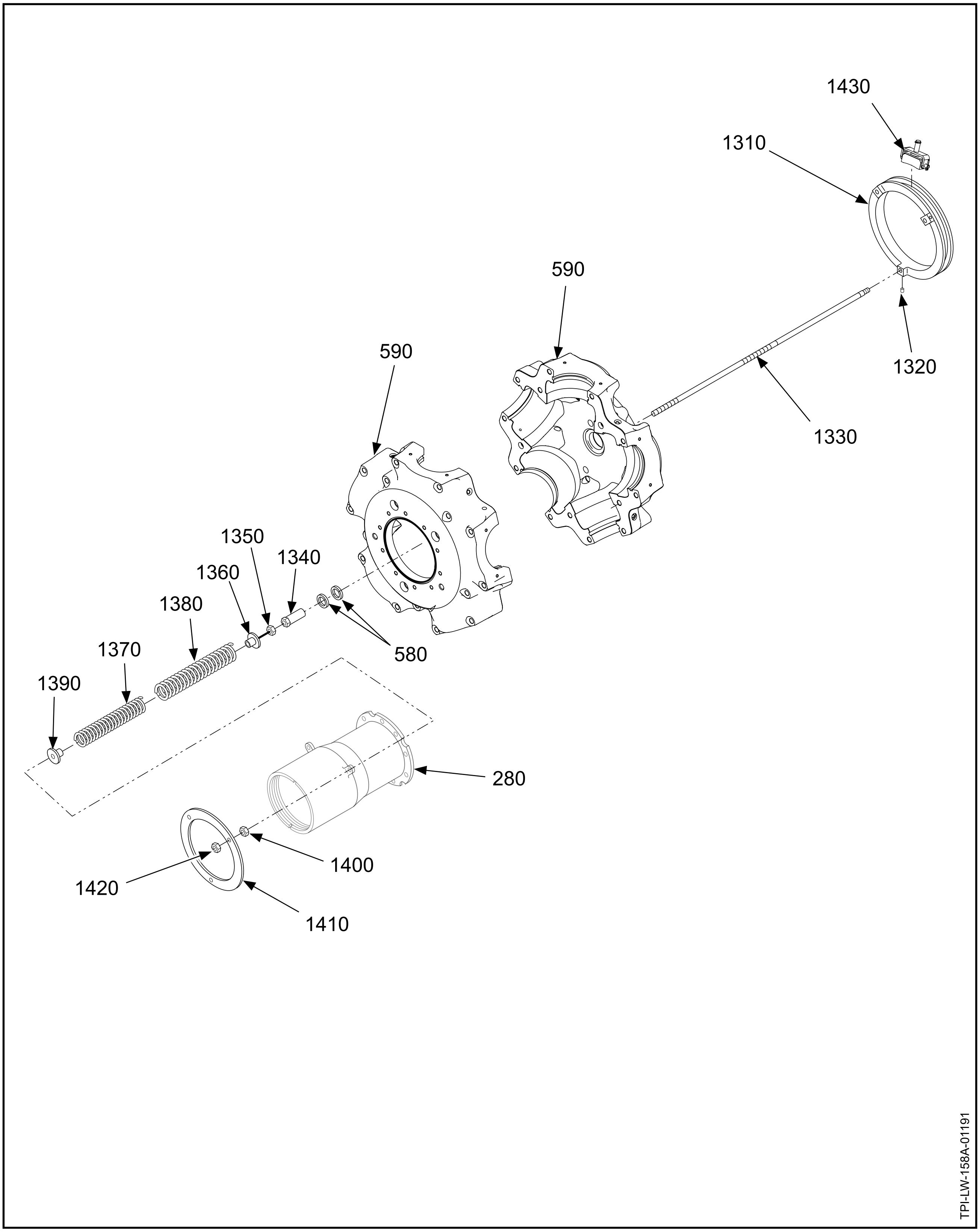
(c) The Hartzell part number must be used when ordering these parts from Hartzell Propeller Inc.



HC-E5A-3A: Propeller Parts
Figure 10-1



HC-E5A-3A: Blade Retention Parts
Figure 10-2



HC-E5A-3A: Beta System Parts
Figure 10-3

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-1		**PROPELLER PARTS - HC-E5A-3A**				
10	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
20	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
60	C-7420-1	• PCP: PLATE, STOP, PITCH		1		PCP
70	A-7428	• PLATE, STOP		1		
90	B-3851-0463	• WASHER (STOP PLATE)		2	Y	
110	B-3384-2H	• BOLT, 1/4-28, HEX HEAD (STOP PLATE)		2	Y	
200	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING (PISTON)		1	Y	
210	B-3678	• PISTON		1		
220	C-3317-217	• O-RING (PISTON ID)		1	Y	
230	B-5132-425	• RING, BACKUP (PISTON OD)		1	Y	
240	C-3317-425-2	• O-RING (PISTON OD)		1	Y	
280	102345	• PCP: CYLINDER ASSEMBLY		1		
290	C-3317-129	• • O-RING		1	Y	
300	A-3784	• • BUSHING, CYLINDER, REPLACED BY ITEM 300A		1		
300A	108298	• • BUSHING, CYLINDER, REPLACES ITEM 300 POST HC-SB-61-392		1		
310	B-6629-175PP	• • RING, RETAINING, INTERNAL		1	Y	
340	101558	• SPRING SEAT		1		
350	102224	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
360	101556	• PCP: SPRING RETAINER, FLANGED		1		PCP
370	A-3687	• KEEPER, SPLIT		1	Y	
380	106212	• PCP: ROD, PITCH CHANGE		1		PCP
400	B-3837-0432	• WASHER, CORROSION RESISTANT		4	Y	
410	B-3837-0463	• WASHER, CORROSION RESISTANT		6	Y	
420	B-3384-2H	• BOLT, 1/4-28, HEX HEAD		4	Y	
430	B-3384-3H	• BOLT, 1/4-28, HEX HEAD		6	Y	
450	104033	• BUSHING (BETA ROD)		3		
460	104034	• RETAINER (BETA ROD BUSHING)		3		
470	C-3317-050	• O-RING (CYLINDER MOUNTING)		1	Y	
480	C-3317-215-2	• O-RING (CYLINDER BUSHING ID)		1	Y	
560	C-3317-212-2	• O-RING (PITCH CHANGE ROD OD)		1	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-1		**PROPELLER PARTS - HC-E5A-3A, CONTINUED**				
590	104065	• PCP: HUB UNIT, HC-E5A-3(1) (REFER TO "104065 HUB UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
660	C-3317-012	• O-RING (BETA ROD)		3	Y	
670	A-1037-4	• BOLT, 3/8-24, HEX HEAD		15		
680	B-3834-0632	• WASHER		15	Y	
690	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING (HUB HALF CLAMPING)		15	Y	
700	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 700A AND 701		10	Y	
700A	A-279	• FITTING, LUBRICATION REPLACES ITEM 700 IN ENGINE-SIDE OF HUB		5	Y	
700B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE IS ITEM 700A		5	Y	
701	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 700 IN CYLINDER-SIDE OF HUB		5	Y	
702	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 700, 700A, AND 700B		5	Y	
720	B-3786	• ROD, ANTI-ROTATION		2		
810	D-7415	• FORK, FIVE BLADE		1		
820	C-3658	• PLATE, FORK, FIVE BLADE		1		
830	B-3824	• SCREW, 8-32 100° HEAD (FORK PLATE)		10	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-1		**PROPELLER PARTS - HC-E5A-3A, CONTINUED**				
10-2		**BLADE RETENTION PARTS**				
1010	104901-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT (REFER TO “104901-( ) PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1060	B-3830	• BOLT, 5/16-24, 12-POINT (PITCH CHANGE KNOB)		10	Y	
1080	104882	• PRELOAD PLATE ASSEMBLY (REFER TO “104882 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1120	101512	• BEARING RETAINING RING		5		
1130	101437	• BLADE SEAL		5		
1140	C-3317-045	• O-RING		5	Y	
-1150	C-792	• BEARING, RETENTION, BLADE		5		
1160	C-792-B	• • RACE, BLADE SIDE		1		
1170	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1180	C-792-A	• • RACE, HUB SIDE		1		
1190	B-793	• BALL SPACER		5	Y	
1200	C-3317-340-8	• O-RING		5	Y	
1220	B-6144-1	• BALL, BEARING, 3/8 INCH DIA.		5	Y	
1230	103413	• PLUG, BLADE		5		
1240	C-3317-028	• O-RING		5	Y	

EFF CODE	INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-1		**PROPELLER PARTS - HC-E5A-3A, CONTINUED**				
10-3		**BETA SYSTEM PARTS**				
1310	105885	• RING, BETA		1		
1320	B-6616-A4P	• SCREW, SET, 10-32, CRES (RING, BETA)		3	Y	
1330	105559	• ROD, BETA		3		
580	B-5132	• RING, BACK-UP (BETA ROD HUB HOLES)		6	Y	
1340	A-3677	• SLEEVE, BETA, THREADED		3		
1350	A-3439	• NUT, 3/8-24, HEX, THIN (BETA)		3	Y	
1360	B-6267	• SPRING RETAINER, FLANGED (BETA)		3		
1370	B-6242	• SPRING, COMPRESSION (BETA)		3	Y	
1380	B-6241	• SPRING, COMPRESSION (BETA)		3	Y	
1390	B-6268	• GUIDE, SPRING		3		
1400	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED (BETA)		3	Y	PCP
1410	C-6310	• RING, SUPPORT, ROD, BETA		1		
1420	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED (BETA)		3	Y	PCP
1430	A-3074	• BLOCK, BETA FEEDBACK - ASSEMBLY (REFER TO “A-3074 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)	A	1		
	A-3044	• BLOCK, BETA FEEDBACK - ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)	B	1		

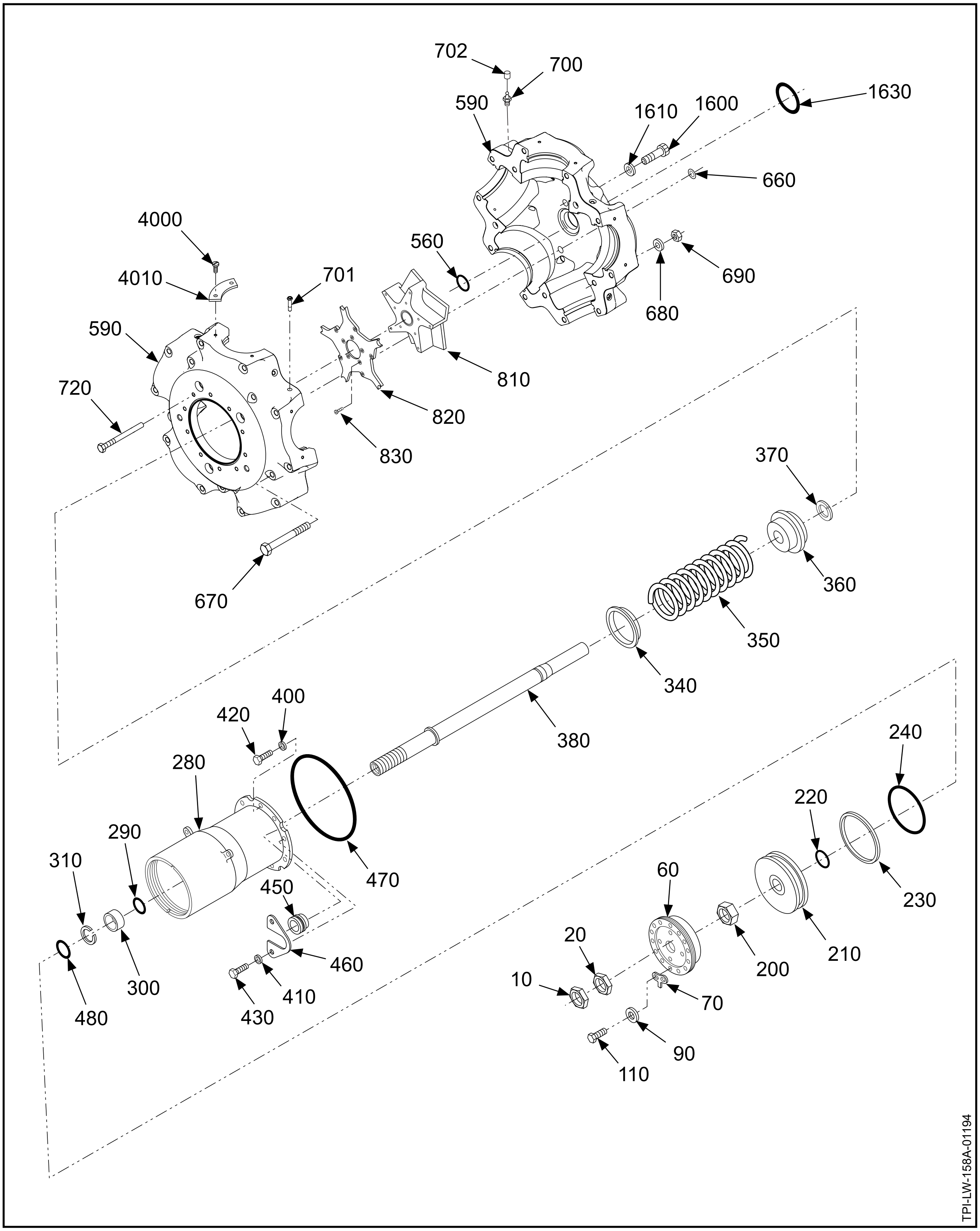
EFF CODE	INFORMATION
A	THIS BETA BLOCK FEEDBACK SYSTEM IS EFFECTIVE FOR PC-12 AND TEXTRON KING AIR 350 INSTALLATIONS.
B	THIS BETA BLOCK FEEDBACK SYSTEM IS EFFECTIVE FOR BLACKHAWK STC INSTALLATIONS.

- ITEM NOT ILLUSTRATED

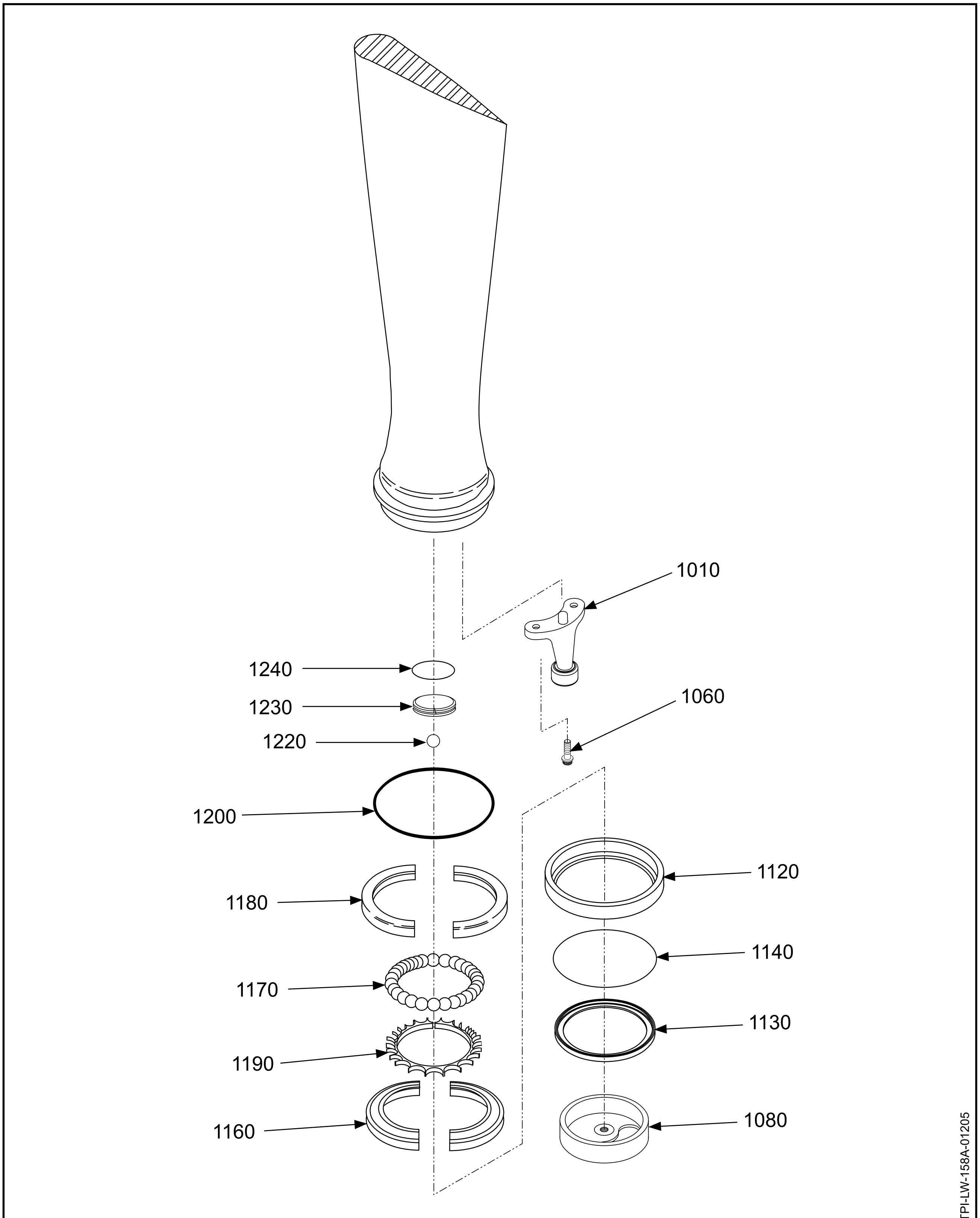
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-1		**PROPELLER PARTS - HC-E5A-3A, CONTINUED**				
		PROPELLER MOUNTING PARTS				
1600		• BOLT, MOUNTING APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59).		12	Y	
1610	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		12	Y	
1630	C-3317-239-2	• O-RING (MOUNTING FLANGE)		1	Y	
		BALANCE PARTS				
4000	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
4010	A-2424(A)-( )	• BALANCE WEIGHT		AR		
		COUNTERWEIGHTS/MOUNTING BOLTS				
-5070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-5050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		COUNTERWEIGHT SLUGS/MOUNTING HARDWARE				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				
-5040		• COUNTERWEIGHT SLUGS				
-5041		• COUNTERWEIGHT SLUG MOUNTING BOLT			Y	
-5042		• COUNTERWEIGHT SLUG MOUNTING NUT			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFF CODE INFORMATION

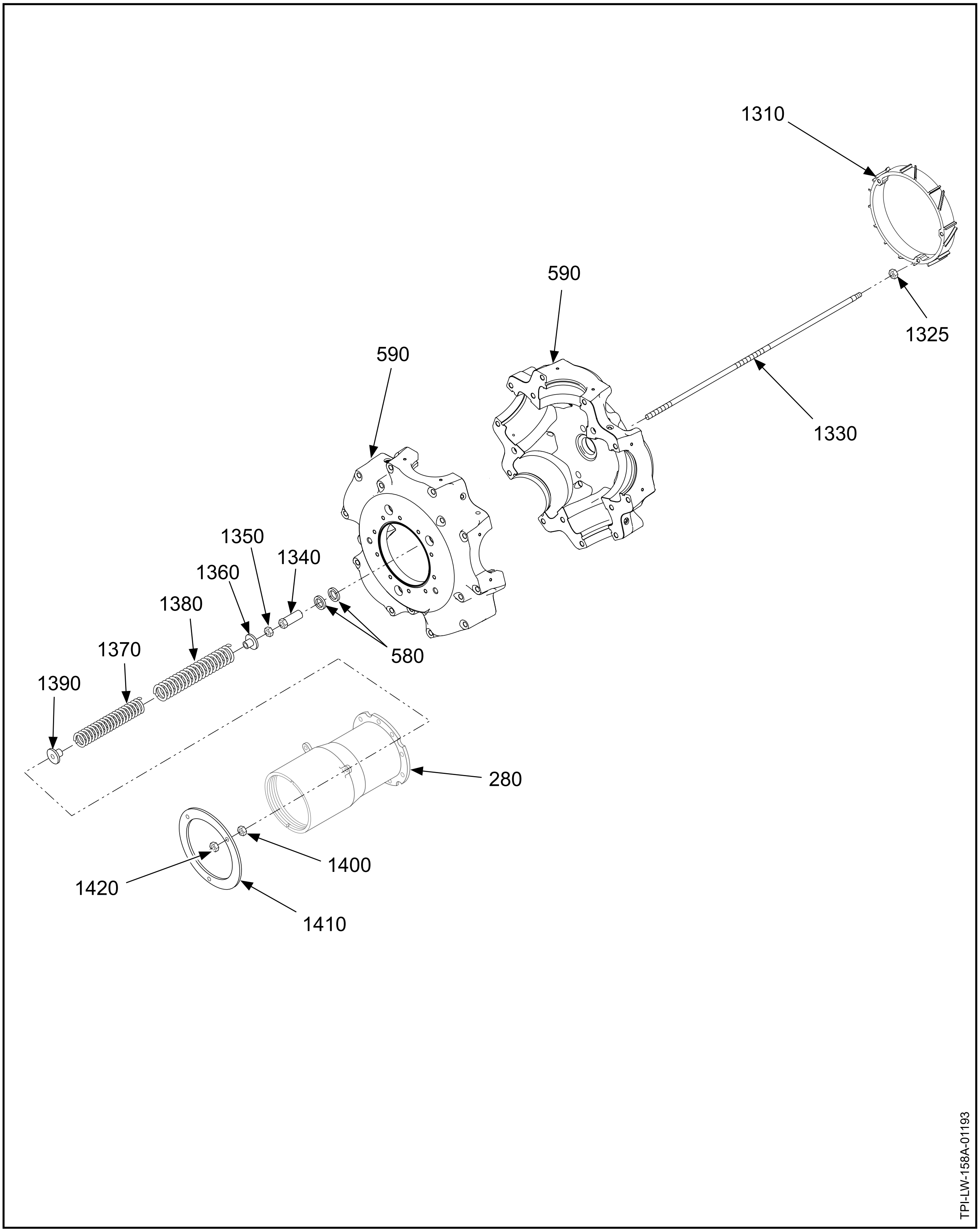
- ITEM NOT ILLUSTRATED



HC-E5A-31A: Propeller Parts
Figure 10-4



HC-E5A-31A: Blade Retention Parts
Figure 10-5



HC-E5A-31A: Beta System Parts
Figure 10-6

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-4		**PROPELLER PARTS - HC-E5A-31A**				
10	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
20	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
60	C-7420-1	• PCP: PLATE, STOP, PITCH		1		PCP
70	A-7428	• PLATE, STOP		1		
90	B-3851-0463	• WASHER (STOP PLATE)		2	Y	
110	B-3384-2H	• BOLT, 1/4-28, HEX HEAD (STOP PLATE)		2	Y	
200	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING (PISTON)		1	Y	
210	B-3678	• PISTON		1		
220	C-3317-217	• O-RING (PISTON ID)		1	Y	
230	B-5132-425	• RING, BACKUP (PISTON OD)		1	Y	
240	C-3317-425-2	• O-RING (PISTON OD)		1	Y	
280	102345	• PCP: CYLINDER ASSEMBLY		1		PCP
290	C-3317-129	• • O-RING		1	Y	
300	A-3784	• • BUSHING, CYLINDER, REPLACED BY ITEM 300A		1		
300A	108298	• • BUSHING, CYLINDER, REPLACES ITEM 300 POST HC-SB-61-392		1		
310	B-6629-175PP	• • RING, RETAINING, INTERNAL		1	Y	
340	101558	• SPRING SEAT		1		
350	102224	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
360	101556	• PCP: SPRING RETAINER, FLANGED		1		PCP
370	A-3687	• KEEPER, SPLIT		1	Y	
380	106212	• PCP: ROD, PITCH CHANGE		1		PCP
400	B-3837-0432	• WASHER, CORROSION RESISTANT		4	Y	
410	B-3837-0463	• WASHER, CORROSION RESISTANT		6	Y	
420	B-3384-2H	• BOLT, 1/4-28, HEX HEAD		4	Y	
430	B-3384-3H	• BOLT, 1/4-28, HEX HEAD		6	Y	
450	104033	• BUSHING (BETA ROD)		3		
460	104034	• RETAINER (BETA ROD BUSHING)		3		
470	C-3317-050	• O-RING (CYLINDER MOUNTING)		1	Y	
480	C-3317-215-2	• O-RING (CYLINDER BUSHING ID)		1	Y	
560	C-3317-212-2	• O-RING (PITCH CHANGE ROD OD)		1	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-4		**PROPELLER PARTS - HC-E5A-31A, CONTINUED**				
590	104065	• PCP: HUB UNIT, HC-E5A-3(1) (REFER TO “104065 HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
660	C-3317-012	• O-RING (BETA ROD)		3	Y	
670	A-1037-4	• BOLT, 3/8-24, HEX HEAD		10		
680	B-3834-0632	• WASHER		15	Y	
690	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING, (HUB HALF CLAMPING)		15	Y	
700	A-279	• FITTING, LUBRICATION (ENGINE-SIDE OF HUB)		5	Y	
700A	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 700		5	Y	
701	106545	• PLUG, LUBRICATION (CYLINDER-SIDE OF HUB)		5	Y	
702	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 700 AND 700A		5	Y	
720	B-3786	• ROD, ANTI-ROTATION		2		
810	D-7415	• FORK, FIVE BLADE		1		
820	C-3658	• PLATE, FORK, FIVE BLADE		1		
830	B-3824	• SCREW, 8-32 100° HEAD (FORK PLATE)		10	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-4		**PROPELLER PARTS - HC-E5A-31A, CONTINUED**				
10-5		**BLADE RETENTION PARTS**				
1010	104901-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT (REFER TO “104901-( ) PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1060	B-3830	• BOLT, 5/16-24, 12-POINT (PITCH CHANGE KNOB)		10	Y	
1080	104882	• PRELOAD PLATE ASSEMBLY (REFER TO “104882 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1120	101512	• RING, RETAINING, BEARING		5		
1130	101437	• SEAL, BLADE		5		
1140	C-3317-045	• O-RING		5	Y	
-1150	C-792	• BEARING, RETENTION, BLADE		5		
1160	C-792-B	• • RACE, BLADE SIDE		1		
1170	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1180	C-792-A	• • RACE, HUB SIDE		1		
1190	B-793	• BALL SPACER		5	Y	
1200	C-3317-340-8	• O-RING		5	Y	
1220	B-6144-1	• BALL, BEARING, 3/8 INCH DIA.		5	Y	
1230	103413	• PLUG, BLADE		5		
1240	C-3317-028	• O-RING		5	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-4		**PROPELLER PARTS - HC-E5A-31A, CONTINUED**				
10-6		**BETA SYSTEM PARTS**				
1310	106849	• PCP: RING, BETA		1		PCP
1325	B-3898-5	• NUT, HEX, THIN, DRILLED		3	Y	
1330	106865	• ROD, BETA		3		
580	B-5132	• RING, BACK-UP (BETA ROD HUB HOLES)		6	Y	
1340	A-3677	• SLEEVE, BETA, THREADED		3		
1350	A-3439	• NUT, 3/8-24, HEX, THIN (BETA)		3	Y	
1360	B-6267	• SPRING RETAINER, FLANGED (BETA)		3		
1370	B-6242	• SPRING, COMPRESSION (BETA)		3	Y	
1380	B-6241	• SPRING, COMPRESSION (BETA)		3	Y	
1390	B-6268	• GUIDE, SPRING		1		
1400	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED (BETA)		3	Y	PCP
1410	C-6310	• RING, SUPPORT, ROD, BETA		1		
1420	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED (BETA)		3	Y	PCP

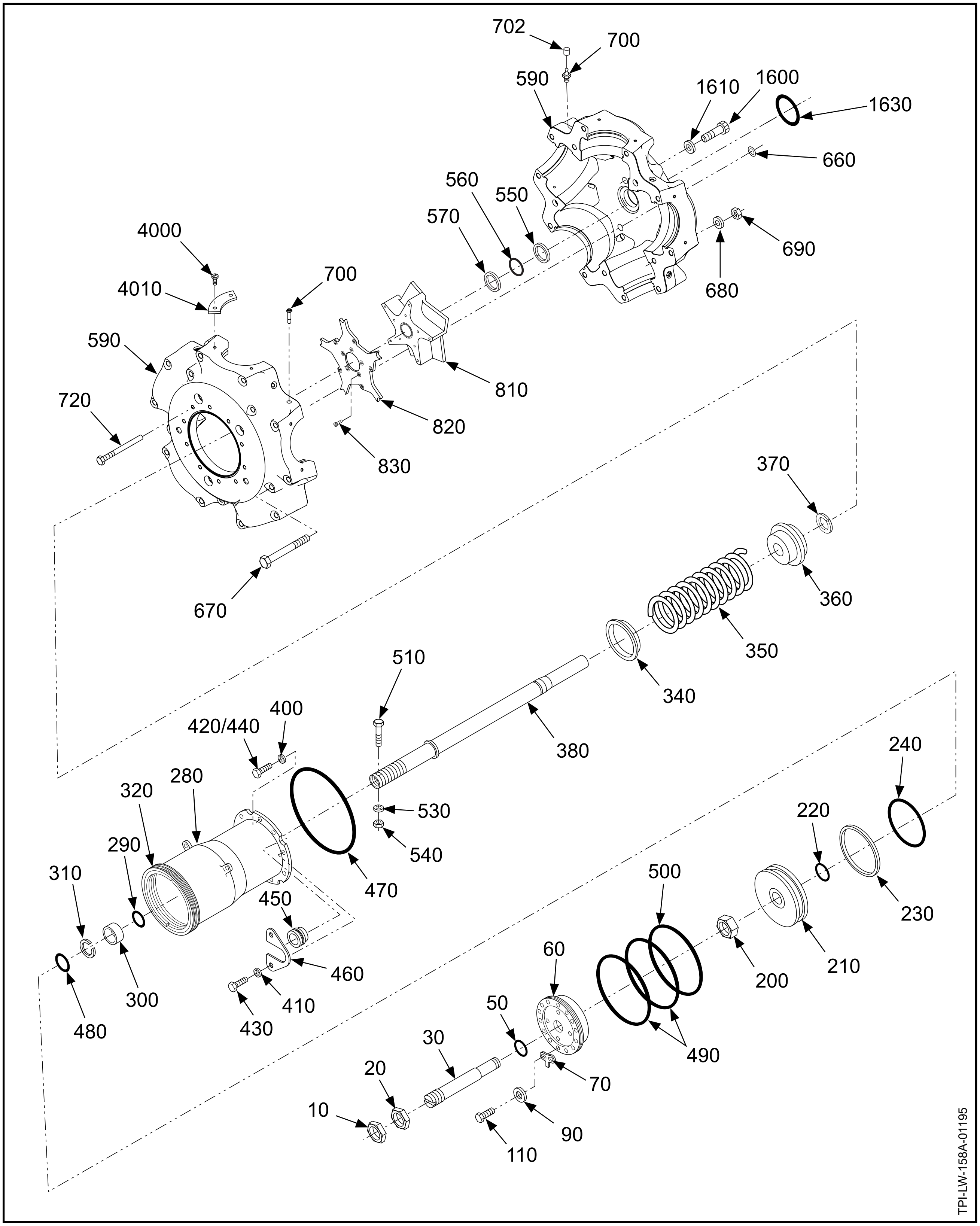
EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

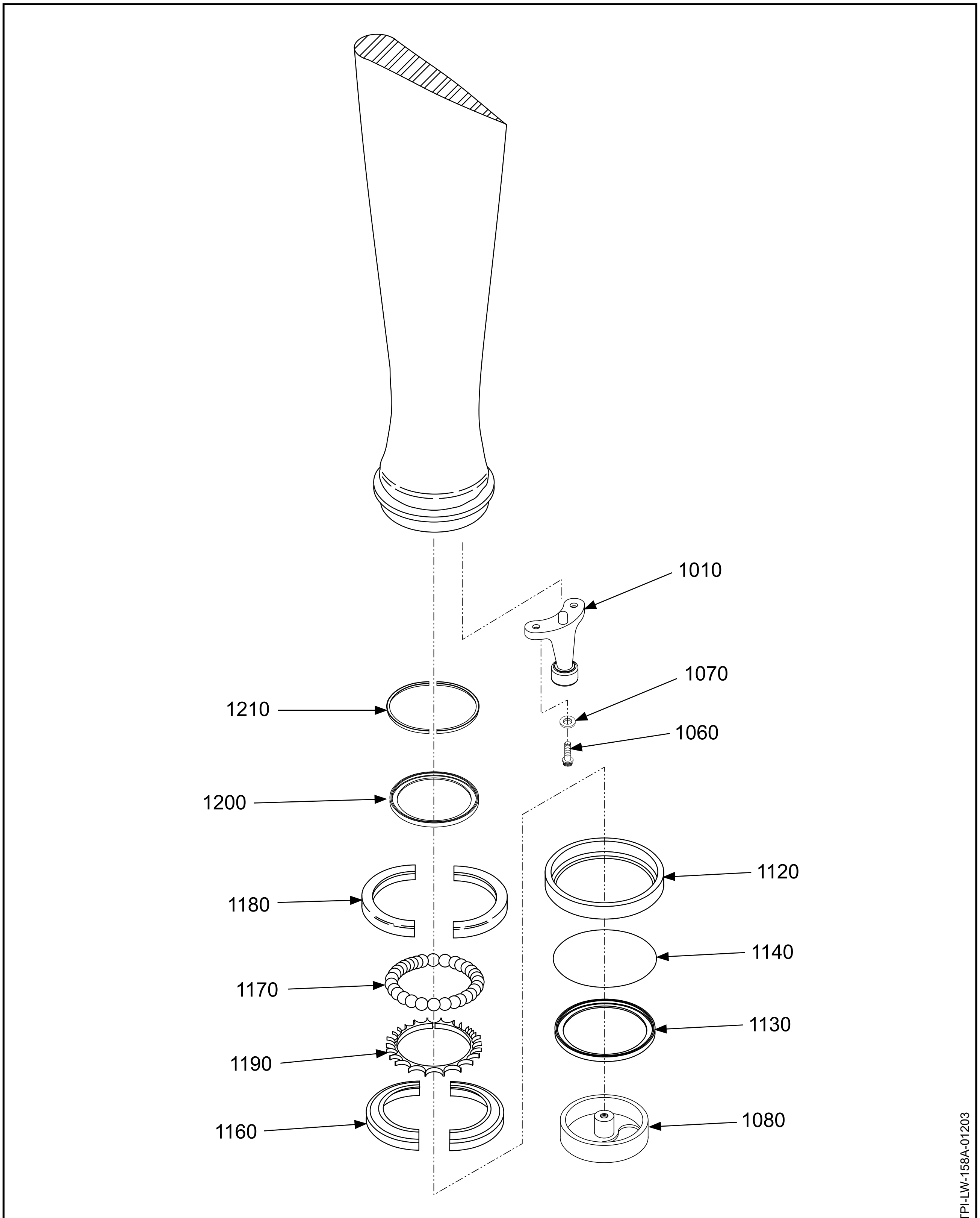
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-4		**PROPELLER PARTS - HC-E5A-31A, CONTINUED**				
		PROPELLER MOUNTING PARTS				
1600	B-3347	• BOLT, MOUNTING, 9/16-18, 12 POINT		12	Y	
1610	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		12	Y	
1630	C-3317-239-2	• O-RING (MOUNTING FLANGE)		1	Y	
		BALANCE PARTS				
4000	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
4010	A-2424(A)-( )	• BALANCE WEIGHT		AR		
		COUNTERWEIGHTS/MOUNTING BOLTS				
-5070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-5050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		COUNTERWEIGHT SLUGS/MOUNTING HARDWARE				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				
-5040		• COUNTERWEIGHT SLUGS				
-5041		• COUNTERWEIGHT SLUG MOUNTING BOLT			Y	
-5042		• COUNTERWEIGHT SLUG MOUNTING NUT			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFF CODE INFORMATION

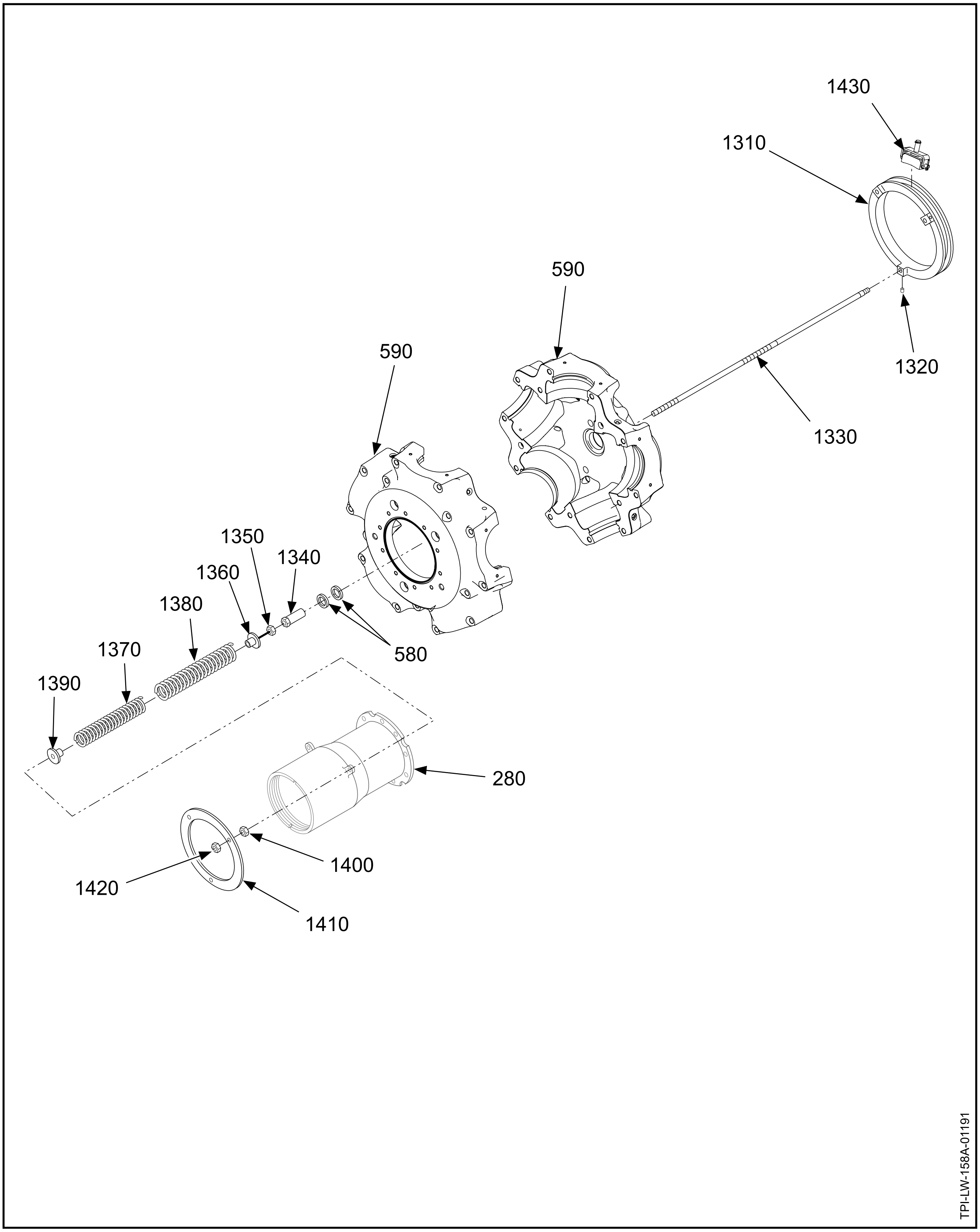
- ITEM NOT ILLUSTRATED



HC-E5N-3, HC-E5N-3A: Propeller Parts
Figure 10-7



HC-E5N-3, HC-E5N-3A: Blade Retention Parts
Figure 10-8



HC-E5N-3, HC-E5N-3A: Beta System Parts
Figure 10-9

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-7		**PROPELLER PARTS - HC-E5N-3, HC-E5N-3A**				
10	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
20	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
30	B-449	• PLUG, ROD, PITCH CHANGE USED WITH ITEMS 50, 380, 510, 530, AND 540		1		
50	C-3317-013	• O-RING (PITCH CHANGE ROD PLUG) USED WITH ITEMS 30, 380, 510, 530, AND 540		1	Y	
60	C-3739	• PCP: PLATE, STOP, PITCH SUPERSEDED BY ITEM 60A USED WITH ITEMS 100, 280, AND 280A	C	1		PCP
60A	C-7420-1	• PCP: PLATE, STOP, PITCH SUPERSEDES ITEM 60 USED WITH ITEMS 70, 90, 110, AND 280B POST HC-SL-61-275	C	1		PCP
70	A-7428	• PLATE, STOP USED WITH ITEMS 60A, 90, 110, AND 280B POST HC-SL-61-275	C	1		
90	B-3851-0463	• WASHER (STOP PLATE) USED WITH ITEMS 60A, 70, 110, AND 280B POST HC-SL-61-275	C	2	Y	
-100	B-3819	• SCREW, 10-32, CAP (STOP PLATE) USED WITH ITEMS 60, 280 AND 280A	C	3	Y	
110	B-3384-2H	• BOLT, 1/4-28, HEX HEAD (STOP PLATE) USED WITH ITEMS 60A, 70, 90, AND 280B POST HC-SL-61-275	C	2	Y	
200	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING (PISTON)		1	Y	
210	B-3678	• PISTON		1		
220	C-3317-217	• O-RING (PISTON ID)		1	Y	
230	B-5132-425	• RING, BACKUP (PISTON OD)		1	Y	
240	C-3317-425-2	• O-RING (PISTON OD)		1	Y	

EFF CODE	INFORMATION
C	WHEN REPLACEMENT OF THE D-3738(-1) CYLINDER ASSEMBLY OR THE C-3739 PITCH STOP PLATE IS REQUIRED, THE 102345-1 CYLINDER ASSEMBLY, THE C-7420-1 PCP:PITCH STOP PLATE, AND THE A-7428 STOP PLATE MUST BE INSTALLED.

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-7		**PROPELLER PARTS - HC-E5N-3, HC-E5N-3A, CONTINUED**				
		D-3738 CYLINDER ASSEMBLY USED WITH ITEMS 60 AND 100	**C**			
280	D-3738	• CYLINDER ASSEMBLY	A	1		
290	C-3317-129	• • O-RING		1	Y	
300	A-3784	• • BUSHING, CYLINDER		1		
310	B-6629-175PP	• • RING, RETAINING, INTERNAL		1	Y	
		D-3738-1 CYLINDER ASSEMBLY SUPERSEDED BY ITEM 280B, USED WITH ITEMS 60 AND 100	**C**			
280A	D-3738-1	• CYLINDER ASSEMBLY	B	1		
290	C-3317-129	• • O-RING		1	Y	
300	A-3784	• • BUSHING, CYLINDER		1		
310	B-6629-175PP	• • RING, RETAINING, INTERNAL		1	Y	
320	C-5575-1	• • RING, LOCATING, BULKHEAD ONLY AVAILABLE AS PART OF ITEM 280A SUPERSEDED BY ITEM 320A USED WITH ITEM 490		1		
320A	C-5575-2	• • RING, LOCATING, BULKHEAD ONLY AVAILABLE AS PART OF ITEM 280A SUPERSEDES ITEM 320 USED WITH ITEM 490A		1		
		102345-1 CYLINDER ASSEMBLY SUPERSEDES ITEM 280A USED WITH ITEMS 60A, 70, 90, AND 100 POST HC-SL-61-275	**C**			
280B	102345-1	• PCP: CYLINDER ASSEMBLY	B	1		PCP
290	C-3317-129	• • O-RING		1	Y	
300	A-3784	• • BUSHING, CYLINDER, REPLACED BY ITEM 300A		1		
300A	108298	• • BUSHING, CYLINDER, REPLACES ITEM 300 POST HC-SB-61-392		1		
310	B-6629-175PP	• • RING, RETAINING, INTERNAL		1	Y	
320	C-5575-1	• • RING, LOCATING, BULKHEAD ONLY AVAILABLE AS PART OF ITEM 280A SUPERSEDED BY ITEM 320A USED WITH ITEM 490		1		
320A	C-5575-2	• • RING, LOCATING, BULKHEAD ONLY AVAILABLE AS PART OF ITEM 280A SUPERSEDES ITEM 320 USED WITH ITEM 490A		1		
340	B-3380	• SEAT, SPRING		1		

EFF CODE	INFORMATION
A	USE WITH D5505-1L(P) SPINNER ASSEMBLY
B	USE WITH D5527-1L(P) SPINNER ASSEMBLY
C	WHEN REPLACEMENT OF THE D-3738(-1) CYLINDER ASSEMBLY OR THE C-3739 PITCH STOP PLATE IS REQUIRED, THE 102345-1 CYLINDER ASSEMBLY, THE C-7420-1 PCP:PITCH STOP PLATE, AND THE A-7428 STOP PLATE MUST BE INSTALLED.

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-7		**PROPELLER PARTS - HC-E5N-3, HC-E5N-3A, CONTINUED**				
		SUPERSEDED BY ITEM 340A USED WITH ITEMS 350 AND 360				
340A	101558	• SPRING SEAT SUPERSEDES ITEM 340 USED WITH ITEMS 350A AND 360A POST HC-SL-61-271		1		
350	B-3361	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDED BY ITEM 350A USED WITH ITEMS 340 AND 360		1		PCP
350A	102224	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDES ITEM 350 USED WITH ITEMS 340A AND 360A POST HC-SL-61-271		1		PCP
360	B-3362	• SPRING RETAINER, REAR SUPERSEDED BY ITEM 360A USED WITH ITEMS 340 AND 350		1		
360A	101556	• PCP: SPRING RETAINER, FLANGED SUPERSEDES ITEM 360 USED WITH ITEMS 340A AND 350A POST HC-SL-61-271		1		PCP
370	A-3687	• KEEPER, SPLIT		1	Y	
380	D-3657	• PCP: ROD, PITCH CHANGE USED WITH ITEMS 30, 50, 510, 530, AND 540		1		PCP
380A	106212	• PCP: ROD, PITCH CHANGE, ALTERNATE FOR ITEM 380, POST HC-SL-61-352		1		PCP
-390	B-3837-0432	• WASHER, CORROSION RESISTANT (CYLINDER MOUNTING) SUPERSEDED BY ITEMS 400 AND 410		10	Y	
400	B-3837-0432	• WASHER, CORROSION RESISTANT (CYLINDER MOUNTING) SUPERSEDES ITEM 390 USED WTH ITEMS 440, 450, AND 460 POST HC-SL-61-325		4	Y	
410	B-3837-0463	• WASHER, CORROSION RESISTANT (CYLINDER MOUNTING) SUPERSEDES ITEM 390 USED WTH ITEMS 430, 450, AND 460 POST HC-SL-61-325		6	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-7		**PROPELLER PARTS - HC-E5N-3, HC-E5N-3A, CONTINUED**				
420	B-3384-2H	• BOLT, 1/4-28, HEX HEAD (CYLINDER MOUNTING) SUPERSEDED BY ITEMS 430 AND 440		10	Y	
430	B-3384-3H	• BOLT, 1/4-28, HEX HEAD (CYLINDER MOUNTING/BUSHING RETAINER) SUPERSEDES ITEM 420 USED WTH ITEMS 410, 450, AND 460 POST HC-SL-61-325		6	Y	
440	B-3384-2H	• BOLT, 1/4-28, HEX HEAD SUPERSEDES ITEM 420 USED WTH ITEMS 400, 450, AND 460 POST HC-SL-61-325		4	Y	
450	104033	• BUSHING (BETA ROD) SUPERSEDES ITEM 420 USED WTH ITEMS 400, 410, 430, 440, AND 460 POST HC-SL-61-325		3		
460	104034	• RETAINER (BETA ROD BUSHING) SUPERSEDES ITEM 420 USED WTH ITEMS 400, 410, 430, 440, AND 450 POST HC-SL-61-325		3		
470	B-5151-3	• O-RING (CYLINDER MOUNTING) SUPERSEDED BY ITEM 470A		1	Y	
470A	C-3317-050	• O-RING (CYLINDER MOUNTING) SUPERSEDES ITEM 470		1	Y	
480	C-3317-215-2	• O-RING (CYLINDER BUSHING ID)		1	Y	
490	C-3317-257-5	• O-RING (BULKHEAD MOUNTING) SUPERSEDED BY ITEM 490A USED WITH ITEM 320		1	Y	
490A	C-3317-257-5	• O-RING (BULKHEAD MOUNTING) SUPERSEDES ITEM 490 USED WITH ITEM 320A		2	Y	
500	C-3317-257-5	• O-RING (BULKHEAD MOUNTING)		1	Y	
510	B-3383-15	• BOLT, 10-32, HEX HEAD (PITCH CHANGE ROD PLUG) USED WITH ITEMS 30, 50, 380, 530, AND 540		1	Y	
530	B-3851-0363	• WASHER (PITCH CHANGE ROD PLUG) USED WITH ITEMS 30, 50, 380, 510, AND 540		1	Y	
540	B-3808-3	• NUT, HEX, SELF LOCKING (PITCH CHANGE ROD PLUG) USED WITH ITEMS 30, 50, 380, 510, AND 530		1	Y	
560	C-3317-212-2	• O-RING (PITCH CHANGE ROD OD)		1	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-7		**PROPELLER PARTS - HC-E5N-3, HC-E5N-3A, CONTINUED**				
590	D-3372	• PCP: HUB UNIT SUPERSEDED BY ITEM 590B (REFER TO “D-3372 HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)	-3, B	1		PCP
590A	D-3372-1	• PCP: HUB UNIT - ALTERNATE, SUPERSEDED BY ITEM 590B (REFER TO “D-3372-1 HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)	-3, B	1		PCP
590B	D-3372-3	• PCP: HUB UNIT, HC-E5N-3 SUPERSEDES ITEMS 590, 590A SUPERSEDED BY ITEM 590C (REFER TO “D-3372-3 HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)	-3A, B	1		PCP
550	B-5129	• RING, BACK-UP (ENGINE-SIDE HUB HALF) USED WTH ITEMS 590, 590A, 590B		1	Y	
570	B-5129	• RING, BACK-UP (ENGINE-SIDE HUB HALF) USED WTH ITEMS 590, 590A, 590B		1	Y	
590C	D-3372-4	• PCP: HUB UNIT, HC-E5N-3 SUPERSEDES ITEM 590, 590A, 590B, POST HC-SL-61-339, R1 (REFER TO “D-3372-4 HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
660	C-3317-012	• O-RING (BETA ROD)		3	Y	
670	A-1037-4	• BOLT, 3/8-24, HEX HEAD		15		
680	B-3851-0732	• WASHER, SUPERSEDED BY ITEM 680A		15	Y	
680A	B-3834-0632	• WASHER, SUPERSEDES ITEM 680		15	Y	
690	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING, (HUB HALF CLAMPING)		15	Y	
700	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 700A AND 701		10	Y	
700A	A-279	• FITTING, LUBRICATION REPLACES ITEM 700 IN ENGINE-SIDE OF HUB		5	Y	
700B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE IS ITEM 700A		5	Y	
701	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 700 IN CYLINDER-SIDE OF HUB		5	Y	
702	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 700, 700A, AND 700B		5	Y	
720	B-3786	• ROD, ANTI-ROTATION		2		
810	C-3656	• FORK, FIVE BLADE, SUPERSEDED BY ITEM 810A		1		
810A	D-7415	• FORK, FIVE BLADE, SUPERSEDES ITEM 810		1		
820	C-3658	• PLATE, FORK, FIVE BLADE		1		
830	B-3824	• SCREW, 8-32 100° HEAD (FORK PLATE)		10	Y	

EFF CODE	INFORMATION
-3	HC-E5N-3
-3A	HC-E5N-3A
B	THE D-3372, D-3372.-1, OR D-3372-3 HUB MAY BE MODIFIED TO INCORPORATE THE 104903 HUB BUSHING. REFER TO THE ALUMINUM HUB OVERHAUL CHAPTER OF HARTZELL PROPELLER INC. STANDARD PRACTICES MANUAL 202A (61-01-02).

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-7		**PROPELLER PARTS - HC-E5N-3, HC-E5N-3A, CONTINUED**				
10-8		**BLADE RETENTION PARTS**				
1010	100035-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE IS ITEM 1010A POST HC-SB-61-346 OR HC-SB-61-320, R1 (REFER TO “100035-( ) PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1010A	B-3778-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE FOR ITEM 1010 (REFER TO “B-3778-( ) PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1060	B-6626-LH5	• BOLT, 1/4-28, HEX HEAD (PITCH CHANGE KNOB) SUPERSEDED BY ITEM 1060A		10	Y	
1060A	B-6626-H5	• BOLT, 1/4-28, HEX HEAD (PITCH CHANGE KNOB) SUPERSEDES ITEM 1060		10	Y	
1070	B-3851-0463	• WASHER		10	Y	
1080	C-3679	• PRELOAD PLATE SUPERSEDED BY ITEM 1080A		5		
1080A	C-7245	• PRELOAD PLATE SUPERSEDES ITEM 1080 SUPERSEDED BY ITEM 1080B		5		
1080B	101738	• PRELOAD PLATE ASSEMBLY SUPERSEDES ITEMS 1080 AND 1080A POST HC-SB-61-289 (REFER TO “101738 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1120	B-1041	• RING, RETAINING, BEARING SUPERSEDED BY ITEM 1120A USE WITH OPTIONAL ITEMS 1130, 1140		5		
1120A	B-7071	• RING, RETAINING, BEARING SUPERSEDES ITEM 1120 POST HC-SL-61-241		5		
1130	B-7726	• SEAL, BLADE, OPTIONAL USE WITH ITEMS 1120A AND 1140 POST HC-SL-61-241		5		
1140	C-3317-045	• O-RING, OPTIONAL USE WITH ITEMS 1120A AND 1130 POST HC-SL-61-241		5	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-7		**PROPELLER PARTS - HC-E5N-3, HC-E5N-3A, CONTINUED**				
10-8		**BLADE RETENTION PARTS, CONTINUED**				
-1150	C-792	• BEARING, RETENTION, BLADE		5		
1160	C-792-B	• • RACE, BLADE SIDE		1		
1170	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1180	C-792-A	• • RACE, HUB SIDE		1		
1190	B-793	• BALL SPACER		5	Y	
1200	C-6337-1	• SEAL, BLADE USE WITH ITEM 1210		5		
-1200A	C-3317-340	• O-RING - ALTERNATE SUPERSEDED BY ITEM 1200B		5	Y	
-1200B	C-3317-340-8	• O-RING - SUPERSEDES ITEM 1200A POST HC-SL-61-301	TS	5	Y	
1210	B-6376-3	• SEAL ENERGIZER RING USE WITH ITEM 1200		5		
-1220	B-1925	• SEAL, PRELOAD PLATE		OBS		

EFF CODE	INFORMATION
TS	C-3317-340-8 O-RING REQUIRES THE INSTALLATION OF 0.010 INCH (0.25 mm) THICK TEFLON® TAPE, CM155, ONTO ALUMINUM BLADE SHANKS.

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-7		**PROPELLER PARTS - HC-E5N-3, HC-E5N-3A, CONTINUED**				
10-9		**BETA SYSTEM PARTS**				
1310	C-2689	• RING, BETA		1		
1320	B-6616-A4P	• SCREW, SET, 10-32, CRES (RING, BETA)		3	Y	
1330	C-3667	• ROD, BETA		3		
580	B-5132	• RING, BACK-UP (BETA ROD HUB HOLES)		6	Y	
1340	A-3677	• SLEEVE, BETA, THREADED		3		
1350	A-3439	• NUT, 3/8-24, HEX, THIN (BETA)		3	Y	
1350A	B-3382	• NUT, 3/8-24, HEX, THIN (BETA), ALTERNATE		3	Y	
1360	A-3668	• SPRING RETAINER, BETA REPLACED BY ITEM 1360A		3		
1360A	B-6267	• SPRING RETAINER, FLANGED (BETA) REPLACES ITEM 1360		3		
1370	A-3763	• SPRING - BETA COMPRESSION REPLACED BY ITEMS 1370A AND 1380		OBS		
1370A	B-6242	• SPRING, COMPRESSION (BETA) USED WITH ITEM 1380		3	Y	
1380	B-6241	• SPRING, COMPRESSION (BETA) USED WITH ITEM 1370A		3	Y	
1390	B-6268	• GUIDE, SPRING		1		
1400	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED (BETA)		3	Y	PCP
1410	C-6310	• RING, SUPPORT, ROD, BETA POST HC-SL-61-263		1		
1420	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED (BETA)		3	Y	PCP
1430	A-3044	• BLOCK, BETA FEEDBACK - ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

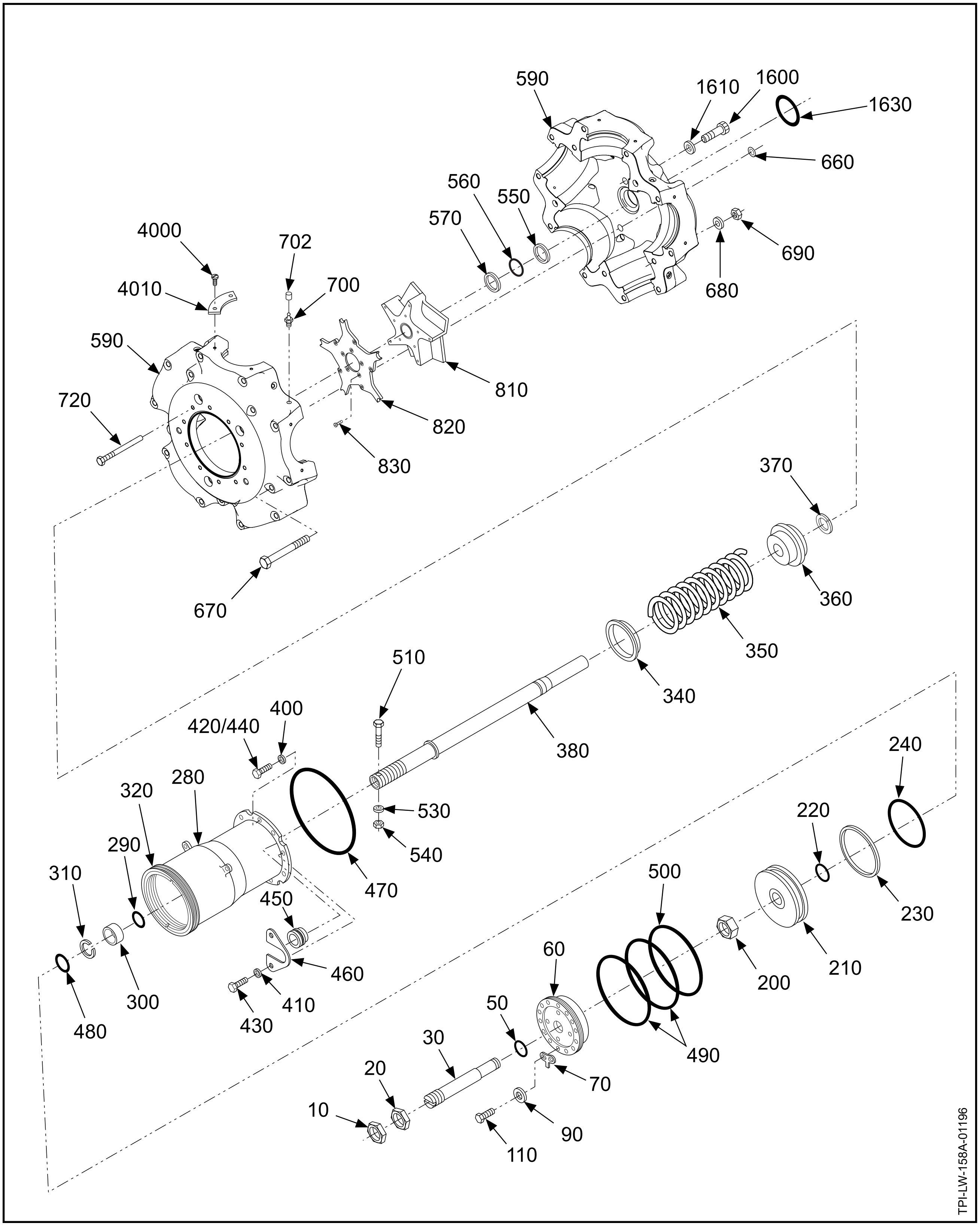
EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

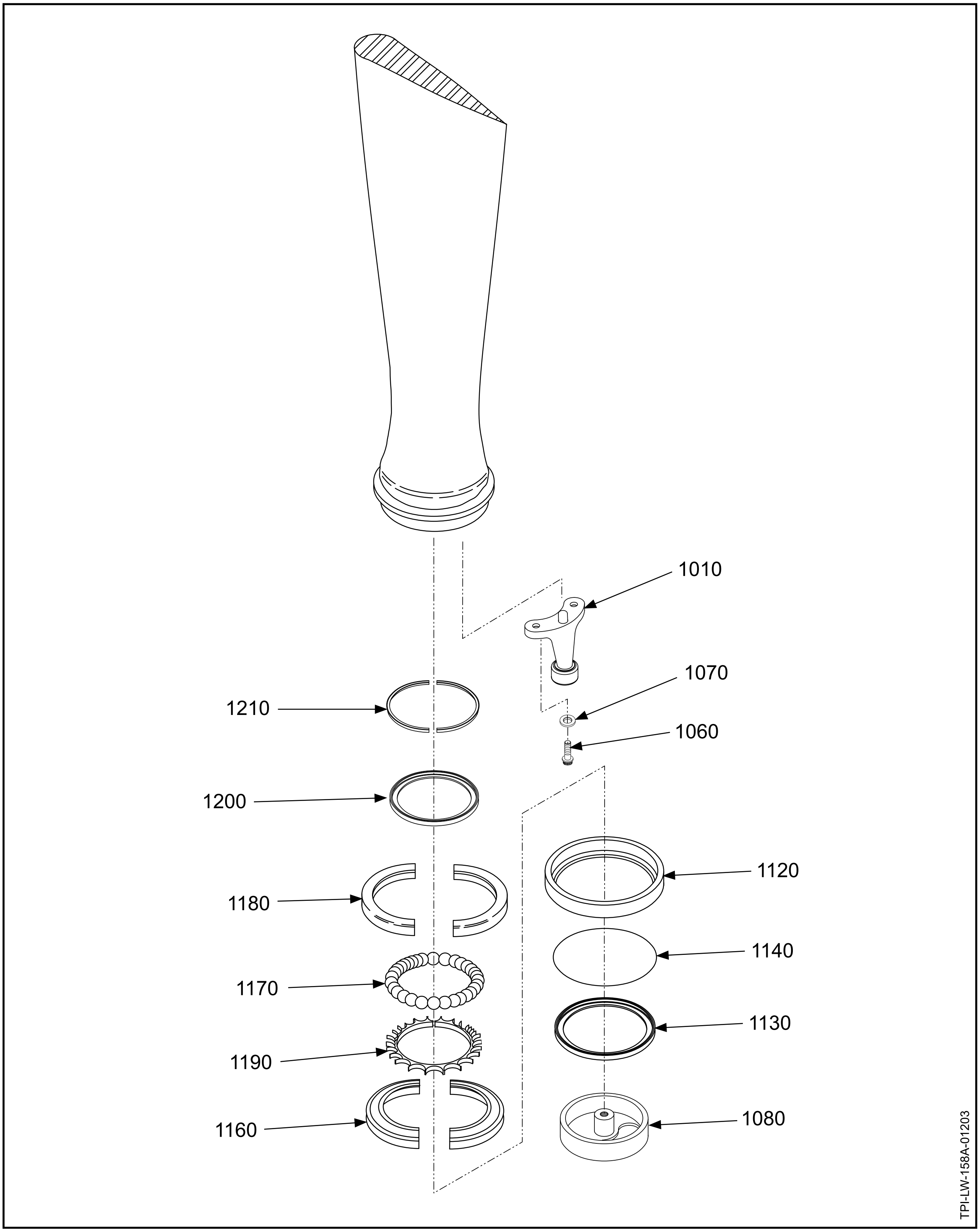
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-7		**PROPELLER PARTS - HC-E5N-3, HC-E5N-3A, CONTINUED**				
		PROPELLER MOUNTING PARTS				
1600	B-3339-1	• BOLT, MOUNTING, 9/16-18, 12 POINT		8	Y	
1610	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
1630	C-3317-230	• O-RING (MOUNTING FLANGE)		1	Y	
		BALANCE PARTS				
4000	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
4010	A-2424(A)-( )	• BALANCE WEIGHT		AR		
		COUNTERWEIGHTS/MOUNTING BOLTS				
-5070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-5050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		COUNTERWEIGHT SLUGS/MOUNTING HARDWARE				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				
-5040		• COUNTERWEIGHT SLUGS				
-5041		• COUNTERWEIGHT SLUG MOUNTING BOLT			Y	
-5042		• COUNTERWEIGHT SLUG MOUNTING NUT			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFF CODE INFORMATION

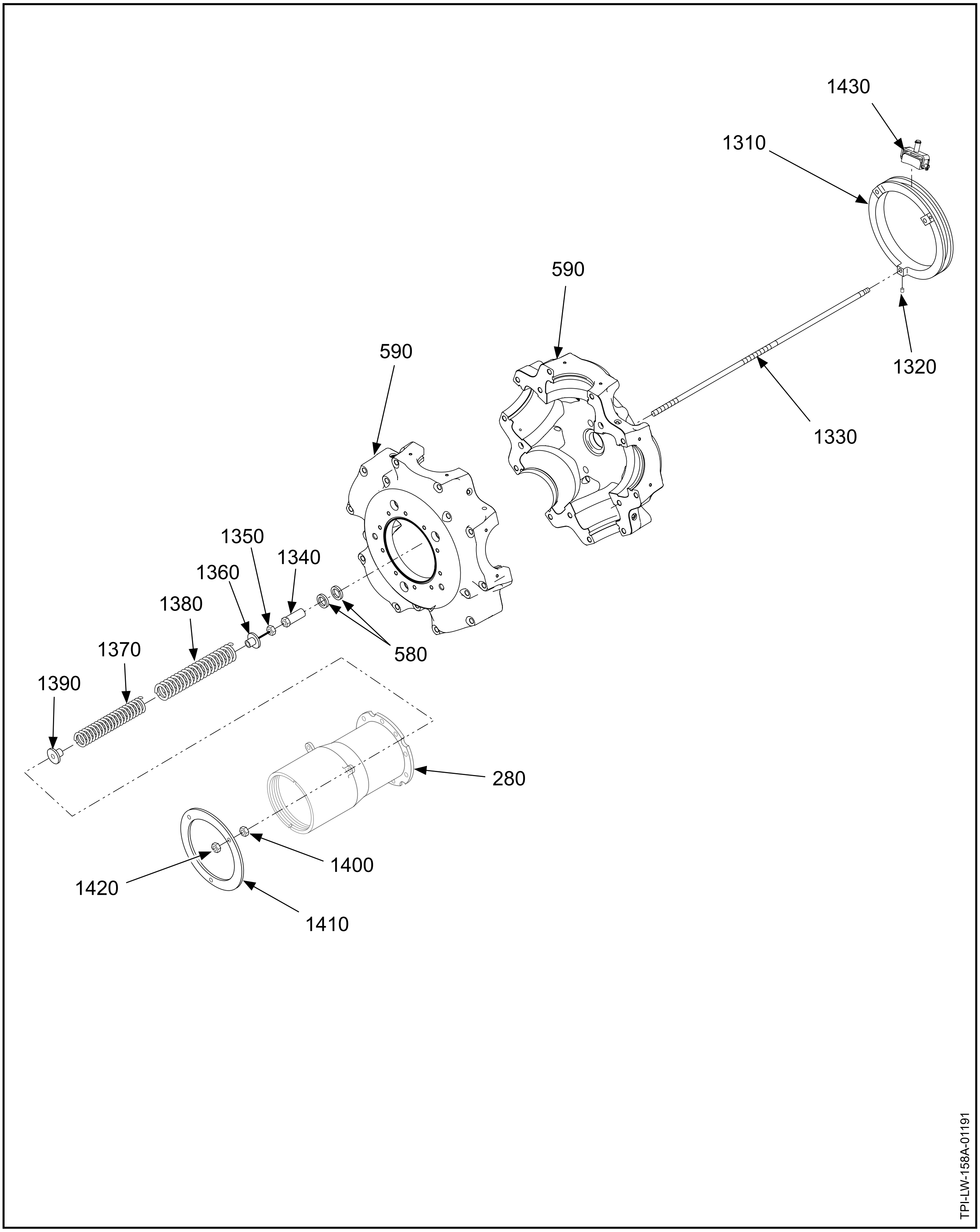
- ITEM NOT ILLUSTRATED



HC-E5N-3AL, HC-E5N-3L: Propeller Parts
Figure 10-10



HC-E5N-3AL, HC-E5N -3L: Blade Retention Parts
Figure 10-11



HC-E5N-3AL, HC-E5N-3L: Beta System Parts
Figure 10-12

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-10		**PROPELLER PARTS - HC-E5N-3AL, HC-E5N-3L**				
10	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
20	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
30	B-449	• PLUG, ROD, PITCH CHANGE USED WITH ITEMS 50, 380, 510, 530, AND 540		1		
50	C-3317-013	• O-RING (PITCH CHANGE ROD PLUG) USED WITH ITEMS 30, 380, 510, 530, AND 540		1	Y	
60	C-3739	• PCP: PLATE, STOP, PITCH SUPERSEDED BY ITEM 60A USED WITH ITEMS 100, 280, AND 280A	C	1		PCP
60A	C-7420-1	• PCP: PLATE, STOP, PITCH SUPERSEDES ITEM 60 USED WITH ITEMS 70, 90, 110, AND 280B POST HC-SL-61-275	C	1		PCP
70	A-7428	• PLATE, STOP USED WITH ITEMS 60A, 90, 110, AND 280B POST HC-SL-61-275	C	1		
90	B-3851-0463	• WASHER (STOP PLATE) USED WITH ITEMS 60A, 70, 110, AND 280B POST HC-SL-61-275	C	2	Y	
-100	B-3819	• SCREW, 10-32, CAP (STOP PLATE) USED WITH ITEMS 60, 280, AND 280A	C	3	Y	
110	B-3384-2H	• BOLT, 1/4-28, HEX HEAD (STOP PLATE) USED WITH ITEMS 60A, 70, 90, AND 280B POST HC-SL-61-275	C	2	Y	
200	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING (PISTON)		1	Y	
210	B-3678	• PISTON		1		
220	C-3317-217	• O-RING (PISTON ID)		1	Y	
230	B-5132-425	• RING, BACKUP (PISTON OD)		1	Y	
240	C-3317-425-2	• O-RING (PISTON OD)		1	Y	

EFF CODE	INFORMATION
C	WHEN REPLACEMENT OF THE D-3738(-1) CYLINDER ASSEMBLY OR THE C-3739 PITCH STOP PLATE IS REQUIRED, THE 102345-1 CYLINDER ASSEMBLY, THE C-7420-1 PCP: PITCH STOP PLATE, AND THE A-7428 STOP PLATE MUST BE INSTALLED.

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-10		**PROPELLER PARTS - HC-E5N-3AL, HC-E5N-3L, CONTINUED**				
		D-3738 CYLINDER ASSEMBLY USED WITH ITEMS 60 AND 100	C			
280	D-3738	• CYLINDER ASSEMBLY	A	1		
290	C-3317-129	• • O-RING		1	Y	
300	A-3784	• • BUSHING, CYLINDER		1		
310	B-6629-175PP	• • RING, RETAINING, INTERNAL		1	Y	
		D-3738-1 CYLINDER ASSEMBLY SUPERSEDED BY ITEM 280B USED WITH ITEMS 60 AND 100	C			
280A	D-3738-1	• CYLINDER ASSEMBLY	B	1		
290	C-3317-129	• • O-RING		1	Y	
300	A-3784	• • BUSHING, CYLINDER		1		
310	B-6629-175PP	• • RING, RETAINING, INTERNAL		1	Y	
320	C-5575-1	• • RING, LOCATING, BULKHEAD ONLY AVAILABLE AS PART OF ITEM 280A USED WITH ITEM 490, SUPERSEDED BY ITEM 320A		1		
320A	C-5575-2	• • RING, LOCATING, BULKHEAD ONLY AVAILABLE AS PART OF ITEM 280A SUPERSEDES ITEM 320, USED WITH ITEM 490A		1		
		102345-1 CYLINDER ASSEMBLY SUPERSEDES ITEM 280A USED WITH ITEMS 60A, 70, 90, AND 100	C			
280B	102345-1	• PCP: CYLINDER ASSEMBLY	B	1		PCP
290	C-3317-129	• • O-RING		1	Y	
300	A-3784	• • BUSHING, CYLINDER, REPLACED BY ITEM 300A		1		
300A	108298	• • BUSHING, CYLINDER, REPLACES ITEM 300 POST HC-SB-61-392		1		
310	B-6629-175PP	• • RING, RETAINING, INTERNAL		1	Y	
320	C-5575-1	• • RING, LOCATING, BULKHEAD ONLY AVAILABLE AS PART OF ITEM 280A USED WITH ITEM 490 SUPERSEDED BY ITEM 320A		1		
320A	C-5575-2	• • RING, LOCATING, BULKHEAD ONLY AVAILABLE AS PART OF ITEM 280A SUPERSEDES ITEM 320 USED WITH ITEM 490A		1		
340	B-3380	• SEAT, SPRING SUPERSEDED BY ITEM 340A USED WITH ITEMS 350 AND 360		1		

EFF CODE	INFORMATION
A	USE WITH D5505-1L(P) SPINNER ASSEMBLY
B	USE WITH D5527-1L(P) SPINNER ASSEMBLY
C	WHEN REPLACEMENT OF THE D-3738(-1) CYLINDER ASSEMBLY OR THE C-3739 PITCH STOP PLATE IS REQUIRED, THE 102345-1 CYLINDER ASSEMBLY, THE C-7420-1 PCP: PITCH STOP PLATE, AND THE A-7428 STOP PLATE MUST BE INSTALLED.

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-10		**PROPELLER PARTS - HC-E5N-3AL, HC-E5N-3L, CONTINUED**				
340A	101558	• SPRING SEAT SUPERSEDES ITEM 340 USED WITH ITEMS 350A AND 360A, POST HC-SL-61-271		1		
350	B-3361	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDED BY ITEM 350A USED WITH ITEMS 340 AND 360		1		PCP
350A	102224	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDES ITEM 350 USED WITH ITEMS 340A AND 360A, POST HC-SL-61-271		1		PCP
360	B-3362	• SPRING RETAINER, REAR SUPERSEDED BY ITEM 360A USED WITH ITEMS 340 AND 350		1		
360A	101556	• PCP: SPRING RETAINER, FLANGED SUPERSEDES ITEM 360 USED WITH ITEMS 340A AND 350A, POST HC-SL-61-271		1		PCP
370	A-3687	• KEEPER, SPLIT		1	Y	
380	D-3657	• PCP: ROD, PITCH CHANGE USED WITH ITEMS 30, 50, 510, 530, AND 540		1		PCP
380A	106212	• PCP: ROD, PITCH CHANGE, ALTERNATE FOR ITEM 380, POST HC-SL-61-352		1		PCP
-390	B-3837-0432	• WASHER, CORROSION RESISTANT (CYLINDER MOUNTING) SUPERSEDED BY ITEMS 400 AND 410		10	Y	
400	B-3837-0432	• WASHER, CORROSION RESISTANT (CYLINDER MOUNTING) SUPERSEDES ITEM 390 USED WTH ITEMS 440, 450, AND 460, POST HC-SL-61-325		4	Y	
410	B-3837-0463	• WASHER, CORROSION RESISTANT (CYLINDER MOUNTING) SUPERSEDES ITEM 390 USED WTH ITEMS 430, 450, AND 460, POST HC-SL-61-325		6	Y	
420	B-3384-2H	• BOLT, 1/4-28, HEX HEAD (CYLINDER MOUNTING) SUPERSEDED BY ITEMS 430 AND 440		10	Y	
430	B-3384-3H	• BOLT, 1/4-28, HEX HEAD (CYLINDER MOUNTING/BUSHING RETAINER) SUPERSEDES ITEM 420 USED WTH ITEMS 410, 450, AND 460, POST HC-SL-61-325		6	Y	
440	B-3384-2H	• BOLT, 1/4-28, HEX HEAD SUPERSEDES ITEM 420 USED WTH ITEMS 400, 450, AND 460, POST HC-SL-61-325		4	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-10		**PROPELLER PARTS - HC-E5N-3AL, HC-E5N-3L, CONTINUED**				
450	104033	• BUSHING (BETA ROD) SUPERSEDES ITEM 420 USED WTH ITEMS 400, 410, 430, 440, AND 460 POST HC-SL-61-325		3		
460	104034	• RETAINER (BETA ROD BUSHING) SUPERSEDES ITEM 420 USED WTH ITEMS 400, 410, 430, 440, AND 450 POST HC-SL-61-325		3		
470	B-5151-3	• O-RING (CYLINDER MOUNTING) SUPERSEDED BY ITEM 470A		1	Y	
470A	C-3317-050	• O-RING (CYLINDER MOUNTING) SUPERSEDES ITEM 470		1	Y	
480	C-3317-215-2	• O-RING (CYLINDER BUSHING ID)		1	Y	
490	C-3317-257-5	• O-RING (BULKHEAD MOUNTING) SUPERSEDED BY ITEM 490A USED WITH ITEM 320		1	Y	
490A	C-3317-257-5	• O-RING (BULKHEAD MOUNTING) SUPERSEDES ITEM 490 USED WITH ITEM 320A		2	Y	
500	C-3317-257-5	• O-RING (BULKHEAD MOUNTING)		1	Y	
510	B-3383-15	• BOLT, 10-32, HEX HEAD (PITCH CHANGE ROD PLUG) USED WITH ITEMS 30, 50, 380, 530, AND 540		1	Y	
530	B-3851-0363	• WASHER (PITCH CHANGE ROD PLUG) USED WITH ITEMS 30, 50, 380, 510, AND 540		1	Y	
540	B-3808-3	• NUT, HEX, SELF LOCKING (PITCH CHANGE ROD PLUG) USED WITH ITEMS 30, 50, 380, 510, AND 530		1	Y	
560	C-3317-212-2	• O-RING (PITCH CHANGE ROD OD)		1	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-10		**PROPELLER PARTS - HC-E5N-3AL, HC-E5N-3L, CONTINUED**				
590	D-3398	• PCP: HUB UNIT, SUPERSEDED BY ITEM 590B SUPERSEDED BY ITEM 590C (REFER TO “D-3398 HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)	-3L, B	1		PCP
590A	D-3398-1	• PCP: HUB UNIT, ALTERNATE, SUPERSEDED BY ITEM 590B SUPERSEDED BY ITEM 590C (REFER TO “D-3398-1 HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)	-3L, B	1		PCP
590B	D-3398-3	• PCP: HUB UNIT, HC-E5N-3L, SUPERSEDES ITEMS 590, 590A SUPERSEDED BY ITEM 590C (REFER TO “D-3398-3 HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)	-3AL, B	1		PCP
550	B-5129	• RING, BACK-UP (ENGINE-SIDE HUB HALF) USED WTH ITEMS 590, 590A, 590B		1	Y	
570	B-5129	• RING, BACK-UP (ENGINE-SIDE HUB HALF) USED WTH ITEMS 590, 590A, 590B		1	Y	
590C	D-3398-4	• PCP: HUB UNIT, HC-E5N-3L SUPERSEDES ITEM 590, 590A, 590B, POST HC-SL-61-339, R1 (REFER TO “D-3398-4 HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
660	C-3317-012	• O-RING (BETA ROD)		3	Y	
670	A-1037-4	• BOLT, 3/8-24, HEX HEAD		15		
680	B-3851-0732	• WASHER, SUPERSEDED BY ITEM 680A		15	Y	
680A	B-3834-0632	• WASHER, SUPERSEDES ITEM 680		15	Y	
690	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING (HUB HALF CLAMPING)		15	Y	
700	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 700A AND 701		10	Y	
700A	A-279	• FITTING, LUBRICATION REPLACES ITEM 700 IN CYLINDER-SIDE OF HUB		5	Y	
700B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE IS ITEM 700A		5	Y	
-701	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 700 IN ENGINE-SIDE OF HUB		5	Y	
702	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 700, 700A, AND 700B		5	Y	
720	B-3786	• ROD, ANTI-ROTATION		2		
810	C-3392	• FORK, FIVE BLADE, LH		1		
820	B-3393	• PLATE, FORK, FIVE BLADE, LH, REPLACED BY ITEM 820A		OBS		
820A	C-3393	• PLATE, FORK, FIVE BLADE, LH, REPLACES ITEM 820		1		
830	B-3824	• SCREW, 8-32 100° HEAD (FORK PLATE)		10	Y	

EFF CODE	INFORMATION
-3L	HC-E5N-3L
-3AL	HC-E5N-3AL
B	THE D-3398, D-3398.-1, OR D-3398-3 HUB MAY BE MODIFIED TO INCORPORATE THE 104903 HUB BUSHING. REFER TO THE ALUMINUM HUB OVERHAUL CHAPTER OF HARTZELL PROPELLER INC. STANDARD PRACTICES MANUAL 202A (61-01-02).

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-10		**PROPELLER PARTS - HC-E5N-3AL, HC-E5N-3L, CONTINUED**				
10-11		**BLADE RETENTION PARTS**				
1010	100035-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE IS ITEM 1010A POST HC-SB-61-346 OR HC-SB-61-320, R1 (REFER TO “100035-( ) PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1010A	B-3778-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT ALTERNATE FOR ITEM 1010 (REFER TO “B-3778-( ) PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1060	B-6626-LH5	• BOLT, 1/4-28, HEX HEAD (PITCH CHANGE KNOB) SUPERSEDED BY ITEM 1060A		10	Y	
1060A	B-6626-H5	• BOLT, 1/4-28, HEX HEAD (PITCH CHANGE KNOB) SUPERSEDES ITEM 1060		10	Y	
1070	B-3851-0463	• WASHER		10	Y	
1080	C-3679	• PRELOAD PLATE SUPERSEDED BY ITEM 1080A		5		
1080A	C-7243	• PRELOAD PLATE SUPERSEDES ITEM 1080 SUPERSEDED BY ITEM 1080B		5		
1080B	101739	• PRELOAD PLATE ASSEMBLY SUPERSEDES ITEMS 1080 AND 1080A POST HC-SB-61-289 (REFER TO “101739 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1120	B-1041	• RING, RETAINING, BEARING SUPERSEDED BY ITEM 1120A USE WITH OPTIONAL ITEMS 1130, 1140		5		
1120A	B-7071	• RING, RETAINING, BEARING SUPERSEDES ITEM 1120		5		
1130	B-7726	• SEAL, BLADE, OPTIONAL USE WITH ITEMS 1120A AND 1140		5		
1140	C-3317-045	• O-RING, OPTIONAL USE WITH ITEMS 1120A AND 1130		5	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-10		**PROPELLER PARTS - HC-E5N-3AL, HC-E5N-3L, CONTINUED**				
10-11		**BLADE RETENTION PARTS, CONTINUED**				
-1150	C-792	• BEARING, RETENTION, BLADE		5		
1160	C-792-B	• • RACE, BLADE SIDE		1		
1170	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1180	C-792-A	• • RACE, HUB SIDE		1		
1190	B-793	• BALL SPACER		5	Y	
1200	C-6337-1	• SEAL, BLADE USE WITH ITEM 1210		5		
-1200A	C-3317-340	• O-RING - ALTERNATE SUPERSEDED BY ITEM 1200B		5	Y	
-1200B	C-3317-340-8	• O-RING - SUPERSEDES ITEM 1200A POST HC-SL-61-301	TS	5	Y	
1210	B-6376-3	• SEAL ENERGIZER RING USE WITH ITEM 1200		5		
-1220	B-1925	• SEAL, PRELOAD PLATE		OBS		

EFF CODE	INFORMATION
TS	C-3317-340-8 O-RING REQUIRES THE INSTALLATION OF 0.010 INCH (0.25 mm) THICK TEFLON® TAPE, CM155, ONTO ALUMINUM BLADE SHANKS.

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-10		**PROPELLER PARTS - HC-E5N-3AL, HC-E5N-3L, CONTINUED**				
10-12		**BETA SYSTEM PARTS**				
1310	C-2689	• RING, BETA		1		
1320	B-6616-A4P	• SCREW, SET, 10-32, CRES (RING, BETA)		3	Y	
1330	C-3667	• ROD, BETA		3		
580	B-5132	• RING, BACK-UP (BETA ROD HUB HOLES)		6	Y	
1340	A-3677	• SLEEVE, BETA, THREADED		3		
1350	A-3439	• NUT, 3/8-24, HEX, THIN (BETA)		3	Y	
1350A	B-3382	• NUT, 3/8-24, HEX, THIN (BETA), ALTERNATE		3	Y	
1360	A-3668	• SPRING RETAINER, BETA, REPLACED BY ITEM 1360A		3		
1360A	B-6267	• SPRING RETAINER, FLANGED (BETA), REPLACES ITEM 1360		3		
1370	A-3763	• SPRING - BETA COMPRESSION REPLACED BY ITEMS 1370A AND 1380		OBS		
1370A	B-6242	• SPRING, COMPRESSION (BETA), USED WITH ITEM 1380		3	Y	
1380	B-6241	• SPRING, COMPRESSION (BETA), USED WITH ITEM 1370A		3	Y	
1390	B-6268	• GUIDE, SPRING		1		
1400	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED (BETA)		3	Y	PCP
1410	C-6310	• RING, SUPPORT, ROD, BETA, POST HC-SL-61-263		1		
1420	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED (BETA)		3	Y	PCP
1430	A-3044	• BLOCK, BETA FEEDBACK - ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

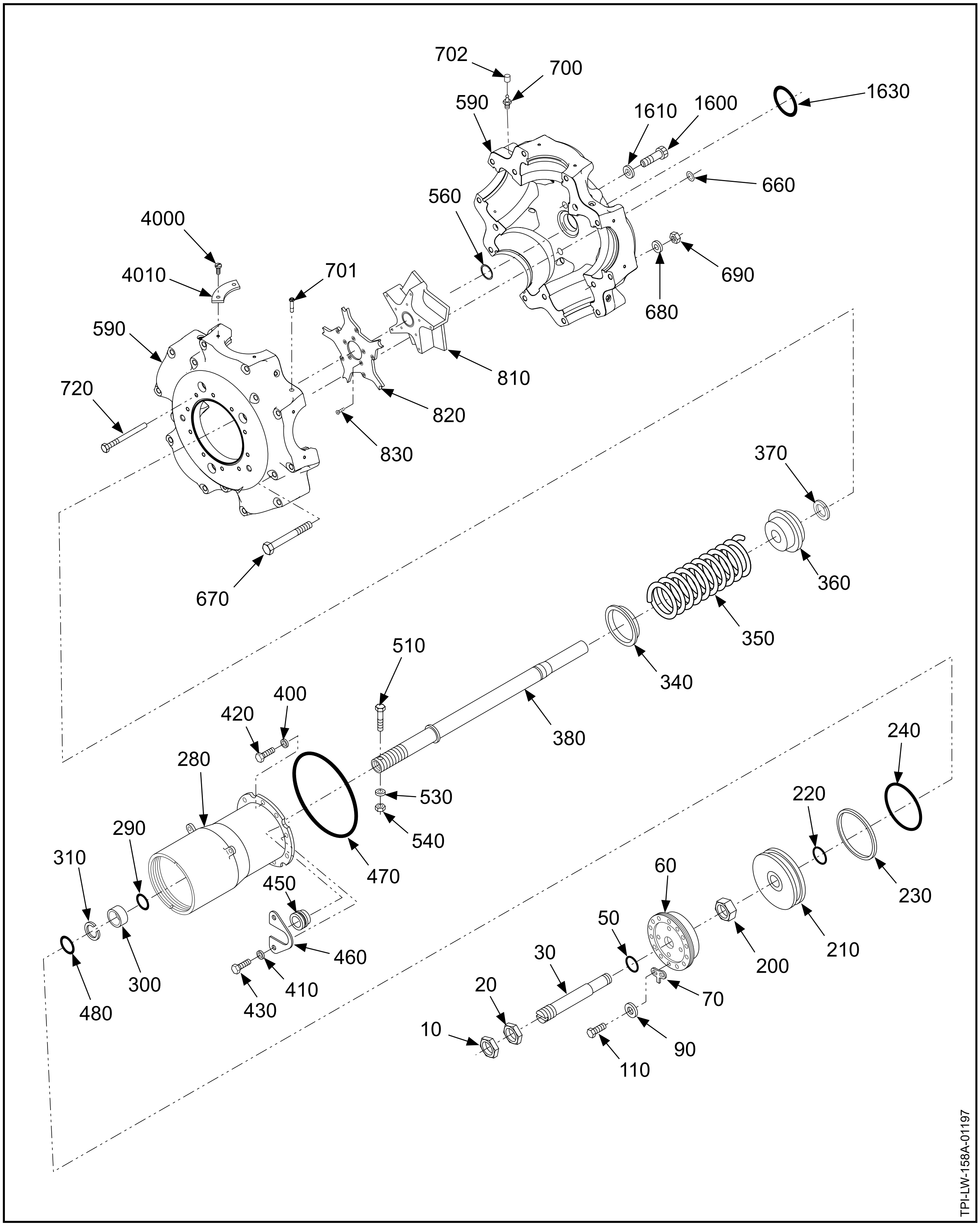
EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

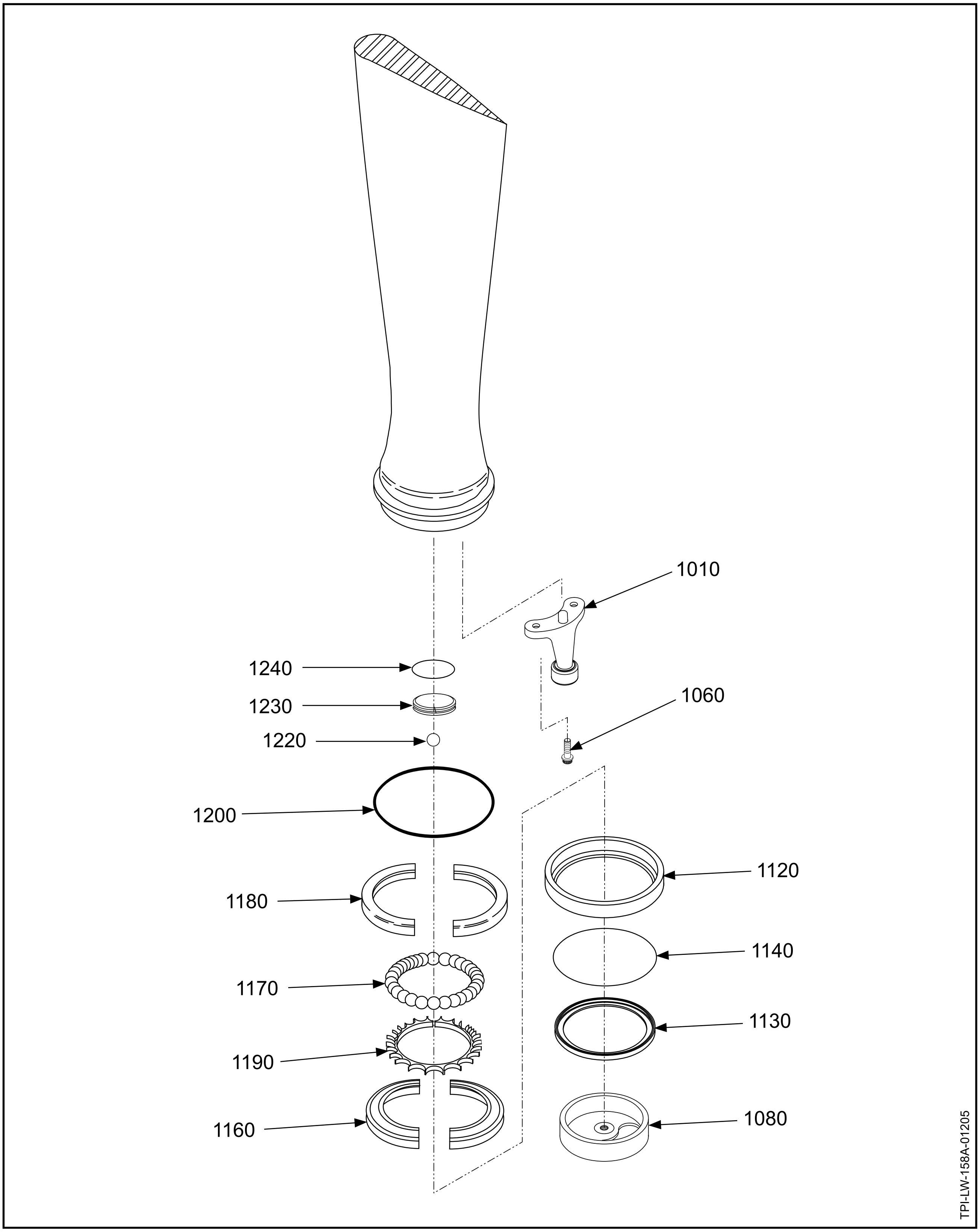
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-10		**PROPELLER PARTS - HC-E5N-3AL, HC-E5N-3L, CONTINUED**				
		PROPELLER MOUNTING PARTS				
1600	B-3339-1	• BOLT, MOUNTING, 9/16-18, 12 POINT		8	Y	
1610	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
1630	C-3317-230	• O-RING (MOUNTING FLANGE)		1	Y	
		BALANCE PARTS				
4000	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
4010	A-2424(A)-( )	• BALANCE WEIGHT		AR		
		COUNTERWEIGHTS/MOUNTING BOLTS				
-5070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-5050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		COUNTERWEIGHT SLUGS/MOUNTING HARDWARE				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				
-5040		• COUNTERWEIGHT SLUGS				
-5041		• COUNTERWEIGHT SLUG MOUNTING BOLT			Y	
-5042		• COUNTERWEIGHT SLUG MOUNTING NUT			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFF CODE INFORMATION

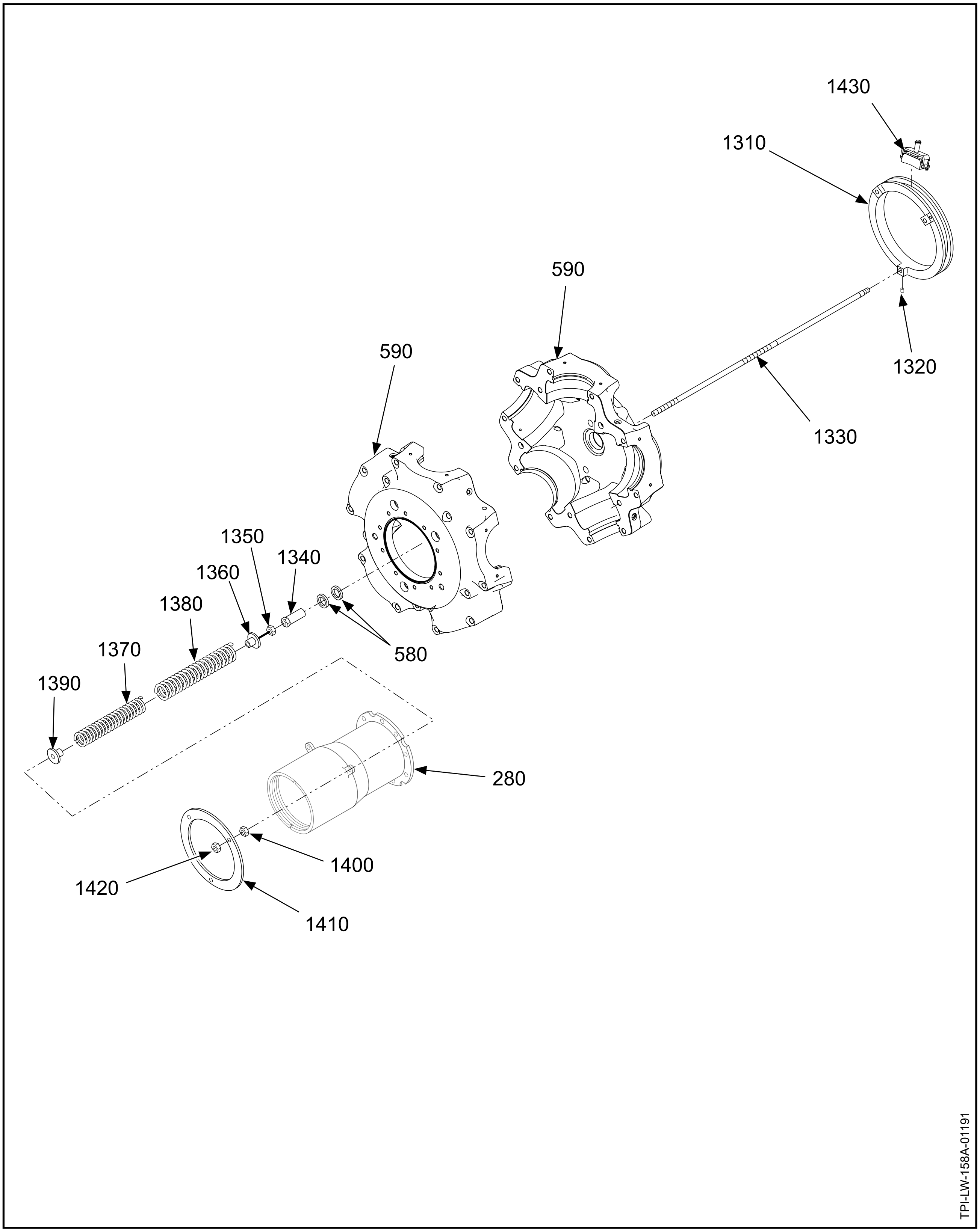
- ITEM NOT ILLUSTRATED



HC-E5N-3C: Propeller Parts
Figure 10-13



HC-E5N-3C: Blade Retention Parts
Figure 10-14



HC-E5N-3C: Beta System Parts
Figure 10-15

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-13		**PROPELLER PARTS - HC-E5N-3C**				
10	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
20	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
30	B-449	• PLUG, ROD, PITCH CHANGE USED WITH ITEMS 50, 380, 510, 530, AND 540		1		
50	C-3317-013	• O-RING (PITCH CHANGE ROD PLUG) USED WITH ITEMS 50, 380, 510, 530, AND 540		1	Y	
60	C-7420-1	•PCP: PLATE, STOP, PITCH		1		PCP
70	A-7428	• PLATE, STOP		1		
90	B-3851-0463	• WASHER (STOP PLATE)		2	Y	
110	B-3384-2H	• BOLT, 1/4-28, HEX HEAD (STOP PLATE)		2	Y	
200	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING (PISTON)		1	Y	
210	B-3678	• PISTON		1		
220	C-3317-217	• O-RING (PISTON ID)		1	Y	
230	B-5132-425	• RING, BACKUP (PISTON OD)		1	Y	
240	C-3317-425-2	• O-RING (PISTON OD)		1	Y	
280	102345	• PCP: CYLINDER ASSEMBLY		1		PCP
290	C-3317-129	• • O-RING		1	Y	
300	A-3784	• • BUSHING, CYLINDER, REPLACED BY ITEM 300A		1		
300A	108298	• • BUSHING, CYLINDER, REPLACES ITEM 300 POST HC-SB-61-392		1		
310	B-6629-175PP	• • RING, RETAINING, INTERNAL		1	Y	
340	101558	• SPRING SEAT		1		
350	102224	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
360	101556	• PCP: SPRING RETAINER, FLANGED		1		PCP
370	A-3687	• KEEPER, SPLIT		1	Y	
380	D-3657	• PCP: ROD, PITCH CHANGE USED WITH ITEMS 30, 50, 510, 530, AND 540		1		PCP
380A	106212	• PCP: ROD, PITCH CHANGE, ALTERNATE FOR ITEM 380, POST HC-SL-61-352		1		PCP
400	B-3837-0432	• WASHER, CORROSION RESISTANT		4	Y	
410	B-3837-0463	• WASHER, CORROSION RESISTANT		6	Y	
420	B-3384-2H	• BOLT, 1/4-28, HEX HEAD		4	Y	
430	B-3384-3H	• BOLT, 1/4-28, HEX HEAD		6	Y	
450	104033	• BUSHING (BETA ROD)		3		
460	104034	• RETAINER (BETA ROD BUSHING)		3		

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-13		**PROPELLER PARTS - HC-E5N-3C, CONTINUED**				
470	C-3317-050	• O-RING (CYLINDER MOUNTING)		1	Y	
480	C-3317-215-2	• O-RING (CYLINDER BUSHING ID)		1	Y	
510	B-3383-15	• BOLT, 10-32, HEX HEAD (PITCH CHANGE ROD PLUG) USED WITH ITEMS 30, 50, 380, 530, AND 540		1	Y	
530	B-3851-0363	• WASHER (PITCH CHANGE ROD PLUG) USED WITH ITEMS 30, 50, 380, 510, AND 540		1	Y	
540	B-3808-3	• NUT, HEX, SELF LOCKING (PITCH CHANGE ROD PLUG) USED WITH ITEMS 30, 50, 380, 510, AND 530		1	Y	
560	C-3317-212-2	• O-RING (PITCH CHANGE ROD OD)		1	Y	
590	104904	• PCP: HUB UNIT, HC-E5N-3C (REFER TO “104904 HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
660	C-3317-012	• O-RING (BETA ROD)		3	Y	
670	A-1037-4	• BOLT, 3/8-24, HEX HEAD		15		
680	B-3834-0632	• WASHER		15	Y	
690	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING (HUB HALF CLAMPING)		15	Y	
700	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 700A AND 701		10	Y	
700A	A-279	• FITTING, LUBRICATION REPLACES ITEM 700 IN ENGINE-SIDE OF HUB		5	Y	
700B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE IS ITEM 700A		5	Y	
701	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 700 IN CYLINDER-SIDE OF HUB		5	Y	
702	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 700, 700A, AND 700B		5	Y	
720	B-3786	• ROD, ANTI-ROTATION		2		
810	C-3656	• FORK, FIVE BLADE, SUPERSEDED BY ITEM 810A		1		
810A	D-7415	• FORK, FIVE BLADE, SUPERSEDES ITEM 810		1		
820	C-3658	• PLATE, FORK, FIVE BLADE		1		
830	B-3824	• SCREW, 8-32 100° HEAD (FORK PLATE)		10	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-13		**PROPELLER PARTS - HC-E5N-3C, CONTINUED**				
10-14		**BLADE RETENTION PARTS**				
1010	104901-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT (REFER TO “104901-( ) PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1060	B-3830	• BOLT, 5/16-24, 12 POINT		10	Y	
1080	104882	• PRELOAD PLATE ASSEMBLY (REFER TO “104882 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1120	101512	• RING, RETAINING, BEARING		5		
1130	101437	• SEAL, BLADE		5		
1140	C-3317-045	• O-RING		5	Y	
-1150	C-792	• BEARING, RETENTION, BLADE		5		
1160	C-792-B	• • RACE, BLADE SIDE		1		
1170	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1180	C-792-A	• • RACE, HUB SIDE		1		
1190	B-793	• BALL SPACER		5	Y	
1200	C-3317-340-8	• O-RING		5	Y	
1220	B-6144-1	• BALL, BEARING, 3/8 INCH DIA.		5		
1230	103413	• PLUG, BLADE		5		
1240	C-3317-028	• O-RING		5	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-13		**PROPELLER PARTS - HC-E5N-3C, CONTINUED**				
10-15		**BETA SYSTEM PARTS**				
1310	104633	• RING, BETA		1		
1320	B-6616-A4P	• SCREW, SET, 10-32, CRES (RING, BETA)		3	Y	
1330	104632	• ROD, BETA		3		
580	B-5132	• RING, BACK-UP (BETA ROD HUB HOLES)		6	Y	
1340	A-3677	• SLEEVE, BETA, THREADED		3		
1350	A-3439	• NUT, 3/8-24, HEX, THIN (BETA)		3	Y	
1360	B-6267	• SPRING RETAINER, FLANGED (BETA)		3		
1370	B-6242	• SPRING, COMPRESSION (BETA)		3	Y	
1380	B-6241	• SPRING, COMPRESSION (BETA)		3	Y	
1390	B-6268	• GUIDE, SPRING		1		
1400	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED (BETA)		3	Y	PCP
1410	C-6310	• RING, SUPPORT, ROD, BETA		1		
1420	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED (BETA)		3	Y	PCP
1430	A-3044	• BLOCK, BETA FEEDBACK - ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

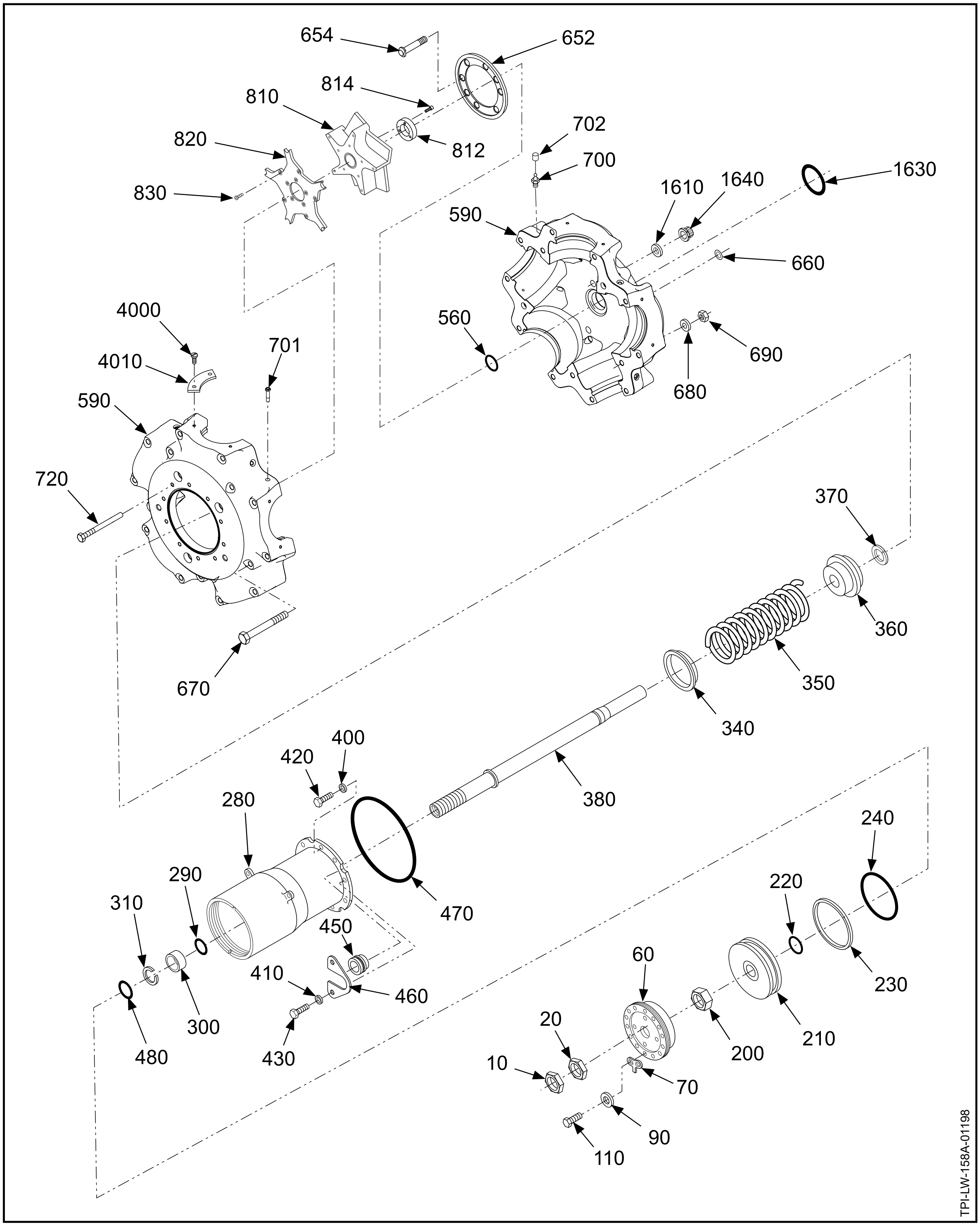
EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

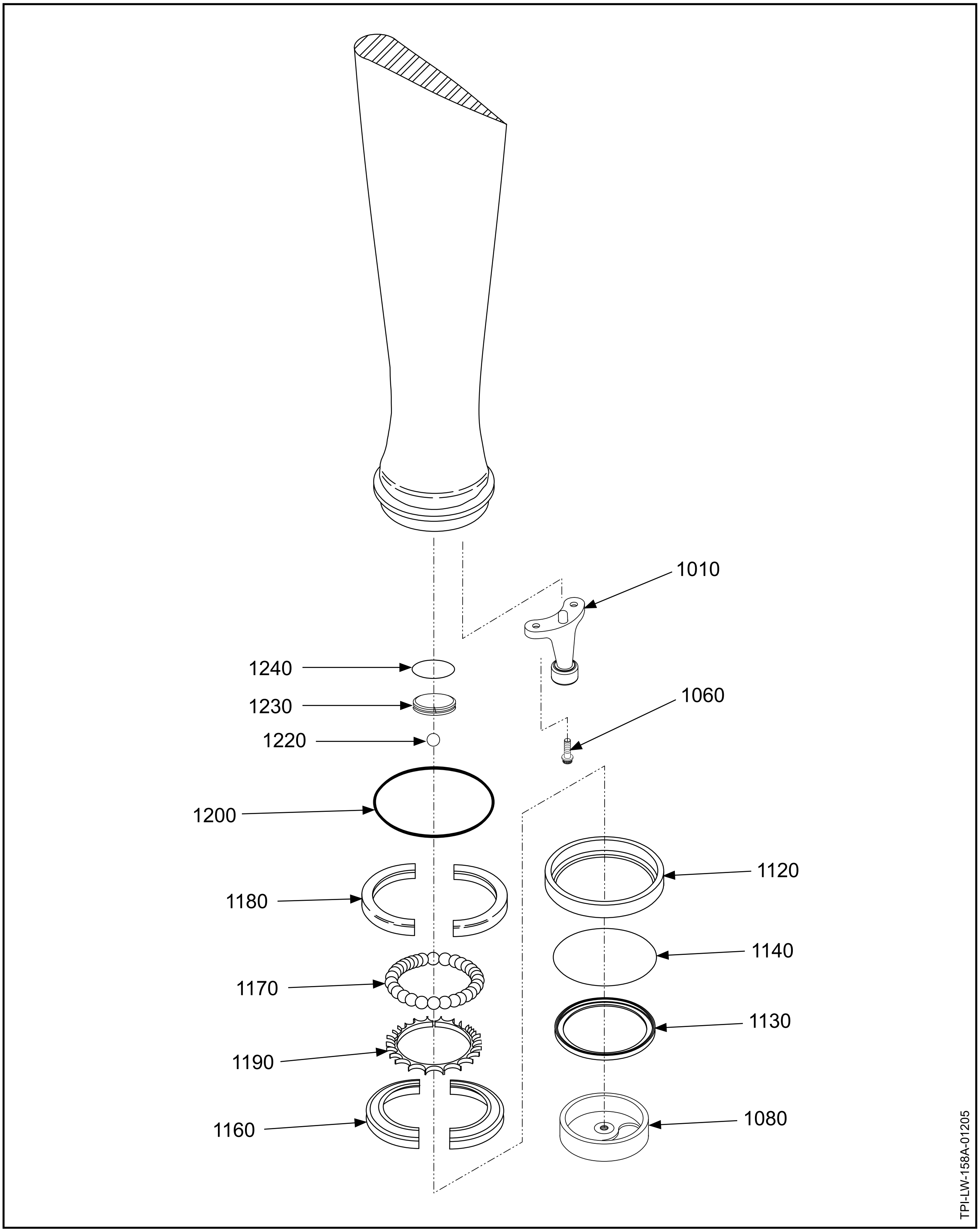
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-13		**PROPELLER PARTS - HC-E5N-3C, CONTINUED**				
		PROPELLER MOUNTING PARTS				
1600	B-3339-1	• BOLT, MOUNTING, 9/16-18, 12 POINT		8	Y	
1610	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
1630	C-3317-230	• O-RING (MOUNTING FLANGE)		1	Y	
		BALANCE PARTS				
4000	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
4010	A-2424(A)-( )	• BALANCE WEIGHT		AR		
		COUNTERWEIGHTS/MOUNTING BOLTS				
-5070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-5050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFF CODE INFORMATION

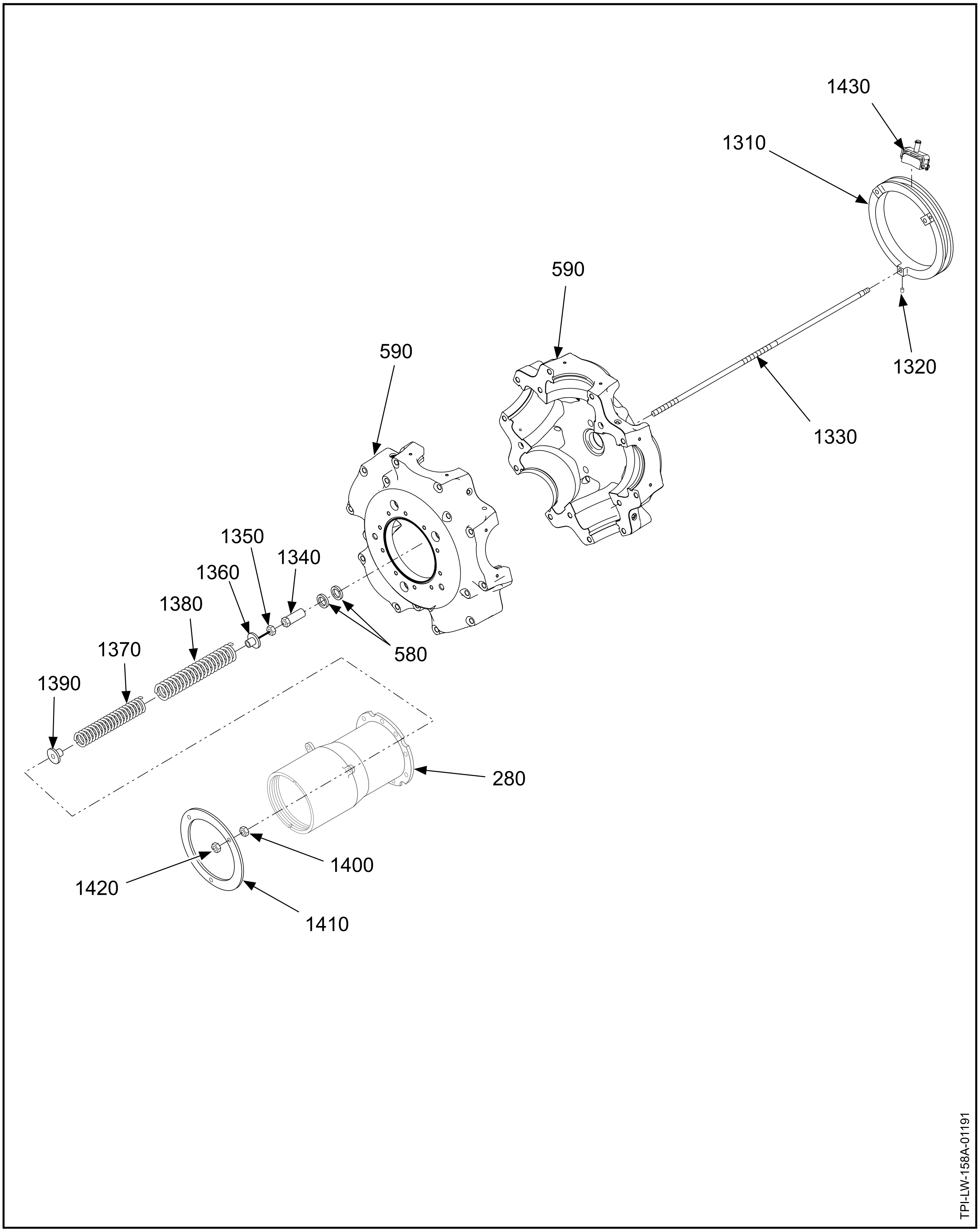
- ITEM NOT ILLUSTRATED



HC-E5P-3: Propeller Parts
Figure 10-16



HC-E5P-3: Blade Retention Parts
Figure 10-17



HC-E5P-3: Beta System Parts
Figure 10-18

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-16		**PROPELLER PARTS - HC-E5P-3**				
10	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
20	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
60	C-7420-1	• PCP: PLATE, STOP, PITCH		1		PCP
70	A-7428	• PLATE, STOP		1		
90	B-3851-0463	• WASHER (STOP PLATE)		2	Y	
110	B-3384-2H	• BOLT, 1/4-28, HEX HEAD (STOP PLATE)		2	Y	
200	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING (PISTON)		1	Y	
210	B-3678	• PISTON		1		
220	C-3317-217	• O-RING (PISTON ID)		1	Y	
230	B-5132-425	• RING, BACKUP (PISTON OD)		1	Y	
240	C-3317-425-2	• O-RING (PISTON OD)		1	Y	
280	102345	• PCP: CYLINDER ASSEMBLY		1		
290	C-3317-129	• • O-RING		1	Y	
300	A-3784	• • BUSHING, CYLINDER, REPLACED BY ITEM 300A		1		
300A	108298	• • BUSHING, CYLINDER, REPLACES ITEM 300 POST HC-SB-61-392		1		
310	B-6629-175PP	• • RING, RETAINING, INTERNAL		1	Y	
340	101558	• SPRING SEAT		1		
350	102224	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
360	101556	• PCP: SPRING RETAINER, FLANGED		1		PCP
370	A-3687	• KEEPER, SPLIT		1	Y	
380	106212	• PCP: ROD, PITCH CHANGE		1		PCP
400	B-3837-0432	• WASHER, CORROSION RESISTANT		4	Y	
410	B-3837-0463	• WASHER, CORROSION RESISTANT		6	Y	
420	B-3384-2H	• BOLT, 1/4-28, HEX HEAD		4	Y	
430	B-3384-3H	• BOLT, 1/4-28, HEX HEAD		6	Y	
450	104033	• BUSHING (BETA ROD)		3		
460	104034	• RETAINER (BETA ROD BUSHING)		3		
470	C-3317-050	• O-RING (CYLINDER MOUNTING)		1	Y	
480	C-3317-215-2	• O-RING (CYLINDER BUSHING ID)		1	Y	
560	C-3317-212-2	• O-RING (PITCH CHANGE ROD OD)		1	Y	

EFF CODE	INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-16		**PROPELLER PARTS - HC-E5P-3, CONTINUED**				
590	105880	• PCP: HUB UNIT, HC-E5P-3( ) (REFER TO “105880 HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
652	105884	• RING, MOUNTING BOLT		1		
654	103560	• BOLT, MOUNTING, 9/16-18, FLANGED		8	Y	
660	C-3317-012	• O-RING (BETA ROD)		3	Y	
670	A-1037-4	• BOLT, 3/8-24, HEX HEAD		15		
680	B-3834-0632	• WASHER		15	Y	
690	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING (HUB HALF CLAMPING)		15	Y	
700	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 700A AND 701		10	Y	
700A	A-279	• FITTING, LUBRICATION REPLACES ITEM 700 IN ENGINE-SIDE OF HUB		5	Y	
700B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE IS ITEM 700A		5	Y	
701	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 700 IN CYLINDER-SIDE OF HUB		5	Y	
702	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 700, 700A, AND 700B		5	Y	
720	B-3786	• ROD, ANTI-ROTATION		2		
810	D-7415	• FORK, FIVE BLADE		1		
812	105908	• BUMPER		1		
814	102612-S50	• SCREW, 10-32, 100° HEAD		3	Y	
820	C-3658	• PLATE, FORK, FIVE BLADE		1		
830	B-3824	• SCREW, 8-32 100° HEAD (FORK PLATE)		10	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-16		**PROPELLER PARTS - HC-E5P-3, CONTINUED**				
10-17		**BLADE RETENTION PARTS**				
1010	104901-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT (REFER TO “104901-( ) PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1060	B-3830	• BOLT, 5/16-24, 12-POINT (PITCH CHANGE KNOB)		10	Y	
1080	104882	• PRELOAD PLATE ASSEMBLY (REFER TO “104882 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1120	101512	• BEARING RETAINING RING		5		
1130	101437	• BLADE SEAL		5		
1140	C-3317-045	• O-RING		5	Y	
-1150	C-792	• BEARING, RETENTION, BLADE		5		
1160	C-792-B	• • RACE, BLADE SIDE		1		
1170	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1180	C-792-A	• • RACE, HUB SIDE		1		
1190	B-793	• BALL SPACER		5	Y	
1200	C-3317-340-8	• O-RING		5	Y	
1220	B-6144-1	• BALL, BEARING, 3/8 INCH DIA.		5	Y	
1230	103413	• PLUG, BLADE		5		
1240	C-3317-028	• O-RING		5		

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-16		**PROPELLER PARTS - HC-E5P-3, CONTINUED**				
10-19		**BETA SYSTEM PARTS**				
-1300	105909	• RING, BETA - UNIT		1		
1310	106088	• • RING, BETA		1		
-1312	B-3333	• • RING, INDICATOR, BETA SWITCH		1		
1320	B-6616-A4P	• SCREW, SET, 10-32, CRES (RING, BETA)		3	Y	
1330	105910	• ROD, BETA		3		
580	B-5132	• RING, BACK-UP (BETA ROD HUB HOLES)		6	Y	
1340	A-3677	• SLEEVE, BETA, THREADED		3		
1350	A-3439	• NUT, 3/8-24, HEX, THIN (BETA)		3	Y	
1360	B-6267	• SPRING RETAINER, FLANGED (BETA)		3		
1370	B-6242	• SPRING, COMPRESSION (BETA)		3	Y	
1380	B-6241	• SPRING, COMPRESSION (BETA)		3	Y	
1390	B-6268	• GUIDE, SPRING		1		
1400	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED (BETA)		3	Y	PCP
1410	C-6310	• RING, SUPPORT, ROD, BETA		1		
1420	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED (BETA)		3	Y	PCP
1430	A-3044	• BLOCK, BETA FEEDBACK - ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

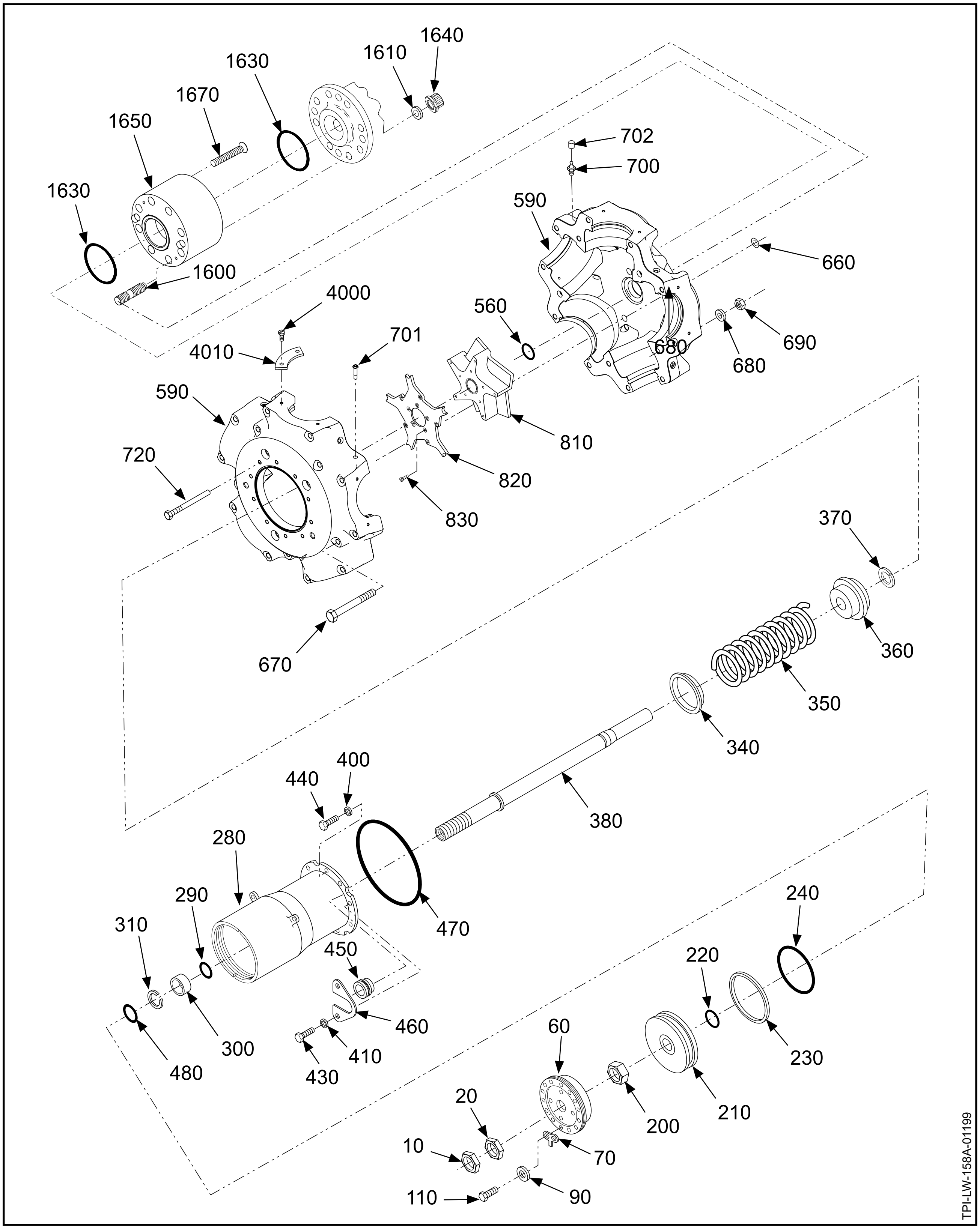
EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

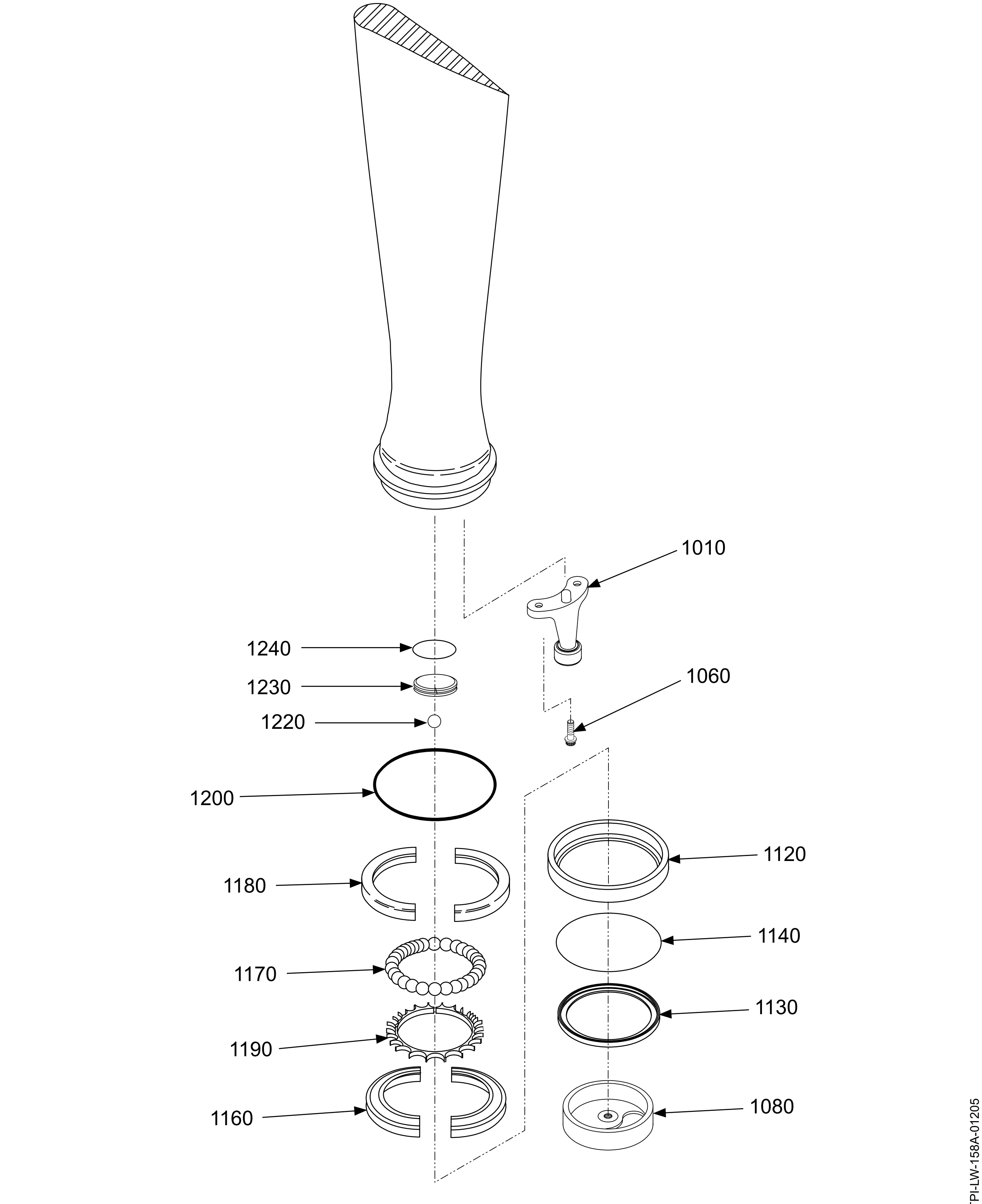
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-16		**PROPELLER PARTS - HC-E5P-3, CONTINUED**				
		PROPELLER MOUNTING PARTS				
1610	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
1630	C-3317-230	• O-RING (MOUNTING FLANGE)		1	Y	
1640	C-6006	• NUT, MOUNTING, 9/16-18, 12 POINT		8	Y	
		BALANCE PARTS				
4000	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
4010	A-2424(A)-( )	• BALANCE WEIGHT		AR		
		COUNTERWEIGHTS/MOUNTING BOLTS				
-5070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-5050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		COUNTERWEIGHT SLUGS/MOUNTING HARDWARE				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				
-5040		• COUNTERWEIGHT SLUGS				
-5041		• COUNTERWEIGHT SLUG MOUNTING BOLT			Y	
-5042		• COUNTERWEIGHT SLUG MOUNTING NUT			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFF CODE INFORMATION

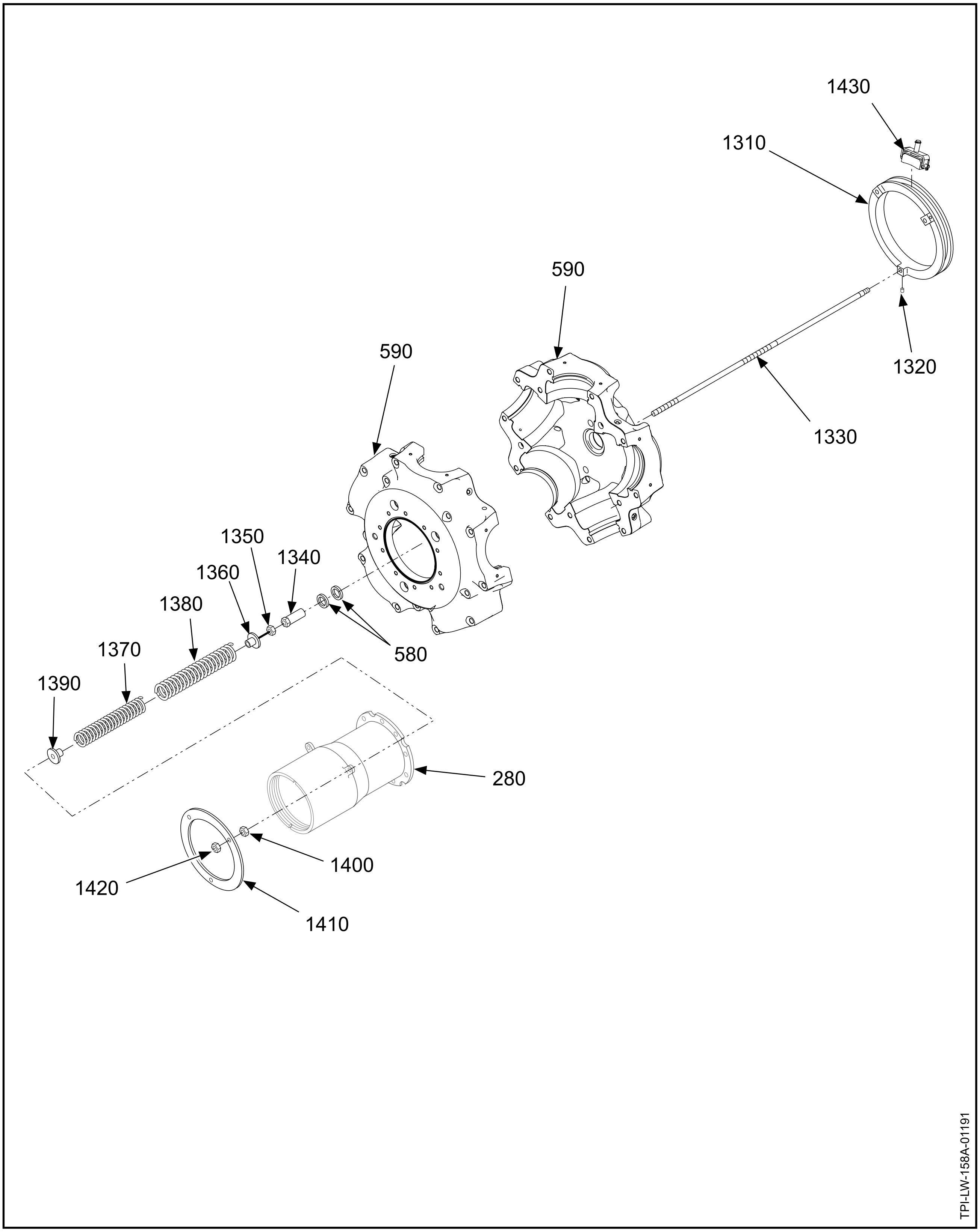
- ITEM NOT ILLUSTRATED



HC-E5W-3( ): Propeller Parts
Figure 10-19



HC-E5W-3( ): Blade Retention Parts
Figure 10-20



HC-E5W-3( ): Beta System Parts
Figure 10-21

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-19		**PROPELLER PARTS - HC-E5W-3( )**				
10	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
20	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
60	C-7420-1	• PCP: PLATE, STOP, PITCH		1		PCP
70	A-7428	• PLATE, STOP		1		
90	B-3851-0463	• WASHER (STOP PLATE)		2	Y	
110	B-3384-2H	• BOLT, 1/4-28, HEX HEAD (STOP PLATE)		2	Y	
200	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING (PISTON)		1	Y	
210	B-3678	• PISTON		1		
220	C-3317-217	• O-RING (PISTON ID)		1	Y	
230	B-5132-425	• RING, BACKUP (PISTON OD)		1	Y	
240	C-3317-425-2	• O-RING (PISTON OD)		1	Y	
280	102345	• PCP: CYLINDER ASSEMBLY		1		PCP
290	C-3317-129	• • O-RING		1	Y	
300	A-3784	• • BUSHING, CYLINDER, REPLACED BY ITEM 300A		1		
300A	108298	• • BUSHING, CYLINDER, REPLACES ITEM 300 POST HC-SB-61-392		1		
310	B-6629-175PP	• • RING, RETAINING, INTERNAL		1	Y	
340	101558	• SPRING SEAT		1		
350	102224	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
360	101556	• PCP: SPRING RETAINER, FLANGED		1		PCP
370	A-3687	• KEEPER, SPLIT		1	Y	
380	106212	• PCP: ROD, PITCH CHANGE		1		PCP
400	B-3837-0432	• WASHER, CORROSION RESISTANT		4	Y	
410	B-3837-0463	• WASHER, CORROSION RESISTANT		6	Y	
430	B-3384-3H	• BOLT, 1/4-28, HEX HEAD		6	Y	
440	B-3384-2H	• BOLT, 1/4-28, HEX HEAD		4	Y	
450	104033	• BUSHING (BETA ROD)		3		
460	104034	• RETAINER (BETA ROD BUSHING)		3		
470	C-3317-050	• O-RING (CYLINDER MOUNTING)		1	Y	
480	C-3317-215-2	• O-RING (CYLINDER BUSHING ID)		1	Y	
560	C-3317-212-2	• O-RING (PITCH CHANGE ROD OD)		1	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-19		**PROPELLER PARTS - HC-E5W-3( ), CONTINUED**				
590	106945	• PCP: HUB UNIT, HC-E5W-3 (REFER TO “106945 HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
660	C-3317-012	• O-RING (BETA ROD)		3	Y	
670	A-1037-4	• BOLT, 3/8-24, HEX HEAD		15		
680	B-3834-0632	• WASHER		15	Y	
690	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING (HUB HALF CLAMPING)		15	Y	
700	A-279	• FITTING, LUBRICATION (ENGINE-SIDE OF HUB)		5	Y	
700A	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 700		5	Y	
701	106545	• PLUG, LUBRICATION (CYLINDER-SIDE OF HUB)		5	Y	
702	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 700 AND 700A		5	Y	
720	B-3786	• ROD, ANTI-ROTATION		2		
810	D-7415	• FORK, FIVE BLADE		1		
820	C-3658	• PLATE, FORK, FIVE BLADE		1		
830	B-3824	• SCREW, 8-32 100° HEAD (FORK PLATE)		10	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-19		**PROPELLER PARTS - HC-E5W-3( ), CONTINUED**				
10-20		**BLADE RETENTION PARTS**				
1010	104901-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT (REFER TO “104901-( ) PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1060	B-3830	• BOLT, 5/16-24, 12 POINT		10	Y	
1080	104882	• PRELOAD PLATE ASSEMBLY (REFER TO “104882 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1120	101512	• RING, RETAINING, BEARING		5		
1130	101437	• SEAL, BLADE		5		
1140	C-3317-045	• O-RING		5	Y	
-1150	C-792	• BEARING, RETENTION, BLADE		5		
1160	C-792-B	• • RACE, BLADE SIDE		1		
1170	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, 3/8 INCH DIA. (BOX OF 1500)		RF		
1180	C-792-A	• • RACE, HUB SIDE		1		
1190	B-793	• BALL SPACER		5	Y	
1200	C-3317-340-8	• O-RING		5	Y	
1220	B-6144-1	• BALL, BEARING, 3/8 INCH DIA.		5		
1230	103413	• PLUG, BLADE		5		
1240	C-3317-028	• O-RING		5	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-19		**PROPELLER PARTS - HC-E5W-3( ), CONTINUED**				
10-21		**BETA SYSTEM PARTS**				
-1300	105909	• RING, BETA - UNIT		1		
1310	106088	• • RING, BETA		1		
-1312	B-3333	• • RING, INDICATOR, BETA SWITCH		1		
1320	B-6616-A4P	• SCREW, SET, 10-32, CRES (RING, BETA)		3	Y	
1330	106946	• ROD, BETA		3		
580	B-5132	• RING, BACK-UP (BETA ROD HUB HOLES)		6	Y	
1340	A-3677	• SLEEVE, BETA, THREADED		3		
1350	A-3439	• NUT, 3/8-24, HEX, THIN (BETA)		3	Y	
1360	B-6267	• SPRING RETAINER, FLANGED (BETA)		3		
1370	B-6242	• SPRING, COMPRESSION (BETA)		3	Y	
1380	B-6241	• SPRING, COMPRESSION (BETA)		3	Y	
1390	B-6268	• GUIDE, SPRING		1		
1400	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED (BETA)		3	Y	PCP
1410	C-6310	• RING, SUPPORT, ROD, BETA		1		
1420	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED (BETA)		3	Y	PCP
1430	A-3044	• BLOCK, BETA FEEDBACK - ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

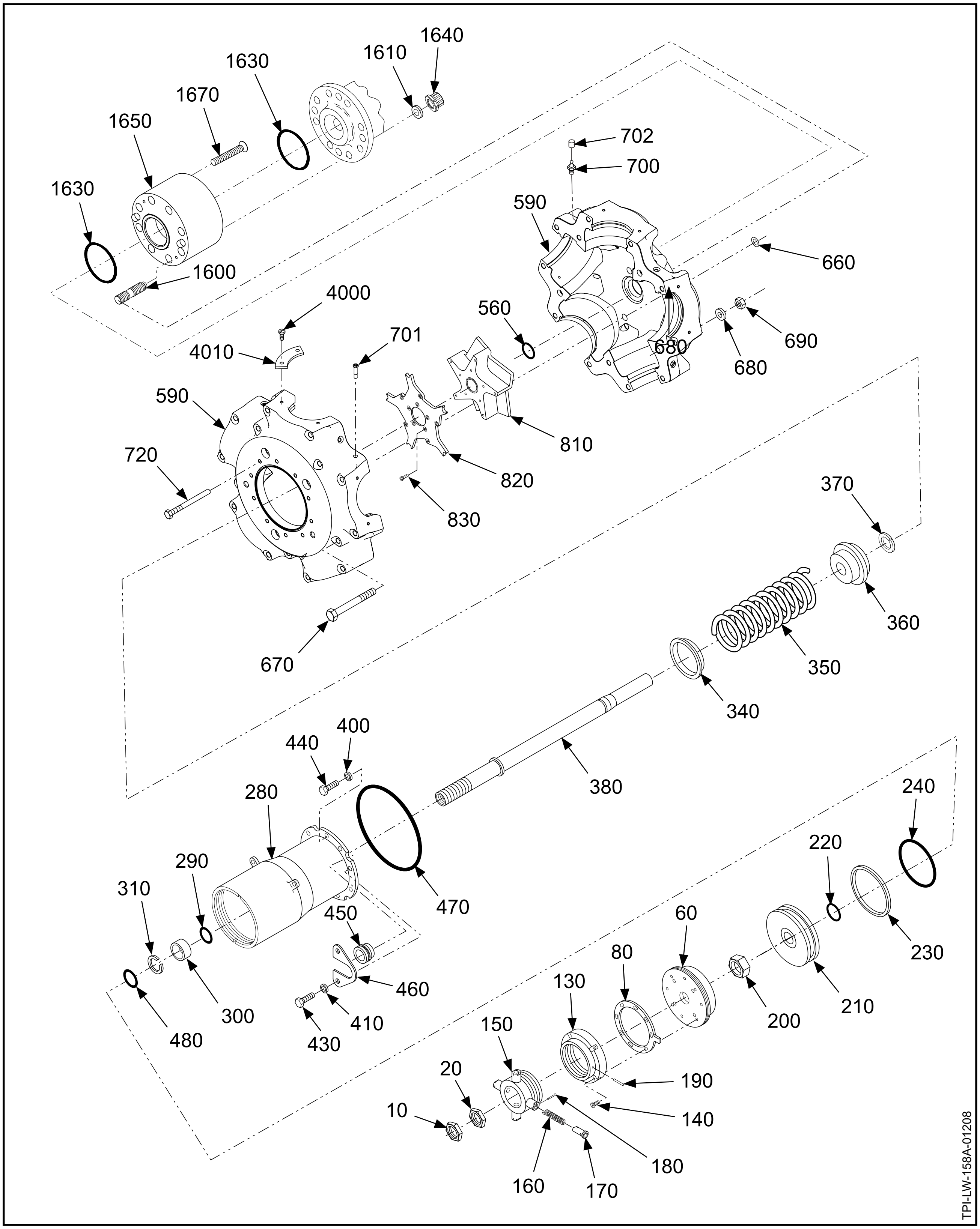
EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

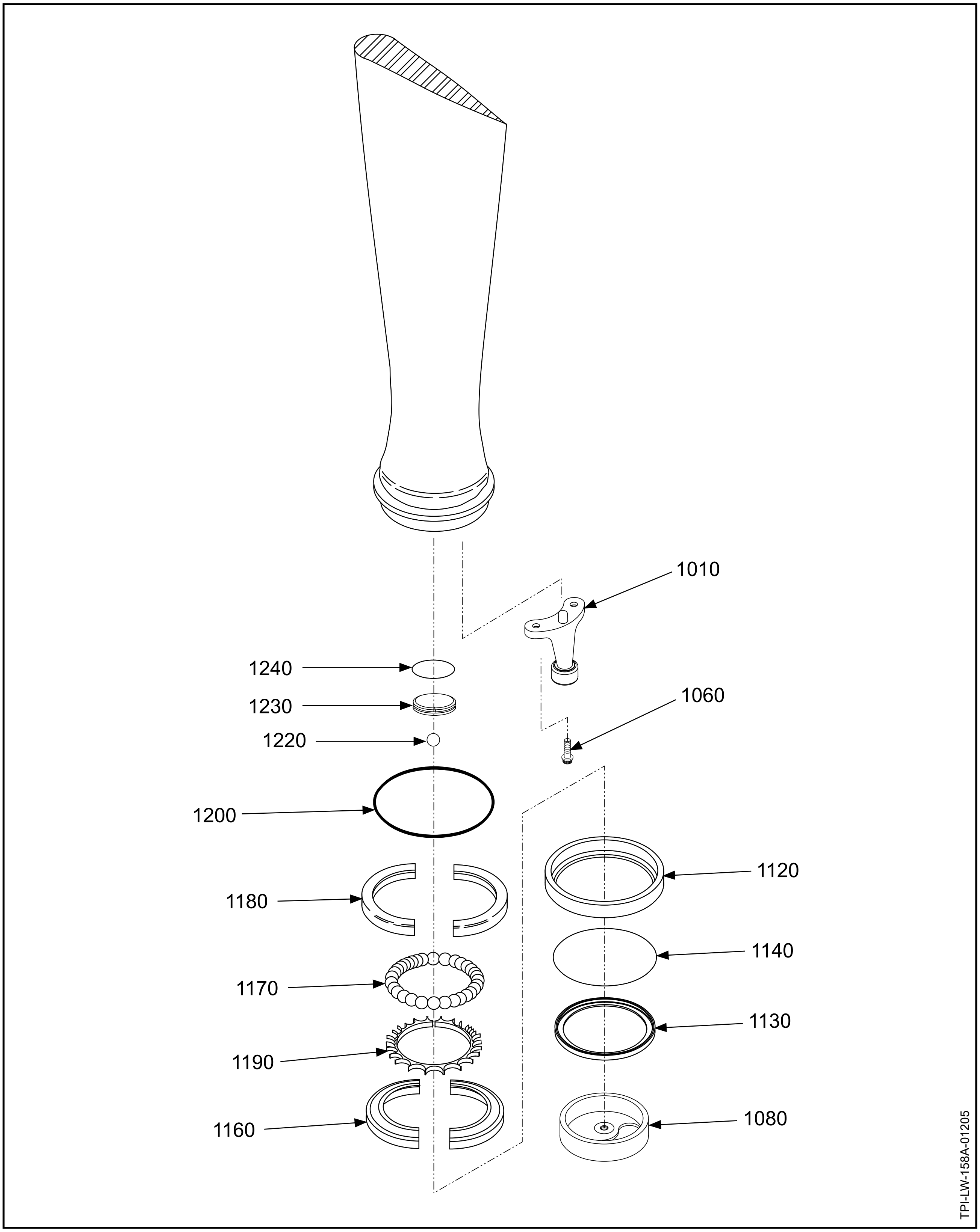
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-19		**PROPELLER PARTS - HC-E5W-3( ), CONTINUED**				
		PROPELLER MOUNTING PARTS				
1600	104720	• STUD, MOUNTING, 9/16-18		8	Y	
1610	B-7624	• WASHER, MOUNTING, 9/16 INCH		8	Y	
1630	C-3317-230	• O-RING (MOUNTING FLANGE)		2	Y	
1640	C-6006	• NUT, MOUNTING, 9/16-18, 12 POINT		8	Y	
1650	106943	• SPACER, MOUNTING		1		
-1660	B-6138-8-6	• • DOWEL PIN		2	Y	
1670	B-3868-S60	• SCREW, 8-32, 100 DEGREE HEAD		2	Y	
		BALANCE PARTS				
4000	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
4010	A-2424(A)-( )	• BALANCE WEIGHT		AR		
		COUNTERWEIGHTS/MOUNTING BOLTS				
-5070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-5050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFF CODE INFORMATION

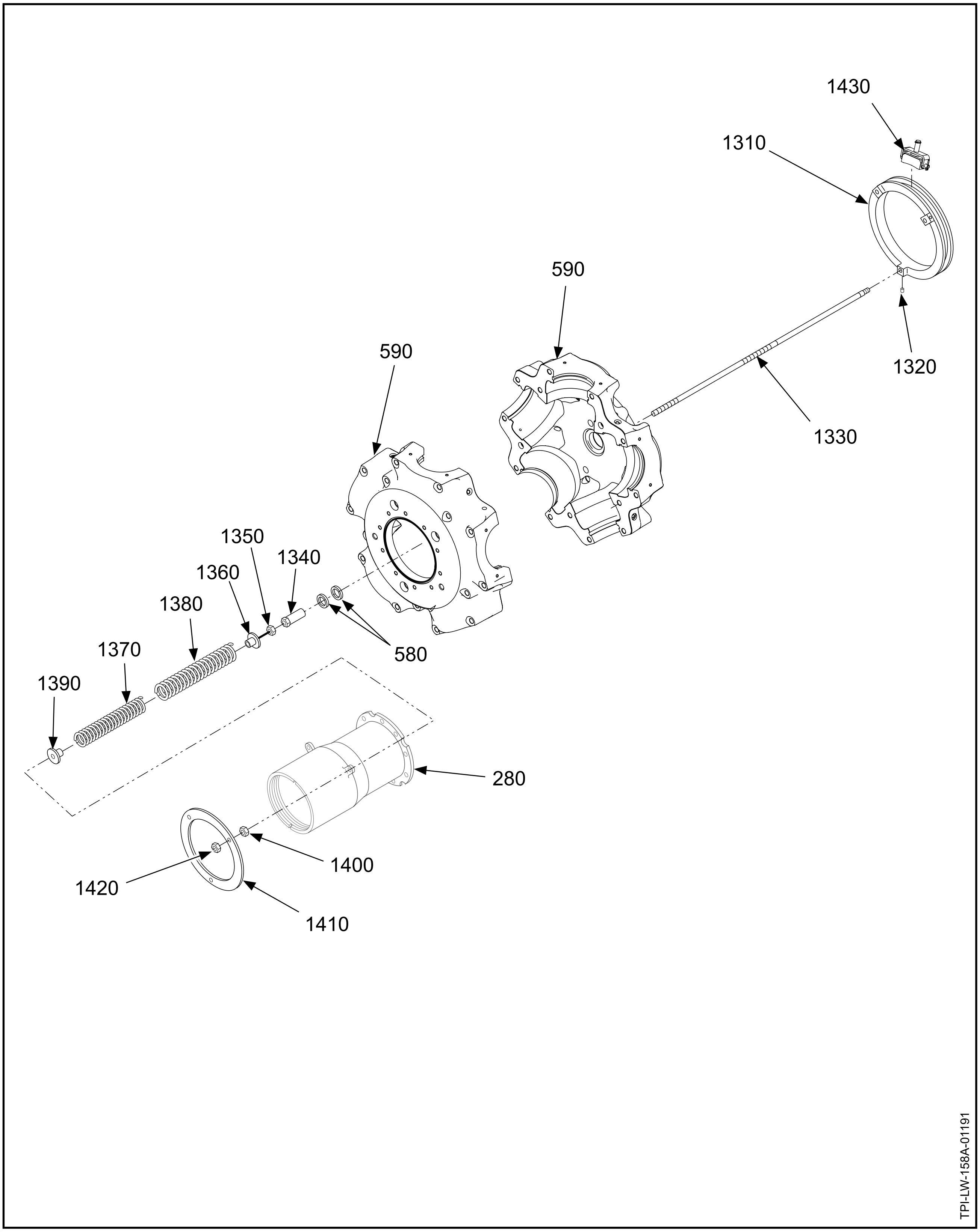
- ITEM NOT ILLUSTRATED



HC-E5W-3Y: Propeller Parts
Figure 10-22



HC-E5W-3Y: Blade Retention Parts
Figure 10-23



HC-E5W-3Y: Beta System Parts
Figure 10-24

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-22		**PROPELLER PARTS - HC-E5W-3Y**				
10	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
20	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
60	C-2871-2	• PLATE, STOP, PITCH		1		
80	102333	• PLATE, ANTI-ROTATION		1		
130	C-2873	• RING, MOUNTING, START LOCK		1		
140	A-2038-6	• SCREW, 1/4-28, CAP (START LOCK)		4	Y	
150	C-2872	• HOUSING, START LOCK		1		
160	B-2875-2	• SPRING, COMPRESSION (START LOCK)		4	Y	
170	B-2874	• PIN, START LOCK		4		
180	B-3838-4-6	• COTTER PIN		4	Y	
190	B-6378-0750	• SPRING PIN, 1/8 INCH , CRES (START LOCK)		1	Y	
200	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING (PISTON)		1	Y	
210	B-3678	• PISTON		1		
220	C-3317-217	• O-RING (PISTON ID)		1	Y	
230	B-5132-425	• RING, BACKUP (PISTON OD)		1	Y	
240	C-3317-425-2	• O-RING (PISTON OD)		1	Y	
280	102345	• PCP: CYLINDER ASSEMBLY		1		PCP
290	C-3317-129	• • O-RING		1	Y	
300	108298	• • BUSHING, CYLINDER		1		
310	B-6629-175PP	• • RING, RETAINING, INTERNAL		1	Y	
340	101558	• SPRING SEAT		1		
350	102224	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
360	101556	• PCP: SPRING RETAINER, FLANGED		1		PCP
370	A-3687	• KEEPER, SPLIT		1	Y	
380	106212	• PCP: ROD, PITCH CHANGE		1		PCP
400	B-3837-0432	• WASHER, CORROSION RESISTANT		4	Y	
410	B-3837-0463	• WASHER, CORROSION RESISTANT		6	Y	
430	B-3384-3H	• BOLT, 1/4-28, HEX HEAD		6	Y	
440	B-3384-2H	• BOLT, 1/4-28, HEX HEAD		4	Y	
450	104033	• BUSHING (BETA ROD)		3		
460	104034	• RETAINER (BETA ROD BUSHING)		3		

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-22		**PROPELLER PARTS - HC-E5W-3Y, CONTINUED**				
470	C-3317-050	• O-RING (CYLINDER MOUNTING)		1	Y	
480	C-3317-215-2	• O-RING (CYLINDER BUSHING ID)		1	Y	
560	C-3317-212-2	• O-RING (PITCH CHANGE ROD OD)		1	Y	
590	106945	• PCP: HUB UNIT, HC-E5W-3 (REFER TO “106945 HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
660	C-3317-012	• O-RING (BETA ROD)		3	Y	
670	A-1037-4	• BOLT, 3/8-24, HEX HEAD		15		
680	B-3834-0632	• WASHER		15	Y	
690	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING (HUB HALF CLAMPING)		15	Y	
700	A-279	• FITTING, LUBRICATION (ENGINE-SIDE OF HUB)		5	Y	
700A	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 700		5	Y	
701	106545	• PLUG, LUBRICATION (CYLINDER-SIDE OF HUB)		5	Y	
702	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 700 AND 700A		5	Y	
720	B-3786	• ROD, ANTI-ROTATION		2		
810	D-7415	• FORK, FIVE BLADE		1		
820	C-3658	• PLATE, FORK, FIVE BLADE		1		
830	B-3824	• SCREW, 8-32 100° HEAD (FORK PLATE)		10	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-22		**PROPELLER PARTS - HC-E5W-3Y, CONTINUED**				
10-23		**BLADE RETENTION PARTS**				
1010	104901-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT (REFER TO “104901-( ) PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1060	B-3830	• BOLT, 5/16-24, 12 POINT		10	Y	
1080	104882	• PRELOAD PLATE ASSEMBLY (REFER TO “104882 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1120	101512	• RING, RETAINING, BEARING		5		
1130	101437	• SEAL, BLADE		5		
1140	C-3317-045	• O-RING		5	Y	
-1150	C-792	• BEARING, RETENTION, BLADE		5		
1160	C-792-B	• • RACE, BLADE SIDE		1		
1170	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, 3/8 INCH DIA. (BOX OF 1500)		RF		
1180	C-792-A	• • RACE, HUB SIDE		1		
1190	B-793	• BALL SPACER		5	Y	
1200	C-3317-340-8	• O-RING		5	Y	
1220	B-6144-1	• BALL, BEARING, 3/8 INCH DIA.		5		
1230	103413	• PLUG, BLADE		5		
1240	C-3317-028	• O-RING		5	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-22		**PROPELLER PARTS - HC-E5W-3Y, CONTINUED**				
10-24		**BETA SYSTEM PARTS**				
-1300	105909	• RING, BETA - UNIT		1		
1310	106088	• • RING, BETA		1		
-1312	B-3333	• • RING, INDICATOR, BETA SWITCH		1		
1320	B-6616-A4P	• SCREW, SET, 10-32, CRES (RING, BETA)		3	Y	
1330	106946	• ROD, BETA		3		
580	B-5132	• RING, BACK-UP (BETA ROD HUB HOLES)		6	Y	
1340	A-3677	• SLEEVE, BETA, THREADED		3		
1350	A-3439	• NUT, 3/8-24, HEX, THIN (BETA)		3	Y	
1360	B-6267	• SPRING RETAINER, FLANGED (BETA)		3		
1370	B-6242	• SPRING, COMPRESSION (BETA)		3	Y	
1380	B-6241	• SPRING, COMPRESSION (BETA)		3	Y	
1390	B-6268	• GUIDE, SPRING		1		
1400	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED (BETA)		3	Y	PCP
1410	C-6310	• RING, SUPPORT, ROD, BETA		1		
1420	B-3839-5	• PCP: NUT, HEX, THIN, DRILLED (BETA)		3	Y	PCP
1430	A-3044	• BLOCK, BETA FEEDBACK - ASSEMBLY (REFER TO “A-3044 BETA FEEDBACK BLOCK ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		

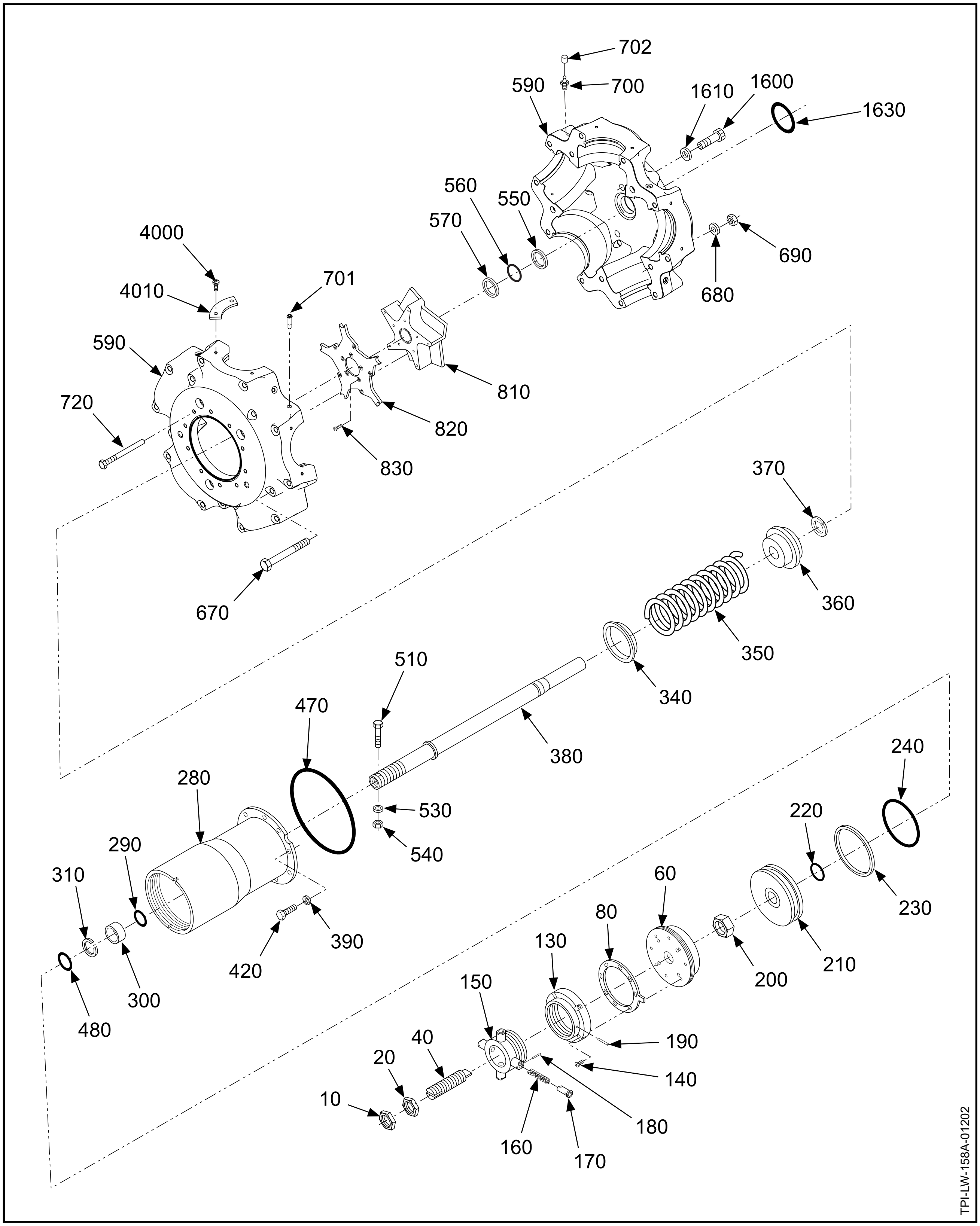
EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

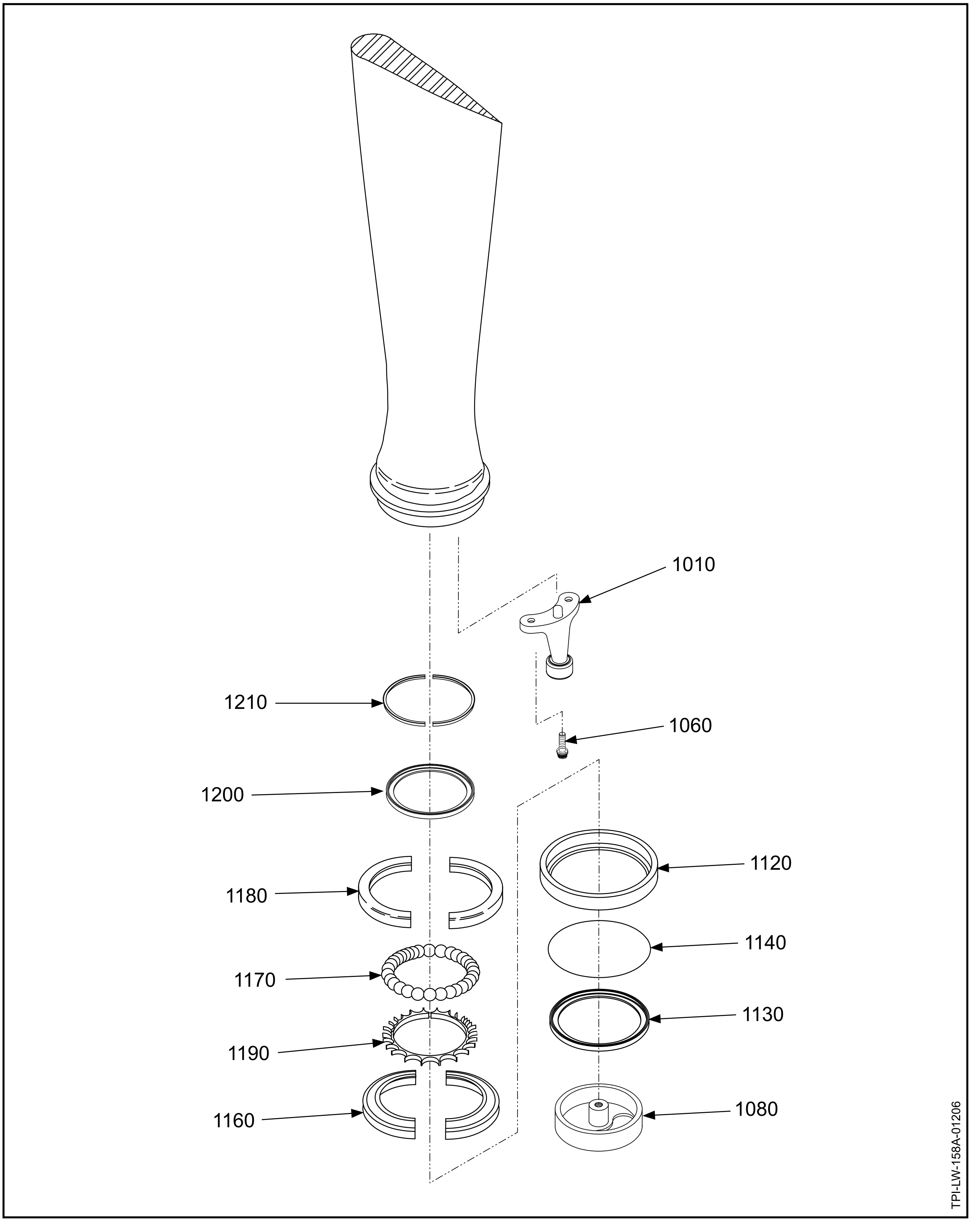
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-22		**PROPELLER PARTS - HC-E5W-3Y, CONTINUED**				
		PROPELLER MOUNTING PARTS				
1600	104720	• STUD, MOUNTING, 9/16-18		8	Y	
1610	B-7624	• WASHER, MOUNTING, 9/16 INCH		8	Y	
1630	C-3317-230	• O-RING (MOUNTING FLANGE)		2	Y	
1640	B-7458	• NUT, 9/16-18, HEX, SELF-LOCKING		8	Y	
1650	106943	• SPACER, MOUNTING		1		
-1660	B-6138-8-6	• • DOWEL PIN		2	Y	
1670	B-3868-S60	• SCREW, 8-32, 100 DEGREE HEAD		2	Y	
		BALANCE PARTS				
4000	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
4010	A-2424(A)-( )	• BALANCE WEIGHT		AR		
		COUNTERWEIGHTS/MOUNTING BOLTS				
-5070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-5050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED



HC-E5B-5: Propeller Parts
Figure 10-25



HC-E5B-5: Blade Retention Parts
Figure 10-26

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-25		**PROPELLER PARTS - HC-E5B-5**				
10	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
20	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
40	B-2829	• SCREW, BETA ADJUST		1	Y	
60	C-2871	• PLATE, STOP, PITCH SUPERSEDED BY ITEM 60A OR 60B USED WITH ITEMS 90 AND 280	A	OBS		
60A	C-2871	• PLATE, STOP, PITCH (MODIFIED) SUPERSEDES ITEM 60 USED WITH ITEMS 80 AND 280A POST HC-SB-61-300	A	1		
60B	C-2871-1	• PLATE, STOP, PITCH SUPERSEDES ITEM 60 USED WITH ITEMS 80 AND 280A POST HC-SB-61-300	A	1		
80	102333	• PLATE, ANTI-ROTATION USED WITH ITEMS 60A AND 280A POST HC-SB-61-300	A	1		
-90	B-3819	• SCREW, 10-32, CAP (STOP PLATE)	A	3	Y	
-90	B-3819	• SCREW, 10-32, CAP (STOP PLATE) POST HC-SB-61-300	A	OBS	Y	
130	C-2873	• RING, MOUNTING, START LOCK		1		
140	A-2038-6	• SCREW, 1/4-28, CAP (START LOCK)		4	Y	
150	C-2872	• HOUSING, START LOCK		1		
160	B-2875-2	• SPRING, COMPRESSION (START LOCK)		4	Y	
170	B-2874	• PIN, START LOCK		4		
180	B-3838-4-6	• COTTER PIN		4	Y	
190	B-6378-0750	• SPRING PIN, 1/8 INCH , CRES (START LOCK)		1	Y	
200	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING (PISTON)		1	Y	
210	B-3678	• PISTON		1		
220	C-3317-217	• O-RING (PISTON ID)		1	Y	
230	B-5132-425	• RING, BACKUP (PISTON OD)		1	Y	
240	C-3317-425-2	• O-RING (PISTON OD)		1	Y	

EFF CODE	INFORMATION
A	WHEN REPLACING THE D-2827 CYLINDER ASSEMBLY THE MODIFIED C-2871-PITCH STOP PLATE OR THE C-2871-1 PITCH STOP PLATE, AND THE 102333 ANTI-ROTATION PLATE MUST BE INSTALLED.

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-25		**PROPELLER PARTS - HC-E5B-5, CONTINUED**				
		D-2827 CYLINDER ASSEMBLY REPLACED BY ITEM 280A OR 280B USED WITH ITEMS 60 AND 90	B	OBS		
280	D-2827	• CYLINDER ASSEMBLY		OBS		
290	C-3317-129	• • O-RING		1	Y	
300	A-3784	• • BUSHING, CYLINDER		1		
310	B-6629-175PP	• • RING, RETAINING, INTERNAL		1	Y	
		D-2827 CYLINDER ASSEMBLY (MODIFIED) REPLACES ITEM 280 USED WITH ITEMS 60A OR 60B, AND 80 POST HC-SB-61-300	B			
280	D-2827	• CYLINDER ASSEMBLY (MODIFIED)		1		
290	C-3317-129	• • O-RING		1	Y	
300	A-3784	• • BUSHING, CYLINDER, REPLACED BY ITEM 300A		1		
300A	108298	• • BUSHING, CYLINDER, REPLACES ITEM 300 POST HC-SB-61-392		1		
310	B-6629-175PP	• • RING, RETAINING, INTERNAL		1	Y	
		102346 CYLINDER ASSEMBLY REPLACES ITEM 280 USED WITH ITEMS 60A OR 60B, AND 80 POST HC-SB-61-300	B			
280A	102346	• CYLINDER ASSEMBLY		1		
290	C-3317-129	• • O-RING		1	Y	
300	A-3784	• • BUSHING, CYLINDER, REPLACED BY ITEM 300A		1		
300A	108298	• • BUSHING, CYLINDER, REPLACES ITEM 300 POST HC-SB-61-392		1		
310	B-6629-175PP	• • RING, RETAINING, INTERNAL		1	Y	

EFF CODE	INFORMATION
B	WHEN REPLACING THE D-2827 CYLINDER ASSEMBLY THE MODIFIED C-2871-PITCH STOP PLATE OR THE C-2871-1 PITCH STOP PLATE, AND THE 102333 ANTI-ROTATION PLATE MUST BE INSTALLED.

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-25		**PROPELLER PARTS - HC-E5B-5, CONTINUED**				
340	B-3380	• SEAT, SPRING SUPERSEDED BY ITEM 340A USED WITH ITEMS 350 AND 360		1		
340A	101558	• SPRING SEAT SUPERSEDES ITEM 340 USED WITH ITEMS 350A AND 360A POST HC-SL-61-271		1		
350	B-3361	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDED BY ITEM 350A USED WITH ITEMS 340 AND 360		1		PCP
350A	102224	• PCP: SPRING, COMPRESSION, FEATHERING SUPERSEDES ITEM 350 USED WITH ITEMS 340A AND 360A POST HC-SL-61-271		1		PCP
360	B-3362	• SPRING RETAINER, REAR SUPERSEDED BY ITEM 360A USED WITH ITEMS 340 AND 350		1		
360A	101556	• PCP:SPRING RETAINER, FLANGED SUPERSEDES ITEM 360 USED WITH ITEMS 340A AND 350A POST HC-SL-61-271		1		PCP
370	A-3687	• KEEPER, SPLIT		1	Y	
380	D-3657	• PCP: ROD, PITCH CHANGE		1		PCP
390	B-3837-0432	• WASHER, CORROSION RESISTANT (CYLINDER MOUNTING)		10	Y	
420	B-3384-2H	• BOLT, 1/4-28, HEX HEAD (CYLINDER MOUNTING)		10	Y	
470	B-5151-3	• O-RING (CYLINDER MOUNTING) SUPERSEDED BY ITEM 470A		1	Y	
470A	C-3317-050	• O-RING (CYLINDER MOUNTING) SUPERSEDES ITEM 470		1	Y	
480	C-3317-215-2	• O-RING (CYLINDER BUSHING ID)		1	Y	
510	B-3383-15	• BOLT, 10-32, HEX HEAD (PITCH CHANGE ROD PLUG)		1	Y	
530	B-3851-0363	• WASHER (PITCH CHANGE ROD PLUG)		1	Y	
560	C-3317-212-2	• O-RING (PITCH CHANGE ROD OD)		1	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-25		**PROPELLER PARTS - HC-E5B-5, CONTINUED**				
590	E-2819	• PCP: HUB UNIT, HC-E5B-5 SUPERSEDED BY ITEM 590A (REFER TO “E-2819 HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)	A	1		PCP
550	B-5129	• RING, BACK-UP (ENGINE-SIDE HUB HALF) USED WTH ITEMS 590, 590A, 590B		1	Y	
570	B-5129	• RING, BACK-UP (ENGINE-SIDE HUB HALF) USED WTH ITEMS 590, 590A, 590B		1	Y	
590A	E-2819-1	• PCP: HUB UNIT, HC-E5B-5 SUPERSEDES ITEM 590, POST HC-SL-61-339, R1 (REFER TO “E-2819-1 HUB UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		PCP
670	A-1037-4	• BOLT, 3/8-24, HEX HEAD		15		
680	B-3851-0732	• WASHER SUPERSEDED BY ITEM 680A		15	Y	
680A	B-3834-0632	• WASHER SUPERSEDES ITEM 680		15	Y	
690	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING (HUB HALF CLAMPING)		15	Y	
700	A-279	• FITTING, LUBRICATION REPLACED BY ITEMS 700A AND 701		10	Y	
700A	A-279	• FITTING, LUBRICATION REPLACES ITEM 700 IN ENGINE-SIDE OF HUB		5	Y	
700B	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE IS ITEM 700A		5	Y	
701	106545	• PLUG, LUBRICATION (POST HC-SL-61-354) REPLACES ITEM 700 IN CYLINDER-SIDE OF HUB		5	Y	
702	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 700, 700A, AND 700B		5	Y	
720	B-3786	• ROD, ANTI-ROTATION		2		
810	C-3656	• FORK, FIVE BLADE		1		
820	C-3658	• PLATE, FORK, FIVE BLADE		1		
830	B-3824	• SCREW, 8-32 100° HEAD (FORK PLATE)		10	Y	

EFF CODE	INFORMATION
A	THE E-2819 HUB MAY BE MODIFIED TO INCORPORATE THE 104903 HUB BUSHING. REFER TO THE ALUMINUM HUB OVERHAUL CHAPTER OF HARTZELL PROPELLER INC. STANDARD PRACTICES MANUAL 202A (61-01-02).

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-25		**PROPELLER PARTS - HC-E5B-5, CONTINUED**				
10-26		**BLADE RETENTION PARTS**				
1010	100037-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT POST HC-SB-61-346 OR HC-SB-61-320, R1 (REFER TO “100037-( ) PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1010A	B-3778-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACED BY ITEM 1010B (REFER TO “B-3778-( ) PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5	Y	
1010B	B-5883-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACES ITEM 1010A REPLACED BY ITEM 1010C (REFER TO “B-5883-( ) PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1010C	100037-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT REPLACES ITEM 1010B (REFER TO “100037-( ) PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1060	B-6626-LH5	• BOLT, 1/4-28, HEX HEAD REPLACED BY ITEM 1060A		10	Y	
1060A	B-3830	• BOLT, 5/16-24, 12 POINT REPLACES ITEM 1060		10	Y	
1080	C-3679	• PRELOAD PLATE SUPERSEDED BY ITEM 1080A		5		
1080A	C-7244	• PRELOAD PLATE SUPERSEDES ITEM 1080 SUPERSEDED BY ITEM 1080B		5		
1080B	101740	• PRELOAD PLATE ASSEMBLY SUPERSEDES ITEMS 1080 AND 1080A POST HC-SB-61-289 (REFER TO “101740 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1120	B-1041	• RING, RETAINING, BEARING SUPERSEDED BY ITEM 1120A USE WITH OPTIONAL ITEMS 1130 AND 1140		5		
1120A	B-7071	• RING, RETAINING, BEARING SUPERSEDES ITEM 1120		5		
1130	B-7726	• SEAL, BLADE, OPTIONAL USE WITH ITEMS 1120A AND 1140		5		
1140	C-3317-045	• O-RING, OPTIONAL USE WITH ITEMS 1120A AND 1130		5	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-25		**PROPELLER PARTS - HC-E5B-5, CONTINUED**				
10-26		**BLADE RETENTION PARTS, CONTINUED**				
-1150	C-792	• BEARING, RETENTION, BLADE		5		
1160	C-792-B	• • RACE, BLADE SIDE		1		
1170	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1180	C-792-A	• • RACE, HUB SIDE		1		
1190	B-793	• BALL SPACER		5	Y	
1200	C-6337-1	• SEAL, BLADE USE WITH ITEM 1210		5	Y	
-1200A	C-3317-340	• O-RING - ALTERNATE FOR ITEM 1200 SUPERSEDED BY ITEM 1200B		5	Y	
-1200B	C-3317-340-8	• O-RING - SUPERSEDES ITEM 1200A POST HC-SL-61-301		5	Y	
1210	B-6376-3	• SEAL ENERGIZER RING USE WITH ITEM 1200		5		
-1220	B-1925	• SEAL, PRELOAD PLATE		OBS		

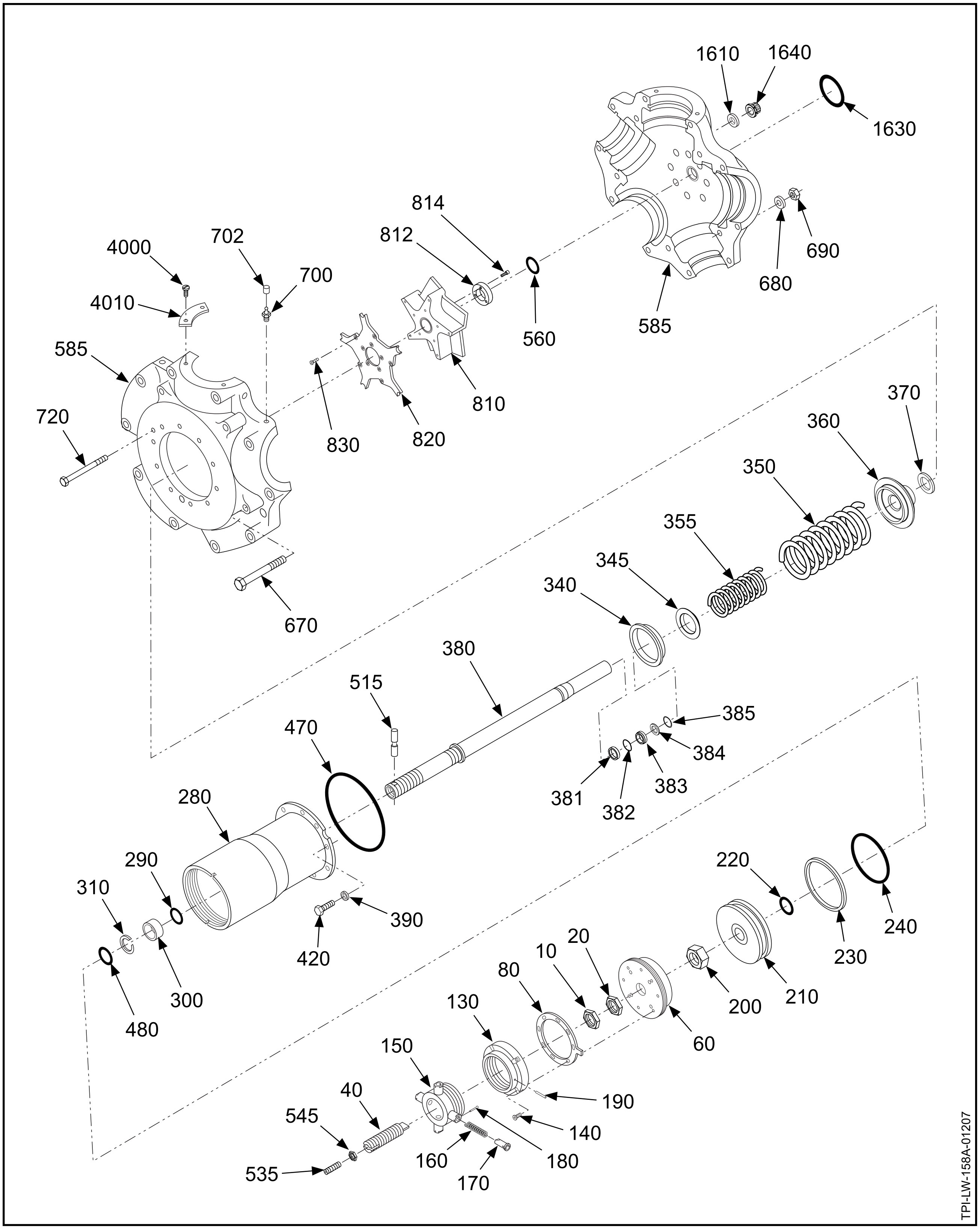
EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

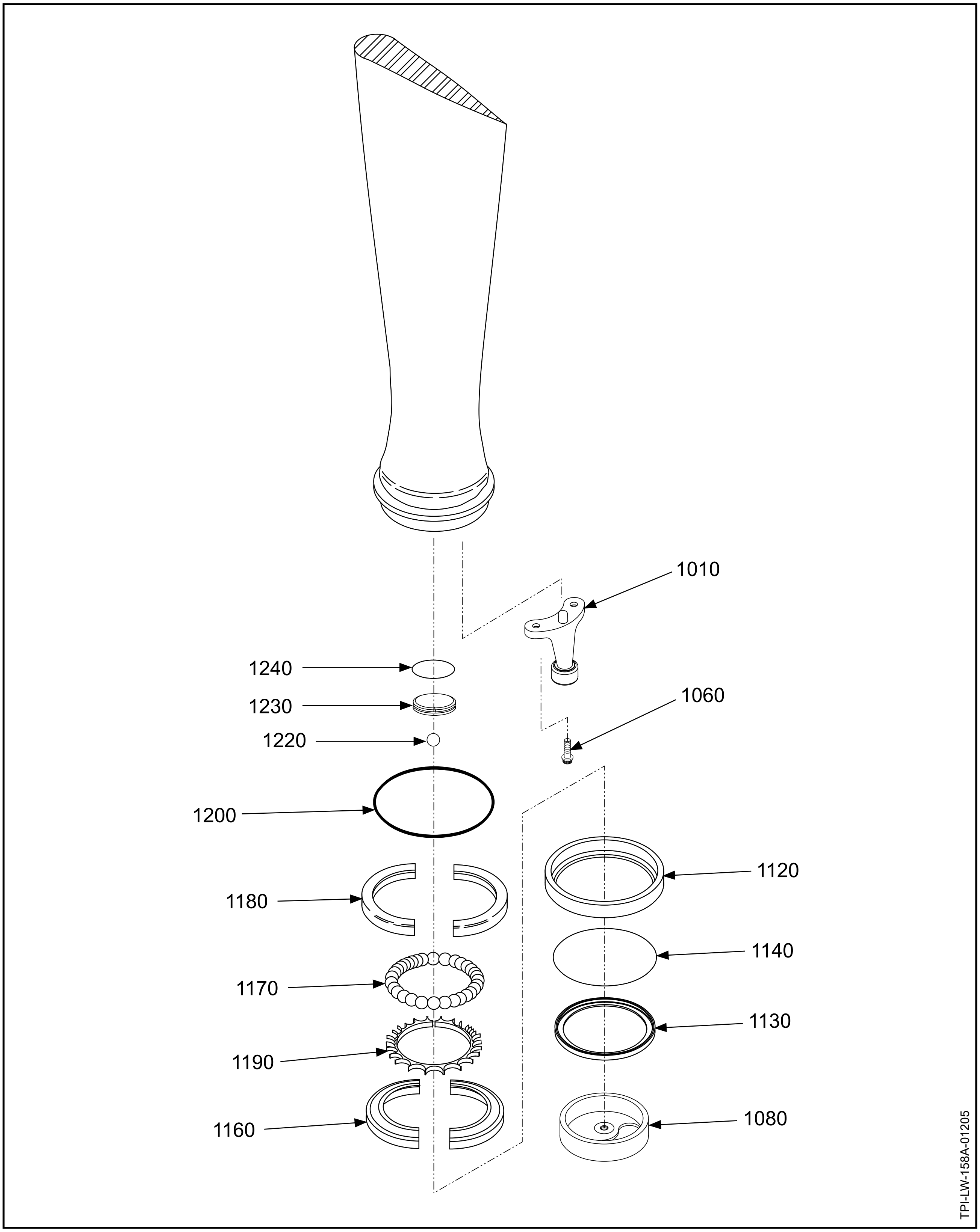
FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-25		**PROPELLER PARTS - HC-E5B-5, CONTINUED**				
		PROPELLER MOUNTING PARTS				
1600	B-3347	• BOLT, MOUNTING, 9/16-18, 12 POINT		12	Y	
1610	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		12	Y	
1630	C-3317-239-2	• O-RING (MOUNTING FLANGE)		1	Y	
		BALANCE PARTS				
4000	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
4010	A-2424(A)-( )	• BALANCE WEIGHT		AR		
		COUNTERWEIGHTS/MOUNTING BOLTS				
-5070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-5050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		COUNTERWEIGHT SLUGS/MOUNTING HARDWARE				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				
-5040		• COUNTERWEIGHT SLUGS				
-5041		• COUNTERWEIGHT SLUG MOUNTING BOLT			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED



HC-E5N-5KL: Propeller Parts
Figure 10-27



HC-E5N-5KL: Blade Retention Parts
Figure 10-28

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-27		**PROPELLER PARTS - HC-E5N-5K**				
10	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
20	B-3839-16	• PCP: NUT, HEX, THIN, DRILLED (FEATHER ADJUST)		1		PCP
40	107170	• SCREW, BETA ADJUST		1	Y	
60	106893	• PCP: PLATE, STOP, PITCH		1		PCP
80	106897	• PLATE, ANTI-ROTATION		1		
130	C-2873	• RING, MOUNTING, START LOCK		1		
140	A-2038-6	• SCREW, 1/4-28, CAP (START LOCK)		4	Y	
150	C-2872	• HOUSING, START LOCK		1		
160	B-2875-2	• SPRING, COMPRESSION (START LOCK)		4	Y	
170	B-2874	• PIN, START LOCK		4		
180	B-3838-4-6	• COTTER PIN		4	Y	
190	B-6378-0750	• SPRING PIN, 1/8 INCH , CRES (START LOCK)		1	Y	
200	B-474	• NUT, 1 1/8-12, HEX, SELF-LOCKING (PISTON)		1	Y	
210	106892	• PISTON		1		
220	C-3317-217	• O-RING (PISTON ID)		1	Y	
230	B-5132-431	• RING, BACK-UP (PISTON OD)		1	Y	
240	C-3317-431-2	• O-RING (PISTON OD)		1	Y	
280	107189	• CYLINDER ASSEMBLY		1		PCP
290	C-3317-129	• • O-RING		1	Y	
300	A-3784	• • BUSHING, CYLINDER, REPLACED BY ITEM 300A		1		
300A	108298	• • BUSHING, CYLINDER, REPLACES ITEM 300 POST HC-SB-61-392		1		
310	B-6629-175PP	• • RING, RETAINING, INTERNAL		1	Y	
340	101558	• SPRING SEAT		1		
345	107188	• SEAT, SPRING		1		
350	102224	• PCP: SPRING, COMPRESSION, FEATHERING		1		PCP
355	107183	• PCP: SPRING, COMP, FEATHERING		1	Y	PCP
360	107187	• PCP: SPRING RETAINER, FLANGED		1		PCP
370	A-3687	• KEEPER, SPLIT		1	Y	
380	107135	• PCP: ROD, PITCH CHANGE		1		PCP
381	107136	• BUSHING, BETA TUBE		1		
382	C-3317-112	• O-RING		1	Y	
383	107137	• BUSHING, BETA TUBE		1		
384	107140	• WASHER, 1/2", CRES		1	Y	
385	A-5839-71	• RING, RETAINING, INTERNAL SPIRAL		1	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-27		**PROPELLER PARTS - HC-E5N-5K, CONTINUED**				
390	B-3837-0432	• WASHER, CORROSION RESISTANT (CYLINDER MOUNTING)		10	Y	
420	B-3384-2H	• BOLT, 1/4-28, HEX HEAD (CYLINDER MOUNTING)		10	Y	
470	B-5151-3	• O-RING (CYLINDER MOUNTING)		1	Y	
480	C-3317-215-2	• O-RING (CYLINDER BUSHING ID)		1	Y	
515	107169	• PIN		1		
535	101307	• SCREW, SET, 5/16-24		1	Y	
545	B-3368	• NUT, 5/16-24, HEX, THIN		1	Y	
560	C-3317-212-2	• O-RING (PITCH CHANGE ROD OD)		1	Y	
585	107147	• PCP: HUB ASSEMBLY, HC-E5N-5KL (REFER TO “107147 HUB ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)				
670	A-1037-4	• BOLT, 3/8-24, HEX HEAD		15		
680	B-3834-0632	• WASHER		15	Y	
690	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING (HUB HALF CLAMPING)		15	Y	
700	A-279	• FITTING, LUBRICATION (CYLINDER-SIDE OF HUB)		5	Y	
700A	C-6349	• FITTING, LUBRICATION, 45° (POST HC-SL-61-187) ALTERNATE FOR ITEM 700		5	Y	
-701	106545	• PLUG, LUBRICATION (ENGINE-SIDE OF HUB)		5	Y	
702	B-6544	• CAP, FITTING, LUBRICATION USED WITH ITEMS 700 AND 700A		5	Y	
720	B-3786	• ROD, ANTI-ROTATION		2		
810	107158	• FORK, FIVE BLADE, LH		1		
812	105908	• BUMPER		1		
814	102612-S50	• SCREW, 10-32, 100° HEAD		3	Y	
820	C-3393	• PLATE, FORK, FIVE BLADE, LH		1		
830	B-3824	• SCREW, 8-32 100° HEAD (FORK PLATE)		10	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-27		**PROPELLER PARTS - HC-E5N-5K, CONTINUED**				
10-28		**BLADE RETENTION PARTS**				
1010	104901-( )	• BRACKET, KNOB, PITCH CHANGE - UNIT (REFER TO “104901-( ) PITCH CHANGE KNOB BRACKET UNIT” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1060	B-3830	• BOLT, 5/16-24, 12 POINT		10	Y	
1080	104882	• PRELOAD PLATE ASSEMBLY (REFER TO “104882 PRELOAD PLATE ASSEMBLY” IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1120	101512	• BEARING RETAINING RING		5		
1130	101437	• SEAL, BLADE		5		
1140	C-3317-045	• O-RING		5	Y	
-1150	C-792	• BEARING, RETENTION, BLADE		5		
1160	C-792-B	• • RACE, BLADE SIDE		1		
1170	B-6144-1	• • BALL, BEARING, 3/8 INCH DIA.		33	Y	
	B-6144-1-1500	• • BALL, BEARING, 3/8 INCH DIA. (BOX OF 1500)		RF		
1180	C-792-A	• • RACE, HUB SIDE		1		
1190	B-793	• BALL SPACER		5	Y	
1200	C-3317-340-8	• O-RING		5	Y	
1220	B-6144-1	• BALL, BEARING, 3/8 INCH DIA.		5	Y	
1230	103413	• PLUG, BLADE		5		
1240	C-3317-028	• O-RING		5	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-27		**PROPELLER PARTS - HC-E5N-5K, CONTINUED**				
		PROPELLER MOUNTING PARTS				
1610	A-2048-2	• WASHER, MOUNTING, 9/16 INCH CSK		8	Y	
1630	C-3317-230	• O-RING (MOUNTING FLANGE)		1	Y	
1640	C-6006	• NUT, MOUNTING, 9/16-18, 12 POINT		8	Y	
		BALANCE PARTS				
4000	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		5	Y	
4010	A-2424(A)-( )	• BALANCE WEIGHT		10		
		COUNTERWEIGHTS/MOUNTING BOLTS				
-5070		• PCP: COUNTERWEIGHT APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER				PCP
-5050		• COUNTERWEIGHT MOUNTING BOLTS REFER TO THE APPLICABLE HARTZELL PROPELLER INC. BLADE OVERHAUL MANUAL: MANUAL 135F (61-13-35) - COMPOSITE BLADES MANUAL 133C (61-13-33) - ALUMINUM BLADES			Y	
		COUNTERWEIGHT SLUGS/MOUNTING HARDWARE				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				
-5040		• COUNTERWEIGHT SLUGS				
-5041		• COUNTERWEIGHT SLUG MOUNTING BOLT			Y	
-5042		• COUNTERWEIGHT SLUG MOUNTING NUT			Y	
		SPINNER PARTS				
		APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) AND THE APPLICABLE HARTZELL PROPELLER INC. SPINNER MAINTENANCE MANUAL: MANUAL 127 (61-16-27) - METAL SPINNER ASSEMBLIES MANUAL 148 (61-16-48) - COMPOSITE SPINNER ASSEMBLIES				

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

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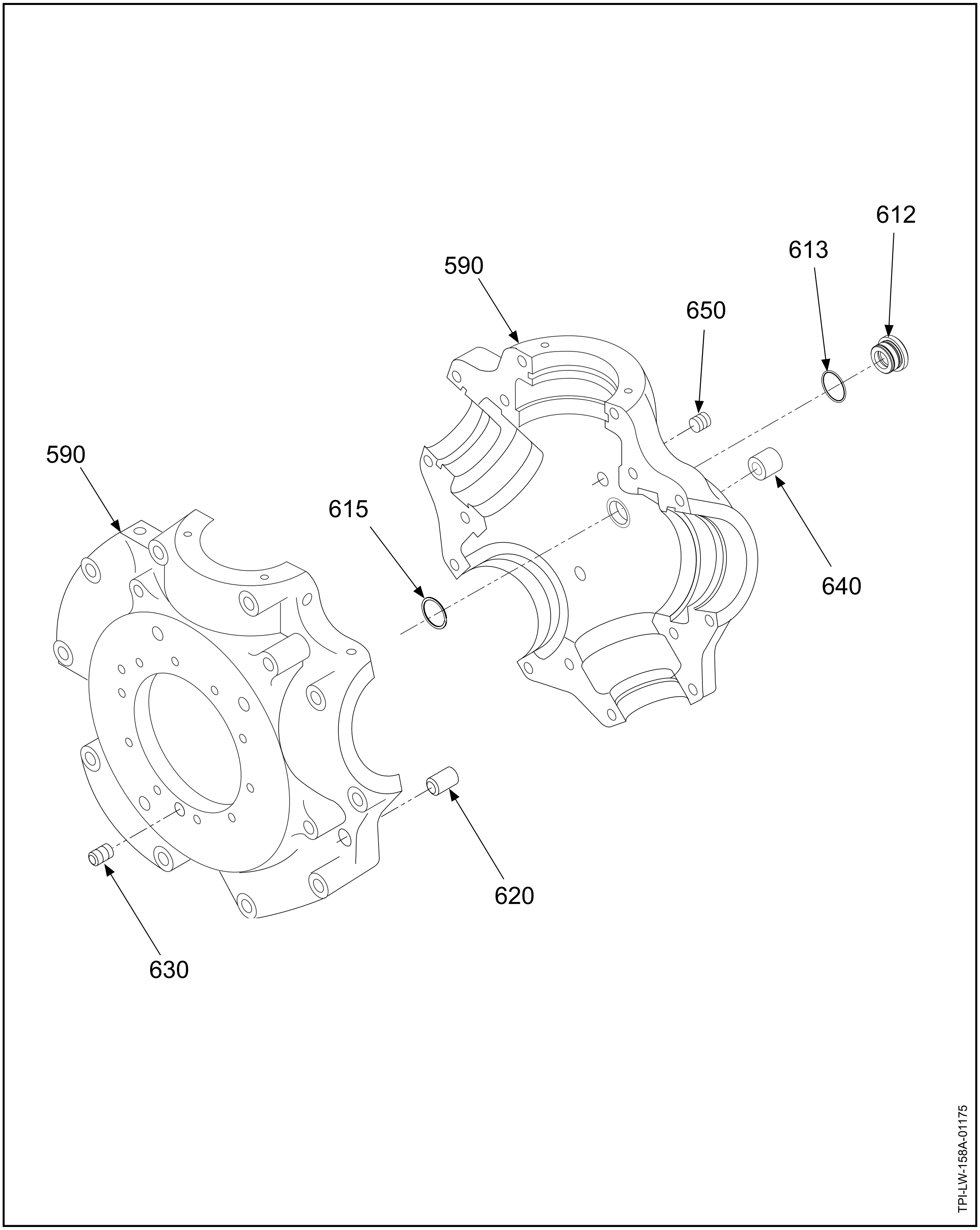
SUB-ASSEMBLY
PARTS LISTS and FIGURES



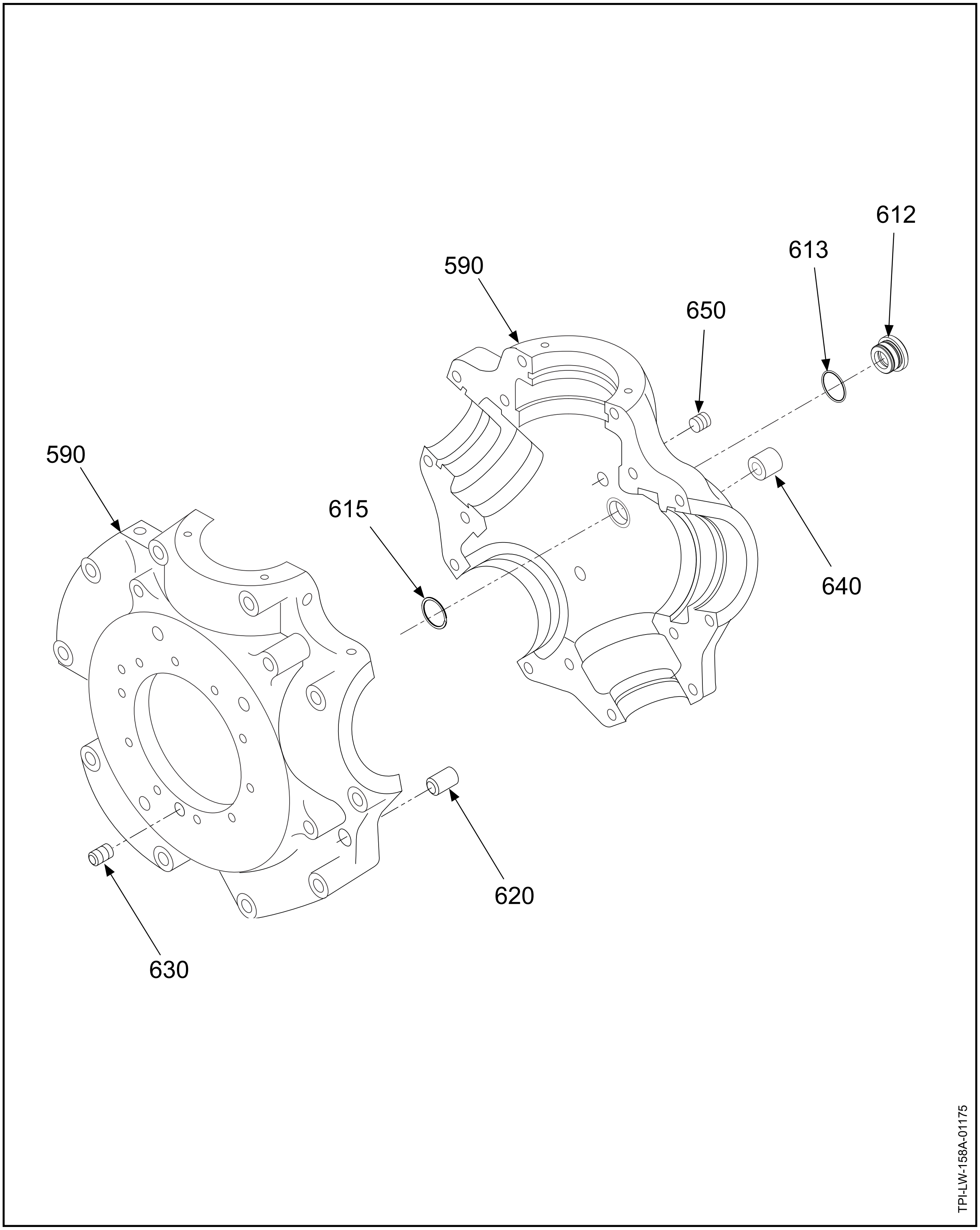
104065: Hub Unit
Figure 10A-1

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-1		**104065: HUB UNIT PARTS**				
590	104065	PCP: HUB UNIT, HC-E5A-3(1)		1		PCP
612	104903	• HUB BUSHING, ROD, REPLACED BY ITEM 612A		1		
612A	108346	• HUB BUSHING, ROD, REPLACES ITEM 612 POST HC-SB-61-392		1		
613	C-3317-026-2	• O-RING, REPLACED BY ITEM 613A		1	Y	
613A	C-3317-123	• O-RING, REPLACES ITEM 613 POST HC-SB-61-392		1	Y	
615	A-6153-137	• RING, RETAINING, EXTERNAL SPIRAL		1	Y	
620	A-2249	• HUB BUSHING, GUIDE		2	Y	
630	B-6142	• INSERT, 1/4-28, CRES, COILED		20	Y	
640	B-6045-6-6	• BUSHING, METAL-POLYMER COMP (BETA ROD)		3	Y	
650	B-1243	• INSERT, 9/16-18, CRES, STAKED (HUB MOUNTING HOLE)		12	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

104065: Hub Unit

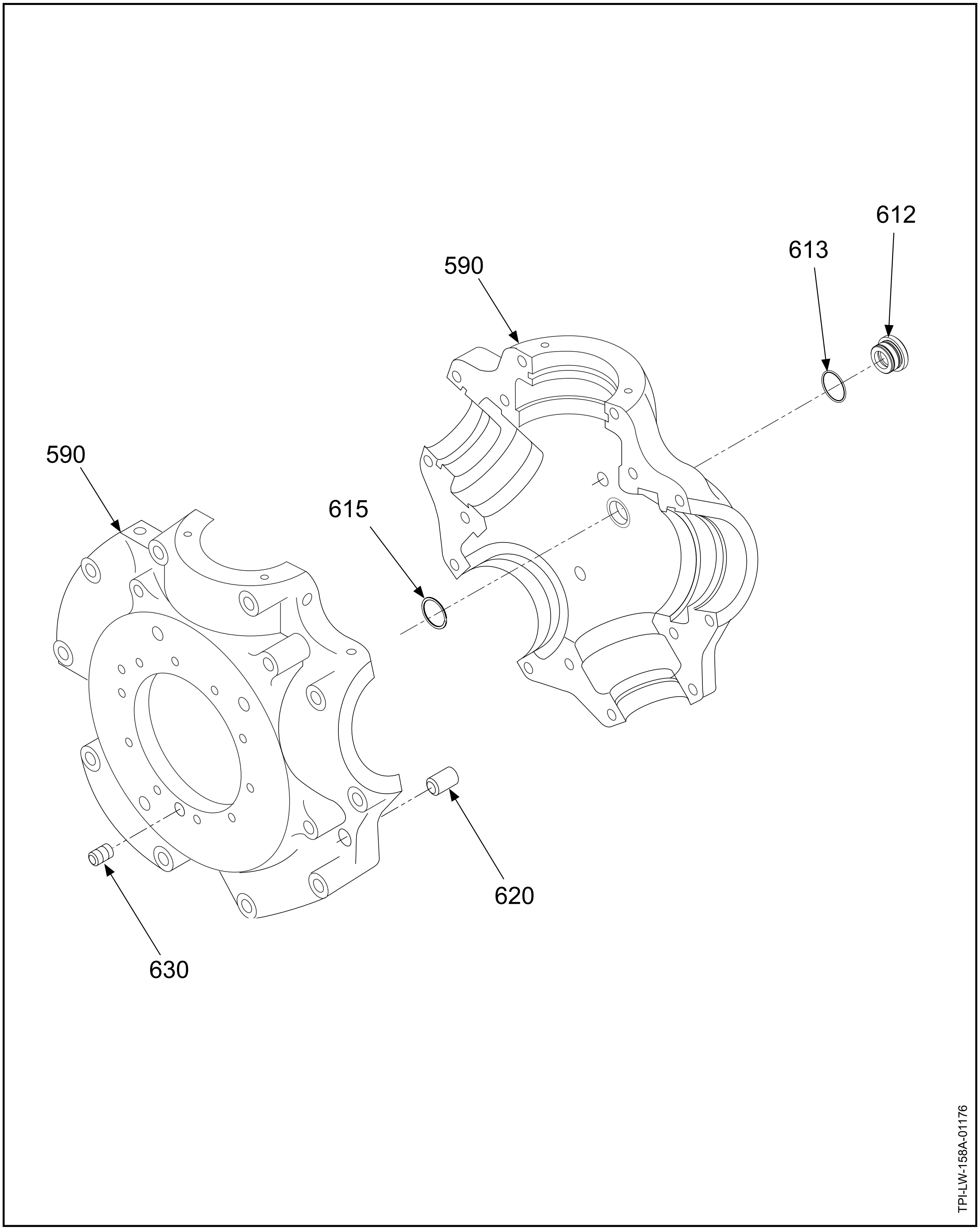


104904: Hub Unit
Figure 10A-2

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-2		**104904: HUB UNIT PARTS**				
590	104904	PCP: HUB UNIT, HC-E5N-3C		1		PCP
612	104903	• HUB BUSHING, ROD, REPLACED BY ITEM 612A		1		
612A	108346	• HUB BUSHING, ROD, REPLACES ITEM 612 POST HC-SB-61-392		1		
613	C-3317-026-2	• O-RING, REPLACED BY ITEM 613A		1	Y	
613A	C-3317-123	• O-RING, REPLACES ITEM 613 POST HC-SB-61-392		1	Y	
615	A-6153-137	• RING, RETAINING, EXTERNAL SPIRAL		1	Y	
620	A-2249	• HUB BUSHING, GUIDE		2	Y	
630	B-6142	• INSERT, 1/4-28, CRES, COILED		20	Y	
640	B-6045-6-6	• BUSHING, METAL-POLYMER COMP (BETA ROD)		3	Y	
650	B-1243	• INSERT, 9/16-18, CRES, STAKED (HUB MOUNTING HOLE)		8	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

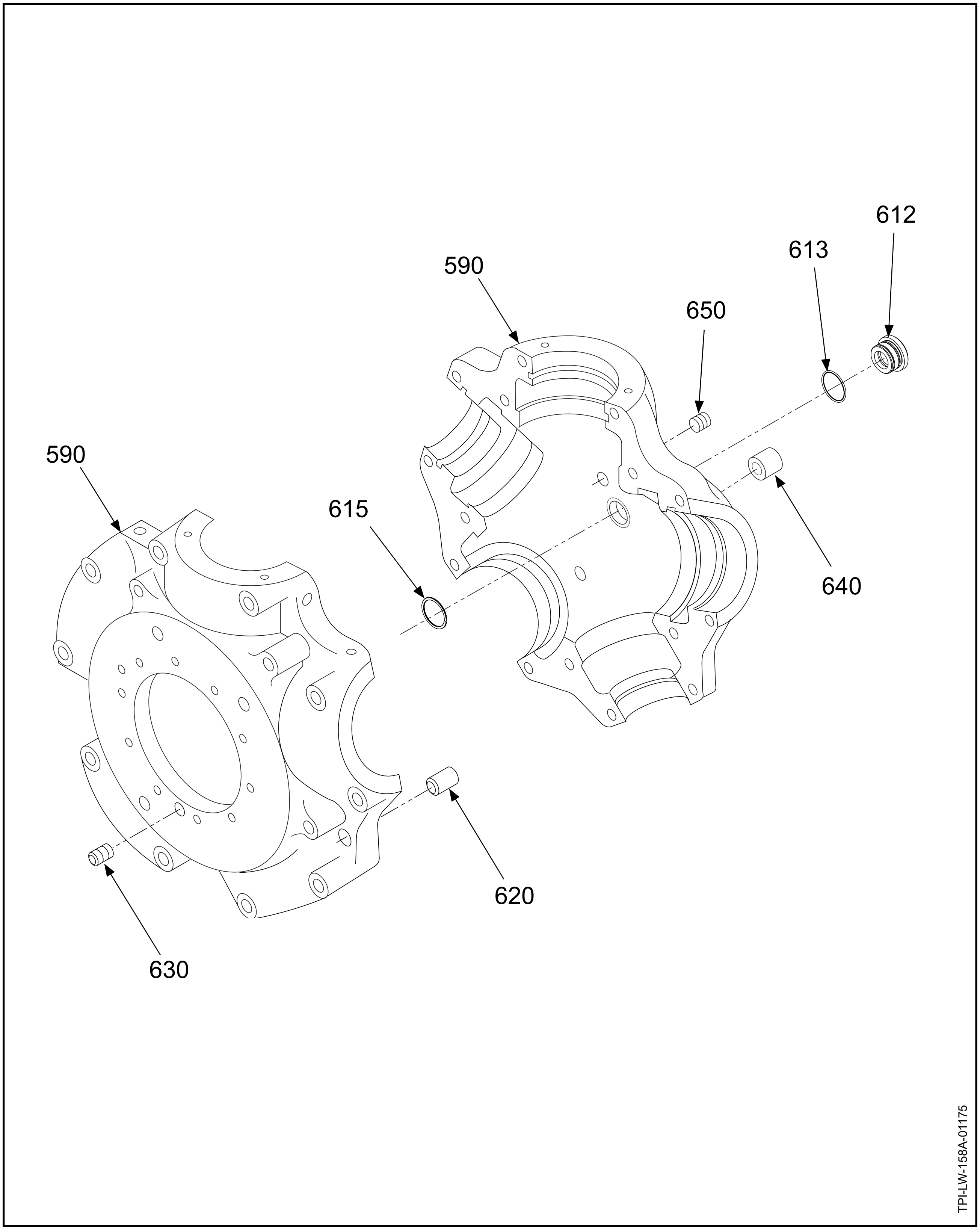


105880: Hub Unit
Figure 10A-3

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-3		**105880: HUB UNIT PARTS**				
590	105880	PCP: HUB UNIT, HC-E5P-3( )		1		PCP
612	104903	• HUB BUSHING, ROD, REPLACED BY ITEM 612A		1		
612A	108346	• HUB BUSHING, ROD, REPLACES ITEM 612 POST HC-SB-61-392		1		
613	C-3317-026-2	• O-RING, REPLACED BY ITEM 613A		1	Y	
613A	C-3317-123	• O-RING, REPLACES ITEM 613 POST HC-SB-61-392		1	Y	
615	A-6153-137	• RING, RETAINING, EXTERNAL SPIRAL		1	Y	
620	A-2249	• HUB BUSHING, GUIDE		2	Y	
630	B-6142	• INSERT, 1/4-28, CRES, COILED		20	Y	
640	B-6045-6-6	• BUSHING, METAL-POLYMER COMP (BETA ROD)		3	Y	

EFF CODE	INFORMATION

- ITEM NOT ILLUSTRATED

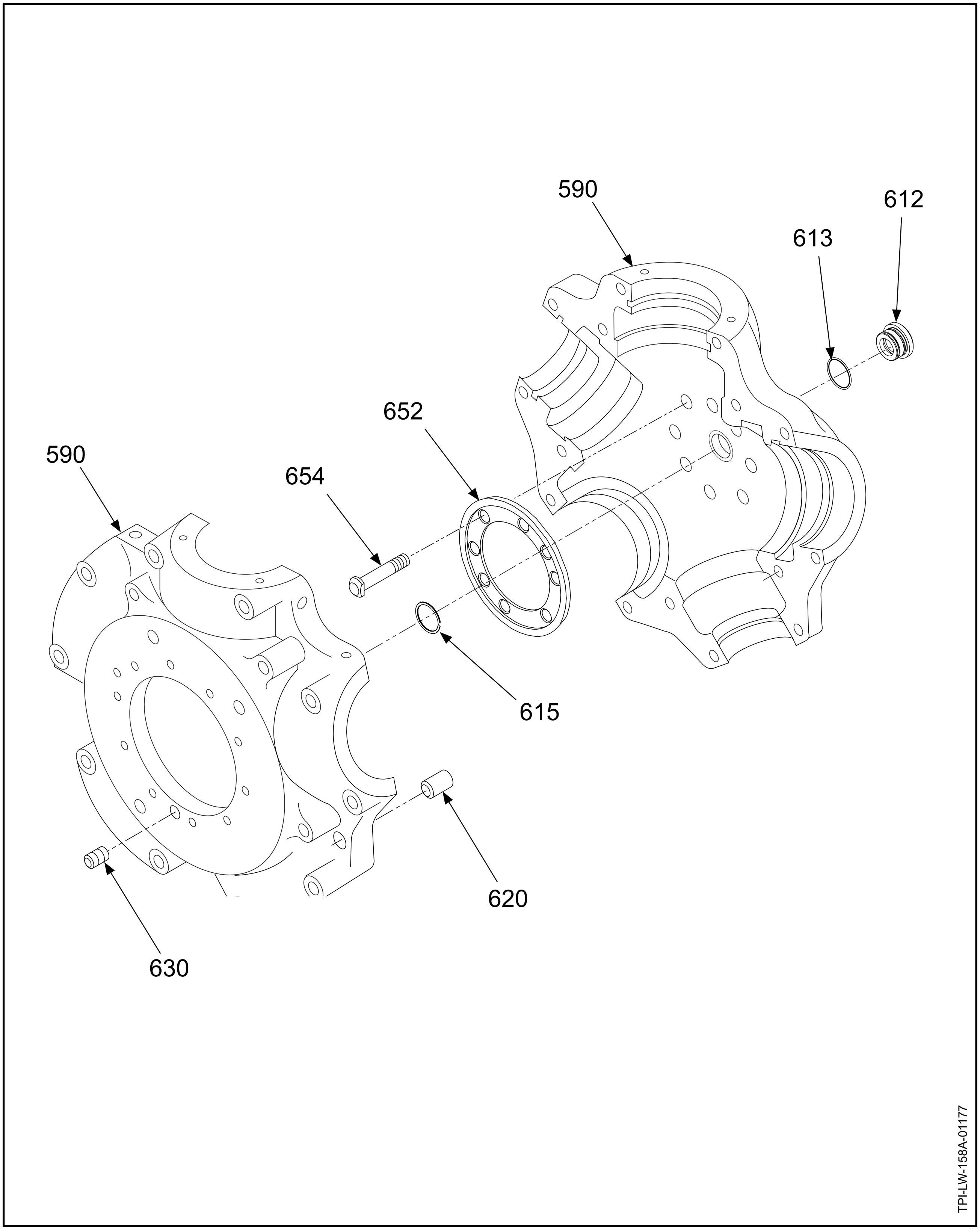


106945: Hub Unit
Figure 10A-4

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-4		**106945: HUB UNIT PARTS**				
590	106945	PCP: HUB UNIT, HC-E5W-3		1		PCP
612	104903	• HUB BUSHING, ROD, REPLACED BY ITEM 612A		1		
612A	108346	• HUB BUSHING, ROD, REPLACES ITEM 612 POST HC-SB-61-392		1		
613	C-3317-026-2	• O-RING, REPLACED BY ITEM 613A, USED WITH ITEM 612		1	Y	
613A	C-3317-123	• O-RING, REPLACES ITEM 613, USED WITH ITEM 612A POST HC-SB-61-392		1	Y	
615	A-6153-137	• RING, RETAINING, EXTERNAL SPIRAL		1	Y	
620	A-2249	• HUB BUSHING, GUIDE		2	Y	
630	B-6142	• INSERT, 1/4-28, CRES, COILED		20	Y	
640	B-6045-6-6	• BUSHING, METAL-POLYMER COMP (BETA ROD)		3	Y	
650	100128	• INSERT, 9/16-18, CRES, NON-STAKED (HUB MOUNTING HOLE)		8	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED



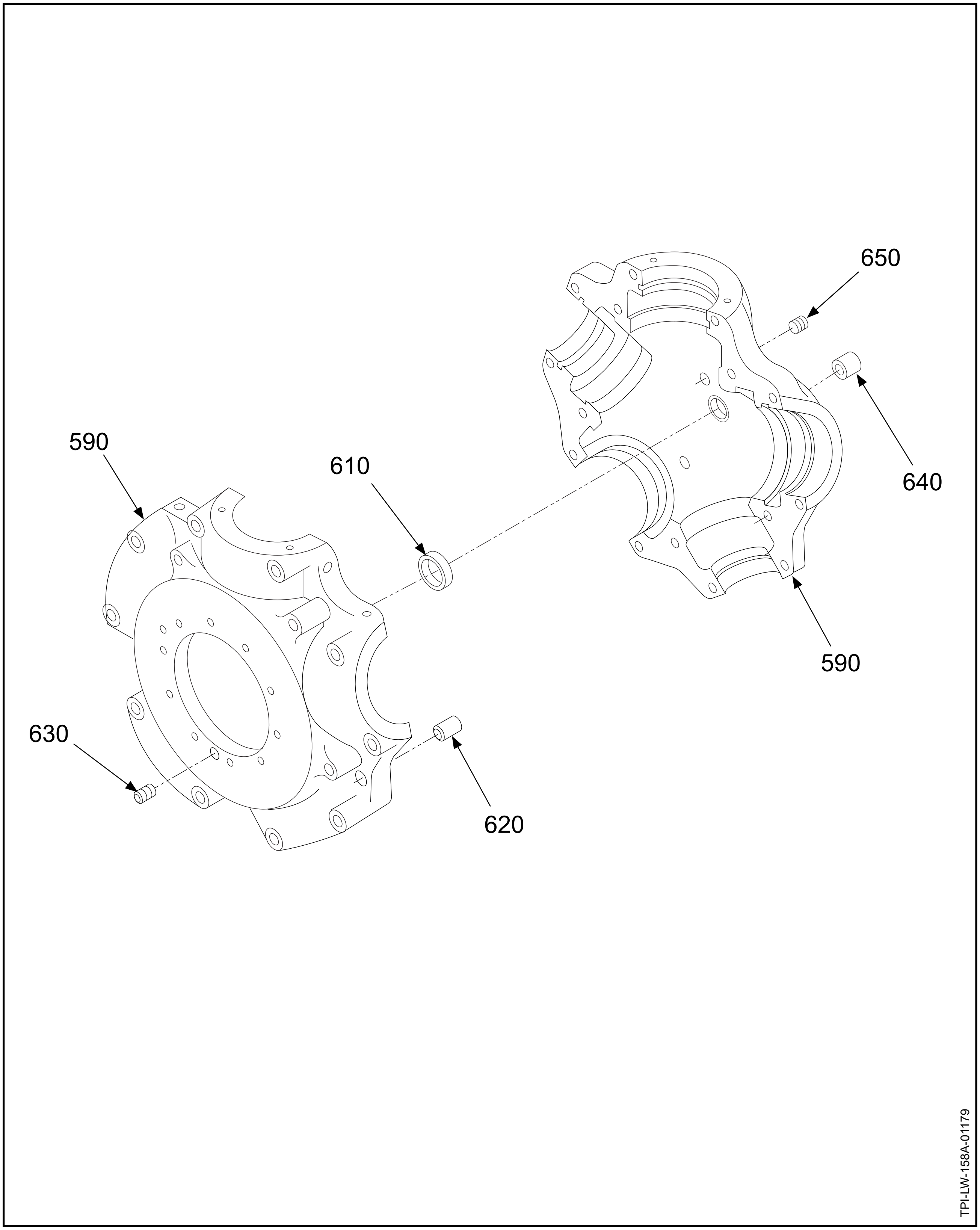
107147: Hub Assembly
Figure 10A-5

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-5		**107147: HUB ASSEMBLY PARTS**				
-585	107147	PCP: HUB ASSEMBLY, HC-E5N-5KL				
590	107145	• PCP: HUB UNIT, HC-E5N-5KL		1		PCP
612	104903	• HUB BUSHING, ROD, REPLACED BY ITEM 612A		1		
612A	108346	• HUB BUSHING, ROD, REPLACES ITEM 612 POST HC-SB-61-392		1		
613	C-3317-026-2	• O-RING, REPLACED BY ITEM 613A				
613A	C-3317-123	• O-RING, REPLACES ITEM 613 POST HC-SB-61-392		1	Y	
615	A-6153-137	• RING, RETAINING, EXTERNAL SPIRAL		1	Y	
620	A-2249	• HUB BUSHING, GUIDE		2	Y	
630	B-6142	• INSERT, 1/4-28, CRES, COILED		20	Y	
652	105884	• RING, MOUNTING BOLT		1		
654	103560	• BOLT, MOUNTING, 9/16-18, FLANGED		8	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

107147: Hub Assembly



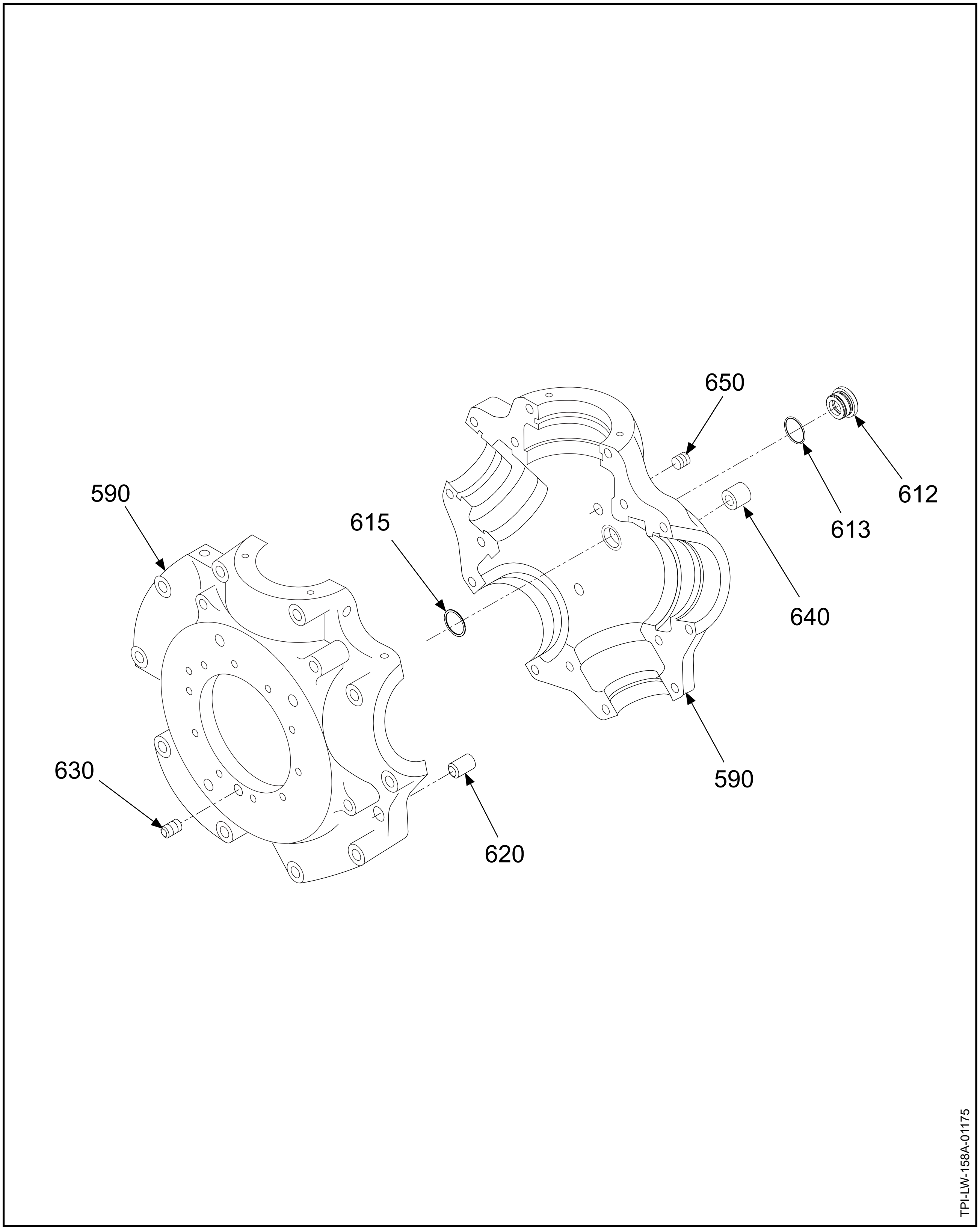
D-3372-(1,3): Hub Unit
Figure 10A-6

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-6		**D-3372-(1,3): HUB UNIT PARTS**				
590	D-3372	PCP: HUB UNIT	A	1		PCP
	D-3372-1	PCP: HUB UNIT	A	1		PCP
	D-3372-3	PCP: HUB UNIT, HC-E5N-3	A	1		PCP
610	A-3789	• HUB BUSHING, ROD		1	Y	
620	A-2249	• HUB BUSHING, GUIDE		2	Y	
630	B-6142	• INSERT, 1/4-28, CRES, COILED		20	Y	
640	329100606	• BUSHING, METAL-POLYMER COMP (BETA ROD) SUPERSEDED BY ITEM 640A		3	Y	
640A	B-6045-6-6	• BUSHING, METAL-POLYMER COMP (BETA ROD) SUPERSEDES ITEM 640		3	Y	
650	B-1243	• INSERT, 9/16-18, CRES, STAKED (HUB MOUNTING HOLE)		8	Y	

EFF CODE	INFORMATION
A	THE D-3372, D-3372-1, OR D-3372-3 HUB MAY BE MODIFIED TO INCORPORATE THE 104903 HUB BUSHING. REFER TO THE ALUMINUM HUB OVERHAUL CHAPTER OF HARTZELL PROPELLER INC. STANDARD PRACTICES MANUAL 202A (61-01-02).

- ITEM NOT ILLUSTRATED

D-3372-(1,3): Hub Unit



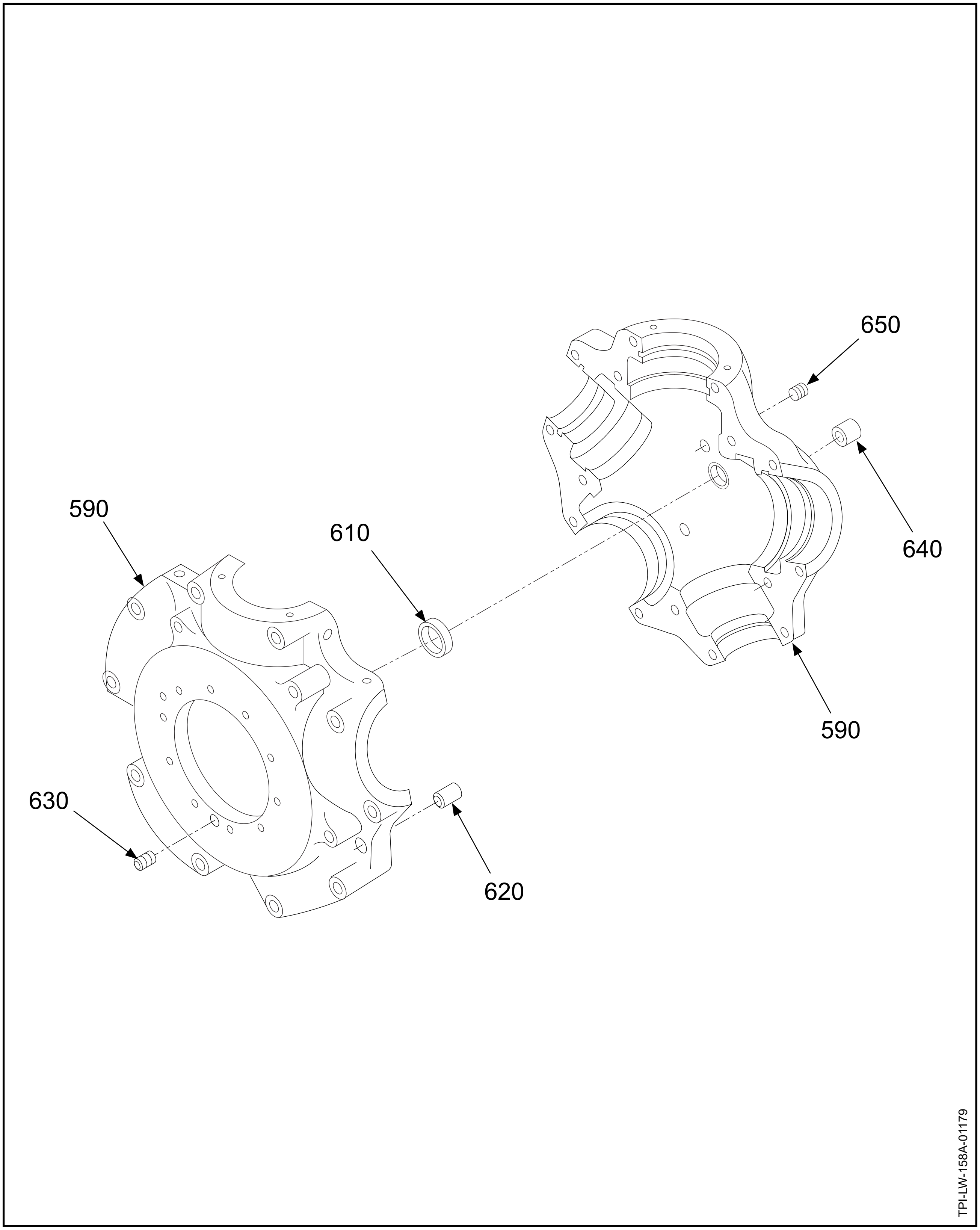
D-3372-4: Hub Unit
Figure 10A-7

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-7		**D-3372-4: HUB UNIT PARTS**				
590	D-3372-4	PCP: HUB UNIT, HC-E5N-3		1		PCP
612	104903	• HUB BUSHING, ROD, REPLACED BY ITEM 612A		1		
612A	108346	• HUB BUSHING, ROD, REPLACES ITEM 612 POST HC-SB-61-392		1		
613	C-3317-026-2	• O-RING, REPLACED BY ITEM 613A		1	Y	
613A	C-3317-123	• O-RING, REPLACES ITEM 613 POST HC-SB-61-392		1	Y	
615	A-6153-137	• RING, RETAINING, EXTERNAL SPIRAL		1	Y	
620	A-2249	• HUB BUSHING, GUIDE		2	Y	
630	B-6142	• INSERT, 1/4-28, CRES, COILED		20	Y	
640	B-6045-6-6	• BUSHING, METAL-POLYMER COMP (BETA ROD)		3	Y	
650	B-1243	• INSERT, 9/16-18, CRES, STAKED, (HUB MOUNTING HOLE)		8	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

D-3372-4: Hub Unit



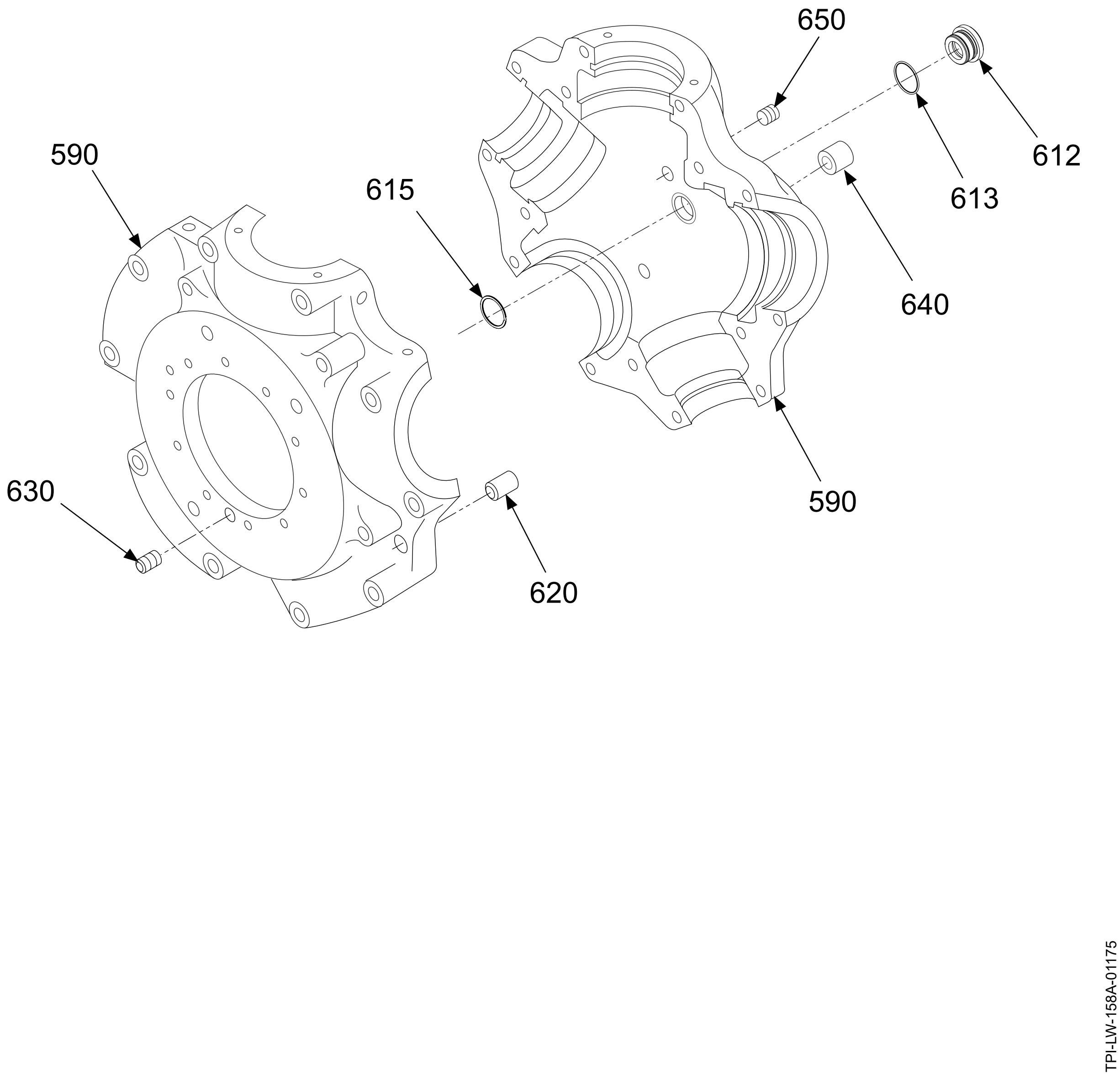
D-3398-(1,3): Hub Unit
Figure 10A-8

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-8		**D-3398-(1,3): HUB UNIT PARTS**				
590	D-3398	PCP: HUB UNIT	A	1		PCP
	D-3398-1	PCP: HUB UNIT	A	1		PCP
	D-3398-3	PCP: HUB UNIT, HC-E5N-3L	A	1		PCP
610	A-3789	• HUB BUSHING, ROD		1	Y	
620	A-2249	• HUB BUSHING, GUIDE		2	Y	
630	B-6142	• INSERT, 1/4-28, CRES, COILED		20	Y	
640	329100606	• BUSHING, METAL-POLYMER COMP (BETA ROD) SUPERSEDED BY ITEM 640A		3	Y	
640A	B-6045-6-6	• BUSHING, METAL-POLYMER COMP (BETA ROD) SUPERSEDES ITEM 640		3	Y	
650	B-1243	• INSERT, 9/16-18, CRES, STAKED (HUB MOUNTING HOLE)		8	Y	

EFF CODE	INFORMATION
A	THE D-3398, D-3398-1, OR D-3398-3 HUB MAY BE MODIFIED TO INCORPORATE THE 104903 HUB BUSHING. REFER TO THE ALUMINUM HUB OVERHAUL CHAPTER OF HARTZELL PROPELLER INC. STANDARD PRACTICES MANUAL 202A (61-01-02).

- ITEM NOT ILLUSTRATED

D-3398-(1,3): Hub Unit



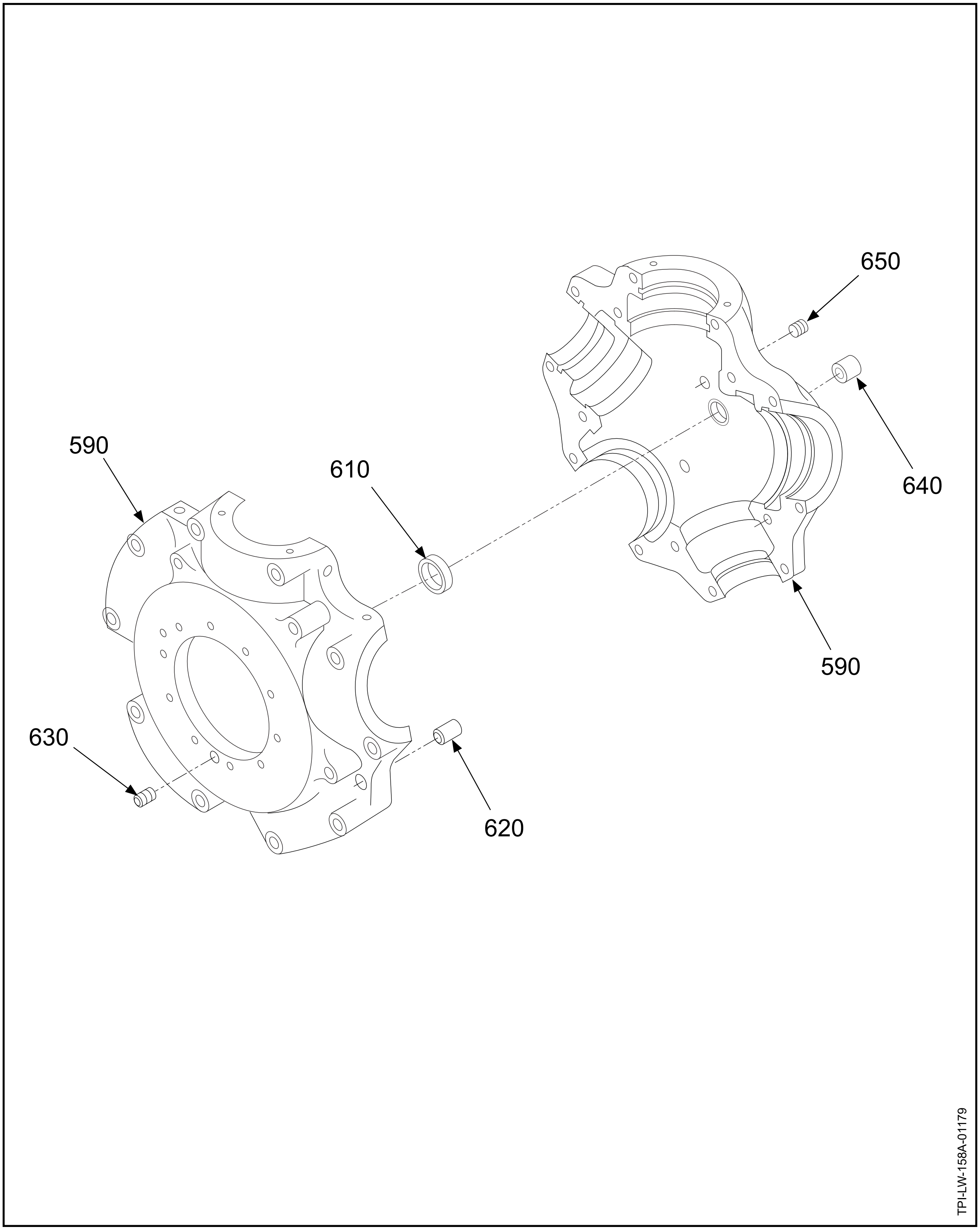
D-3398-4: Hub Unit
Figure 10A-9

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-9		**D-3398-4: HUB UNIT PARTS**				
590	D-3398-4	PCP: HUB UNIT, HC-E5N-3L		1		PCP
612	104903	• HUB BUSHING, ROD, REPLACED BY ITEM 612A		1		
612A	108346	• HUB BUSHING, ROD, REPLACES ITEM 612 POST HC-SB-61-392		1		
613	C-3317-026-2	• O-RING, REPLACED BY ITEM 613A		1	Y	
613A	C-3317-123	• O-RING, REPLACES ITEM 613 POST HC-SB-61-392		1	Y	
615	A-6153-137	• RING, RETAINING, EXTERNAL SPIRAL		1	Y	
620	A-2249	• HUB BUSHING, GUIDE		2	Y	
630	B-6142	• INSERT, 1/4-28, CRES, COILED		20	Y	
640	B-6045-6-6	• BUSHING, METAL-POLYMER COMP (BETA ROD)		3	Y	
650	B-1243	• INSERT, 9/16-18, CRES, STAKED, (HUB MOUNTING HOLE)		8	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

D-3398-4: Hub Unit

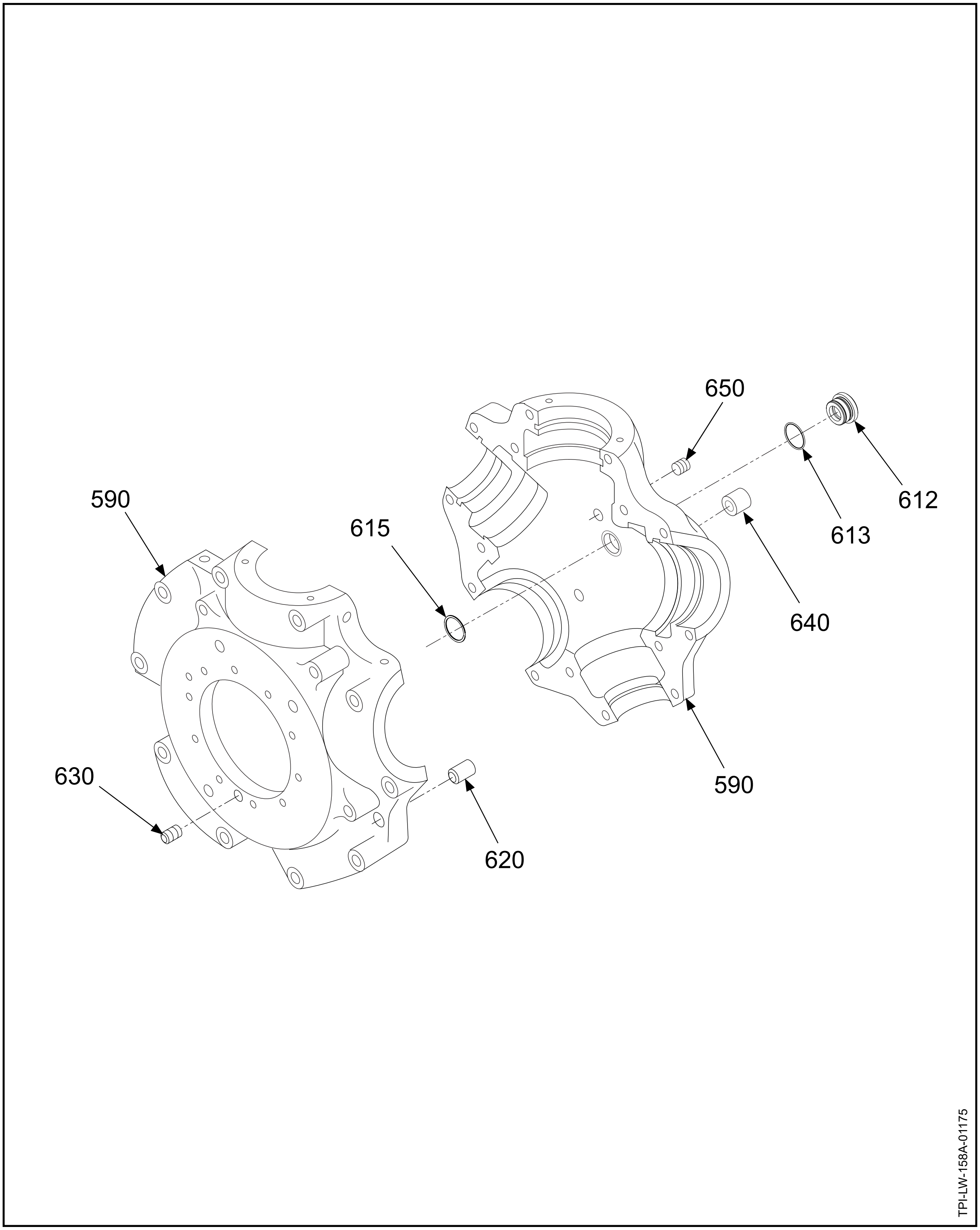


E-2819: Hub Unit
Figure 10A-10

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-10		**E-2819: HUB UNIT PARTS**				
590	E-2819	PCP: HUB UNIT, HC-E5B-5	A	1		PCP
610	A-3789	• HUB BUSHING, ROD SUPERSEDED BY ITEM 610A		1	Y	
610A	A-3789-1	• HUB BUSHING, ROD SUPERSEDES ITEM 610		1	Y	
620	A-2249	• HUB BUSHING, GUIDE		2	Y	
630	B-6142	• INSERT, 1/4-28, CRES, COILED		20	Y	
650	B-1243	• INSERT, 9/16-18, CRES, STAKED (HUB MOUNTING HOLE)		12	Y	

EFF CODE	INFORMATION
A	THE E-2819 HUB MAY BE MODIFIED TO INCORPORATE THE 104903 HUB BUSHING. REFER TO THE ALUMINUM HUB OVERHAUL CHAPTER OF HARTZELL PROPELLER INC. STANDARD PRACTICES MANUAL 202A (61-01-02).

- ITEM NOT ILLUSTRATED

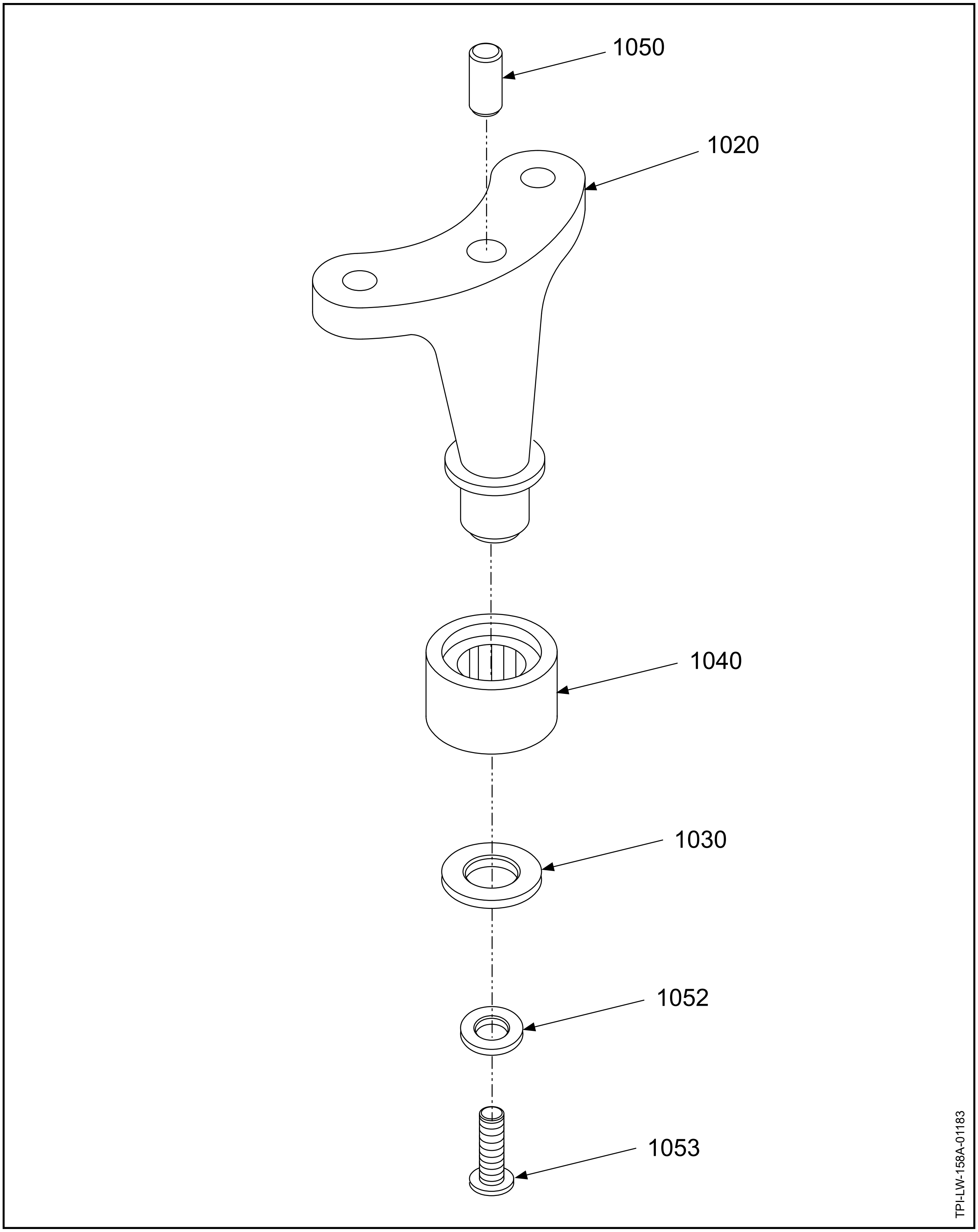


E-2819-1: Hub Unit
Figure 10A-11

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-11		**E-2819-1: HUB UNIT PARTS**				
590A	E-2819-1	PCP: HUB UNIT, HC-E5B-5		1		PCP
612	104903	• HUB BUSHING, ROD, REPLACED BY ITEM 612A		1		
612A	108346	• HUB BUSHING, ROD, REPLACES ITEM 612 POST HC-SB-61-392		1		
613	C-3317-026-2	• O-RING, REPLACED BY ITEM 613A		1	Y	
613A	C-3317-123	• O-RING, REPLACES ITEM 613 POST HC-SB-61-392		1	Y	
615	A-6153-137	• RING, RETAINING, EXTERNAL SPIRAL		1	Y	
620	A-2249	• HUB BUSHING, GUIDE		2	Y	
630	B-6142	• INSERT, 1/4-28, CRES, COILED		20	Y	
650	B-1243	• INSERT, 9/16-18, CRES, STAKED (HUB MOUNTING HOLE)		8	Y	

EFF CODE	INFORMATION

- ITEM NOT ILLUSTRATED



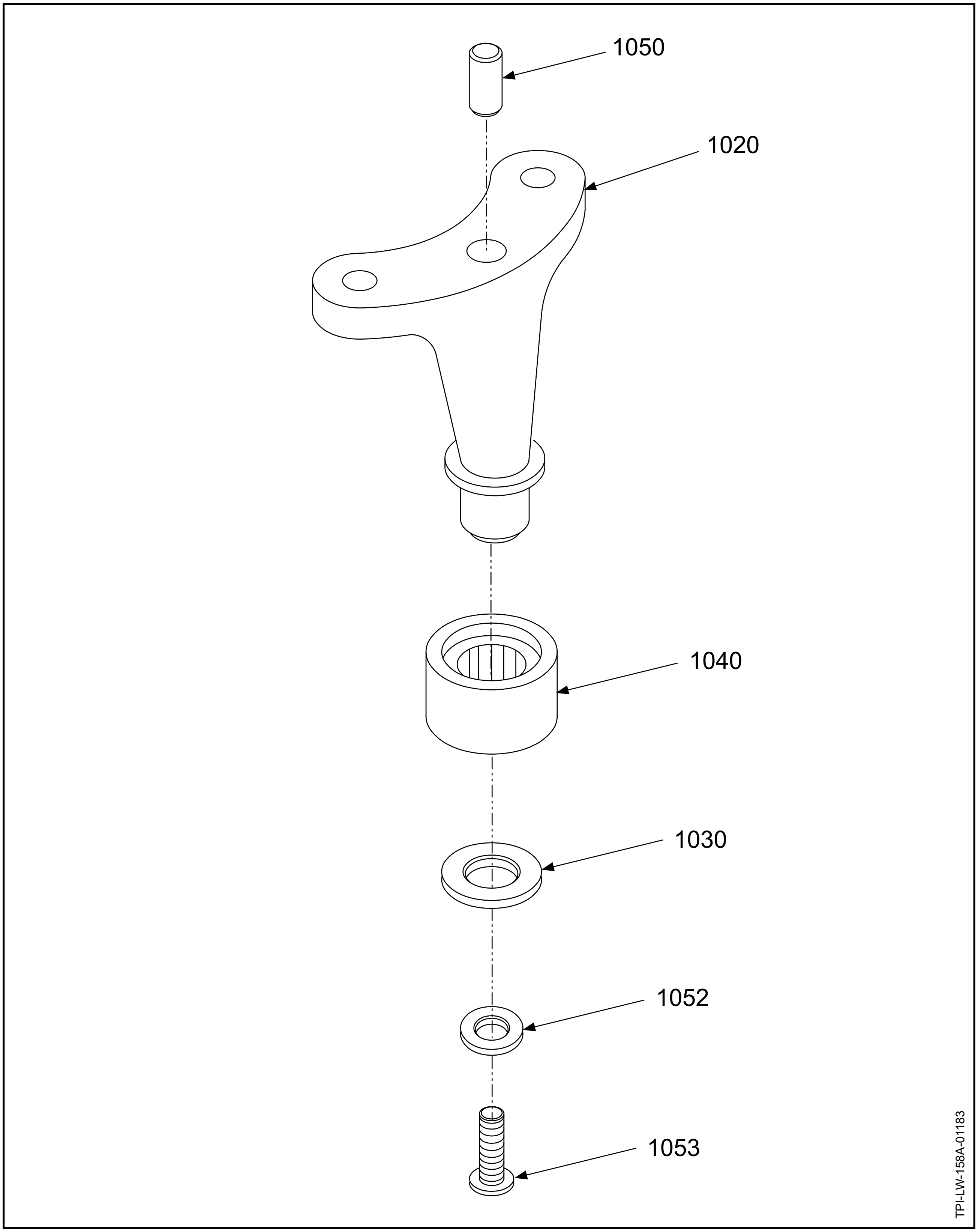
B-3778-( ): Pitch Change Knob Bracket Unit
Figure 10A-12

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-12		**B-3778-( ): PITCH CHANGE KNOB BRACKET UNIT**				
-1010	B-3778-( )	BRACKET, KNOB, PITCH CHANGE - UNIT		5		
1020	C-2661-( )	• BRACKET, KNOB, PITCH CHANGE USE WITH ITEM 1030		1		
1020A	C-2661-( )A	• BRACKET, KNOB, PITCH CHANGE (MODIFIED) USE WITH ITEMS 1030A, 1052, AND 1053 POST HC-SB-61-346 OR HC-SB-61-320, R1		1		
1030	B-475	• WASHER, RETAINING, KNOB UNIT USE WITH ITEM 1020		1	Y	
1030A	103395	• WASHER, RETAINING, KNOB UNIT USE WITH ITEMS 1020A, 1052, AND 1053 POST HC-SB-61-346 OR HC-SB-61-320, R1		1	Y	
1040	B-6545	• CAM FOLLOWER		1	Y	
1050	B-6138-6-7	• DOWEL PIN, PITCH CHANGE KNOB SUPERSEDED BY ITEM 1050A		1		
1050A	B-6260	• DOWEL PIN, 3/8 INCH, PITCH CHANGE KNOB SUPERSEDES ITEM 1050		1		
1052	B-3860-10L	• WASHER, DIMPLED, 100°, CRES USE WITH ITEMS 1020A, 1030A, AND 1053 POST HC-SB-61-346 OR HC-SB-61-320, R1		1	Y	
1053	B-3867-272	• SCREW, 10-32, 100° HEAD, CRES USE WITH ITEMS 1020A, 1030A, AND 1052 POST HC-SB-61-346 OR HC-SB-61-320, R1		1	Y	

EFF CODE	INFORMATION

- ITEM NOT ILLUSTRATED

B-3778-( ): Pitch Change Knob Bracket Unit



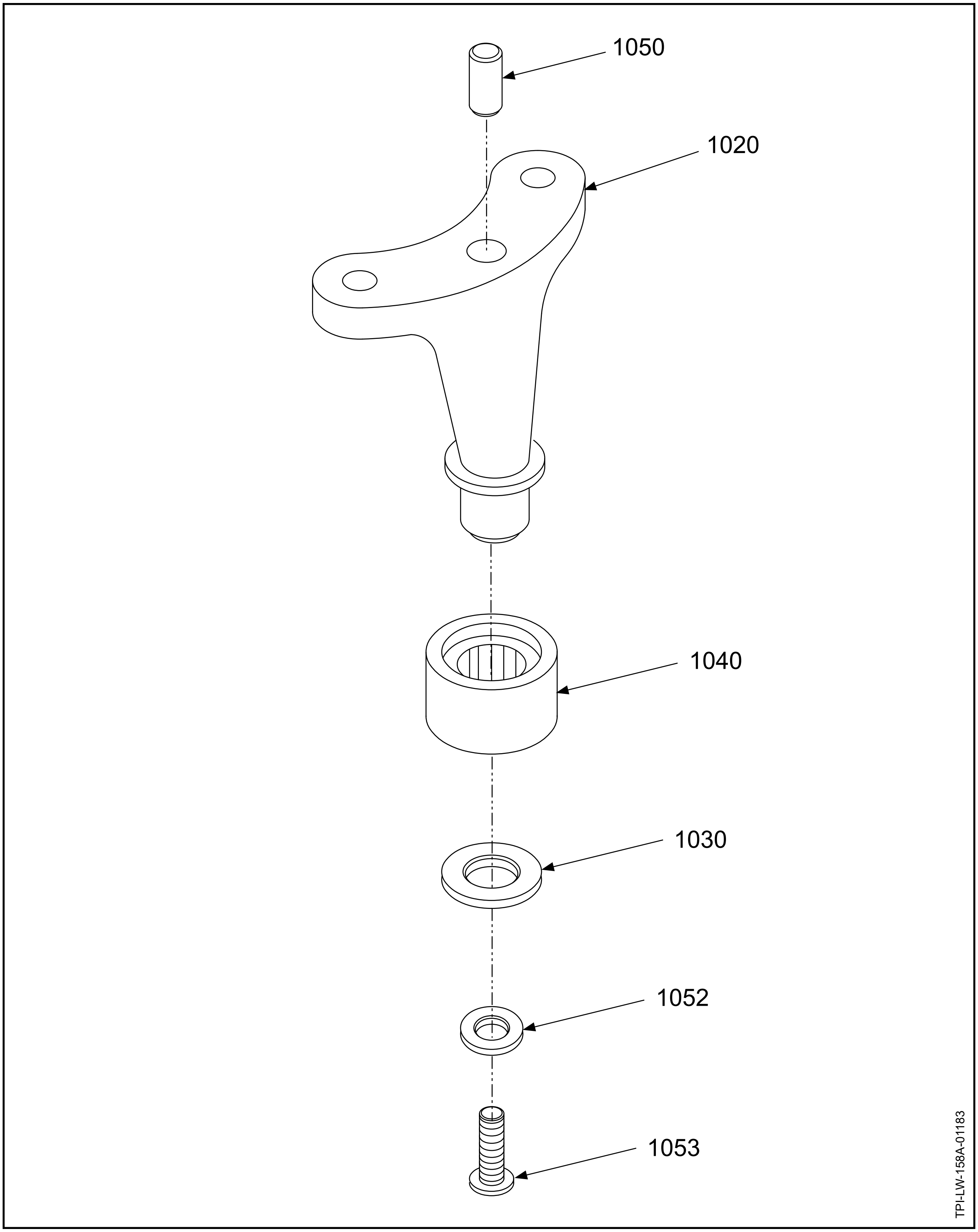
B-5883-( ): Pitch Change Knob Bracket Unit
Figure 10A-13

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-13		**B-5883-( ): PITCH CHANGE KNOB BRACKET UNIT**				
-1010	B-5883-( )	BRACKET, KNOB, PITCH CHANGE - UNIT		5		
1020	C-5618-( )	• PITCH CHANGE KNOB BRACKET USE WITH ITEM 1030		1		
1020A	C-5618-( )A	• PITCH CHANGE KNOB BRACKET (MODIFIED) USE WITH ITEMS 1030A, 1052, AND 1053 POST HC-SB-61-346 OR HC-SB-61-320, R1		1		
1030	B-475	• WASHER, RETAINING, KNOB UNIT USE WITH ITEM 1020		1	Y	
1030A	103395	• WASHER, RETAINING, KNOB UNIT USE WITH ITEMS 1020A, 1052, AND 1053 POST HC-SB-61-346 OR HC-SB-61-320, R1		1	Y	
1040	B-6545	• CAM FOLLOWER		1	Y	
1050	B-6260	• DOWEL PIN, 3/8 INCH, PITCH CHANGE KNOB		1		
1052	B-3860-10L	• WASHER, DIMPLED, 100°, CRES USE WITH ITEMS 1020A, 1030A, AND 1053 POST HC-SB-61-346 OR HC-SB-61-320, R1		1	Y	
1053	B-3867-272	• SCREW, 10-32, 100° HEAD, CRES USE WITH ITEMS 1020A, 1030A, AND 1052 POST HC-SB-61-346 OR HC-SB-61-320, R1		1	Y	

EFF CODE	INFORMATION

- ITEM NOT ILLUSTRATED

B-5883-( ): Pitch Change Knob Bracket Unit



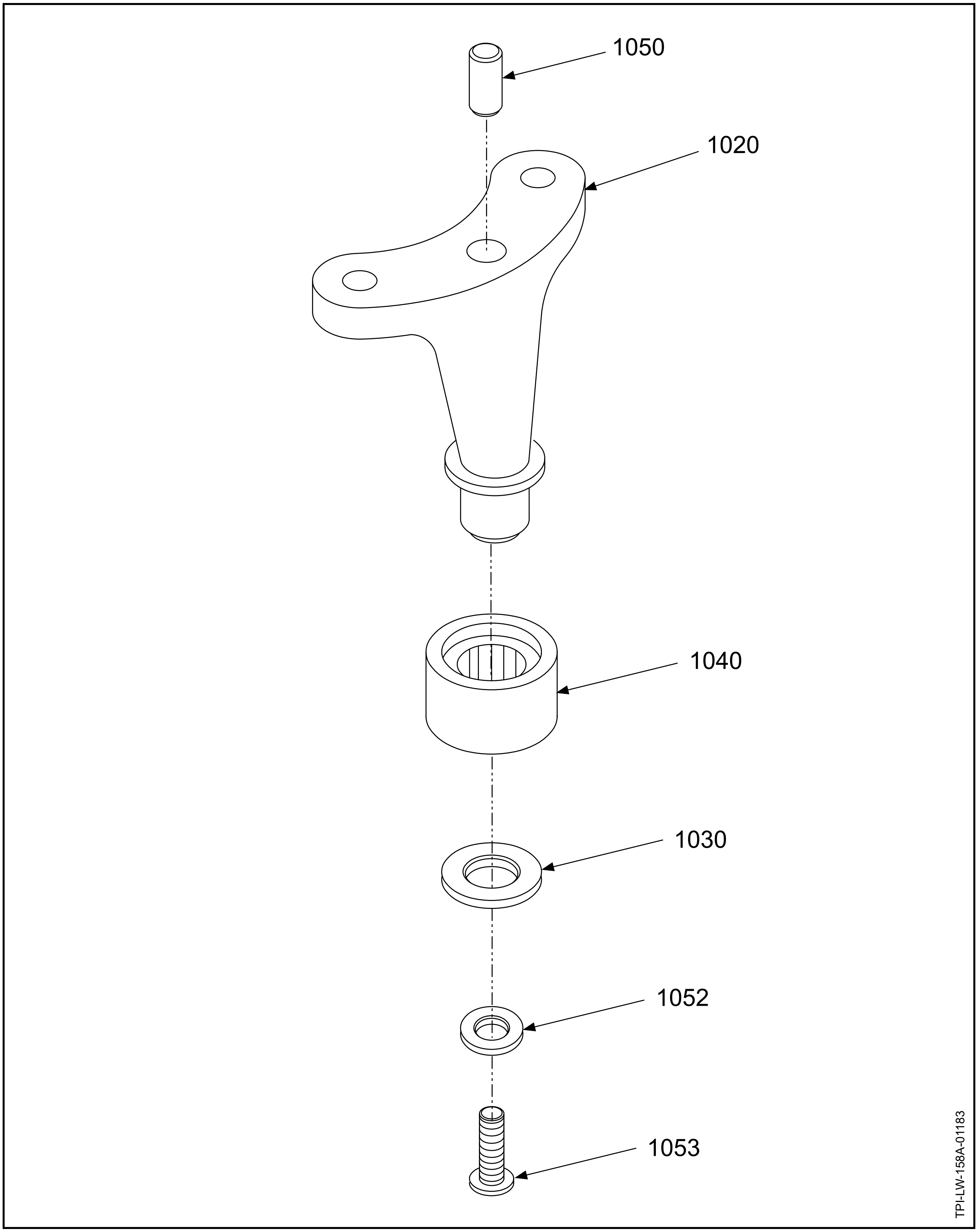
100035-( ): Pitch Change Knob Bracket Unit
Figure 10A-14

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-14		**100035-( ): PITCH CHANGE KNOB BRACKET UNIT**				
-1010	100035-( )	BRACKET, KNOB, PITCH CHANGE - UNIT		5		
1020	100034-( )	• BRACKET, KNOB, PITCH CHANGE		1		
1030	103395	• WASHER, RETAINING, KNOB UNIT		1		
1040	B-6545	• CAM FOLLOWER		1	Y	
1050	B-6260	• DOWEL PIN, 3/8 INCH, PITCH CHANGE KNOB		1		
1052	B-3860-10L	• WASHER, DIMPLED, 100°, CRES		1	Y	
1053	B-3867-272	• SCREW, 10-32, 100° HEAD, CRES		1	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

100035-( ): Pitch Change Knob Bracket Unit



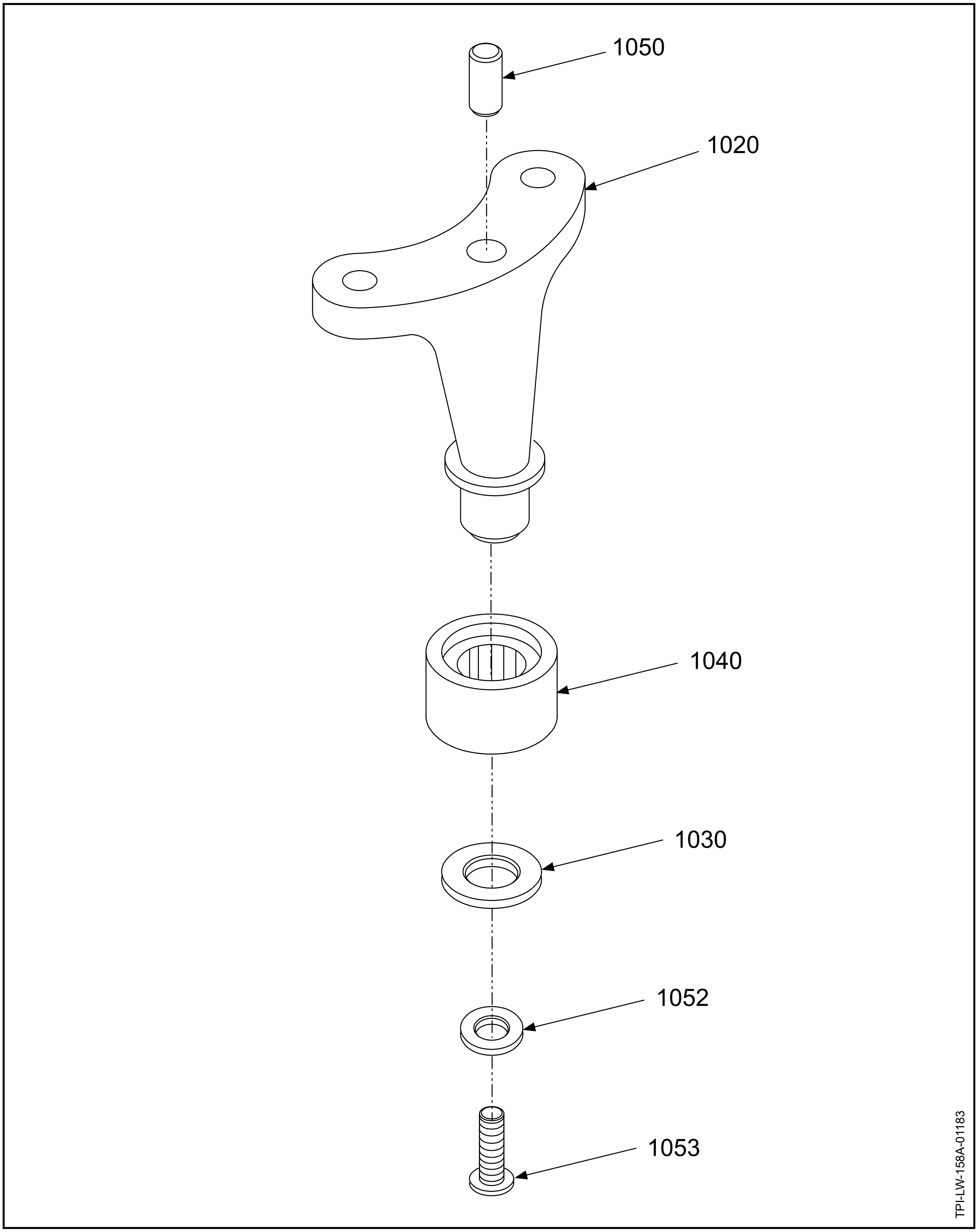
100037-( ): Pitch Change Knob Bracket Unit
Figure 10A-15

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-15		**100037-( ): PITCH CHANGE KNOB BRACKET UNIT**				
-1010	100037-( )	BRACKET, KNOB, PITCH CHANGE - UNIT		5		
1020	100036-( )	• PITCH CHANGE KNOB BRACKET		1		
1030	103395	• WASHER, RETAINING, KNOB UNIT		1		
1040	B-6545	• CAM FOLLOWER		1	Y	
1050	B-6260	• DOWEL PIN, 3/8 INCH, PITCH CHANGE KNOB		1		
1052	B-3860-10L	• WASHER, DIMPLED, 100°, CRES		1	Y	
1053	B-3867-272	• SCREW, 10-32, 100° HEAD, CRES		1	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

100037-( ): Pitch Change Knob Bracket Unit



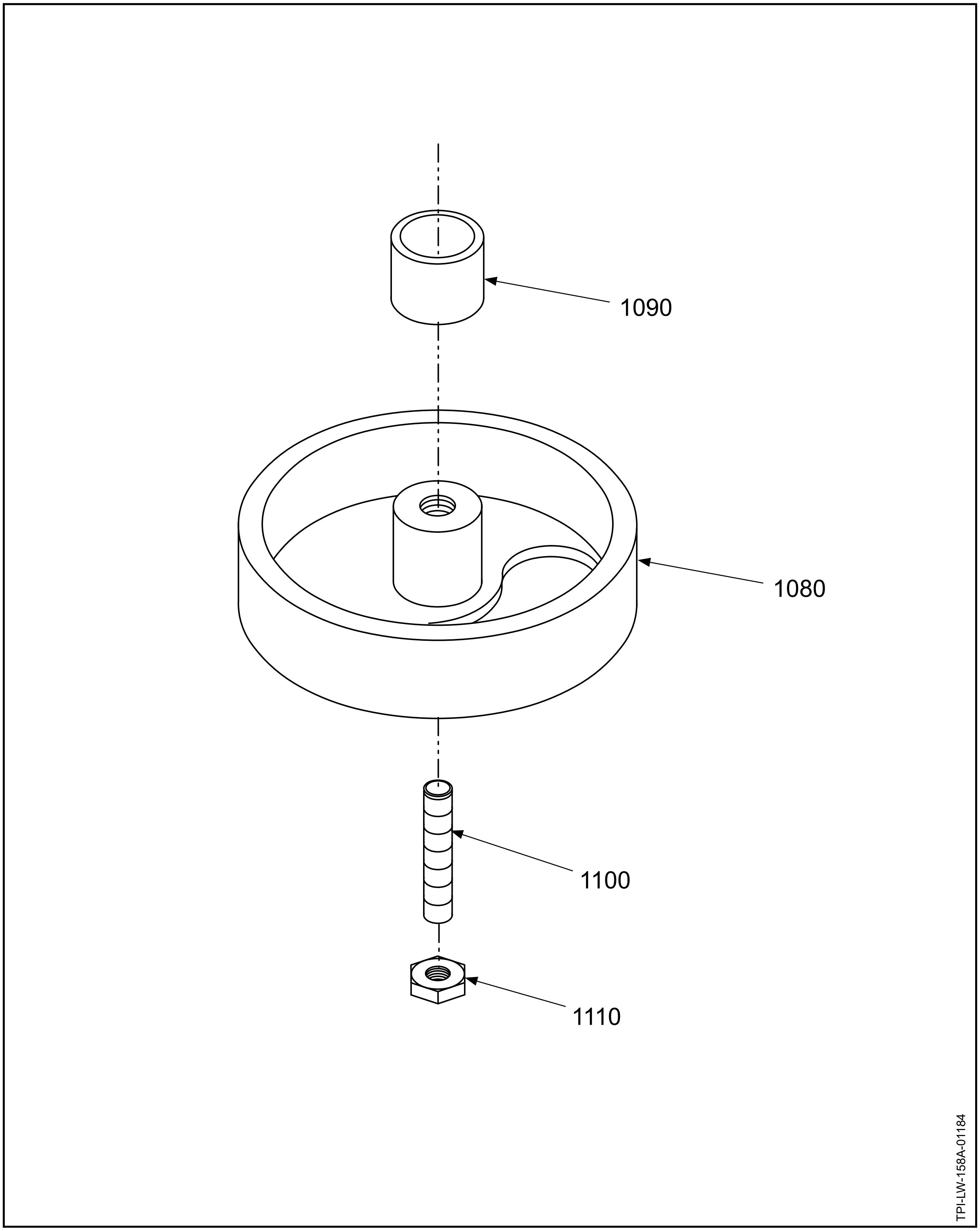
104901-( ): Pitch Change Knob Bracket Unit
Figure 10A-16

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-16		**104901-( ): PITCH CHANGE KNOB BRACKET UNIT**				
-1010	104901-( )	BRACKET, KNOB, PITCH CHANGE - UNIT		5		
1020	104858-( )	• PITCH CHANGE KNOB BRACKET		1		
1030	103395	• WASHER, RETAINING, KNOB UNIT		1		
1040	B-6545	• CAM FOLLOWER		1	Y	
1050	B-6260	• DOWEL PIN, 3/8 INCH		1		
1052	B-3860-10L	• WASHER, DIMPLED, 100°, CRES		1	Y	
1053	B-3867-272	• SCREW, 10-32, 100° HEAD, CRES		1	Y	

EFF CODE	INFORMATION

- ITEM NOT ILLUSTRATED

104901-( ): Pitch Change Knob Bracket Unit



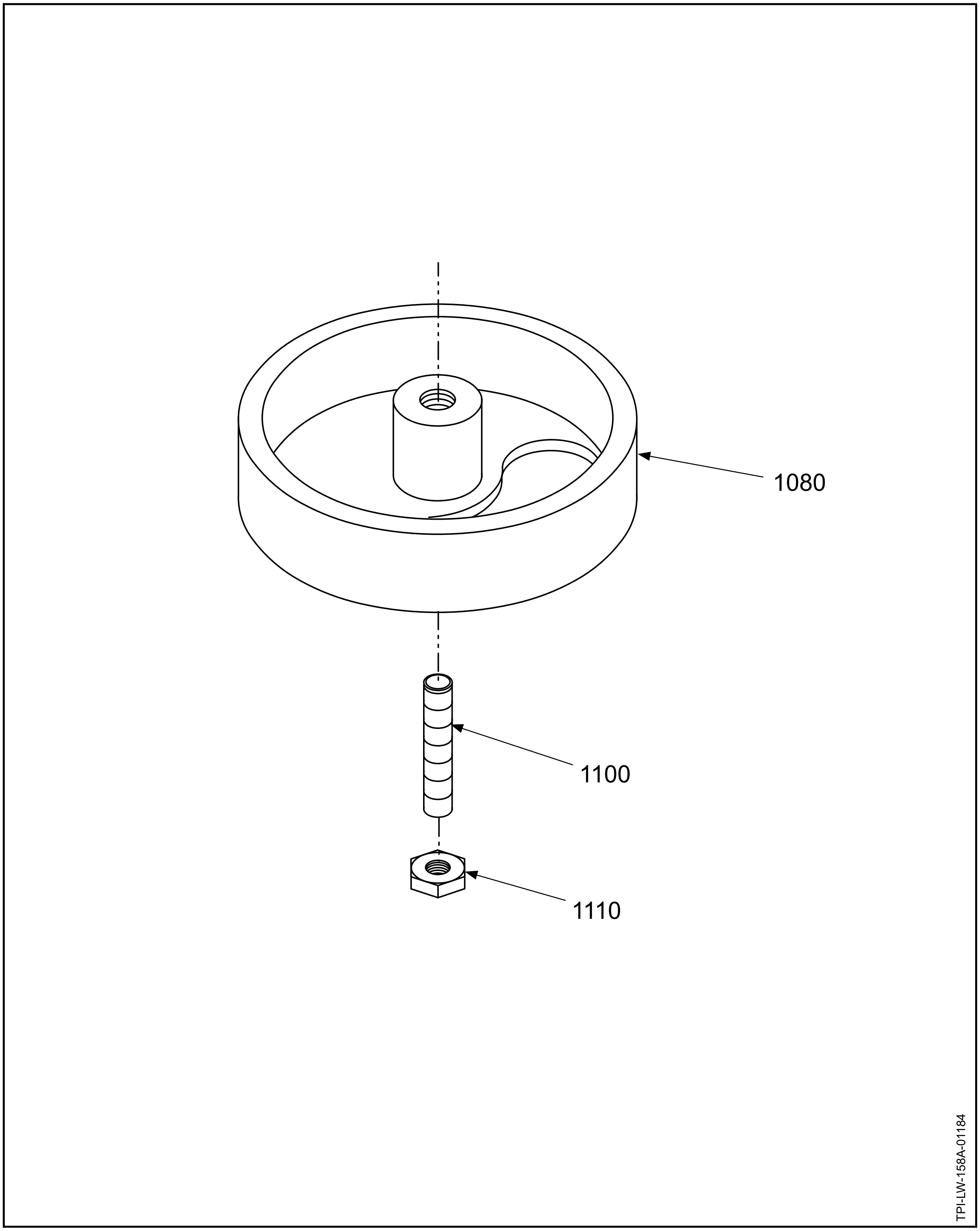
C-7243: Preload Plate Assembly
Figure 10A-17

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-17		**C-7243: PRELOAD PLATE ASSEMBLY**				
1080	C-7243	PRELOAD PLATE ASSEMBLY		5		
1090	A-1272	• RACE, INNER BEARING ONLY AVAILABLE AS PART OF ITEM 1080		1		
1100	A-3204	• SCREW, SET, 5/16-24, PRELOAD PLATE REPLACED BY ITEM 1100B		1	Y	
1100A	A-3204-1	• SCREW, SET, 5/16-24, PRELOAD PLATE - ALTERNATE REPLACED BY ITEM 1100B		1	Y	
1100B	A-3204-2	• SCREW, SET, 5/16-24, PRELOAD PLATE - REPLACES ITEM 1100 AND 1100A POST HC-SB-61-225		1	Y	
1110	B-3368	• NUT, 5/16-24, HEX, THIN		1	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

C-7243: Preload Plate Assembly



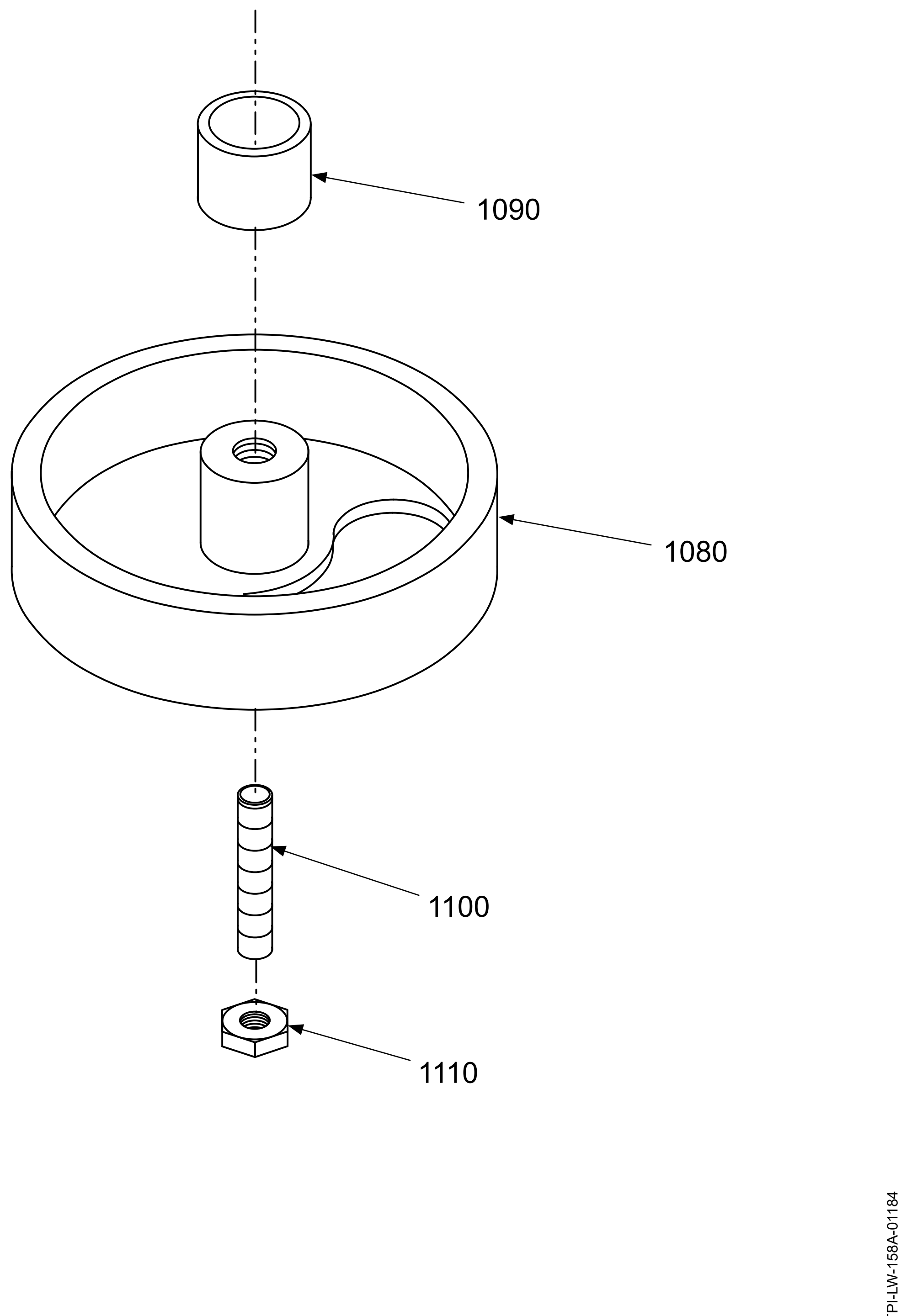
C-7244: Preload Plate Assembly
Figure 10A-18

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-18		**C-7244: PRELOAD PLATE ASSEMBLY**				
1080	C-7244	PRELOAD PLATE ASSEMBLY		5		
1100	A-3204	• SCREW, SET, 5/16-24, PRELOAD PLATE REPLACED BY ITEM 1100B		1	Y	
1100A	A-3204-1	• SCREW, SET, 5/16-24, PRELOAD PLATE - ALTERNATE REPLACED BY ITEM 1100B		1	Y	
1100B	A-3204-2	• SCREW, SET, 5/16-24, PRELOAD PLATE - REPLACES ITEM 1100 AND 1100A POST HC-SB-61-225		1	Y	
1110	B-3368	• NUT, 5/16-24, HEX, THIN		1	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

C-7244: Preload Plate Assembly



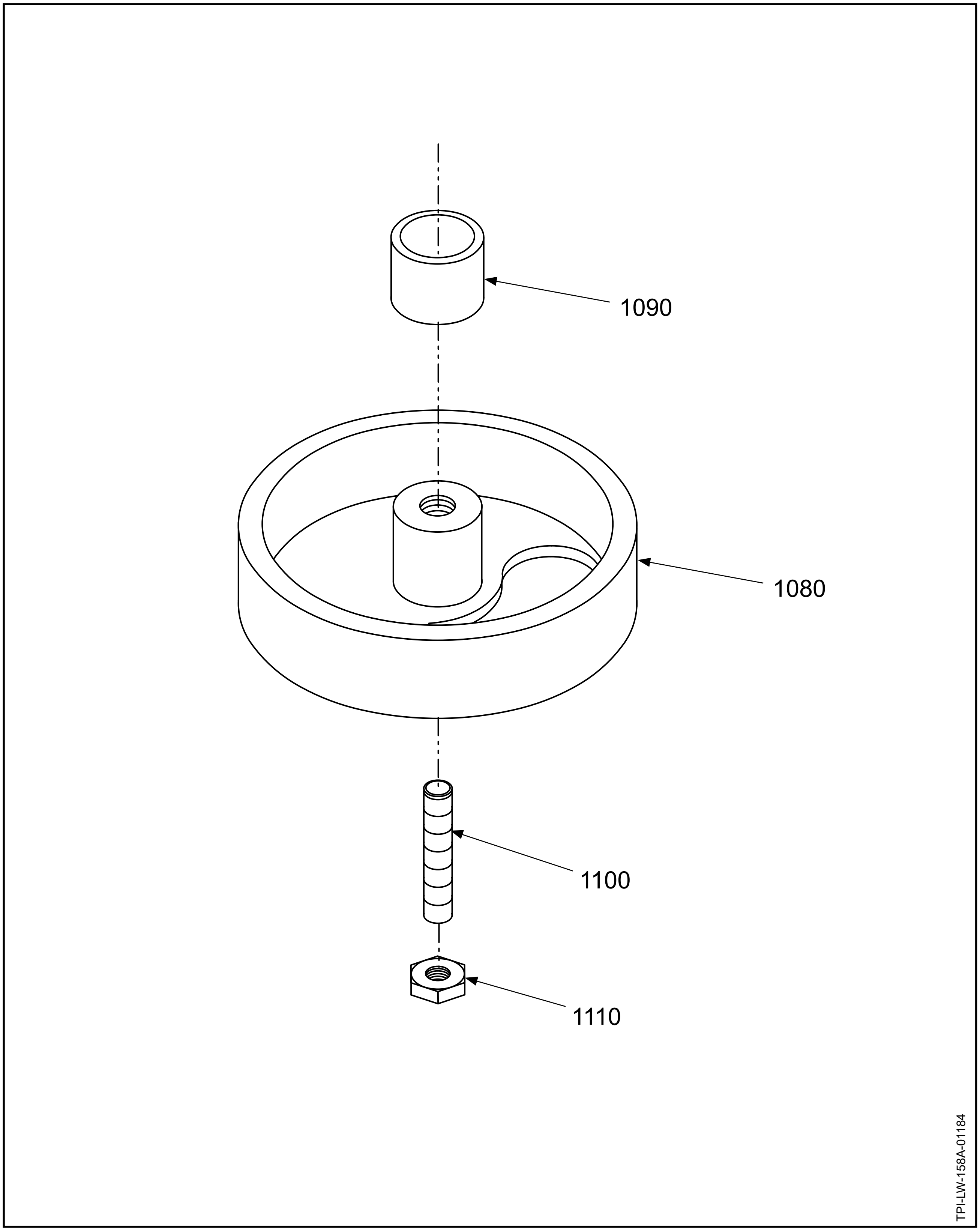
C-7245: Preload Plate Assembly
Figure 10A-19

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-19		**C-7245: PRELOAD PLATE ASSEMBLY**				
1080	C-7245	PRELOAD PLATE ASSEMBLY		5		
1090	A-1272	• RACE, INNER BEARING ONLY AVAILABLE AS PART OF ITEM 1080		1		
1100	A-3204	• SCREW, SET, 5/16-24, PRELOAD PLATE REPLACED BY ITEM 1100B		1	Y	
1100A	A-3204-1	• SCREW, SET, 5/16-24, PRELOAD PLATE - ALTERNATE REPLACED BY ITEM 1100B		1	Y	
1100B	A-3204-2	• SCREW, SET, 5/16-24, PRELOAD PLATE - REPLACES ITEM 1100 AND 1100A POST HC-SB-61-225		1	Y	
1110	B-3368	• NUT, 5/16-24, HEX, THIN		1	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

C-7245: Preload Plate Assembly

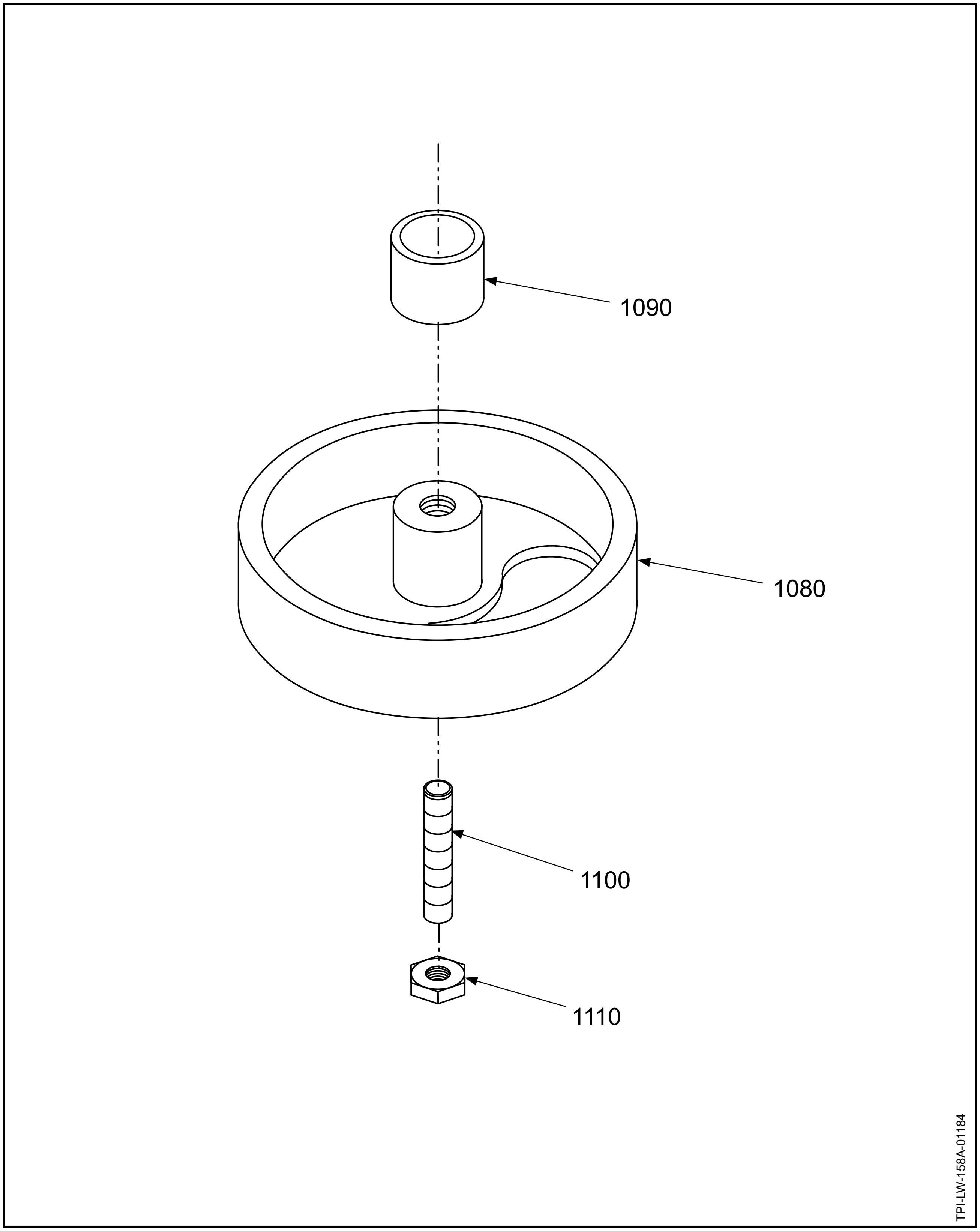


101738: Preload Plate Assembly
Figure 10A-20

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-20		**101738: PRELOAD PLATE ASSEMBLY**				
1080	101738	PRELOAD PLATE ASSEMBLY		5		
1090	A-1272	• RACE, INNER BEARING ONLY AVAILABLE AS PART OF ITEM 1080		1		
1100	A-3204	• SCREW, SET, 5/16-24, PRELOAD PLATE REPLACED BY ITEM 1100B		1	Y	
1100A	A-3204-1	• SCREW, SET, 5/16-24, PRELOAD PLATE - ALTERNATE REPLACED BY ITEM 1100B		1	Y	
1100B	A-3204-2	• SCREW, SET, 5/16-24, PRELOAD PLATE - REPLACES ITEM 1100 AND 1100A POST HC-SB-61-225		1	Y	
1110	B-3368	• NUT, 5/16-24, HEX, THIN		1	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED



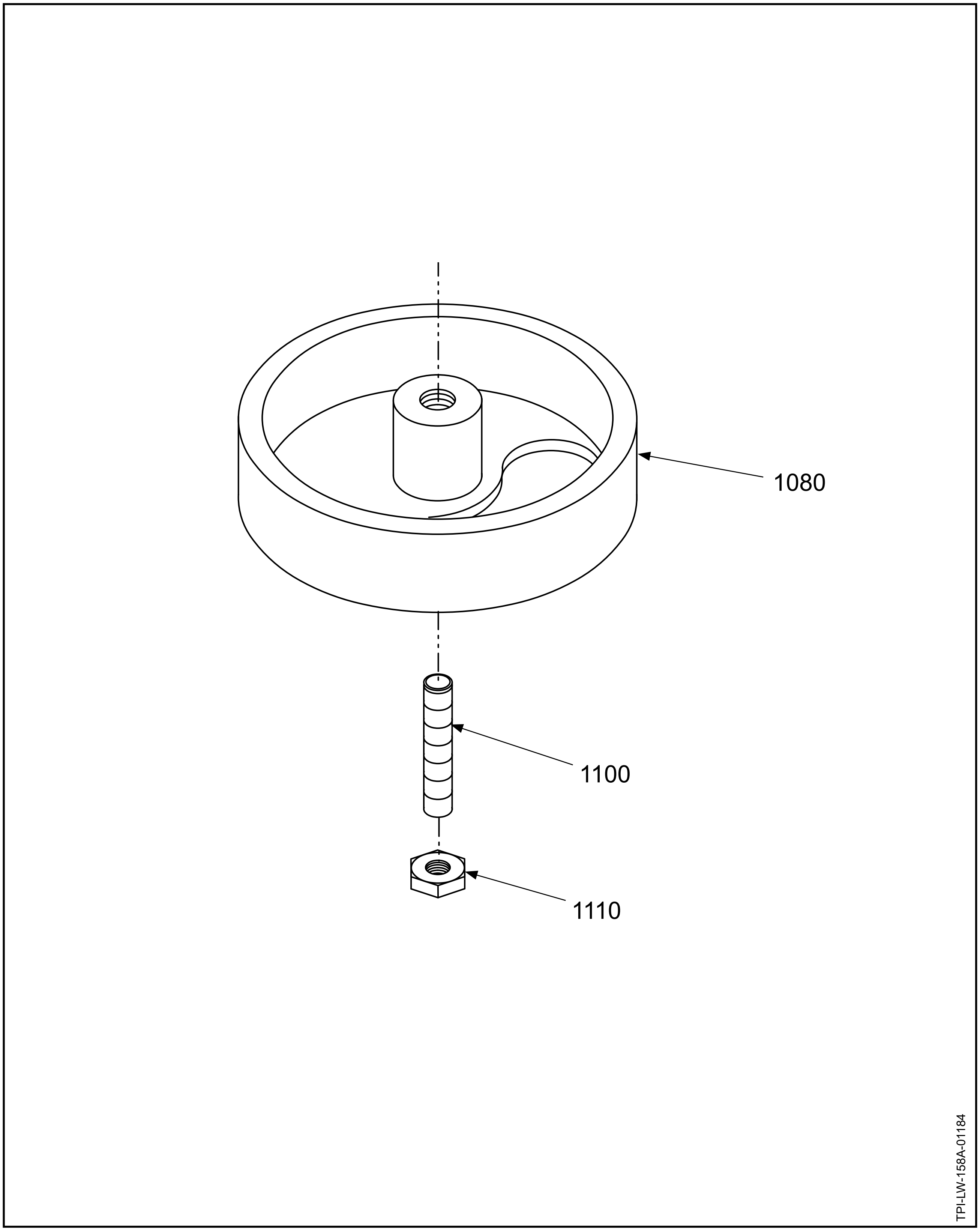
101739: Preload Plate Assembly
Figure 10A-21

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-21		**101739: PRELOAD PLATE ASSEMBLY**				
1080	101739	PRELOAD PLATE ASSEMBLY		5		
1090	A-1272	• RACE, INNER BEARING ONLY AVAILABLE AS PART OF ITEM 1080		1		
1100	A-3204	• SCREW, SET, 5/16-24, PRELOAD PLATE REPLACED BY ITEM 1100B		1	Y	
1100A	A-3204-1	• SCREW, SET, 5/16-24, PRELOAD PLATE - ALTERNATE REPLACED BY ITEM 1100B		1	Y	
1100B	A-3204-2	• SCREW, SET, 5/16-24, PRELOAD PLATE - REPLACES ITEM 1100 AND 1100A POST HC-SB-61-225		1	Y	
1110	B-3368	• NUT, 5/16-24, HEX, THIN		1	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

101739: Preload Plate Assembly

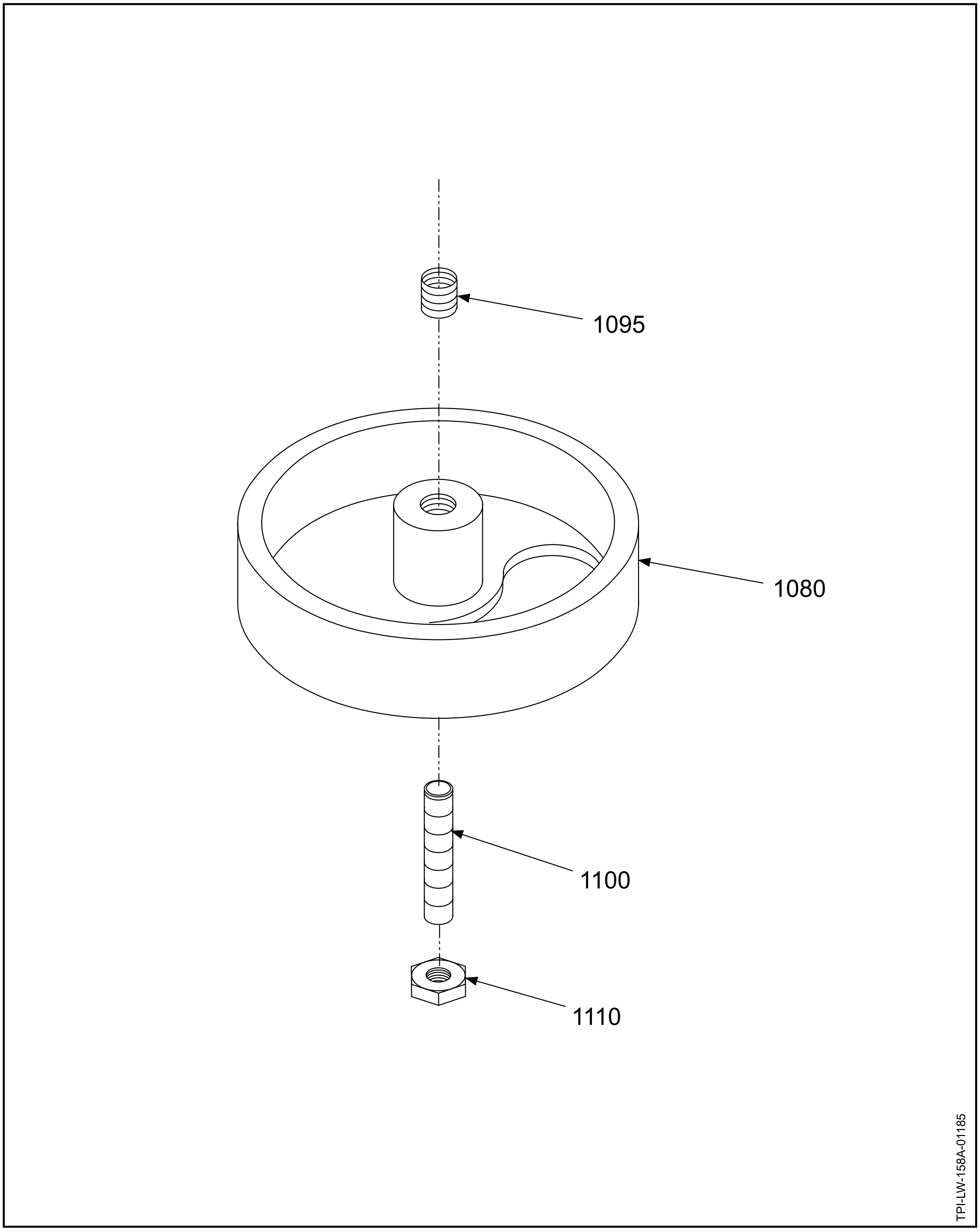


101740: Preload Plate Assembly
Figure 10A-22

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-22		**101740: PRELOAD PLATE ASSEMBLY**				
1080	101740	PRELOAD PLATE ASSEMBLY		5		
1100	A-3204	• SCREW, SET, 5/16-24, PRELOAD PLATE REPLACED BY ITEM 1100B		1	Y	
1100A	A-3204-1	• SCREW, SET, 5/16-24, PRELOAD PLATE - ALTERNATE REPLACED BY ITEM 1100B		1	Y	
1100B	A-3204-2	• SCREW, SET, 5/16-24, PRELOAD PLATE - REPLACES ITEM 1100 AND 1100A POST HC-SB-61-225		1	Y	
1110	B-3368	• NUT, 5/16-24, HEX, THIN		1	Y	

EFF CODE	INFORMATION

- ITEM NOT ILLUSTRATED



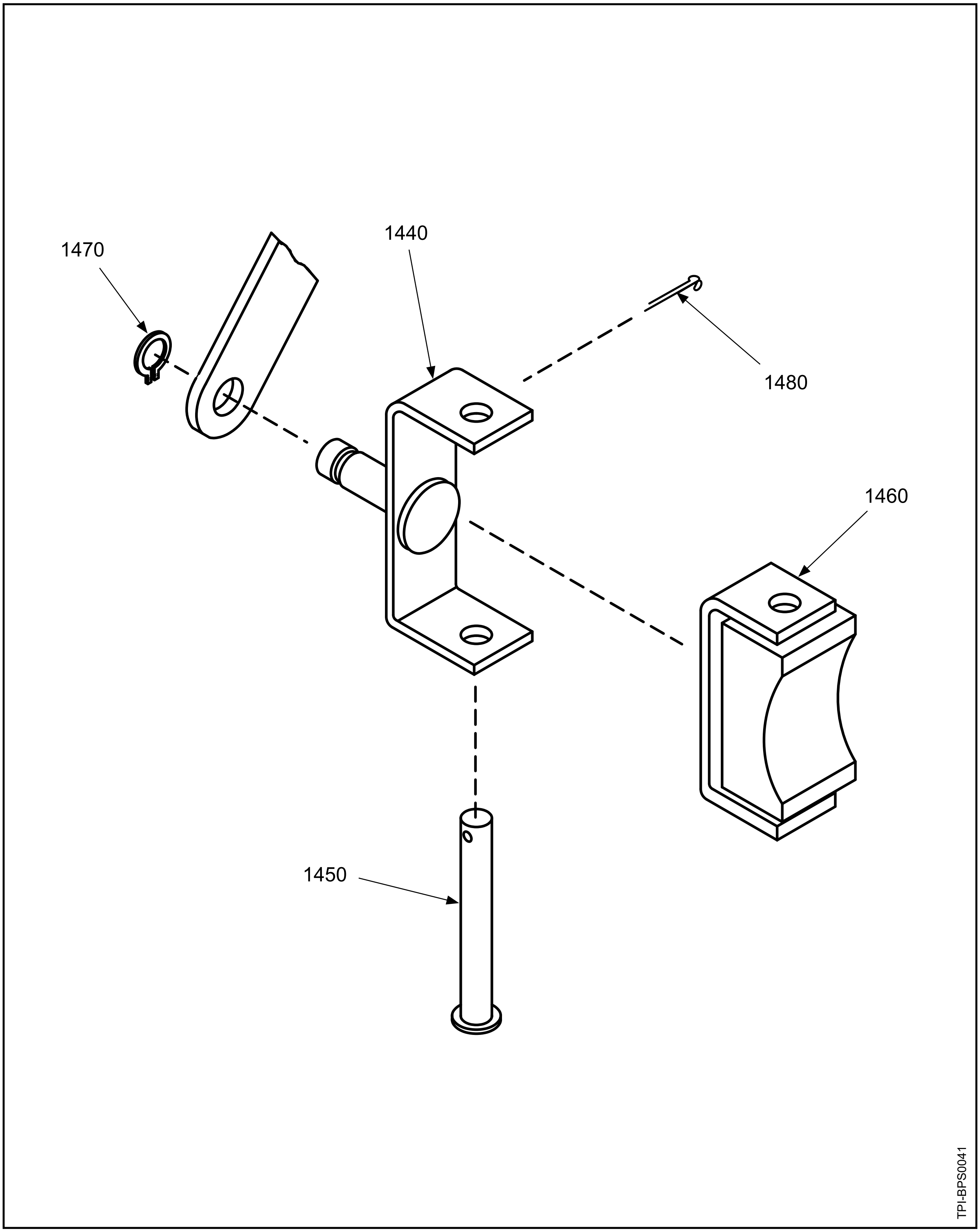
104882: Preload Plate Assembly
Figure 10A-23

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-23		**104882: PRELOAD PLATE ASSEMBLY**				
1080	104882	PRELOAD PLATE ASSEMBLY		5		
1095	B-6986-314M	• INSERT, THREAD, THIN WALL		1		
1100	101667	• SET SCREW, PRELOAD PLATE		1	Y	
1110	B-3368	• NUT, 5/16-24, HEX, THIN		1	Y	

EFF CODE	INFORMATION

- ITEM NOT ILLUSTRATED

104882: Preload Plate Assembly



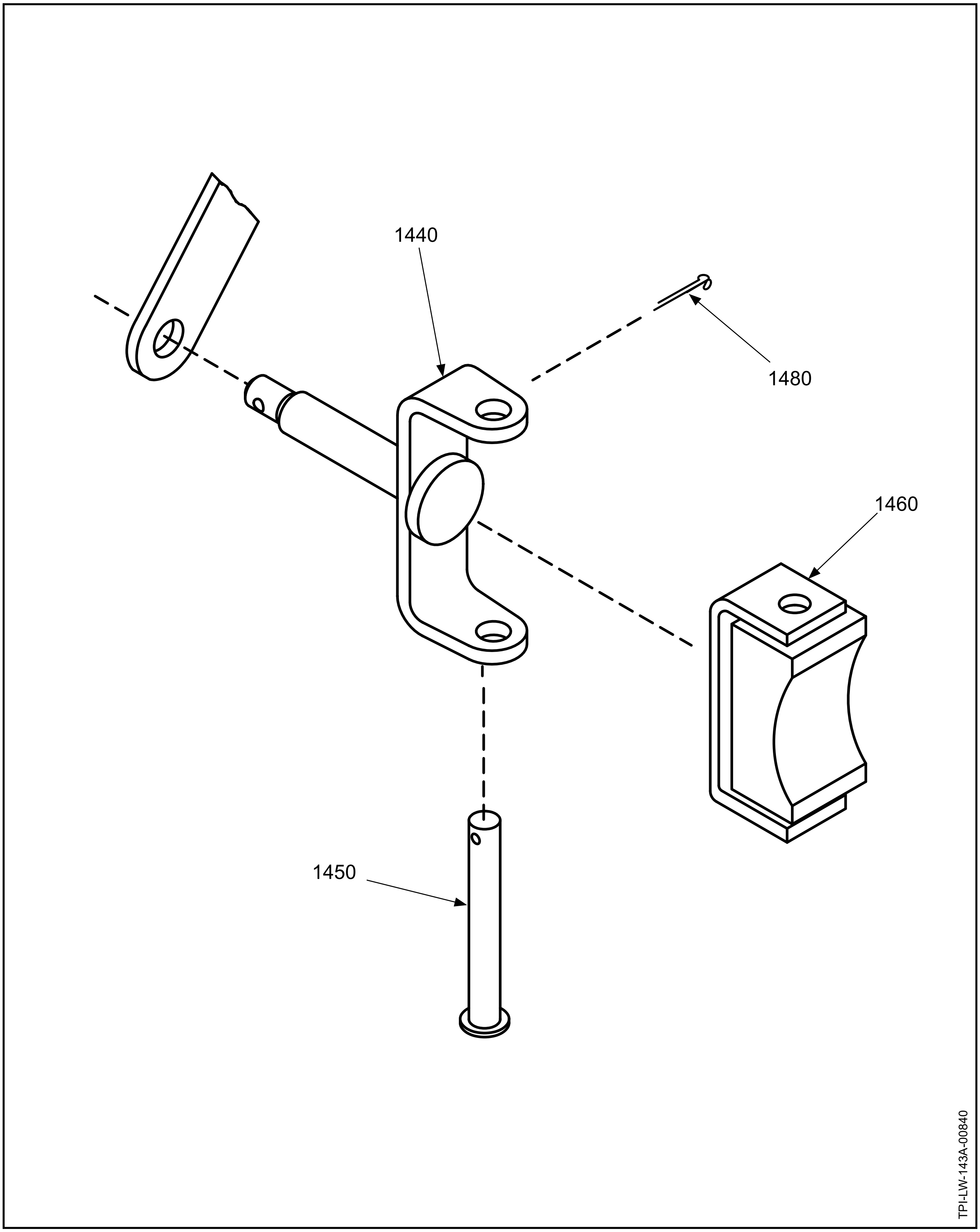
A-3044: Beta Feedback Block Assembly
Figure 10A-24

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-24		**A-3044: BETA FEEDBACK BLOCK ASSEMBLY**				
-1430	A-3044	BLOCK, BETA FEEDBACK - ASSEMBLY		1		
1440	A-3025	• YOKE UNIT		1		
1450	A-3027	• CLEVIS PIN - SUPERSEDED BY ITEM 1450A		1	Y	
1450A	B-3844-53	• CLEVIS PIN - SUPERSEDES ITEM 1450		1	Y	
1460	A-3026	• CARBON BLOCK UNIT		1	Y	
1470	B-3843-25PP	• SNAP RING, EXTERNAL		1	Y	
1480	A-4543	• COTTER PIN, T HEAD		1	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

A-3044: Beta Feedback Block Assembly



A-3074: Beta Feedback Block Assembly
Figure 10A-25

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-25		**A-3074: BETA FEEDBACK BLOCK ASSEMBLY**				
-1430	A-3074	BLOCK, BETA FEEDBACK - ASSEMBLY		1		
1440	A-3073	• YOKE UNIT		1		
1450	B-3844-53	• CLEVIS PIN		1	Y	
1460	A-3026	• CARBON BLOCK UNIT		1	Y	
1480	A-4543	• COTTER PIN, T HEAD		1	Y	

EFF CODE INFORMATION

- ITEM NOT ILLUSTRATED

A-3074: Beta Feedback Block Assembly

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