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MANUAL REVISION TRANSMITTAL

Manual 132A (61-10-32)
Five-Blade Steel Hub Turbine Engine Propeller
Overhaul and Maintenance Manual

REVISION 26 dated June 2023

Remove Pages:	Insert Pages:
ENTIRE MANUAL	ENTIRE MANUAL

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

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Manual No. 132A
61-10-32
Revision 26
June 2023

Five-Blade Steel Hub Turbine Engine Propeller
Overhaul Manual

HC-B5MA-2
HC-B5MA-3( )( )
HC-B5MA-5( )( )
HC-B5MP-3( )( )
HC-B5MP-5( )( )

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REVISION 26 HIGHLIGHTS

Revision 26, dated June 2023, incorporates the following:

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

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

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

- TESTING AND FAULT ISOLATION
  - Revised the section, "Troubleshooting Guide" and applicable figures
- DISASSEMBLY
  - Revised Figure 3-3, "Blade and Flange Mounting Parts"
- CHECK
  - Revised the section, "Inspection Criteria/Procedures"
- REPAIR
  - Revised the section, "Repair/Modification Procedures"
  - Revised the section, "Piston Repair"
- ASSEMBLY
  - Revised Figure 7-2, "Hub Arm Build-Up"
  - Revised the section, "Piston Installation"
  - Revised Figure 7-13, "Pitch Adjust Spacers for Feathering Spring Assemblies"
  - Revised the section, "Blade Angle Reference Tape Application (Optional)"
  - Added the section, "Setting Reverse Position of Blades"
  - Revised the section, "Final Inspection of the Propeller"
  - Revised the section, "Special Cases"
- FITS AND CLEARANCES
  - Revised the section, "Blade Tolerances"
- ILLUSTRATED PARTS LIST
  - Added Blade Retention Parts to the section, "Sub-Assembly Parts Lists and Figures" and revised the applicable Propeller Parts Lists and Figures

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REVISION 26 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 revision dates are the same and no change bars are used.

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

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

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

Revision No.	Issue Date	Comments
Rev. 3	Jan/97	Total Reprint
Rev. 4	Jun/98	None
Rev. 5	June/99	Minor Revision
Rev. 6	Mar/01	Major Revision
Rev. 7	Jan/03	Major Revision
Rev. 8	May/03	Minor Revision
Rev. 9	Nov/03	Minor Revision
Rev. 10	Apr/04	Minor Revision
Rev. 11	Jun/04	Minor Revision
Rev. 12	Oct/04	Minor Revision
Rev. 13	Jan/05	Minor Revision
Rev. 14	Jun/07	Minor Revision
Rev. 15	Oct/07	Minor Revision
Rev. 16	Oct/08	Minor Revision
Rev. 17	Dec/12	Minor Revision
Rev. 18	May/13	Minor Revision
Rev. 19	Mar/16	Minor Revision
Rev. 20	Feb/18	Minor Revision
Rev. 21	Jul/18	Minor Revision
Rev. 22	Dec/20	Minor Revision
Rev. 23	Dec/21	Minor Revision
Rev. 24	Jun/22	Minor Revision
Rev. 25	Sep/22	Minor Revision
Rev. 26	Jun/23	Major Revision

RECORD OF REVISIONS

This is a record of revisions inserted into this manual.
Revision 26 includes all prior revisions.

Revision Number	Issue Date	Date Inserted	Inserted By
26	Jun/23	Jun/23	HPI

Revision Number	Issue Date	Date Inserted	Inserted By

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RECORD OF TEMPORARY REVISIONS

Update this page to show all temporary revisions inserted into this manual.
Revision 26 includes all prior temporary revisions, up to and including TR-019.

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

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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:	
SB147	Rev. 3, Jan/97
SB149B	Rev. 3, Jan/97
HC-SB-61-275, R3	Rev. 3, Dec/12
HC-SB-61-285, R1	Rev. 17, Dec/12
HC-SB-61-293	Rev. 14, Jun/07
HC-SB-61-294, R1	Rev. 17, Dec/12
HC-SB-61-324	Rev. 17, Dec/12
HC-SB-61-340	Rev. 18, May/13
HC-SB-61-374	Rev. 20, Feb/18

Service Document Number	Incorporation Rev./Date
Service Letters:	
SL131A	Rev. 17, Dec/12
SL149	Rev. 3, Jan/97
SL152	Rev. 3, Jan/97
SL153	Rev. 3, Jan/97
SL154	Rev. 3, Jan/97
SL159	Rev. 3, Jan/97
SL167	Rev. 3, Jan/97
SL169	Rev. 3, Jan/97
SL-61-173, R1	Rev. 6, Mar/01
SL-61-188	Rev. 6, Mar/01
SL-61-244	Rev. 17, Dec/12
SL-61-248	Rev. 17, Dec/12
SL-61-291	Rev. 17, Dec/12
SL-61-351	Rev. 19, Mar/16
HC-SL-61-364	Rev. 22, Dec/20
HC-SL-61-367	Rev. 22, Dec/20

SERVICE DOCUMENT LIST

Service Document Number	Incorporation Rev./Date
Service Advisories:	
SA6C	Rev. 3, Jan/97
SA18A	Rev. 3, Jan/97
SA30	Rev. 3, Jan/97
SA42	Rev. 3, Jan/97
SA52	Rev. 3, Jan/97
SA72	Rev. 3, Jan/97

Service Document Number	Incorporation Rev./Date
Service Instructions:	
SI140A, R6	Rev. 3, Jan/97
SI147A	Rev. 3, Jan/97
SI150	Rev. 3, Jan/97
SI166	Rev. 3, Jan/97
SI169	Rev. 3, Jan/97
SI172	Rev. 3, Jan/97
SI182	Rev. 3, Jan/97
SI190	Rev. 3, Jan/97
SI191A	Rev. 3, Jan/97

AIRWORTHINESS LIMITATIONS

1. Airworthiness Limitations

A. Life Limits

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

(2) For airworthiness limitations information, refer to Hartzell Propeller Inc. Owner's Manual 139 (61-00-39).

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LIST OF EFFECTIVE PAGES

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INTRODUCTION - CONTENTS

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1. General (Rev. 1)

A. Statement of Purpose

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

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

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

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

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

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

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

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

B. Item References

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

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

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

2. Reference Publications

A. Hartzell Propeller Inc. Publications

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

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

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 139 (61-00-39)	Yes	Owner's Manual and Logbook for Steel Hub Turbine Propellers with Aluminum Blades

Manual No. (ATA No.)	Available at www.hartzellprop.com	Hartzell Propeller Inc. Manual Title
Manual 159 (61-02-59)	Yes	Application Guide
Manual 165A (61-00-65)	Yes	Illustrated Tool and Equipment Manual
Manual 180 (30-61-80)	Yes	Propeller Ice Protection System Manual
Manual 202A (61-01-02)	Vol. 7, Yes Vol. 11, Yes	Standard Practices Manual, Volumes 1 through 11

B. Vendor Publications

None.

3. Personnel Requirements (Rev. 1)

A. Service and Maintenance Procedures in this Manual

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

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

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

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

4. <u>Special Tooling and Consumable Materials</u> (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 those items specified may be used.

5. <u>Safe Handling of Paints and Chemicals</u> (Rev.1)

A. Instructions for Use

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

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

(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

(2) 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 as 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.

(b) 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.	Telephone: 937.778.4200
Attn: Technical Publications Department	Fax: 937.778.4215
One Propeller Place	E-mail: manuals@hartzellprop.com
Piqua, Ohio 45356-2634 U.S.A.	

C. Recommended Facilities

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

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

12. Definitions (Rev. 4)

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

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

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

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

Term	Definition
Face	The surface of the blade that is directed toward the rear of the aircraft. The face side is the high pressure, or thrusting, side of the blade. The blade airfoil sections are normally cambered or curved such that the face side of the blade may be flat or even concave in the midblade and tip region.
Face Alignment	Distance from the blade centerline to the highest point on the face side perpendicular to the chord line
Feathering	The capability of blades to be rotated parallel to the relative wind, thus reducing aerodynamic drag
Fraying	A raveling or shredding of material
Fretting	Damage that develops when relative motion of small displacement takes place between contacting parts, wearing away the surface
Galling	To fret or wear away by friction
Gouge	Surface area where material has been removed
Hazardous Propeller Effect	The hazardous propeller effects are defined in Title 14 CFR section 35.15(g)(1)
Horizontal Balance	Balance between the blade tip and the center of the hub
Impact Damage	Damage that occurs when the propeller blade or hub assembly strikes, or is struck by, an object while in flight or on the ground
Inboard	Toward the butt of the blade
Intergranular Corrosion	Corrosion that attacks along the grain boundaries of metal alloys
Jog	A term used to describe movement up/down, left/right, or on/off in short incremental motions
Laminate	To unite composite material by using a bonding material, usually with pressure and heat
Lengthwise	A direction that is generally parallel to the pitch axis
Loose Material	Material that is no longer fixed or fully attached
Low Pitch	The lowest blade angle attainable by the governor for constant speed operation

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

Term	Definition
Pitting (Linear)	The configuration of the majority of pits forming a pattern in the shape of a line
Porosity	An aggregation of microvoids. See “voids”.
Propeller Critical Part	A part on the propeller whose primary failure can result in a hazardous propeller effect, as determined by the safety analysis required by Title 14 CFR section 35.15
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

Term	Definition
Ticking	A series of parallel marks or scratches running circumferentially around the diameter of the blade
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

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DESCRIPTION AND OPERATION - CONTENTS

LIST OF ILLUSTRATIONS

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1. <u>General</u> (Rev. 1)

   A. Propeller/Blade Model Designation

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

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

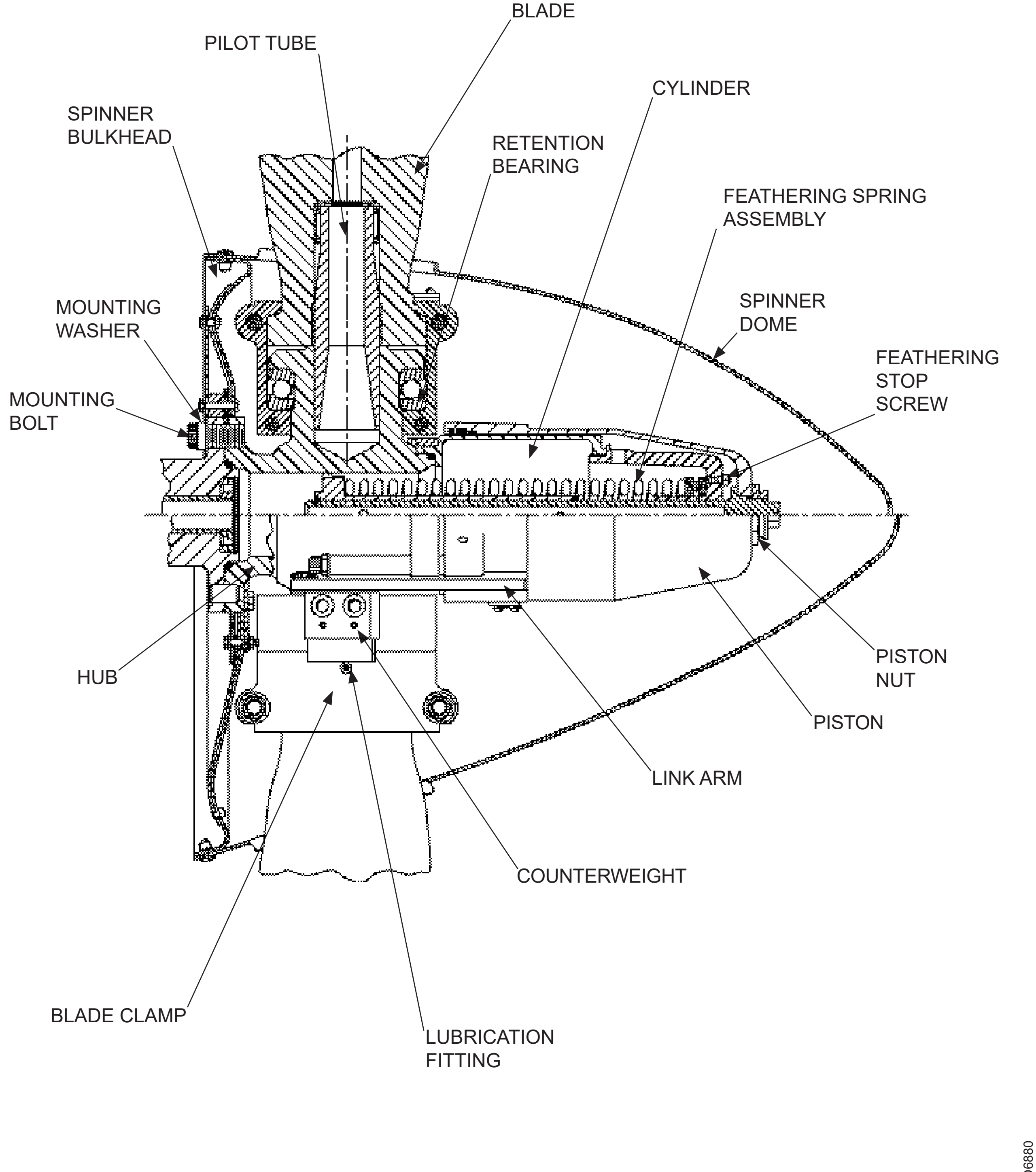
      (2) The propeller model number is impression stamped on the propeller hub.

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

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

         (a) For additional information about the model number designation system for composite blades, refer to Hartzell Propeller Inc. Composite 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).



HC-B5M( )-2( ) Propeller Assembly
Figure 1

2. Operation

A. Feathering Counterweighted Propellers - HC-B5M( )-2( ) Series

Refer to Figure 1.

(1) The propellers described in this section are constant speed and feathering. They use a single oil supply from a governing device to hydraulically actuate a change in blade angle. The propellers have five blades and they are used primarily on Pratt and Whitney turbine engines.

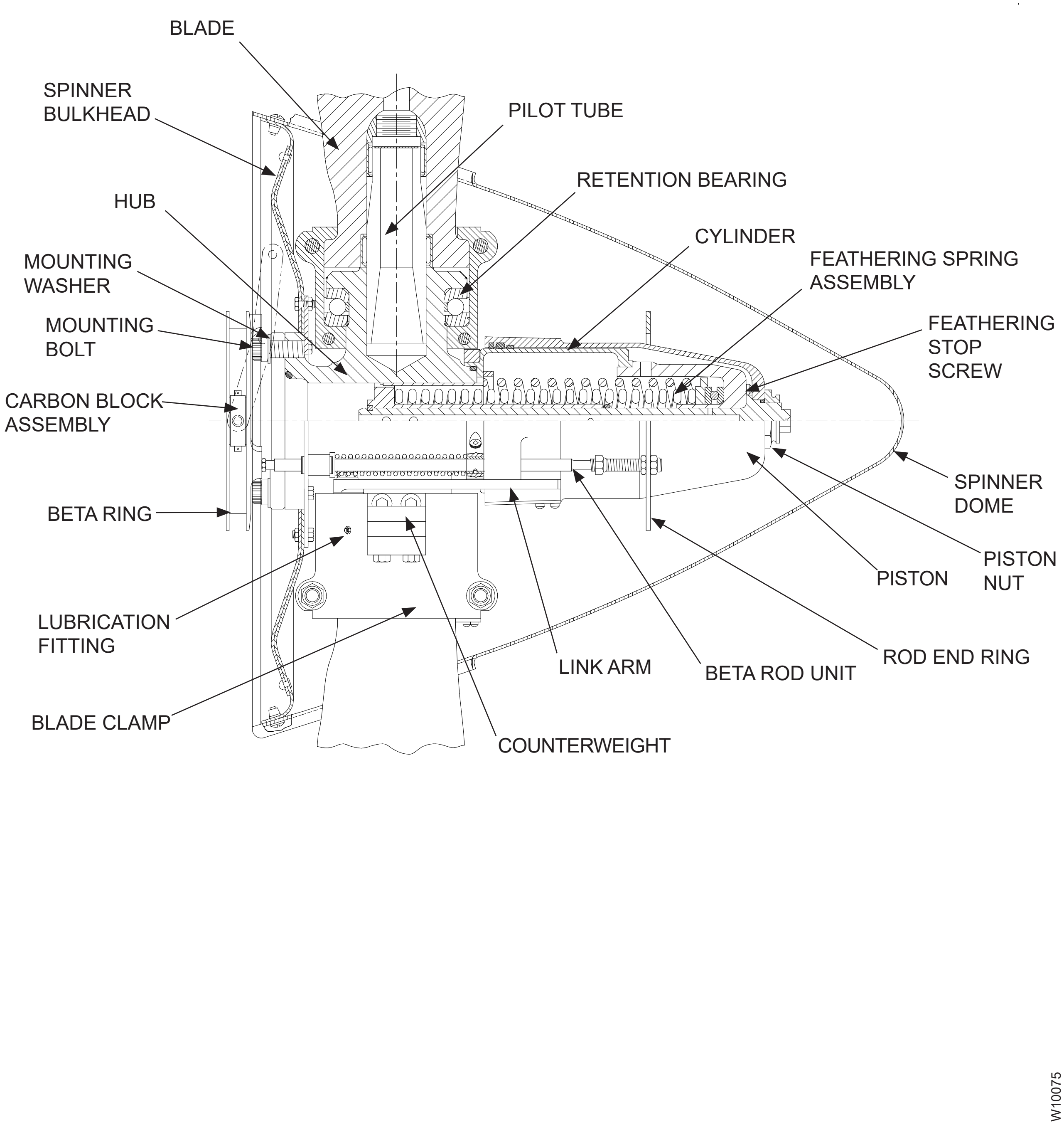
(2) Propeller blades and bearing assemblies are mounted on the arms of a steel hub unit and are held in place by two-piece blade clamps. A cylinder is threaded onto the hub, and a feathering spring assembly is installed in the cylinder. A piston is placed over the cylinder and is connected by a link arm to each blade clamp. Propeller blade angle change is accomplished through the linear motion of the hydraulically actuated piston that is transmitted to each blade through the link arms and blade clamps.

(3) While the propeller is operating, the following forces are constantly present: 1) spring force, 2) counterweight force, 3) centrifugal twisting moment of each blade, and 4) blade aerodynamic twisting forces. The spring and counterweight forces attempt to rotate the blades to higher blade angle, while the centrifugal twisting moment of each blade is generally acting toward lower blade angle. Blade aerodynamic twisting force is usually very small in relation to the other forces and can attempt to increase or decrease blade angle.

(4) The summation of the propeller forces is toward higher pitch (low RPM) and is opposed by a variable force toward lower pitch (high RPM). The variable force is oil under pressure from a governor with an internal pump, which is mounted on and driven by the engine. The oil from the governor is supplied to the propeller and hydraulic piston through a hollow engine shaft. Increasing the volume of oil within the piston and cylinder will decrease the blade angle and increase propeller RPM. Decreasing the volume of oil will increase blade angle and decrease propeller RPM. By changing the blade angle, the governor can vary the load on the engine and maintain constant engine RPM (within limits), independent of where the power lever is set. The governor uses engine speed sensing mechanisms that allow it to supply or drain oil as necessary to maintain constant engine speed (RPM).

(5) If governor supplied oil is lost during operation, the propeller will increase pitch and feather. Feathering occurs because the summation of internal propeller forces causes the oil to drain out of the propeller until the feather stop position is reached.

(6) Normal in-flight feathering is accomplished when the pilot retards the propeller condition lever past the feather detent. This allows control oil to drain from the propeller and return to the engine sump. Feathering is accomplished during the engine shutdown.



HC-B5M( )-3( ) Propeller Assembly
Figure 2

(7) Normal in-flight unfeathering is accomplished when the pilot positions the propeller condition lever into the normal flight (governing) range and restarts the engine. As engine speed increases, the governor supplies oil to the propeller, and the blade angle decreases.

B. Feathering and Reversing Propellers - HC-B5M( )-3( ) Series (External Beta System) Refer to Figure 2.

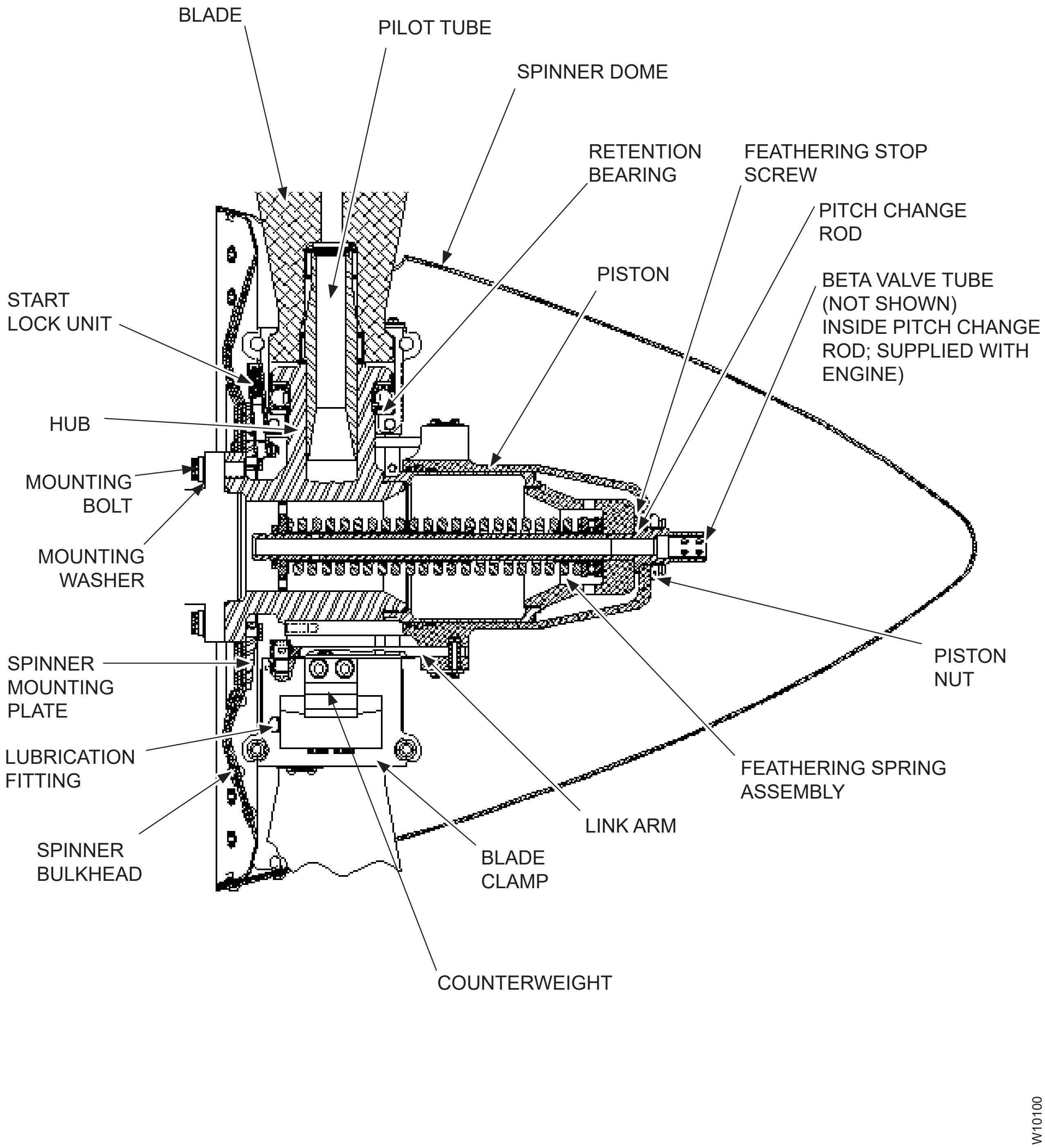
(1) The propellers described in this section are constant speed, feathering and reversing. They use a single oil supply from a governing device to hydraulically actuate a change in blade angle. The propellers have five blades and they are used primarily on Pratt and Whitney turbine engines.

(2) Propeller blades and bearing assemblies are mounted on the arms of a steel hub unit and are held in place by two-piece blade clamps. A cylinder is threaded onto the hub, and a feathering spring assembly is installed in the cylinder. A piston is placed over the cylinder and is connected by a link arm to each blade clamp. Propeller blade angle change is accomplished through the linear motion of the hydraulically actuated piston that is transmitted to each blade through the link arms and blade clamps.

(3) While the propeller is operating, the following forces are constantly present: 1) spring force, 2) counterweight force, 3) centrifugal twisting moment of each blade, and 4) blade aerodynamic twisting forces. The spring and counterweight forces attempt to rotate the blades to higher blade angle, while the centrifugal twisting moment of each blade is generally acting toward lower blade angle. Blade aerodynamic twisting force is usually very small in relation to the other forces and can attempt to increase or decrease blade angle.

(4) The summation of the propeller forces is toward higher pitch (low RPM) and is opposed by a variable force toward lower pitch (high RPM). The variable force is oil under pressure from a governor with an internal pump, which is mounted on and driven by the engine. The oil from the governor is supplied to the propeller and hydraulic piston through a hollow engine shaft. Increasing the volume of oil within the piston and cylinder will decrease the blade angle and increase propeller RPM. Decreasing the volume of oil will increase blade angle and decrease propeller RPM. By changing the blade angle, the governor can vary the load on the engine and maintain constant engine RPM (within limits), independent of where the power lever is set. The governor uses engine speed sensing mechanisms that allow it to supply or drain oil as necessary to maintain constant engine speed (RPM).

(5) If governor supplied oil is lost during operation, the propeller will increase pitch and feather. Feathering occurs because the summation of internal propeller forces causes the oil to drain out of the propeller until the feather stop position is reached.



HC-B5M( )-5( ) Propeller Assembly
Figure 3

(6) Normal in-flight feathering is accomplished when the pilot retards the propeller condition lever past the feather detent. This allows control oil to drain from the propeller and return to the engine sump. Feathering is accomplished during the engine shutdown.

(7) Normal in-flight unfeathering is accomplished when the pilot positions the propeller condition lever into the normal flight (governing) range and restarts the engine. As engine speed increases, the governor supplies oil to the propeller, and the blade angle decreases.

(8) In reverse mode of operation, the governor operates in an underspeed condition to act strictly as a source of pressurized oil, without attempting to control RPM. Control of the propeller blade angle in reverse is accomplished through the beta valve.

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

(9) 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. An external propeller feedback mechanism, which include a beta ring and carbon block assembly, communicate propeller blade angle position to the beta valve.

(10) When the propeller reaches the desired reverse position, movement of the beta ring and carbon 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.

(11) The five blade turbine propeller (-3 only) typically has no start lock assembly, so it feathers itself when stationary.

C. Feathering and Reversing Propellers - HC-B5M( )-5( ) Series (Internal Beta System) Refer to Figure 3.

(1) The propellers described in this section are constant speed, feathering and reversing. They use a single oil supply from a governing device to hydraulically actuate a change in blade angle. The propellers are used primarily on Garrett (Allied Signal) turbine engines.

(2) Propeller blades and bearing assemblies are mounted on the arms of a steel hub unit and are held in place by two-piece blade clamps. A cylinder is threaded onto the hub, and a feathering spring assembly is installed in the cylinder. A piston is placed over the cylinder and is connected by a link arm to each blade clamp. Propeller blade angle change is accomplished through the linear motion of the hydraulically actuated piston that is transmitted to each blade through the link arms and blade clamps.

(3) While the propeller is operating, the following forces are constantly present: 1) spring force, 2) counterweight force, 3) centrifugal twisting moment of each blade, and 4) blade aerodynamic twisting forces. The spring and counterweight forces attempt to rotate the blades to higher blade angle, while the centrifugal twisting moment of each blade is generally toward lower blade angle. Blade aerodynamic twisting force is usually very small in relation to the other forces and can attempt to increase or decrease blade angle.

(4) The summation of the propeller forces is toward higher pitch (low RPM) and is opposed by a variable force toward lower pitch (high RPM). The variable force is oil under pressure from a governor with an internal pump, which is mounted on and driven by the engine. The oil from the governor is supplied to the propeller and hydraulic piston through a hollow engine shaft. Increasing the volume of oil within the piston and cylinder will decrease the blade angle and increase propeller RPM. Decreasing the volume of oil will increase blade angle and decrease propeller RPM. By changing the blade angle, the governor can vary the load on the engine and maintain constant engine RPM (within limits), independent of where the power lever is set. The governor uses engine speed sensing mechanisms that allow it to supply or drain oil as necessary to maintain constant engine speed (RPM).

(5) If governor supplied oil is lost during operation, the propeller will increase pitch and feather. Feathering occurs because the summation of internal propeller forces causes the oil to drain out of the propeller until the feather stop position is reached.

(6) Normal in-flight feathering is accomplished when the pilot places the propeller condition lever into feather position. This allows control oil to drain from the propeller and return to the engine sump. Feathering is accomplished during the engine shutdown.

(7) Normal in-flight unfeathering is accomplished when the pilot positions the propeller condition lever into the normal flight (governing) range, activates the auxiliary pump to decrease blade pitch, and restarts the engine. As engine speed increases, the governor supplies oil to the propeller, and the blade angle decreases until it reaches an onspeed condition.

(8) In reverse mode of operation, the governor operates in an underspeed condition to act strictly as a source of pressurized oil, without attempting to control RPM. Control of the propeller blade angle in reverse is accomplished through the beta valve.

<u>NOTE</u>: The beta valve is normally located on the side of the gearbox opposite the propeller.

(9) The propeller is reversed by manually repositioning the power lever within the beta range to cause the beta valve to supply oil from the governor pump to the propeller. A beta rod inserted into the front of the propeller communicates propeller blade angle position to the beta valve. When the propeller reaches the desired reverse position, movement of the beta rod 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.

(10) It is undesirable to feather the propeller when the engine is stopped after landing the aircraft. This propeller type is normally installed on a fixed shaft engine that causes the propeller to rotate during an engine start process. If the propeller is in the feathered position, a hot or hung start may occur.

(11) To prevent feathering during normal engine shutdown, the propeller incorporates spring-energized pins called start lock units. Refer to Figure 3. If propeller rotation is approximately 800 RPM or above, the start lock units are disengaged from the blade clamp mounted plates by centrifugal force acting on the pins to compress the springs (within the units). When the RPM drops below 800, the springs overcome the centrifugal force and move the pins to engage the clamp-mounted stop/start lock plate, preventing blade angle movement to feather.

(12) Shortly after engine start-up, with the propeller RPM above 800, the pins in the start lock units will still retain the blade angle. To release the pins, it is necessary to manually actuate the propeller slightly toward reverse. This will move the stop/start lock plate, allowing the pins to slide freely. Centrifugal force will compress the springs and disengage the pins from the stop/start lock plate.

3. Model Designation System

A. Propeller Model Designation

(1) Hartzell Propeller Inc. uses a model number designation system to identify specific propeller and blade assemblies. An example model number would be HC-B5MP-3A/M10282A+6, with the slash mark separating the propeller designation from the blade designation.

(2) The propeller model number is impression stamped on the propeller hub. The blade model number is impression stamped on the butt end of the blade, as well as ink stamped or identified by a label on the camber side of the blade.

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

B. Blade Shank Designation

(1) For more information about blade shank designs:

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

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

TESTING AND FAULT ISOLATION - CONTENTS

LIST OF ILLUSTRATIONS

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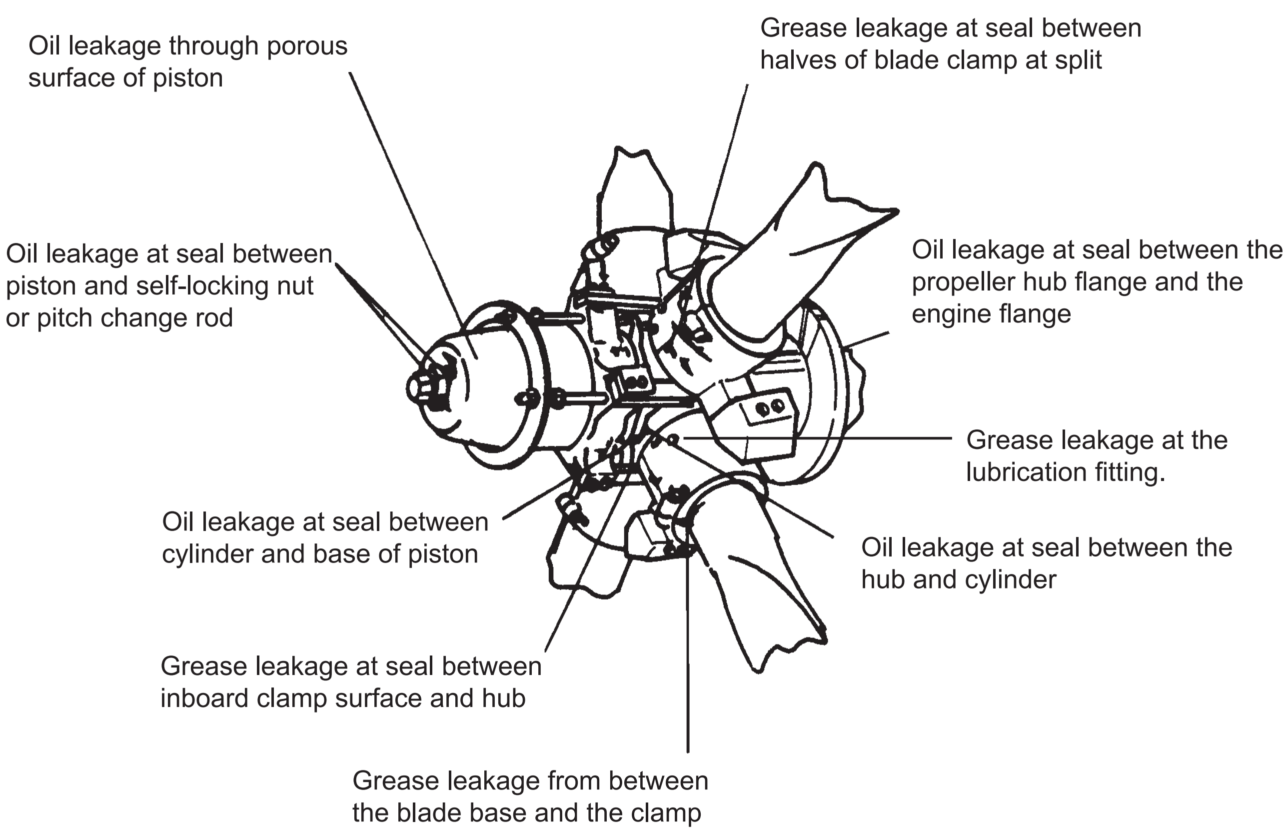
1. Troubleshooting Guide

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. Excessive Friction in the Hub Mechanism	Insufficient clearance between various moving parts in the pitch change mechanism.	Check moving parts individually for interference, and establish correct clearances as specified in this manual.
	Balls in the blade race are unusually rough, corroded, or chipped.	Replace the blade race assembly.
	The pilot tube has slipped out slightly and is rubbing hard against the end of the cavity in the blade.	Follow the Disassembly procedure for the hub unit to expose the hub arm and pilot tubes. Inspect each pilot tube for wear and length of protrusion from the hub arm, in accordance with Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Replace the pilot tube as required.
	Blade O-ring is not allowing the clamp and blade to rotate freely on the hub.	Disconnect the blade clamp from the piston by removing the piston link pin. The clamp and blade should rotate on the hub with light to moderate hand pressure. If not, replace the C-3317-232 O-ring with a C-3317-231 O-ring. If there is still friction, replace the O-ring with a C-3317-230 O-ring.
	Lack of blade thrust bearing lubrication.	Add approved grease to the blade clamp lubrication fittings in accordance with Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

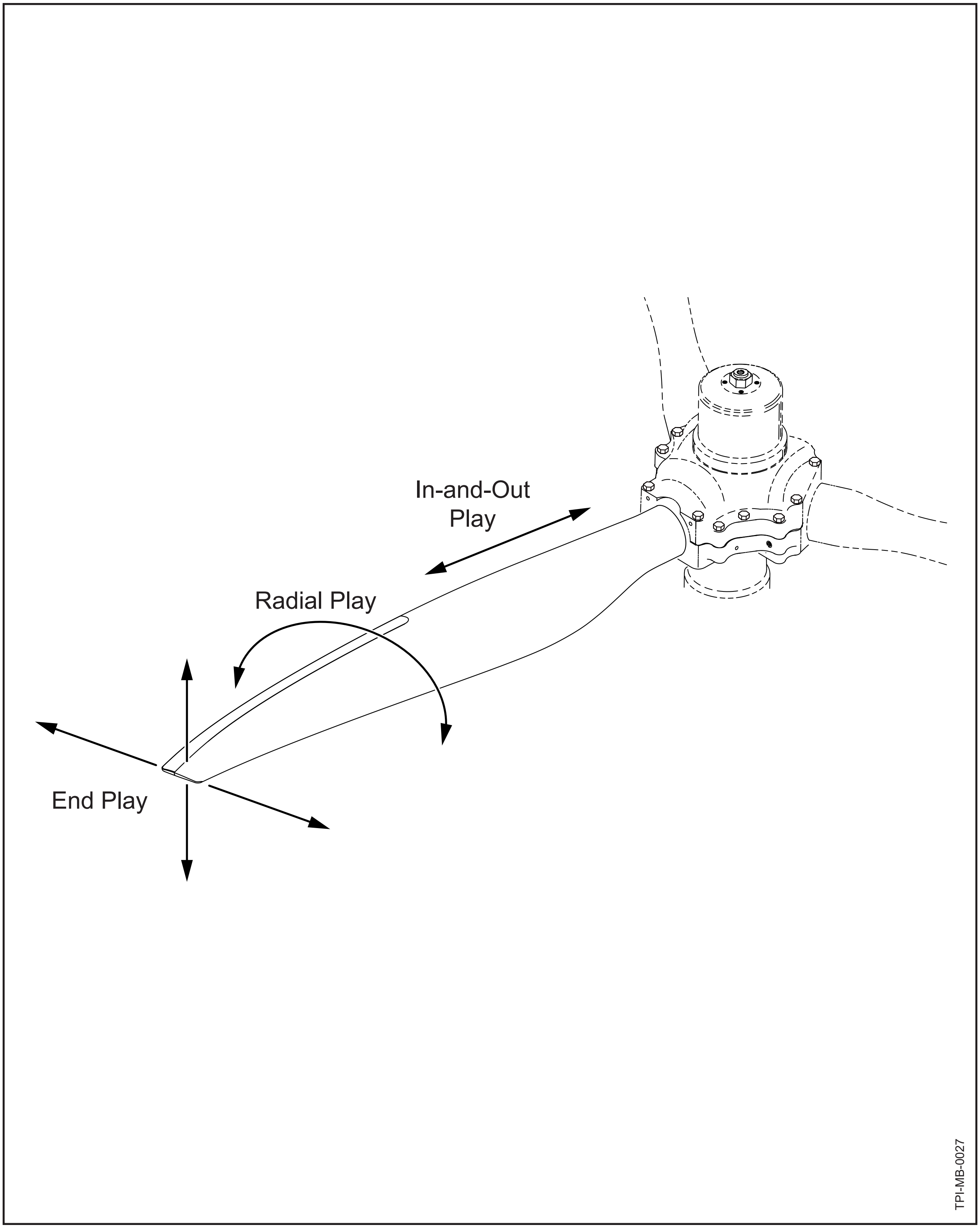
Problem	Probable Cause	Remedy
A. Excessive Friction in the Hub Mechanism (continued)	Piston plastic bushing is scraping against the wall of the cylinder.	Check the ID of the plastic bushing. Refer to the section, "Piston Assembly" in the Check chapter of this manual. Check the roundness of the bushing. Follow replacement procedure, if necessary. Check the OD of the cylinder. Refer to the section, "Cylinder" in the Check chapter of this manual. Follow the cylinder replacement procedure, if necessary. Remove any evidence of wear or chafing on the cylinder. Follow the repair procedure, or replace if necessary.
	Piston O-ring is causing excessive friction.	Replace the piston O-ring.
B. Failure to Feather	Excessive friction in moving parts.	Refer to Problem: A. Excessive Friction in Hub the Mechanism
	Feathering spring is broken.	Replace the feathering spring.
C. Failure to Change Pitch (Sluggish RPM change to increase or decrease)	Excessive friction in moving parts.	Refer to Problem(s): A. Excessive Friction in the Hub Mechanism B. Failure to Feather NOTE: Isolate the friction in each blade by uncoupling the piston from each link arm and testing each blade individually before disassembling the propeller.
	Oil passages are not clear and open.	Inspect the hydraulic system, including the propeller and oil transfer system in the engine and governor.
D. Surging RPM or Torque	Excessive friction in the pitch change mechanism.	Refer to Problem: A. Excessive Friction in the Hub Mechanism
	Air is trapped in the propeller actuating piston or in the engine shaft.	The engine should have provision for allowing trapped air to escape from the hydraulic system during one-half of the pitch cycle. Before each flight, exercise the propeller by changing pitch or feathering.
	The socket head cap screw in the guide collar is too tight.	Loosen the socket head cap screw to the minimum torque. Refer to the Torque Values table in the Fits and Clearances chapter of this manual.



Checking for Oil and Grease Leaks
Figure 1-1

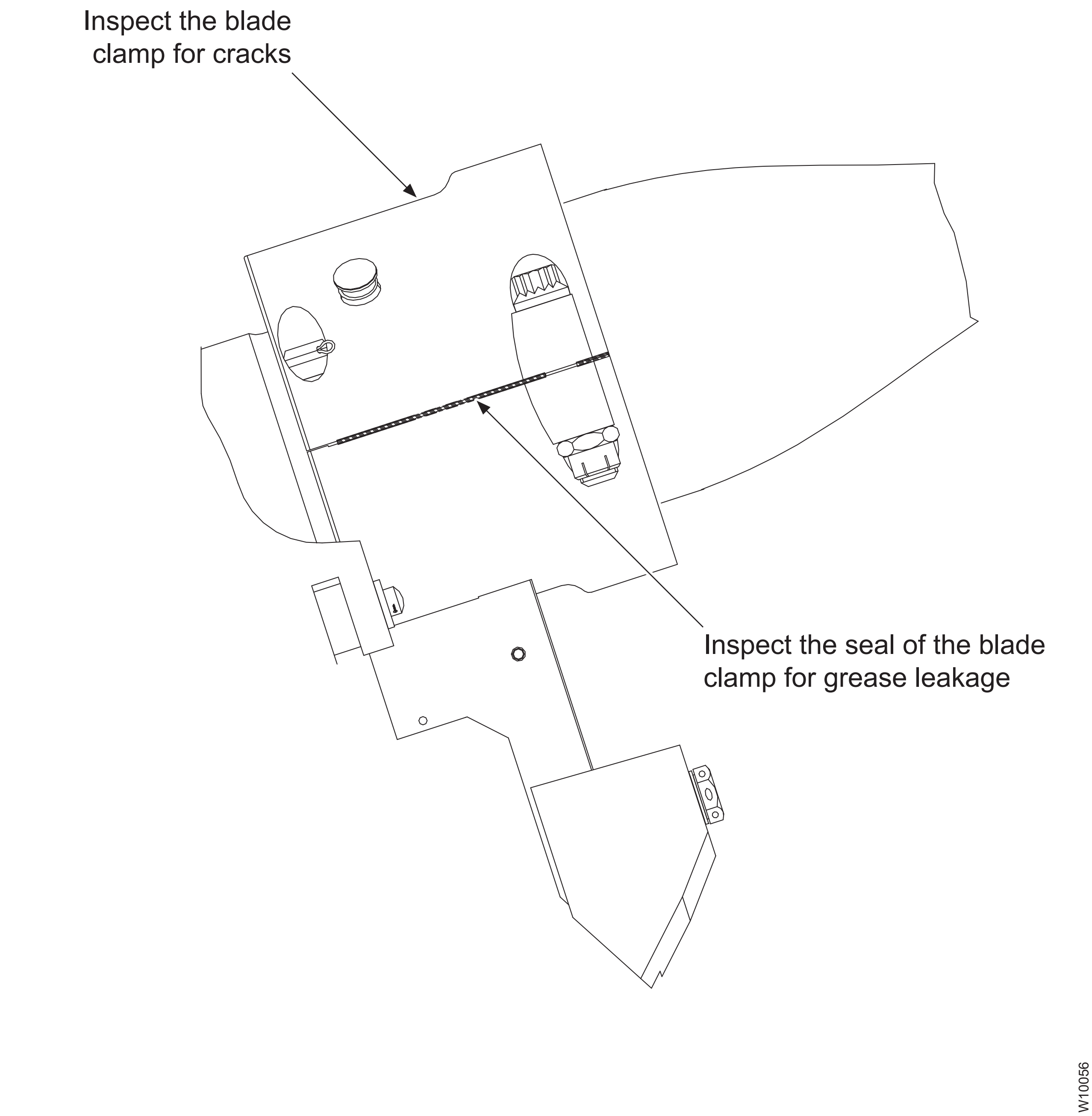
	Problem	Probable Cause	Remedy
E.	Propeller Windmills in Excess of Airframe Manufacturer's Specifications	Incorrect feather blade angle.	Refer to the section, "Setting Feathering Angle of Blades" in the Assembly chapter of this manual.
F.	Oil Leakage Refer to Figure 1-1	Faulty O-ring seal between the hub and cylinder.	Disassemble the propeller and inspect the O-ring and the surfaces it seals. Replace defective O-ring. When replacing the O-ring, use approved hydraulic sealant adhesive CM134 on the O-ring groove of the hub at the top of the cylinder mounting threads
		Faulty O-ring seal between the piston and cylinder.	Remove the piston and inspect the O-ring and surfaces it seals. Replace defective O-ring. Replace or repair the cylinder if its surface is scratched or gouged in the area where the O-ring slides.
		Faulty O-ring seal between the piston and the pitch change rod.	Remove the piston and inspect the O-ring and surfaces it seals. Replace defective O-ring.
		Faulty O-ring between the propeller hub and the engine.	Remove the propeller from the engine and inspect the O-ring and surfaces it seals. Replace defective O-ring.
		Faulty Piston (oil leaks through the wall of the piston).	Replace the piston.
		Felt seal is displaced.	Replace the felt seal.

Problem	Probable Cause	Remedy
G. Grease Leakage Refer to Figure 1-1 <u>NOTE</u>: The blade clamp/race is the only source for grease leakage.	Improperly torqued or loose lubrication fitting.	Torque the lubrication fitting in accordance with the Torque Values table in the Fits and Clearances chapter of this manual.
	Defective lubrication fitting (spring loaded ball is not seating properly).	Replace defective lubrication fittings. Replace missing lubrication fitting caps. <u>NOTE</u>: If propeller RPM will exceed 2300 rpm, safety wire the lubrication fitting caps with 0.020 inch (0.51 mm) minimum diameter stainless steel wire.
	Grease leaks past the blade clamp half seal gaskets.	Remove the blade clamp bolts and replace the gaskets, sealant CM93, and gasket compound CM46.
	Grease leaks from between the blade and clamp.	Remove the blade clamp. Add approved gasket compound CM46 in the radius of the blade. Replace clamp sealant CM93 and the blade clamp half seal gasket, if necessary.
	Defective O-ring between the blade clamp and hub (leaks when propeller is stopped).	Disassemble the blade clamp and inspect the O-ring and surfaces it seals. Replace defective O-ring.



Blade Play
Figure 1-2

Problem	Probable Cause	Remedy
H. Excessive End Play:		
(1) Leading Edge to Trailing Edge Refer to Figure 1-2	Blade alignment bearings are worn.	Refer to the Blade Tolerances table in the Fits and Clearances chapter of this manual for blade play limits. Inspect the blade alignment bearings for wear or damage and replace as necessary.
(2) Fore-and-Aft (face to camber) Refer to Figure 1-2	Hub pilot tube is worn.	Refer to the Blade Tolerances table in the Fits and Clearances chapter of this manual for blade play limits. Inspect the pilot tube for wear or damage and replace as necessary.
I. Excessive In-and-Out Play Refer to Figure 1-2	Excessive wear to blade bearings.	Refer to the Blade Tolerances table in the Fits and Clearances chapter of this manual for blade play limits. Disassemble the propeller and replace parts as necessary.
J. Excessive Radial Play Refer to Figure 1-2	Wear in link arm screw hole or pin hole.	Refer to the Blade Tolerances table in the Fits and Clearances chapter of this manual for blade play limits.
K. Blades not Tracking	Ground strike damage.	Refer to the appropriate blade overhaul manual for repair or replacement procedure. Refer to the Special Inspections chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
	Hub pilot tube(s) distorted.	Follow pilot tube replacement procedure. Refer to the Steel Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
	Blade face(s) out of alignment.	Refer to the applicable blade overhaul manual for repair or replacement procedure.
L. Blade Slippage in Blade Clamp	There is not enough clamping action.	Increase clamping action as necessary. Refer to the Clamp Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02) for blade clamp rework.



Excessive Vibration
Figure 1-3

Problem	Probable Cause	Remedy
M. Excessive Propeller Vibration Refer to Figure 1-3	Blade slipped in clamp	Inspect blade-to-blade angles. Reset angles in accordance to the Assembly chapter of this manual.
	Cracked blade clamp (grease leaking from a seemingly solid surface).	Inspect the blade clamp (visual, magnetic particle, etc.) and replace the defective part.
	Bent, cracked, or damaged blade	Refer to the applicable Hartzell Propeller Inc. Blade Overhaul manual.
	Cracked or damaged hub	Refer to the Steel Hub Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02)
	Link arm holes are worn	Inspect the link arm and replace as necessary.
	Link arm is disconnected from the piston	Threads in the link pin unit safety screw hole are worn or damaged. Repair threads. Refer to the Repair chapter of this manual.
	Blade aerodynamic imbalance due to excessive differences in blade-to-blade angles	Perform blade-to-blade angle checks at the set up blade radius, at a blade radius six inches inboard of the set up blade radius, and at a blade radius six inches outboard of the set up blade radius. If any blade is consistently high or low at all three locations, rotate the blade(s) in the clamp(s) to minimize blade angle variance, and recheck the blade-to-blade angles.

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.

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 ILLUSTRATIONS

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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.

1. Important Information (Rev. 3)

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.

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 EXCEED 200 P.S.I. (13.78 BARS) OF PRESSURE WHEN ACTUATING PROPELLERS INCLUDED IN THIS MANUAL.

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

2. Spinner Bulkhead and Piston Disassembly

A. HC-B5MA-2 and HC-B5M( )-5( ) Propeller Models ONLY

CAUTION: MAKE SURE THE PROPELLER IS IN FEATHERED POSITION BEFORE BEGINNING DISASSEMBLY PROCEDURES.

CAUTION 2: REPLACEMENT SPACER WASHERS AND SPECIAL "BELLEVILLE" WASHERS IN THE DE-ICER SYSTEM MUST BE INSTALLED PRECISELY IN REVERSE SEQUENCE AT REASSEMBLY.

(1) Remove and discard the self-locking nuts (60), flat washers, (70) and hexagon head bolts (100) that attach the bulkhead to the spinner mounting plate (40).

(2) Remove the bulkhead.

(3) Install the hub unit (1400) on the rotatable fixture on the propeller assembly table.

(4) Using a crayon or soft, non-graphite pencil CM162 or equivalent, number the blades counterclockwise from the serial number of the propeller hub (as viewed from the front or piston side).

(5) Using special wrench TE144-1, or equivalent, and a one-inch (25.4 mm) socket wrench, remove and discard the large self-locking hex nut (110) on the end of the pitch change rod (430).

(6) Turn the blades by hand from feather to reverse.

(7) Remove and discard all of the link pin units (240) and fillister head screws (250).

(8) Disconnect the link arms (230) from the piston unit (210).

(9) Remove the piston unit (210).

(10) Remove and discard the piston O-ring (260) and the piston dust seal (270).

(11) Remove and discard the pitch change rod O-ring (120).

B. HC-B5M( )-3( ) Propeller Models ONLY

CAUTION 1: MAKE SURE THE PROPELLER IS IN FEATHERED POSITION BEFORE BEGINNING DISASSEMBLY PROCEDURES.

CAUTION 2: REPLACEMENT SPACER WASHERS AND SPECIAL "BELLVILLE" WASHERS IN THE DE-ICER SYSTEM MUST BE INSTALLED PRECISELY IN REVERSE SEQUENCE AT REASSEMBLY.

(1) Remove and discard the self-locking hex nuts (1010) that retain the propeller beta rod support ring (1020).

(2) Remove the beta rod support ring (1020).

(3) Remove and discard the thin hex nuts (1030) and self-locking hex nuts (1040).

(4) Loosen the thin hex nuts (1110) that secure the beta rods (1060) to the beta ring (1120).

CAUTION: DURING REMOVAL OF PROPELLER BETA RODS, BE CAREFUL NOT TO COCK THE BETA RING. TURN THE BETA RODS EQUALLY TO PREVENT DAMAGE TO THE THREADS AND BETA RING.

(5) Unscrew the beta rods (1060) from the beta ring (1120).

(6) Remove and discard the self-locking nuts (60), flat washers, (70) and hexagon head bolts (100) that attach the bulkhead to the spinner mounting plate (40).

(7) Remove the bulkhead.

(8) Install the hub unit (1400) on the rotatable fixture on the propeller assembly table.

(9) Remove and discard the thin hex nuts (1110) on the ends of the beta rods (1060).

(10) Using a special wrench TE144-1, or equivalent, and a one inch (25.4 mm) socket wrench, remove and discard the large self-locking hex nut (110) on the end of the pitch change rod (430).

(11) Rotate the blades by hand from feather to reverse.

(12) Remove and discard all of the link pin units (240) and fillister head screws (250).

(13) Disconnect the link arms (230) from the piston unit (210).

(14) Remove the piston unit (210).

(15) Remove and discard the piston O-ring (260) and the piston dust seal (270).

(16) Remove and discard the pitch change rod O-ring (120).

3. Start Lock Disassembly

A. HC-B5M( )-5( ) Propeller Models ONLY

WARNING: THE COMPRESSION SPRING (1590) IS COMPRESSED AND WILL BE RELEASED WHEN THE COTTER PIN (1580) IS REMOVED.

(1) Remove and discard the cotter pin (1580) from the start lock bracket (1510).

(2) Remove the washer (1530) from the start lock bracket (1510).

(3) Remove and discard the compression spring (1590) from the start lock bracket (1510).

(4) Remove the start lock pin (1600) from the start lock bracket (1510).

4. Feathering Spring Disassembly

A. All Propeller Models

WARNING: THE FEATHERING SPRING ASSEMBLY IS PRELOADED TO APPROXIMATELY 1000 POUNDS (454 KG) FORCE. ENSURE THE SAFETY OF EVERYONE IN THE AREA DURING DISASSEMBLY, OR SERIOUS INJURY MAY OCCUR.

(1) 831-192 Feathering Spring Assembly ONLY

(a) Remove and discard the internal retaining ring (540).

(b) Remove and discard the split keeper retainer (530).

(2) All Other Feathering Spring Assemblies

(a) Remove the safety wire from the fillister head screws (130).

(b) Optionally, measure and make a record of the distance from the top of each fillister head screw (130) to the spring retainer cup (450).

NOTE: These measurements may be used later in the reassembly of the propeller to approximate the required feather angle.

(c) Remove and discard the fillister head screws (130).

(d) Remove the safety wire from the spring retainer cup (450).

(e) Using a spanner wrench TE148 or a locally procured strap wrench, remove the spring retainer cup (450).

(f) Remove the feathering spring assembly (400).

(g) Using an appropriate fixture (such as a bench-top fixture TE59 or equivalent), compress the spring for disassembly.

(h) Remove and discard the rear split keeper (520).

(i) Let the feathering spring assembly (400) to expand to its unloaded length, and remove it from the special fixture.

(j) Remove the rear spring retainer (510).

(k) Remove the rear spring guide (460), as applicable.

(l) Remove the feathering compression spring (480).

(m) Remove the spacer sleeve (500).

(n) Remove the pitch adjust spacers (490).

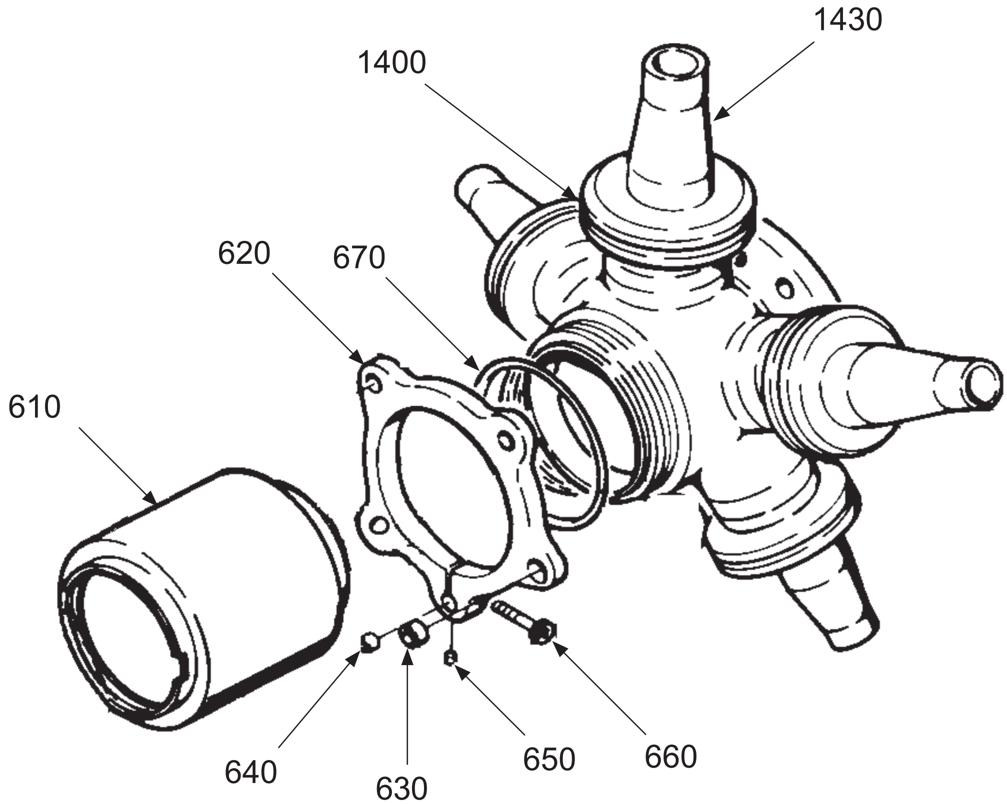
1 If the pitch adjust spacer (490) is a sleeve, retain, inspect, and reuse if within serviceable limits.

2 If the pitch adjust spacer (490) is a washer, discard and replace.

(o) Remove the front spring guide (465), as applicable.

(p) Remove the ball thrust bearing (470).

(q) Remove the pitch change rod (430).



Cylinder and Hub
Figure 3-1

5. Cylinder and Guide Collar Unit Disassembly

A. All Propeller Models
Refer to Figure 3-1.

(1) Remove and discard the self-locking socket head cap screw (660) in the side of the guide collar unit (620).

CAUTION: UNSCREW THE CYLINDER (610) SLOWLY AND CAREFULLY TO AVOID DAMAGING THE THREADS.

(2) Use a square-bar of appropriate size to fit into the slot in the top of the cylinder (610) and serve as a wrench to slowly unscrew the cylinder from the hub unit (1400).

(3) Remove the cylinder (610).

(4) Remove the guide collar unit (620).

(5) Remove and discard the cylinder O-ring (670).

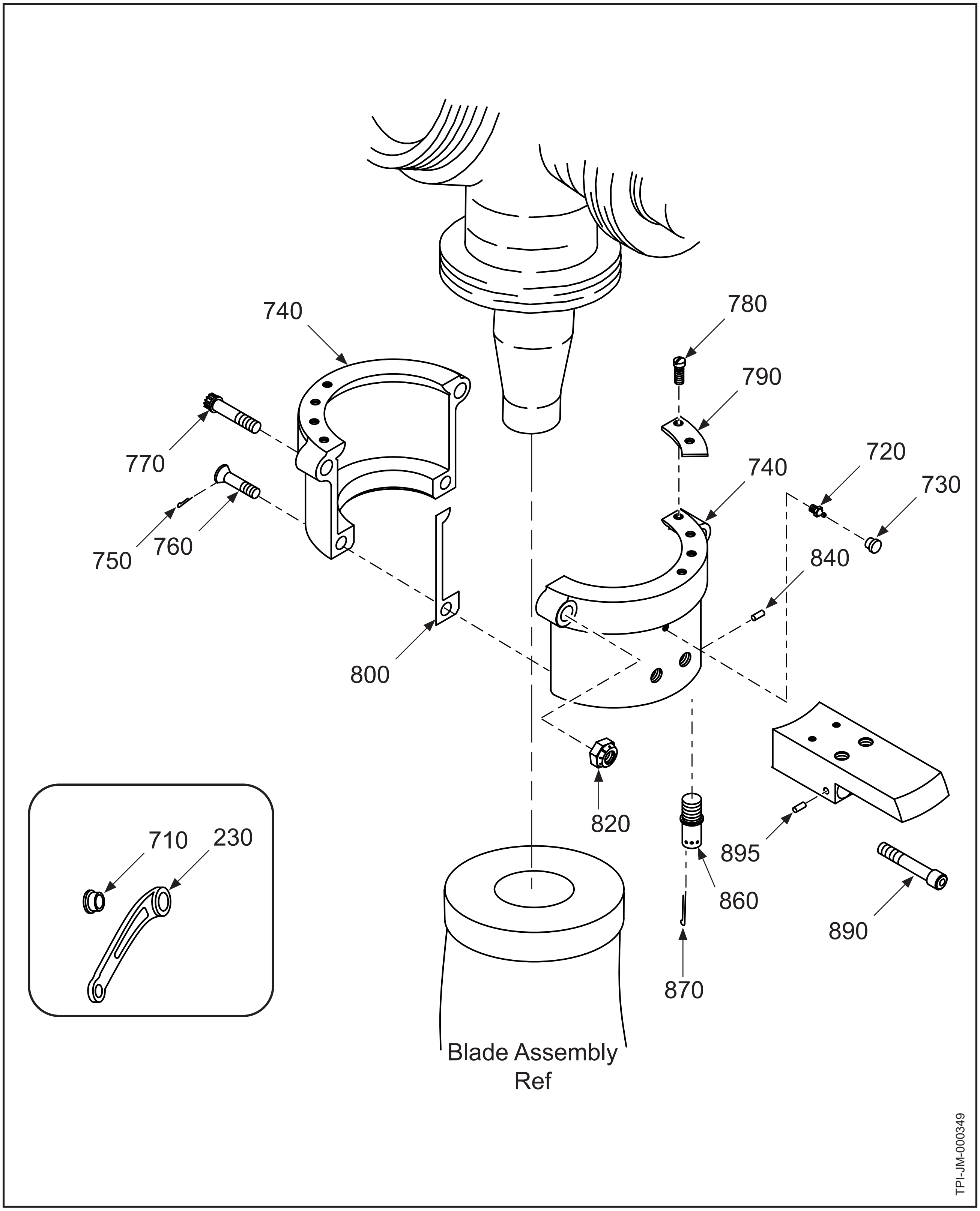
(6) For HC-B5M( )-3( ) propeller models only:

(a) Remove and discard the beta compression springs (1050).

(b) Remove the propeller beta rods (1060) from the spinner mounting plate (40).

(c) Remove the beta spring retainers (1070).

(d) Remove and discard the retaining rings (1080).



Blade Clamp and Link Arm
Figure 3-2

6. Blade Clamp Disassembly

A. All Propeller Models
Refer to Figure 3-2.

(1) Using a round bottom stamp or electric pencil, put the clamp serial number on each corresponding counterweight (880).

(2) Remove and discard all outboard clamp bolts (770) and self-locking hex nuts (820).

(3) Remove and discard all inboard clamp screws (760) and cotter pins (750).

(4) Remove all blade clamp (740) halves from the hub (1400) arms.

(5) Remove and discard the clamp gasket (800).

(6) Remove and discard balance weight fillister head screws (780).

(7) Remove all balance weights (790).

(8) Remove and discard the cotter pin (870) from each linkscrew (860), and disengage the link arms (230) from the linkscrews.

(9) Remove and discard the linkscrews (860), spring pins (840), and link arm bushing (920).

(10) For blade clamp overhaul instructions, refer to the Blade Clamp Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

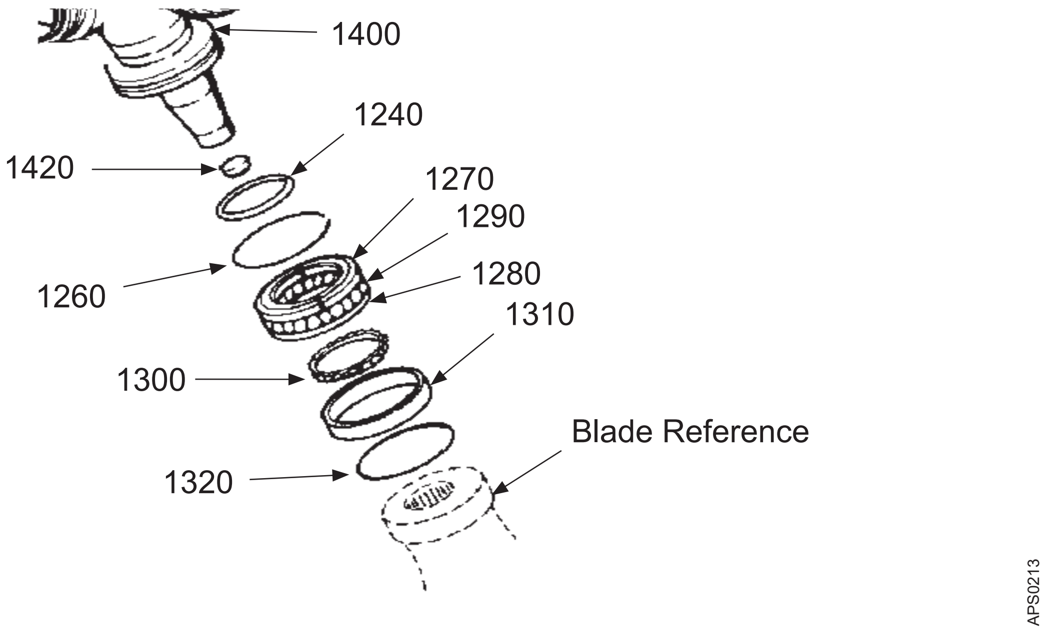
CAUTION 1: IF POSSIBLE, EACH BLADE ASSEMBLY SHOULD BE REINSTALLED ON THE HUB ARM FROM WHICH IT WAS REMOVED. RECORD EACH BLADE SERIAL NUMBER AND ITS MATCHING HUB ARM AND CLAMP.

CAUTION 2: BE CAREFUL NOT TO DAMAGE THE BLADES WHEN THEY ARE REMOVED AND STORED.

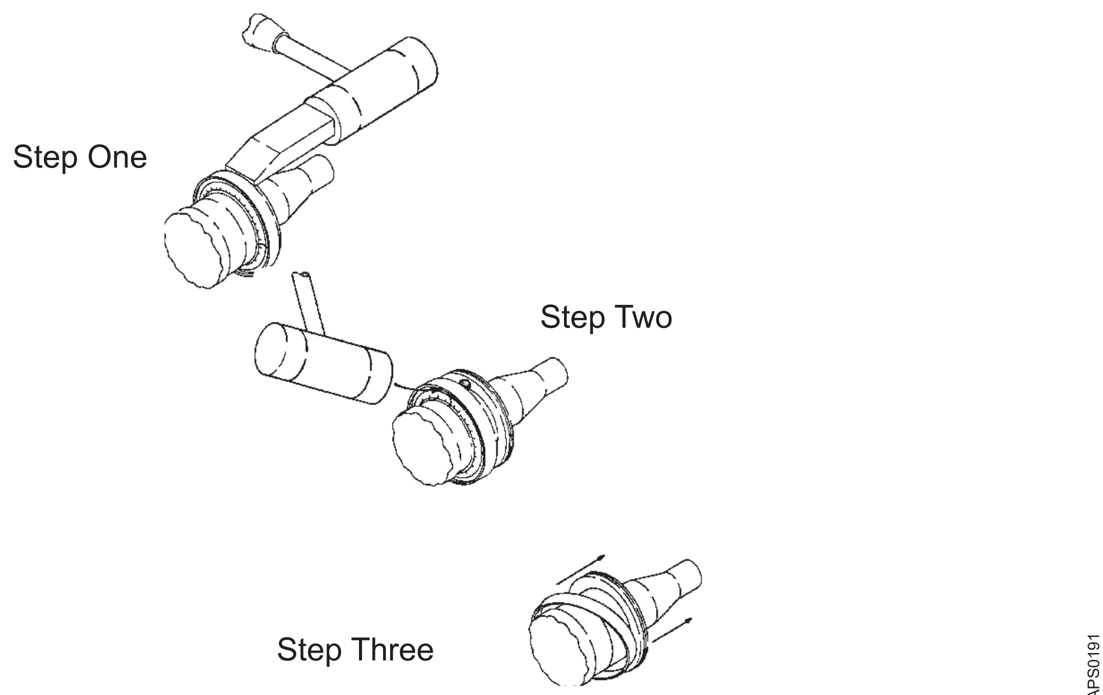
(11) Remove each blade assembly (1200) from its hub pilot tube.

(12) For additional aluminum blade disassembly and overhaul instructions, refer to Hartzell Propeller Inc. Aluminum Blade Overhaul Manual 133C (61-13-33).

(13) For additional composite blade disassembly and overhaul instructions, refer to Hartzell Propeller Inc. Composite Blade Overhaul Manual 135F (61-13-35).



Blade and Flange Mounting Parts
Figure 3-3



Blade Retention Split Bearing
Figure 3-4

7. Blade and Flange Mounting Parts Disassembly

A. All Propeller Models
Refer to Figure 3-3.

(1) Beginning with blade number one, remove the wire bearing retainer (1260) from its groove in the inboard race (1270) of the blade retention bearing (1250).

(2) Remove the two halves of the blade-side race (1270).

(3) Remove and discard the bearing balls (1290).

(4) Remove and discard the ball spacer (1300).

(5) Remove and discard the blade O-ring (1240).

(6) As shown in Step One of Figure 3-4, using a mallet and soft punch at several places on the outboard edge of the bearing retaining ring (1310), drive the bearing retaining ring inboard over the shoulder of the hub (1400) arm.

(7) Remove and discard the wire ring retainer (1320) that had been covered by the bearing retaining ring (1310).

(8) As shown in Step Two of Figure 3-4, turn the halves of the blade-side race (1270) so the parting line is at the top.

(9) At the parting line, put one of the bearing balls (1290) between the hub-side race (1280) and the inboard shoulder of the hub (1400) arm.

(10) Using a soft mallet, lightly tap the inboard top edge of the bearing retaining ring (1310) to release the hub-side race (1280).

(11) Remove the halves of the hub-side race (1280) as they become separated from the bearing retaining ring (1310).

(12) As shown in Step Three of Figure 3-4, tilt the bearing retaining ring (1310) inboard to an approximate 45 degree angle and remove the bearing retaining ring by sliding it outboard over the shoulder of the hub arm.

8. Carbon Block Disassembly

A. HC-B5M( )-3( ) Propeller Models ONLY
Refer to Figure 3-5

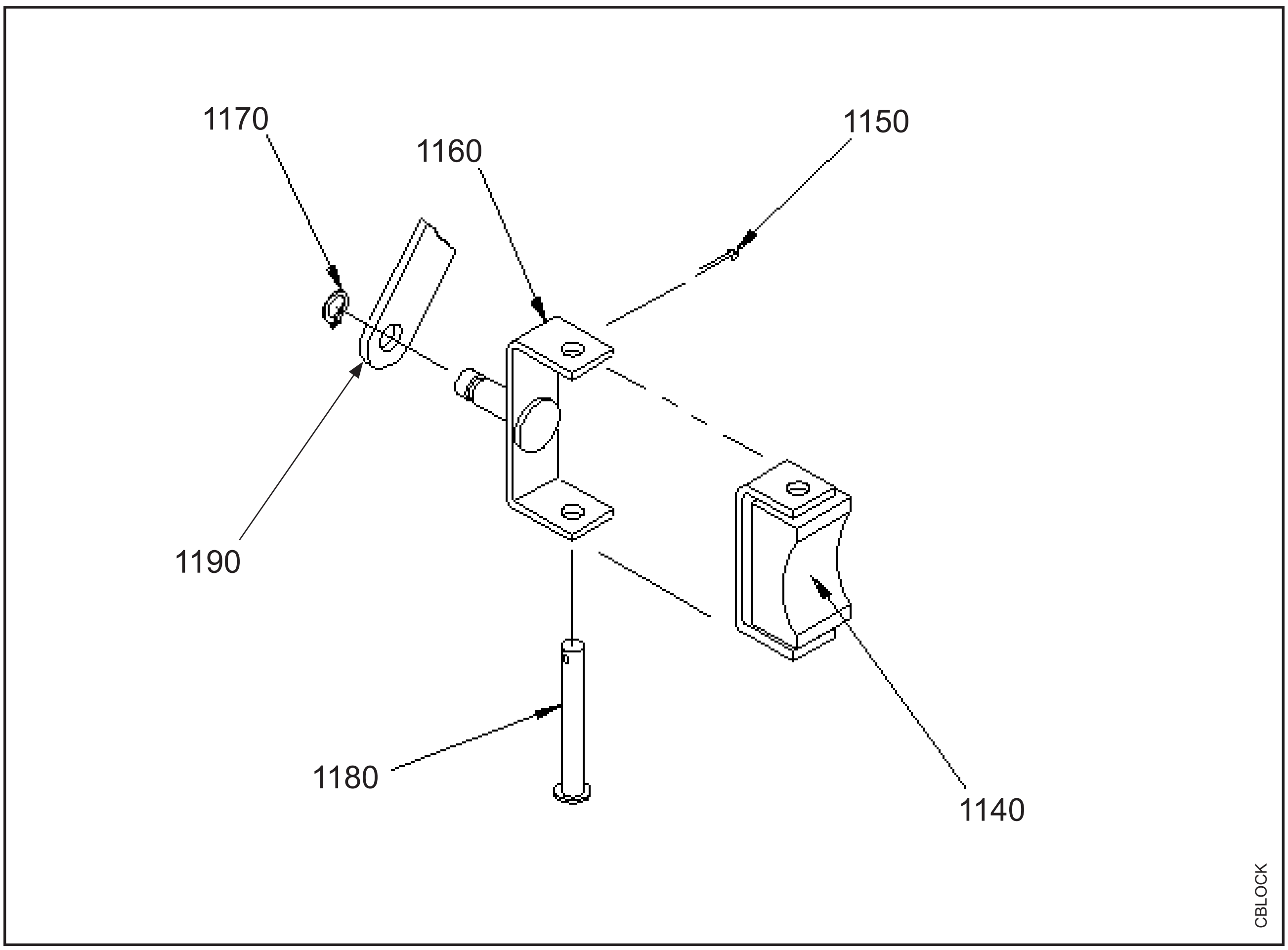
(1) Remove and discard the external snap ring (1170) that retains the carbon block unit (1140) to the beta linkage (1190).

(2) Remove the yoke unit (1160).

(3) Remove and discard the cotter pin (1150).

(4) Remove the clevis pin (1180).

(5) Remove and discard the carbon block unit (1140).



Carbon Block Assembly
Figure 3-5

9. Hub Unit Disassembly

A. HC-B5MA-2 Propeller Models ONLY

(1) Remove and discard the hex head bolts (30) that fasten the spinner mounting plate (40) to the hub unit (1400).

(2) Remove the split spinner mounting plate (40).

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

B. HC-B5M( )-3( ) and HC-B5M( )-5( ) Propeller Models ONLY

(1) Remove and discard the hex head bolts (30) that fasten the spinner mounting plate (40) to the hub unit (1400).

(2) Remove the split spinner mounting plate (40).

(3) Remove and discard the external snap rings (1100).

(4) Remove the guide lugs (1090).

(a) For information concerning guide lug bushing replacement, refer to the Special Adhesive and Bonding chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

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

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CLEANING - CONTENTS

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1. Cleaning Procedures (Rev. 3)

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).

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CHECK - CONTENTS

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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. 2)

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

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

B. Hubs

(1) Refer to the Steel 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. Blade Clamps (For steel hub propellers only)

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

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).

F. 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).

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

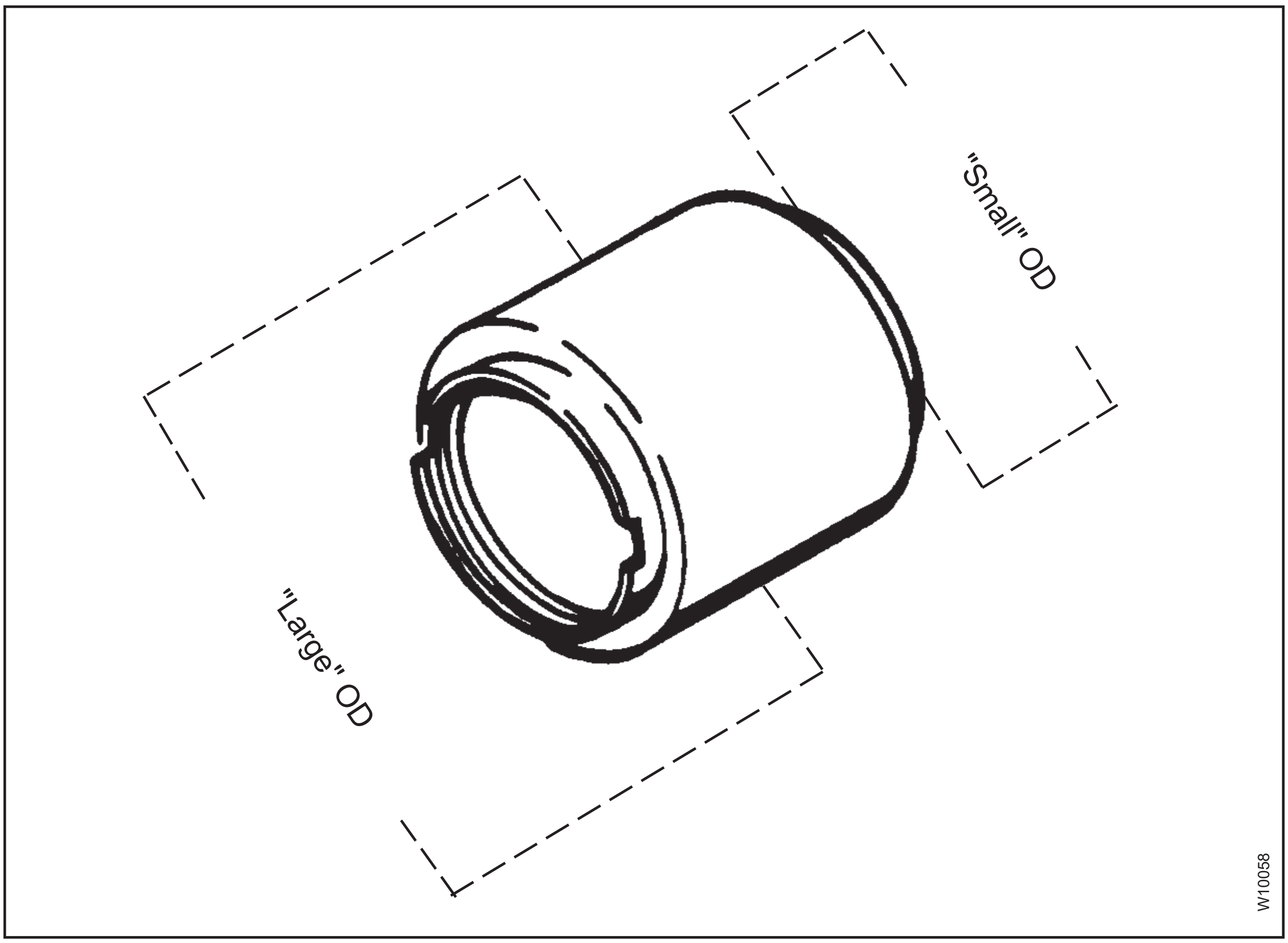
CAUTION: INSTRUCTIONS AND PROCEDURES IN THIS CHAPTER MAY INVOLVE PROPELLER CRITICAL PARTS. REFER TO THE INTRODUCTION CHAPTER OF THIS MANUAL FOR INFORMATION ABOUT PROPELLER CRITICAL PARTS. REFER TO THE ILLUSTRATED PARTS LIST IN THIS MANUAL FOR IDENTIFICATION OF PROPELLER CRITICAL PARTS.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
A. SPINNER MOUNTING PLATE (Item 40)		
NOTE: Spinner mounting plates installed on HC-B5MA-2 propeller assemblies are Cadmium plated and painted to provide additional corrosion protection. All paint must be removed before inspection. These mounting plates must be repainted in accordance with the Repair chapter of this manual before being returned to service.		
(1) Visually examine the spinner mounting plate for corrosion product and pitting.	Corrosion product is not permitted. The maximum permitted depth of pitting is 0.005 inch (0.12 mm).	If the depth of corrosion product is 0.005 inch (0.12 mm) or less, remove the corrosion product and replate the spinner mounting plate in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the depth of corrosion product is greater than 0.005 inch (0.12 mm), replace the spinner mounting plate.
(2) Visually examine the spinner mounting plate for scratches.	The maximum permitted depth of a scratch is 0.005 inch (0.12 mm).	If the depth of the scratch is 0.005 inch (0.12 mm) or less, replate the spinner mounting plate in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the depth of a scratch is greater than 0.005 inch (0.13 mm), replace the spinner mounting plate.
(3) Visually examine the spinner mounting plate for cadmium plating coverage.	Except for missing cadmium plating on corners, complete cadmium coverage is required.	Replate the spinner mounting plate in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(4) Magnetic particle inspect the spinner mounting plate at each overhaul 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 a relevant indication cannot be removed within the serviceable limits in this section, replace the spinner mounting plate.

Component Inspection Criteria
Table 5-1

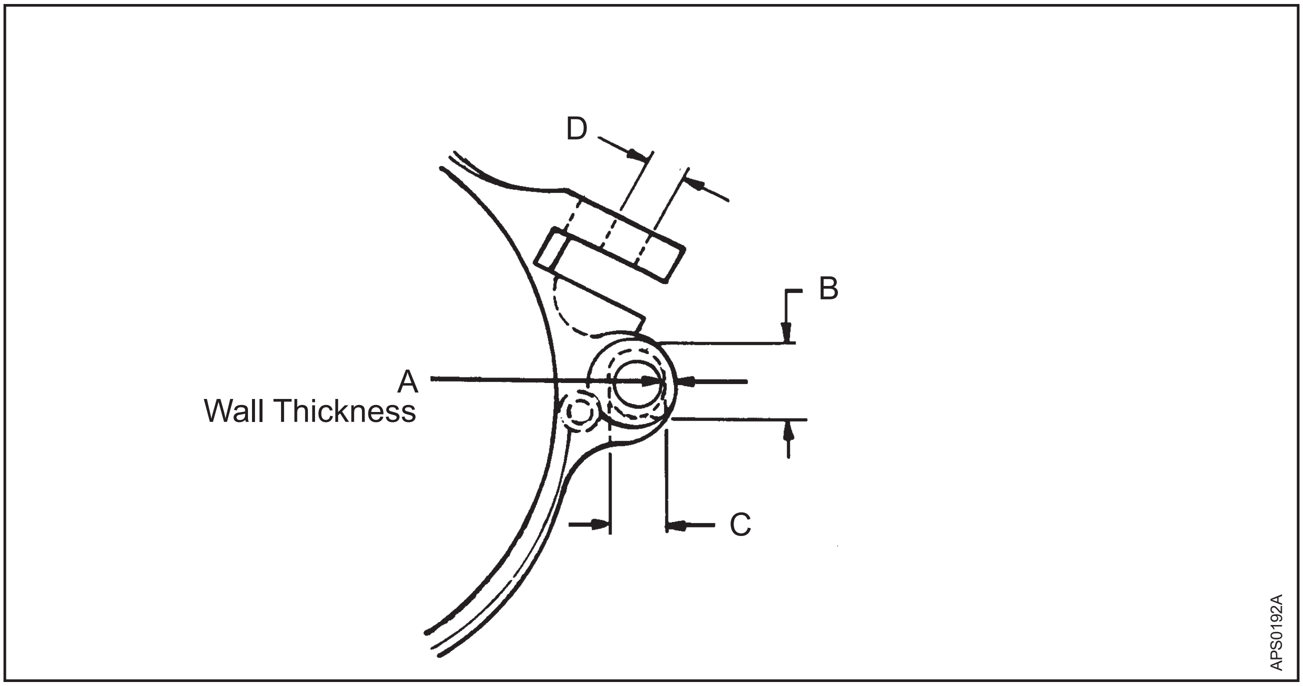
Inspect	Serviceable Limits	Corrective Action
B. CYLINDER (Item 610) Refer to Figure 5-1		
(1) Visually examine all threaded surfaces on the cylinder.	One damaged thread is permitted.	If the damage is greater than the permitted serviceable limits, replace the cylinder
(2) Visually examine the cylinder for chrome plate coverage.	Flaking of the chrome finish is not permitted. Minor wear that is within the permitted serviceable limits and random, light scratches that are not greater than the chrome depth and do not interfere with the seal of the O-ring are permitted. Otherwise, complete chrome coverage is required.	If the wear or damage is greater than the permitted serviceable limits, repair or replace the cylinder. For cylinder repair and rechroming procedures, refer to the Hard Chromium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



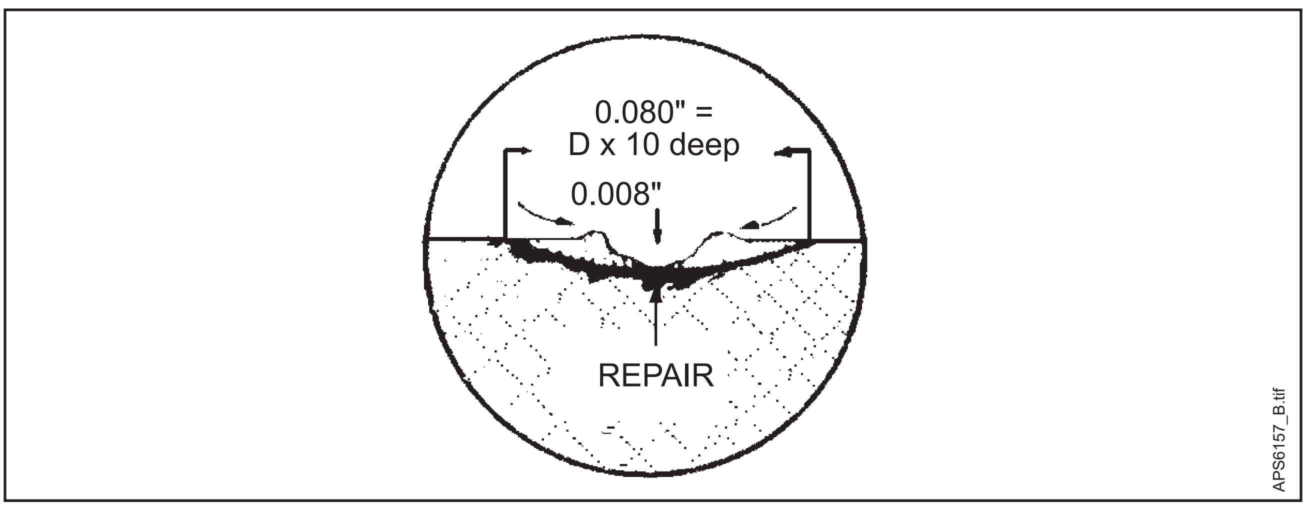
Cylinder Large and Small OD
Figure 5-1

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
B. CYLINDER, continued (Item 610) Refer to Figure 5-1		
(3) Visually examine the normal operating area of the cylinder for scratches, wear, or gouges.	The maximum permitted depth of a scratch, wear, or gouge is 0.001 inch (0.025 mm).	If the scratches, wear, or gouges are deeper than the permitted serviceable limit, repair or replace the cylinder. For cylinder repair and rechroming procedures, refer to the Hard Chromium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(4) Measure the large OD and the small OD of the cylinder.	The minimum permitted large OD is 4.998 inches (126.95 mm). The minimum permitted small OD is 4.721 inches (119.92 mm).	If the large OD or small OD of the cylinder is smaller than the permitted serviceable limits, repair or replace the cylinder. For cylinder repair and rechroming procedures, refer to the Hard Chromium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(5) Magnetic particle inspect the cylinder at each overhaul 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 cylinder.



Piston Inspection
Figure 5-2



External Piston Assembly Surface Inspection
Figure 5-3

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
C. PISTON ASSEMBLY (Item 210) Refer to Figures 5-2 and 5-3		
(1) Visually examine the threads of the link pin safety screw holes in the piston.	Worn threads can cause the link pin to disconnect from the piston. There must be at least three thread lengths in the piston link pin screw hole to hold the safety screw in place.	Repair threads in the link pin safety screw holes by using a thin wall insert. Refer to the Repair chapter of this manual.
(2) Visually examine the ID of the plastic piston bushing for wear.	If there is wear, measure the ID of the plastic piston bushing. The maximum permitted bushing ID is 5.015 inches (127.38 mm).	If the ID of the plastic piston bushing is greater than the permitted serviceable limits, replace the plastic piston bushing. Refer to the Repair chapter of this manual.
(3) Visually examine the hole at the front of the piston for damage caused by inserting or removing the pitch change rod.	Damage must not interfere with the sealing ability of the O-ring.	If the damage is greater than the permitted serviceable limits, replace the piston.
(4) Measure the thickness of the piston lug wall in the area of the beta rod hole. Refer to "A" in Figure 5-2.	For "A", the minimum permitted wall thickness is 0.094 inch (2.39 mm).	If the wall thickness is less than the minimum permitted serviceable limits, replace the piston.
(5) Measure the beta rod hole. Refer to "B" and "C" in Figure 5-2.	For "B", the maximum permitted beta rod hole dimension is 0.500 inch (12.70 mm). For "C", the maximum permitted beta rod hole dimension is 0.469 inch (11.91 mm).	If either measurement of the beta rod hole ("B" or "C") is greater than the maximum permitted serviceable limits, replace the piston.
(6) Measure the piston link pin holes. Refer to "D" in Figure 5-2.	For "D", the maximum permitted diameter of a piston link pin hole is 0.377 inch (9.57 mm).	For bonding of an A-946 bronze bushing into a link pin hole of the piston unit, if a link pin hole diameter is greater than the permitted serviceable limits, repair the hole in accordance with the Special Adhesive and Bonding Procedures chapter of Hartzell Propeller Inc. Standard Practices manual 202A, (61-01-02).

Component Inspection Criteria
Table 5-1

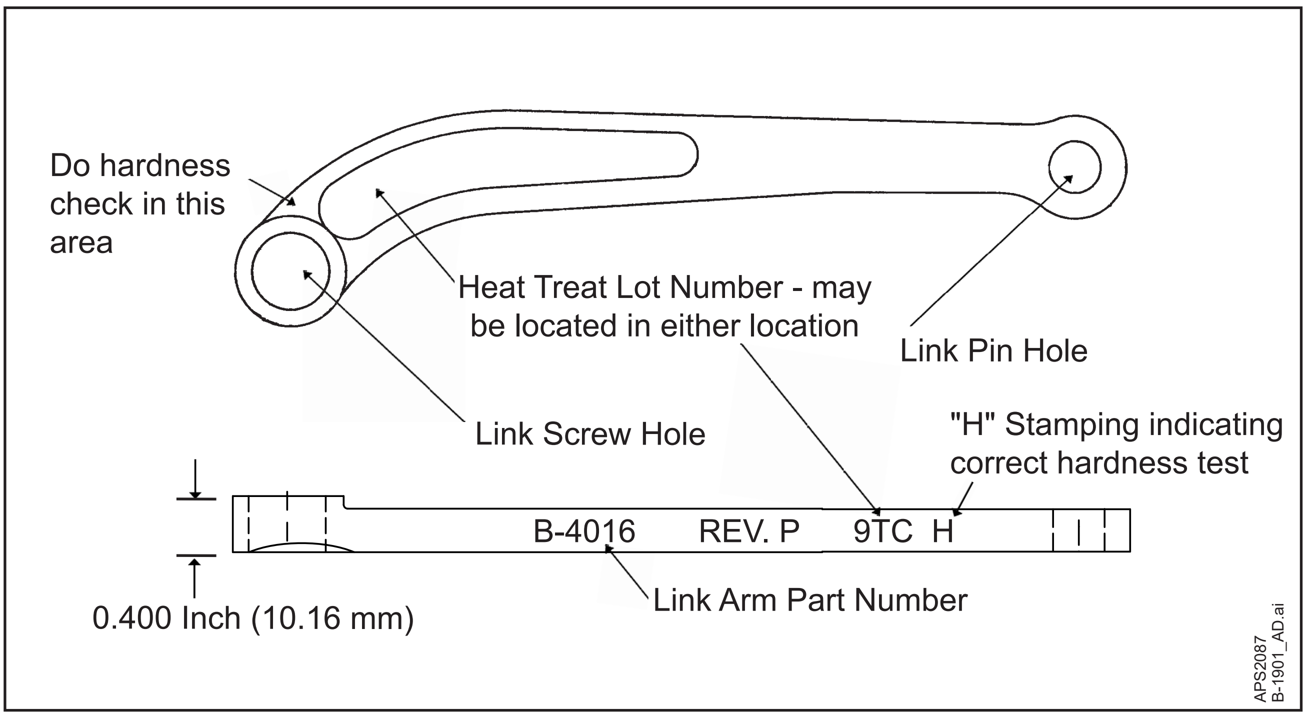
Inspect	Serviceable Limits	Corrective Action
C. PISTON ASSEMBLY, continued (Item 210) Refer to Figures 5-2 and 5-3		
(7) Visually examine the felt seal groove side walls for pitting or damage.	The maximum permitted depth of pitting or damage is 0.003 inch (0.07 mm). The maximum permitted diameter of an individual pit is 0.06 inch (1.5 mm). Pin-point penetrant indications from corrosion pitting are permitted.	Using an abrasive pad CM47 or equivalent, polish to remove pitting or damage to a maximum depth of 0.006 inch (0.15 mm). If the pitting or damage is greater than the permitted serviceable limits or corrective action, replace the piston.
(8) Visually examine the O-ring groove side walls for pitting or damage.	A smooth surface finish is required. Pitting or damage is not permitted.	Using an abrasive pad CM47 or equivalent, polish to remove pitting or damage to a maximum depth of 0.006 inch (0.15 mm). If the pitting or damage is greater than the permitted serviceable limits or corrective action, replace the piston.
(9) Visually examine the felt seal groove ID for pitting or damage.	The maximum permitted depth of pitting or damage is 0.005 inch (0.12 mm). The maximum permitted diameter of an individual pit is 0.060 inch (1.50 mm). Pin-point penetrant indications from corrosion pitting are permitted.	Using an abrasive pad CM47 or equivalent, polish to remove pitting or damage to a maximum depth of 0.006 inch (0.15 mm). Localized repairs of pitting or damage are permitted up to a maximum depth of 0.015 inch (0.38 mm). A maximum of three localized repair sites are permitted. The maximum length of each localized repair site is 0.250 inch (6.35 mm). Each localized repair site may be the entire width of the felt seal groove. If the pitting or damage is greater than the permitted serviceable limits or corrective action, replace the piston.
(10) Visually examine the O-ring groove ID for pitting or damage.	A smooth surface finish is required. Pitting or damage is not permitted.	Using an abrasive pad CM47 or equivalent, polish to remove pitting or damage to a maximum depth of 0.003 inch (0.07 mm). If the pitting or damage is greater than the permitted serviceable limits or corrective action limits, replace the piston.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
C. <u>PISTON ASSEMBLY, continued</u> (Item 210) Refer to Figures 5-2 and 5-3		
(11) Visually examine the outside surfaces of the piston assembly for corrosion product, pitting, scratches or damage. Refer to Figure 5-3.	Corrosion product is not permitted. The maximum permitted depth of pitting, scratches, or damage is 0.008 inch (0.20 mm) deep and 0.0625 inch (1.587 mm) diameter.	Repair the outside surfaces of the piston assembly to a minimum diameter of the damage depth x 10. If corrosion product, pitting, scratches, or damage is greater than the serviceable limits, replace the piston.
	Damage is not permitted in the link pin attaching area.	Repair is not permitted in the link pin attaching area. If there is damage, replace the piston.
(12) Aluminum Piston (all except piston 100460): Penetrant inspect the piston in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A crack is not permitted.	If there is a crack, replace the piston.
(13) Titanium Piston (piston 100460 <u>only</u>): Penetrant inspect the piston in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A crack is not permitted.	If there is a crack, replace the piston.

Component Inspection Criteria
Table 5-1

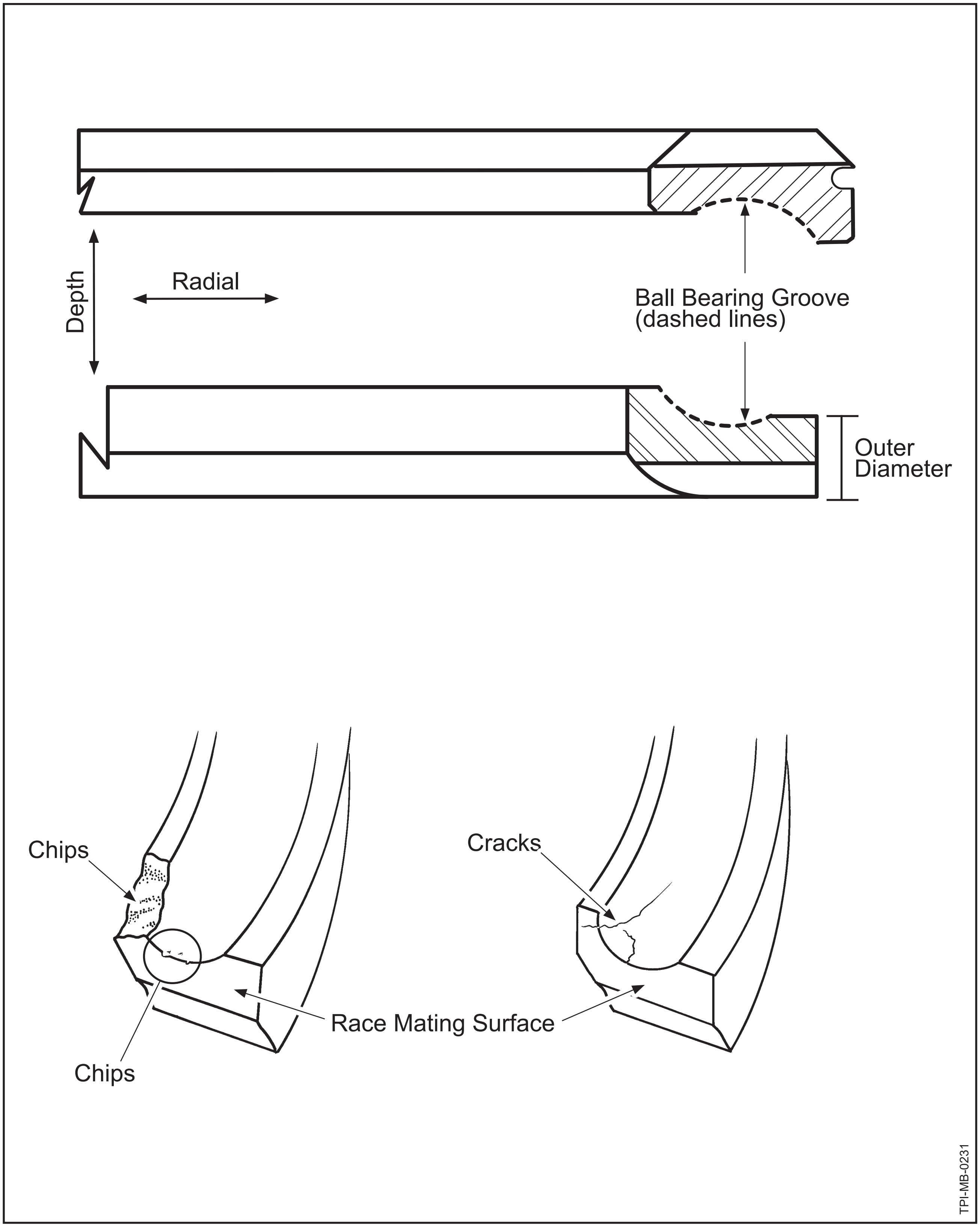
Inspect	Serviceable Limits	Corrective Action
D. <u>LINK ARM</u> (Item 230) Refer to Figure 5-4		
(1) Visually examine each link arm for twisting or distortion.	Twisting or distortion is not permitted. Flatness must be less than 0.015 inch (0.38 mm) from one hole to the other.	If there is twisting, distortion, or if flatness is greater than the permitted serviceable limits, replace the link arm.
(2) Measure the ID of the link pin hole and link screw hole of each link arm.	The maximum permitted ID of the link pin hole is 0.3785 inch (9.613 mm). The maximum permitted ID of the link screw hole is 0.5665 inch (14.389 mm).	If either ID is greater than the permitted serviceable limits, replace the link arm.
(3) Measure the thickness of the end of the link arm, adjacent to the link screw hole. Refer to Figure 5-4.	The minimum thickness is 0.400 inch (10.16 mm).	If the thickness is less than the permitted serviceable limits, replace the link arm.



Link Arm
Figure 5-4

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
D. LINK ARM, continued (Item 230) Refer to Figure 5-4		
(4) Magnetic particle inspect the link arms in accordance with the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A crack is not permitted.	If there is a crack, replace the link arm.
(5) Visually examine each link arm for wear to the cadmium plating.	Wear through the cadmium plating is not permitted.	Replate the link arm in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(6) B4016(L) and B-1901(L) link arms only: Visually examine the link arm for the heat treat lot number 9TC. Refer to Figure 5-4 for the location of the heat treat lot number.	If the heat treat lot number is 9TC, the link hardness must be within the range of HRC 31 through 37.	Perform an HRC hardness test in the area shown in Figure 5-4. If the hardness is greater than a Rockwell C value of 37, replace the link arm. If the hardness is equal to or less than a Rockwell C value of 37 but equal to or greater than a value of 31, then use a round bottom stamp to stamp an "H" following the heat treat lot number. Refer to Figure 5-4 for the location of the stamping.



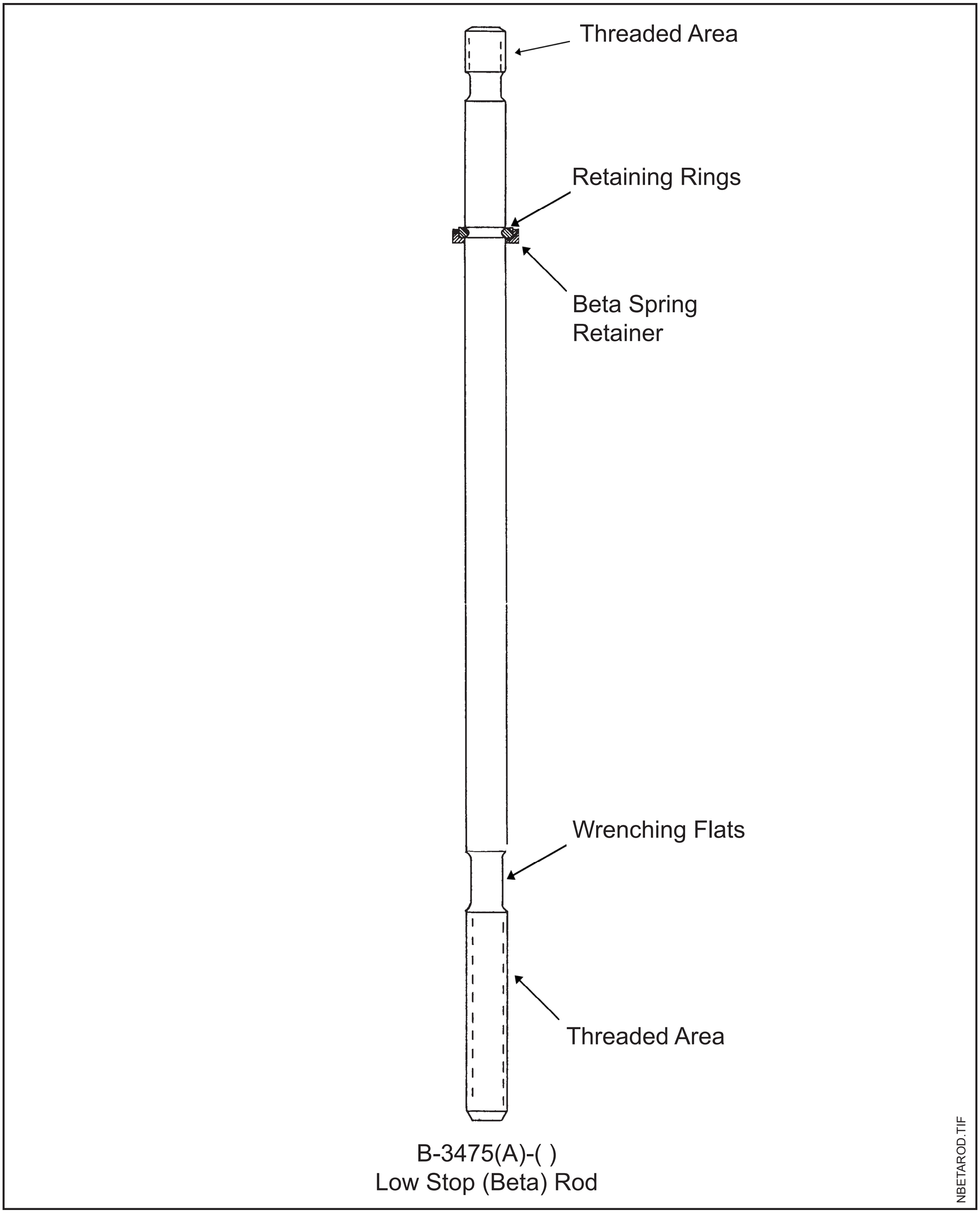
Race Inspection
Figure 5-5

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
E. RACE (Items 1270, 1280) Refer to Figure 5-5		
(1) Visually examine the ball bearing groove in each race for corrosion product.	Corrosion product is not permitted.	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 the corrosion product cannot be removed, replace the race.
(2) Visually examine the ball bearing groove in each 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 race is 0.12 square inch (77.4 square mm) (two 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 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 race.
	Fretting damage is not permitted.	If there is fretting damage, replace the 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 race.
(3) Except for the ball bearing groove, visually examine all other surfaces of each race for corrosion product.	Corrosion product is not permitted.	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 the corrosion product cannot be removed, replace the race.

Component Inspection Criteria
Table 5-1

Inspect		Serviceable Limits	Corrective Action
E. RACE, continued (Items 1270, 1280) Refer to Figure 5-5			
(4)	Except for the ball bearing groove, visually examine all other surfaces of each 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 race is 0.25 square inch (161.2 square mm) (two races for each bearing set).	If the pitting is greater than the permitted serviceable limits, replace the race.
		Fretting damage is permitted on the outer diameter of the races that interface with the bearing retaining ring. Fretting must not loosen the tight fit with the bearing retaining ring.	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 to the race is not tight, replace the race.
		Wear is not permitted.	If there is wear, replace the race.
		For damage other than pitting or fretting, the maximum permitted depth of damage is 0.005 inch (0.12 mm) and must not interfere with the mating surfaces.	If the damage is greater than the permitted serviceable limits, replace the race.
(5)	Visually examine the 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 race are not permitted.	If there are chips or cracks adjacent to the mating surfaces of the race, replace the race.
(6)	Magnetic particle inspect each 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 race.



Beta Rod (Low Stop Rod)
Figure 5-6

Component Inspection Criteria
Table 5-1

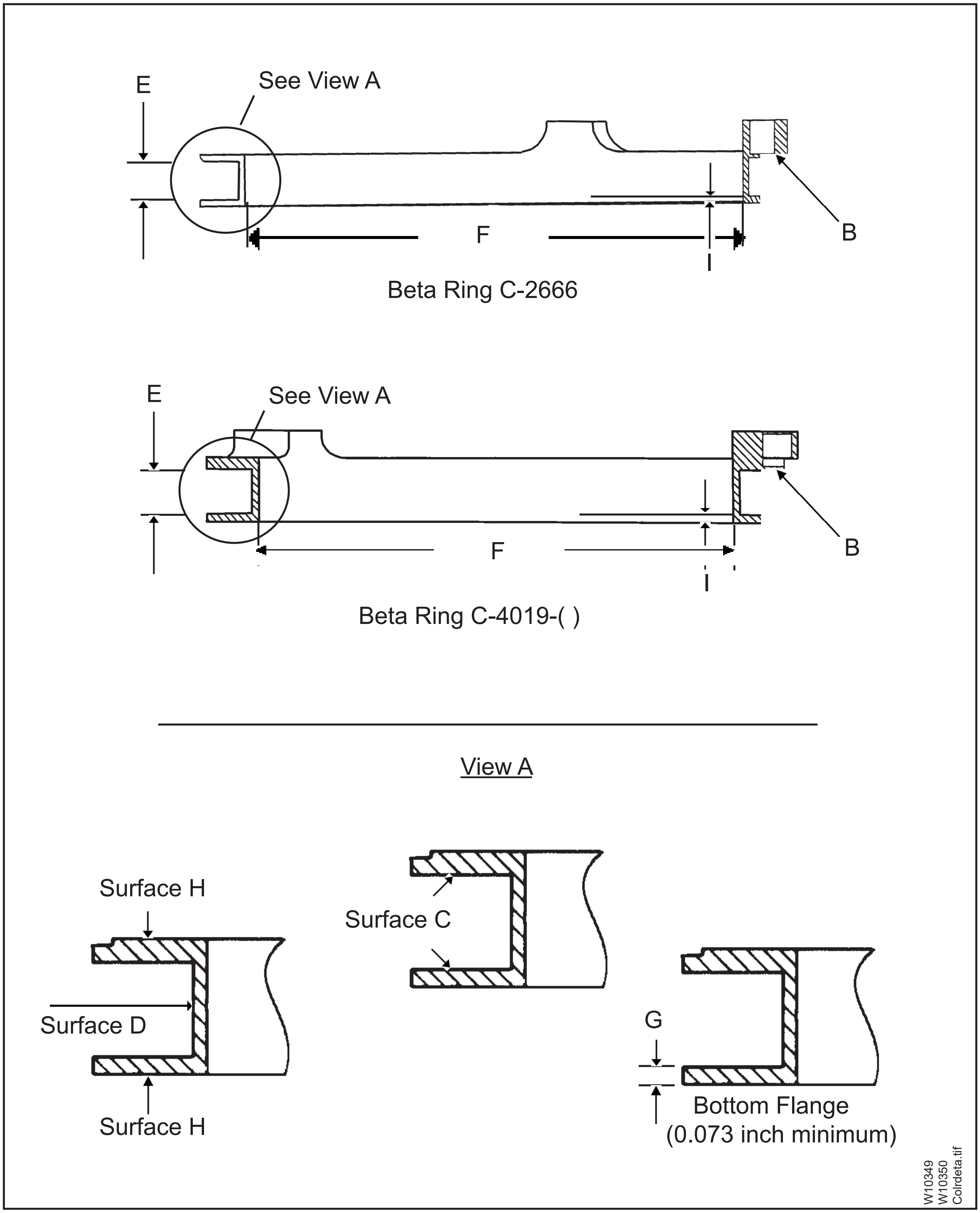
Inspect	Serviceable Limits	Corrective Action
F. BEARING RETAINING RING (Item 1310)		
(1) Magnetic particle inspect and replate in accordance with the Magnetic Particle Inspection and the Cadmium Replating chapters of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A crack is not permitted.	If there is a crack, replace the bearing retaining ring.
G. BETA ROD (LOW STOP ROD) (Item 1060) Refer to figure 5-6		
NOTE: B-3475(A)-( ) beta rods incorporate pressed-on retaining rings, which are removed and discarded at overhaul. Refer to the Assembly chapter of this manual for installation procedures.		
(1) Visually examine each beta rod for bending or distortion.	The beta rod must be straight.	If the beta rod is not straight, replace the beta rod.
(2) Visually examine each beta rod for damage that is through the chrome finish.	Damage that is through the chrome surface is not permitted.	If the damage is greater than the permitted serviceable limits, replace the beta rod.
(3) Visually examine the threaded areas of each beta rod for damage or wear.	The maximum permitted amount of damage or wear is 10 degrees of circumference of the beta rod.	If the damage or wear is greater than the permitted serviceable limits, replace the beta rod.
(4) Visually examine the beta rod wrenching flats for moved material. Refer to Figure 5-6.	Moved material caused by wrench engagement must not be above or below the beta rod shoulder surfaces. Sufficient flat surfaces must remain to support applied open-end wrench torque.	Remove the moved material flush with the beta rod shoulder thickness. If sufficient flat surfaces do not remain, replace the beta rod.
(5) Measure the OD of each beta rod.	The minimum permitted OD is 0.370 inch (9.40 mm).	If the OD is less than the permitted serviceable limits, replace the beta rod.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
G. BETA ROD (LOW STOP ROD), CONTINUED (Item 1060) Refer to figure 5-6		
(6) Magnetic particle inspect each beta rod at each overhaul in accordance with the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A crack is not permitted.	If there is a crack, replace the beta rod.
(7) Visually examine the cadmium plating coverage on the threaded areas of each 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.	Replate and bake the beta rod 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
H. BETA SPRING RETAINER (Item 1070) Refer to Figure 5-6		
(1) Visually examine each beta rod retainer 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 with glass bead cleaning in accordance with the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If pitting is 0.005 inch (0.12 mm) deep or less, remove the pitting and replate the beta rod retainer in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If pitting is greater than 0.005 inch (0.12 mm) depth, replace the beta spring retainer.
(2) Visually examine each beta spring retainer for wear to the cadmium plating.	Wear to the cadmium plating is not permitted.	Replate the beta spring retainer in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(3) Visually examine each beta spring retainer for scratches.	The maximum permitted depth for a scratch is 0.005 inch (0.12 mm).	Replate the beta spring retainer in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the depth of a scratch is greater than 0.005 inch (0.12 mm), replace the beta spring retainer.



Beta Ring (Low Stop Collar)
Figure 5-7

Component Inspection Criteria
Table 5-1

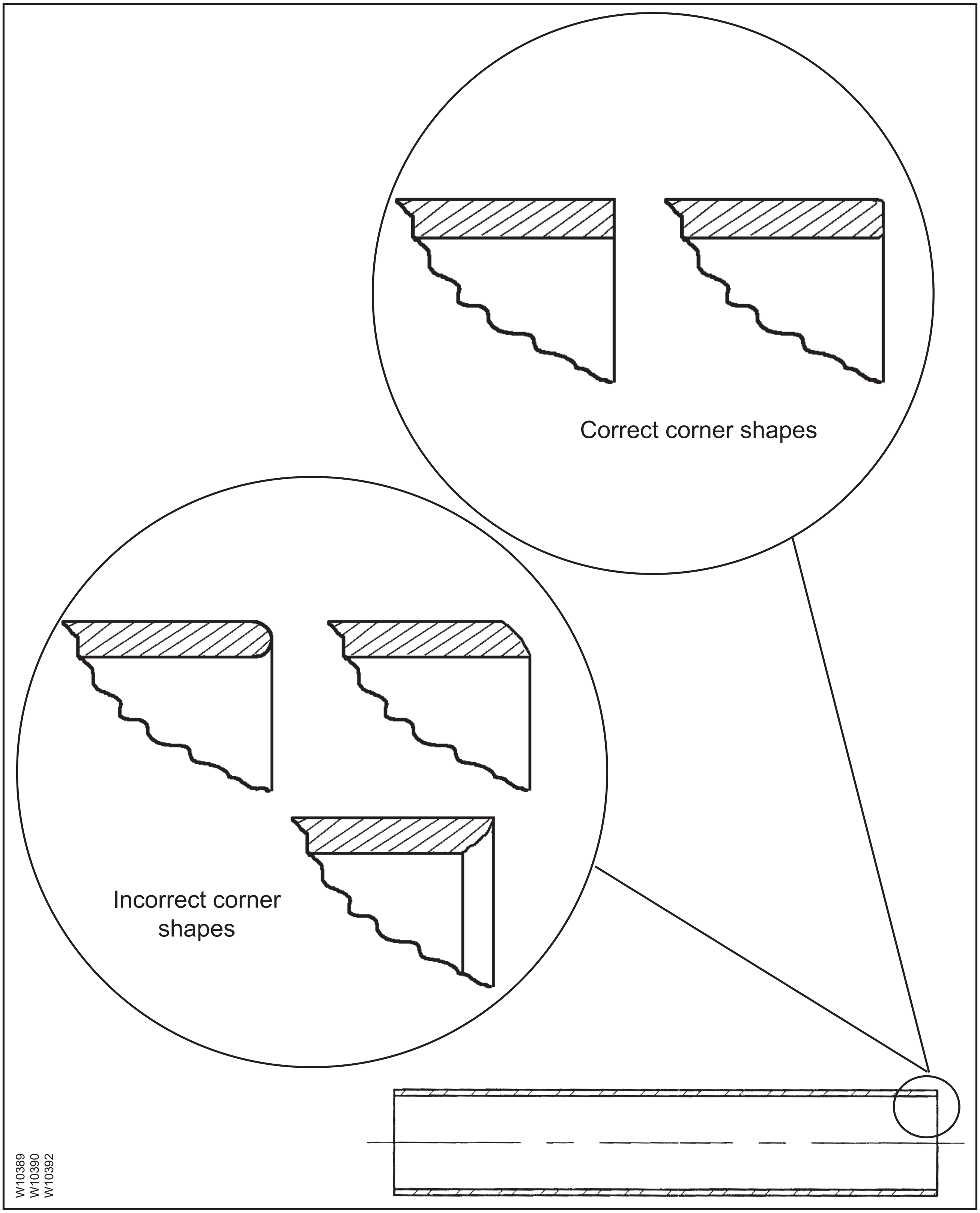
Inspect		Serviceable Limits	Corrective Action
I.	BETA RING (LOW STOP COLLAR) (Item 1120) Refer to Figure 5-7		
(1)	Visually examine the beta ring for cracks.	A crack is not permitted.	If there is a crack, replace the beta ring.
(2)	Visually examine the bottom of the threaded holes (area B) for indications of a raised bump made by the low stop rod.	The maximum permitted height of a raised bump in this area is 0.004 inch (0.10 mm).	If the height of a raised bump is greater than the permitted serviceable limits, replace the beta ring.
(3)	Visually examine the beta ring (area C) for any scratches.	The maximum permitted depth of a scratch is 0.004 inch (0.10 mm).	If the depth is greater than the permitted serviceable limits, replace the beta ring.
(4)	Measure any depression or gouge in the groove (area D) of the beta ring.	The maximum permitted depth of a depression or gouge is 0.007 inch (0.17 mm).	If the damage is within the permitted serviceable limits, refer to the Repair chapter of this manual. If the damage is greater than the permitted serviceable limits, replace the beta ring.
(5)	Measure the width of the groove (area E) in the beta ring.	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 F).	The maximum permitted ID of beta ring C-4019-( ) is 5.4270 inches (137.545 mm). The maximum permitted ID of beta ring C-2666 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 bottom flange on the beta ring (area G) at a minimum of four separate points on each flange.	At any one point on the bottom flange, the minimum permitted width is 0.073 inch (1.85 mm).	If the width is less than the permitted serviceable limits, replace the beta ring.
(8)	Measure any depression or gouge on the outside surface (area H) of the beta ring.	The maximum permitted depth of a depression or gouge is 0.007 inch (0.17 mm).	If the damage is within the permitted serviceable limits, refer to the Repair chapter of this manual. 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
I. BETA RING (LOW STOP COLLAR), continued (Item 1120) Refer to Figure 5-7		
(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 I).	The maximum permitted depth of a groove or scratch is 0.007 inch (0.17 mm).	If a groove/scratch is 0.007 inch (0.17 mm) or less, using an abrasive pad CM47 or equivalent, polish the inner surface, maintaining maximum ID of the beta ring as described in "F," above.
(10) Visually examine the inner surface, excluding area I, above, but including inner surface of lug areas for grooves or scratches.	The maximum permitted depth of a groove or scratch is 0.007 inch (0.17 mm).	If a groove/scratch is 0.007 inch (0.17 mm) or less, using an abrasive pad CM47 or equivalent, polish the inner surface, maintaining maximum ID of the beta ring as described in "F," above.
(11) 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.

Component Inspection Criteria
Table 5-1

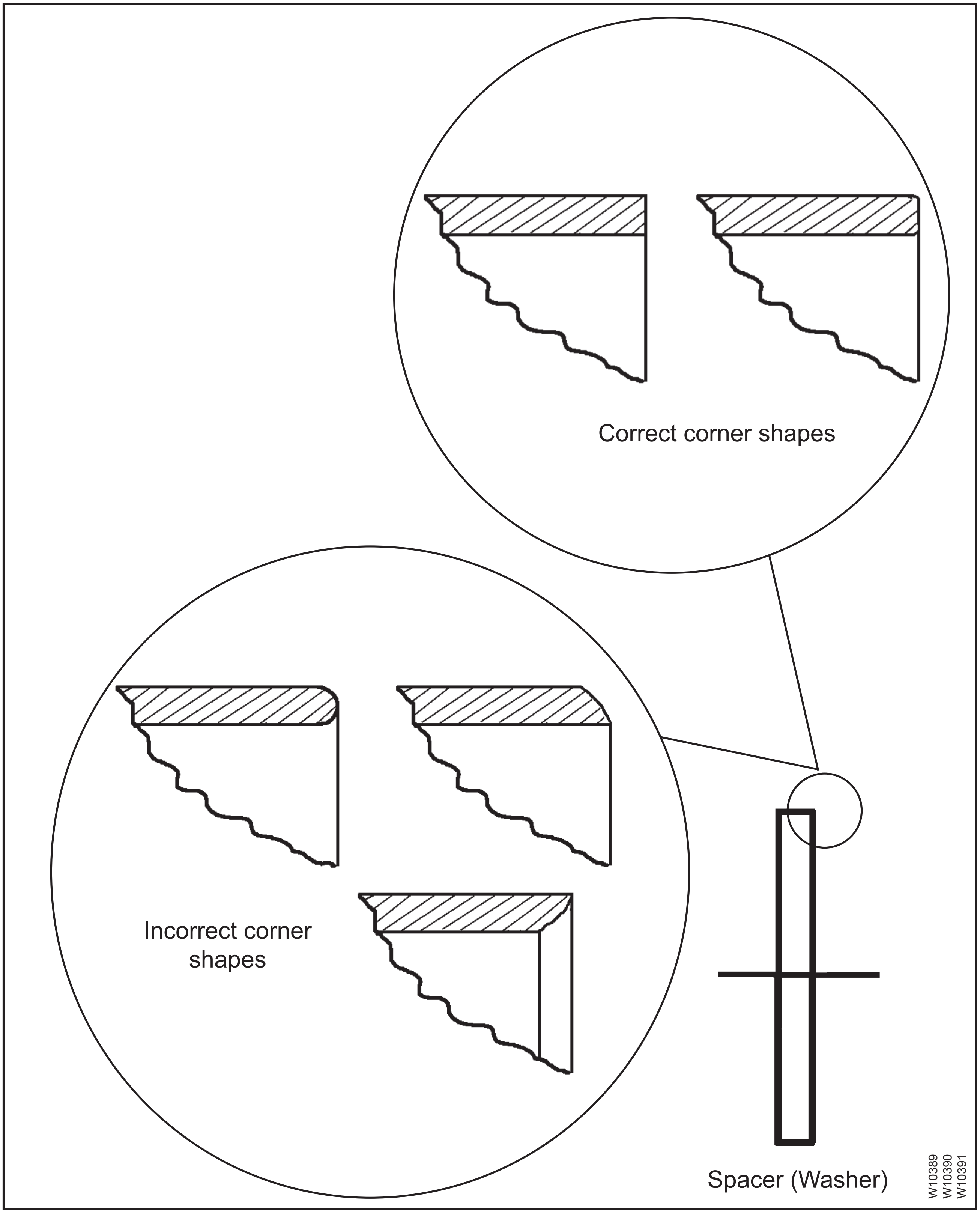
Inspect	Serviceable Limits	Corrective Action
J. <u>FEATHERING COMPRESSION SPRING</u> (Item 480)		
(1) Special Inspection: Visually examine for part number A-3496.	A feathering compression spring that has the part number A-3496 is not permitted.	If the feathering compression spring part number is A-3496, remove and replace it with a 102877 feathering compression spring.
(2) Visually examine each 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 by using glass bead cleaning in accordance with the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If pitting is deeper than 0.005 inch (0.12 mm), replace the feathering compression spring.
(3) Magnetic Particle inspect in accordance with the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A crack, lap, or seam is not permitted.	If there is a crack, lap, or seam, replace the feathering compression spring.



Spacer Sleeve Corner Inspection
Figure 5-8

Component Inspection Criteria
Table 5-1

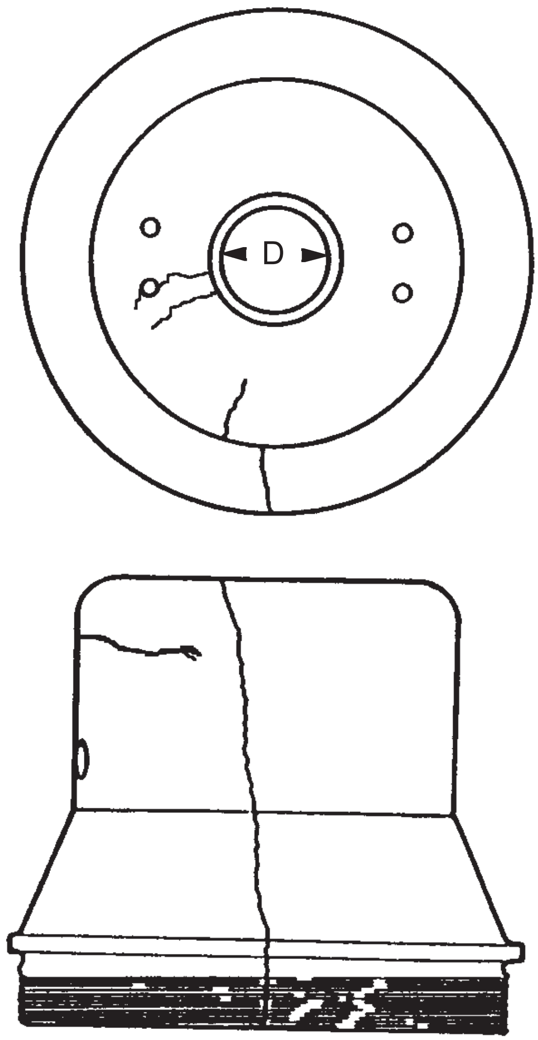
Inspect	Serviceable Limits	Corrective Action
K. SPACER SLEEVE (Item 500)		
(1) Visually examine for wear, corrosion product, and pitting.	Corrosion product is not permitted. The maximum permitted depth of wear or pitting is 0.005 inch (0.12 mm).	Remove corrosion product by using glass bead cleaning in accordance with the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If wear or pitting is deeper than 0.005 inch (0.12 mm), replace the spacer sleeve.
(2) Visually examine the shape of the corner of the spacer sleeve, between the ID and the OD. Refer to Figure 5-8.	The corners on both ends of the spacer sleeve must be square, as defined in Figure 5-8.	If any corner is not square, replace the spacer sleeve.
(3) Visually examine for cadmium plating coverage.	Cadmium plating must completely cover the spacer sleeve.	Replate and bake the spacer sleeve in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
L. REAR SPRING RETAINER (Item 510)		
(1) Visually examine 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 by using glass bead cleaning in accordance with the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If pitting is deeper than 0.005 inch (0.12 mm), replace the rear spring retainer.
(2) Visually examine for damage caused by the feathering spring.	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.
(3) Measure the OD surface that contacts the hub bore for wear.	The minimum permitted OD is 2.985 inch (75.82 mm).	If the OD is less than the permitted serviceable limits, replace the rear spring retainer.



Spacer (Washer) Corner Inspection
Figure 5-9

Component Inspection Criteria
Table 5-1

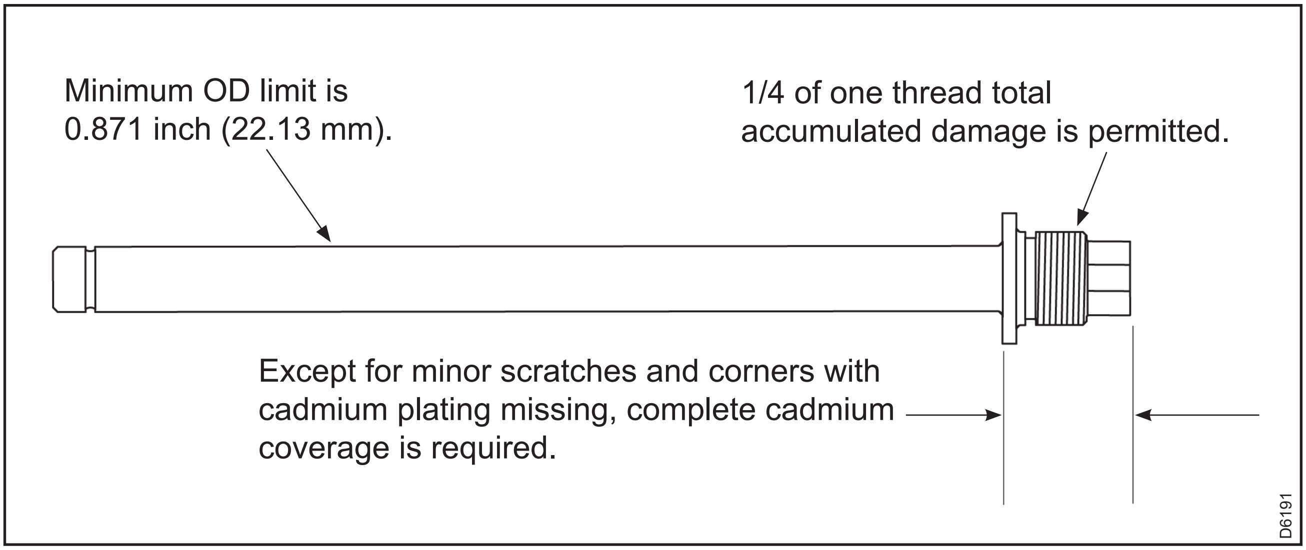
Inspect	Serviceable Limits	Corrective Action
M. BALL THRUST BEARING (Item 470)		
(1) Visually examine the ball thrust bearing for smooth operation.	The ball thrust bearing must rotate smoothly.	If the ball thrust bearing does not rotate smoothly, replace the ball thrust bearing.
(2) Visually examine the bearing race for pitting or wear.	The maximum permitted depth of pitting or wear is 0.002 inch (0.05 mm).	If the pitting or wear is greater than the permitted serviceable limits, replace the ball thrust bearing.
(3) Visually examine each bearing ball (encased in the ball spacer) for corrosion product or pitting.	Corrosion product or pitting is not permitted.	If there is corrosion product or pitting, replace the ball thrust bearing.
(4) Visually examine the ball thrust bearing for elongated holes.	Elongated holes are permitted if the bearing ball can stay in the ball thrust bearing.	If a bearing ball cannot stay in the ball spacer, replace the ball thrust bearing.
N. PITCH ADJUST SPACER (Item 490)		
(1) Visually examine the pitch adjust spacer for wear, 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 in accordance with the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the corrosion product cannot be removed or if wear or pitting is greater than the permitted serviceable limits, replace the pitch adjust spacer.
(2) Visually examine the shape of the corner of the pitch adjust spacer, between the ID and the OD.	The corners on both ends of the pitch adjust spacer must be square, as defined in Figure 5-9.	If any corner is not square, replace the pitch adjust spacer.
(3) Visually examine the pitch adjust spacer for cadmium plating coverage.	Cadmium plating must completely cover the pitch adjust spacer.	If the cadmium plate coverage is less than the permitted serviceable limits, cadmium replate the pitch adjust spacer in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02)



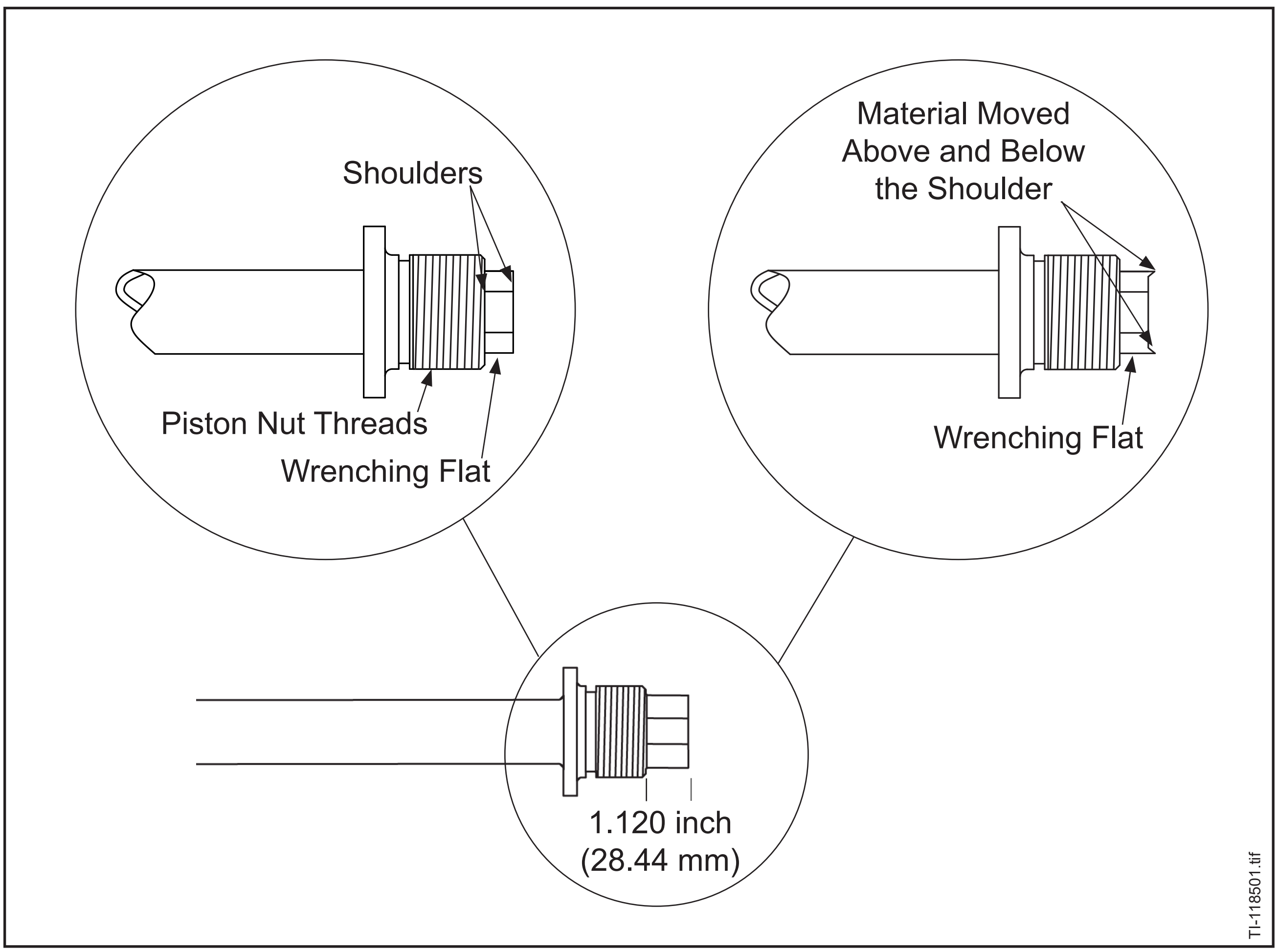
Spring Retainer Cup Typical Crack Locations
Figure 5-10

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
O. SPRING RETAINER CUP (Item 450) Refer to Figure 5-10		
(1) Visually examine the spring retainer cup for damage to the OD threads.	Slight damage to the first three threads that was caused when the initial hole was drilled for the safety wire is permitted. An additional 1/4 of one thread total accumulated damage (excluding drill damage to the first three threads) is permitted.	If the damage is greater than the permitted serviceable limits, replace the spring retainer cup.
(2) Visually examine the 10-32UNF-3B threaded holes for damage.	A maximum of 1/2 of one thread total accumulated damage for each threaded hole is permitted.	If the damage is greater than the permitted serviceable limits, replace the spring retainer cup.
(3) Visually examine the spring retainer cup for damage to the safety wire hole area.	Safety wire holes can be "pulled out" of the spring retainer cup. This damage is permitted if a new safety wire hole can be established. Additional damage is not permitted.	If the damage is greater than the permitted serviceable limits, replace the spring retainer cup.
(4) Measure the pitch change rod hole (ID) of the spring retainer cup.	The maximum permitted ID for the pitch change rod hole in the spring retainer cup is 0.881 inch (22.37 mm).	If the ID is greater than the permitted serviceable limits, replace the spring retainer cup.
(5) Penetrant inspect the spring retainer cup in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A crack is not permitted.	If there is a crack, replace the spring retainer cup.



Pitch Change Rod Inspection
Figure 5-11



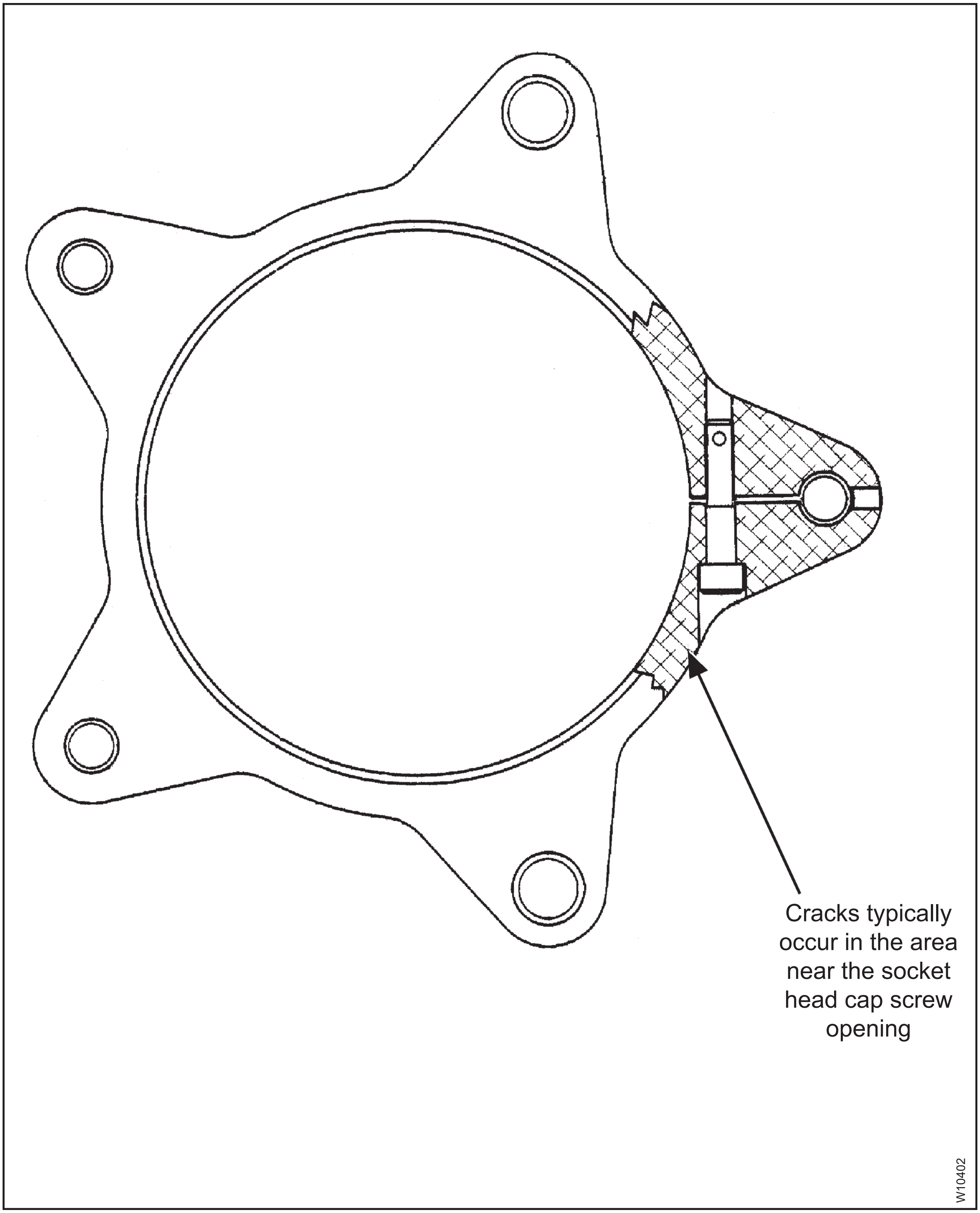
Pitch Change Rod
Figure 5-12

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
P. SPRING GUIDE (Items 460, 465)		
(1) Visually examine the spring guides for wear, corrosion product and pitting.	Corrosion product is not permitted. The maximum permitted depth of wear or pitting is 0.005 inch (0.12 mm).	Remove corrosion product by using glass bead cleaning in accordance with the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If wear or pitting is deeper than 0.005 inch (0.12 mm), replace the spring guide.
(2) Visually examine for cadmium plating coverage.	Cadmium plating must completely cover the spring guide.	Replate and bake the spring guide in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(3) Visually examine the welds for secure attachment to the washer and tube portion of the spring guide.	All welds between the tube and washer portion of the spring guide must be securely attached.	If there is a weld between the tube and washer portion of the spring guide that is not securely attached, replace the spring guide.
Q. PITCH CHANGE ROD (Item 430) Refer to Figures 5-11 and 5-12		
(1) Visually examine the threaded areas of the pitch change rod for damage.	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 pitch change rod.
(2) Measure the OD of the pitch change rod.	The minimum permitted OD limit is 0.871 inch (22.13 mm).	If the OD is less than the permitted serviceable limits, replace the pitch change rod.
(3) Visually examine the flange and threaded portion of the rod for cadmium plating coverage.	Except for minor scratches and corners with cadmium plating missing, complete coverage is required.	Replate and bake the end of the pitch change rod in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

Component Inspection Criteria
Table 5-1

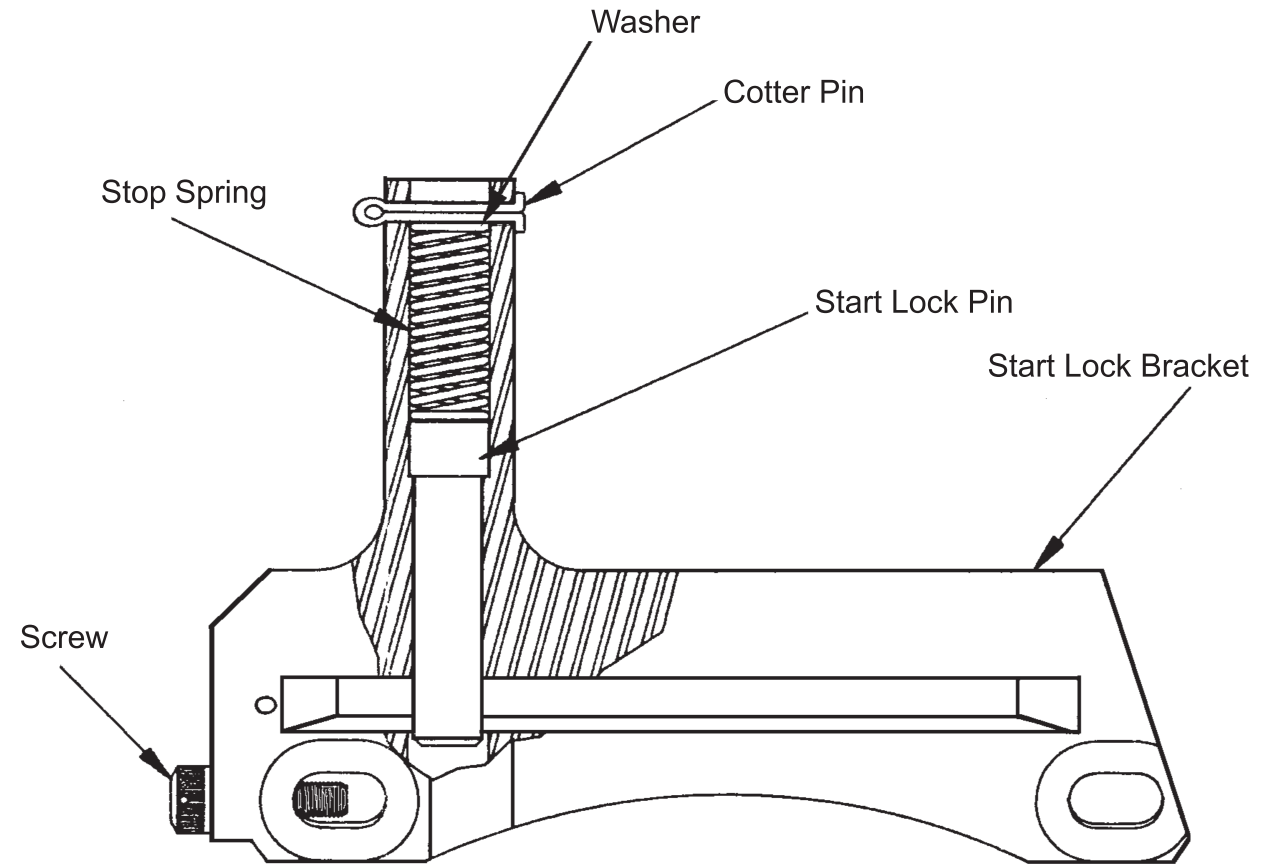
Inspect	Serviceable Limits	Corrective Action
Q. PITCH CHANGE ROD, continued (Item 430) Refer to Figures 5-11 and 5-12		
(4) Visually examine the beta rod wrenching flats for moved material. Refer to Figure 5-12.	Moved material caused by wrench engagement must not be above or below the beta rod shoulder surfaces. Sufficient flat surfaces must remain to support applied open-end wrench torque.	Remove the moved material flush with the beta rod shoulder thickness. If sufficient flat surfaces do not remain, replace the pitch change rod.
(5) Magnetic particle inspect each pitch change rod in accordance with the Magnetic Particle Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A crack is not permitted.	If there is a crack, replace the pitch change rod.
R. BETA ROD SUPPORT RING (Item 1020)		
(1) Visually examine 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 by using plastic media or glass bead cleaning in accordance with the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If pitting is deeper than 0.005 inch (0.12 mm), replace the beta rod support ring.
(2) Visually examine for anodize coverage.	Anodize must completely cover the beta rod support ring with the following exceptions: Loss of anodize around each of three holes caused by clamping nuts is permitted. Sparse and light, random scratches are permitted.	Strip the remaining anodize and anodize in accordance with the Chromic Acid Anodize chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Guide Collar
Figure 5-13

Component Inspection Criteria
Table 5-1

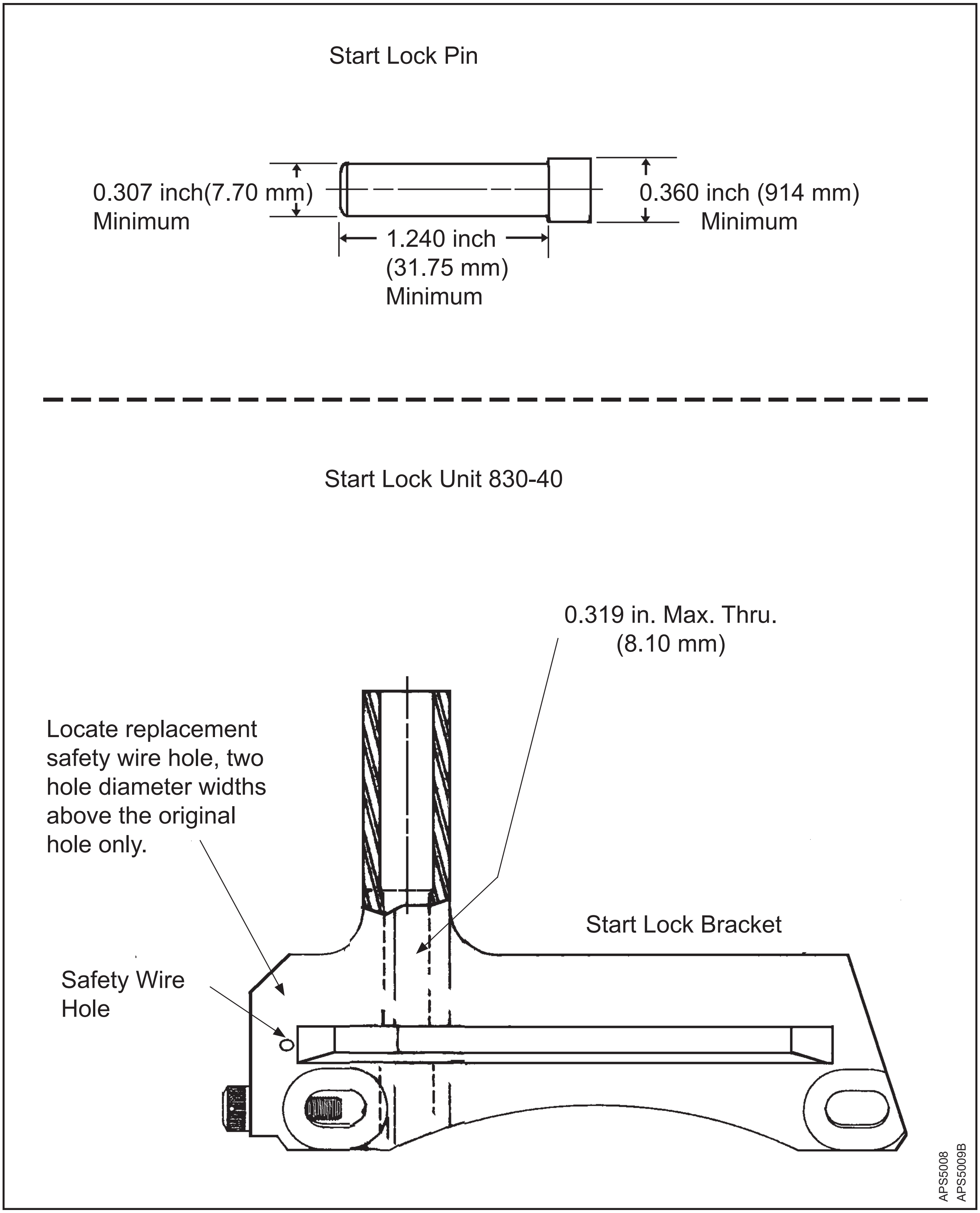
Inspect	Serviceable Limits	Corrective Action
S. GUIDE COLLAR (Item 620) Refer to Figure 5-13		
(1) Visually examine the guide collar for nicks, gouges, or other damage	Nicks, gouges, or other damage are not permitted.	If the depth of the nick, gouge, or damage is less than 0.020 inch (0.51 mm), using an abrasive pad CM47 or equivalent, polish the damaged area and 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 depth of the damage is greater than 0.020 inch (0.51 mm), replace the guide collar.
(2) Measure the ID of each A-116-A1 large guide collar bushing.	The maximum permitted large guide collar bushing ovality is 0.008 inch (0.20 mm).	If the large guide collar bushing ovality is more than 0.008 inch (0.20 mm), replace the large guide collar bushing.
	The maximum permitted ID for a large guide collar A-116-A1 bushing is 0.5150 inch (13.081 mm).	If the large guide collar bushing has an ID that is greater than 0.5150 inch (13.081 mm), replace the large guide collar bushing. Refer to the Repair chapter of this manual for replacement procedures.
(3) Penetrant inspect the guide collar in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Refer to Figure 5-13 for typical crack locations.	A crack is not permitted.	If there is a crack, replace the guide collar.
(4) Measure the ID of each A-3023-( ) small guide collar bushing.	The maximum permitted ID for an A-3023-( ) small guide collar bushing is 0.3870 inch (9.829 mm).	If the small guide collar bushing has an ID that is greater than 0.3870 inch (9.829 mm), replace the small guide collar bushing. Refer to the Repair chapter of this manual for replacement procedures.



Start Lock Unit 830-40
Figure 5-14

Component Inspection Criteria
Table 5-1

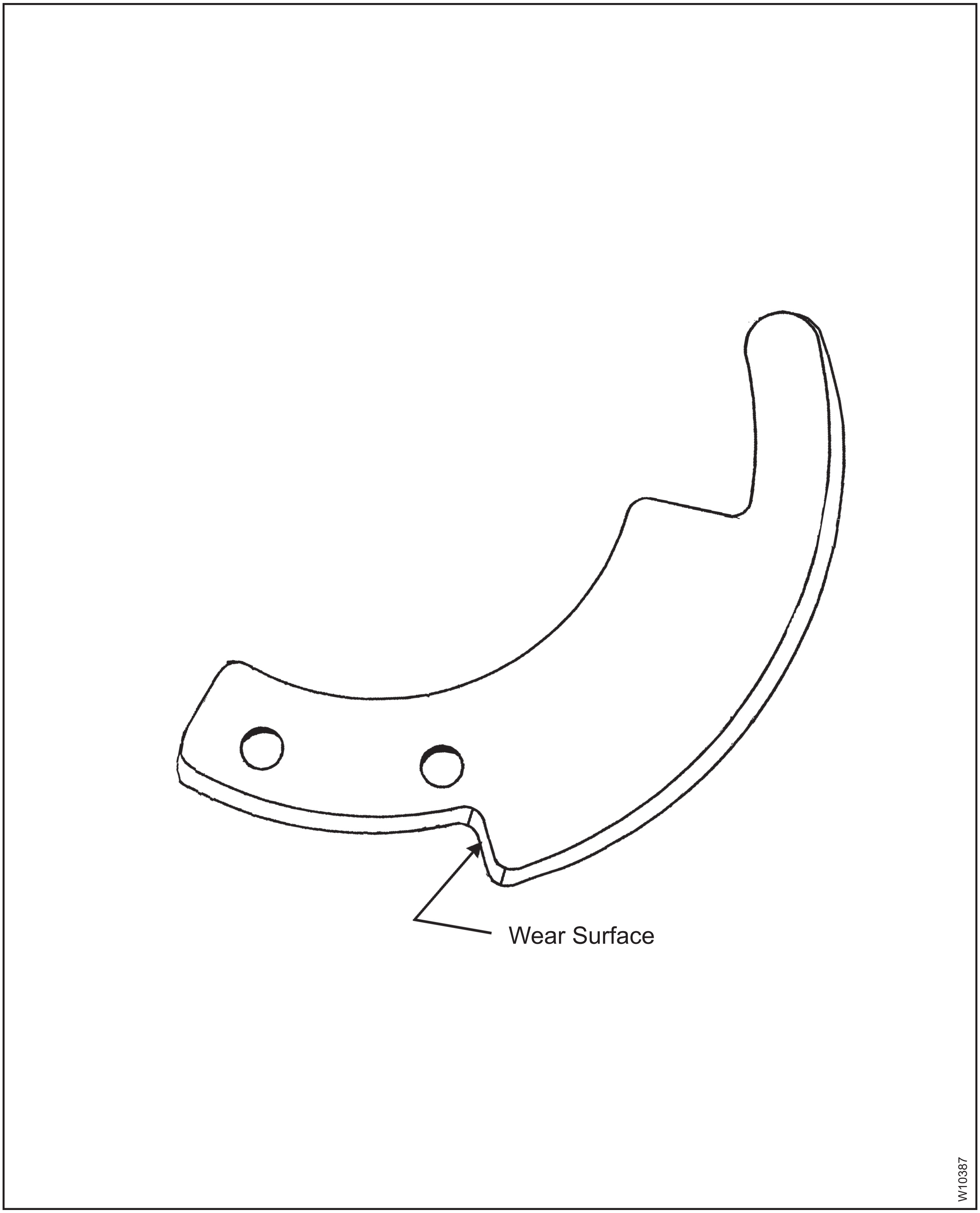
Inspect	Serviceable Limits	Corrective Action
T. START LOCK BRACKET (Item 1510) Refer to Figures 5-14 and 5-15		
(1) Visually examine the start lock bracket surface area (not including the bracket bore area) for nicks, gouges, or other damage.	A nick, gouge or other damage is not permitted.	If the depth of the nick, gouge, or damage is less than 0.005 inch (0.12 mm), using an abrasive pad CM47 or equivalent, polish the damaged area and chemical conversion coat in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the depth of the nick, gouge, or damage is greater than 0.005 inch (0.12 mm), replace the start lock bracket.
(2) Visually examine the bracket bore area of the start lock bracket for corrosion product.	Corrosion product is not permitted.	If there is corrosion product, replace the start lock bracket.
(3) Visually examine the start lock bracket (not including the bracket bore area) for corrosion product and pitting.	Corrosion product is not permitted.	Remove corrosion product and pitting up to 0.005 inch (0.12 mm) maximum depth by using glass bead cleaning in accordance with the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If corrosion product and pitting cannot be completely removed by using the above procedures, replace the start lock bracket. Apply chemical conversion coating in accordance with the Chromic Acid Anodizing chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Start Lock Bracket and Start Lock Pin
Figure 5-15

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
T. START LOCK BRACKET, continued (Item 1510) Refer to Figures 5-14 and 5-15		
(4) Measure the start lock bracket.	For the permitted measurement limits, refer to Figure 5-15.	If the measurements exceed the permitted serviceable limits, replace the start lock bracket.
(5) Penetrant inspect the start lock bracket in accordance with the Penetrant Inspection chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).	A crack is not permitted.	If there is a crack, replace the start lock bracket.
(6) Visually examine the safety wire hole in the start lock bracket for sufficient material to support the safety wire. Refer to Figure 5-15.	There must be sufficient material available in the start lock bracket to support the safety wire. A maximum of two safety wire holes are permitted in the start lock bracket.	If the original safety wire hole is stripped, drill a new safety wire hole, two hole diameter widths above the original hole only, using a #51 (0.067 inch [1.70 mm]) drill. If a second safety wire hole is no longer usable, replace the start lock bracket.
U. START LOCK PIN (Item 1600) Refer to Figure 5-15		
(1) Measure the start lock pin.	For the permitted measurement limits, refer to Figure 5-15.	If the measurements exceed the permitted serviceable limits, replace the start lock pin.
(2) Visually examine the start lock pin for corrosion product.	Corrosion product is not permitted.	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 by glass bead cleaning, replace the start lock pin.



Start Lock Plate Inspection
Figure 5-16

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
V. START LOCK PLATE (Item 1570) Refer to Figure 5-16		
(1) Visually examine the start lock plate of 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 and pitting up to 0.005 inch (0.12 mm) maximum depth by using glass bead cleaning in accordance with the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If corrosion product and pitting cannot be removed, replace the start lock plate.
(2) Visually examine the start lock plate for scratches.	The maximum permitted depth of a scratch is 0.005 inch (0.12 mm).	If the depth is greater than the permitted serviceable limits, replace the start lock plate.
(3) Visually examine for wear on the surface that contacts the start lock pin (Figure 5-16).	The maximum permitted depth of wear is 0.020 inch (0.50 mm).	If the depth is greater than the permitted serviceable limits, replace the start lock plate.
(4) Visually examine the start lock plate for cadmium plating coverage.	A few random scratches are permitted; otherwise, cadmium plating must completely cover the start lock plate.	Replate and bake the start lock plate 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
W. BALANCE WEIGHT (Item 790)		
(1) 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).	Polish to a maximum depth of 0.005 inch (0.12 mm). If depth of pitting, wear, or damage is deeper than the permitted serviceable limits after rework, replace the balance weight.
(2) Visually examine the balance weight for corrosion product.	Corrosion product is not permitted.	Remove corrosion using glass bead cleaning. Refer to the Cleaning chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(3) 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 balance weight in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

X. WEIGHT SLUG
(Item 830)
Refer to Hartzell Propeller Inc. Standard Practices Manual 202A, Volume 5 for component inspection criteria.

Component Inspection Criteria
Table 5-1

Inspect	Serviceable Limits	Corrective Action
Y. GUIDE LUG (Item 1090) and GUIDE LUG BUSHING (Item 1095)		
(1) Guide Lug ONLY: Visually examine the cadmium plating coverage on the guide lug.	A few random scratches are permitted; otherwise, cadmium plating must completely cover the guide lug.	Remove the guide lug bushing from the guide lug. Remove cadmium plating from the guide lug, mask the ID of the guide lug, and replate in accordance with the Cadmium Replating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). Install a guide lug bushing into the guide lug in accordance with the Special Adhesive and Bonding Procedures chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(2) Guide Lug Bushing ONLY: Examine the guide lug bushing for movement within the guide lug.	Movement is not permitted.	If there is movement, replace the guide lug bushing in accordance with the Special Adhesive and Bonding Procedures chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
(3) Guide Lug Bushing ONLY: Measure the ID of the guide lug bushing.	The maximum permitted ID of the guide lug bushing is 0.383 inch (9.72 mm).	If the ID of the guide lug bushing is greater than maximum permitted serviceable limits, replace the guide lug bushing in accordance with the Special Adhesive and Bonding Procedures chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).
	The minimum permitted ID of the guide lug bushing is 0.379 inch (9.62 mm).	If the ID of the guide lug bushing is less than the minimum permitted serviceable limits, machine the guide lug bushing ID in accordance with the Special Adhesive and Bonding Procedures chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02). If the guide lug bushing cannot be machined, replace the guide lug bushing in accordance with the Special Adhesive and Bonding Procedures chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

REPAIR - CONTENTS

LIST OF ILLUSTRATIONS

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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 SHOULD NOT BE REMOVED.

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

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

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

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

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

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

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

b Contact Hartzell Propeller Inc. Product Support

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

B. Aluminum and Steel Parts

(1) Remove scratches, nicks, burrs, and other minor damage 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. 2)

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

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

B. Hubs

(1) Refer to the Steel 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. Blade Clamps

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

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. 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. Propeller Specific Repair Procedures

A. Piston Repair

(1) For specific inspection criteria, refer to Piston Inspection in the Check chapter of this manual.

(2) Link Pin Safety Screw Hole Repair

(a) For piston units that have link pin unit safety screw holes with 10-32UNF-3B threads:

1 When damaged, these threaded holes may be repaired by using a modified thin wall insert.

NOTE: In the past, coiled insert repairs were also authorized. Existing coiled insert repairs are acceptable; however, future repairs are to be made using a modified thin wall insert and the following procedure:

(b) The tools and the part necessary to make a thin wall insert repair to the link pin unit safety screw holes are as follows:

1 0.221 inch (5.61 mm) Diameter No. 2 Drill

2 Repair kit TE421

a Drive Wrench TE353

b B-6986-192 Thin Wall Insert TE422

c 1/4-28UNF-3B Bottom Tap TE423

CAUTION: MAKE SURE THE DRILL IS CENTERED AND PERPENDICULAR TO THE HOLE.

(c) Remove the damaged threads using the No. 2 drill.

CAUTION: MAKE SURE THE TAP TE423 IS PERPENDICULAR TO THE HOLE.

(d) Using the 1/4-28UNF-3B bottom tap TE423, re-tap the hole to a depth of 0.220 to 0.270 inch (5.59 to 6.85 mm).

NOTE: This will make sure that the thin wall insert does not extend into the slot and interfere with the link arm.

(e) Clean the newly drilled and tapped hole with solvent CM106.

(f) Place the thin wall insert TE422 in a lathe and remove the counterbored end of the thin wall insert.

(g) Apply loctite primer CM127 to the thin wall insert TE422 and the tapped hole.

(h) Apply thread locking compound CM74 to the thin wall insert TE422.

(i) Install the thin wall insert by using the drive wrench TE353 so that the thin wall insert is flush or slightly below flush with the outboard surface of the piston.

(3) Plastic Bushing Removal and Replacement for Aluminum Pistons

NOTE 1: The following procedures must be performed by a skilled machinist.

NOTE 2: Piston p/n 100460 is titanium and must be returned to Hartzell Propeller Inc. for bushing replacement.

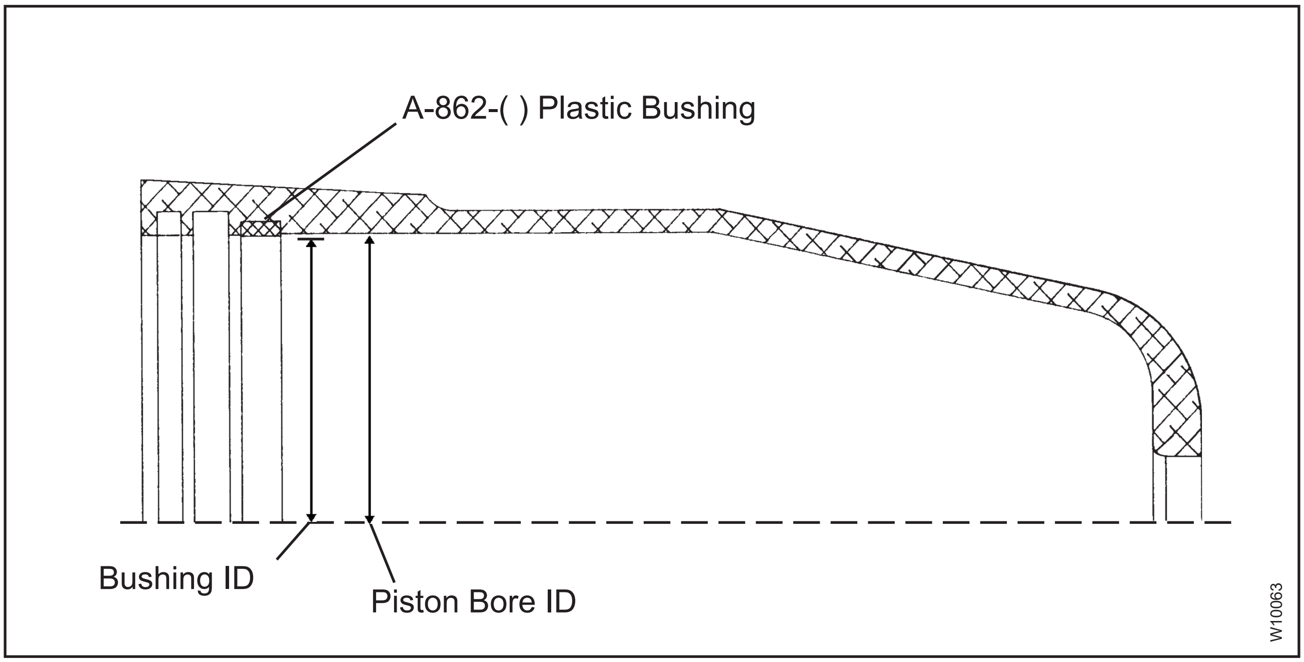
(a) Remove the plastic bushing (220), using care not to damage the bushing groove.

(b) Remove any remaining adhesive from the bushing groove using cleaning solvent CM106.

(c) Clean, install, and ream the plastic bushing in accordance with the Special Adhesive and Bonding Procedures chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(d) Measure the runout of the plastic bushing (220) to the bore of the piston outboard of the plastic bushing groove.

1 The runout must be within 0.005 inch (0.12 mm).



Plastic Piston Bushing Replacement
Figure 6-1

B. Cylinder Repair

(1) For dimensional limits, refer to the Check chapter of this manual.

(2) The cylinder may be reground and rechromed if necessary.

(a) For rechroming limits and procedures, refer to the Hard Chromium Re-plating chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

C. Guide Collar Repair

(1) For specific inspection criteria and repair limits, refer to Guide Collar Inspection in the Check chapter of this manual.

(2) Replace any large guide collar bushing (630) and/or small guide collar bushing (640) that does not meet the dimensions specified in the Check chapter of this manual.

(a) To replace either size of guide collar bushing:

1 Drill out the old bushing.

2 Drill out the dowel pin (650) at the split, if necessary.

3 Clean the guide collar unit (620) and bushing(s) (630 and 640) with the approved cleaning solvent CM106.

4 Coat the bushing(s) with the approved retaining compound. Refer to the Special Adhesive and Bonding Procedures chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

5 Insert bushing(s) flush into the guide collar unit (620).

CAUTION: ALLOW THE RETAINING COMPOUND TO DRY FOR AT LEAST FOUR HOURS.

6 Allow a minimum of four hours drying time for the retaining compound.

7 Test a small bushing (640) to 225 pounds (102 kg).

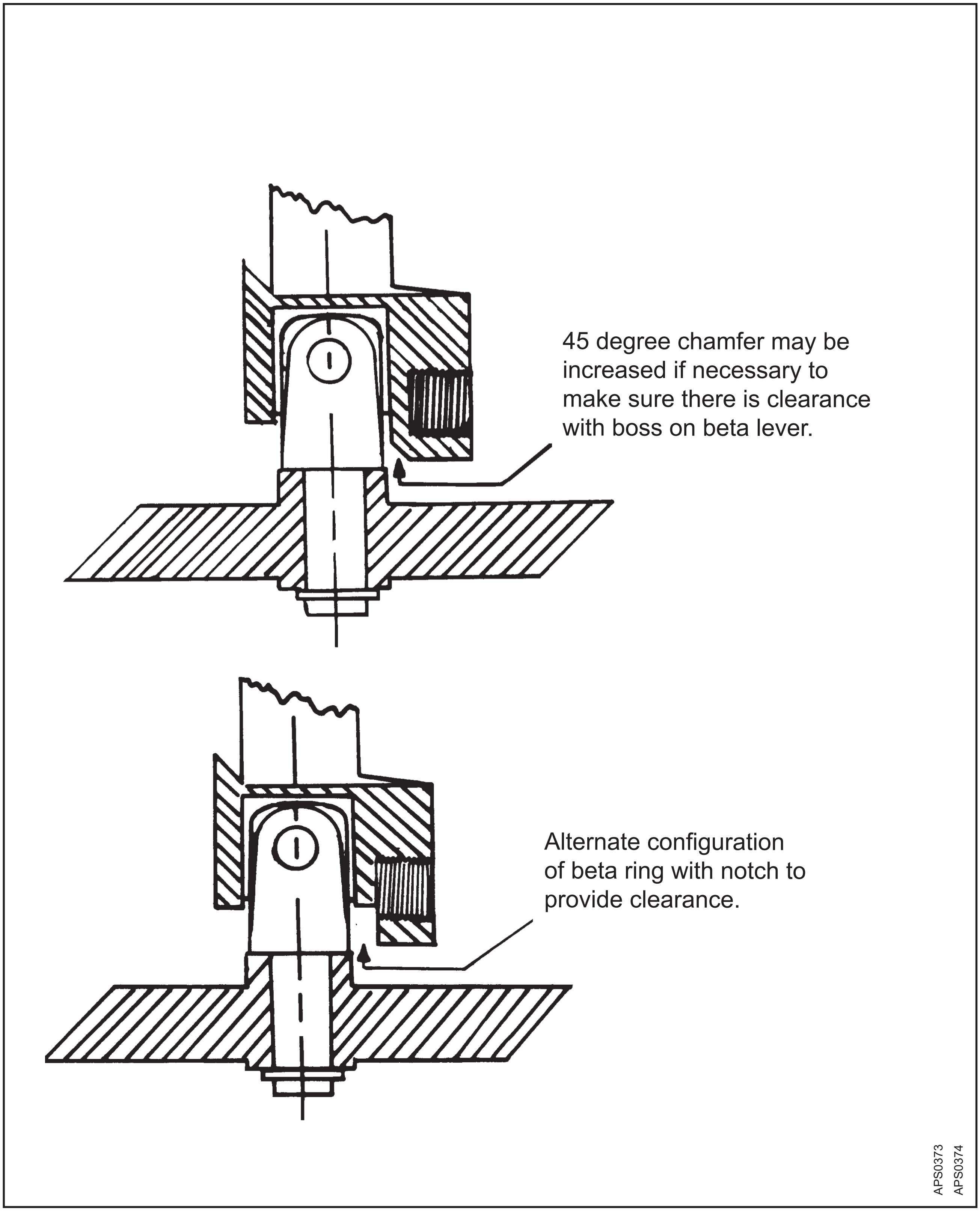
a Ream to between 0.381 inch (9.68 mm) and 0.384 inch (9.74 mm).

8 Test a large bushing (630) to 300 pounds (136 kg).

a Ream to between 0.508 inch (12.90 mm) and 0.510 inch (12.95 mm).

9 If the bushing at the split is replaced, stake the new bushing with dowel pin (650).

10 Drive the dowel pin with a center punch and peen the end.



Eliminating Interference Between Beta Lever Arm and Beta Ring
Figure 6-2

D. Beta Ring (Low Stop Collar) Repair

NOTE: Applies to HC-B5M( )-3( ), only.

(1) General Repairs

(a) Repair or replace the beta ring (1120) in accordance with the allowable limits specified in Beta Ring (Low stop collar) Inspection, Table 5-1, in the Check chapter of this manual.

(b) Using a soft cotton wheel, polish the beta ring (1120).

(c) Using a soft cotton wheel, polish the clevis-pin (1180) in the carbon block assembly to make sure there is sufficient clearance in accordance with the section, "Carbon Block Assembly" in the Fits and Clearances chapter of this manual.

(d) Following a repair of the interior surface of the beta ring (1120), using 80 to 120 grit sandpaper or emery and finishing with 240 grit polishing compound, smooth the internal surface.

(2) Repairing Beta Ring to Eliminate Interference with Beta Lever Arm

(a) Inspect the beta ring (1120) at the point shown in Figure 6-2 to verify configuration.

(b) If necessary, make sure there is sufficient clearance with the beta lever.

1 If there is not sufficient clearance:

a Place the beta ring (1120) into a lathe

b Notch the beta ring (1120) as shown in Figure 6-2.

E. Additional Corrosion Protection for Spinner Mounting Plates

(1) Spinner Mounting Plates Used on HC-B5MA-2 Propeller Assemblies

(a) For general information concerning painting procedures and paint mixtures refer to the Paint and Finish chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(b) Visually examine the spinner mounting plate for scratches, corrosion, and cadmium plate coverage in accordance with the Check chapter of this manual.

(c) Clean the entire spinner mounting plate using solvent CM106.

1 Let the part air dry.

(d) Apply Mixture #3 to the entire spinner mounting plate. Refer to the Paint and Finish chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

1 Let the paint dry for approximately 3-5 minutes.

(e) Apply Mixture #4, 1-4 mils thick, to the entire spinner mounting plate. Refer to the Paint and Finish chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

1 Let the paint dry for approximately 2 hours.

(f) Visually examine the spinner mounting plate for complete paint coverage.

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ASSEMBLY - CONTENTS

ASSEMBLY - CONTENTS, CONTINUED

ASSEMBLY - LIST OF ILLUSTRATIONS

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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.

1. General (Rev. 5)

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 lubricant CM12 before installing them in the propeller assembly.

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

D. Blade Bore Plug/Bearing Installation

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

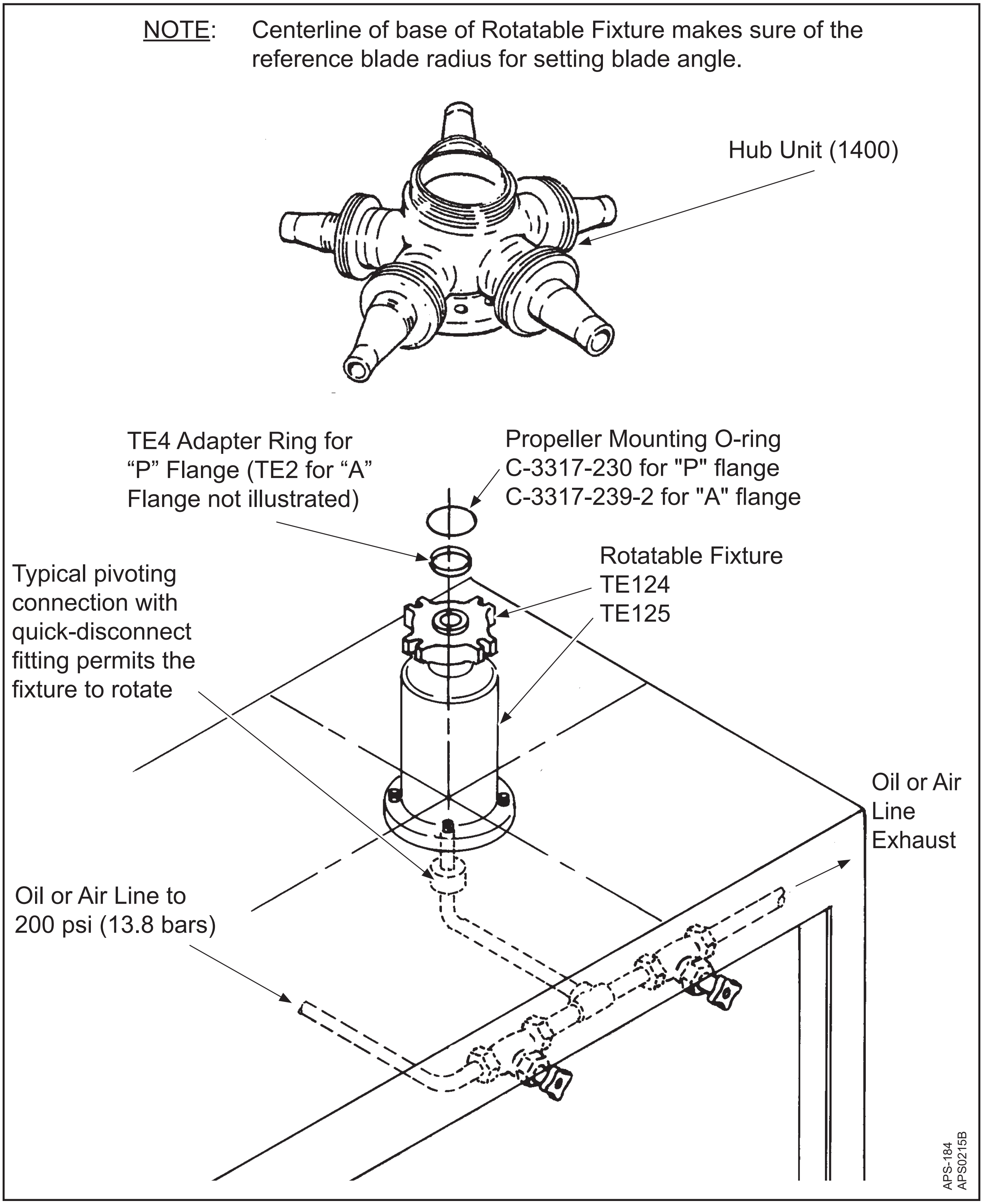
(2) For composite blades, refer to Hartzell Propeller Inc. Composite Blade Overhaul Manual 135F (61-13-35).

E. Blade Angle Information

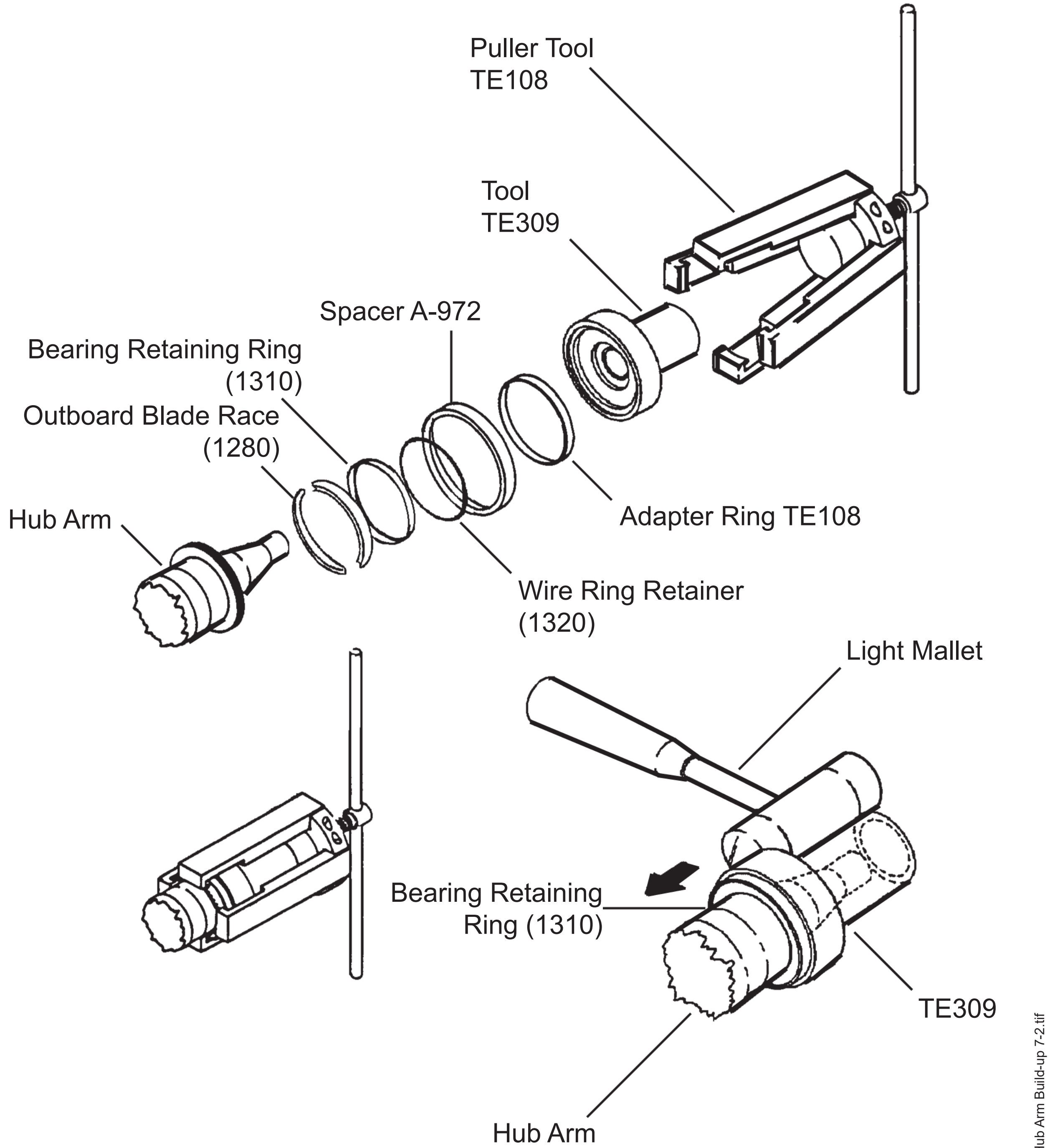
(1) For specific blade angle information, refer to the Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

F. Blade Clamp Assembly

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



Hub onto Rotatable Fixture
Figure 7-1



Hub Arm Build-Up
Figure 7-2

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: DO NOT EXCEED 200 P.S.I. (13.8 BARS) AIR PRESSURE WHEN ACTUATING PROPELLERS INCLUDED IN THIS SECTION.

2. Blade and Flange Mounting Parts Assembly

A. All Propeller Models

(1) Mount the hub unit (1400) on the rotatable fixture of the assembly table, as shown in Figure 7-1. Tighten the mounting bolts (1220).

CAUTION: THE INTERNAL RECESS OF THE BEARING RETAINING RING (1310) MUST FACE OUTBOARD WHEN THE BEARING RETAINING RING IS SLIPPED OVER THE BLADE ARM FLANGE OF THE HUB UNIT (1400).

(2) Using a light mallet and special tool TE309 or equivalent, drive a bearing retaining ring (1310) onto one blade arm flange of the hub unit (1400). Refer to Figure 7-2.

(a) Drive the bearing retaining ring far enough onto the blade arm flange so that the ring forms a narrow channel on the inboard surface of the flange.

(3) Repeat this bearing guide ring installation procedure for the other four blade arm flanges on the hub.

(4) Using lubricant CM12, lightly grease the inboard surface of each blade arm flange.

(5) Put the halves of an outboard blade race (1280) (matched set) in position over one hub arm.

(6) Check the bearing-to-hub-arm fit.

(a) The bearing should rest firmly against the seating area on the hub arm, with no "rocking" action evident.

(b) The race halves should fully contact each other at the parting surfaces.

(c) Replace the bearing if it does not fit correctly.

NOTE: The break-line for the outboard blade race (1280) halves should be vertical to the table top.

(7) Using a combination of special tools TE309 and TE108, or equivalent, push the bearing retaining ring (1310) far enough onto the outboard blade race (1280) to get the wire ring retainer (1320) into the groove in the blade arm flange. Refer to Figure 7-2.

(8) Install the wire ring retainer (1320).

(9) Using a combination of special tools TE309 and TE108, or equivalent, with special spacer A-972, pull the bearing retaining ring (1310) outboard far enough to get the wire ring retainer (1320) to seat in the wire retention groove in the bearing retaining ring. Refer to Figure 7-2.

CAUTION: THE WIRE RING RETAINER MUST BE FULLY ENCLOSED TO MAKE SURE IT IS NOT PINCHED.

(10) Check to make sure the wire ring retainer (1320) is fully enclosed.

(11) Lubricate the blade O-ring (1240) using lubricant CM12.

(12) Slide the O-ring over the blade arm flange of the hub unit to a location inboard of the blade retention bearing (1250). Leave it there for use later in the reassembly.

(13) Repeat steps (2) through (12) of this procedure for the remaining hub arms.

CAUTION: DURING THE FOLLOWING PROCEDURES, THE BLADE ARM ON WHICH A BLADE RETENTION BEARING IS GOING TO BE ASSEMBLED MUST BE SUPPORTED VERTICALLY WITH THE PILOT TUBE FACING DOWN.

(14) Remove the hub unit (1400) from the rotatable fixture on the assembly table.

(a) Use special tool TE309, or an appropriate fixture, to hold the unit vertical during the next stages of blade retention split-bearing assembly.

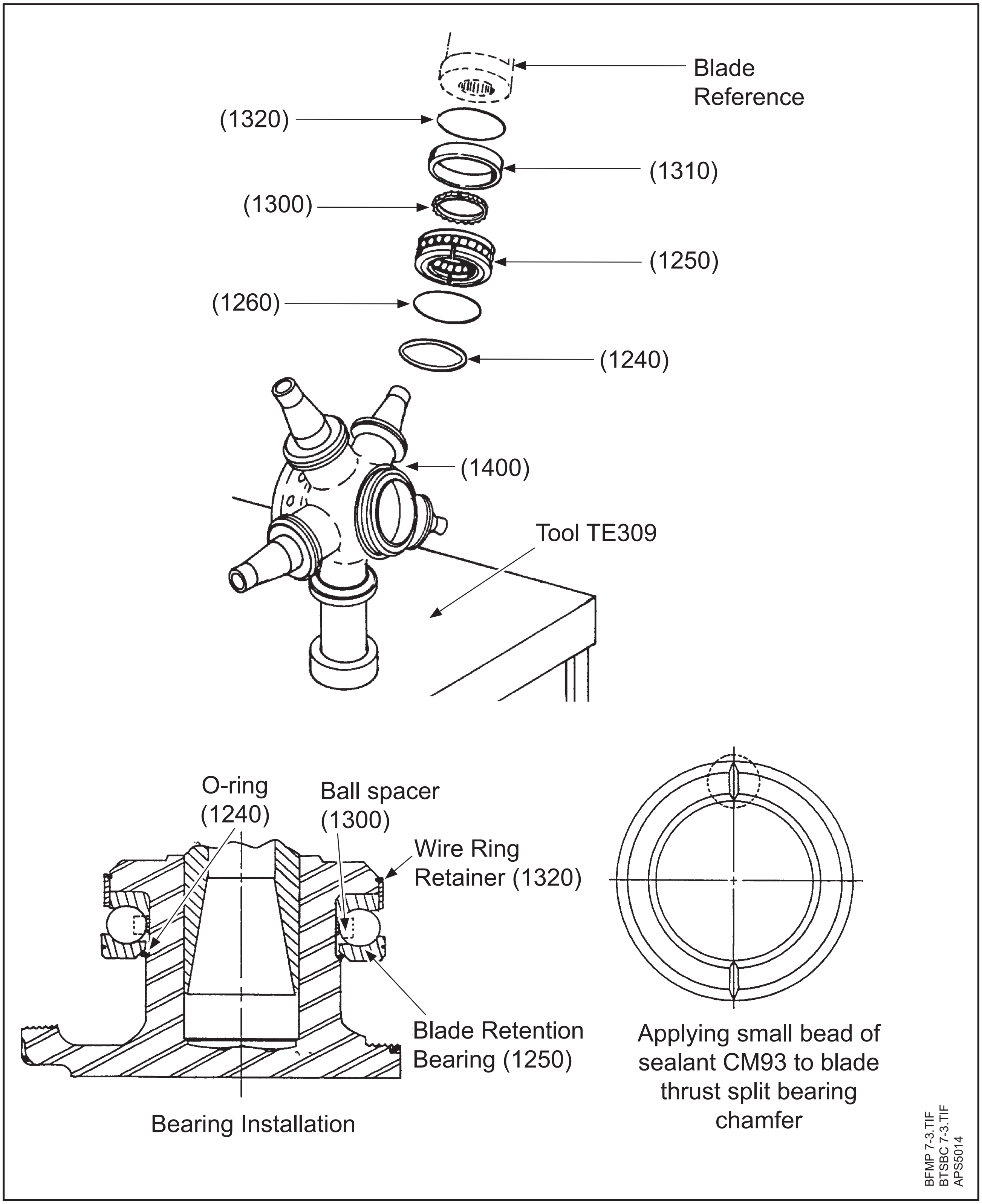
CAUTION 1: DO NOT DAMAGE BLADE RETENTION BEARINGS (1250) DURING INSTALLATION.

(15) Install the ball spacer (1300) and the required number of bearing balls (1290) onto the outboard blade race (1280).

NOTE: All bearing balls (1290) installed in a blade retention bearing must be of the same gauge.

CAUTION: THE OPENING OF THE WIRE RING RETAINER (1320) MUST BE AT A RIGHT ANGLE TO THE PARTING LINE OF THE INBOARD BLADE RETENTION BEARING (1250) RACE.

(16) Put the inboard blade race (1270) around one blade arm of the hub unit (1400) and install the wire bearing retainer (1260) to hold the halves in position.



Blade and Flange Mounting Parts
Figure 7-3

CAUTION: EXCESSIVE USE OF SEALANT CAN CAUSE UNEVEN SEATING BETWEEN THE BLADE CLAMP AND BLADE RETENTION BEARING (1250).

(17) Apply a small bead of sealant CM93 to the inboard blade race (1270) at the chamfer (break point) to evenly fill the void in the chamfered area of the race. Refer to Figure 7-3.

(18) Slide the blade O-ring (1240) outboard in position against the blade retention bearing (1250).

(19) Wrap wide masking tape around the outside diameter of the bearing assembly to hold the parts in position.

(20) Repeat steps (14) through (19) of this procedure for each of the remaining blade arms on the hub unit (1400).

3. Hub Unit Assembly

A. All Propeller Models

CAUTION 1: THE SPINNER BULKHEAD UNIT MUST BE PLACED OVER THE ROTATABLE FIXTURE SPINDLE ON THE ASSEMBLY TABLE BEFORE THE HUB UNIT IS REMOUNTED ON THE TABLE.

CAUTION 2: FOR HC-B5M( )-3( ) PROPELLER MODELS ONLY: THE RAISED SURFACES OF THE THREADED BETA ROD ACCESS HOLES IN THE BETA RING MUST FACE UPWARD WHEN THE RING IS PLACED OVER THE ROTATABLE FIXTURE SPINDLE.

(1) For HC-B5M( )-3( ) propellers only: Put the beta ring (1120) on the rotatable fixture on the propeller assembly table with the raised surfaces of the beta rod access holes facing upward.

(2) Put the spinner bulkhead unit (50) over the rotatable fixture.

(3) Remount the hub unit (1400) on the rotatable fixture.

(4) Secure the hub unit (1400) to the rotatable fixture flange with washers (1230) and mounting bolts (1220).

4. Spinner Support Plate Assembly

A. All Propeller Models

(1) For information about the applicable spinner assembly and spinner bulkhead, refer to the Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

(2) For HC-B5M( )-3( ) propeller models only

(a) Insert a guide lug (1090) at each of the three locations in the spinner mounting plate (40).

NOTE: Insert the guide lug (1090) from the hub-side of the spinner mounting plate (40).

(b) On the table-side of the spinner mounting plate (40), secure each guide lug (1090) in position with an external snap ring (1100).

CAUTION 1: FOR HC-B5M( )-3( ) PROPELLER MODELS ONLY: INSTALL THE SPINNER MOUNTING PLATE (40) ON THE HUB MOUNTING FLANGE AT A POSITION BETWEEN THE HUB ARMS THAT WILL PERMIT THE BETA RODS (1060) TO PASS BETWEEN THE HUB ARMS DURING LATER ASSEMBLY PROCEDURES.

CAUTION 2: MAKE SURE EACH HALF OF THE SPINNER MOUNTING PLATE (40) HAS THE SAME SERIAL NUMBER.

(3) All propeller models

(a) Attach the spinner mounting plate (40) to the blade arm side of the hub mounting flange with hex head bolts (30).

NOTE: Do not tighten the hex head bolts (30) at this step of assembly.

(b) Align the spinner support plate with the hub mounting flange using one of the following methods:

1 Method 1:

a Using fixture TE184, locate the spinner bulkhead support plate, drilling the spinner mounting holes in the spinner support plate, if required.

NOTE 1: A new spinner mounting plate is supplied with undersize bulkhead mounting holes. Drill all bulkhead mounting holes using a 0.250 inch (6.35 mm) diameter drill. Remove any burrs that exist from drilling. A previously used spinner mounting plate will already have the holes drilled to the proper size.

NOTE 2: For applicable spinner assembly and spinner bulkhead information, refer to the Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

b When the spinner mounting plate (40) is aligned between the fixture TE184 and the hub mounting flange, torque all ten hex head bolts (30) into the hub flange in accordance with Torque Values Table 8-1 in the Fits and Clearances chapter of this manual.

1 Method 2:

NOTE 1: For applicable spinner assembly and spinner bulkhead information, refer to the Hartzell Propeller Inc. Application Guide, Manual 159 (61-02-59).

NOTE 2: This procedure can not be used with new spinner support plates.

a Temporarily attach the spinner bulkhead to the support plate with bolts (100).

b When the spinner mounting plate (40) is aligned between the spinner bulkhead and the hub mounting flange, torque all ten hex head bolts (30) into the hub flange in accordance with Torque Values Table 8-1 in the Fits and Clearances chapter of this manual.

c Remove the hex head bolts (100) that attach the spinner bulkhead to the spinner mounting plate (40).

d Remove the spinner bulkhead from the spinner mounting plate (40) to make further assembly procedures easier.

(c) Safety the hex head bolts (30) together with 0.032 inch (0.82 mm) minimum diameter stainless steel wire CM131.

5. Blade Clamp and Counterweight Assembly

A. All Propeller Models

(1) For blade clamp overhaul and reassembly instructions, refer to the Blade Clamp Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

(2) For information on applicable counterweight slugs, refer to the Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

6. Installing Link Arm on Blade Clamp

A. All Propeller Models

CAUTION 1: A LINK ARM (230) CANNOT BE INSTALLED ON THE BLADE CLAMP (740) HALF AFTER THE BLADE CLAMP HAS BEEN INSTALLED ON THE HUB UNIT (1400).

CAUTION 2: THE SHOULDER OF THE LINKSCREW SLEEVE (710) MUST BE POSITIONED ON THE SIDE OF THE LINK ARM (230) THAT FACES AWAY FROM THE CLAMP (740) HALF.

(1) Install the linkscrew sleeve (710) into the large hole of the link arm (230), from the side of the link arm that faces away from the clamp half (740).

NOTE: The flange of the linkscrew sleeve (710) faces inboard.

(2) Install the link arm bushing (920) between the link arm (230) and the blade clamp (740).

(3) Fit the link arm (230) onto the linkscrew (860).

NOTE: The raised shoulder on the link arm (230) must face the blade clamp (740).

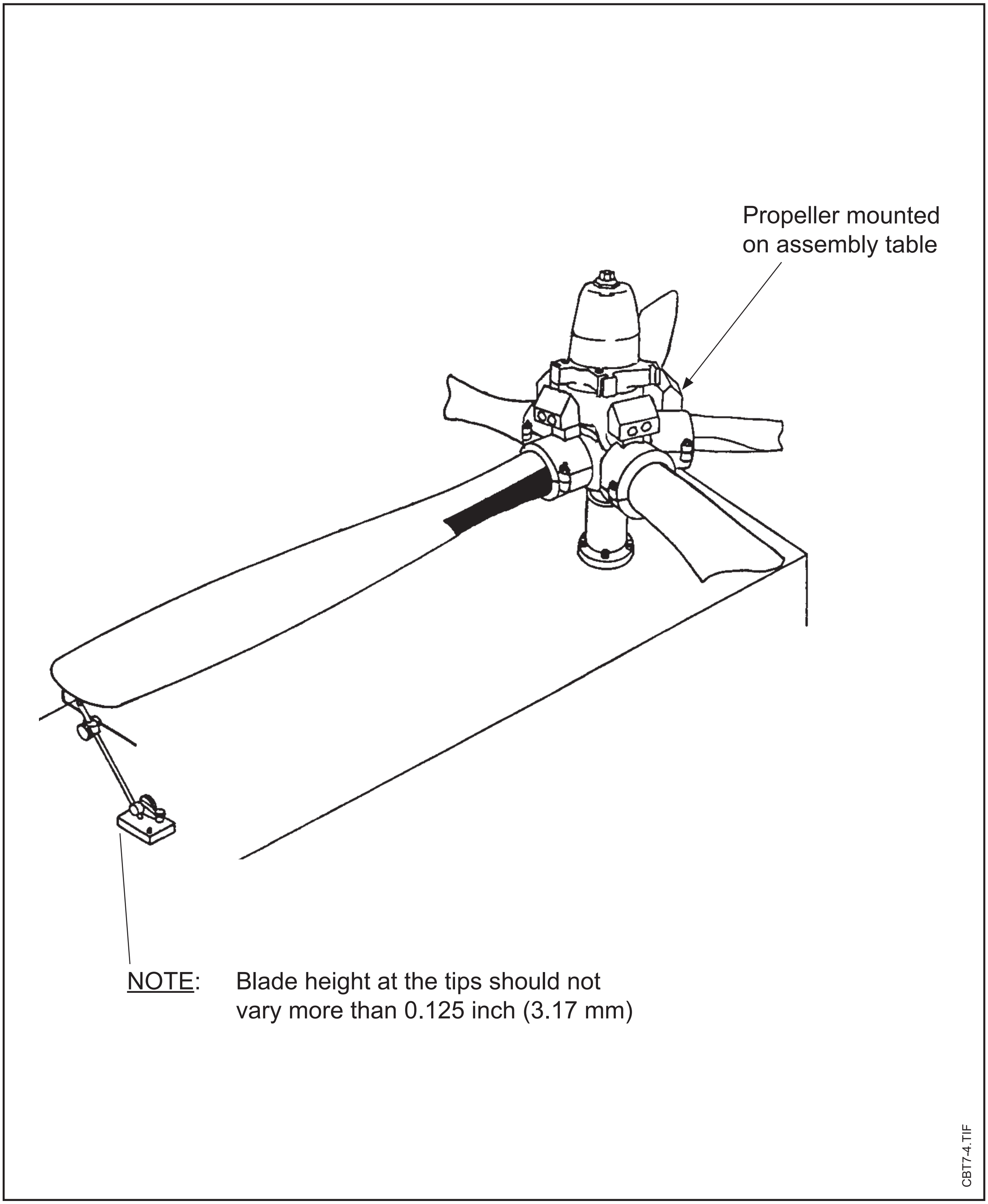
(4) Push the cotter pin (870) through hole in end of linkscrew (860).

(5) Open the cotter pin (870) to secure it in position.

NOTE: The link arm (230) should move freely on the linkscrew (860).

CAUTION: DO NOT INSTALL THE LUBRICATION FITTINGS (720) ON THE BLADE CLAMP (740) AT THIS STAGE OF ASSEMBLY.

(6) Repeat steps (1) through (5) of this procedure for the remaining blade clamps (740) and counterweights (880).



Using Height Gauge with Adjustable Pointer to Check Blade Track
Figure 7-4

7. Blade and Clamp Installation

A. All Propeller Models

(1) For instructions regarding aluminum blade bearing installation, balancing, and all other overhaul or repair procedures, refer to the Hartzell Propeller Inc. Aluminum Blade Overhaul Manual 133C (61-13-33).

(2) For instructions regarding composite blade bearing installation, balancing, and all other overhaul or repair procedures, refer to the Hartzell Propeller Inc. Composite Blade Overhaul Manual 135F (61-13-35).

CAUTION: IF POSSIBLE, EACH BLADE SHOULD BE REINSTALLED ON THE HUB ARM FROM WHICH IT WAS REMOVED AT DISASSEMBLY.

(3) As specified in the Disassembly Procedure, each blade should have an identifying number from “1” through “5” to make sure of correct assembly.

(4) Stand blade "1" in vertical position (shank up, tip down) and fill the pilot tube cavity with grease CM12 to the top of the bottom blade needle bearing.

WARNING: AIR TRAPPED IN THE GREASE CAN AFFECT PROPELLER BALANCE AFTER RUN-UP.

(5) After making sure no air is trapped in the grease, press the blade onto its matching hub pilot tube (1430).

NOTE: A slight amount of grease will be squeezed out around the pilot tube (1430) if the blade has been lubricated correctly.

(6) In consecutive order, do the lubrication and reinstallation procedure for the remaining four blades.

(7) Check blade track.

CAUTION: BLADE HEIGHTS AT THE TIP SHOULD NOT VARY MORE THAN 0.125 INCH (3.17 MM).

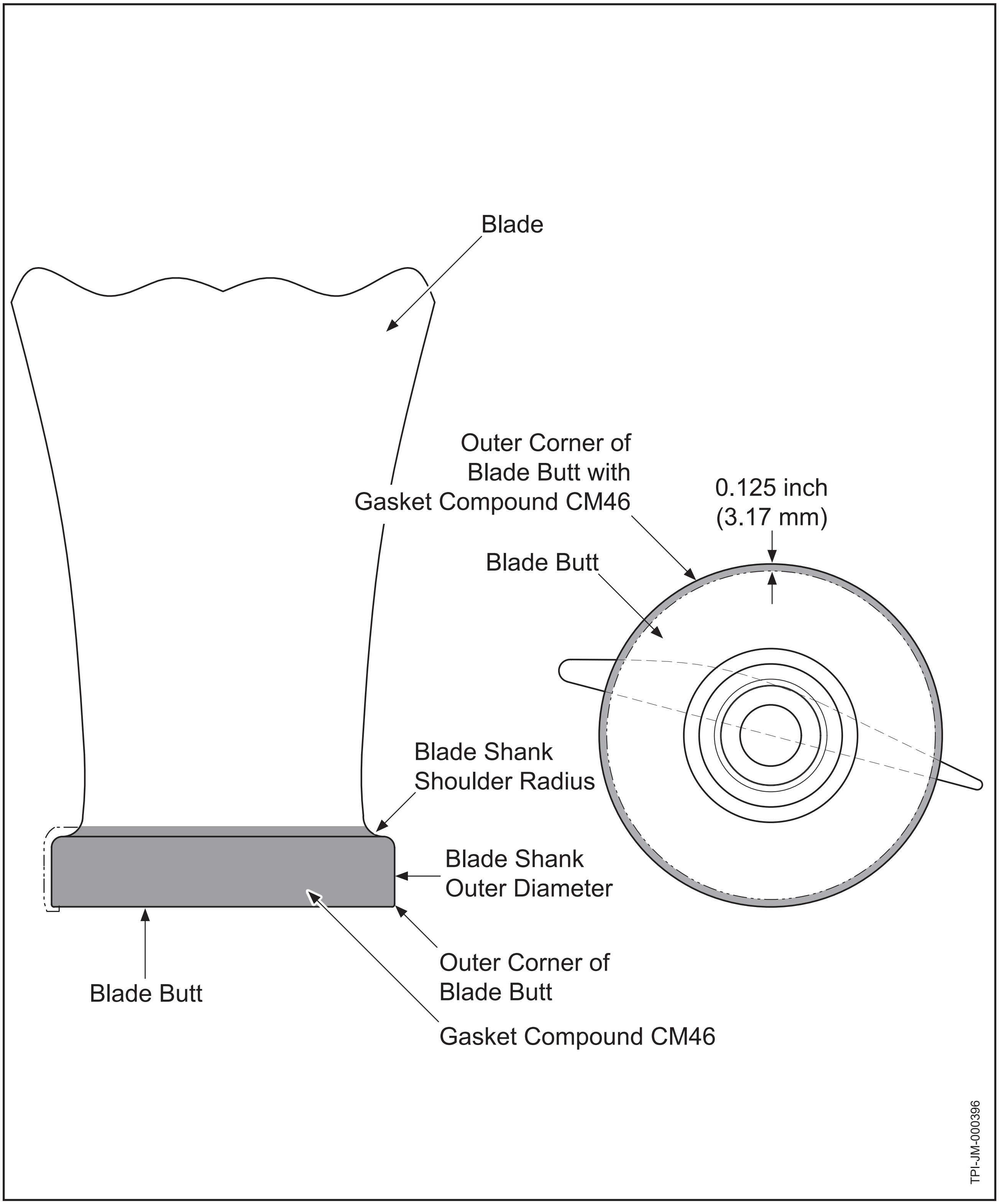
(a) Turn the propeller on the rotatable fixture.

1 Check the height at the tip of each blade using a gauge and adjustable pointer. Refer to Figure 7-4.

(b) If all blades do not track:

1 Make sure that there is no debris between the rotatable fixture flange and the propeller hub flange.

2 A blade or blades not in tolerance with the majority must be removed and reinspected for blade face alignment in accordance with the Hartzell Propeller Inc. Aluminum Blade Overhaul Manual 133C (61-13-33).



Gasket Compound CM46 Application
Figure 7-5

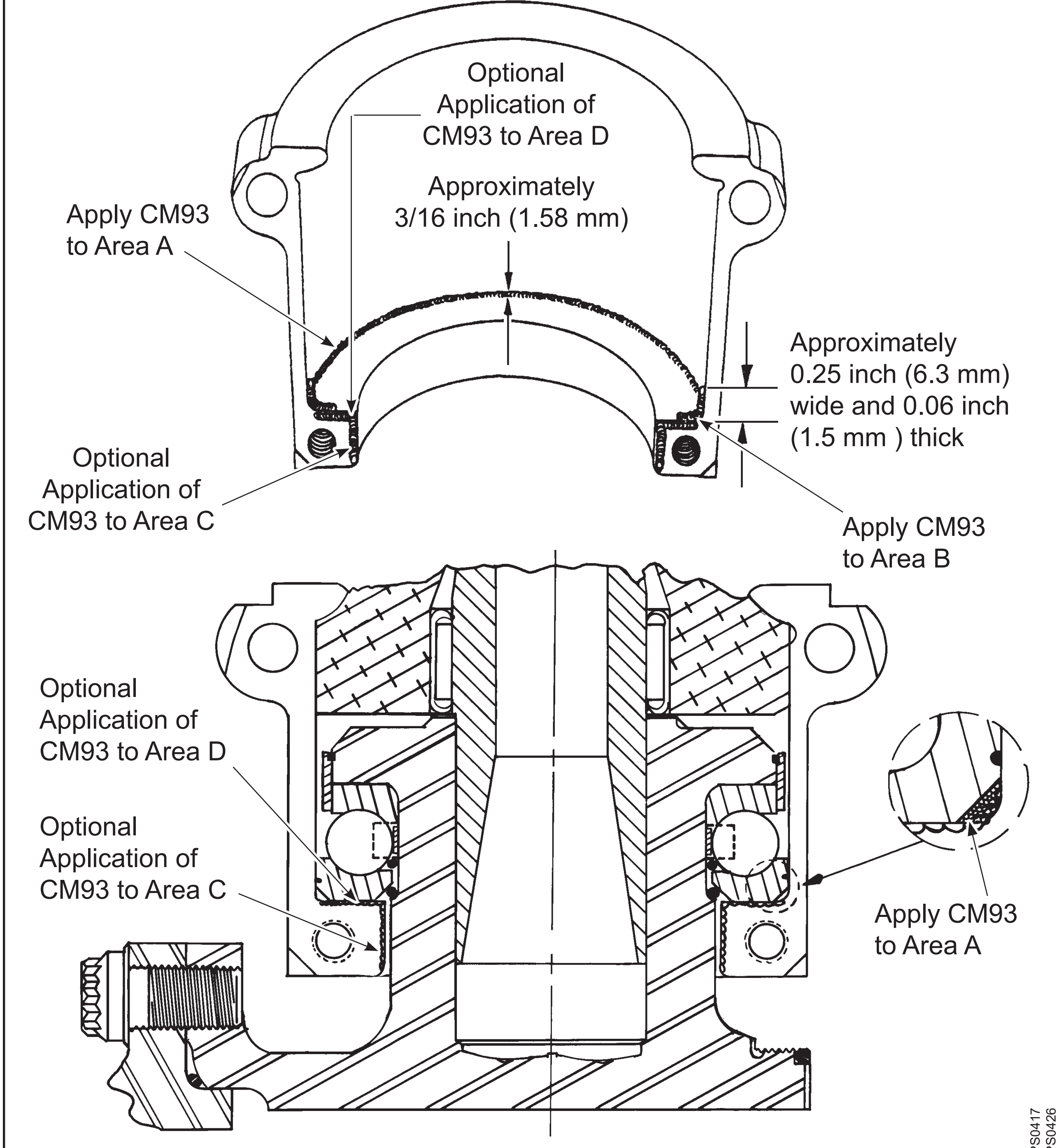
CAUTION: BE SURE TO USE HARDENING GASKET COMPOUND CM46 ON THE SHOULDER RADIUS OF THE BLADE SHANK, THE OUTER DIAMETER OF THE BLADE SHANK, AND THE OUTER CORNER OF THE BLADE BUTT. REFER TO FIGURE 7-5.

(8) Using an acid brush or finger, optionally wearing non-powdered latex gloves, apply a smooth even layer of gasket compound CM46 on the shoulder radius of the blade shank (in the area where it will contact the blade clamp), the outer diameter of the blade shank, and approximately 0.125 inch (3.17 mm) on the outer corner of the blade butt. Refer to Figure 7-5.

NOTE 1: Before installing a clamp, ensure that the shoulder radius of the blade base, the outer diameter of the blade base, and the outside corner of the blade butt are completely covered by a smooth even layer of gasket compound CM46. Refer to Figure 7-5.

NOTE 2: Do not apply gasket compound CM46 if blades will be removed to facilitate shipment of the propeller.

(9) Remove the masking tape used to temporarily hold the blade retention bearing (1250) together.



Sealant CM93 Application
Figure 7-6

CAUTION: THE PARTING LINE OF THE BLADE CLAMP HALVES (740) MUST BE AT A 90 DEGREE ANGLE TO THE PARTING LINE OF THE INBOARD BEARING RACE (1270).

(10) Apply a small bead of sealant CM93 on the inboard bearing radius (areas A and B) to fill the void from the beveled edge of the bearing outside diameter. Refer to Figure 7-6.

(11) Optionally, put a small bead of sealant CM93 on a part of the mating surfaces (Areas C and D) on both clamp halves (740), as shown in Figure 7-6.

NOTE: The application of sealant CM93 to the clamp mating surfaces is an optional procedure. Application of CM93 to the clamp mating surfaces can cause the gasket to slip out of position.

(12) Install the matching blade clamp (740) half to which the counterweight (880) is attached.

(13) Put a new clamp gasket (800) between each of the blade clamp half parting surfaces.

(14) Install the other blade clamp half.

CAUTION 1: A 0.06 INCH (1.5 MM) MAXIMUM OF GASKET MATERIAL MUST BE EVENLY EXPOSED THROUGH THE LIPS ON EACH BLADE CLAMP HALF PARTING SURFACE; HOWEVER, GASKET MATERIAL MUST BE TRIMMED, AS NECESSARY, TO PROVIDE METAL-TO-METAL CONTACT WHERE THE CLAMP LUGS MEET.

CAUTION 2: DO NOT TORQUE THE OUTBOARD CLAMP BOLTS (770) AT THIS STEP OF THE ASSEMBLY.

(15) Apply anti-seize lubricant CM118 to the threaded part of the outboard clamp bolts (770).

(16) Insert the outboard clamp bolts (770) and attach them with self-locking hex nuts (820).

(a) Hand tighten.

NOTE: This step helps align the blade clamp gasket, but the clamp bolts should not be torqued at this time.

(17) Insert inboard clamp socket screws (760).

CAUTION 1: INBOARD CLAMP SOCKET SCREWS (760) MUST BE TORQUED IN THE INCREMENTS SPECIFIED.

CAUTION 2: DO NOT EXCEED THE RECOMMENDED TORQUE ON INBOARD CLAMP SOCKET SCREWS. REFER TO TORQUE VALUES TABLE 8-1 IN THE FITS AND CLEARANCES CHAPTER OF THIS MANUAL.

(18) Using a 5/16 inch Allen wrench, torque the clamp socket screws (760) in 10 Ft-Lb (14 N·m) increments (10, 20, etc.), alternating between screws at each increment.

CAUTION: DO NOT CONTACT THE INNER BLADE CLAMP HALF (740) WHILE DRILLING TO SAFETY THE INBOARD CLAMP SOCKET SCREWS (760).

(19) Using a #42 (0.094 inch [2.37 mm]) size bit, drill the head of each inboard clamp socket screw.

NOTE 1: If damage is caused to the clamp unit bore during drilling for serviceable inspection criteria, refer to the Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

NOTE 2: Apply zinc chromate primer CM67 to any surface that is repaired. Refer to the

(20) Safety each clamp socket screw (760) using a cotter pin (750) in such a way that the cotter pin contacts the blade clamp half (740) and prevents any tendency for the screw to back out of the blade clamp.

NOTE 1: Three wraps of 0.032 inch (0.82 mm) minimum diameter stainless steel wire CM131 may be used as an alternative to safety the clamp socket screw if the cotter pin causes clearance problems.

NOTE 2: Do not drill or safety the clamp socket screws (760) if blades will be removed to facilitate shipment of the propeller.

(21) Repeat the blade clamp reinstallation procedures for each of the remaining blades.

(22) Install weight slugs on the clamp counterweight arms, if applicable.

(a) Refer to Hartzell Propeller Inc. Application Guide 159 (61-02-59) for specific weight slug information.

8. Beta System Assembly

A. HC-B5M( )-3( ) Propeller Models ONLY

CAUTION: BETA ROD RETAINING RINGS (1080) MUST BE ASSEMBLED WITH THEIR SHARP EDGES AGAINST EACH OTHER.

(1) Slide two retaining rings (1080) over the inboard end of one propeller beta rod (1060) and into the groove provided for them in the rod.

NOTE: The rounded edges of the retaining rings must face away from each other.

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

(3) Slide a beta spring retainer (1070) over the piston end of the propeller beta rod (1060) and down onto the crimped retaining rings (1080). The crimped retaining rings fit down inside the beta rod retainer ID recess.

(4) Slide a beta compression spring (1050) onto the piston end of the beta rod (1060).

(5) Using the special tool TE29, or equivalent, compress the beta compression spring (1050) by hand to approximately half its length.

NOTE: Leave the special tool on the spring to aid further assembly procedures.

(6) Follow these procedures for the other two propeller beta rod subassemblies.

(7) Insert the assembled beta rods (1060) through the guide lugs (1090) provided in the spinner mounting plate (40).

NOTE: The short length of the beta rod (1060), from the retaining rings to the threaded end, should be facing the beta ring (1120).

(8) Install the socket head cap screw (660) in the guide collar unit (620).

9. Cylinder and Guide Collar Unit Assembly

A. All Propeller Models

(1) Install the guide collar unit (620) onto the small diameter of the cylinder (610).

NOTE 1: The chamfer in the guide collar (620) must face the flange on the cylinder (610).

NOTE 2: Do not torque the guide collar socket screw at this time.

CAUTION 1: DO NOT APPLY HYDRAULIC SEALANT ADHESIVE COMPOUND CM134 TO THE THREADS OF THE CYLINDER (610).

CAUTION 2: DO NOT LET THE HYDRAULIC SEALANT ADHESIVE GET INTO THE CYLINDER. CONTAMINATION TO THE AIRCRAFT ENGINE OIL SYSTEM CAN OCCUR.

(2) Clean the threads on the hub unit (1400).

(3) Clean the threads on the cylinder (610).

(4) Apply a bead of approved hydraulic sealant adhesive CM134 in the chamfer where the cylinder O-ring will contact the hub (1400).

(5) Install the O-ring (670) into the cylinder chamfer, facing the hub (1400).

(6) For HC-B5M( )-3( ) propeller models only, slide the assembled guide collar (620) and cylinder (610) down over the three beta rods (1060).

NOTE: Each beta rod (1060) must slide through a guide collar bushing (640) when the cylinder (610) is installed onto the hub (1400).

(7) Install the cylinder (610) with the guide collar (620) onto the hub (1400).

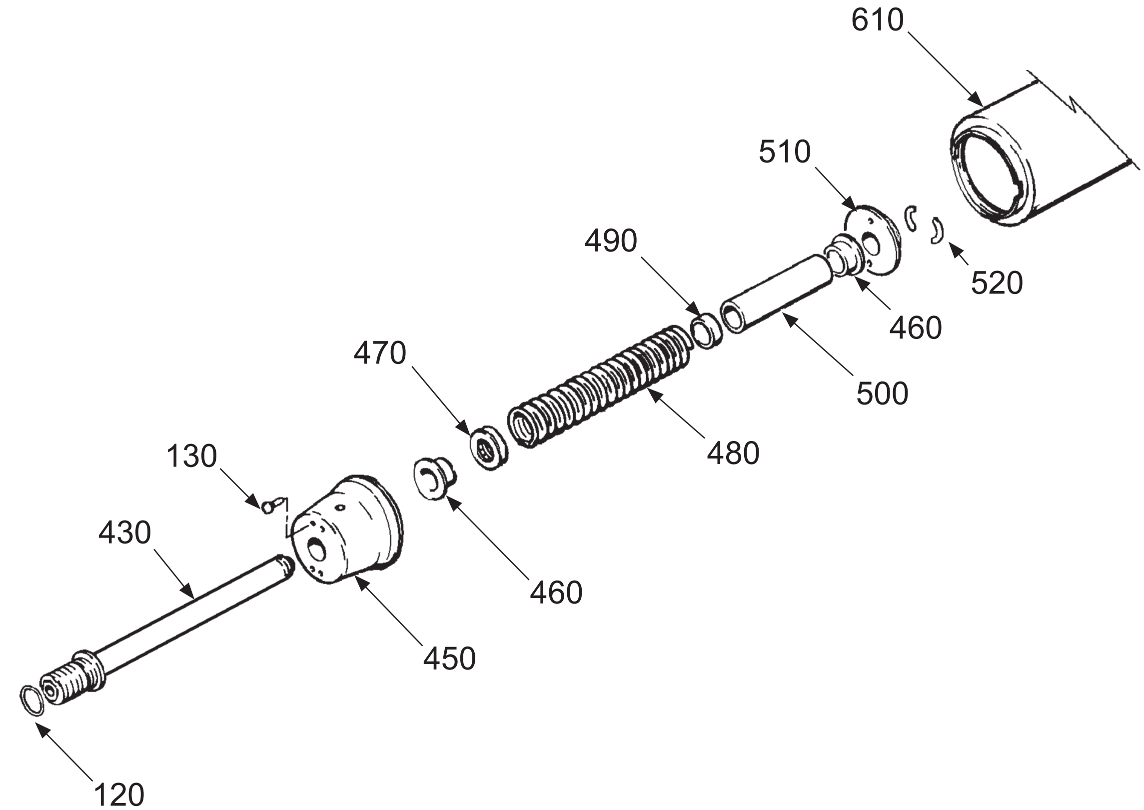
(8) Using a 1.00 inch (25.4 mm) square bar, fit the slot provided for it in the top of the cylinder.

(a) Torque the cylinder against the hub unit in accordance with Torque Values Table 8-1 in the Fits and Clearances chapter of this manual.

CAUTION 1: INSPECT THE INSIDE OF THE CYLINDER (610) TO MAKE SURE THE O-RING (670) HAS NOT BEEN FORCED OUT OF POSITION DURING THE CYLINDER INSTALLATION PROCEDURE.

CAUTION 2: INSPECT THE SLOT IN THE TOP OF THE CYLINDER (610) TO MAKE SURE THE SQUARE-BAR WRENCH USED FOR TORQUING DID NOT RAISE ANY SHARP EDGES OR DAMAGE THE THREADS.

(9) Remove any sharp edges in the wrench slot on top of the cylinder.



Feathering Spring Assembly
Figure 7-7

10. Feathering Spring Assembly
Refer to Figure 7-7

A. All Propeller Models

CAUTION: A SPECIAL FIXTURE TE59 OR EQUIVALENT IS REQUIRED FOR COMPRESSING THE FEATHERING SPRING AT ASSEMBLY.

(1) Put the threaded end of the pitch change rod (430) in the special tooling of the fixture TE59 or equivalent, used for the feathering spring reassembly.

(2) Slide the spring retainer cup (450) onto the pitch change rod (430).

(3) Add the front spring guide (465).

(4) Assemble the three parts of the ball thrust bearing (470) onto the pitch change rod (430).

(5) Add pitch adjust spacer (490) as needed.

NOTE: The exact length of the spacer needed is not determined until the counterweight angle is set (later assembly procedure); however, the length of the spacer needed may be the same as that of the spacer removed during propeller disassembly. Refer to Figure 7-13 for spacer lengths.

(6) Put the spacer sleeve (500) on the pitch change rod (430).

(7) Slide the feathering compression spring (480) over the spacer sleeve (500).

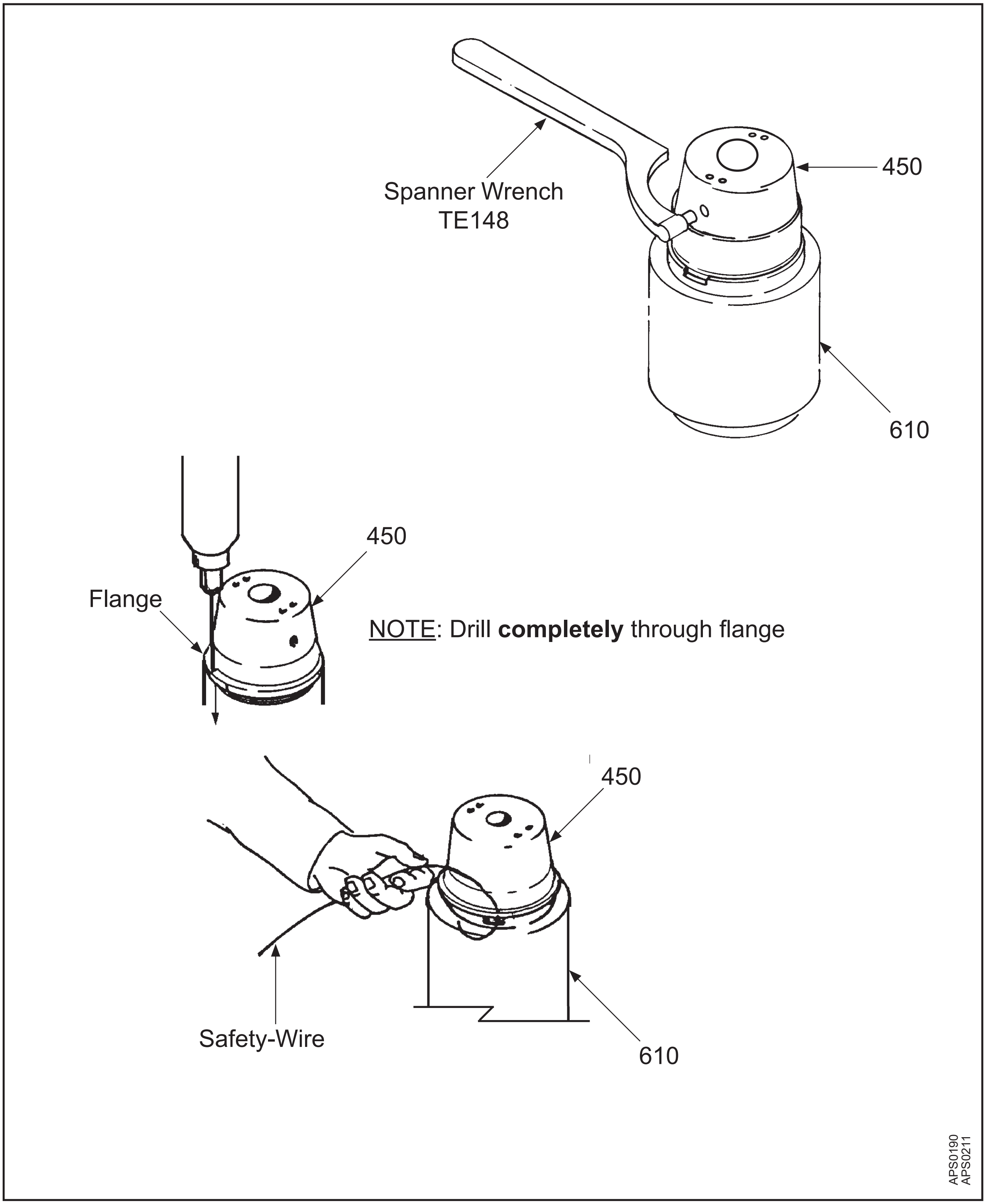
(8) Add the rear spring guide (460), if applicable.

(9) Put the rear spring retainer (510) on the pitch change rod.

WARNING: THE FEATHERING SPRING ASSEMBLY (400) IS PRELOADED TO APPROXIMATELY 1000 POUNDS (454 KG) FORCE. MAKE SURE THE SAFETY OF EVERYONE IN THE VICINITY DURING ASSEMBLY PROCEDURES.

(10) Compress the feathering spring assembly (400) enough to insert the two-piece rear split keeper (520) that holds the spring in compression on the pitch change rod (430).

NOTE: Apply oil or grease to each half of the rear split keeper (520) to keep it in position until the feathering compression spring (480) is decompressed.



Installing Feathering Spring Assembly in Cylinder
Figure 7-8

CAUTION: MAKE SURE THE REAR SPLIT KEEPER (520) DOES NOT DISLODGE FROM ITS GROOVE IN THE PITCH CHANGE ROD (430) DURING DECOMPRESSION OF THE FEATHERING COMPRESSION SPRING (480).

(11) Carefully decompress (unload) the feathering spring assembly (400).

NOTE: Make sure the split keeper (520) does not dislodge from its groove in the pitch change rod (430) during decompression of the feathering compression spring (480).

(a) For the 831-192 Feathering Spring Assembly (400)

1 The rear spring retainer (510) will cover the split keeper (520) on the 831-192 feathering spring assembly (400).

2 Install the split keeper retainer (530) on the pitch change rod (430).

3 With the radiused side of the internal retaining ring (540) facing the split keeper retainer (530), install the internal retaining ring (540) on the pitch change rod (430).

(12) Apply anti-seize compound CM118 to the threads of the spring retainer cup (450).

(13) Insert the feathering spring assembly (400) into the cylinder (610).

(14) Using the special spanner wrench TE148 or a locally procured strap wrench, turn the feathering spring assembly (400) into position in the cylinder (610). Refer to Figure 7-8.

(15) Tighten the assembly until it is secure.

CAUTION 1: DRILL THE HOLE IN THE SPRING RETAINER CUP SO THAT IT IS ALIGNED WITH THE EDGE OF THE CYLINDER SLOT TO PREVENT THE SPRING RETAINER CUP (450) FROM LOOSENING.

CAUTION 2: DO NOT DAMAGE THE CYLINDER THREADS.

(16) Using a #42 (0.094 inch [2.37 mm]) size bit, drill through the flange of the spring retainer cup (450) at the wrench slot in the cylinder (610), as shown in Figure 7-8.

NOTE: Drill in and down at an angle that exits on the other side of the spring retainer cup (450) flange.

(17) Insert 0.032 inch (0.82 mm) minimum diameter stainless steel wire CM131 through the drilled hole.

(a) Using three loops of wire, safety the feathering spring assembly (400).

(b) Tuck the twisted wire into the slotted area.

(18) Install the fillister head screws (130) in the spring retainer cup (450).

(19) Adjust the height of the fillister head screws (130) using one of the following methods:

(a) Set the height of the fillister head screws (130) to match the recorded measurements of the previous screws that were discarded at disassembly.

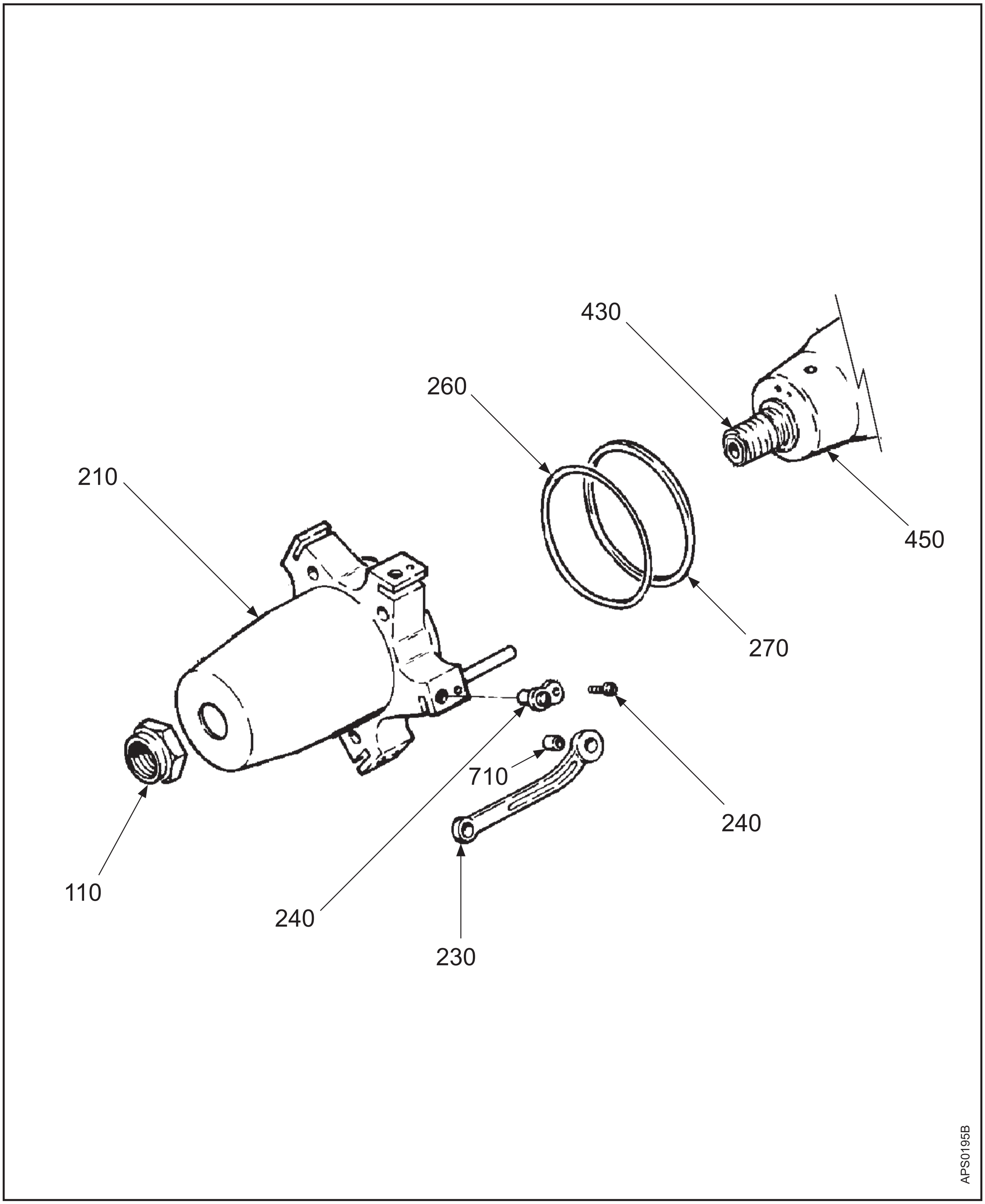
(b) If the height of the previous fillister head screws (130) was not measured and recorded at disassembly, turn the fillister head screws (130) all the way in; then, back them out to an even height of approximately three threads.

NOTE: The fillister head screw (130) may be adjusted later to obtain the specified feather angle. These screws will be safetied after the feather angle has been set.

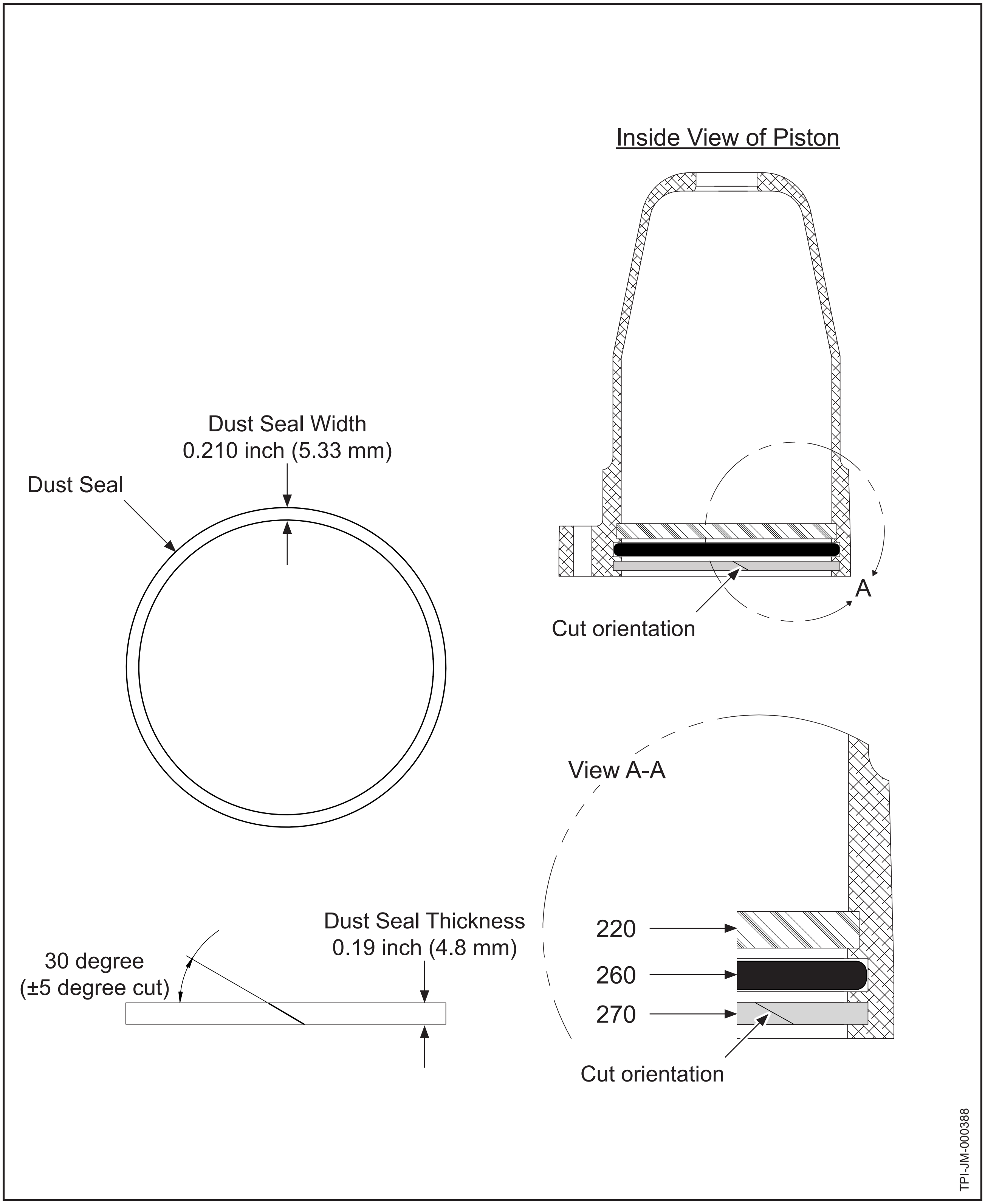
CAUTION: ENGINE OIL ENTERS THIS AREA OF THE ASSEMBLY. MAKE SURE ALL BITS OF METAL FROM DRILLING AND SAFETY WIRING ARE REMOVED.

(20) Using lubricant CM12, lubricate the pitch change rod O-ring (120).

(21) Install the O-ring in the groove that is provided for it.



Piston Installation
Figure 7-9



Piston Dust Seal Orientation
Figure 7-10

11. Piston Installation

NOTE: Refer to Figure 7-9 and Figure 7-10 for the installation and orientation of components installed in the piston (210) and piston dust seal length.

A. All Propeller Models

(1) Using lubricant CM12, lubricate the piston O-ring (260).

(2) Install the piston O-ring (260) in the groove provided for it in the piston (210).

CAUTION: MAKE SURE THAT THE PISTON DUST SEAL (270) IS FREE OF FUZZ.

(3) Cut the necessary length of piston dust seal (270) material on a 30 degree diagonal so there will be an overlap at the parting line with a smooth surface, free of fuzz. Refer to Figure 7-10.

(a) If the piston dust seal (270) has fuzz or long strands that could interfere with the operation of the O-ring, replace the piston dust seal.

(4) Soak the piston dust seal (270) in aviation grade turbine engine oil until it is completely saturated.

(a) Squeeze the excess oil from the piston dust seal (270).

CAUTION: MAKE SURE THAT THE DIAGONAL OVERLAP OF THE PISTON DUST SEAL (270) REMAINS VISIBLE AND DOES NOT ROTATE TO ITS SIDE AS IT IS INSTALLED IN THE GROOVE OF THE PISTON (210).

(5) Install the thinnest section of the piston dust seal (270) in the remaining piston OD groove.

(6) Slide the piston (210) into position over the cylinder (610).

(a) For HC-B5M( )-3( ) propeller models only, align the beta rods (1060) with the holes provided for them in the piston (210).

(8) Apply a thin layer of anti-seize compound CM118 in the hole of the free end of each link arm.

(9) Install the free end of each link arm (230) in the slot provided for it in the piston (210).

(10) Install each link pin unit (240) through the large hole in each piston (210) boss, and through the hole in each link arm (230).

(11) Push each link pin unit (240) flush with the piston (210) boss.

(12) Put the guide collar unit (620) against the cylinder (610) at the correct radial location to assist in aligning the piston unit (210).

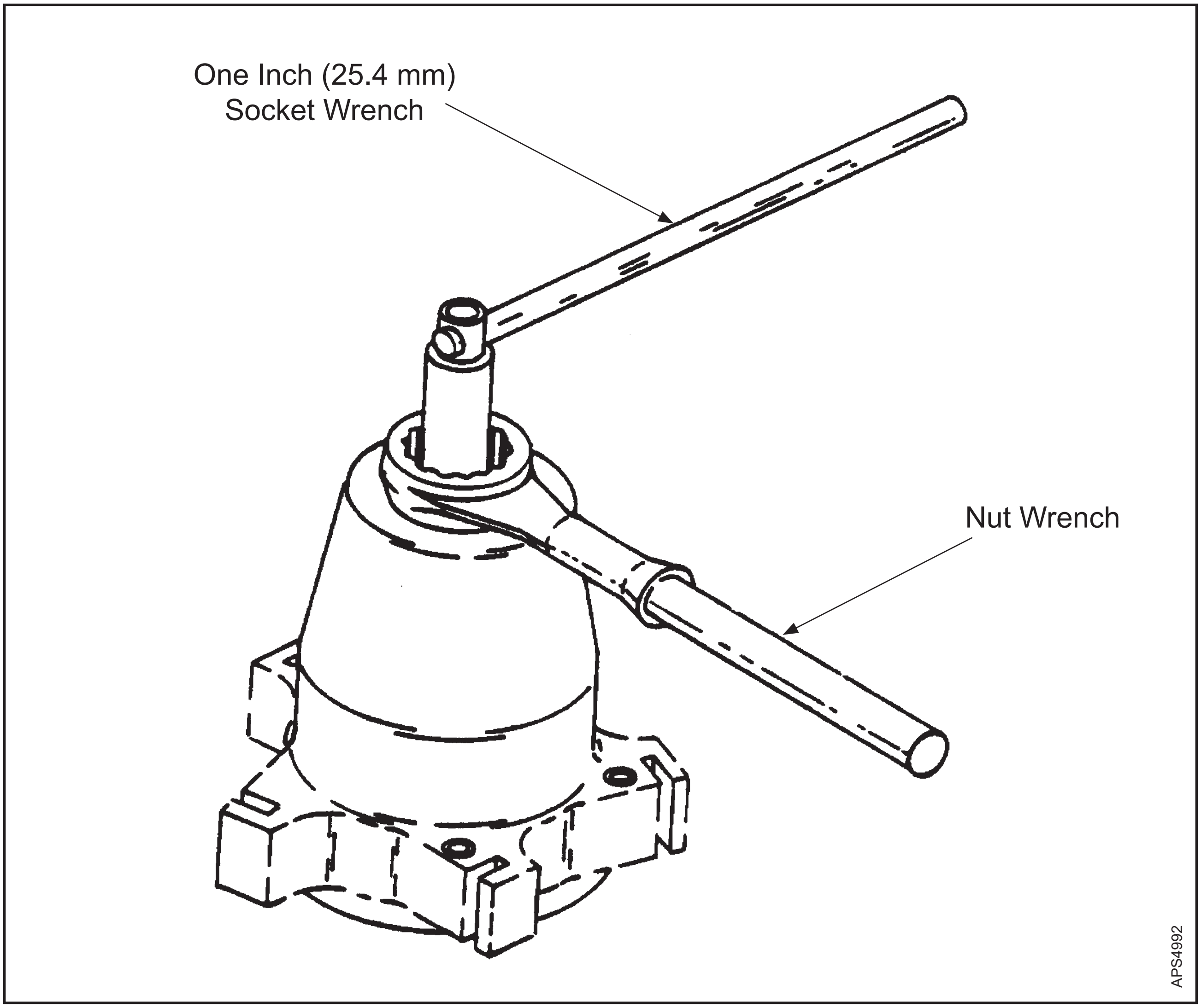
(a) If necessary, shift the guide collar unit (620) radially to provide the clearances required between the piston (210) and the guide rods (215).

CAUTION: FOR SETUP PURPOSES ONLY, USE A NON-LOCKING NUT ON THE END OF THE PITCH CHANGE ROD IN PLACE OF THE SELF-LOCKING HEX NUT (110). THE NON-LOCKING NUT MUST BE REPLACED WITH A SELF-LOCKING HEX NUT (110) AFTER FEATHER ANGLES ARE CHECKED.

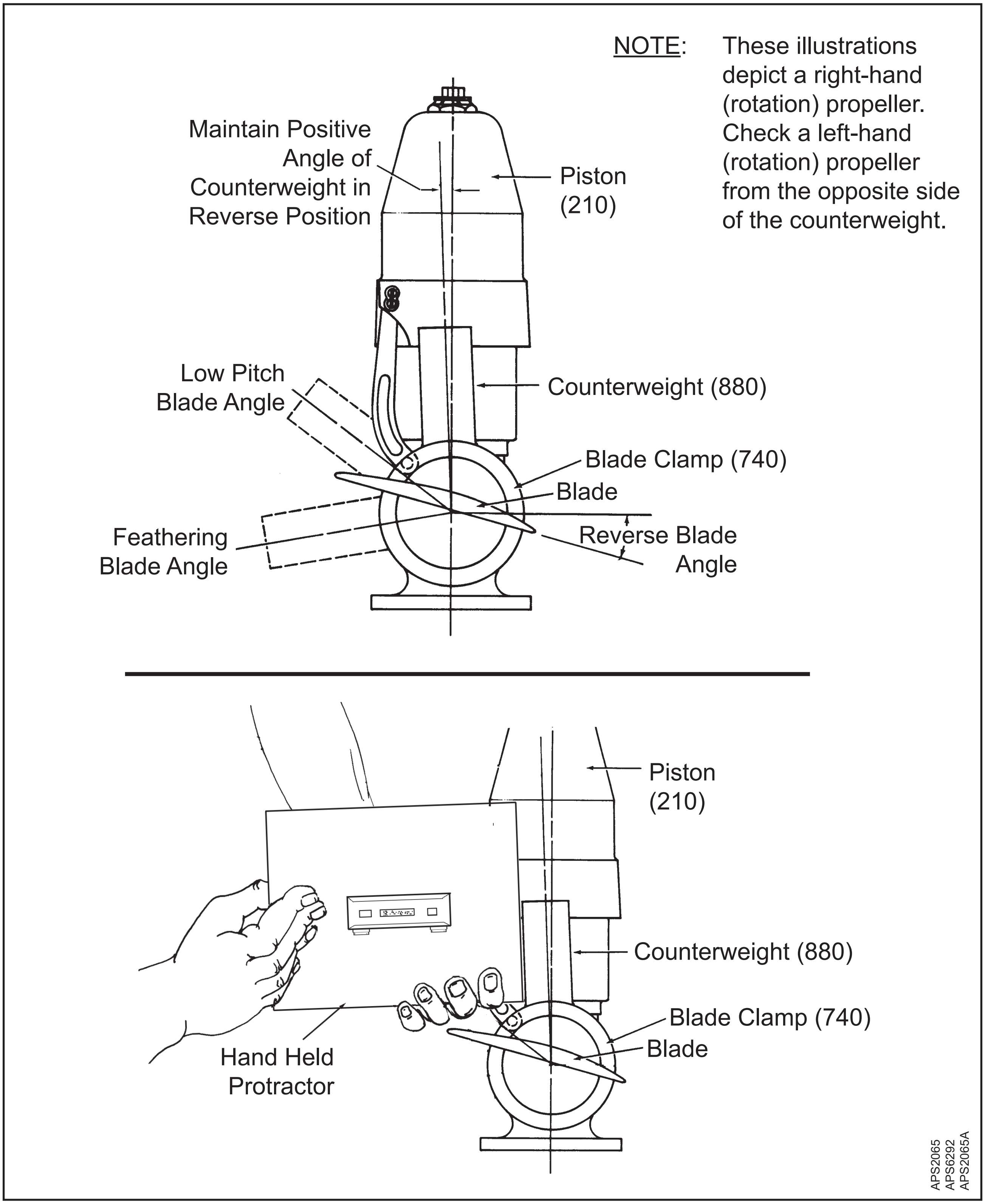
(13) Install a non-locking setup nut on the end of the pitch change rod (430).

(14) Using a 1-13/16 inch wrench TE144-1, or equivalent, on the non-locking setup nut, and a one inch (25.4 mm) socket on the pitch change rod (430), tighten the nut in position. Refer to Figure 7-11.

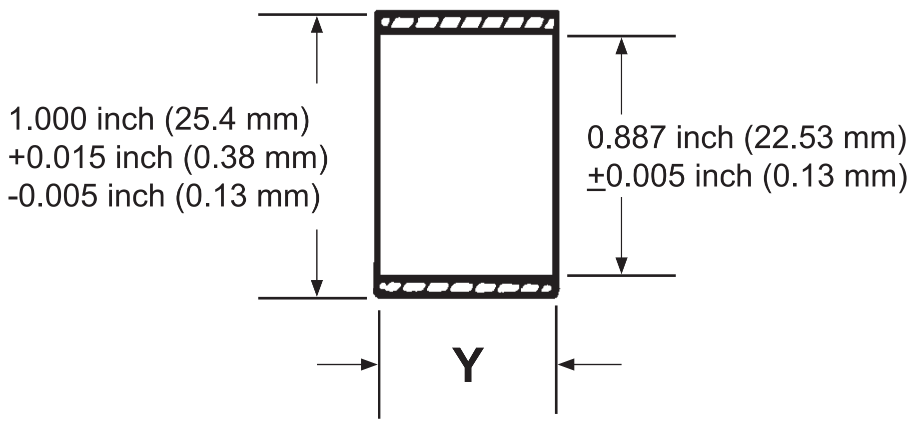
(a) On HC-B5( )( )-3( ) propeller models, a crowfoot wrench (1-13/16) may be used with an adaptor to tighten the non-locking setup nut.



Tightening the Non-locking Setup Nut on Pitch Change Rod
Figure 7-11



Correct Angle of Counterweight Relative to Axis of Piston
Figure 7-12



Part Number	**Dimension "Y"
A-4027	0.598 inch (15.19 mm)
A-4027-1	0.630 inch (16.00 mm)
A-4027-2	0.663 inch (16.84 mm)
A-4027-3	0.725 inch (18.42 mm)

**Dimension "Y" has a ±0.005 inch (0.13 mm) tolerance

APS5015A

Pitch Adjust Spacers for Feathering Spring Assemblies
Figure 7-13

12. Setting Counterweight Angle

A. All Propeller Models

CAUTION 1: REFER TO THE APPLICABLE TYPE CERTIFICATE DATA SHEET, SUPPLEMENTAL TYPE CERTIFICATE DATA SHEET, OR HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59), FOR THE SPECIFIC COUNTERWEIGHT ANGLE REQUIRED.

CAUTION 2: AT THIS TIME THE OUTBOARD CLAMP BOLTS (770) HAVE NOT BEEN TIGHTENED, BECAUSE ADJUSTMENTS OF COUNTERWEIGHT ANGLE AND BLADE PITCH USUALLY INVOLVE SOME DISASSEMBLY PROCEDURES.

CAUTION 3: DO NOT EXCEED 200 P.S.I. (13.8 BARS) AIR PRESSURE WHEN ACTUATING PROPELLERS INCLUDED IN THIS MANUAL.

(1) Apply pressure to the piston through the rotatable fixture on the propeller assembly table to move the piston to low pitch position.

(2) Using a hand-held protractor TE97 or equivalent, check the angle of the counterweight relative to the axis of the piston, as shown in Figure 7-12.

(a) For the specific counterweight angle required, refer to the applicable Type Certificate Data sheet, Supplemental Type Certificate Data sheet, or Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

(b) As indicated in Figure 7-12, the positive angle (usually 2 degrees), is for reference only. Do not consider it for the prescribed angle.

CAUTION: THE LENGTH OF THE PITCH ADJUSTMENT SPACER NEEDED AT ASSEMBLY MAY BE THE SAME AS THE LENGTH OF THE SPACER REMOVED AT DISASSEMBLY. IF A SPACER IS ADDED AT ASSEMBLY, USE THE CORRECT LENGTH SPECIFIED FOR THE REQUIRED CHANGE IN ANGLE.

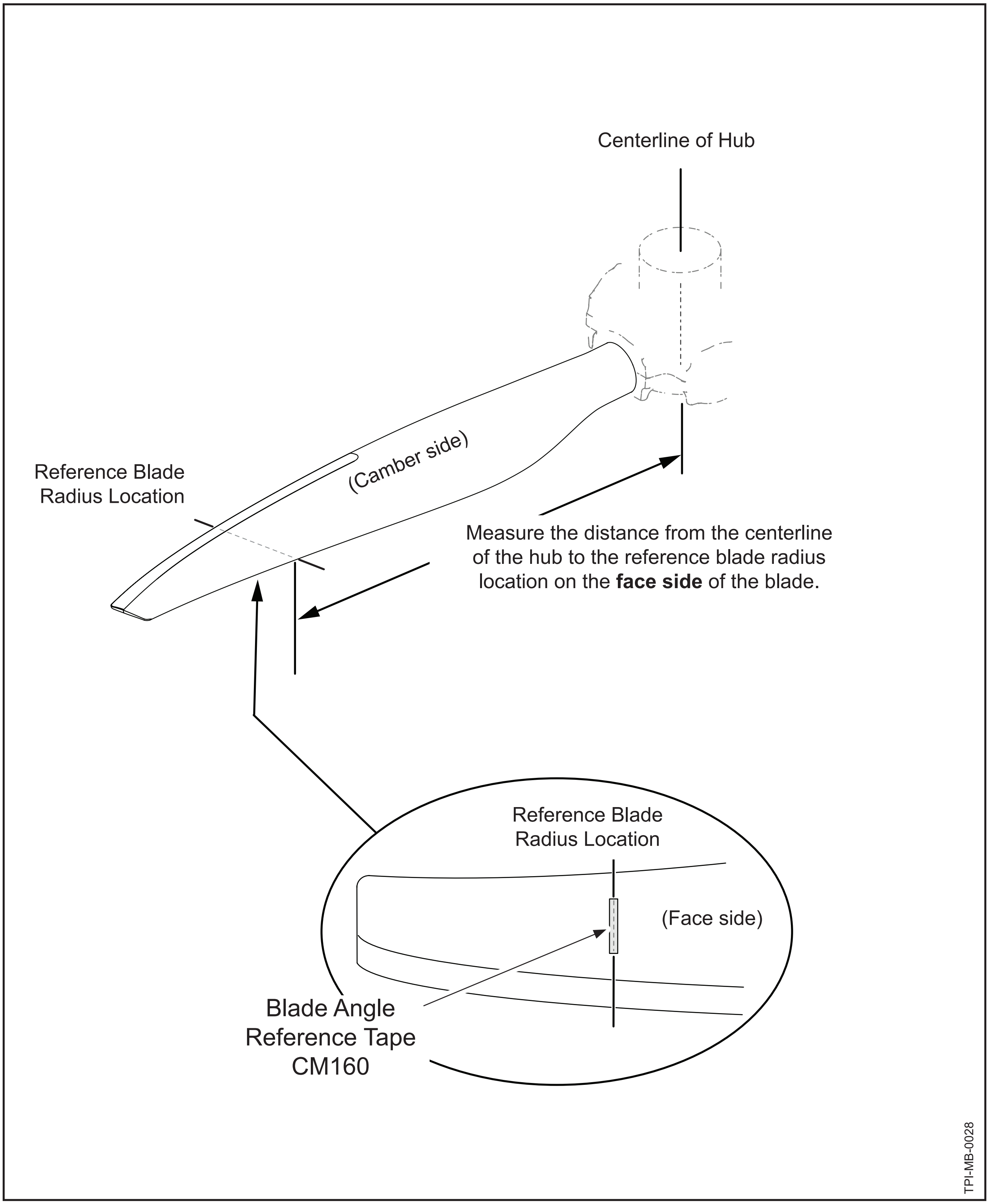
(3) Adjust the counterweight angle.

(a) In the feathering spring assembly (400):

1 If the counterweight angle requires adjustment, replace the pitch adjust spacer (490) between the front spring guide (460) and the spring retainer cup (450) with a longer or shorter spacer.

a Each incremental spacer size will change the counterweight angle by approximately one degree.

b To determine the required size spacer to achieve counterweight angle, refer to the chart in Figure 7-13.



Blade Angle Reference Tape
Figure 7-14

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

A. All Propeller Models

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 7-14.

(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 7-14.

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.

14. Setting Reverse Position of Blades

A. HC-B5M( )-3( ) and HC-B5M( )-5( ) Propeller Models ONLY

CAUTION: DO NOT EXCEED 200 P.S.I. (13.8 BARS) AIR PRESSURE WHEN ACTUATING PROPELLERS INCLUDED IN THIS MANUAL.

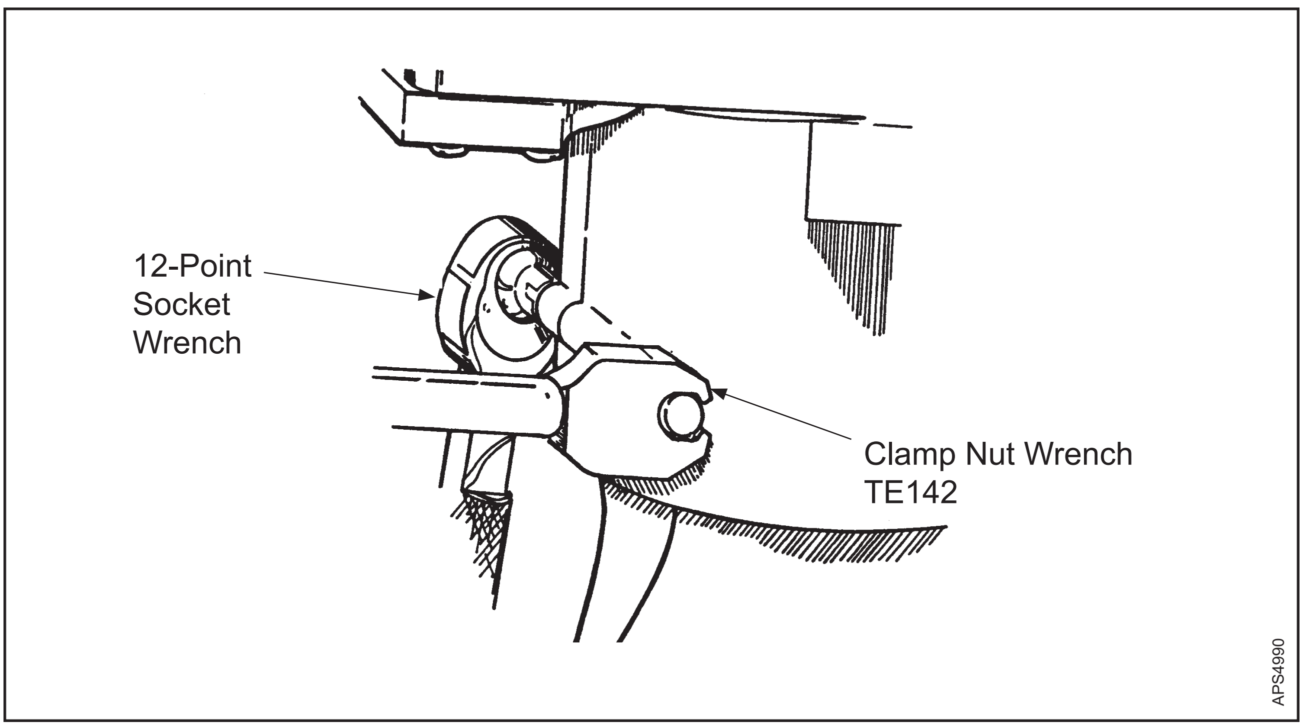
(1) Apply pressure to the piston through the rotatable fixture on the propeller assembly table to bring the propeller to reverse position.

(2) Using a hand held protractor TE97 or bench-top protractor TE96 and special riser fixture TE48, or equivalent, measure the reverse angle on blade one at the reference blade radius.

NOTE 1: Refer to the applicable Type Certificate Data sheet, Supplemental Type Certificate Data sheet, or Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59), for the specific requirements for low pitch blade angles.

NOTE 2: The reverse angle of all five blades must be within a blade-to-blade tolerance of 0.2 degree from the maximum to the minimum blade angle at low pitch.

(3) Rotate the blade in the clamp to obtain the correct reverse blade angle.



Blade Angle and Blade Clamp Torque
Figure 7-15

(4) Using a clamp nut wrench TE142, or equivalent, hold the self-locking nut (820) and a standard 12-point socket to torque the outboard clamp bolts (770) per Torque Values Table 8-1 in the Fits and Clearances chapter of this manual. Refer to Figure 7-15.

(a) While torquing outboard clamp bolts (770), make sure gasket position is maintained in order to provide a sufficient grease seal.

(b) Make sure a nearly equal gap between the two halves is maintained after final torque is applied.

(5) Repeat steps (2) through (4)(b) for each of the other blades.

(6) Check the blade-to-blade reverse angle variance at the reference blade radius, and readjust the blade reverse angles if they are not within tolerance.

NOTE: A blade-to-blade tolerance is applicable when setting the reverse blade angle. A blade-to-blade tolerance is also applicable when setting the low pitch and feather blade angle. It is recommended that a minimum blade-to-blade tolerance be met in the reverse blade angle. This will make sure of the best opportunity to meet all blade angle tolerance requirements for each subsequent angle.

(7) Confirm the correct blade angle setting and counterweight angle by cycling the propeller from reverse to feather, and back to reverse.

(8) Confirm that the reverse blade angle settings and counterweight angle are correct.

(9) If the counterweight angle is incorrect, remove and disassemble the spring.

(a) Add or remove the pitch adjust spacers (490), as needed, to achieve the correct counterweight angle.

(b) If necessary, reset the reverse angle after adjusting the counterweight angle.

15. Setting Low Pitch Angle of Blades

A. HC-B5MA-2 Propeller Models ONLY

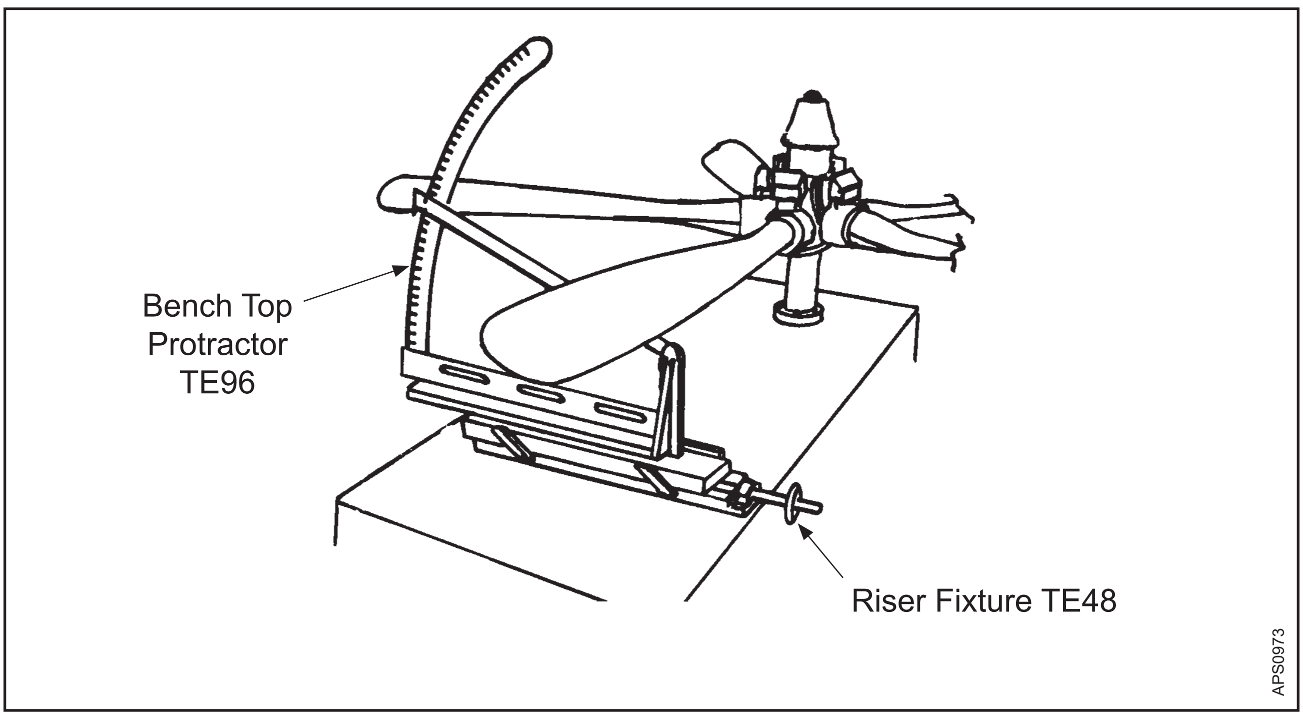
CAUTION: DO NOT EXCEED 200 P.S.I. (13.8 BARS) AIR PRESSURE WHEN ACTUATING PROPELLERS INCLUDED IN THIS MANUAL.

(1) Apply pressure to the propeller assembly through the rotatable fixture on the assembly table to move the propeller to low pitch position.

(2) Using a hand held protractor TE97 or bench-top protractor TE96 and special riser fixture TE48, or equivalent, measure the low pitch angle on blade one at the reference blade radius. Refer to Figure 7-16.

NOTE 1: Refer to the applicable Type Certificate Data sheet, Supplemental Type Certificate Data sheet, or Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59), for the specific requirements for low pitch blade angles.

NOTE 2: The low pitch angle of all five blades must be within a blade-to-blade tolerance of 0.2 degree from the maximum to the minimum blade angle at low pitch.



Blade Angle Settings
Figure 7-16

(3) Rotate the blade in the clamp to obtain the correct low pitch blade angle.

(4) Use clamp nut wrench TE142, or equivalent to hold the self-locking nut (820) and a standard 12-point socket to torque the outboard clamp bolts (770) per Torque Values Table 8-1 in the Fits and Clearances chapter of this manual. Refer to Figure 7-15.

(a) While torquing outboard clamp bolts (770), make sure gasket position is maintained in order to provide a sufficient grease seal.

(b) Make sure a nearly equal gap between the two halves is held after final torque is applied.

(5) Repeat steps (2) through (4)(b) for each of the other blades.

(6) Check the blade-to-blade low pitch angle variance at the reference blade radius, and readjust the blade low pitch angles if they are not within tolerance.

NOTE: A blade-to-blade tolerance is applicable when setting the low pitch blade angle. This will make sure of the best opportunity to meet all blade angle tolerance requirements.

(7) Confirm the correct blade angle setting and counterweight angle by cycling the propeller from low pitch to feather, and back to low pitch.

(8) Confirm that the low pitch blade angle settings and counterweight angle are correct.

(9) If the counterweight angle is incorrect, remove and disassemble the spring.

(a) Add or remove the pitch adjust spacers (490), as needed, to achieve the correct counterweight angle.

(b) If necessary, reset the low pitch angle after adjusting the counterweight angle.

16. Setting Feathering Angle of Blades

A. All Propeller Models

(1) Release air pressure to the rotatable fixture.

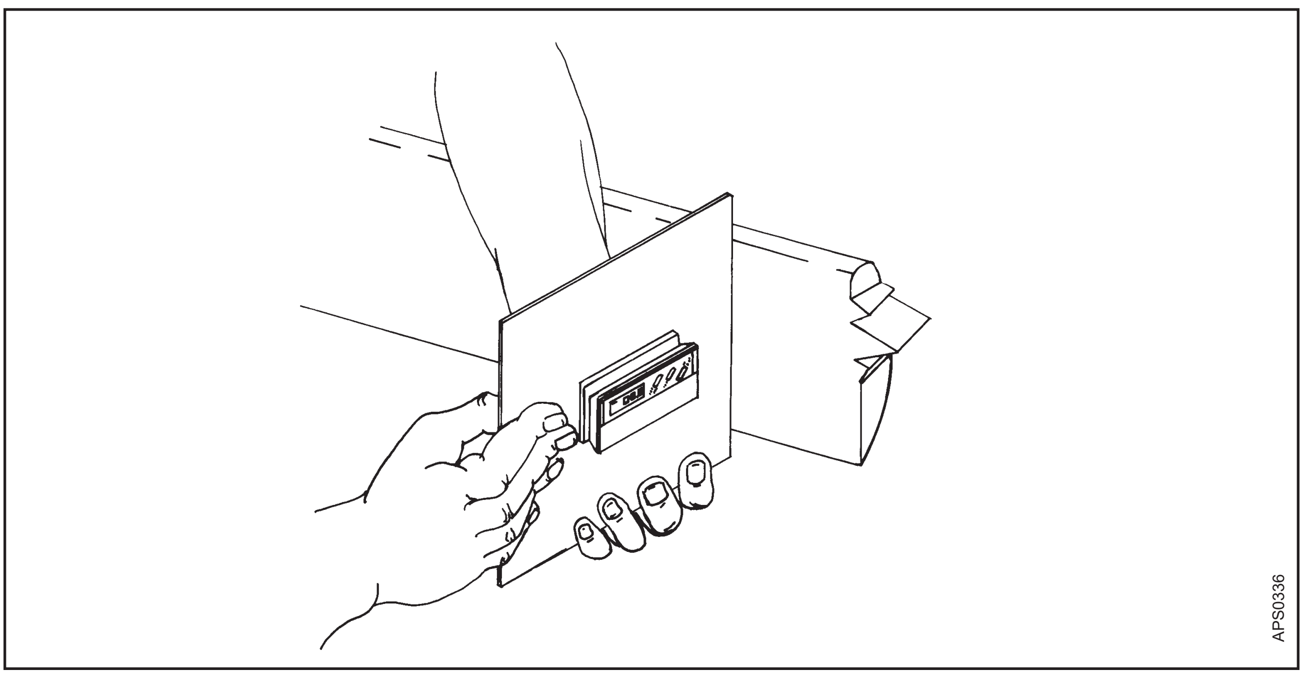
(2) Using a hand-held protractor TE97, or equivalent, check the feathering angle on Blade One at the reference blade radius. Refer to Figure 7-17.

NOTE: For the specific feathering angle, blade-to-blade tolerance at feather blade angle, and reference blade radius required, refer to the applicable Type Certificate Data sheet, Supplemental Type Certificate Data sheet, or Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

CAUTION: BEFORE REMOVING THE PISTON, MARK A PISTON BOSS WITH A GREASE PENCIL, AND MATCH MARK THE GUIDE COLLAR TO MAKE SURE THAT THE PISTON IS REINSTALLED IN THE SAME POSITION.

(3) Adjust the feather angle, as necessary, by removing the piston and turning the fillister head screws (130).

(a) Using a special wrench TE144-1 or equivalent, and a one inch (25.4 mm) socket wrench, remove the non-locking setup nut on the end of the pitch change rod (430).



Checking the Feathering Angle of the Blade
Figure 7-17

(b) Rotate blades by hand.

1 For HC-B5MA-2 propeller models, rotate from feather to low pitch.

2 For HC-B5M( )-3( ) and HC-B5M( )-5( ) propeller models, rotate from feather to reverse.

(c) Remove all link pin units (240).

(d) Disconnect the link arms (230) from the piston (210).

(e) Remove the piston (210).

(f) Adjust the feather angle as necessary.

NOTE: Turning a fillister head screw (130) in one turn will increase the feathering angle approximately 1.5 degrees. Turning a fillister head screw out one turn will decrease the feathering angle approximately 1.5 degrees.

CAUTION: MAKE SURE THE PROPER FILLISTER HEAD SCREW (250) IS INSTALLED, AND THAT ADEQUATE THREADS ARE AVAILABLE TO HOLD THE SCREW IN PLACE. AT LEAST THREE THREAD LENGTHS ARE REQUIRED.

(g) Safety the fillister head screws (130) with 0.032 inch (0.82 mm) minimum diameter stainless steel wire CM131.

(h) Slide the piston (210) into position over the cylinder (610).

(i) For HC-B5M( )-3( ) propeller models only, align the beta rods (1060) with the holes provided for them in the piston (210).

(j) Apply a thin layer of anti-seize compound CM118 in the hole of the free end of each link arm.

(k) Install the free end of each link arm (230) in the slot provided for it in the piston (210).

(l) Install each link pin unit (240) through the large hole in each piston (210) boss, and through the hole in each link arm (230).

(m) Push each link pin unit (240) flush with the piston (210) boss.

CAUTION: REPLACE THE NON-LOCKING NUT THAT WAS USED ON THE END OF THE PITCH CHANGE ROD DURING THE BUILDUP PROCESS WITH A SELF-LOCKING HEX NUT (110).

(4) Install the self-locking hex nut (110) onto the end of the pitch change rod (430).

(5) Check the feather blade angle of all the blades

(a) Adjust the feather blade angle as necessary.

(6) Using a 1-13/16 inch wrench TE144-1, or equivalent, on the self-locking hex nut (110), and a one inch (25.4 mm) socket on the pitch change rod (430), torque the nut in accordance with the Torque Values Table 8-1 in the Fits and Clearances chapter of this manual.

(a) For HC-B5( )( )-3( ) propeller models only, a crowfoot wrench (1-13/16) may be used with an adaptor to tighten the non-locking setup nut.

(7) With the blades at feather angle, check the blade-to-blade tolerance.

CAUTION: MAKE SURE THE PROPER FILLISTER HEAD SCREW (250) IS INSTALLED, AND THAT ADEQUATE THREADS ARE AVAILABLE IN THE PISTON (210) TO HOLD THE SCREW IN PLACE. AT LEAST THREE THREAD LENGTHS ARE REQUIRED.

(8) Install the fillister head screw (250) through each link pin unit (240) and into the piston boss.

(9) Using 0.032 inch (0.82 mm) minimum diameter stainless steel wire CM131, safety wire the fillister head screws (250) to the link pin unit (240).

17. Spinner Bulkhead Assembly

A. All Propeller Models

(1) Using a suitable sling and overhead hoist, lift the propeller assembly from the rotatable fixture on the assembly table and into vertical position.

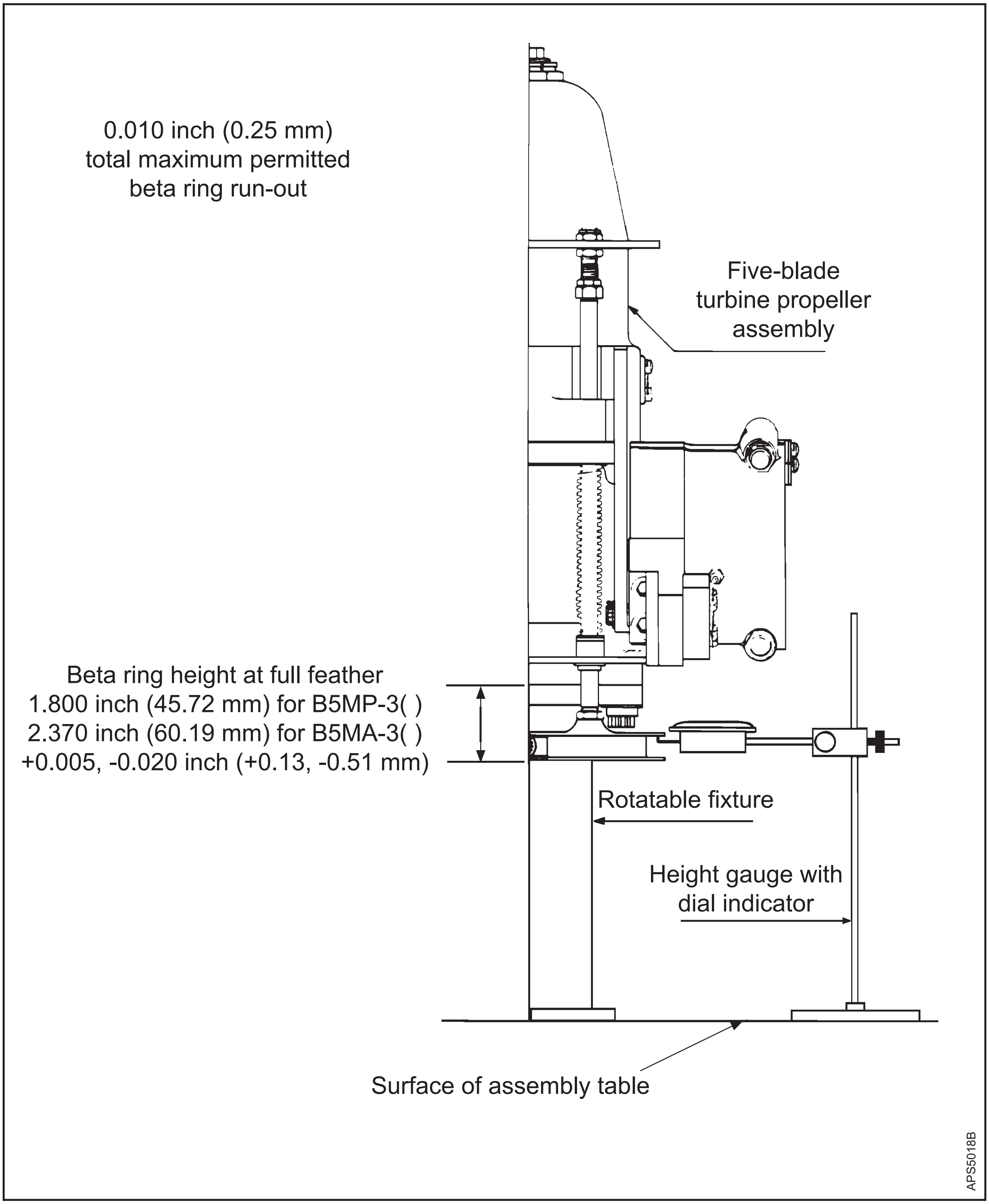
(2) If the propeller is equipped with an ice protection system that uses components supplied by Hartzell Propeller Inc., applicable instructions and technical information can be found in Hartzell Propeller Inc. Ice Protection System Manual 180 (30-61-80) available on the Hartzell Propeller Inc. website at www.hartzellprop.com.

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

(4) Using the specified hex head bolts (100), flat washers (70) and nuts (60), attach the bulkhead unit to the spinner mounting plate (40).

(5) Torque the hex head bolts (100) in accordance with Torque Values Table 8-1 in the Fits and Clearances chapter of this manual.

(6) Return the propeller assembly to the rotatable fixture on the assembly table.



Using Dial Indicator to Check Height and Run-out of Beta Ring
Figure 7-18

18. Beta Ring Installation

A. HC-B5M( )-3( ) Propeller Models ONLY

(1) Turn a thin hex nut (1110) onto the engine end of each beta rod (1060).

(2) Turn a self-locking hex nut (1040) onto each beta rod (1060).

CAUTION: TAKE CARE NOT TO BOTTOM THE BETA RODS (1060) IN THE BETA RING (1120). THIS COULD RESULT IN DAMAGE TO THE PARTS.

(3) Turn the beta rods (1060) evenly into the beta ring (1120) until each beta rod reaches the height indicated in Figure 7-18.

(a) Using a one inch (25.4 mm) to two inch (50.8 mm) depth micrometer, measure the beta ring height.

19. Checking Run-out of Beta Ring

A. HC-B5M( )-3( ) Propeller Models ONLY

CAUTION: BETA RING RUN-OUT MUST BE KEPT WITHIN 0.010 INCH (0.25 MM) TOTAL.

(1) Using a dial indicator, check run-out of the beta ring (1120) at full feather. Refer to Figure 7-18.

(2) After checking the run-out of the beta ring, torque the thin hex nuts (1110) in accordance with the Torque Values Table 8-1 in the Fits and Clearances chapter of this manual.

(3) Recheck the beta ring run-out.

20. Setting Low Pitch Angle of Blades

A. HC-B5M( )-3( ) Propeller Models ONLY

CAUTION 1: DO NOT EXCEED 200 P.S.I. (13.8 BARS) AIR PRESSURE WHEN ACTUATING PROPELLERS INCLUDED IN THIS SECTION.

CAUTION 2: WHEN A BLADE ANGLE IS SET OR CHECKED, ACTIVATE THE ASSEMBLY AWAY FROM THE REVERSE PITCH POSITION BY HAND TO RESEAT THE BLADE AND BLADE CLAMP PARTS AND TO REMOVE PLAY FROM THE ASSEMBLY.

(1) Setting the low pitch angle of the blades establishes hydraulic low pitch for the propeller.

(a) Apply air pressure to the piston through the rotatable fixture on the propeller assembly table, until Blade Number One reaches the correct low pitch blade angle.

1 For the specific low pitch angle, tolerance at low pitch blade angle, and reference blade radius required for measurement, refer to the applicable Type Certificate Data sheet, Supplemental Type Certificate Data sheet, or Hartzell Propeller Inc. Applications Guide Manual 159 (61-02-59).

(b) Trap the air at this position of Blade Number One, and check for correct low pitch angle.

1 The low pitch angle of all five blades must be within a blade-to-blade tolerance of 0.2 degree from the maximum to the minimum blade angle at low pitch.

2 For HC-B5M(A, P)-3(A, C, D, F) propellers installed on Air Tractor aircraft, low pitch blade angles must be within a blade-to-blade tolerance of 0.2 degree at the 36, 42, 48, and 54 inch stations.

(c) Turn the self-locking hex nuts (1040) on the three propeller beta rods (1060) so that the nuts are against the bosses on the piston at low stop position.

(d) Apply air pressure to the rotatable fixture, forcing the propeller against the reverse pitch stop.

(e) Select a blade with a beta rod adjacent to it.

1 "Zero" the dial indicator on the beta ring (1120) at a position close to the selected beta rod (1060).

CAUTION: ADJUSTING THE BETA RING RUN-OUT IN REVERSE PITCH WILL AFFECT THE LOW PITCH ANGLE.

(f) Adjust the other two self-locking hex nuts (1040) to correct the beta ring (1120) run-out to within 0.010 inch (0.25 mm) maximum movement for one revolution of the propeller.

(g) Recheck the low pitch blade angle.

(h) Release the air pressure from the rotatable fixture, permitting the propeller blade angle to move to feather or to a blade pitch higher than low pitch.

(i) Apply enough air pressure to the rotatable fixture to force the propeller from a higher blade angle to low pitch blade angle.

NOTE: Make sure that the self-locking hex nuts (1040) are just barely engaged by the piston (210).

CAUTION: BETA RODS (1060) AND BETA RING (1120) SHOULD NOT MOVE WHEN VERIFYING CONTACT BETWEEN THE PISTON (210) AND THE SELF-LOCKING HEX NUTS (1040).

(j) Move the assembly away from the reverse pitch position, by hand, to reseat the blade and blade clamp parts, and to remove play from the assembly.

(k) Recheck the low pitch blade angle and the blade-to-blade tolerance at low pitch blade angle of the specified blades.

(l) If the tolerance requirement is not met, then one or more blades must be rotated in the blade clamp(s).

1 Using a wrench TE142, hold the self-locking nut (820).

2 Using a standard 12-point socket, loosen the outboard clamp bolts to permit rotation of the blade in the blade clamp.

3 Repeat the procedure in this chapter for setting the reverse angle and tolerance of the blades.

4 Repeat the procedure in this chapter for setting the feather angle and tolerance of the blades.

5 Repeat the procedure in this chapter for setting the low pitch angle and tolerance of the blades.

NOTE: If the blade-to-blade tolerance is within specification, but the actual blade angle is not within specification, evenly turn the self-locking hex nuts (1040) down to increase the low pitch angle, or turn them up to decrease the low pitch angle.

(m) Apply air pressure to the piston to move the propeller assembly into full reverse position.

(n) Recheck the beta ring run-out.

NOTE: The total maximum permitted run-out is 0.010 inch (0.25 mm), as shown in Figure 7-18.

21. Checking Blade-to-Blade Angle Tolerance

A. HC-B5M( )-5( ) Propeller Models ONLY

CAUTION: THE ANGLE OF ALL BLADES AT FLOATING PITCH MUST BE WITHIN A TOLERANCE OF 0.2 DEGREE TOTAL.

(1) After the feathering angle of all blades is set, check to make sure the blade-to-blade angle tolerance at a floating pitch angle is established within tolerance.

(2) With the propeller assembly still mounted on the rotatable fixture of the assembly table, apply air pressure to the piston until blade number one attains a floating pitch position between 20 degrees - 25 degrees.

(3) Measure the pitch angle of each of the other four blades.

(4) If necessary to attain tolerance, follow the reverse pitch angle setting procedure.

(a) After resetting any blade angle:

1 Recheck the blade-to-blade angle tolerance

2 Recheck the reverse blade angle and tolerance

3 Recheck the feather angles and tolerance

22. Start Lock Unit Assembly

A. HC-B5M( )-5( ) Propeller Models ONLY

(1) Insert the start lock pin (1600) into the start lock bracket (1510).

(2) Insert the compression spring (1590) into the start lock bracket (1510), against the start lock pin (1600).

(3) Compress the compression spring (1590) and install the washer (1530) on top of the spring.

(4) Insert the cotter pin (1580) into the start lock bracket (1510) to retain the washer (1530), compression spring (1590), and the start lock pin (1600) in the bracket.

(5) Secure the cotter pin (1580).

(6) Attach the start lock units (1500) to the spinner mounting plate (40) with hex head bolts (1550).

(7) Hand tighten the hex head bolts (1550) just snug enough to let some adjustment to be made to the position of start lock units (1500).

NOTE: The position of start lock units will be adjusted when setting the starting pitch blade angle.

23. Checking Starting Pitch Blade Angle

A. HC-B5M( )-5( ) Propeller Models ONLY

CAUTION: TO PREVENT POSSIBLE OVERLOAD OF ONE START LOCK DURING THE CHECK PROCEDURE, RELEASE THE LINK ARMS FROM THE PISTON. THIS ALLOWS THE BLADES TO BE ROTATED BY HAND TO ENGAGE THE CLAMP MOUNTED START LOCK PLATES WITH THE START LOCK PINS.

(1) Apply 200 psi (13.8 bars) air pressure to the piston (210) through the rotatable fixture on the propeller assembly table.

(2) Force the piston (210) to full reverse position.

(3) Remove the link pin unit (240) from each piston (210) boss and link arm (230).

(4) Make sure that each start lock pin (1600) is extended.

(a) If the start lock pin (1600) has been secured to the start lock bracket (1510) with wire, remove the wire to release the pin.

(5) Rotate each blade by hand to firmly engage the clamp-mounted start lock plates (1570) against the start lock pins (1600).

(6) While holding hand pressure against the blade to firmly engage the clamp-mounted start lock plates (1570) against the start lock pins (1600), measure the blade angle.

CAUTION: THE STARTING PITCH ANGLE OF ALL BLADES MUST BE WITHIN A TOLERANCE OF 0.2 DEGREE TOTAL.

(7) Adjust the position of the start locks, to achieve the desired start lock blade angle.

(a) Turn the socket head cap screws (1610), located on the start lock, to achieve the desired start lock angle.

(b) Maintain a maximum blade-to-blade difference of 0.2 degree.

NOTE: For the specific start lock blade angle and reference blade radius required, refer to the applicable aircraft specifications manual or Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

(8) Torque bolts (1540, 1550) in accordance with the Torque Values Table 8-1 in the Fits and Clearances chapter of this manual.

(9) Apply a thin layer of anti-seize compound CM118 in the hole of the free end of each link arm.

(10) Rotate the blades by hand to full reverse and install the free end of each link arm (230) in the slot provided for it in each piston (210) boss.

(11) Install a link pin unit (240) through each piston (210) boss and link arm (230) to retain the link arm to the piston.

<u>CAUTION</u>: MAKE SURE THAT THE PROPER FILLISTER HEAD SCREW (250) IS INSTALLED AND THAT ADEQUATE THREADS ARE AVAILABLE IN THE PISTON UNIT TO HOLD THE SCREW IN PLACE. AT LEAST THREE THREADS MUST BE ENGAGED.

(12) Install a fillister head screw (250) through each link pin unit (240) and into the piston (210).

(a) Tighten the screws until snug.

(13) Release the 200 psi air pressure and let the feathering compression spring (480) rotate all blades to firmly engage the clamp-mounted start lock plates (1570) against the start lock pins (1600).

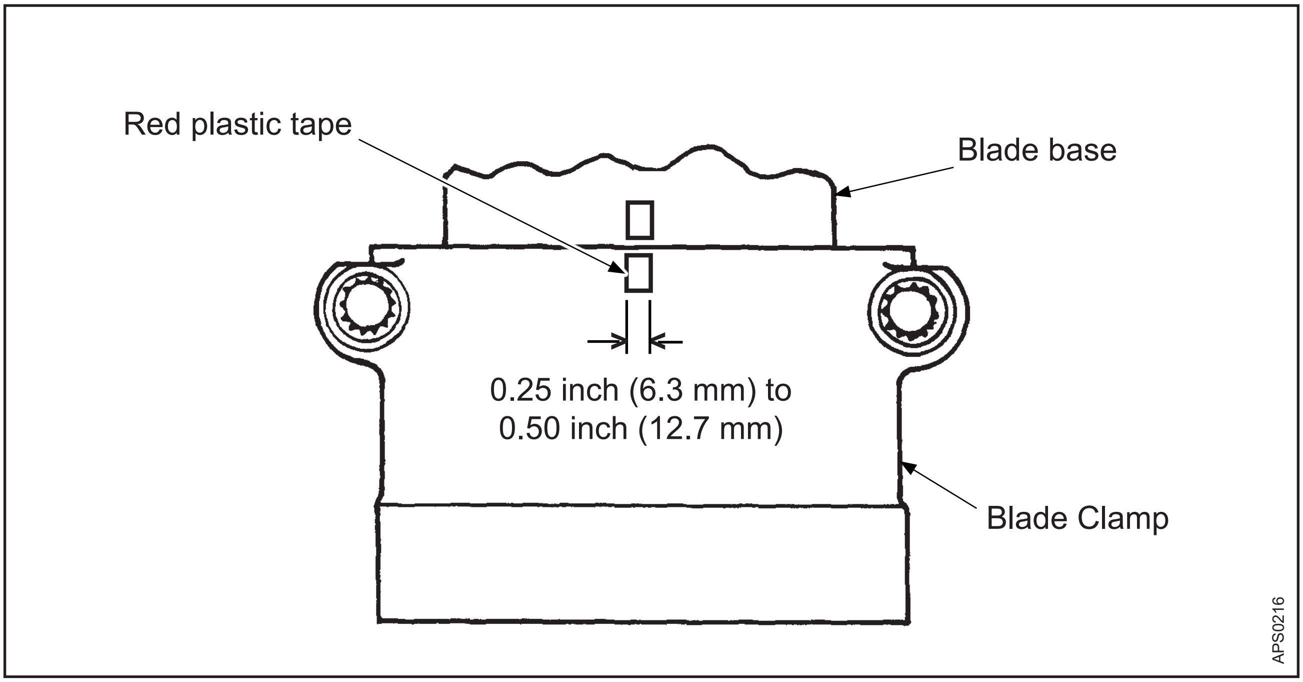
<u>CAUTION</u>: DO NOT ADJUST THE SOCKET HEAD CAP SCREWS (1610) WITH FULL FEATHERING SPRING PRESSURE AGAINST THE START LOCK PINS. ADJUSTMENTS TO THE SOCKET HEAD CAP SCREWS MUST BE MADE WITH THE PROPELLER IN FULL REVERSE.

(14) Measure the blade angle and blade-to-blade difference to make sure that the blade angles are still within tolerance.

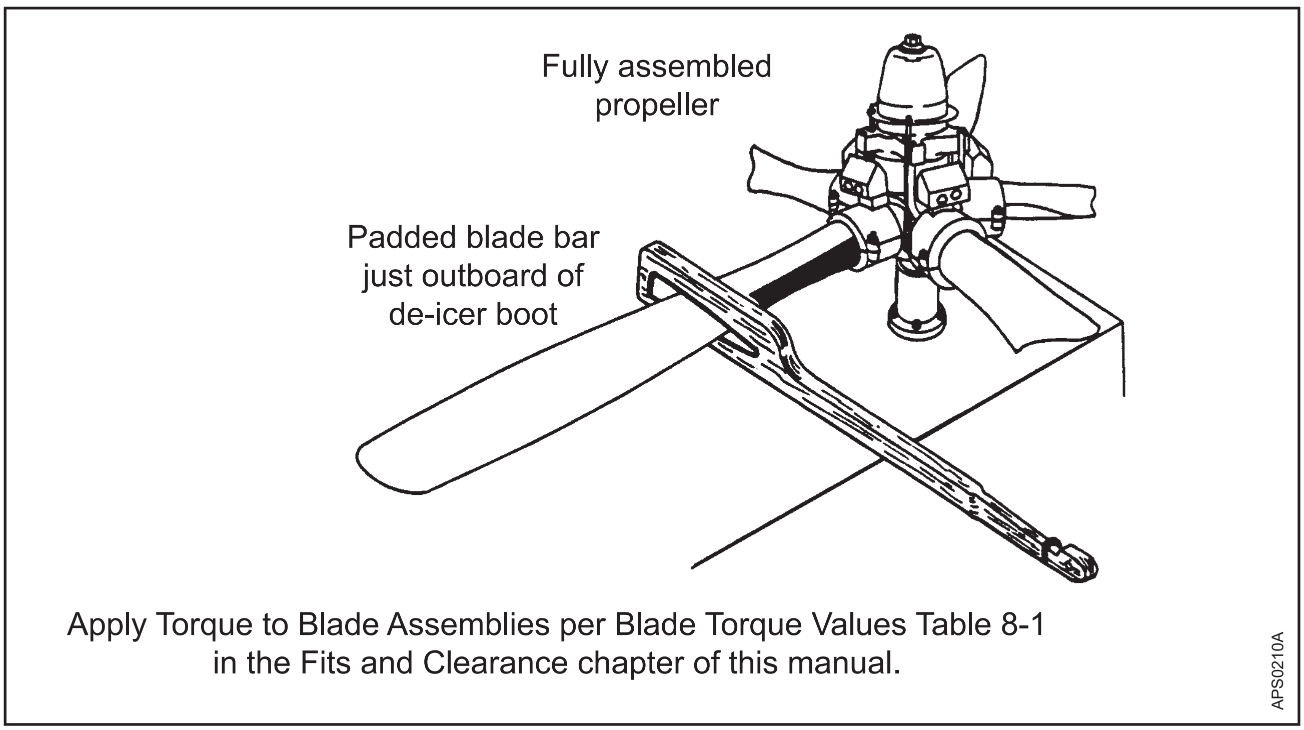
(a) Make adjustments as necessary with the propeller in full reverse.

(15) Using 0.032 inch (0.82 mm) minimum diameter stainless steel wire CM131, safety the fillister head screw (250) to the link pin unit on each piston (210) boss.

(16) Using 0.032 inch (0.82 mm) minimum diameter stainless steel wire CM131, safety the socket head cap screw (1610) to the start lock bracket (1510) on each start lock assembly (1500).



Providing for Visual Detection of Blade Slippage in Blade Clamp
Figure 7-19



Using Padded Blade Bar to Check for Blade Slippage in Blade Clamp
Figure 7-20

24. Checking for Blade Slippage in Blade Clamp

A. All Propeller Models

(1) With the propeller still mounted on the rotatable fixture of the assembly table, proceed as follows to provide for visual detection of slippage between the blade base and the blade clamp.

CAUTION: DO NOT USE A PUNCH OR SCRIBE A LINE ON THE BLADE BASE. THIS COULD START A CRACK IN THE BLADE.

(a) After you make sure that each blade has the correct pitch, apply a strip of red plastic tape down the base and across the blade clamp of Blade Number One as shown in Figure 7-19.

NOTE: If the blade will later be removed to facilitate shipping the propeller, apply two strips of red tape across each mated blade base and blade clamp assembly to mark the correct pitch.

(b) Carefully slit the tape along the line where the blade base and blade clamp meet.

(c) Spray the pieces of tape with lacquer so cleaning solvent will not wash them off.

(d) Repeat this procedure on the other four blade assemblies.

NOTE 1: After rough flight operations or when the spinner is removed for maintenance, check the alignment of the pieces of tape on each blade to detect any slight rotation of a blade base in a blade clamp.

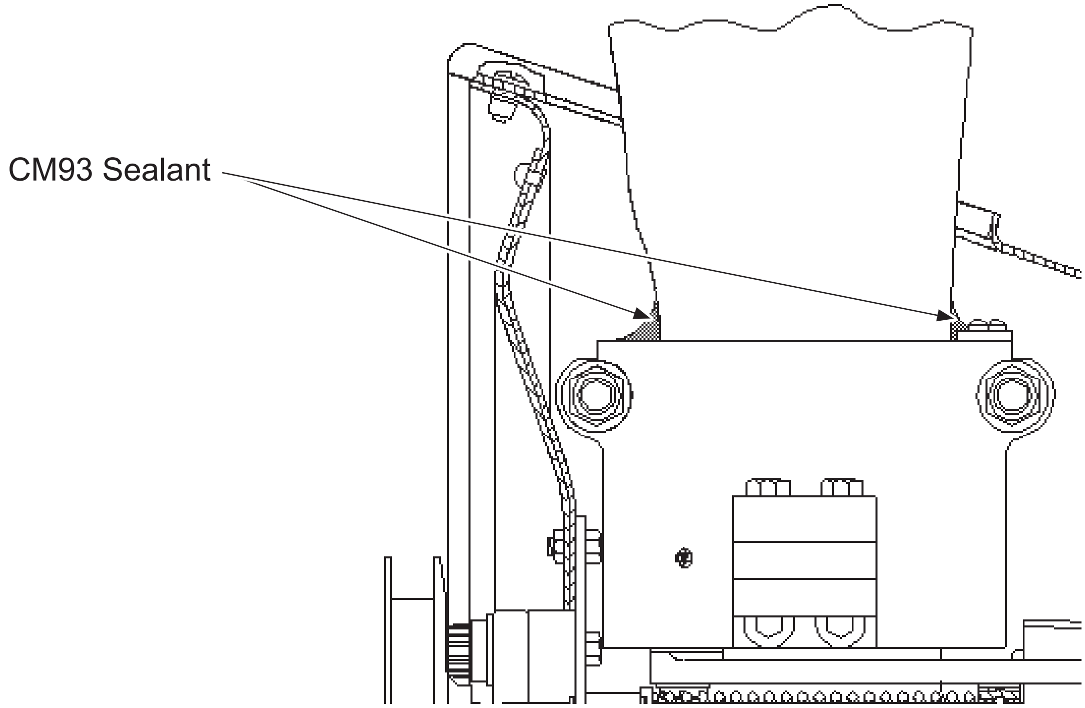
NOTE 2: Misalignment of the halves of tape on a blade assembly indicates slippage between the blade base and blade clamp. Follow the rework procedure in the Blade Clamp Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02) to correct blade slippage.

CAUTION: DO NOT PLACE THE PADDED BAR IN THE AREA OF THE DE-ICE BOOT WHEN APPLYING TORQUE TO A BLADE ASSEMBLY. PLACE THE BAR IN THE THICKEST AREA OF THE BLADE, JUST OUTBOARD OF THE DE-ICE BOOT. USE ONE BLADE PADDLE PER BLADE.

(e) Using a padded blade bar, apply a torque to each blade assembly in accordance with Torque Values Table 8-1 in the Fits and Clearances chapter of this manual, as shown in Figure 7-20.

1 Set the propeller to low pitch position and torque the blade toward low pitch.

(f) If necessary to correct blade slippage, refer to the Blade Clamp Overhaul chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).



Sealant CM93 Application
Figure 7-21

(g) Sealant CM93 Application

1 The application of sealant CM93 to the blade/blade clamp interface is an optional procedure that may provide additional protection against corrosion of the blade retention components.

NOTE: Do not apply sealant CM93 to the blade/blade clamp interface if the blades will be removed to facilitate shipment of the propeller.

CAUTION 1: TO AVOID PERMANENT DAMAGE TO THE BLADE RETENTION COMPONENTS CAUSED BY TRAPPED CHEMICALS, THIS PROCEDURE MUST ONLY BE PERFORMED FOLLOWING THE ASSEMBLY OF A PROPELLER AFTER OVERHAUL OR AFTER ANY OTHER PROCEDURE INVOLVING DISASSEMBLY AND CLEANING OF THE PROPELLER BLADE RETENTION COMPONENTS.

CAUTION 2: TO MAKE SURE OF CORRECT ADHESION OF SEALANT CM93, BLADE AND BLADE CLAMP SURFACES MUST BE FREE OF GREASE AND DIRT.

2 After performing the check for blade slippage in the clamp, fill the external void at the blade/blade clamp interface with a 0.25 inch (6.3 mm) maximum bead of sealant CM93, around the entire circumference of the blade, as shown in Figure 7-21.

3 Permit the sealant to cure for a minimum of two hours, before returning the propeller to service.

NOTE: Do not let sealant CM93 extend onto the surface of the clamp, where balance weights and de-ice hardware are installed.

25. Beta System Assembly (resumed)

A. HC-B5M( )-3( ) Propeller Models ONLY

(1) Torque the socket head cap screw (660) into the guide collar (620) to secure it in position on the cylinder (610). Refer to the Torque Values Table 8-1 in the Fits and Clearances chapter of this manual.

(2) Thread a thin hex nut (1030) onto the end of each propeller beta rod (1060).

(3) Put the rod end ring (1020) on the ends of the beta rods (1060).

(4) Thread a self-locking hex nut (1010) onto the end of each beta rod (1060).

(5) Torque each self-locking hex nut (1010) per Torque Values Table 8-1 in the Fits and Clearances chapter of this manual.

CAUTION: BINDING OF THE GUIDE LUGS MAY OCCUR IF THE PISTON/GUIDE COLLAR ARE OUT OF ALIGNMENT. MAKE SURE THE BETA ROD GUIDE LUGS IN THE SPINNER SUPPORT PLATE CAN BE TURNED BY HAND. REFER TO STEPS A.(7) AND A.(9).

(6) Apply air pressure until there is a gap between the guide lug (1090) and the retaining ring (1080) of approximately .050" to .100".

(7) Check for free rotation of the guide lugs (1090).

(a) If the guide lugs (1090) cannot be turned smoothly, without sticking, the guide collar unit (620) or spinner mounting plate (40) must be loosened and adjusted.

(8) Apply air pressure until the propeller is in reverse position.

(9) Check for free rotation of the guide lugs (1090).

(a) If the guide lugs (1090) cannot be turned smoothly (without sticking), the guide collar unit (620) or spinner mounting plate (40) must be loosened and adjusted.

HARTZELL PROPELLER INC
Assembly Inspection Check-off Record
Constant Speed Propeller
Reversing and Feathering Propeller

MODEL HC-B5MA-3 Assembly Serial No.

Customer Factory No.

Order New Repair Experimental Warranty

Hub Ser. No.	Ass'y No. 840-146	FINAL ASSEMBLY	Functional Test 0 to 200 lbs.
BLADES	Design No.	PITCH L. P. at "	Radius
Ser. No. (1)	(2)	F. A. R. P.	S. P.
(3) (4)	(5)	Track	Cw't Angle in Reverse Position
Grease In Pilot Tube Hole		Blade Angles Set By:	Insp. By:
Clamps Assy. No. 838-119	with RTV 123	BALANCE	
Ser. No. (1)	(2)	Greased By:	
(3) (4)	(5)	Slugs Per Blade (1)	(2)
Ct. Wt. B-3663-4	B-3341 + B-3343	(3) (4)	(5)
(7/16-20) Clamp Bolts Torqued at 60-65 ft.lbs.		Bal. By:	Insp. By:
A-321 Clamp Bolts Torqued at 40 ft.lbs.		SHIPPING INSPECTION	
Blades Torqued at 165 ft.lbs.		(12) B-3347 Bolts	(2) Reverse Block A-3044
PISTON Ser. No.	Ass'y No. D-3732	General Appearance	(1) C-3317-239-2 O'Ring
Cyl. No. B-4007		(12) A-2048-2 Washers	(1) A-3338-4 Lube
C-3317-243 O'Ring & B-1843 Dust Seal In Place		Red Index Tape Installed	C-2666 Low Stop Collar
GUIDE COLLAR	Ass'y No. 834-24	A-880-2A Nut	C-2668 Ring Installed
SPRING ASS'Y	No. 831-50	C-2666 Has Total Runout in Reverse Position	
C-3317-429-2 O'Ring (Color Ident. Red)		C-2666 Has Total Runout in Feather Position	Serial No.
Tip Angle - ° Difference at 42"	48" Rad.	Hub and Cyl. Clean	Spring Safetied
Dwg. ________ Rev. ________		Deicer Slip Ring Ass'y No.	Ser. No.
		Deicer Unit Installed Yes No	Deicer Platter Runout
COMMENTS:		Deicer Platter Runout	Bulkhead Ser. No.
		C-2666 Set At	Signed
		F.A.A. Designee	
		Inspector	Date:

** For Repairs Only! Complies with all Hartzell Service Bulletins through AD & Bulletin

** This propeller has been repaired in accordance with FAR Part 43 or in accordance with manufacturer's approved data on file with the Federal Aviation Agency and is classed as a minor repair. This sheet should be attached to your log book in lieu of a log book entry in compliance with requirements of FAR Part 43.

** Not applicable if assembly is new.

Example of an Inspection Check-off Form
Figure 7-22

26. Final Inspection of the Propeller

A. All Propeller Models

(1) Use a checklist, such as the appropriate Propeller Assembly Inspection Check-Off Form, for final inspection of the reassembled propeller. Refer to Figure 7-22.

(2) Make sure that propeller balance has been accomplished. Refer to the Static and Dynamic Balance chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02)

(3) Check each blade for Blade Track (in low pitch position).

(a) For acceptable limits, refer to the section, "Blade Tolerances" in the Fits and Clearances chapter of this manual.

(4) Check each blade for In-and-Out Play.

(a) For acceptable limits, refer to the section, "Blade Tolerances" in the Fits and Clearances chapter of this manual.

(5) Check each blade for End Play.

(a) Leading Edge to Trailing Edge

1 For acceptable limits, refer to the section, "Blade Tolerances" in the Fits and Clearances chapter of this manual.

(b) Fore-and-Aft (face to camber).

1 For acceptable limits, refer to the section, "Blade Tolerances" in the Fits and Clearances chapter of this manual.

(6) Check each blade for Radial Play.

(a) For acceptable limits, refer to the section, "Blade Tolerances" in the Fits and Clearances chapter of this manual.

(7) Check Blade Pitch Setting Tolerance between blades at low pitch.

(a) For the applicable blade pitch settings, associated tolerance, and the reference blade radius specified for measurement, refer to the applicable aircraft specifications manual, Type Certificate Data sheet, Supplemental Type Certificate Data sheet, or Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

27. Lubrication Procedures

A. All Propeller Models

(1) For lubrication procedures, refer to the Propeller Lubrication chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

28. Propeller Balancing Procedures

A. All Propeller Models

(1) For static and dynamic balancing procedures, refer to the Static and Dynamic Balance chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

29. Labels

A. All Propeller Models

(1) For installation of labels, refer to the Parts Identification and Marking chapter and the Paint and Finish chapter of Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

30. Special Cases

A. Assembly Procedures when Blades Have Been Removed for Shipment

(1) The following procedures apply to all propellers included in this manual.

CAUTION: A PROPELLER SHIPPED WITH BLADES REMOVED MUST BE REASSEMBLED IN A FACILITY APPROVED BY HARTZELL PROPELLER INC.

(2) In some cases, blades are removed from the propeller after assembly to facilitate shipment. In such cases:

(a) The propeller has been fully assembled and balanced before blade removal and shipment.

(b) Two strips of red tape have been positioned across each mated blade base and blade clamp assembly to mark the blade angle that was set. Refer to Figure 7-19.

(c) Each blade and its corresponding blade clamp assembly have been marked with matching numbers.

(d) The hub end of each removed blade has been wrapped to retain the lubricant and to prevent entry of foreign matter.

(e) Each blade clamp assembly has been reinstalled on the hub unit for shipment.

CAUTION: FOLLOW EVERY PROCEDURE NECESSARY TO MAKE SURE OF AN AIRWORTHY INSTALLATION.

(3) As applicable, follow the disassembly procedures detailed in the Disassembly chapter of this manual.

(4) As applicable, follow the assembly procedures detailed in this chapter.

CAUTION: BLADE PITCH ANGLES MUST BE SET IN ACCORDANCE WITH SPECIFICATIONS IN THE APPROPRIATE AIRCRAFT MANUAL OR HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59). BE SURE REFERENCE INCLUDES BOTH THE ANGLE AND THE BLADE RADIUS LOCATION.

(5) Reinstall blade assemblies on the propeller.

NOTE: Item references are to figures in the Illustrated Parts List chapter of this manual unless otherwise noted.

(a) Install the hub unit on the rotatable fixture of the assembly table. Refer to Figure 7-1.

(b) Remove the blade clamp assembly for Blade Number One from the hub unit.

CAUTION: IT IS IMPORTANT THAT ALL LUBRICANT THAT MAY HAVE ESCAPED FROM THE CAVITY DURING SHIPMENT BE RETURNED TO THE PILOT TUBE CAVITY IN THE BLADE.

(c) Return any lubricant that has accumulated on the blade base or blade clamp assembly to the pilot tube cavity in the blade.

(d) Return any lubricant that has accumulated in the protective wrapping on the hub end of the blade to the pilot tube cavity in the blade.

CAUTION: MAKE SURE THE NUMBER ON THE BLADE BASE MATCHES THE NUMBER ON THE BLADE CLAMP ASSEMBLY, AND THAT THE CLAMP ASSEMBLY IS IN THE SAME POSITION ON THE HUB AS WHEN FIRST ASSEMBLED AT THE FACTORY.

(e) Press the blade onto the hub pilot tube.

CAUTION: BE SURE TO USE APPROVED GASKET COMPOUND CM46 ON THE SHOULDER RADIUS OF THE BLADE BASE.

(f) Spread approved gasket compound CM46 on the shoulder radius of the blade base in the area where it will contact the blade clamp.

NOTE: A bead approximately 0.25 inch (6.3 mm) wide and 0.06 inch (1.5 mm) thick is sufficient.

CAUTION 1: MAKE SURE THE PARTING SURFACES OF THE BLADE CLAMP DO NOT HAVE ANY LUBRICANT ON THEM.

CAUTION 2: THE PARTING LINE OF THE BLADE CLAMP-HALVES MUST BE AT A RIGHT ANGLE TO THE PARTING LINE OF THE INBOARD BLADE THRUST SPLIT BEARING.

(g) Insert the new blade clamp gaskets (800).

(h) Reinstall the blade clamp assembly onto the blade base.

1 Refer to the section, "Blade and Clamp Installation" in this chapter, to complete the propeller assembly procedures.

(i) It should not be necessary to rebalance the propeller assembly if no lubricant was lost in the above procedures.

CAUTION: BLADE PITCH ANGLES MUST BE SET IN ACCORDANCE WITH SPECIFICATIONS IN THE APPROPRIATE AIRCRAFT SPECIFICATIONS MANUAL OR HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59). BE SURE REFERENCE INCLUDES BOTH THE ANGLE AND THE BLADE RADIUS LOCATION.

(6) Set the blade pitch by following the procedures in the section, "Setting Blade Pitch" in this chapter.

(7) Check for blade slippage in the clamp in accordance with the section, "Checking for Blade Slippage in the Clamp" in this chapter.

(8) Sealant CM93 Application

(a) The application of sealant CM93 to the blade/blade clamp interface is an optional procedure that may provide additional protection against corrosion of the blade retention components.

CAUTION 1: TO AVOID PERMANENT DAMAGE TO THE BLADE RETENTION COMPONENTS CAUSED BY TRAPPED CHEMICALS, THIS PROCEDURE MUST ONLY BE PERFORMED FOLLOWING THE ASSEMBLY OF A PROPELLER AFTER OVERHAUL OR AFTER ANY OTHER PROCEDURE INVOLVING DISASSEMBLY AND CLEANING OF THE PROPELLER BLADE RETENTION COMPONENTS.

CAUTION 2: TO MAKE SURE OF CORRECT ADHESION OF SEALANT CM93, BLADE AND BLADE CLAMP SURFACES MUST BE FREE OF GREASE AND DIRT.

(b) After performing the check for blade slippage in the clamp, fill the external void at the blade/blade clamp interface with a 0.25 inch 6.3 mm maximum bead of sealant CM93, around the entire circumference of blade, as shown in Figure 7-21.

(c) Let the sealant cure for a minimum of two hours, before returning the propeller to service.

NOTE: Do not permit the sealant CM93 to extend onto the surface of the clamp, where balance weights and de-ice hardware are installed.

(9) If necessary, follow the propeller balancing procedures in the Hartzell Propeller Inc. Standard Practices Manual 202A (61-01-02).

B. Removing Blades to Facilitate Shipment of the Propeller

(1) The following procedures apply to all propellers included in this manual.

(a) Perform the following procedures on each blade that must be removed from the propeller assembly to facilitate shipment.

1 Apply pressure to the piston through the rotatable fixture on the propeller assembly table.

2 Move the piston to full reverse position (low pitch for -2 series propellers).

3 Put a piece of tape across the blade and blade clamp (740) assembly.

4 Mark the tape on each blade with the corresponding blade clamp (740) serial number.

5 Mark the tape on each blade clamp with the corresponding blade serial number.

6 Remove the outboard clamp bolts (770) from the blade clamp (740) assembly.

7 Remove the safety wire, if applicable, from the clamp socket screws (760).

8 Remove the clamp socket screws (760) from the blade clamp (740) assembly.

CAUTION: DO NOT CLEAN THE BEARING LUBRICANT OFF THE CLAMP HALVES (740).

9 Remove the clamp halves (740).

10 Remove the blade clamp gasket (800), but do not discard.

NOTE: The blade clamp gasket will be used later in this procedure.

11 If sealant CM93 was applied to the blade clamp halves (740) and/or to the blade/blade clamp interface during assembly, remove the sealant.

a Soften the CM93 sealant using a cloth dipped stoddard solvent.

b Using a locally fabricated, plastic wedge-shaped tool, carefully scrape the CM93 sealant off the blade clamp halves and the blade shank.

CAUTION: WHEN THE BLADE IS REMOVED, THERE WILL BE LUBRICANT ON THE END OF THE BLADE AND PILOT TUBE (1430). RETAIN THE LUBRICANT.

12 Remove the blade.

13 If sealant CM46 was applied to the shoulder radius of the blade base where it contacts the blade clamp (740), remove the sealant.

a Soften the CM93 sealant using a cloth dipped stoddard solvent.

b Using a locally fabricated, plastic wedge-shaped tool, carefully scrape the CM93 sealant off the blade clamp halves and the blade shank.

14 Using a finger, carefully wipe excess lubricant from the pilot tube (1430) and the end of the blade.

a Put the lubricant back into the blade bore.

15 Put a clean plastic bag over the inboard end of each removed blade to contain the lubricant.

a Tape the plastic around the blade shank.

16 Install the previously removed blade clamp gasket to protect the blade clamp surfaces during shipping.

NOTE: A new blade clamp gasket must be installed when the propeller is reassembled after shipment.

17 Put the blade clamp (740) halves around the blade retention bearing (1250) and secure them with the clamp bolts (770), just tight enough to keep the blade clamp halves together.

CAUTION: THE BLADE THRUST SPLIT BEARING/BLADE CLAMP ASSEMBLY MUST BE KEPT FREE OF CONTAMINANTS.

18 Put a clean plastic bag over the blade retention bearing (1250)/blade clamp (740) assembly to keep it free of contaminates.

a Secure the plastic with tape.

FITS AND CLEARANCES - CONTENTS

LIST OF FIGURES

LIST OF TABLES

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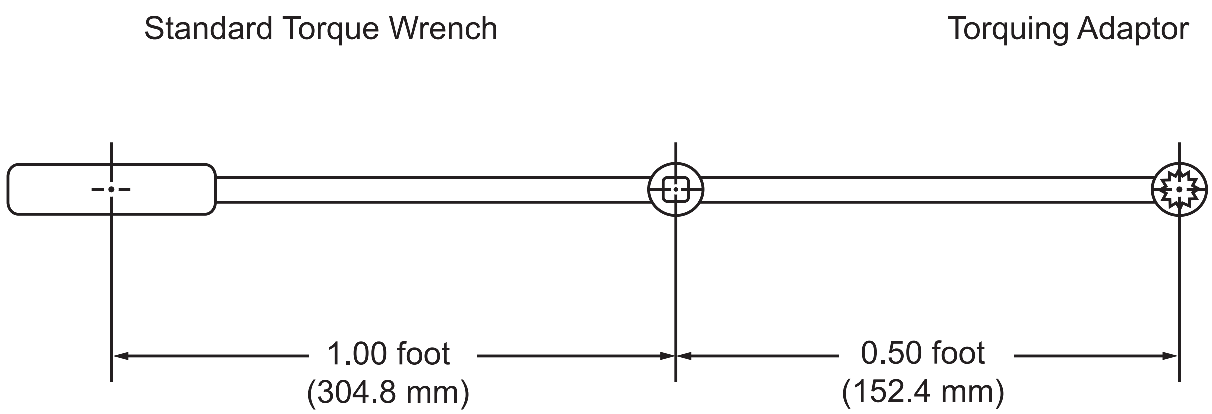


$$\frac{\text{(actual torque required) x (torque wrench length)}}{\text{(torque wrench length) + (length of adaptor)}} = \text{torque wrench reading to achieve required actual torque}$$

EXAMPLE:

$$\frac{\text{100 Ft-Lb (136 N•m) x 1 ft (304.8 mm)}}{\text{1 ft (304.8 mm) + 0.50 ft (152.4 mm)}} = \text{66.7 Ft-Lb (90 N•m)} < \text{reading on torque wrench with 6-inch (152.4 mm) adapter for actual torque of 100 Ft-Lb (136 N•m)}$$

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.

APS0212B

Calculating Torque When Using a Torque Wrench Adapter
Figure 8-1

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

1. Torque Values (Rev. 1)

A. Important Information

(1) The structural integrity of joints in the propeller that are held together with threaded fasteners is dependent upon proper torque application.

(a) Vibration can cause an incorrectly tightened fastener to fail in a matter of minutes.

(b) Correct tension in a fastener depends on a variety of known load factors and can influence fastener service life.

(c) Correct tension is achieved by application of measured torque.

(2) Use accurate wrenches and professional procedures to make sure of correct tensioning.

(3) For the torque values to use when assembling a Hartzell Propeller Inc. propeller, refer to Table 8-1, Torque Values in this chapter.

(4) When an adapter is used with a torque wrench, use the equation in Figure 8-1 to determine the correct torque value.

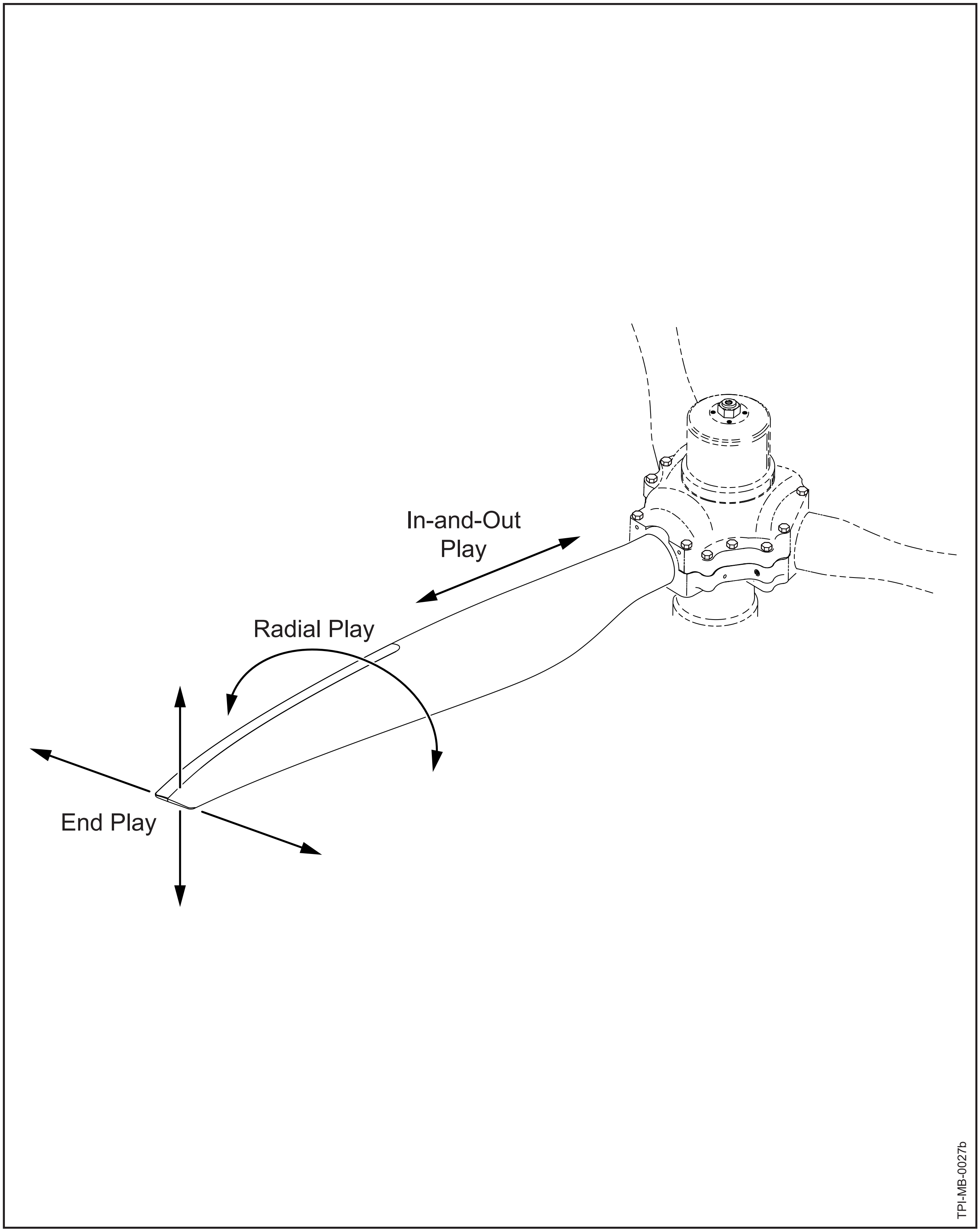
CAUTION 1: TORQUE VALUES ARE BASED ON NON-LUBRICATED THREADS, UNLESS SPECIFIED IN TABLE 8-1.

CAUTION 2: FOR TORQUE READING WHEN USING A TORQUE WRENCH ADAPTER, REFER TO FIGURE 8-1.

NOTE: Torque tolerance is ±10 percent unless otherwise noted.

Item Number	Part Number	Description/Location	Torque Ft-Lb	Torque In-Lb	Torque N•m
30	A-2051	Bolt, 5/16-24, Hex Head/Support Spinner	15	180	20
	A-2051-1	Bolt, 5/16-24, Hex Head/Support Spinner	15	180	20
	B-3385-5H	Bolt, 5/16-24, Hex Head/Support Spinner	15	180	20
100	B-3384-( )	Bolt, 1/4-28, Hex Head/Bulkhead Mounting	--	40-120	4.6-13.5
110	A-880-( )	Nut, Hex, Self-Locking, Thin/Piston	120	1440	162
610	B-4007	Cylinder	125-150	1500-1800	170-203
660	A-2038-12	Screw, 1/4-28, Cap/Guide Collar	Tighten Until Secure		
760	A-321	Screw, 3/8-24, Double 60° Head/Clamp	40	480	54
770	A-1372	Bolt, 7/16-20, 12 Point/Clamp Outer	60-65 Wet	720-780 Wet	82-88 Wet
	A-1379	Bolt, 7/16-20, 12 Point/Clamp Outer	60-65 Wet	720-780 Wet	82-88 Wet
1010	B-3359	Nut, 3/8-24, Hex, Self-Locking/Ring Rod End	12	144	16
1010A	B-3599	Nut, 3/8-24, Hex, Self-Locking/Ring Rod End	12	144	16
1110	A-3439	Nut, 3/8-24, Hex, Thin/Low Stop Collar	12	144	16
1540	B-3384-( )	Bolt, 1/4-28, Hex Head/Start Lock Mounting	--	40-120	4.6-13.5
1550	B-3384-( )	Bolt, 1/4-28, Hex Head/Start Lock Mounting	--	40-120	4.6-13.5
1560	B-3384-( )	Bolt, 1/4-28, Hex Head/Start Lock Plate	--	96-120	11-13.5
	A-2016	Bolt, 10-32, Hex Head/Start Lock Plate	--	48-72	5.5-8
Aluminum blade mounted in clamp			167	2004	226
Composite blade mounted in clamp			200	2400	271

Torque Values
Table 8-1



Blade Play
Figure 8-2

2. Blade Tolerances (Rev. 3)

A. Blade Play

(1) Limits for blade play are specified below. Refer to Figure 8-2.

(a) End Play:

Leading Edge to Trailing Edge	0.125 inch (3.17 mm) total
Fore-and-Aft (face to camber)	0.125 inch (3.17 mm) total

(b) In-and-Out Play — 0.032 inch (0.81 mm)

(c) Radial Play (pitch change) — ±0.5 degree (1 degree total) measured at reference station

(2) Blades should be tight in the propeller; however, play that is within the allowable limits is acceptable if the blade returns to its original position when released.

(a) If blade play is greater than the allowable limits, or if the blade(s) do not return to their original position when released, there may be internal wear or damage that should be referred to a certified propeller repair station with the appropriate rating.

B. Blade Track

(1) Blade Track — 0.125 inch (3.17 mm) total

C. Blade Pitch Tolerance

(1) Blade pitch setting tolerance between blades at low pitch — ±0.2 degree

3. Carbon Block Assembly

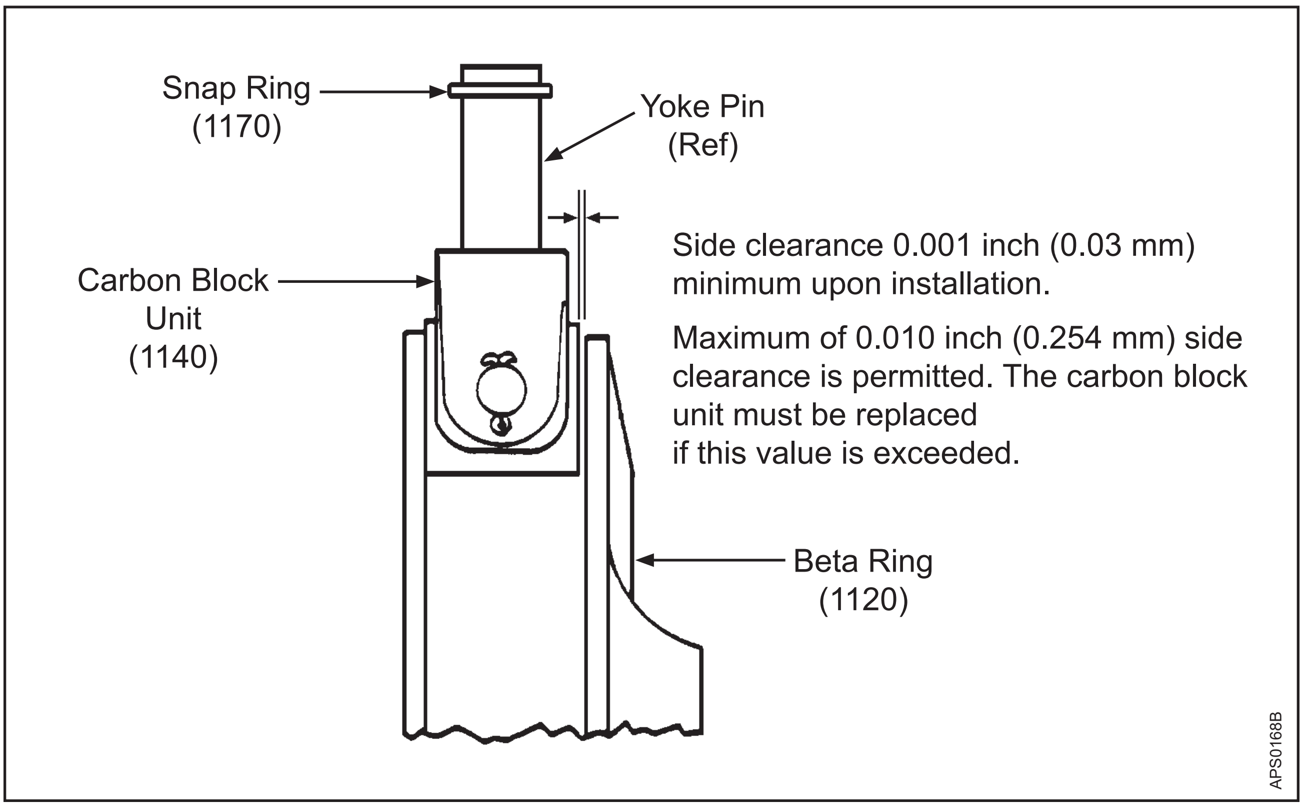
A. Clearance Between the Carbon Block Unit and the Beta Ring

(1) Examine the following clearance dimension when installing the carbon block assembly in the beta ring, and when there are unusual conditions that could create excessive wear.

(a) The carbon block unit must be replaced at overhaul.

(2) The minimum side clearance between a new carbon block unit (1140) and the beta ring (1120) when installed is 0.001 inch (0.03 mm). Refer to Figure 8-3.

(3) If the maximum side clearance between the carbon block unit and the beta ring (1120) is greater than 0.010 inch (0.25 mm), replace the carbon block unit (1140).



Carbon Block and Beta Ring Clearance
Figure 8-3

SPECIAL TOOLS, FIXTURES, AND EQUIPMENT - CONTENTS

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1. <u>Tooling and Facility Requirements</u> (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 facility 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

SUB-ASSEMBLY PARTS LISTS AND FIGURES

Spring/Feathering Spring Assemblies

Clamp Assemblies

SUB-ASSEMBLY PARTS LISTS AND FIGURES

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.

1. Introduction (Rev. 1)

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

A. General

(1) This chapter includes the parts lists and applicable illustrations for the propeller models included in this manual.

CAUTION: THE ILLUSTRATIONS IN THIS CHAPTER ARE PROVIDED FOR PART IDENTIFICATION AND LOCATION REFERENCE ONLY. THEY SHOULD NOT BE USED FOR ASSEMBLY

(a) The illustrations in this chapter use some general views of parts that may not exactly depict every propeller part configuration.

B. Counterweights/Slugs/Mounting Hardware

(1) Counterweights, counterweight slugs, and the applicable mounting hardware are application specific. Refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

C. Spinner Assemblies/Mounting Hardware

(1) Spinner assemblies and the applicable mounting hardware are application specific. Refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

D. Ice Protection System Components

(1) Ice protection systems are application specific. Refer to Hartzell Propeller Inc. Application Guide Manual 159 (61-02-59).

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

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

2. Description of Columns (Rev. 2)

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 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-assembly.

(a) For example, a Fork Assembly that is part of a HC-C2YR-1 propeller assembly will have one bullet (•) before the description. This indicates that the Fork Assembly is part of the propeller assembly.

1 A Fork Bumper that is part of the Fork Assembly will appear directly below the Fork Assembly with two bullets (• •) before the description. This indicates that the Fork Bumper is part of the Fork Assembly - that is part of the Propeller Assembly.

a Example: HC-C2YR-1
• Fork Assembly
• • Fork Bumper

(3) If the description in this column includes a "PCP:" prefix, the part is classified as a Propeller Critical Part.

(4) If applicable, information regarding part alternatives, supersedures, replacements, or obsolescence will appear in the Description column.

(a) Refer to the section, "Description of Terms" in this chapter for definitions and requirements for part "alternates", "supersedures", etc.

(b) When part alternatives, supersedures, replacements, etc. are listed, the service document number related to the change may be included for reference.

(5) If applicable, vendor CAGE codes will be listed in the Description column.

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 that require replacement 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 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 numbers 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 parts are considered unairworthy for continued flight.

4. Vendor Supplied Hardware (Rev. 1)

A. Important Information

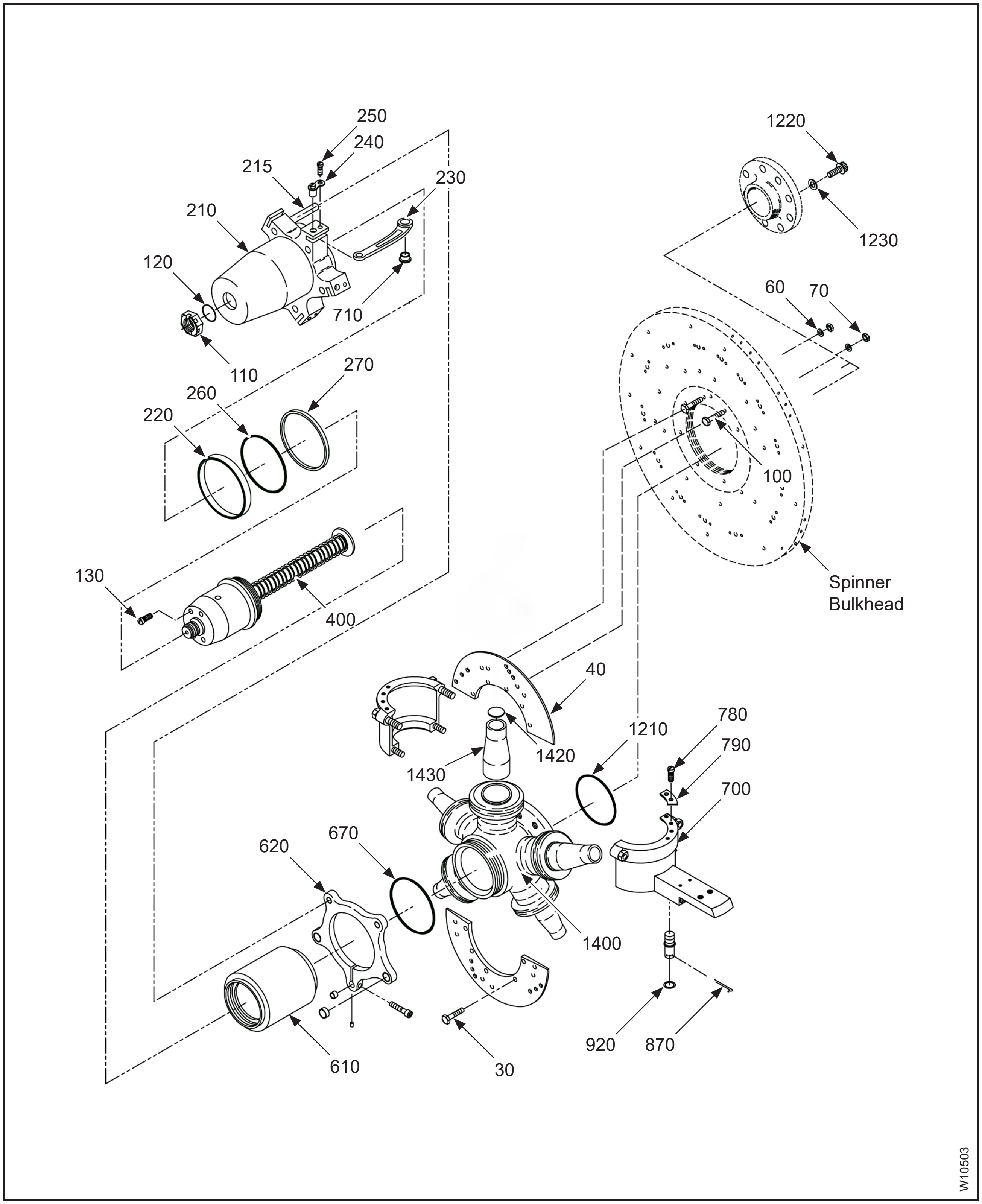
(1) Many O-rings, fasteners, and other vendor supplied hardware listed in Hartzell Propeller Inc. manuals have previously been specified with AN, MS, NAS or vendor part number. To provide internal controls and procurement flexibility, Hartzell part numbers have been assigned to all O-rings, fasteners, 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 (61-01-01).

(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-B5MA-2(A): Propeller Parts
Figure 10-1

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-1		**PROPELLER ASSEMBLY**				
30	A-2051	• BOLT, 5/16-24, HEX HEAD		10	Y	
30A	A-2051-1	• BOLT, 5/16-24, HEX HEAD, ALTERNATE FOR ITEM 30		10	Y	
40	C-3733-1	• PLATE, MOUNTING, SPINNER	A	1		
	103690	• PLATE, MOUNTING, SPINNER	B	1		
60	B-3808-4	• NUT, HEX, SELF LOCKING		10	Y	
70	B-3851-0463	• WASHER	A	20	Y	
	B-3851-0463	• WASHER	B	10	Y	
100	B-3384-5H	• BOLT, 1/4-28, HEX HEAD	A	10	Y	
	B-3384-6H	• BOLT, 1/4-28, HEX HEAD	B	10	Y	
110	A-880-2A	• NUT, HEX, SELF-LOCKING, THIN		1	Y	
120	C-3317-121	• O-RING (PITCH CHANGE ROD)		1	Y	
130	B-3840-8	• SCREW, 10-32, FILLISTER HEAD		4	Y	
210	D-3732	• PISTON UNIT, REPLACED BY ITEM 210A	A	1		
210A	D-3732-1	• PISTON UNIT, REPLACES ITEM 210		1		
215	A-817-7	• • ROD, GUIDE, PISTON		2		
220	A-862-9	• • BUSHING, PLASTIC		1		
-280	A-114-7	• • DOWEL PIN		2		
230	B-4016	• LINK ARM		5		
240	A-1464	• LINK PIN UNIT		5	Y	
250	B-3840-6	• SCREW, 10-32, FILLISTER HEAD		5	Y	
260	C-3317-429-2	• O-RING (PISTON)		1	Y	
270	B-1843	• SEAL, DUST, PISTON		1	Y	
		REFER TO THE APPLICABLE SPRING ASSEMBLY IN THE SUB-ASSEMBLY PARTS LISTS AND FIGURES SECTION FOR EXPLODED VIEW/PARTS LIST				
400	831-92	• SPRING ASSEMBLY, REPLACED BY ITEM 400A	A	RF		
400A	831-192	• FEATHERING SPRING ASSEMBLY, REPLACES ITEM 400 POST SB-61-340		RF		
610	B-4007	• PCP: CYLINDER		1		PCP
620	834-24	• GUIDE COLLAR UNIT (REFER TO "834-24 GUIDE COLLAR UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
670	C-3317-243	• O-RING (CYLINDER)		1	Y	
700	838-127	• PCP: CLAMP ASSEMBLY (REFER TO "838-127 CLAMP ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		RF		PCP
710	A-944	• SLEEVE, LINKSCREW		5	Y	
780	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		A/R	Y	
790	A-1305	• BALANCE WEIGHT		A/R		
870	B-3838-3-3	• COTTER PIN		5	Y	
920	A-6119	• BUSHING, LINK ARM		5	Y	
1210	C-3317-239-2	• O-RING (PROP MOUNTING)		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
A	HC-B5MA-2		
B	HC-B5MA-2A		

- ITEM NOT ILLUSTRATED

HC-B5MA-2(A)

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-1		**PROPELLER ASSEMBLY**				
1220	B-3347	• BOLT, MOUNTING, 9/16-18, 12 POINT		12	Y	
1230	A-2048-2	• WASHER, MOUNTING, 9/16" CSK		12	Y	
1400	840-154	• PCP: HUB UNIT		1		PCP
1420	B-3897-1	• • PLUG, EXPANSION		5	Y	
1430	B-4020-( )	• • PILOT TUBE		5		
		BLADE RETENTION PARTS				
		(REFER TO THE BLADE RETENTION PARTS IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)				
		COUNTERWEIGHT SLUGS				
-9040		• COUNTERWEIGHT SLUG APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

HC-B5MA-2(A)

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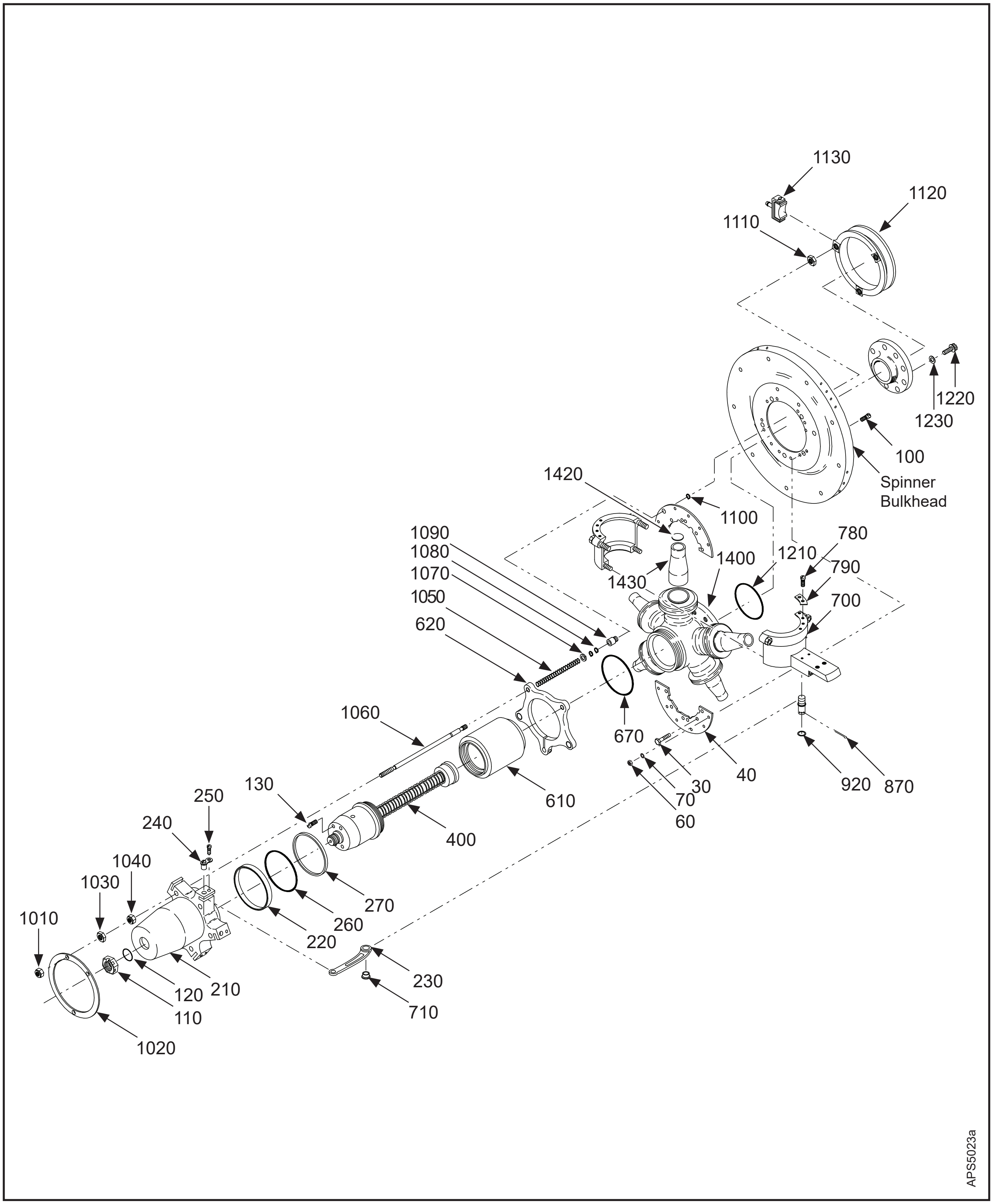

HC-B5MA-3: Propeller Parts
Figure 10-2

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-2		**PROPELLER ASSEMBLY**				
30	A-2051	• BOLT, 5/16-24, HEX HEAD		10	Y	
30A	A-2051-1	• BOLT, 5/16-24, HEX HEAD, ALTERNATE FOR ITEM 30		10	Y	
40	C-3733	• PLATE, MOUNTING, SPINNER		1		
60	H10-4	• NUT, KAYLOCK, REPLACED BY ITEM 60A		OBS		
60A	B-3808-4	• NUT, HEX, SELF-LOCKING, REPLACES ITEM 60		10	Y	
70	B-3851-0463	• WASHER		10	Y	
100	B-3384-6H	• BOLT, 1/4-28, HEX HEAD		10	Y	
110	A-880-2A	• NUT, HEX, SELF-LOCKING, THIN		1	Y	
120	C-3317-121	• O-RING (PITCH CHANGE ROD)		1	Y	
130	B-3840-8	• SCREW, 10-32, FILLISTER HEAD		4	Y	
210	D-3732	• PISTON UNIT (ALUMINUM)		1		
220	A-862-9	• • BUSHING, PLASTIC		1		
-280	A-114-7	• • DOWEL PIN		2		
-215	A-817-7	• • ROD, GUIDE, PISTON		2		
230	B-4016	• LINK ARM		5		
240	A-1464	• LINK PIN UNIT		5	Y	
250	B-3840-6	• SCREW, 10-32, FILLISTER HEAD		5	Y	
260	C-3317-429-2	• O-RING (PISTON)		1	Y	
270	B-1843	• SEAL, DUST, PISTON		1	Y	
400	831-50	• SPRING ASSEMBLY (REFER TO "831-50 SPRING ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		RF		
610	B-4007	• PCP: CYLINDER		1		PCP
620	834-24	• GUIDE COLLAR UNIT (REFER TO "834-24 GUIDE COLLAR UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
670	C-3317-243	• O-RING (CYLINDER)		1	Y	
700	838-119	• PCP: CLAMP ASSEMBLY (REFER TO "838-119 CLAMP ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		RF		PCP
710	A-944	• SLEEVE, LINKSCREW		5	Y	
870	B-3838-3-3	• COTTER PIN		5	Y	
920	A-6119	• BUSHING, LINK ARM		5	Y	
1010	B-3359	• NUT, 3/8-24, HEX, SELF-LOCKING		3	Y	
1010A	B-3599	• NUT, 3/8-24, HEX, SELF-LOCKING ALTERNATE FOR ITEM 1010, POST HC-SL-61-244		3	Y	
1020	C-2668	• RING, SUPPORT, ROD BETA		1		
1030	A-3439	• NUT, 3/8-24, HEX, THIN		3	Y	
1030A	B-3382	• NUT, 3/8-24, HEX, THIN, ALTERNATE FOR ITEM 1030		3	Y	
1040	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		3	Y	
1050	A-3099	• SPRING, COMPRESSION, BETA		3	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

HC-B5MA-3

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-2		**PROPELLER ASSEMBLY**				
1060	B-3475A-12	• ROD, BETA - UNIT		3		
-1065	B-3476A-12	• • ROD, BETA		1		
1070	A-3478-1	• • SPRING RETAINER, BETA		1		
1080	A-3482	• • RING, RETAINING, CRIMPED		2	Y	
1090	A-3067-2	• LUG, GUIDE		3		
-1095	A-3023-2	• • BUSHING, PLASTIC		1		
1100	B-3843-56ZD	• SNAP RING, EXTERNAL		3	Y	
1110	A-3439	• NUT, 3/8-24, HEX, THIN		3	Y	
1120	C-2666	• RING, BETA		1		
1130	A-3044	• BLOCK, BETA FEEDBACK - ASSEMBLY (REFER TO "A-3044 BETA FEEDBACK BLOCK ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1210	C-3317-239-2	• O-RING (PROP MOUNTING)		1	Y	
1220	B-3347	• BOLT, MOUNTING, 9/16-18, 12 POINT		12	Y	
1230	A-2048-2	• WASHER, MOUNTING, 9/16" CSK		12	Y	
1400	840-146	• PCP: HUB UNIT		1		PCP
1420	B-3897-1	• • PLUG, EXPANSION		5	Y	
1430	B-4020-( )	• • PILOT TUBE		5		
		BLADE RETENTION PARTS				
		(REFER TO THE BLADE RETENTION PARTS IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)				
		COUNTERWEIGHT SLUGS				
-9040		• COUNTERWEIGHT SLUG APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

HC-B5MA-3

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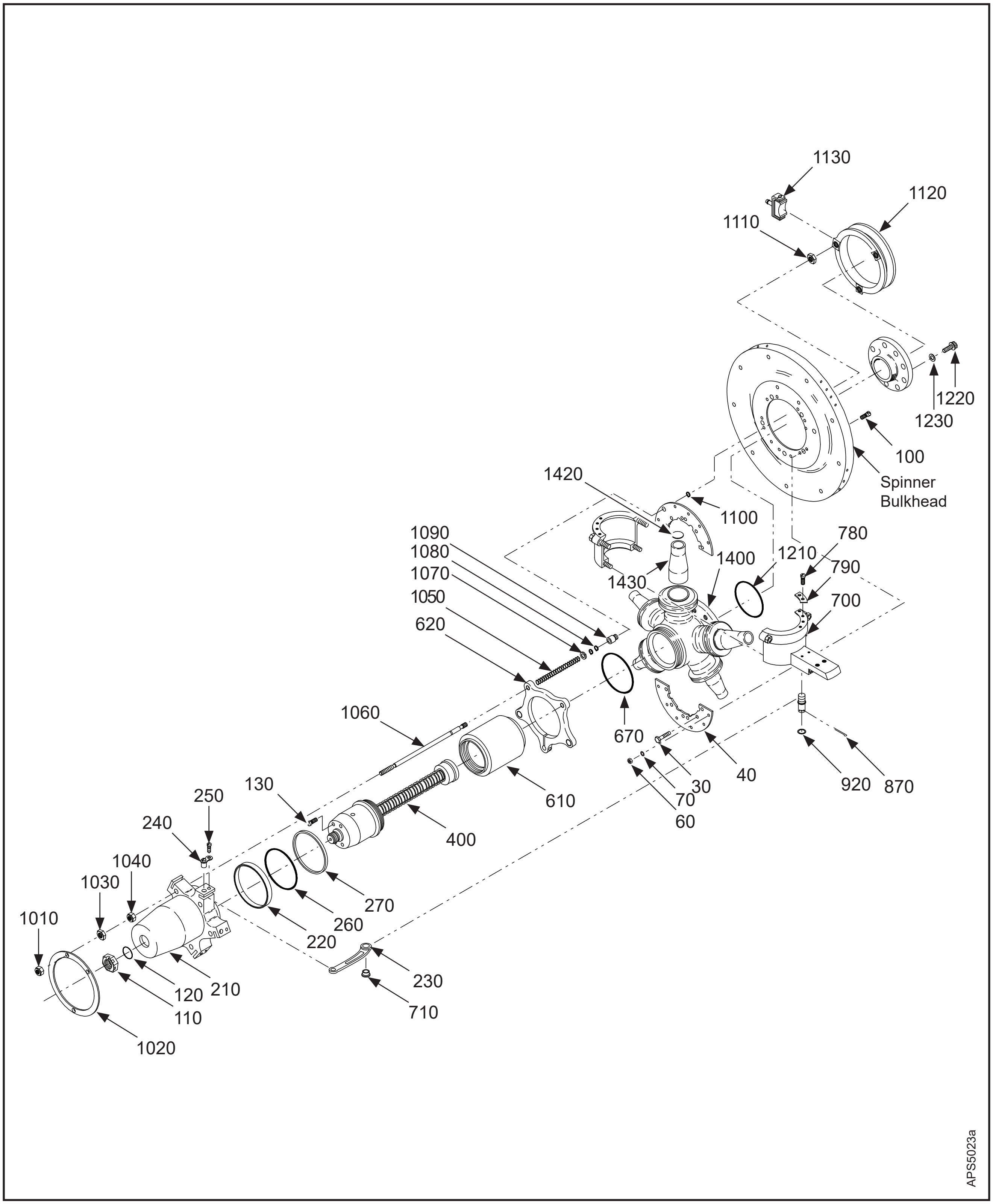

HC-B5MA-3A: Propeller Parts
Figure 10-3

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-3		**PROPELLER ASSEMBLY**				
30	A-2051	• BOLT, 5/16-24, HEX HEAD		10	Y	
30A	A-2051-1	• BOLT, 5/16-24, HEX HEAD, ALTERNATE FOR ITEM 30		10	Y	
40	C-3733	• PLATE, MOUNTING, SPINNER		1		
60	H10-4	• NUT, KAYLOCK, REPLACED BY ITEM 60A		OBS		
60A	B-3808-4	• NUT, HEX, SELF-LOCKING, REPLACES ITEM 60		10	Y	
70	B-3851-0463	• WASHER		10	Y	
100	B-3384-6H	• BOLT, 1/4-28, HEX HEAD		10	Y	
100A	B-3384-5H	• BOLT, 1/4-28, HEX HEAD, ALTERNATE FOR ITEM 100		10	Y	
100B	B-3384-4	• BOLT, 1/4-28, HEX HEAD, ALTERNATE FOR ITEM 100		10	Y	
110	A-880-2A	• NUT, HEX, SELF-LOCKING, THIN		1	Y	
120	C-3317-121	• O-RING (PITCH CHANGE ROD)		1	Y	
130	B-3840-8	• SCREW, 10-32, FILLISTER HEAD		4	Y	
210	D-3732	• PISTON UNIT (ALUMINUM)		1		
220	A-862-9	• • BUSHING, PLASTIC		1		
-280	A-114-7	• • DOWEL PIN		2		
-215	A-817-7	• • ROD, GUIDE, PISTON		2		
230	B-4016	• LINK ARM		5		
240	A-1464	• LINK PIN UNIT		5	Y	
250	B-3840-6	• SCREW, 10-32, FILLISTER HEAD		5	Y	
260	C-3317-429-2	• O-RING (PISTON)		1	Y	
270	B-1843	• SEAL, DUST, PISTON		1	Y	
400	831-50	• SPRING ASSEMBLY (REFER TO "831-50 SPRING ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		RF		
610	B-4007	• PCP: CYLINDER		1		PCP
620	834-24	• GUIDE COLLAR UNIT (REFER TO "834-24 GUIDE COLLAR UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
670	C-3317-243	• O-RING (CYLINDER)		1	Y	
700	838-119	• PCP: CLAMP ASSEMBLY (REFER TO "838-119 CLAMP ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		RF		PCP
710	A-944	• SLEEVE, LINKSCREW		5	Y	
870	B-3838-3-3	• COTTER PIN		5	Y	
920	A-6119	• BUSHING, LINK ARM		5	Y	
1010	B-3359	• NUT, 3/8-24, HEX, SELF-LOCKING		3	Y	
1010A	B-3599	• NUT, 3/8-24, HEX, SELF-LOCKING ALTERNATE FOR ITEM 1010, POST HC-SL-61-244		3	Y	
1020	C-2668	• RING, SUPPORT, ROD BETA		1		
1030	A-3439	• NUT, 3/8-24, HEX, THIN		3	Y	
1030A	B-3382	• NUT, 3/8-24, HEX, THIN, ALTERNATE FOR ITEM 1030		3	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

HC-B5MA-3A

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-3		**PROPELLER ASSEMBLY**				
1040	A-2043	• NUT, 3/8-24, HEX, SELF-LOCKING SUPERSEDED BY ITEM 1040A		3		
1040A	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING, SUPERSEDES ITEM 1040		3	Y	
1050	A-3099	• SPRING, COMPRESSION, BETA		3	Y	
1060	B-3475A-12	• ROD, BETA - UNIT		3		
-1065	B-3476A-12	• • ROD, BETA		1		
1070	A-3478-1	• • SPRING RETAINER, BETA		1		
1080	A-3482	• • RING, RETAINING, CRIMPED		2	Y	
1090	A-3067-2	• LUG, GUIDE		3		
-1095	A-3023-2	• • BUSHING, PLASTIC		1		
1100	B-3843-56ZD	• SNAP RING, EXTERNAL		3	Y	
1110	A-3439	• NUT, 3/8-24, HEX, THIN		3	Y	
1120	C-2666	• RING, BETA		1		
1130	A-3044	• BLOCK, BETA FEEDBACK - ASSEMBLY (REFER TO "A-3044 BETA FEEDBACK BLOCK ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1210	C-3317-239-2	• O-RING (PROP MOUNTING)		1	Y	
1220	B-3347	• BOLT, MOUNTING, 9/16-18, 12 POINT		12	Y	
1230	A-2048-2	• WASHER, MOUNTING, 9/16" CSK		12	Y	
1400	840-146	• PCP: HUB UNIT		1		PCP
1420	B-3897-1	• • PLUG, EXPANSION		5	Y	
1430	B-4020-( )	• • PILOT TUBE		5		
		BLADE RETENTION PARTS				
		(REFER TO THE BLADE RETENTION PARTS IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)				
		COUNTERWEIGHT SLUGS				
-9040		• COUNTERWEIGHT SLUG APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

HC-B5MA-3A

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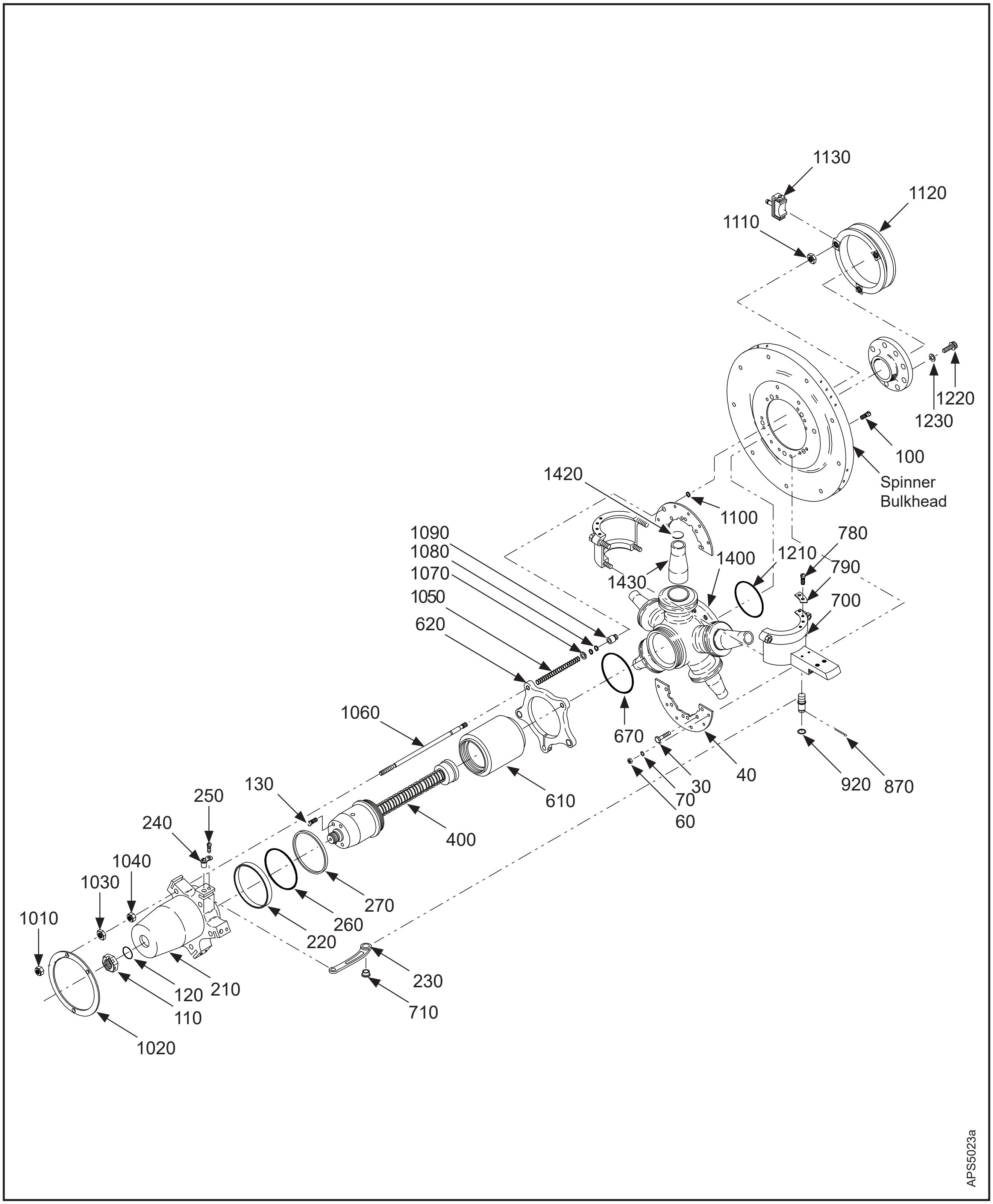

HC-B5MA-3B, -3C, -3D, -3J, -3M: Propeller Parts
Figure 10-4

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-4		**PROPELLER ASSEMBLY**				
30	A-2051	• BOLT, 5/16-24, HEX HEAD		10	Y	
30A	A-2051-1	• BOLT, 5/16-24, HEX HEAD, ALTERNATE FOR ITEM 30		10	Y	
40	C-3733	• PLATE, MOUNTING, SPINNER		1		
60	H10-4	• NUT, KAYLOCK, REPLACED BY ITEM 60A		OBS		
60A	B-3808-4	• NUT, HEX, SELF-LOCKING, REPLACES ITEM 60		10	Y	
70	B-3851-0463	• WASHER		10	Y	
100	B-3384-6H	• BOLT, 1/4-28, HEX HEAD		10	Y	
100A	B-3384-5H	• BOLT, 1/4-28, HEX HEAD, ALTERNATE FOR ITEM 100		10	Y	
100B	B-3384-4	• BOLT, 1/4-28, HEX HEAD, ALTERNATE FOR ITEM 100		10	Y	
110	A-880-2A	• NUT, HEX, SELF-LOCKING, THIN		1	Y	
120	C-3317-121	• O-RING (PITCH CHANGE ROD)		1	Y	
130	B-3840-8	• SCREW, 10-32, FILLISTER HEAD		4	Y	
210	D-3732	• PISTON UNIT (ALUMINUM)		1		
220	A-862-9	• • BUSHING, PLASTIC		1		
-280	A-114-7	• • DOWEL PIN		2		
-215	A-817-7	• • ROD, GUIDE, PISTON		2		
230	B-4016	• LINK ARM		5		
240	A-1464	• LINK PIN UNIT		5	Y	
250	B-3840-6	• SCREW, 10-32, FILLISTER HEAD		5	Y	
260	C-3317-429-2	• O-RING (PISTON)		1	Y	
270	B-1843	• SEAL, DUST, PISTON		1	Y	
400	831-50	• SPRING ASSEMBLY (REFER TO "831-50 SPRING ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		RF		
610	B-4007	• PCP: CYLINDER		1		PCP
620	834-24	• GUIDE COLLAR UNIT (REFER TO "834-24 GUIDE COLLAR UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
670	C-3317-243	• O-RING (CYLINDER)		1	Y	
		REFER TO THE APPLICABLE CLAMP ASSEMBLY IN THE SUB-ASSEMBLY PARTS LISTS AND FIGURES SECTION FOR EXPLODED VIEW/PARTS LIST				
700	838-119	• PCP: CLAMP ASSEMBLY	-3B, -3C, -3D, -3M	RF		PCP
	838-107	• PCP: CLAMP ASSEMBLY	-3J	RF		PCP
710	A-944	• SLEEVE, LINKSCREW		5	Y	
870	B-3838-3-3	• COTTER PIN		5	Y	
920	A-6119	• BUSHING, LINK ARM		5	Y	
1010	B-3359	• NUT, 3/8-24, HEX, SELF-LOCKING		3	Y	
1010A	B-3599	• NUT, 3/8-24, HEX, SELF-LOCKING ALTERNATE FOR ITEM 1010, POST HC-SL-61-244		3	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
-3B	HC-B5MA-3B	-3J	HC-B5MA-3J
-3C	HC-B5MA-3C	-3M	HC-B5MA-3M
-3D	HC-B5MA-3D		

- ITEM NOT ILLUSTRATED

HC-B5MA-3B, -3C, -3D, -3J, -3M

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-4		**PROPELLER ASSEMBLY**				
1020	C-2668	• RING, SUPPORT, ROD BETA		1		
1030	A-3439	• NUT, 3/8-24, HEX, THIN		3	Y	
1030A	B-3382	• NUT, 3/8-24, HEX, THIN, ALTERNATE FOR ITEM 1030		3	Y	
1040	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		3	Y	
1050	A-3099	• SPRING, COMPRESSION, BETA		3	Y	
1060	B-3475A-12	• ROD, BETA - UNIT		3		
-1065	B-3476A-12	• • ROD, BETA		1		
1070	A-3478-1	• • SPRING RETAINER, BETA		1		
1080	A-3482	• • RING, RETAINING, CRIMPED		2	Y	
1090	A-3067-2	• LUG, GUIDE		3		
-1095	A-3023-2	• • BUSHING, PLASTIC		1		
1100	B-3843-56ZD	• SNAP RING, EXTERNAL		3	Y	
1110	A-3439	• NUT, 3/8-24, HEX, THIN		3	Y	
1120	C-2666	• RING, BETA		1		
1130	A-3044	• BLOCK, BETA FEEDBACK - ASSEMBLY (REFER TO "A-3044 BETA FEEDBACK BLOCK ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1210	C-3317-239-2	• O-RING (PROP MOUNTING)		1	Y	
1220	B-3347	• BOLT, MOUNTING, 9/16-18, 12 POINT		12	Y	
1230	A-2048-2	• WASHER, MOUNTING, 9/16" CSK		12	Y	
1400	840-146	• PCP: HUB UNIT		1		PCP
1420	B-3897-1	• • PLUG, EXPANSION		5	Y	
1430	B-4020-( )	• • PILOT TUBE		5		
		BLADE RETENTION PARTS				
		(REFER TO THE BLADE RETENTION PARTS IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)				
		COUNTERWEIGHT SLUGS				
-9040		• COUNTERWEIGHT SLUG APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

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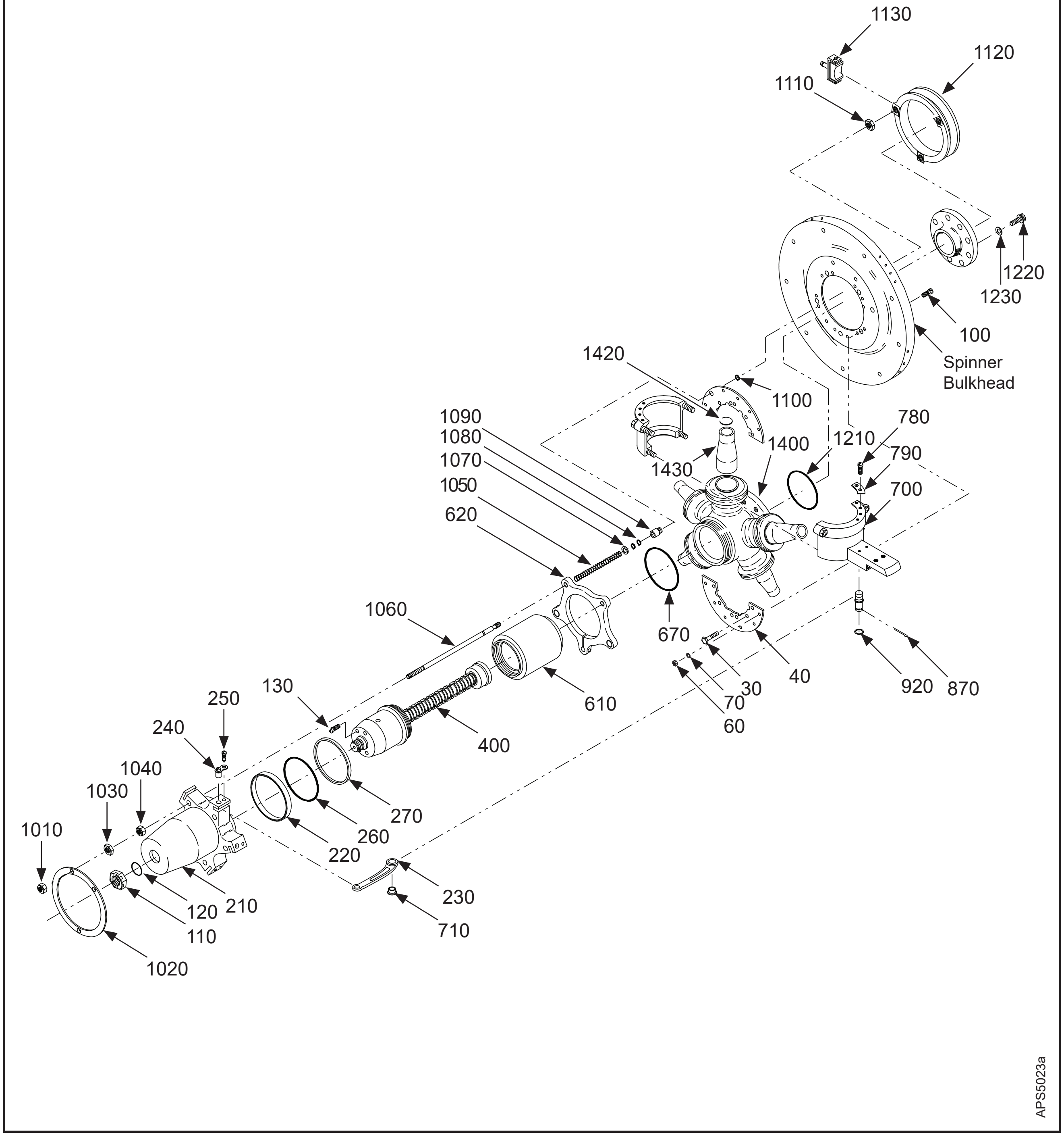

HC-B5MA-3D(A,T): Propeller Parts
Figure 10-5

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-5		**PROPELLER ASSEMBLY**				
30	A-2051	• BOLT, 5/16-24, HEX HEAD		10	Y	
30A	A-2051-1	• BOLT, 5/16-24, HEX HEAD, ALTERNATE FOR ITEM 30		10	Y	
40	C-3733	• PLATE, MOUNTING, SPINNER		1		
60	H10-4	• NUT, KAYLOCK, REPLACED BY ITEM 60A		OBS		
60A	B-3808-4	• NUT, HEX, SELF-LOCKING, REPLACES ITEM 60		10	Y	
70	B-3851-0463	• WASHER		10	Y	
100	B-3384-6H	• BOLT, 1/4-28, HEX HEAD		10	Y	
100A	B-3384-5H	• BOLT, 1/4-28, HEX HEAD, ALTERNATE FOR ITEM 100		10	Y	
100B	B-3384-4	• BOLT, 1/4-28, HEX HEAD, ALTERNATE FOR ITEM 100		10	Y	
110	A-880-2A	• NUT, HEX, SELF-LOCKING, THIN		1	Y	
120	C-3317-121	• O-RING (PITCH CHANGE ROD)		1	Y	
130	B-3840-8	• SCREW, 10-32, FILLISTER HEAD		4	Y	
210	100460 D-3732	• PISTON UNIT (TITANIUM) • PISTON UNIT (ALUMINUM)	-3DT -3DA	1 1		
-215	A-817-7	• • ROD, GUIDE, PISTON		2		
220	A-862-9	• • BUSHING, PLASTIC		1		
-280	A-114-7	• • DOWEL PIN		2		
230	B-4016	• LINK ARM		5		
240	A-1464	• LINK PIN UNIT		5	Y	
250	B-3840-6	• SCREW, 10-32, FILLISTER HEAD		5	Y	
260	C-3317-429-2	• O-RING (PISTON)		1	Y	
270	B-1843	• SEAL, DUST, PISTON		1	Y	
		REFER TO THE APPLICABLE SPRING ASSEMBLY IN THE SUB-ASSEMBLY PARTS LISTS AND FIGURES SECTION FOR EXPLODED VIEW/PARTS LIST				
400	831-50 831-50-1	• SPRING ASSEMBLY • SPRING ASSEMBLY	-3DT -3DA	RF RF		
610	B-4007	• PCP: CYLINDER		1		PCP
620	834-24	• GUIDE COLLAR UNIT (REFER TO "834-24 GUIDE COLLAR UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
670	C-3317-243	• O-RING (CYLINDER)		1	Y	
700	838-119	• PCP: CLAMP ASSEMBLY (REFER TO "838-119 CLAMP ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		RF		PCP
710	A-944	• SLEEVE, LINKSCREW		5	Y	
870	B-3838-3-3	• COTTER PIN		5	Y	
920	A-6119	• BUSHING, LINK ARM		5	Y	
1010	B-3359	• NUT, 3/8-24, HEX, SELF-LOCKING		3	Y	
1010A	B-3599	• NUT, 3/8-24, HEX, SELF-LOCKING ALTERNATE FOR ITEM 1010, POST HC-SL-61-244		3	Y	
1020	C-2668	• RING, SUPPORT, ROD BETA		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
-3DA	HC-B5MA-3DA		
-3DT	HC-B5MA-3DT		

- ITEM NOT ILLUSTRATED

HC-B5MA-3D(A,T)

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-5		**PROPELLER ASSEMBLY**				
1030	A-3439	• NUT, 3/8-24, HEX, THIN		3	Y	
1030A	B-3382	• NUT, 3/8-24, HEX, THIN, ALTERNATE FOR ITEM 1030		3	Y	
1040	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		3	Y	
1050	A-3099	• SPRING, COMPRESSION, BETA		3	Y	
1060	B-3475A-12	• ROD, BETA - UNIT		3		
-1065	B-3476A-12	• • ROD, BETA		1		
1070	A-3478-1	• • SPRING RETAINER, BETA		1		
1080	A-3482	• • RING, RETAINING, CRIMPED		2	Y	
1090	A-3067-2	• LUG, GUIDE		3		
-1095	A-3023-2	• • BUSHING, PLASTIC		1		
1100	B-3843-56ZD	• SNAP RING, EXTERNAL		3	Y	
1110	A-3439	• NUT, 3/8-24, HEX, THIN		3	Y	
1120	C-2666	• RING, BETA		1		
1130	A-3044	• BLOCK, BETA FEEDBACK - ASSEMBLY (REFER TO "A-3044 BETA FEEDBACK BLOCK ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
1210	C-3317-239-2	• O-RING (PROP MOUNTING)		1	Y	
1220	B-3347	• BOLT, MOUNTING, 9/16-18, 12 POINT		12	Y	
1230	A-2048-2	• WASHER, MOUNTING, 9/16" CSK		12	Y	
1400	840-146	• PCP: HUB UNIT		1		PCP
1420	B-3897-1	• • PLUG, EXPANSION		5	Y	
1430	B-4020-( )	• • PILOT TUBE		5		
		BLADE RETENTION PARTS (REFER TO THE BLADE RETENTION PARTS IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)				
		COUNTERWEIGHT SLUGS				
-9040		• COUNTERWEIGHT SLUG APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

HC-B5MA-3D(A,T)

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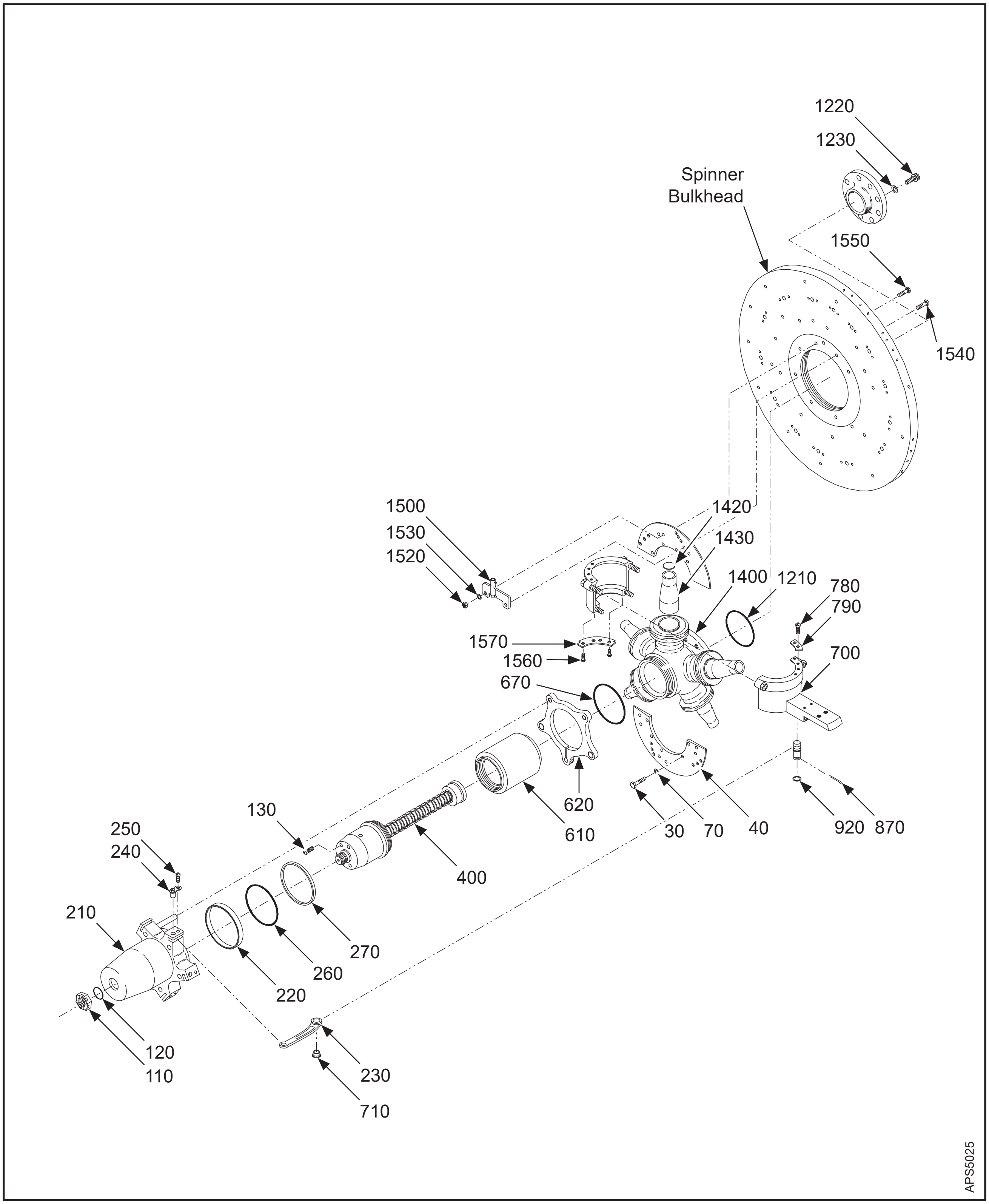

HC-B5MA-5A, -5H, -5HT: Propeller Parts
Figure 10-6

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-6		**PROPELLER ASSEMBLY**				
30	B-3385-5H	• BOLT, 5/16-24, HEX HEAD		10	Y	
40	C-6070	• PLATE, MOUNTING, SPINNER		1		
70	B-3851-0532	• WASHER		10	Y	
110	A-880-2A	• NUT, HEX, SELF-LOCKING, THIN		1	Y	
120	C-3317-121	• O-RING		1	Y	
130	B-3840-8	• SCREW, 10-32, FILLISTER HEAD		4	Y	
210	D-3732	• PISTON UNIT	-5A,-5H	1		
	100460	• PISTON UNIT	-5HT	1		
215	A-817-7	• • ROD, GUIDE, PISTON		2		
220	A-862-9	• • BUSHING, PLASTIC		1		
-280	A-114-7	• • DOWEL PIN		2		
230	B-4016	• LINK ARM		5		
240	A-1464	• LINK PIN UNIT		5	Y	
250	B-3840-6	• SCREW, 10-32, FILLISTER HEAD		5	Y	
260	C-3317-429-2	• O-RING		1	Y	
270	B-1843	• SEAL, DUST, PISTON (CUT TO LENGTH)		1	Y	
		REFER TO THE APPLICABLE SPRING ASSEMBLY IN THE SUB-ASSEMBLY PARTS LISTS AND FIGURES SECTION FOR EXPLODED VIEW/PARTS LIST				
400	831-61	• SPRING ASSEMBLY, REPLACED BY ITEM 400A	-5A, -5H	1		
400A	831-96	• SPRING ASSEMBLY, REPLACES ITEM 400	-5A	1		
	831-95	• SPRING ASSEMBLY, REPLACES ITEM 400	-5H, -5HT	1		
610	B-4007	• PCP: CYLINDER		1		PCP
620	834-24	• GUIDE COLLAR UNIT (REFER TO "834-24 GUIDE COLLAR UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
670	C-3317-243	• O-RING		1	Y	
700	838-121	• PCP: CLAMP ASSEMBLY (REFER TO "838-121 CLAMP ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		PCP
710	A-944	• SLEEVE, LINKSCREW		1	Y	
780	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
790	A-1305	• BALANCE WEIGHT		AR		
870	B-3838-3-3	• COTTER PIN		5	Y	
920	A-6119	• BUSHING, LINK ARM		5	Y	
1210	C-3317-239-2	• O-RING		1	Y	
1220	B-3347	• BOLT, MOUNTING, 9/16-18, 12 POINT		12	Y	
1230	A-2048-2	• WASHER, MOUNTING, 9/16" CSK		12	Y	
1400	840-146	• PCP: HUB UNIT		1		PCP
1420	HP-1125-A81	• • PLUG, EXPANSION, REPLACED BY ITEM 1420A		OBS	Y	
1420A	B-3897-1	• • PLUG, EXPANSION, REPLACES ITEM 1420		5	Y	
1430	B-4020-( )	• • PILOT TUBE		5		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
-5A	HC-B5MA-5A		
-5H	HC-B5MA-5H		
-5HT	HC-B5MA-5HT		

- ITEM NOT ILLUSTRATED

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-6		**PROPELLER ASSEMBLY**				
1500	830-40	• START LOCK - ASSEMBLY (REFER TO "830-40 START LOCK ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1520	H10-4	• NUT, HEX, SELF-LOCKING, REPLACED BY ITEM 1520A		OBS	Y	
1520A	B-3808-4	• NUT, HEX, SELF-LOCKING, REPLACES ITEM 1520		10	Y	
1530	B-3851-0463	• WASHER		10	Y	
1540	B-3384-12H	• BOLT, 1/4-28, HEX HEAD	-5H,-5HT	5	Y	
	B-3384-16H	• BOLT, 1/4-28, HEX HEAD	-5A	5	Y	
1550	B-3384-17H	• BOLT, 1/4-28, HEX HEAD	-5H, 5HT	5	Y	
	B-3384-21H	• BOLT, 1/4-28, HEX HEAD	-5A	5	Y	
1560	B-3384-1H	• BOLT, 1/4-28, HEX HEAD		10	Y	
1570	C-6073	• PLATE, START LOCK	-5A	5		
	C-6073-1	• PLATE, START LOCK	-5H,-5HT	5		
		BLADE RETENTION PARTS (REFER TO THE BLADE RETENTION PARTS IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)				
		COUNTERWEIGHT SLUGS				
-9040		• COUNTERWEIGHT SLUG APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
-5A	HC-B5MA-5A		
-5H	HC-B5MA-5H		
-5HT	HC-B5MA-5HT		

- ITEM NOT ILLUSTRATED

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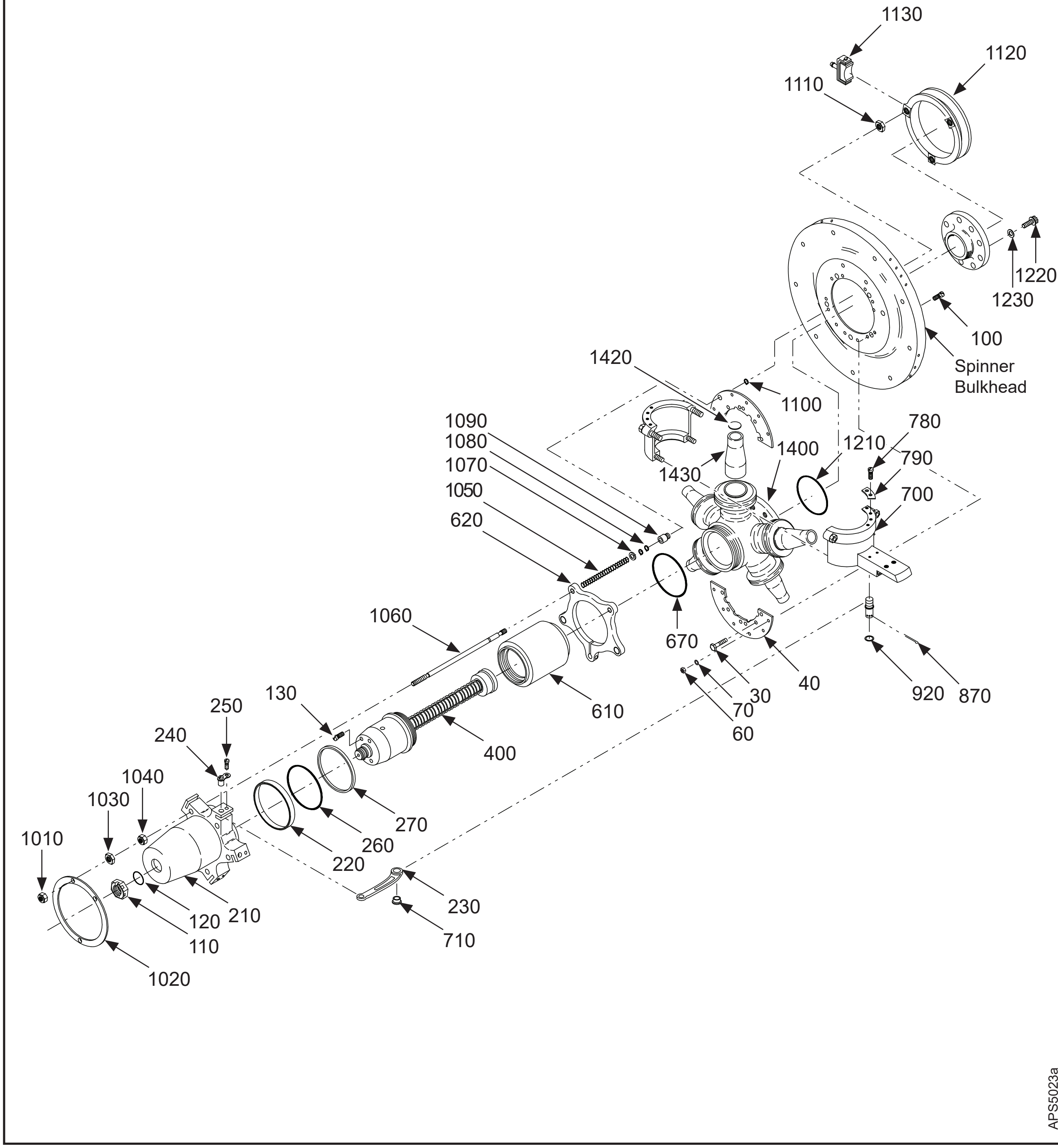

HC-B5MP-3A, -3C, -3D, -3F: Propeller Parts
Figure 10-7

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-7		**PROPELLER ASSEMBLY**				
30	A-2051	• BOLT, 5/16-24, HEX HEAD		10	Y	
30A	A-2051-1	• BOLT, 5/16-24, HEX HEAD, ALTERNATE FOR ITEM 30		10	Y	
40	C-4011-1	• PLATE, MOUNTING, SPINNER		1		
60	H10-4	• KAYLOCK HEXAGON NUT, REPLACED BY ITEM 60A		OBS		
60A	B-3808-4	• NUT, HEX, SELF-LOCKING, REPLACES ITEM 60		10	Y	
70	B-3851-0463	• WASHER		10	Y	
100	B-3384-6H	• BOLT, 1/4-28, HEX HEAD		10	Y	
110	A-880-2A	• NUT, HEX, SELF-LOCKING, THIN		1	Y	
120	C-3317-121	• O-RING (PITCH CHANGE ROD)		1	Y	
130	B-3840-8	• SCREW, 10-32, FILLISTER HEAD		4	Y	
-200	832-39	• PISTON ASSEMBLY		1		
210	D-4006-2	• • PISTON UNIT		1		
220	A-862-9	• • BUSHING, PLASTIC		1		
230	B-4016	• LINK ARM		5		
240	A-1464	• LINK PIN UNIT		5	Y	
250	B-3840-6	• SCREW, 10-32, FILLISTER HEAD		5	Y	
260	C-3317-429-2	• O-RING (PISTON)		1	Y	
270	B-1843-2	• SEAL, DUST, PISTON, SUPERSEDED BY ITEM 270A		1	Y	
270A	B-1843	• SEAL, DUST, PISTON, SUPERSEDES ITEM 270		1	Y	
400	831-50	• SPRING ASSEMBLY (REFER TO "831-50 SPRING ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
610	B-4007	• PCP: CYLINDER		1		PCP
620	834-19	• GUIDE COLLAR UNIT (REFER TO "834-19 GUIDE COLLAR UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
670	C-3317-243	• O-RING (CYLINDER)		1	Y	
		REFER TO THE APPLICABLE CLAMP ASSEMBLY IN THE SUB-ASSEMBLY PARTS LISTS AND FIGURES SECTION FOR EXPLODED VIEW/PARTS LIST				
700	838-87 838-107 838-119	• PCP: CLAMP ASSEMBLY • PCP: CLAMP ASSEMBLY • PCP: CLAMP ASSEMBLY	-3A -3C,-3D -3F	4 4 4		PCP PCP PCP
710	A-944	• SLEEVE, LINKSCREW		1	Y	
780	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
790	A-1305	• BALANCE WEIGHT		AR		
870	B-3838-3-3	• COTTER PIN		1	Y	
920	A-6119	• BUSHING, LINK ARM		1	Y	
1010	B-3359	• NUT, 3/8-24, HEX, SELF-LOCKING		3	Y	
1010A	B-3599	• NUT, 3/8-24, HEX, SELF-LOCKING ALTERNATE FOR ITEM 1010, POST HC-SL-61-244		3	Y	
1020	C-4013	• RING, SUPPORT, ROD, BETA		1		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
-3A	HC-B5MP-3A		
-3C	HC-B5MP-3C		
-3D	HC-B5MP-3D		
-3F	HC-B5MP-3F		

- ITEM NOT ILLUSTRATED

HC-B5MP-3A, -3C, -3D, -3F

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-7		**PROPELLER ASSEMBLY**				
1030	A-3439	• NUT, 3/8-24, HEX, THIN		3	Y	
1040	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		3	Y	
1050	A-3099	• SPRING, COMPRESSION, BETA		3	Y	
1060	B-3475A-3	• ROD, BETA-UNIT		3		
1070	A-3478-1	• SPRING RETAINER, BETA		1		
1080	A-3482	• RING, RETAINING, CRIMPED		2	Y	
1090	A-3067-2	• LUG, GUIDE		3		
-1095	A-3023-2	• • BUSHING, PLASTIC		1		
1100	5100-56	• TRUARC SNAP RING, REPLACED BY ITEM 1100A		OBS		
1100A	B-3843-56ZD	• SNAP RING, EXTERNAL, REPLACES ITEM 1100		3	Y	
1110	A-3439	• NUT, 3/8-24, HEX, THIN		3	Y	
1120	C-4019-1	• RING, BETA		1		
1130	A-3044	• BLOCK, BETA FEEDBACK - ASSEMBLY (REFER TO "A-3044 BETA FEEDBACK BLOCK ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		2		
-1190	REF	• BETA LINKAGE (REFER TO ENGINE MANUFACTURER'S INSTRUCTION MANUAL)		2		
1210	C-3317-230	• O-RING (PROP MOUNTING)		1	Y	
-1215	101058	• SHIM, PROPELLER MOUNTING, POST HC-SB-61-275	A	1		
1220	B-3339	• BOLT, MOUNTING, 9/16-18, 12 POINT		8	Y	
1230	A-2048-2	• WASHER, MOUNTING, 9/16" CSK		8	Y	
1400	D-4005	• PCP: HUB UNIT, REPLACED BY ITEM 1400A		OBS		PCP
1400A	840-118	• PCP: HUB UNIT, REPLACES ITEM 1400		1		PCP
1420	HP-1125-A81	• • PLUG, EXPANSION, REPLACED BY ITEM 1420A		OBS	Y	
1420A	B-3897-1	• • PLUG, EXPANSION, REPLACES ITEM 1420		5	Y	
1430	B-4020-( )	• • PILOT TUBE		5		
		BLADE RETENTION PARTS (REFER TO THE BLADE RETENTION PARTS IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)				
		COUNTERWEIGHT SLUGS				
-9040		• COUNTERWEIGHT SLUG APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
		A	PROPELLER MOUNTING SHIM IS APPLICATION SPECIFIC. REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59).

- ITEM NOT ILLUSTRATED

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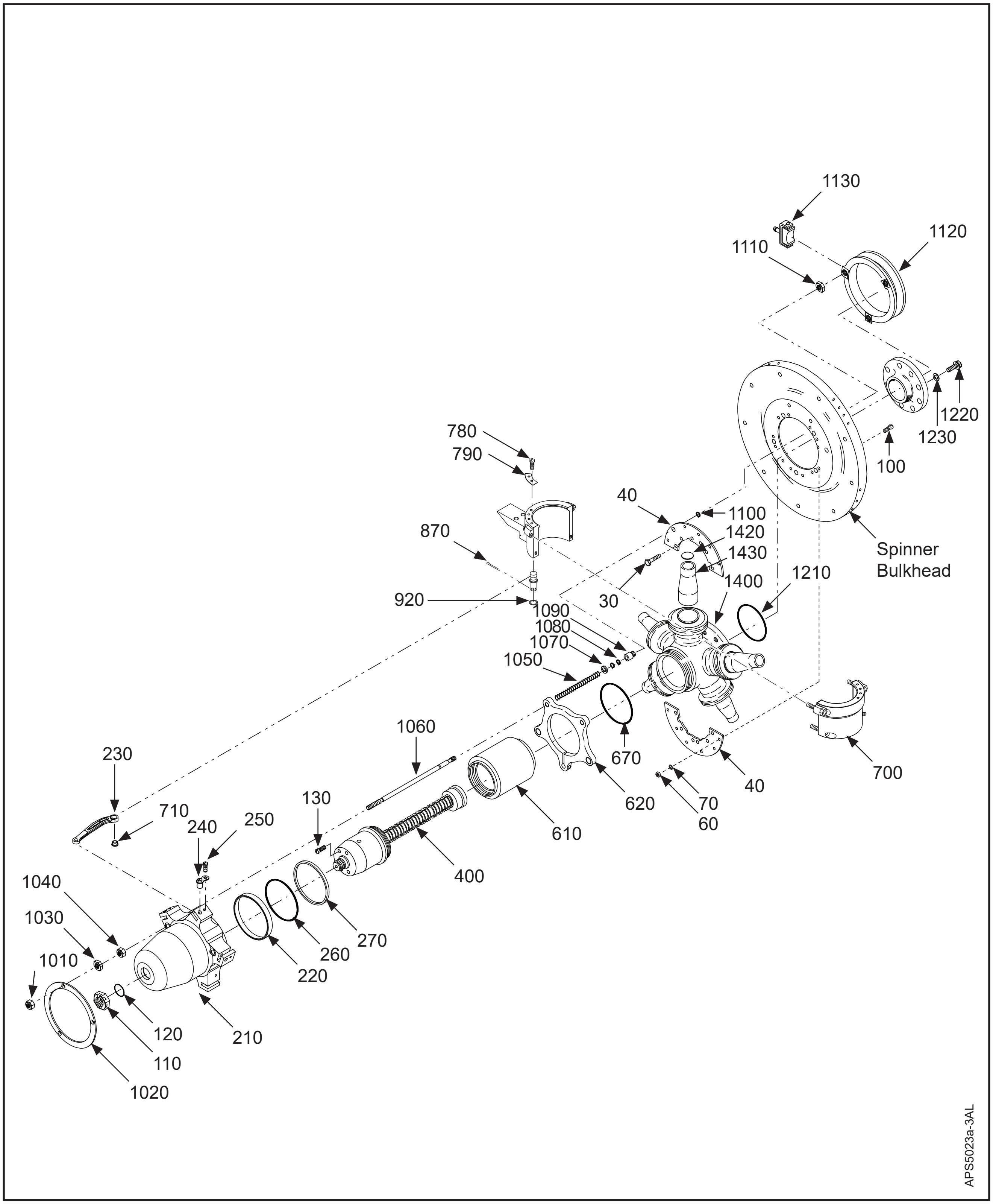

HC-B5MP-3AL: Propeller Parts
Figure 10-8

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-8		PROPELLER ASSEMBLY				
30	A-2051	• BOLT, 5/16-24, HEX HEAD		10	Y	
30A	A-2051-1	• BOLT, 5/16-24, HEX HEAD, ALTERNATE FOR ITEM 30		10	Y	
40	C-4011-1	• PLATE, MOUNTING, SPINNER		1		
60	H10-4	• KAYLOCK HEXAGON NUT, REPLACED BY ITEM 60A		OBS		
60A	B-3808-4	• NUT, HEX, SELF-LOCKING, REPLACES ITEM 60		10	Y	
70	B-3851-0463	• WASHER		10	Y	
100	B-3384-6H	• BOLT, 1/4-28, HEX HEAD		10	Y	
110	A-880-2A	• NUT, HEX, SELF-LOCKING, THIN		1	Y	
120	C-3317-121	• O-RING (PITCH CHANGE ROD)		1	Y	
130	B-3840-8	• SCREW, 10-32, FILLISTER HEAD		4	Y	
-200	832-39L	• PISTON ASSEMBLY		1		
210	D-4006-2L	• • PISTON UNIT		1		
220	A-862-9	• • BUSHING, PLASTIC		1		
230	B-4016L	• LINK ARM		5		
240	A-1464	• LINK PIN UNIT		5	Y	
250	B-3840-6	• SCREW, 10-32, FILLISTER HEAD		5	Y	
260	C-3317-429-2	• O-RING (PISTON)		1	Y	
270	B-1843-2	• SEAL, DUST, PISTON, SUPERSEDED BY ITEM 270A		1	Y	
270A	B-1843	• SEAL, DUST, PISTON, SUPERSEDES ITEM 270		1	Y	
400	831-50	• SPRING ASSEMBLY (REFER TO "831-50 SPRING ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
610	B-4007	• PCP: CYLINDER		1		PCP
620	834-19	• GUIDE COLLAR UNIT (REFER TO "834-19 GUIDE COLLAR UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
670	C-3317-243	• O-RING (CYLINDER)		1	Y	
700	838-87L	• PCP: CLAMP ASSEMBLY (REFER TO "838-87L CLAMP ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		4		PCP
710	A-944	• SLEEVE, LINKSCREW		1	Y	
780	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
790	A-1305	• BALANCE WEIGHT		AR		
870	B-3838-3-3	• COTTER PIN		1	Y	
920	A-6119	• BUSHING, LINK ARM		1	Y	
1010	B-3359	• NUT, 3/8-24, HEX, SELF-LOCKING		3	Y	
1010A	B-3599	• NUT, 3/8-24, HEX, SELF-LOCKING ALTERNATE FOR ITEM 1010, POST HC-SL-61-244		3	Y	
1020	C-4013	• RING, SUPPORT, ROD, BETA		1		
1030	A-3439	• NUT, 3/8-24, HEX, THIN		3	Y	
1040	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		3	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

HC-B5MP-3AL

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-8		**PROPELLER ASSEMBLY**				
1050	A-3099	• SPRING, COMPRESSION, BETA		3	Y	
1060	B-3475A-3	• ROD, BETA-UNIT		3		
1070	A-3478-1	• SPRING RETAINER, BETA		1		
1080	A-3482	• RING, RETAINING, CRIMPED		2	Y	
1090	A-3067-2	• LUG, GUIDE		3		
-1095	A-3023-2	• • BUSHING, PLASTIC		1		
1100	5100-56	• TRUARC SNAP RING, REPLACED BY ITEM 1100A		OBS		
1100A	B-3843-56ZD	• SNAP RING, EXTERNAL, REPLACES ITEM 1100		3	Y	
1110	A-3439	• NUT, 3/8-24, HEX, THIN		3	Y	
1120	C-4019-1	• RING, BETA		1		
1130	A-3044	• BLOCK, BETA FEEDBACK - ASSEMBLY (REFER TO "A-3044 BETA FEEDBACK BLOCK ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		2		
-1190	REF	• BETA LINKAGE (REFER TO ENGINE MANUFACTURER'S INSTRUCTION MANUAL)		2		
1210	C-3317-230	• O-RING (PROP MOUNTING)		1	Y	
1215	101058	• SHIM, PROPELLER MOUNTING, POST HC-SB-61-275	A	1		
1220	B-3339	• BOLT, MOUNTING, 9/16-18, 12 POINT		8	Y	
1230	A-2048-2	• WASHER, MOUNTING, 9/16" CSK		8	Y	
1400	D-4005	• PCP: HUB UNIT, REPLACED BY ITEM 1400A		OBS		PCP
1400A	840-118	• PCP: HUB UNIT, REPLACES ITEM 1400		1		PCP
1420	HP-1125-A81	• • PLUG, EXPANSION, REPLACED BY ITEM 1420A		OBS	Y	
1420A	B-3897-1	• • PLUG, EXPANSION, REPLACES ITEM 1420		5	Y	
1430	B-4020-( )	• • PILOT TUBE		5		
		BLADE RETENTION PARTS (REFER TO THE BLADE RETENTION PARTS IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)				
		COUNTERWEIGHT SLUGS				
-9040		• COUNTERWEIGHT SLUG APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
		A	PROPELLER MOUNTING SHIM IS APPLICATION SPECIFIC. REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59).

- ITEM NOT ILLUSTRATED

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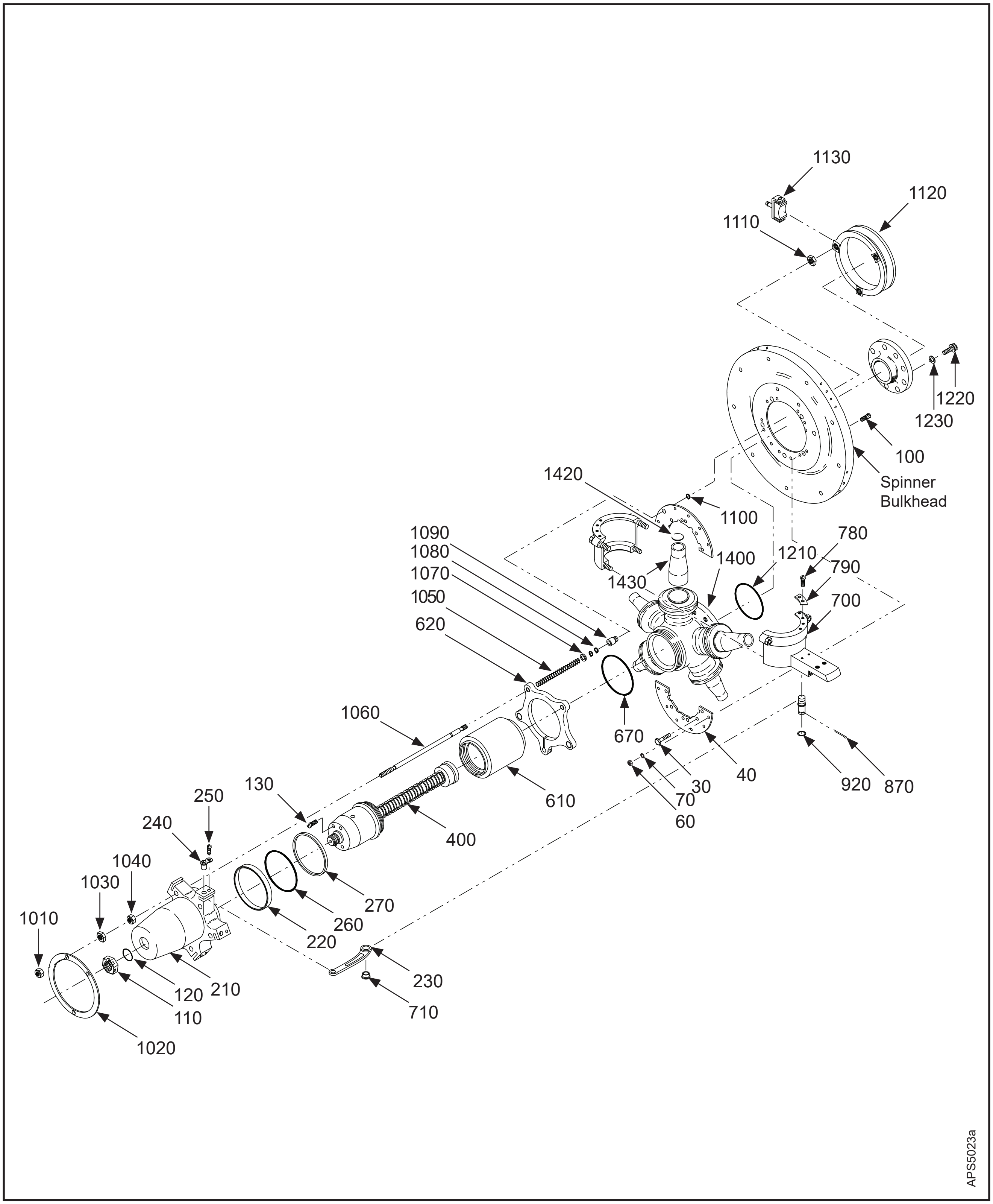

HC-B5MP-3G: Propeller Parts
Figure 10-9

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-9		**PROPELLER ASSEMBLY**				
30	A-2051	• BOLT, 5/16-24, HEX HEAD		10	Y	
30A	A-2051-1	• BOLT, 5/16-24, HEX HEAD, ALTERNATE FOR ITEM 30		10	Y	
40	C-4011-1	• PLATE, MOUNTING, SPINNER		1		
60	H10-4	• KAYLOCK HEXAGON NUT, REPLACED BY ITEM 60A		OBS		
60A	B-3808-4	• NUT, HEX, SELF-LOCKING, REPLACES ITEM 60		10	Y	
70	B-3851-0463	• WASHER		10	Y	
100	B-3384-6H	• BOLT, 1/4-28, HEX HEAD		10	Y	
110	A-880-2A	• NUT, HEX, SELF-LOCKING, THIN		1	Y	
120A	C-3317-121-2	• O-RING (PITCH CHANGE ROD)		1	Y	
130	B-3840-8	• SCREW, 10-32, FILLISTER HEAD		4	Y	
-200	832-39	• PISTON ASSEMBLY		1		
210	D-4006-2	• • PISTON UNIT		1		
220	A-862-9	• • BUSHING, PLASTIC		1		
230	B-4016	• LINK ARM		5		
240	A-1464	• LINK PIN UNIT		5	Y	
250	B-3840-6	• SCREW, 10-32, FILLISTER HEAD		5	Y	
260	C-3317-429-2	• O-RING (PISTON)		1	Y	
270	B-1843-2	• SEAL, DUST, PISTON, SUPERSEDED BY ITEM 270A		1	Y	
270A	B-1843	• SEAL, DUST, PISTON, SUPERSEDES ITEM 270		1	Y	
400	831-50	• SPRING ASSEMBLY (REFER TO "831-50 SPRING ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
610	B-4007	• PCP: CYLINDER		1		PCP
620	834-19	• GUIDE COLLAR UNIT (REFER TO "834-19 GUIDE COLLAR UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
670	C-3317-243-2	• O-RING (CYLINDER)		1	Y	
700	838-107	• PCP: CLAMP ASSEMBLY (REFER TO "838-107 CLAMP ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		4		PCP
710	A-944	• SLEEVE, LINKSCREW		1	Y	
780	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
790	A-1305	• BALANCE WEIGHT		AR		
870	B-3838-3-3	• COTTER PIN		1	Y	
920	A-6119	• BUSHING, LINK ARM		1	Y	
1010	B-3359	• NUT, 3/8-24, HEX, SELF-LOCKING		3	Y	
1010A	B-3599	• NUT, 3/8-24, HEX, SELF-LOCKING ALTERNATE FOR ITEM 1010, POST HC-SL-61-244		3	Y	
1020	C-4013	• RING, SUPPORT, ROD, BETA		1		
1030	A-3439	• NUT, 3/8-24, HEX, THIN		3	Y	
1040	A-2043-1	• NUT, 3/8-24, HEX, SELF-LOCKING		3	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

HC-B5MP-3G

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-9		**PROPELLER ASSEMBLY**				
1050	A-3099	• SPRING, COMPRESSION, BETA		3	Y	
1060	B-3475A-3	• ROD, BETA-UNIT		3		
1070	A-3478-1	• SPRING RETAINER, BETA		1		
1080	A-3482	• RING, RETAINING, CRIMPED		2	Y	
1090	A-3067-2	• LUG, GUIDE		3		
-1095	A-3023-2	• • BUSHING, PLASTIC		1		
1100	5100-56	• TRUARC SNAP RING, REPLACED BY ITEM 1100A		OBS		
1100A	B-3843-56ZD	• SNAP RING, EXTERNAL, REPLACES ITEM 1100		3	Y	
1110	A-3439	• NUT, 3/8-24, HEX, THIN		3	Y	
1120	C-4019-1	• RING, BETA		1		
1130	A-3044	• BLOCK, BETA FEEDBACK - ASSEMBLY (REFER TO "A-3044 BETA FEEDBACK BLOCK ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		2		
-1190	REF	• BETA LINKAGE (REFER TO ENGINE MANUFACTURER'S INSTRUCTION MANUAL)		2		
1210	C-3317-230-2	• O-RING (PROP MOUNTING)		1	Y	
-1215	101058	• SHIM, PROPELLER MOUNTING, POST HC-SB-61-275	A	1		
1220	B-3339	• BOLT, MOUNTING, 9/16-18, 12 POINT		8	Y	
1230	A-2048-2	• WASHER, MOUNTING, 9/16" CSK		8	Y	
1400	D-4005	• PCP: HUB UNIT, REPLACED BY ITEM 1400A		OBS		PCP
1400A	840-118	• PCP: HUB UNIT, REPLACES ITEM 1400		1		PCP
1420	HP-1125-A81	• • PLUG, EXPANSION, REPLACED BY ITEM 1420A		OBS	Y	
1420A	B-3897-1	• • PLUG, EXPANSION, REPLACES ITEM 1420		5	Y	
1430	B-4020-( )	• • PILOT TUBE		5		
		BLADE RETENTION PARTS (REFER TO THE BLADE RETENTION PARTS IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)				
		COUNTERWEIGHT SLUGS				
-9040		• COUNTERWEIGHT SLUG APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
		A	PROPELLER MOUNTING SHIM IS APPLICATION SPECIFIC. REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59).

- ITEM NOT ILLUSTRATED

HC-B5MP-3G

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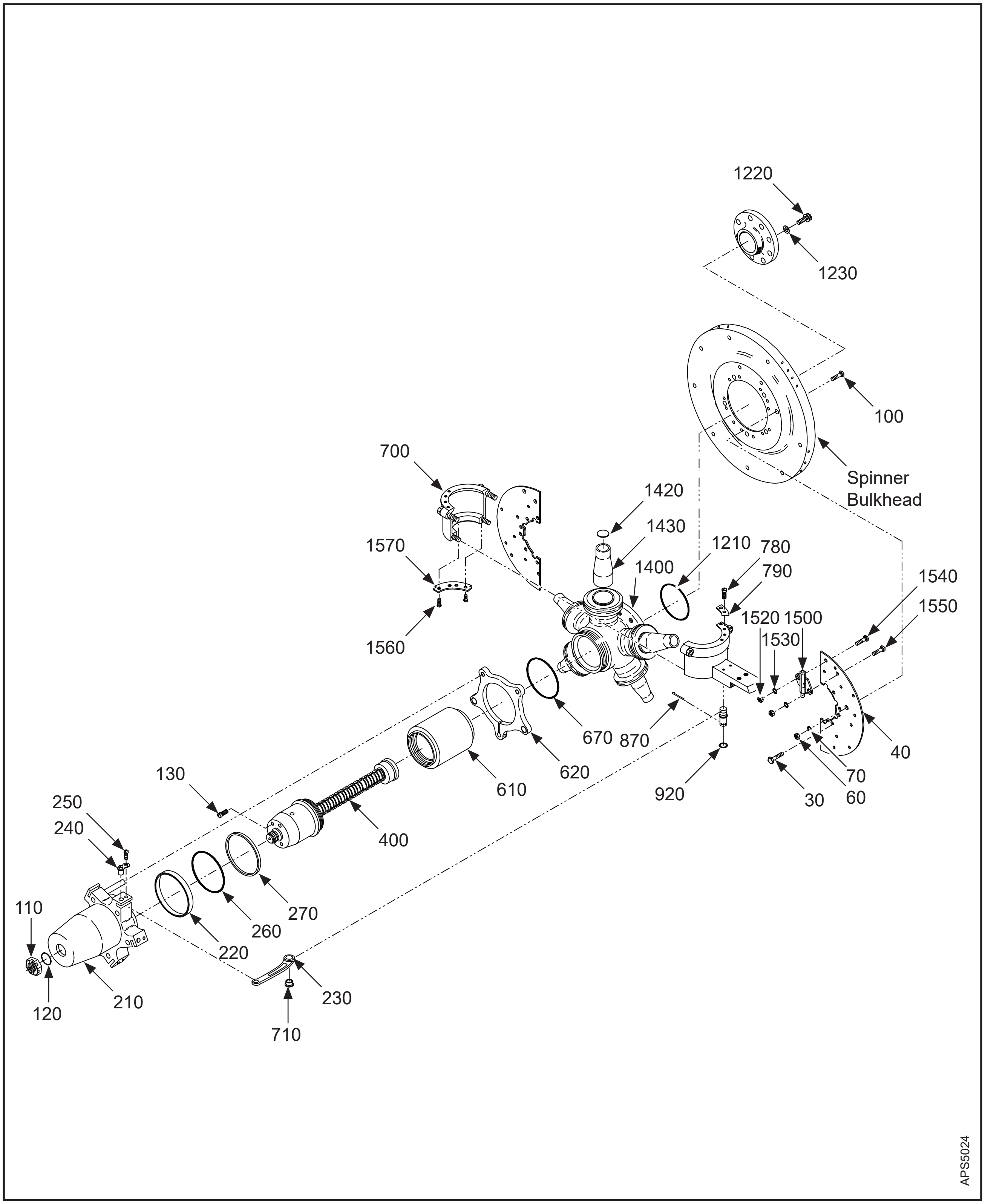

HC-B5MP-5: Propeller Parts
Figure 10-10

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-10		**PROPELLER ASSEMBLY**				
30	A-2051	• BOLT, 5/16-24, HEX HEAD, ALTERNATE FOR ITEM 30A		10	Y	
30A	A-2051-1	• BOLT, 5/16-24, HEX HEAD		10	Y	
40	C-1652-2	• PLATE, MOUNTING, SPINNER		1		
60	H10-4	• NUT, KAYLOCK, REPLACED BY ITEM 60A		OBS	Y	
60A	B-3808-4	• NUT, HEX, SELF-LOCKING, REPLACES ITEM 60		10	Y	
70	B-3851-0463	• WASHER		10	Y	
100	B-3384-7	• BOLT, SHEAR-HEXAGON HEAD, REPLACED BY ITEM 100A		10	Y	
100A	B-3384-7H	• BOLT, 1/4-28, HEX HEAD, REPLACES ITEM 100		10	Y	
110	A-880-2A	• NUT, HEX, SELF-LOCKING, THIN		1	Y	
120	C-3317-121	• O-RING		1	Y	
130	B-3840-8	• SCREW, 10-32, FILLISTER HEAD		4	Y	
210	D-4006-2	• PISTON UNIT		1		
220	A-862-9	• • BUSHING, PLASTIC		1		
230	B-4016	• LINK ARM		5		
240	A-1464	• LINK PIN UNIT		5	Y	
250	B-3840-6	• SCREW, 10-32, FILLISTER HEAD		5	Y	
260	C-3317-429-2	• O-RING		1	Y	
270	B-1843-2	• SEAL, DUST, PISTON, SUPERSEDED BY ITEM 270A		1	Y	
270A	B-1843	• SEAL, DUST, PISTON, SUPERSEDES ITEM 270		1	Y	
		REFER TO THE APPLICABLE SPRING ASSEMBLY IN THE SUB-ASSEMBLY PARTS LISTS AND FIGURES SECTION FOR EXPLODED VIEW/PARTS LIST				
400	831-61	• SPRING ASSEMBLY, REPLACED BY ITEM 400A		1		
400A	831-95	• SPRING ASSEMBLY, REPLACES ITEM 400		1		
610	B-4007	• PCP: CYLINDER		1		PCP
620	834-19	• GUIDE COLLAR UNIT (REFER TO "834-19 GUIDE COLLAR UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
670	C-3317-243	• O-RING		1	Y	
700	838-115	• PCP: CLAMP ASSEMBLY (REFER TO "838-115 CLAMP ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		PCP
710	A-944	• SLEEVE, LINKSCREW		1	Y	
780	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
790	A-1305	• BALANCE WEIGHT		AR		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

HC-B5MP-5

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-10		**PROPELLER ASSEMBLY**				
870	B-3838-3-3	• COTTER PIN		1	Y	
920	A-6119	• BUSHING, LINK ARM		1	Y	
1210	C-3317-230	• O-RING		1	Y	
1220	B-3339-1	• BOLT, MOUNTING, 9/16-18, 12 POINT		8	Y	
1230	A-2048-2	• WASHER, MOUNTING, 9/16" CSK		8	Y	
1400	D-4005	• PCP: HUB UNIT, REPLACED BY ITEM 1400		OBS		PCP
1400A	840-118	• PCP: HUB UNIT, REPLACES ITEM 1400A		1		PCP
1420	HP-1125-A81	• • PLUG, EXPANSION, REPLACED BY ITEM 1420A		OBS	Y	
1420A	B-3897-1	• • PLUG, EXPANSION, REPLACES ITEM 1420		5	Y	
1430	B-4020-( )	• • PILOT TUBE		5		
1500	830-38	• START LOCK - ASSEMBLY (REFER TO "830-38 START LOCK ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1520	B-3808-4	• NUT, HEX, SELF-LOCKING		10	Y	
1530	B-3851-0463	• WASHER		10	Y	
1540	B-3384-3	• BOLT, SHEAR HEXAGON HEAD, REPLACED BY ITEM 1540A		5	Y	
1540A	B-3384-3H	• BOLT, 1/4-28, HEX HEAD, REPLACES ITEM 1540		5	Y	
1550	B-3384-5	• BOLT, SHEAR HEXAGON HEAD, REPLACED BY ITEM 1550A		5	Y	
1550A	B-3384-5H	• BOLT, 1/4-28, HEX HEAD, REPLACES ITEM 1550		5	Y	
1560	A-2016	• BOLT, 10-32, HEX HEAD		2	Y	
1570	A-3419-6	• PLATE, START LOCK		1		
		BLADE RETENTION PARTS (REFER TO THE BLADE RETENTION PARTS IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)				
		COUNTERWEIGHT SLUGS				
-9040		• COUNTERWEIGHT SLUG APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

HC-B5MP-5

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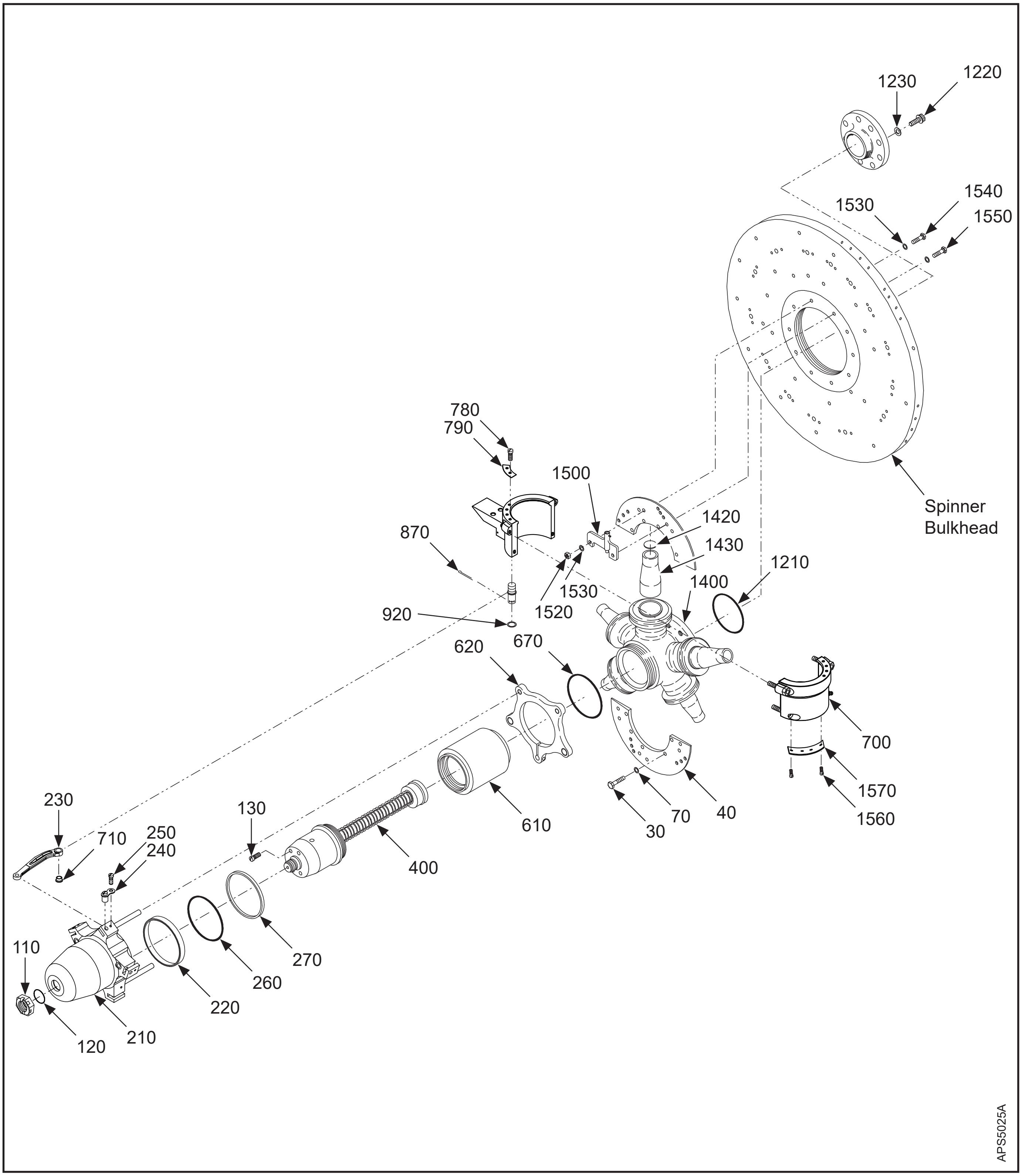

HC-B5MP-5BL: Propeller Parts
Figure 10-11

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-11		PROPELLER ASSEMBLY				
30	A-2051	• BOLT, 5/16-24, HEX HEAD, SUPERSEDED BY ITEM 30A		10	Y	
30A	B-3385-5H	• BOLT, 5/16-24, HEX HEAD, SUPERSEDES ITEM 30		10	Y	
40	C-6959L	• PLATE, MOUNTING, SPINNER		1		
70	B-3851-0532	• WASHER (INSTALL UNDER ITEM 30)		10	Y	
110	A-880-2A	• NUT, HEX, SELF-LOCKING, THIN		1	Y	
120	C-3317-121	• O-RING		1	Y	
130	B-3840-8	• SCREW, 10-32, FILLISTER HEAD		4	Y	
210	D-4006-2L	• PISTON UNIT		1		
220	A-862-9	• • BUSHING, PLASTIC		1		
230	B-4016L	• LINK ARM		5		
240	A-1464	• LINK PIN UNIT		5	Y	
250	B-3840-6	• SCREW, 10-32, FILLISTER HEAD		5	Y	
260	C-3317-429-2	• O-RING		1	Y	
270	B-1843	• SEAL, DUST, PISTON		1	Y	
400	831-93	• SPRING ASSEMBLY (REFER TO "831-93 SPRING ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
610	B-4007	• PCP: CYLINDER		1		PCP
620	834-19	• GUIDE COLLAR UNIT (REFER TO "834-19 GUIDE COLLAR UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
670	C-3317-243	• O-RING (CYLINDER)		1	Y	
700	838-123L	• PCP: CLAMP ASSEMBLY (REFER TO "838-123L CLAMP ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		PCP
710	A-944	• SLEEVE, LINKSCREW		1	Y	
780	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
790	A-1305	• BALANCE WEIGHT		AR		
870	B-3838-3-3	• COTTER PIN		1	Y	
920	A-6119	• BUSHING, LINK ARM		1	Y	
1210	C-3317-230	• O-RING		1	Y	
1220	B-3339-1	• BOLT, MOUNTING, 9/16-18, 12 POINT		8	Y	
1230	A-2048-2	• WASHER, MOUNTING, 9/16" CSK		8	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

HC-B5MP-5BL

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-11		**PROPELLER ASSEMBLY**				
1400	D-4005	• PCP: HUB UNIT, REPLACED BY ITEM 1400		OBS		PCP
1400A	840-118	• PCP: HUB UNIT, REPLACES ITEM 1400A		1		PCP
1420	HP-1125-A81	• • PLUG, EXPANSION, REPLACED BY ITEM 1420A		OBS	Y	
1420A	B-3897-1	• • PLUG, EXPANSION, REPLACES ITEM 1420		5	Y	
1430	B-4020-( )	• • PILOT TUBE		5		
1500	830-40L	• START LOCK, LH - ASSEMBLY (REFER TO "830-40L START LOCK ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1520	B-3808-4	• NUT, HEX, SELF-LOCKING		10	Y	
1530	B-3851-0463	• WASHER		20	Y	
1540	B-3384-12H	• BOLT, 1/4-28, HEX HEAD		5	Y	
1550	B-3384-16H	• BOLT, 1/4-28, HEX HEAD		5	Y	
1560	B-3384-1H	• BOLT, 1/4-28, HEX HEAD		10	Y	
1570	C-6960L	• PLATE, START LOCK		5		
		BLADE RETENTION PARTS				
		(REFER TO THE BLADE RETENTION PARTS IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)				
		COUNTERWEIGHT SLUGS				
-9040		• COUNTERWEIGHT SLUG APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

HC-B5MP-5BL

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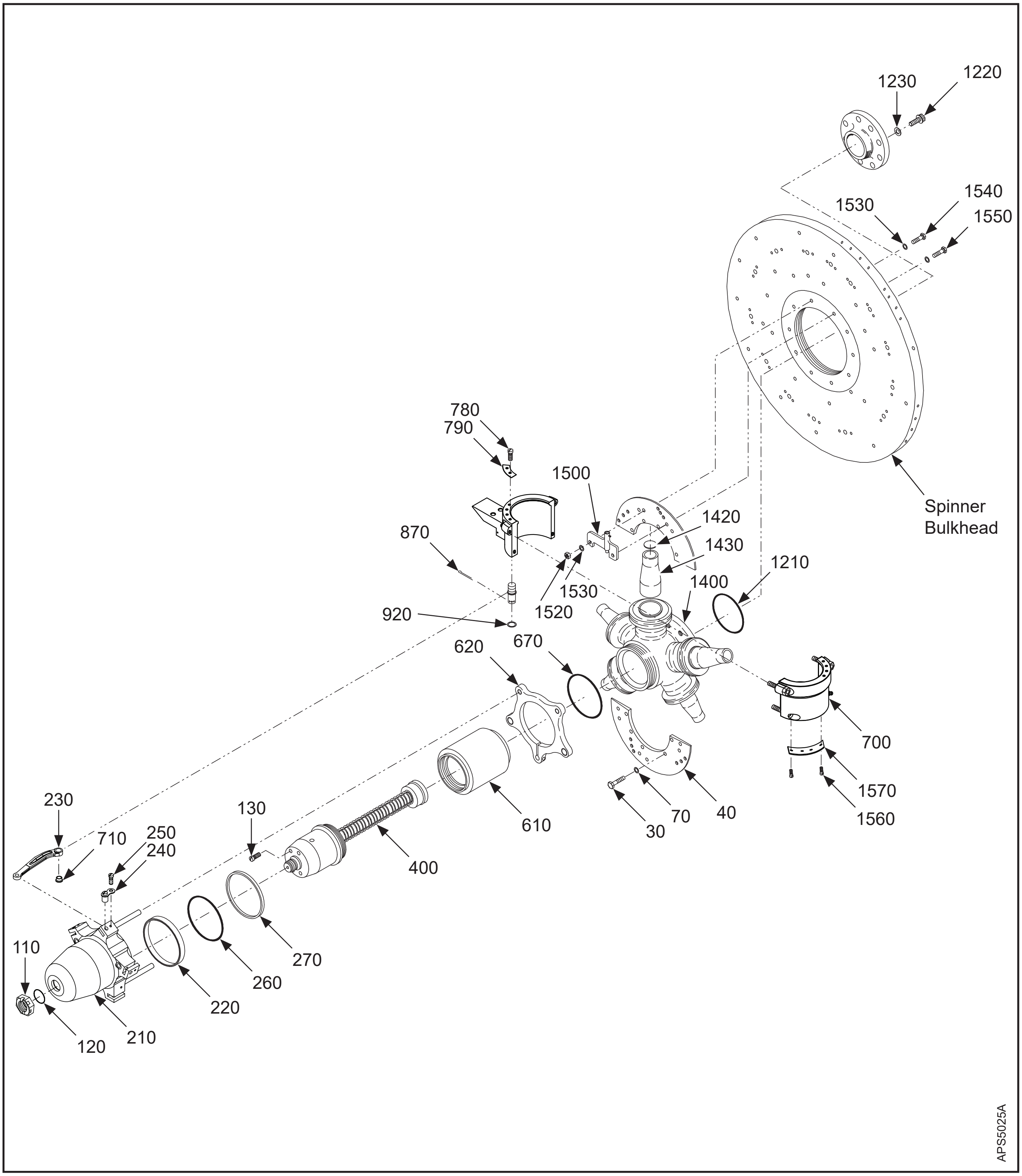


HC-B5MP-5CL: Propeller Parts
Figure 10-12

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-12		PROPELLER ASSEMBLY				
30	A-2051	• BOLT, 5/16-24, HEX HEAD, SUPERSEDED BY ITEM 30A		10	Y	
30A	B-3385-5H	• BOLT, 5/16-24, HEX HEAD, SUPERSEDES ITEM 30		10	Y	
40	C-6959-1L	• PLATE, MOUNTING, SPINNER		1		
70	B-3851-0532	• WASHER (INSTALL UNDER ITEM 30)		10	Y	
110	A-880-2A	• NUT, HEX, SELF-LOCKING, THIN		1	Y	
120	C-3317-121	• O-RING		1	Y	
130	B-3840-8	• SCREW, 10-32, FILLISTER HEAD		4	Y	
210	D-4006-2L	• PISTON UNIT		1		
220	A-862-9	• • BUSHING, PLASTIC		1		
-280	A-114-G	• • DOWEL PIN		2		
-215	A-817-7	• • ROD, GUIDE, PISTON		2		
230	B-4016L	• LINK ARM		5		
240	A-1464	• LINK PIN UNIT		5	Y	
250	B-3840-6	• SCREW, 10-32, FILLISTER HEAD		5	Y	
260	C-3317-429-2	• O-RING		1	Y	
270	B-1843	• SEAL, DUST, PISTON		1	Y	
400	831-93	• SPRING ASSEMBLY (REFER TO "831-93 SPRING ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
610	B-4007	• PCP: CYLINDER		1		PCP
620	834-19	• GUIDE COLLAR UNIT (REFER TO "834-19 GUIDE COLLAR UNIT" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		1		
670	C-3317-243	• O-RING (CYLINDER)		1	Y	
700	838-128L	• PCP: CLAMP ASSEMBLY (REFER TO "838-128L CLAMP ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		PCP
710	A-944	• SLEEVE, LINKSCREW		1	Y	
780	B-3840-( )	• SCREW, 10-32, FILLISTER HEAD		AR	Y	
790	A-1305	• BALANCE WEIGHT		AR		
860	A-304	• LINKSCREW, 1/2-20		1	Y	
870	B-3838-3-3	• COTTER PIN		1	Y	
920	A-6119	• BUSHING, LINK ARM		1	Y	
1210	C-3317-230	• O-RING		1	Y	
1220	B-3339-1	• BOLT, MOUNTING, 9/16-18, 12 POINT		8	Y	
1230	A-2048-2	• WASHER, MOUNTING, 9/16" CSK		8	Y	
1400	D-4005	• PCP: HUB UNIT, REPLACED BY ITEM 1400A		1		PCP
1400A	840-118	• PCP: HUB UNIT, REPLACES ITEM 1400		1		PCP
1420	HP-1125-A81	• • PLUG, EXPANSION, REPLACED BY ITEM 1420A		OBS	Y	
1420A	B-3897-1	• • PLUG, EXPANSION, REPLACES ITEM 1420		5	Y	
1430	B-4020-( )	• • PILOT TUBE		5		

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

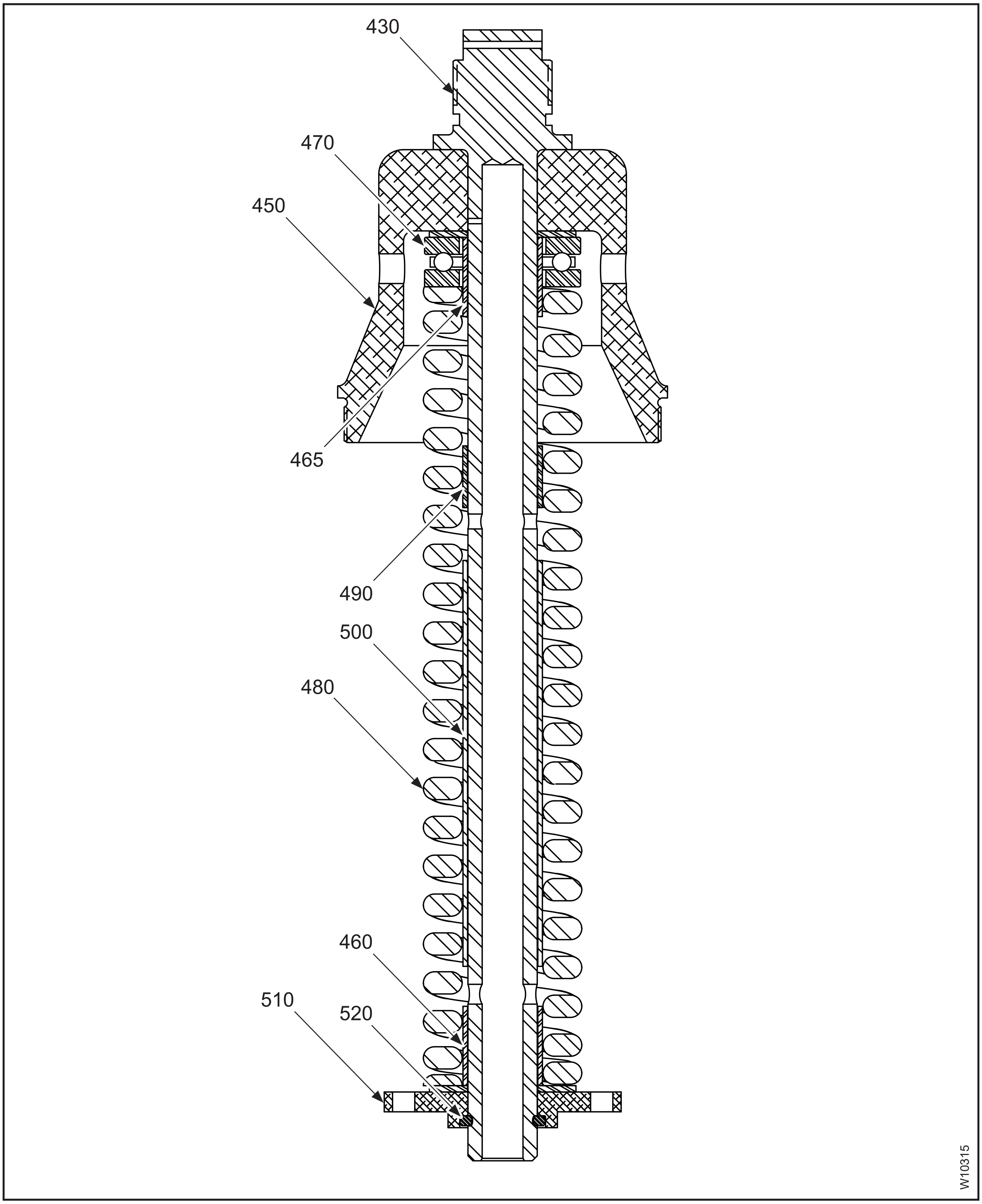
HC-B5MP-5CL

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10-12		**PROPELLER ASSEMBLY**				
1500	830-40L	• START LOCK, LH - ASSEMBLY (REFER TO "830-40L START LOCK ASSEMBLY" IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)		5		
1520	B-3808-4	• NUT, HEX, SELF-LOCKING		10	Y	
1530	B-3851-0463	• WASHER		20	Y	
1540	B-3384-21H	• BOLT, 1/4-28, HEX HEAD		5	Y	
1550	B-3384-16H	• BOLT, 1/4-28, HEX HEAD		5	Y	
1560	B-3384-1H	• BOLT, 1/4-28, HEX HEAD		10	Y	
1570	C-6960L	• PLATE, START LOCK		1		
		BLADE RETENTION PARTS				
		(REFER TO THE BLADE RETENTION PARTS IN THIS CHAPTER FOR EXPLODED VIEW/PARTS LIST)				
		COUNTERWEIGHT SLUGS				
-9040		• COUNTERWEIGHT SLUG APPLICATION SPECIFIC REFER TO HARTZELL PROPELLER INC. APPLICATION GUIDE MANUAL 159 (61-02-59) FOR PART NUMBER AND PROPELLER CRITICAL PART (PCP) IDENTIFICATION				

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

SUB-ASSEMBLY
PARTS LISTS and FIGURES



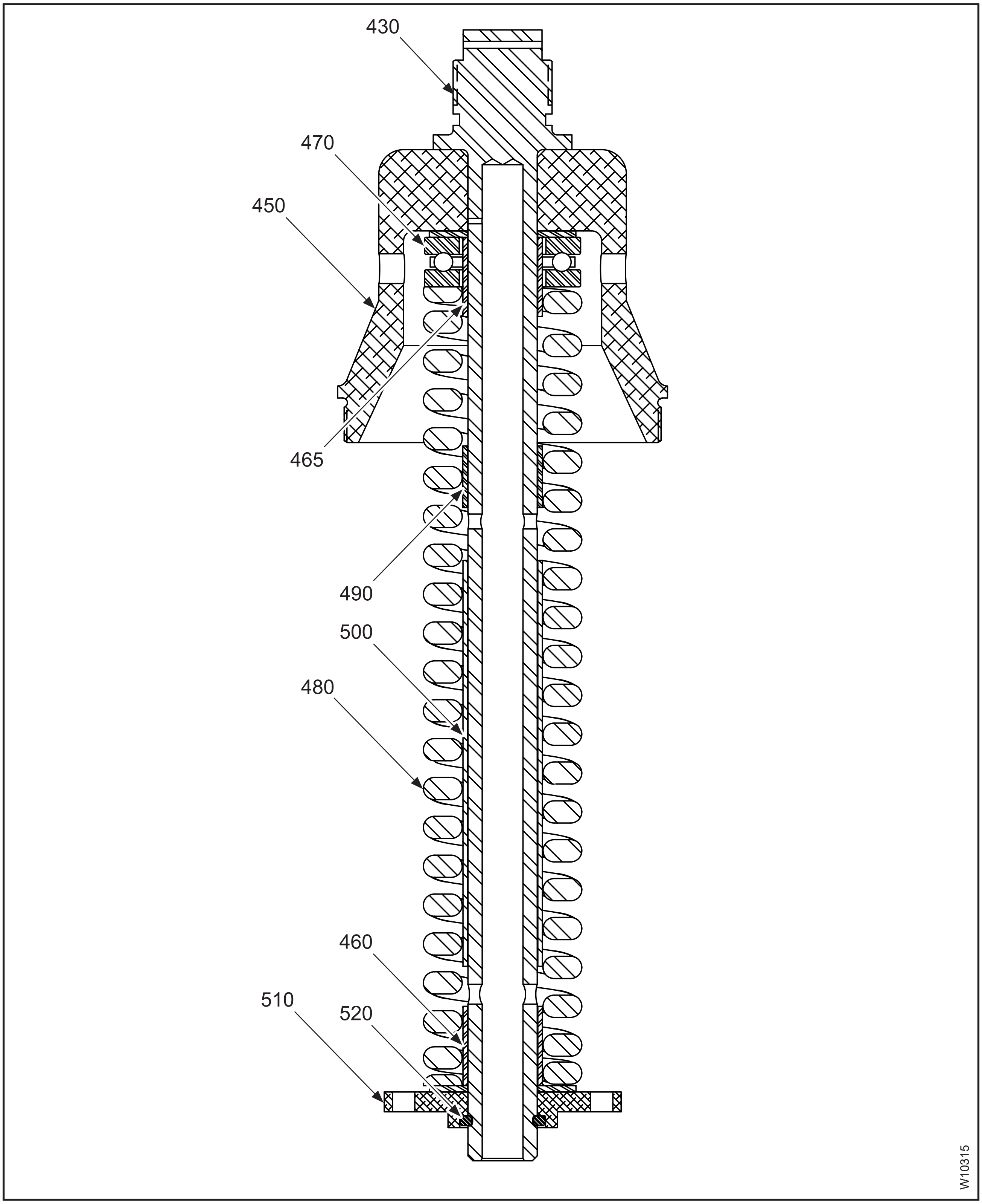
831-50: Spring Assembly
Figure 10A-1

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-1		**831-50 SPRING ASSEMBLY**				
430	B-4026	• PCP: ROD, PITCH CHANGE		1		PCP
450	A-4025	• PCP: SPRING RETAINER CUP		1		PCP
460	A-4030	• GUIDE, SPRING (REAR)		1		
465	A-4030	• GUIDE, SPRING (FRONT)		1		
470	A-3497	• BEARING, THRUST, BALL		1		
480	A-3496	• PCP: SPRING, COMPRESSION, FEATHERING REPLACED BY ITEM 480A		OBS		PCP
480A	102877	• PCP: SPRING, COMPRESSION, FEATHERING REPLACES ITEM 480, POST HC-SB-61-324		1		PCP
490	A-4027-1	• PCP: SPACER, PITCH ADJUST		AR		PCP
500	A-4029	• PCP: SLEEVE, SPACER		1		PCP
510	A-4028	• PCP: SPRING RETAINER, REAR		1		PCP
520	A-4031	• PCP: KEEPER, SPLIT		1	Y	PCP

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

831-50: Spring Assembly



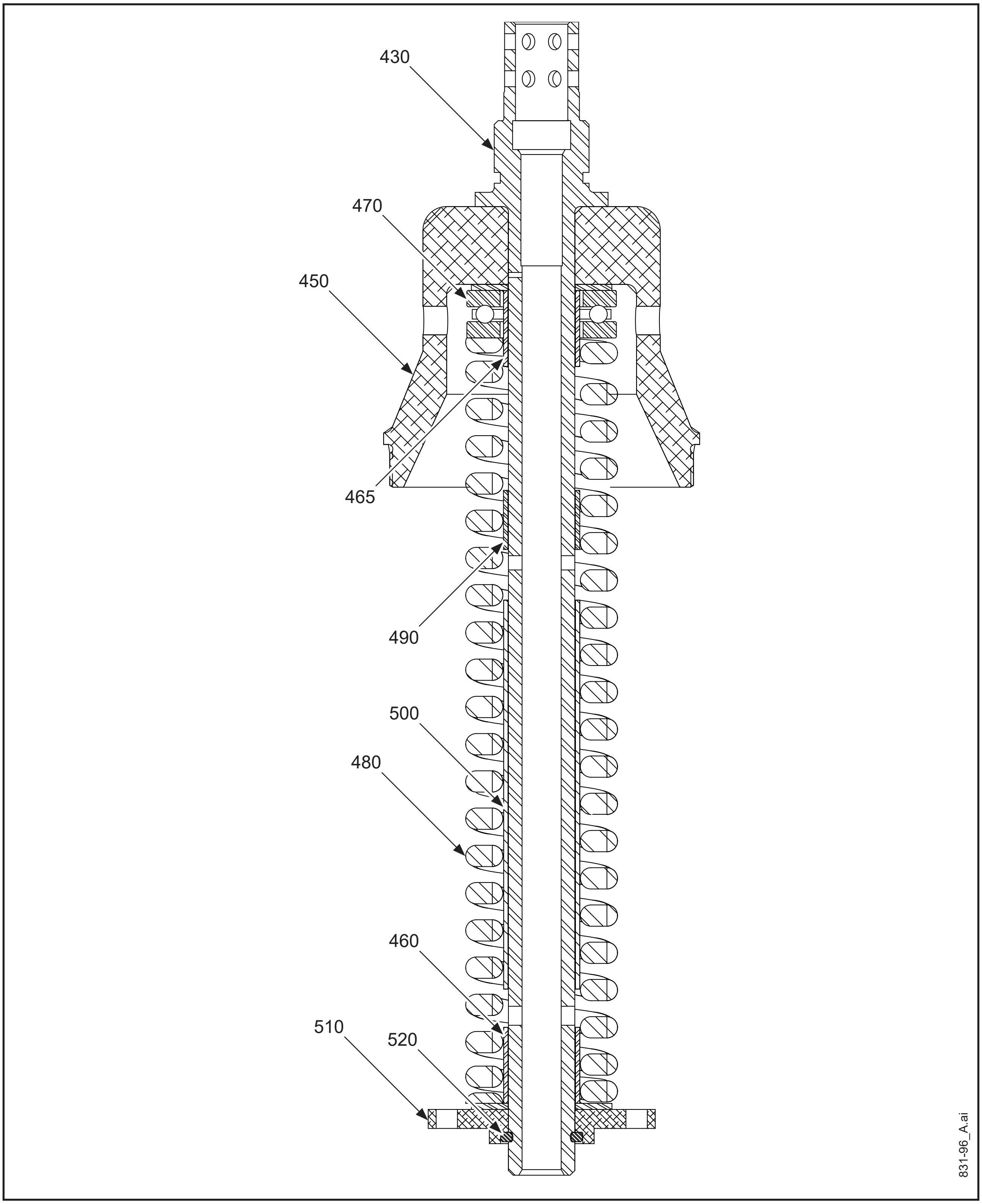
831-50-1: Spring Assembly
Figure 10A-2

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-2		**831-50-1 SPRING ASSEMBLY**				
430	B-4026-1	• PCP: ROD, PITCH CHANGE		1		PCP
450	A-4025	• PCP: SPRING RETAINER CUP		1		PCP
460	A-4030	• GUIDE, SPRING (REAR)		1		
465	A-4030	• GUIDE, SPRING (FRONT)		1		
470	A-3497	• BEARING, THRUST, BALL		1		
480	A-3496	• PCP: SPRING, COMPRESSION, FEATHERING REPLACED BY ITEM 480A		OBS		PCP
480A	102877	• PCP: SPRING, COMPRESSION, FEATHERING REPLACES ITEM 480, POST HC-SB-61-324		1		PCP
490	A-4027-1	• PCP: SPACER, PITCH ADJUST		AR		PCP
500	A-4029	• PCP: SLEEVE, SPACER		1		PCP
510	A-4028	• PCP: SPRING RETAINER, REAR		1		PCP
520	A-4031	• PCP: KEEPER, SPLIT		1	Y	PCP

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

831-50-1: Spring Assembly



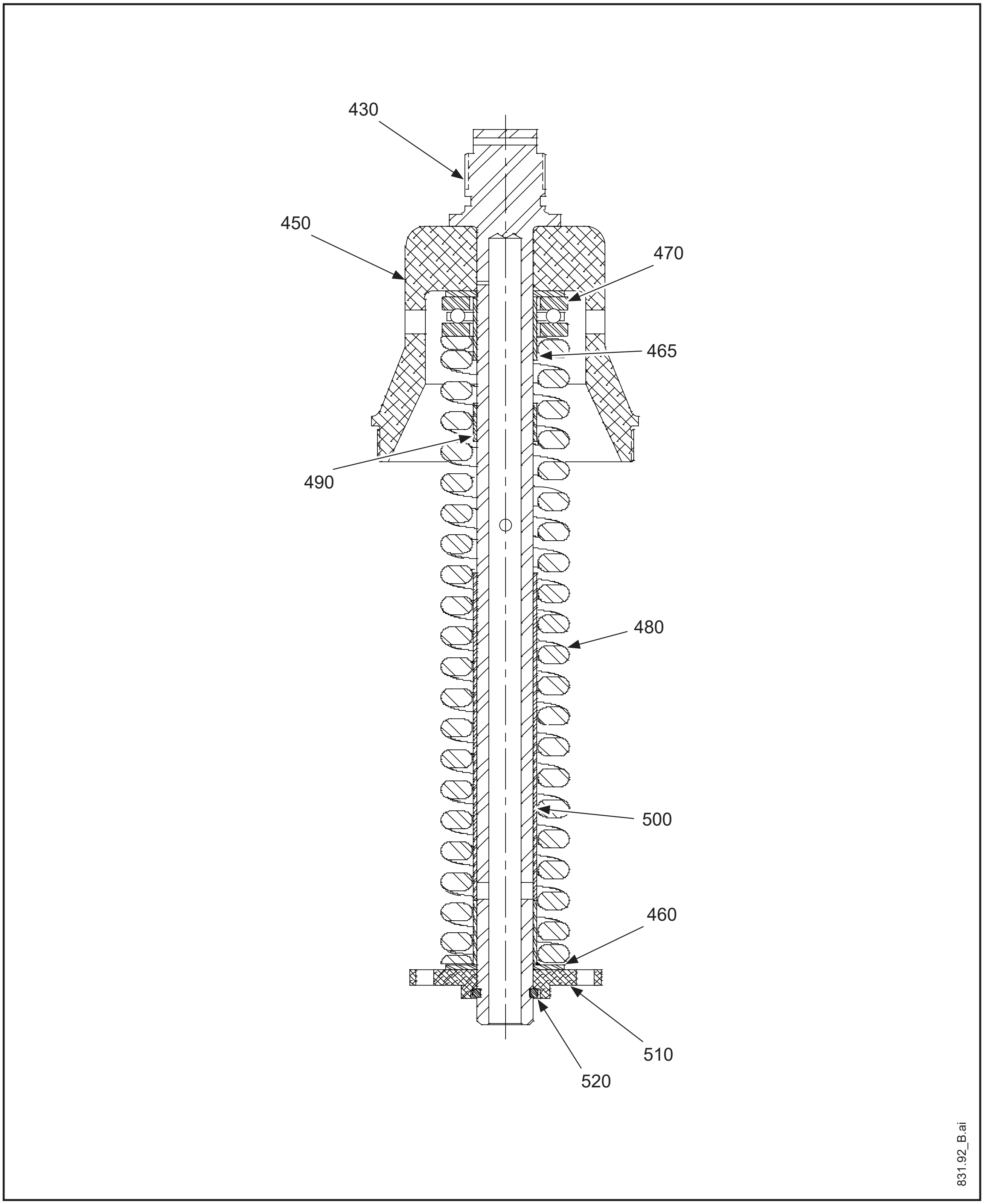
831-61: Spring Assembly
Figure 10A-3

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-3		**831-61 SPRING ASSEMBLY**				
430	C-1169	• ROD, PITCH CHANGE		1		
450	A-4025	• PCP: SPRING RETAINER CUP		1		PCP
460	A-4030	• GUIDE, SPRING (REAR)		1		
465	A-4030	• GUIDE, SPRING (FRONT)		1		
470	A-3497	• BEARING, THRUST, BALL		1		
480	A-3496	• PCP: SPRING, COMPRESSION, FEATHERING REPLACED BY ITEM 480A		1		PCP
480A	102877	• PCP: SPRING, COMPRESSION, FEATHERING REPLACES ITEM 480, POST HC-SB-61-324		1		PCP
490	A-4027-2	• PCP: SPACER, PITCH ADJUST		AR		PCP
500	A-4029	• PCP: SLEEVE, SPACER		1		PCP
510	A-4028	• PCP: SPRING RETAINER, REAR		1		PCP
520	A-4031	• PCP: KEEPER, SPLIT		1	Y	PCP

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

831-61: Spring Assembly



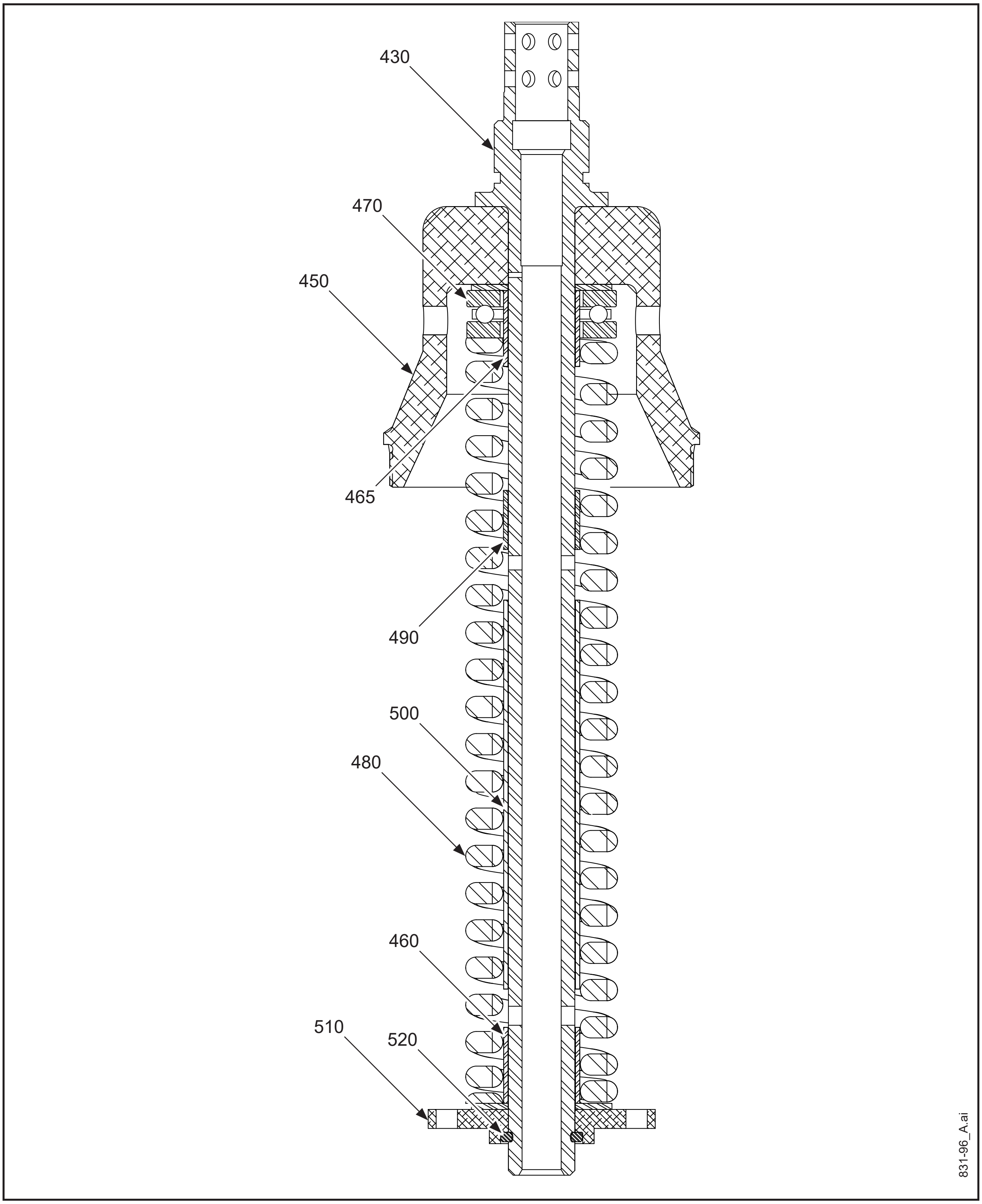
831-92: Spring Assembly
Figure 10A-4

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-4		**831-92 SPRING ASSEMBLY**				
430	B-4026	• PCP: ROD, PITCH CHANGE		1		PCP
450	A-4025	• PCP: SPRING RETAINER, CUP		1		PCP
460	A-4030	• GUIDE, SPRING (REAR)		1		
465	A-4030	• GUIDE, SPRING (FRONT)		1		
470	A-3497	• BEARING, THRUST, BALL		1		
480	A-3496	• PCP: SPRING, COMPRESSION, FEATHERING REPLACED BY ITEM 480A		1		PCP
480A	102877	• PCP: SPRING, COMPRESSION, FEATHERING REPLACES ITEM 480, POST HC-SB-61-324		1		PCP
490	A-4027-1	• PCP: SPACER, PITCH ADJUST		2		PCP
500	A-4029	• PCP: SLEEVE, SPACER		1		PCP
510	A-4028	• PCP: SPRING RETAINER, REAR		1		PCP
520	A-4031	• PCP: KEEPER, SPLIT		1	Y	PCP

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

831-92: Spring Assembly



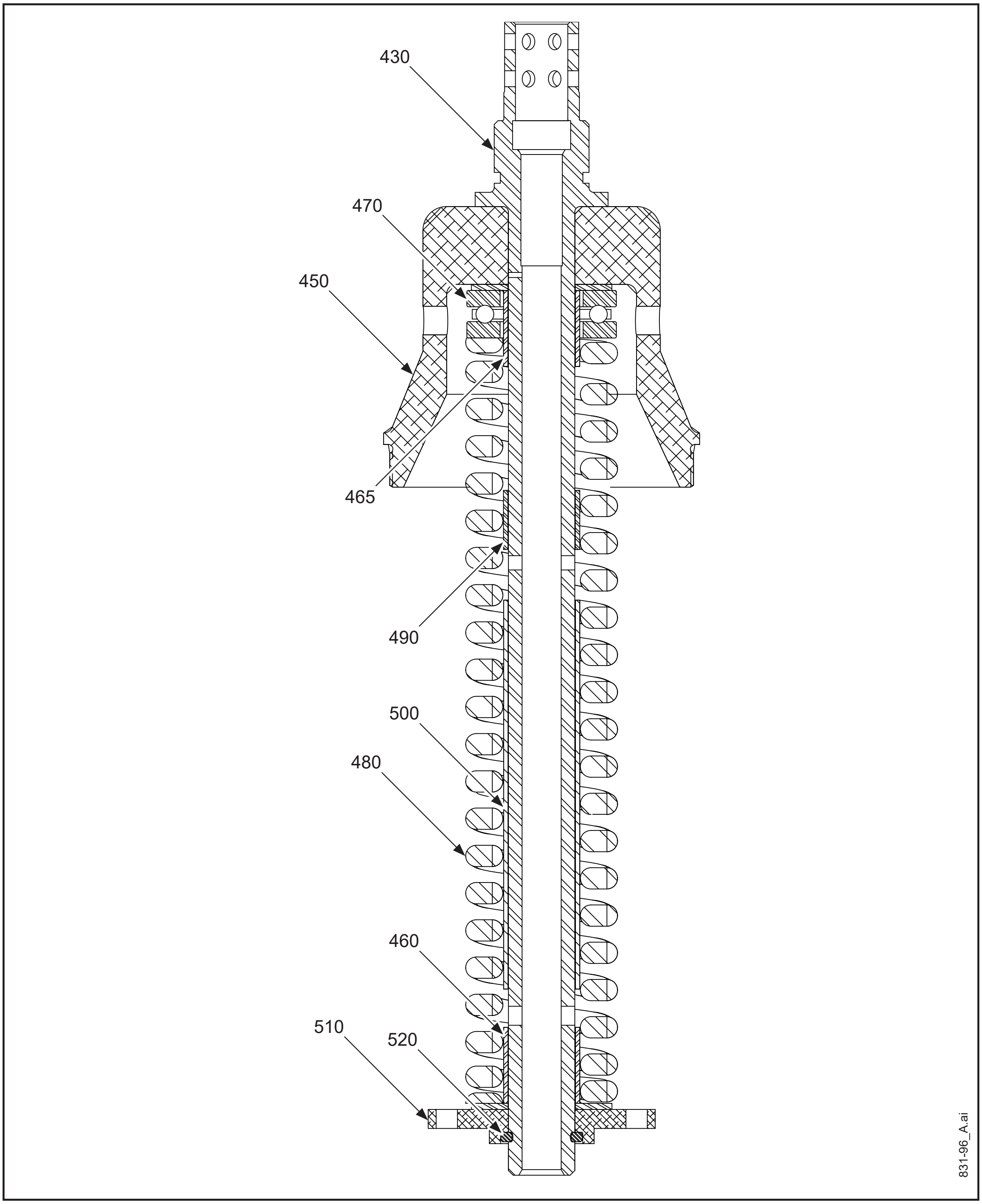
831-93: Spring Assembly
Figure 10A-5

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-5		**831-93 SPRING ASSEMBLY**				
430	D-6961	• ROD, PITCH CHANGE		1		
450	A-4025	• PCP: SPRING RETAINER CUP		1		PCP
460	A-4030	• GUIDE, SPRING (REAR)		1		
465	A-4030	• GUIDE, SPRING (FRONT)		1		
470	A-3497	• BEARING, THRUST, BALL		1		
480	A-3496	• PCP: SPRING, COMPRESSION, FEATHERING REPLACED BY ITEM 480A		1		PCP
480A	102877	• PCP: SPRING, COMPRESSION, FEATHERING REPLACES ITEM 480, POST HC-SB-61-324		1		PCP
490	A-4027-1	• PCP: SPACER, PITCH ADJUST		AR		PCP
500	A-4029	• PCP: SLEEVE, SPACER		1		PCP
510	A-4028	• PCP: SPRING RETAINER, REAR		1		PCP
520	A-4031	• PCP: KEEPER, SPLIT		1	Y	PCP

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

831-93: Spring Assembly



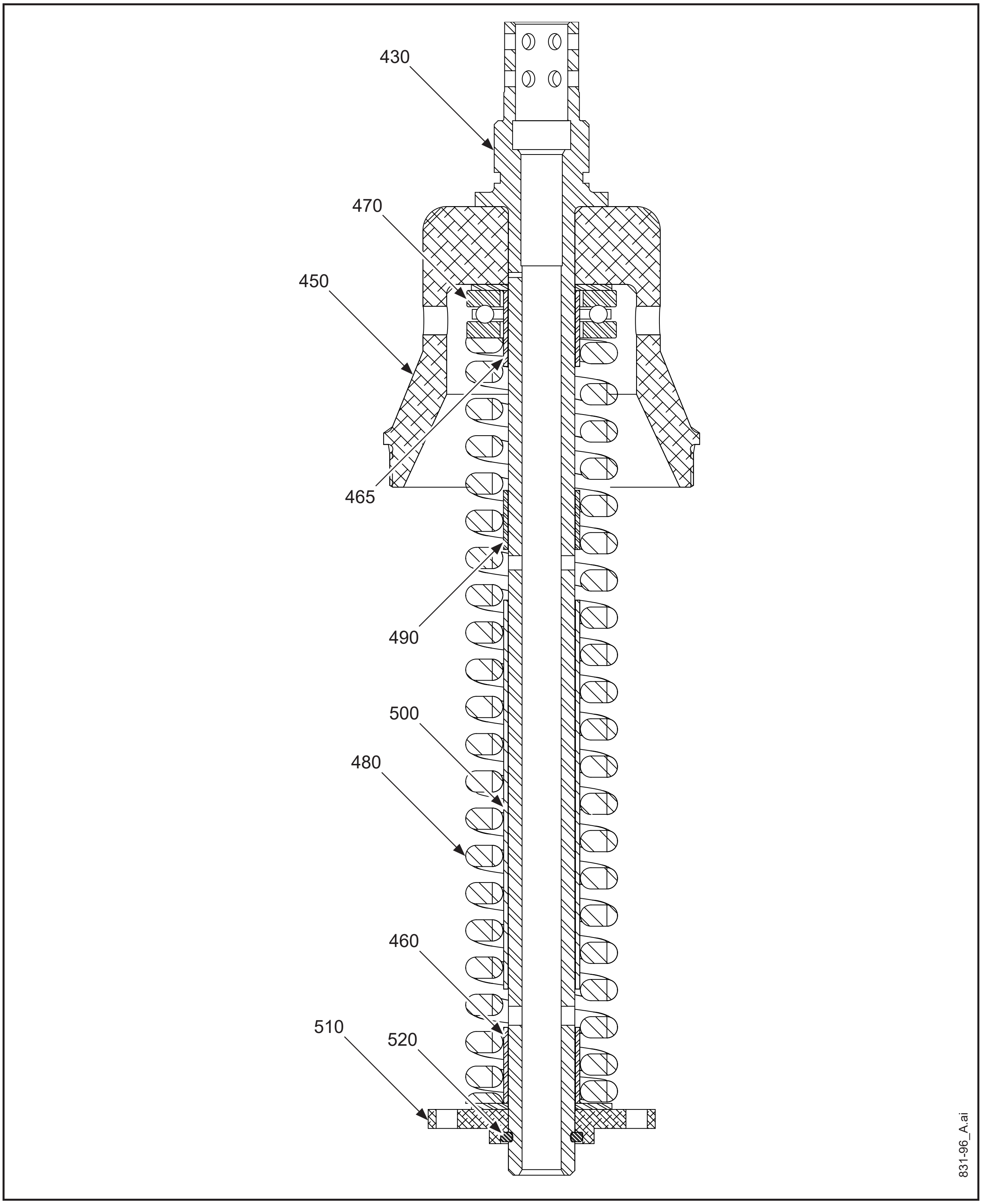
831-95: Spring Assembly
Figure 10A-6

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-6		**831-95 SPRING ASSEMBLY**				
430	C-1169-1	• ROD, PITCH CHANGE		1		
450	A-4025	• PCP: SPRING RETAINER CUP		1		PCP
460	A-4030	• GUIDE, SPRING (REAR)		1		
465	A-4030	• GUIDE, SPRING (FRONT)		1		
470	A-3497	• BEARING, THRUST, BALL		1		
480	A-3496	• PCP: SPRING, COMPRESSION, FEATHERING REPLACED BY ITEM 480A		1		PCP
480A	102877	• PCP: SPRING, COMPRESSION, FEATHERING REPLACES ITEM 480, POST HC-SB-61-324		1		PCP
490	A-4027-2	• PCP: SPACER, PITCH ADJUST		1		PCP
500	A-4029	• PCP: SLEEVE, SPACER		1		PCP
510	A-4028	• PCP: SPRING RETAINER, REAR		1		PCP
520	A-4031	• PCP: KEEPER, SPLIT		1	Y	PCP

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

831-95: Spring Assembly



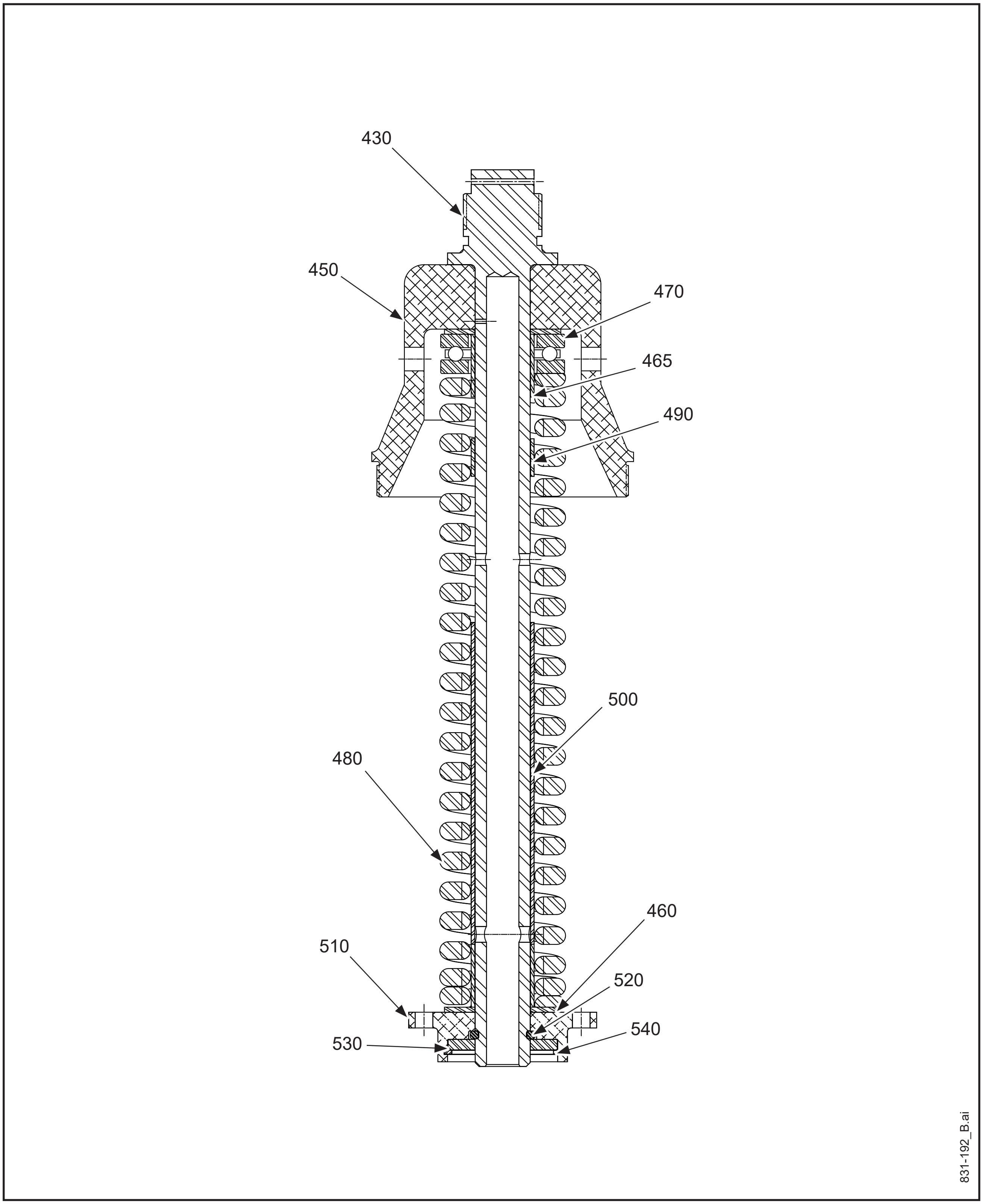
831-96: Spring Assembly
Figure 10A-7

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-7		**831-96 SPRING ASSEMBLY**				
430	C-1169-2	• ROD, PITCH CHANGE		1		
450	A-4025	• PCP: SPRING RETAINER CUP		1		PCP
460	A-4030	• GUIDE, SPRING (REAR)		1		
465	A-4030	• GUIDE, SPRING (FRONT)		1		
470	A-3497	• BEARING, THRUST, BALL		1		
480	A-3496	• PCP: SPRING, COMPRESSION, FEATHERING REPLACED BY ITEM 480A		1		PCP
480A	102877	• PCP: SPRING, COMPRESSION, FEATHERING REPLACES ITEM 480, POST HC-SB-61-324		1		PCP
490	A-4027-2	• PCP: SPACER, PITCH ADJUST		AR		PCP
500	A-4029	• PCP: SLEEVE, SPACER		1		PCP
510	A-4028	• PCP: SPRING RETAINER, REAR		1		PCP
520	A-4031	• PCP: KEEPER, SPLIT		1	Y	PCP

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

831-96: Spring Assembly



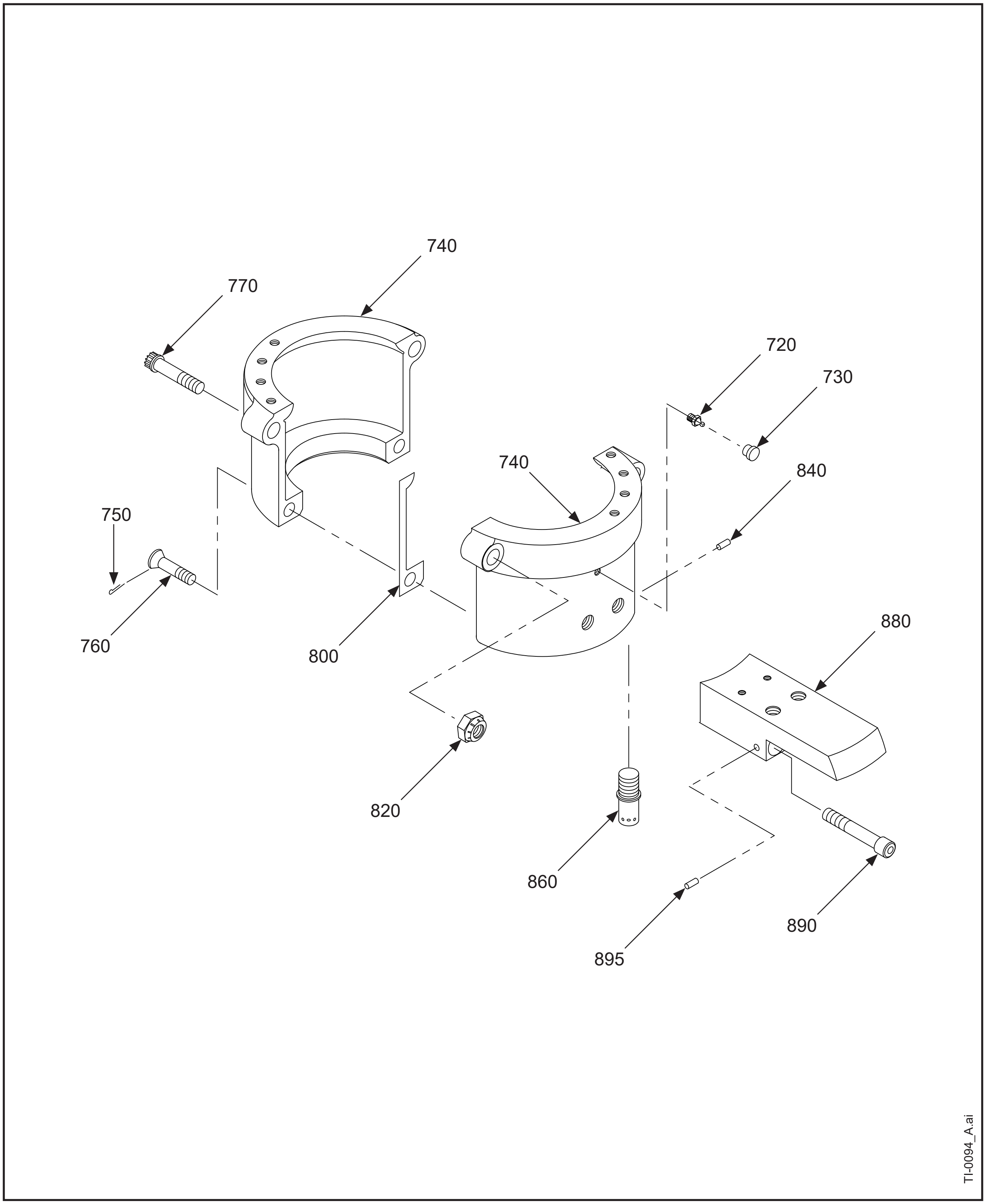
831-192: Feathering Spring Assembly
Figure 10A-8

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-8		**831-192 FEATHERING SPRING ASSEMBLY**				
430	B-4026	• PCP: ROD, PITCH CHANGE		1		PCP
450	A-4025	• PCP: SPRING RETAINER, CUP		1		PCP
460	A-4030	• GUIDE, SPRING (REAR)		1		
465	A-4030	• GUIDE, SPRING (FRONT)		1		
470	A-3497	• BEARING, THRUST, BALL		1		
480	A-3496	• PCP: SPRING, COMPRESSION, FEATHERING REPLACED BY ITEM 480A		1		PCP
480A	102877	• PCP: SPRING, COMPRESSION, FEATHERING REPLACES ITEM 480, POST HC-SB-61-324		1		PCP
490	A-4027-1	• PCP: SPACER, PITCH ADJUST		2		PCP
500	A-4029	• PCP: SLEEVE, SPACER		1		PCP
510	A-4028	• PCP: SPRING RETAINER, REAR, REPLACED BY ITEM 510A		1		PCP
510A	104479	• PCP: SPRING RETAINER, REAR, REPLACES ITEM 510		1		PCP
520	A-4031	• PCP: KEEPER, SPLIT		1	Y	PCP
530	104487	• RETAINER, SPLIT KEEPER		1	Y	
540	B-6629-175PP	• RING, RETAINING, INTERNAL		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

831-192: Feathering Spring Assembly



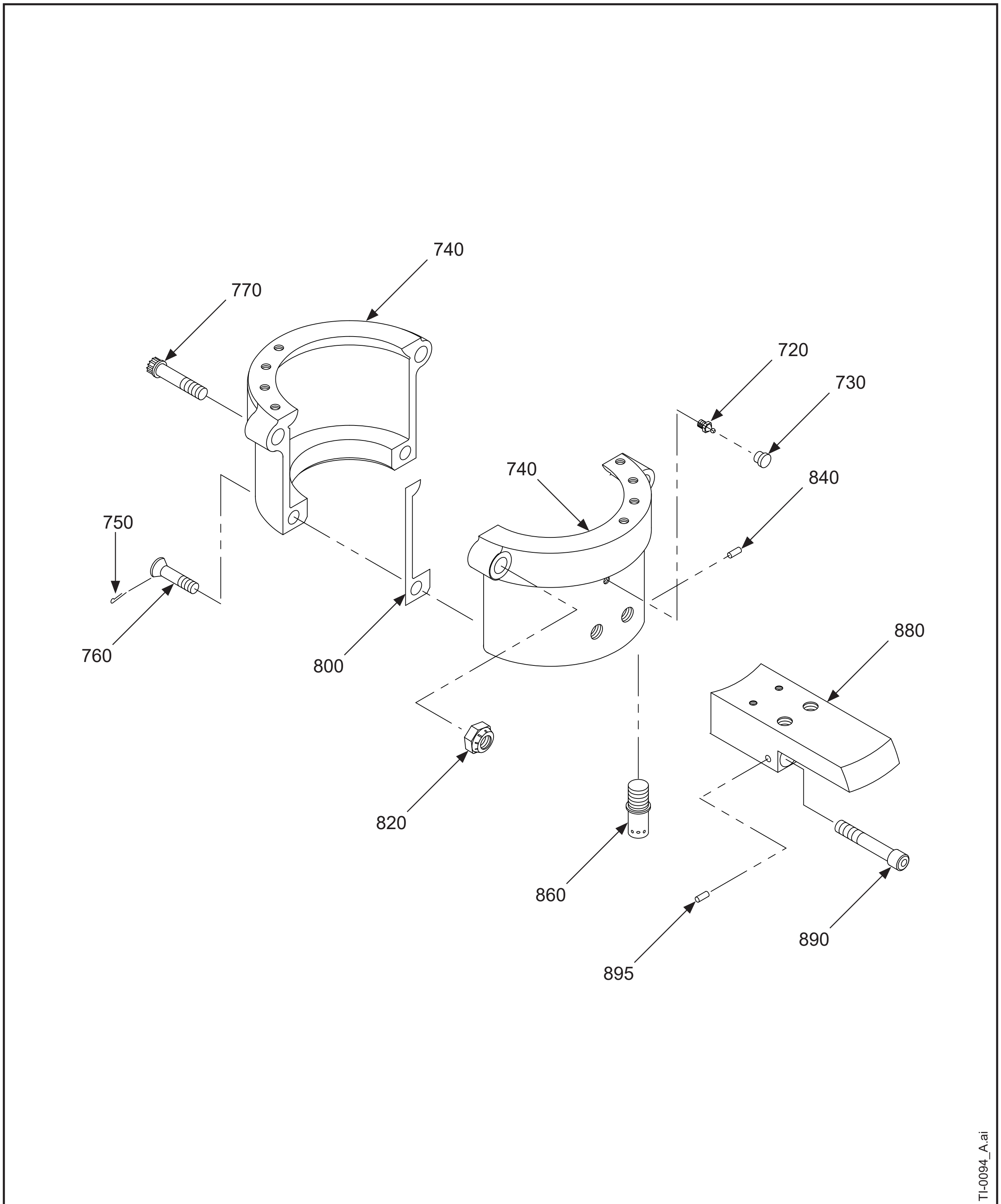
838-87: Clamp Assembly
Figure 10A-9

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-9		**838-87 CLAMP ASSEMBLY**				
720	B-6588-1	• FITTING, LUBRICATION		2	Y	
730	B-6544	• CAP, FITTING, LUBRICATION		2	Y	
740	C-1977-1P	• PCP: CLAMP, "M", "P", "R", SHANK		1		PCP
750	B-3838-3-2	• COTTER PIN		2	Y	
760	A-321	• SCREW, 3/8-24 DOUBLE 60° HEAD		2	Y	
770	A-1379	• BOLT, 7/16-20, 12 POINT, REPLACED BY ITEM 770A		2	Y	
770A	A-1372	• BOLT, 7/16-20, 12 POINT, REPLACES ITEM 770		2	Y	
800	A-1306-1	• GASKET, CLAMP		2	Y	
820	A-1373	• NUT, 7/16-20, HEX, SELF-LOCKING		2	Y	
840	A-285	• SPRING PIN, 3/32", CRES (LINK SCREW)		3	Y	
860	A-304	• LINKSCREW, 1/2-20		1	Y	
880	B-4009	• PCP: COUNTERWEIGHT		1		PCP
890	A-2036-12	• SOCKET, 7/16-20, CAP, MODIFIED, REPLACED BY ITEM 890A		2	Y	
890A	107995-12	• BOLT, 7/16-20, 12 POINT, REPLACES ITEM 890 POST HC-SL-61-367, REV. 1		2	Y	
895	A-285	• SPRING PIN, 3/32", CRES (SOCKET HEAD CAP SCREW)		2	Y	
-900	A-6741-131	• WIRE, SAFTEY, STAINLESS		2	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

838-87: Clamp Assembly



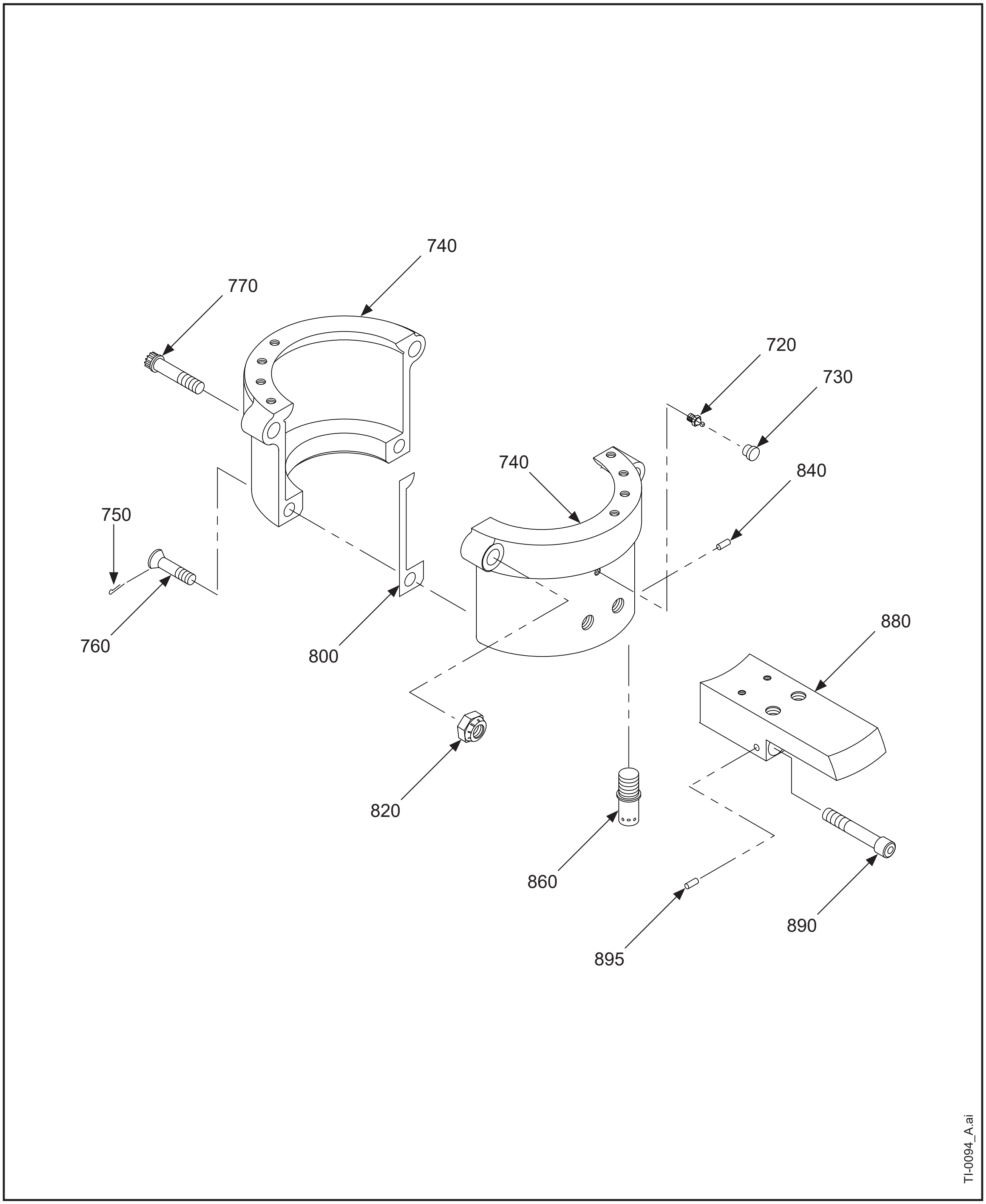
838-87L: Clamp Assembly
Figure 10A-10

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-10		**838-87L CLAMP ASSEMBLY**				
720	B-6588-1	• FITTING, LUBRICATION		2	Y	
730	B-6544	• CAP, FITTING, LUBRICATION		2	Y	
740	C-1977-2P	• PCP: CLAMP, "M", "P", "R", SHANK		1		PCP
750	B-3838-3-2	• COTTER PIN		2	Y	
760	A-321	• SCREW, 3/8-24 DOUBLE 60° HEAD		2	Y	
770	A-1379	• BOLT, 7/16-20, 12 POINT, REPLACED BY ITEM 770A		2	Y	
770A	A-1372	• BOLT, 7/16-20, 12 POINT, REPLACES ITEM 770		2	Y	
800	A-1306-1	• GASKET, CLAMP		2	Y	
820	A-1373	• NUT, 7/16-20, HEX, SELF-LOCKING		2	Y	
840	A-285	• SPRING PIN, 3/32", CRES (LINK SCREW)		1	Y	
860	A-304	• LINKSCREW, 1/2-20		1	Y	
880	B-4009	• PCP: COUNTERWEIGHT		1		PCP
890	A-2036-12	• SOCKET, 7/16-20, CAP, MODIFIED, REPLACED BY ITEM 890A		2	Y	
890A	107995-12	• BOLT, 7/16-20, 12 POINT, REPLACES ITEM 890 POST HC-SL-61-367, REV. 1		2	Y	
895	A-285	• SPRING PIN, 3/32", CRES (SOCKET HEAD CAP SCREW)		2	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

838-87L: Clamp Assembly



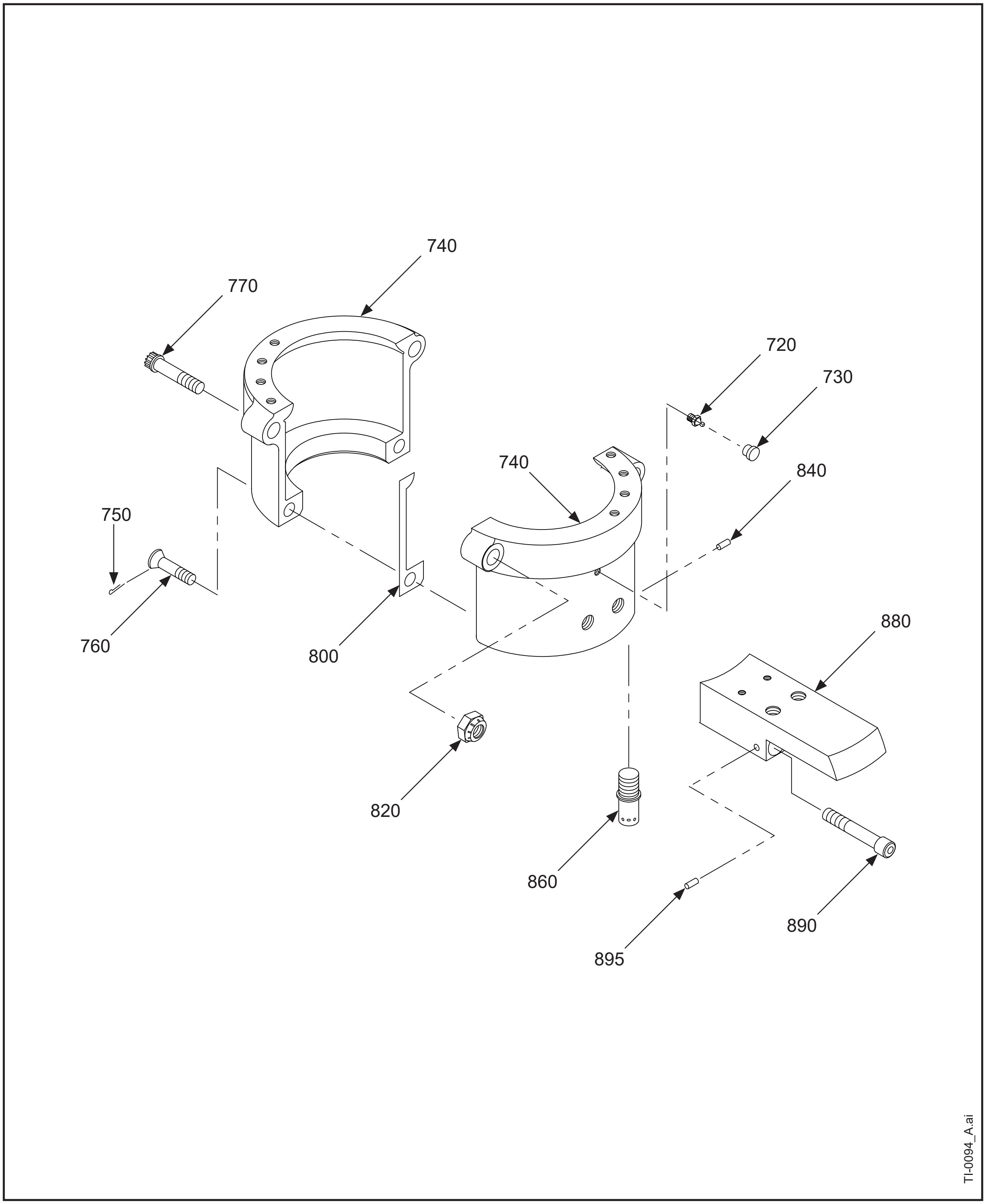
838-107: Clamp Assembly
Figure 10A-11

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-11		**838-107 CLAMP ASSEMBLY**				
720	B-6588-1	• FITTING, LUBRICATION		2	Y	
730	B-6544	• CAP, FITTING, LUBRICATION		2	Y	
740	C-1977-1P	• PCP: CLAMP, "M", "P", "R", SHANK		1		PCP
750	B-3838-3-2	• COTTER PIN		2	Y	
760	A-321	• SCREW, 3/8-24 DOUBLE 60° HEAD		2	Y	
770	A-1379	• BOLT, 7/16-20, 12 POINT, REPLACED BY ITEM 770A		2	Y	
770A	A-1372	• BOLT, 7/16-20, 12 POINT, REPLACES ITEM 770		2	Y	
800	A-1306-1	• GASKET, CLAMP		2	Y	
820	A-1373	• NUT, 7/16-20, HEX, SELF-LOCKING		2	Y	
840	A-285	• SPRING PIN, 3/32", CRES (LINK SCREW)		1	Y	
860	A-304	• LINKSCREW, 1/2-20		1	Y	
880	B-3341	• PCP: COUNTERWEIGHT		1		PCP
890	A-2036-12	• SOCKET, 7/16-20, CAP, MODIFIED, REPLACED BY ITEM 890A		2	Y	
890A	107995-12	• BOLT, 7/16-20, 12 POINT, REPLACES ITEM 890 POST HC-SL-61-367, REV. 1		2	Y	
895	A-285	• SPRING PIN, 3/32", CRES (SOCKET HEAD CAP SCREW)		2	Y	
-900	A-6741-131	• WIRE, SAFTEY, STAINLESS		2	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

838-107: Clamp Assembly



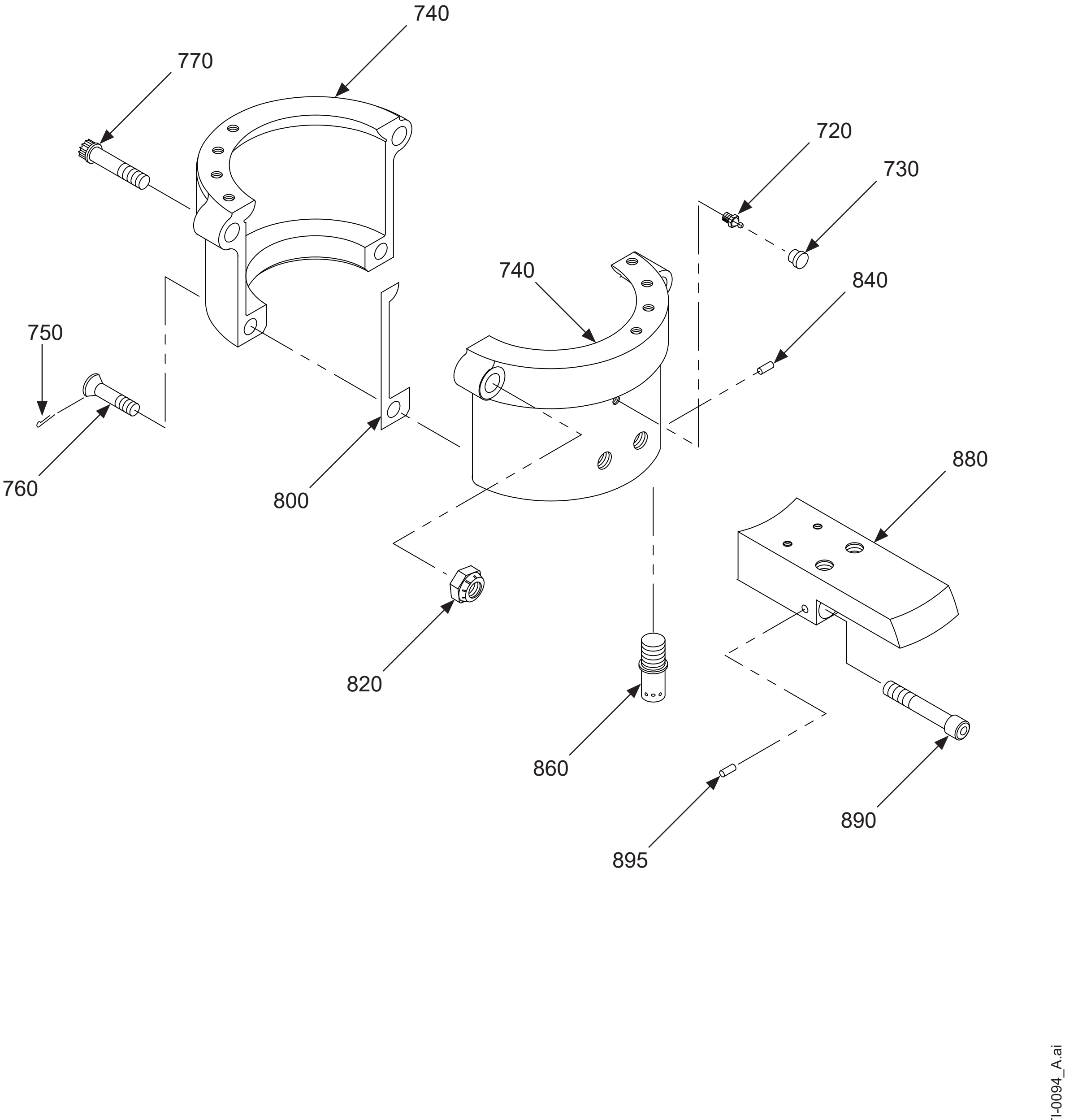
838-115: Clamp Assembly
Figure 10A-12

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-12		**838-115 CLAMP ASSEMBLY**				
720	B-6588-1	• FITTING, LUBRICATION		2	Y	
730	B-6544	• CAP, FITTING, LUBRICATION		2	Y	
740	C-1977-4P	• PCP: CLAMP, "M", "P", "R" SHANK		1		PCP
750	B-3838-3-2	• COTTER PIN		2	Y	
760	A-321	• SCREW, 3/8-24 DOUBLE 60° HEAD		2	Y	
770	A-1379	• BOLT, 7/16-20, 12 POINT, REPLACED BY ITEM 770A		2	Y	
770A	A-1372	• BOLT, 7/16-20, 12 POINT, REPLACES ITEM 770		2	Y	
800	A-1306-1	• GASKET, CLAMP		2	Y	
820	A-1373	• NUT, 7/16-20, HEX, SELF-LOCKING		2	Y	
840	A-285	• SPRING PIN, 3/32", CRES (LINK SCREW)		1	Y	
860	A-304	• LINKSCREW, 1/2-20		1	Y	
880	B-3341	• PCP: COUNTERWEIGHT		1		PCP
890	A-2036-12	• SOCKET, 7/16-20, CAP, MODIFIED, REPLACED BY ITEM 890A		2	Y	
890A	107995-12	• BOLT, 7/16-20, 12 POINT, REPLACES ITEM 890 POST HC-SL-61-367, REV. 1		2	Y	
895	A-285	• SPRING PIN, 3/32", CRES (SOCKET HEAD CAP SCREW)		2	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

838-115: Clamp Assembly



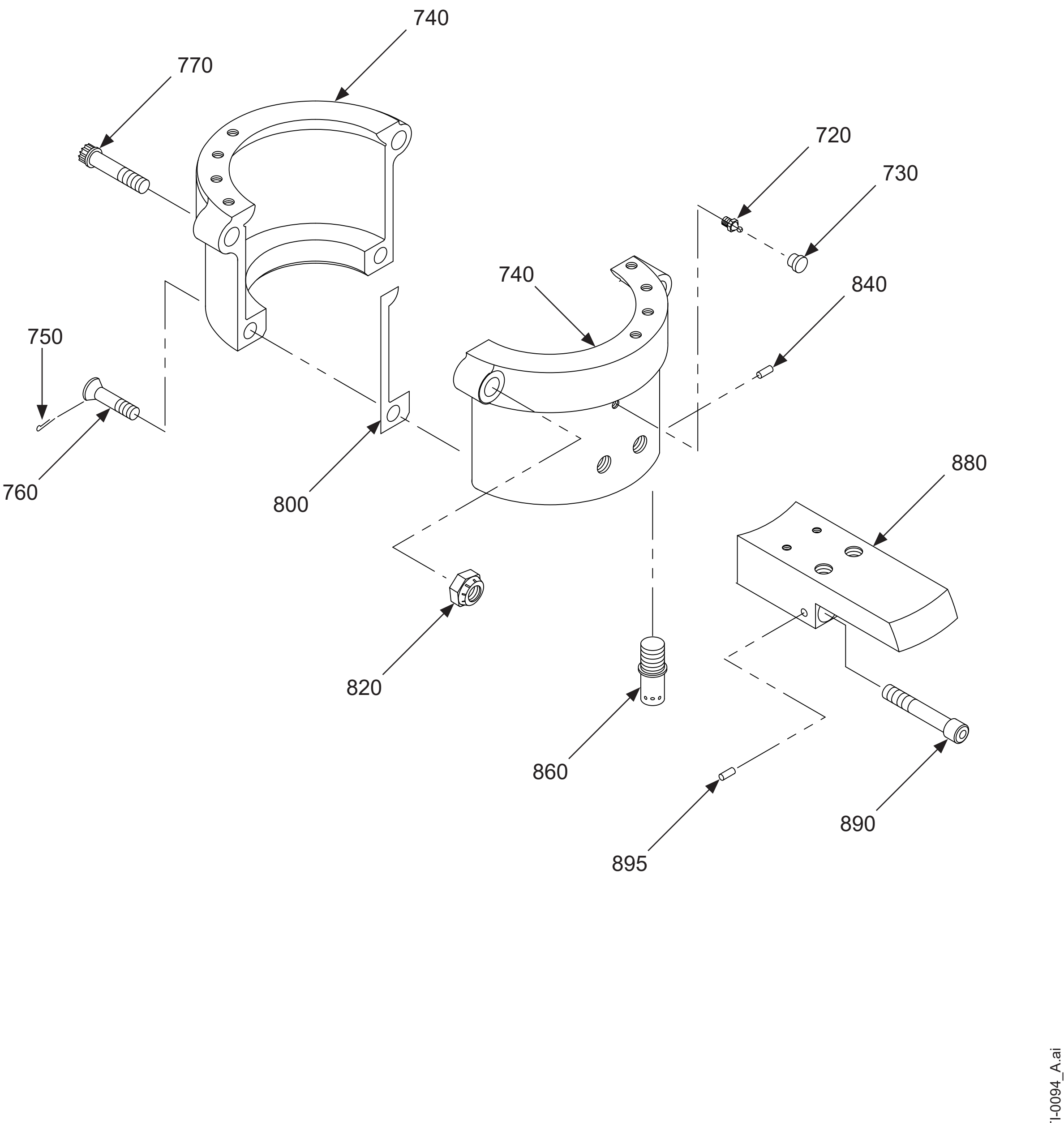
838-119: Clamp Assembly
Figure 10A-13

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-13		**838-119 CLAMP ASSEMBLY**				
720	B-6588-1	• FITTING, LUBRICATION		2	Y	
730	B-6544	• CAP, FITTING, LUBRICATION		2	Y	
740	C-1977-1P	• PCP: CLAMP, "M", "P", "R", SHANK		1		PCP
740A	C-1977-4P	• PCP: CLAMP, "M", "P", "R" SHANK ALTERNATE FOR ITEM 740		1		PCP
750	B-3838-3-2	• COTTER PIN		2	Y	
760	A-321	• SCREW, 3/8-24 DOUBLE 60° HEAD		2	Y	
770	A-1379	• BOLT, 7/16-20, 12 POINT, REPLACED BY ITEM 770A		2	Y	
770A	A-1372	• BOLT, 7/16-20, 12 POINT, REPLACES ITEM 770		2	Y	
800	A-1306-1	• GASKET, CLAMP		2	Y	
820	A-1373	• NUT, 7/16-20, HEX, SELF-LOCKING		2	Y	
840	A-285	• SPRING PIN, 3/32", CRES (LINK SCREW)		1	Y	
860	A-304	• LINKSCREW, 1/2-20		1	Y	
880	C-2681	• PCP: COUNTERWEIGHT		1		PCP
890	A-2036-12	• SOCKET, 7/16-20, CAP, MODIFIED, REPLACED BY ITEM 890A		2	Y	
890A	107995-12	• BOLT, 7/16-20, 12 POINT, REPLACES ITEM 890 POST HC-SL-61-367, REV. 1		2	Y	
895	A-285	• SPRING PIN, 3/32", CRES (SOCKET HEAD CAP SCREW)		2	Y	
-900	A-6741-131	• WIRE, SAFETY, STAINLESS		2	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

838-119: Clamp Assembly



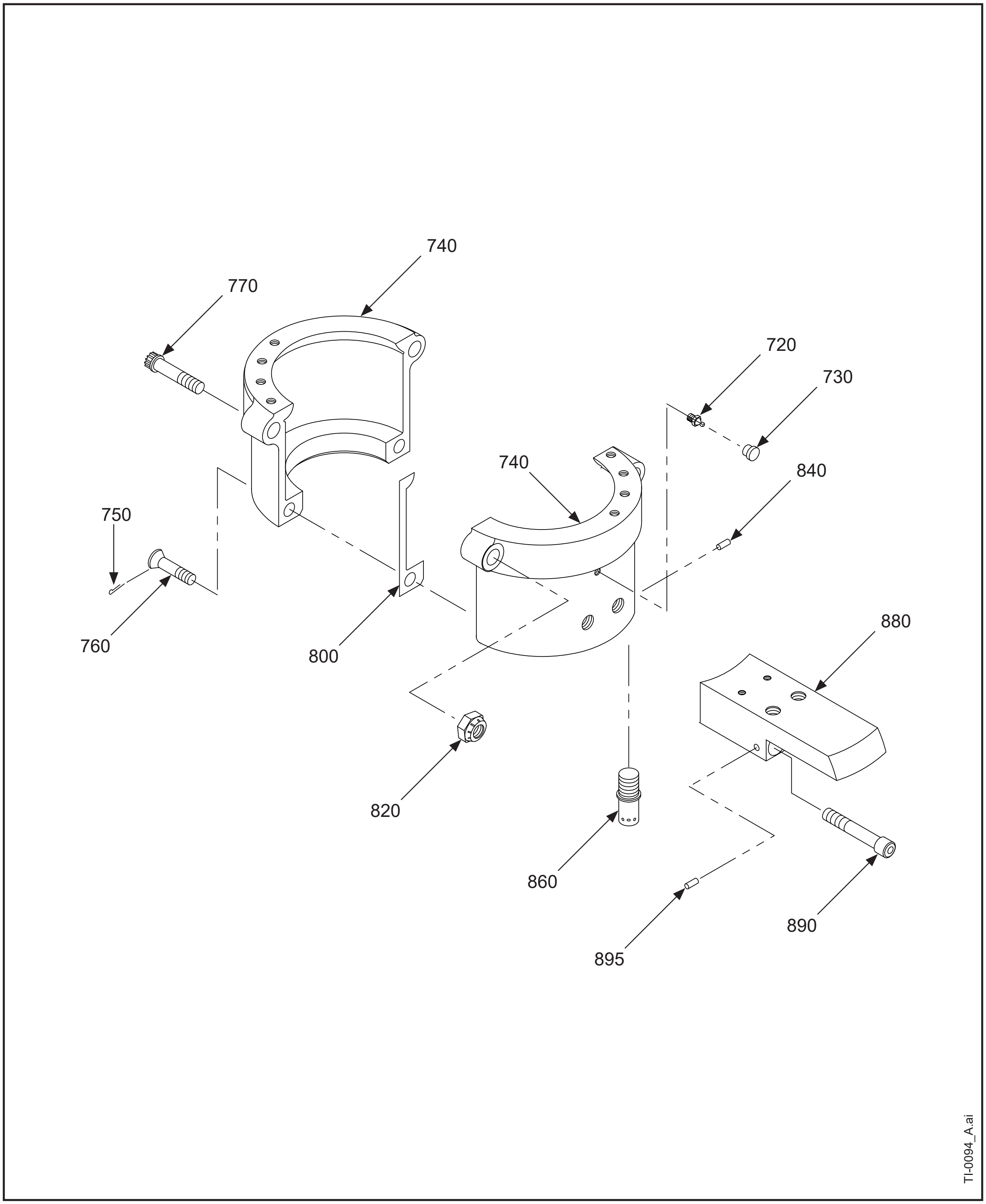
838-121: Clamp Assembly
Figure 10A-14

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-14		**838-121 CLAMP ASSEMBLY**				
720	B-6588-1	• FITTING, LUBRICATION		2	Y	
730	B-6544	• CAP, FITTING, LUBRICATION		2	Y	
740	C-1977-5P	• PCP: CLAMP, BLADE, M, P, R SHANK		1		PCP
750	B-3838-3-2	• COTTER PIN		2	Y	
760	A-321	• SCREW, 3/8-24 DOUBLE 60° HEAD		2	Y	
770	A-1379	• BOLT, 7/16-20, 12 POINT, REPLACED BY ITEM 770A		2	Y	
770A	A-1372	• BOLT, 7/16-20, 12 POINT, REPLACES ITEM 770		2	Y	
800	A-1306-1	• GASKET, CLAMP		2	Y	
820	A-1373	• NUT, 7/16-20, HEX, SELF-LOCKING		2	Y	
840	A-285	• SPRING PIN, 3/32", CRES (LINK SCREW)		1	Y	
860	A-304	• LINKSCREW, 1/2-20		1	Y	
880	C-2681	• PCP: COUNTERWEIGHT		1		PCP
890	A-2036-12	• SOCKET, 7/16-20, CAP, MODIFIED, REPLACED BY ITEM 890A		2	Y	
890A	107995-12	• BOLT, 7/16-20, 12 POINT, REPLACES ITEM 890 POST HC-SL-61-367, REV. 1		2	Y	
895	A-285	• SPRING PIN, 3/32", CRES (SOCKET HEAD CAP SCREW)		2	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

838-121: Clamp Assembly



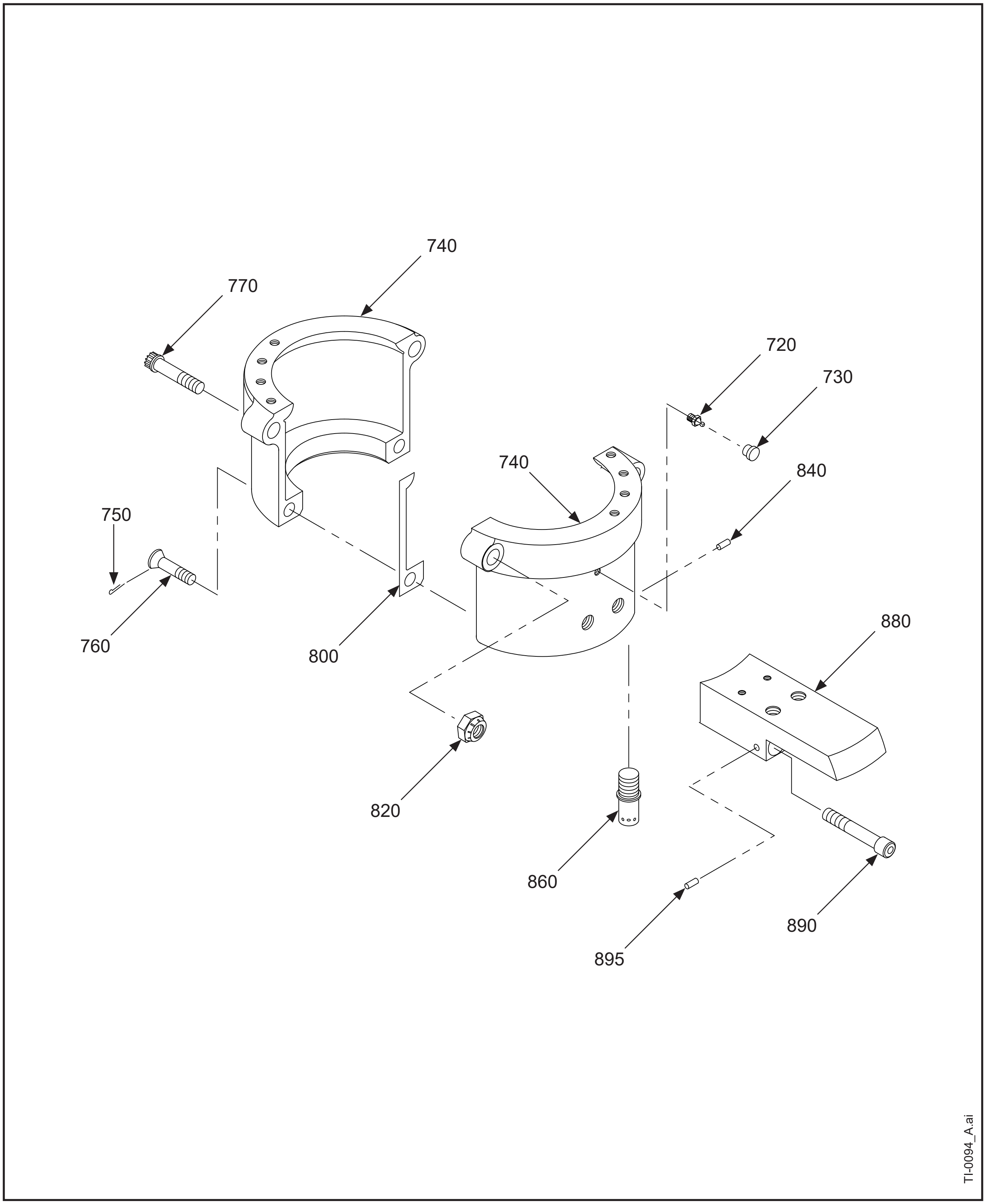
838-123L: Clamp Assembly
Figure 10A-15

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-15		**838-123L CLAMP ASSEMBLY**				
720	B-6588-1	• FITTING, LUBRICATION		2	Y	
730	B-6544	• CAP, FITTING, LUBRICATION		2	Y	
740	C-1977-6P	• PCP: CLAMP, "M", "P", "R" SHANK		1		PCP
750	B-3838-3-2	• COTTER PIN		2	Y	
760	A-321	• SCREW, 3/8-24 DOUBLE 60° HEAD		2	Y	
770	A-1379	• BOLT, 7/16-20, 12 POINT, REPLACED BY ITEM 770A		2	Y	
770A	A-1372	• BOLT, 7/16-20, 12 POINT, REPLACES ITEM 770		2	Y	
800	A-1306-1	• GASKET, CLAMP		2	Y	
820	A-1373	• NUT, 7/16-20, HEX, SELF-LOCKING		2	Y	
840	A-285	• SPRING PIN, 3/32", CRES (LINK SCREW)		1	Y	
860	A-304	• LINKSCREW, 1/2-20		1	Y	
880	C-2681	• PCP: COUNTERWEIGHT		1		PCP
890	A-2036-12	• SOCKET, 7/16-20, CAP, MODIFIED, REPLACED BY ITEM 890A		2	Y	
890A	107995-12	• BOLT, 7/16-20, 12 POINT, REPLACES ITEM 890 POST HC-SL-61-367, REV. 1		2	Y	
895	A-285	• SPRING PIN, 3/32", CRES (SOCKET HEAD CAP SCREW)		2	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

838-123L: Clamp Assembly



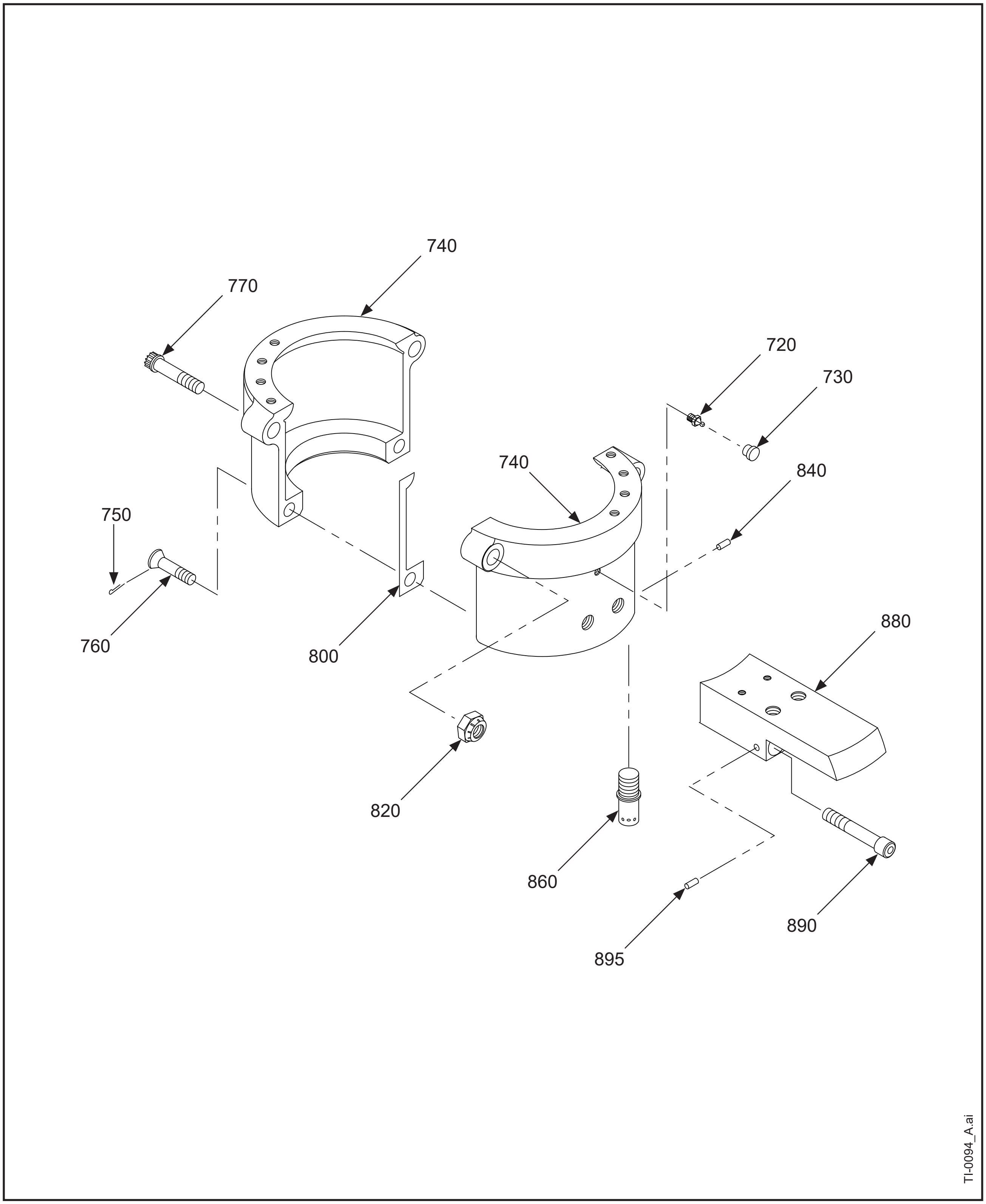
838-127: Clamp Assembly
Figure 10A-16

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-16		**838-127 CLAMP ASSEMBLY**				
720	B-6588-1	• FITTING, LUBRICATION		2	Y	
730	B-6544	• CAP, FITTING, LUBRICATION		2	Y	
740	C-1977-7P	• PCP: CLAMP, "M", "P", "R", SHANK		1		PCP
750	B-3838-3-2	• COTTER PIN		2	Y	
760	A-321	• SCREW, 3/8-24 DOUBLE 60° HEAD		2	Y	
770	A-1379	• BOLT, 7/16-20, 12 POINT, REPLACED BY ITEM 770A		2	Y	
770A	A-1372	• BOLT, 7/16-20,12 POINT, REPLACES ITEM 770		2	Y	
800	A-1306-1	• GASKET, CLAMP		2	Y	
820	A-1373	• NUT, 7/16-20, HEX, SELF-LOCKING		2	Y	
840	A-285	• SPRING PIN, 3/32", CRES (LINK SCREW)		1	Y	
860	A-304	• LINKSCREW, 1/2-20		1	Y	
880	C-2681	• PCP: COUNTERWEIGHT		1		PCP
890	A-2036-12	• SOCKET, 7/16-20, CAP, MODIFIED, REPLACED BY ITEM 890A		2	Y	
890A	107995-12	• BOLT, 7/16-20, 12 POINT, REPLACES ITEM 890 POST HC-SL-61-367, REV. 1		2	Y	
895	A-285	• SPRING PIN, 3/32", CRES (SOCKET HEAD CAP SCREW)		2	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

838-127: Clamp Assembly



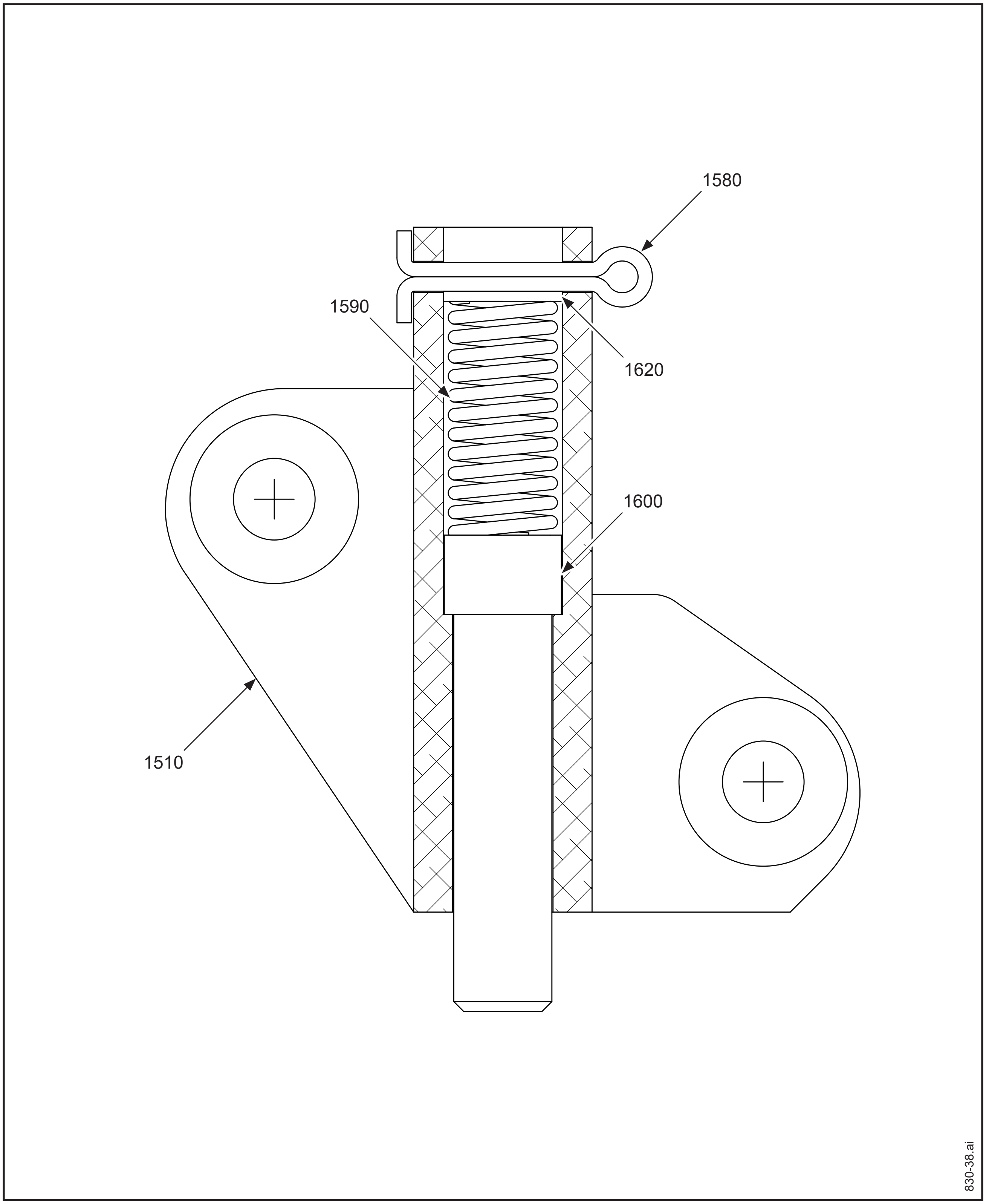
838-128L: Clamp Assembly
Figure 10A-17

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-17		**838-128L CLAMP ASSEMBLY**				
720	B-6588-1	• FITTING, LUBRICATION		2	Y	
730	B-6544	• CAP, FITTING, LUBRICATION		2	Y	
740	C-1977-6P	• PCP: CLAMP, "M", "P", "R" SHANK		1		PCP
750	B-3838-3-2	• COTTER PIN		2	Y	
760	A-321	• SCREW, 3/8-24 DOUBLE 60° HEAD		2	Y	
770	A-1379	• BOLT, 7/16-20, 12 POINT, REPLACED BY ITEM 770A		2	Y	
770A	A-1372	• BOLT, 7/16-20, 12 POINT, REPLACES ITEM 770		2	Y	
800	A-1306-1	• GASKET, CLAMP		2	Y	
820	A-1373	• NUT, 7/16-20, HEX, SELF-LOCKING		2	Y	
840	A-285	• SPRING PIN, 3/32", CRES (LINK SCREW)		1	Y	
860	A-304	• LINKSCREW, 1/2-20		1	Y	
880	C-2681-1	• COUNTERWEIGHT		1		
890	A-2036-12	• SOCKET, 7/16-20, CAP, MODIFIED, REPLACED BY ITEM 890A		2	Y	
890A	107995-12	• BOLT, 7/16-20, 12 POINT, REPLACES ITEM 890 POST HC-SL-61-367, REV. 1		2	Y	
895	A-285	• SPRING PIN, 3/32", CRES (SOCKET HEAD CAP SCREW)		2	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

838-128L: Clamp Assembly



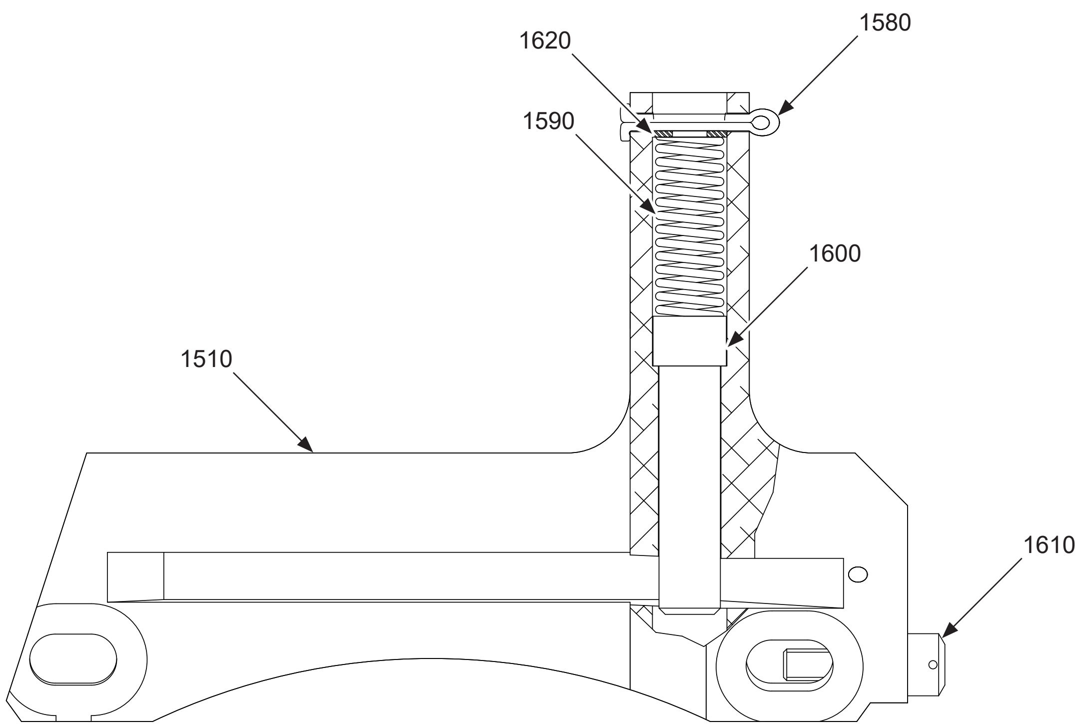
830-38: Start Lock Assembly
Figure 10A-18

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-18		**830-38 START LOCK ASSEMBLY**				
1510	B-3418-2	• BRACKET, START LOCK, SUPERSEDED BY ITEM 1510A	NDI	1		
1510A	101225	• BRACKET, START LOCK, SUPERSEDES ITEM 1510 POST HC-SL-61-248		1		
1580	B-3838-3-3	• COTTER PIN		1	Y	
1590	B-3399	• PCP: SPRING, COMPRESSION		1		PCP
1600	A-883	• PIN, START LOCK		1		
1620	B-3851-N832	• WASHER		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
NDI	NO DE-ICE		

- ITEM NOT ILLUSTRATED

830-38: Start Lock Assembly



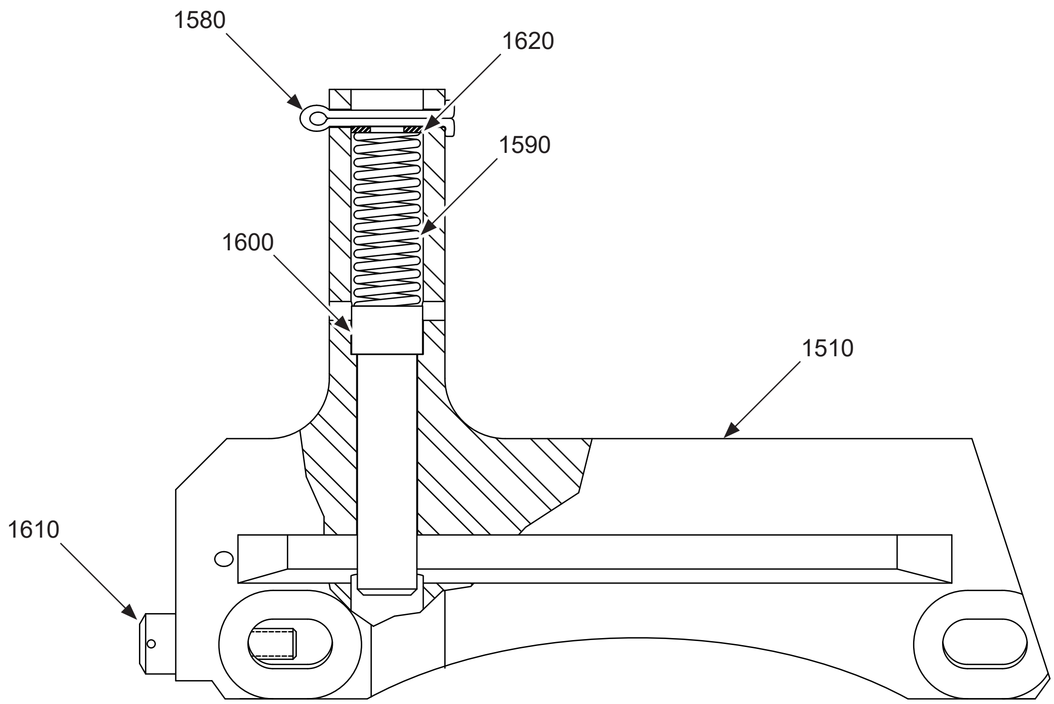
830-40: Start Lock Assembly
Figure 10A-19

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-19		**830-40 START LOCK ASSEMBLY**				
1510	C-6072	• BRACKET, START LOCK		1		
1580	B-3838-3-3	• COTTER PIN		1	Y	
1590	A-3066	• PCP: SPRING, COMPRESSION		1	Y	PCP
1600	A-883	• PIN, START LOCK		1		
1610	A-3429-1	• SCREW, 10-32, CAP		1	Y	
1620	B-3851-N832	• WASHER		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

830-40: Start Lock Assembly



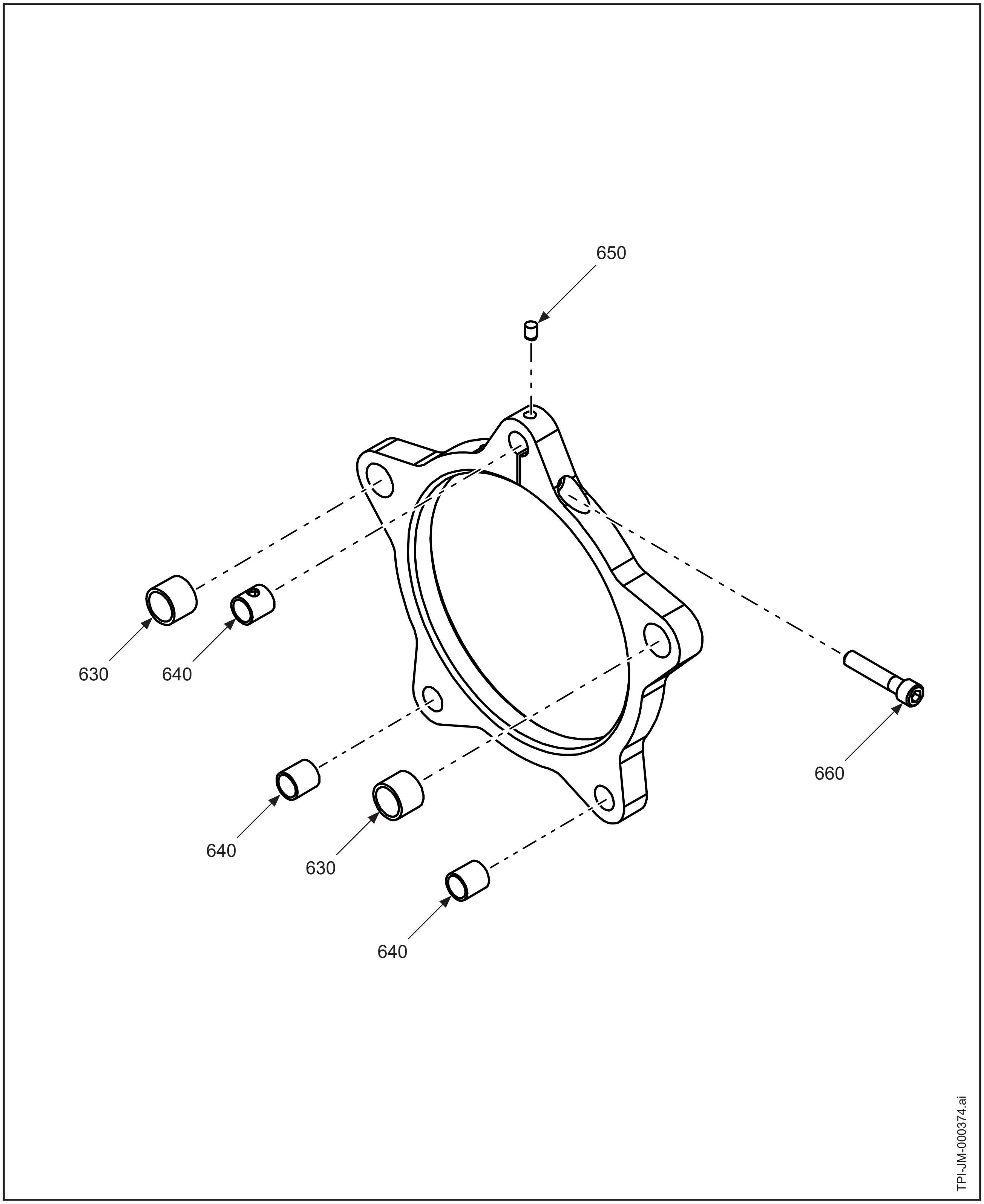
830-40L: Start Lock Assembly
Figure 10A-20

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-20		**830-40L START LOCK ASSEMBLY**				
1510	C-5884	• BRACKET, START LOCK		1		
1580	B-3838-3-3	• COTTER PIN		1	Y	
1590	A-3066	• PCP: SPRING, COMPRESSION		1	Y	PCP
1600	A-883	• PIN, START LOCK		1		
1610	A-3429-1	• SCREW, 10-32, CAP		1	Y	
1620	B-3851-N832	• WASHER		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

830-40L: Start Lock Assembly



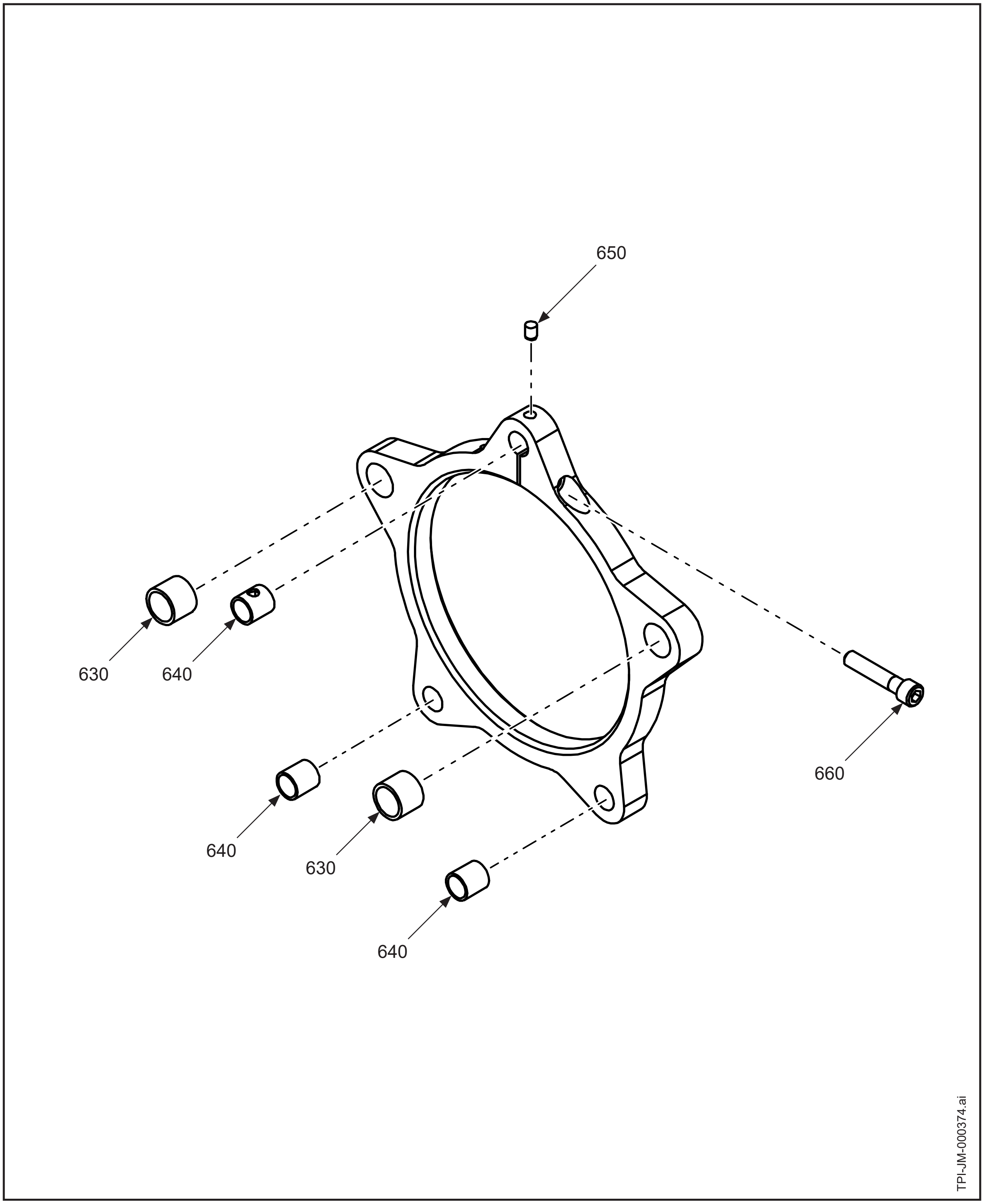
834-19: Guide Collar Unit
Figure 10A-21

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-21		**834-19 GUIDE COLLAR UNIT**				
630	A-116-A	• BUSHING, PLASTIC (LARGE), SUPERSEDED BY ITEM 630A		2		
630A	A-116-A1	• BUSHING, PLASTIC (LARGE), SUPERSEDES ITEM 630		2		
640	A-3023	• BUSHING, PLASTIC (SMALL)		3		
650	A-114-C	• DOWEL PIN		1		
660	A-2038-12	• SCREW, 1/4-28, CAP		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

834-19: Guide Collar Unit



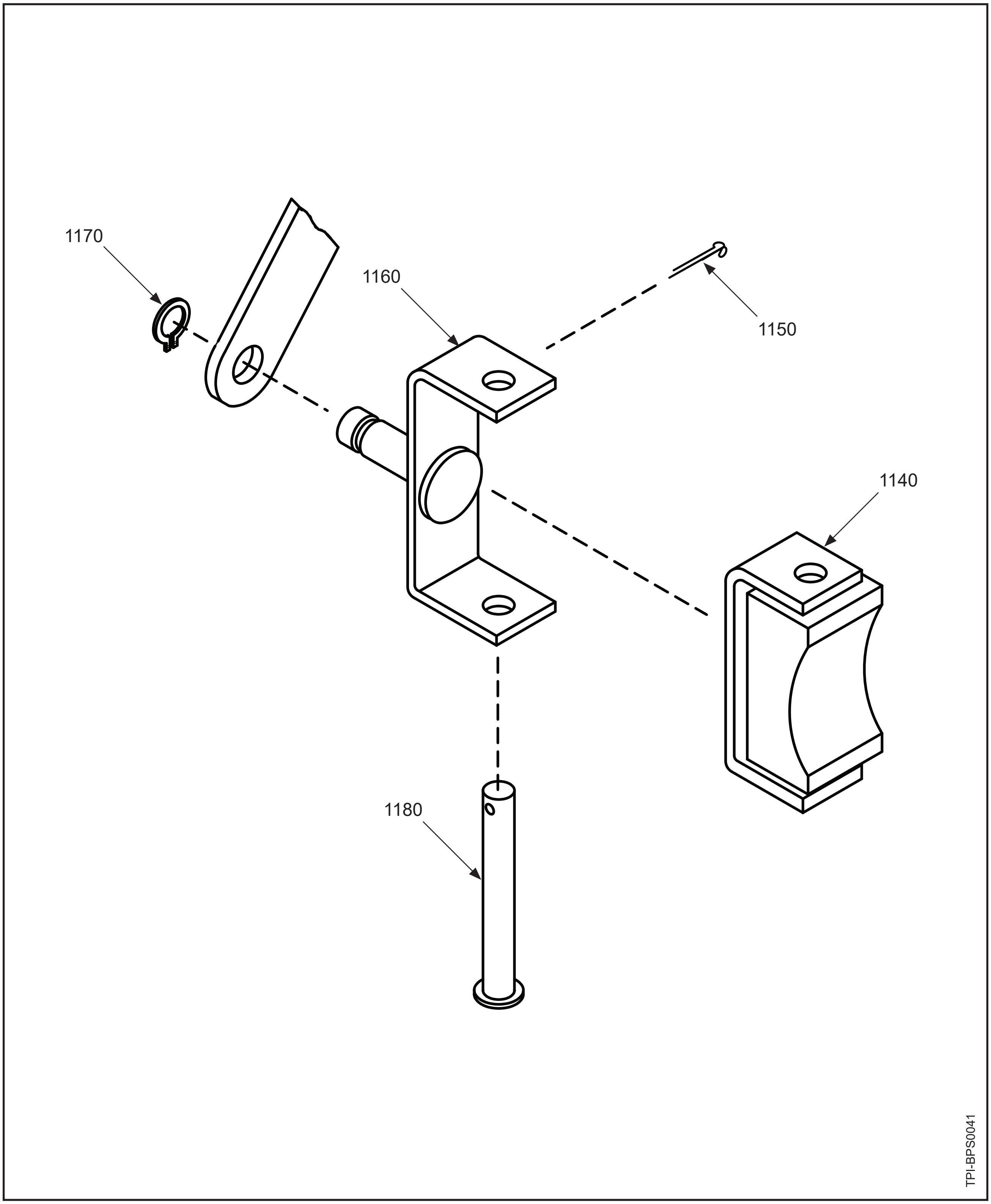
834-24: Guide Collar Unit
Figure 10A-22

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-22		**834-24 GUIDE COLLAR UNIT**				
630	A-116-A1	• BUSHING, PLASTIC (LARGE)		2		
640	A-3023	• BUSHING, PLASTIC (SMALL)		3		
650	A-114-C	• DOWEL PIN		1		
660	A-2038-12	• SCREW, 1/4-28, CAP		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

834-24: Guide Collar Unit



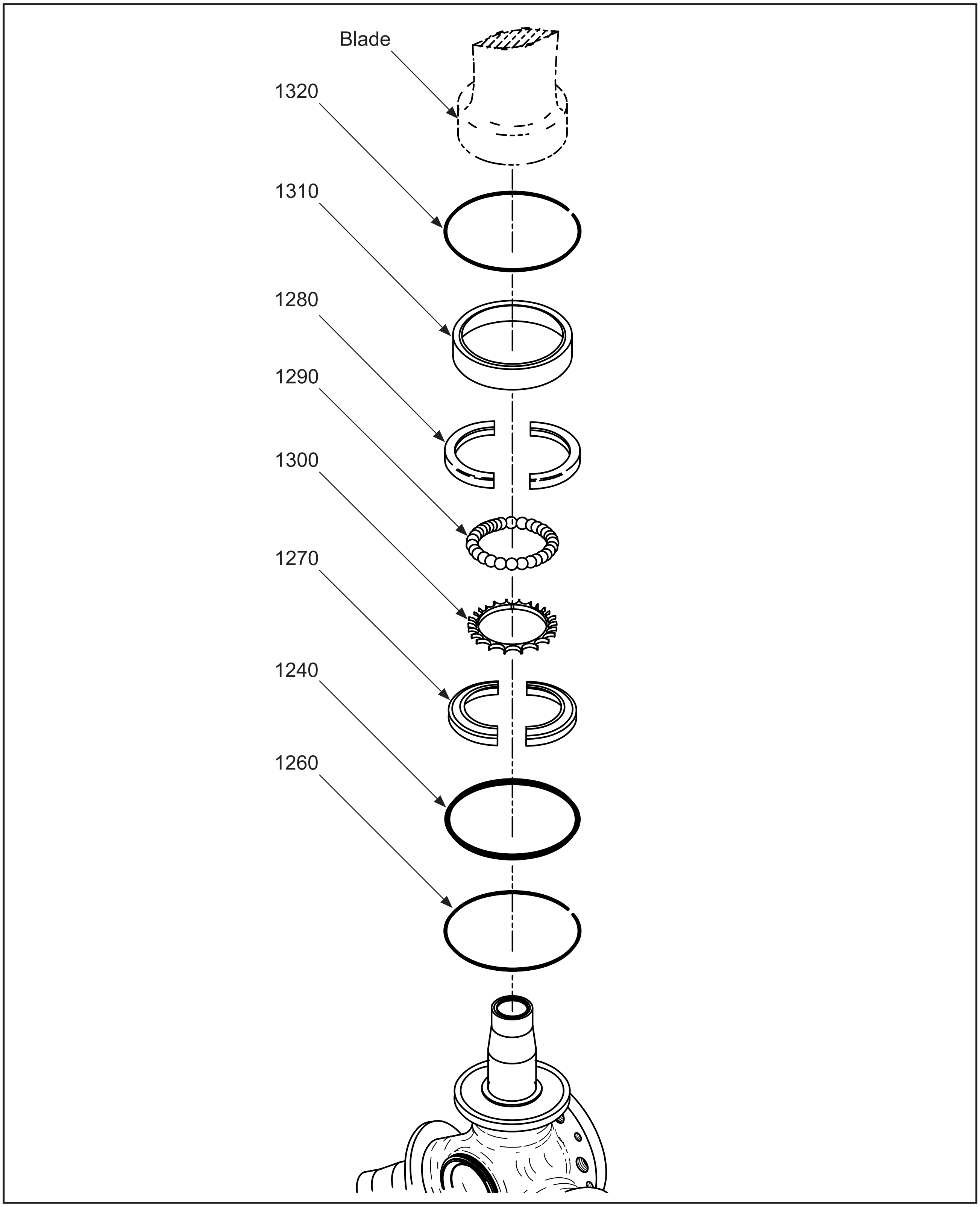
A-3044: Beta Feedback Block Assembly
Figure 10A-23

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-23		**A-3044 BETA FEEDBACK BLOCK ASSEMBLY**				
1140	A-3026	• CARBON BLOCK - UNIT		1	Y	
1150	A-4543	• COTTER PIN, T HEAD		1	Y	
1160	A-3025	• YOKE UNIT		1		
-1170	791210025	• 5100-25-S-PP TRUARC SNAP RING, EXTERNAL REPLACED BY ITEM 1170A		OBS		
1170A	B-3843-25PP	• SNAP RING, EXTERNAL, REPLACES ITEM 1170		1	Y	
1180	B-3844-53	• CLEVIS PIN		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL

- ITEM NOT ILLUSTRATED

A-3044: Beta Feedback Block Assembly



Blade Retention Parts
Figure 10A-24

FIG./ITEM NUMBER	PART NUMBER	DESCRIPTION	EFF CODE	UPA	O/H	PCP
10A-24		**BLADE RETENTION PARTS** **All quantities (UPA) in this parts list are per blade assembly.**				
1240	C-3317-232	• O-RING		1	Y	
1240A	C-3317-230	• O-RING, ALTERNATE FOR ITEM 1240 (IF ITEM 1240 CAUSES TOO MUCH FRICTION)		1	Y	
1240B	C-3317-231	• O-RING, ALTERNATE FOR ITEM 1240 (IF ITEM 1240 CAUSES TOO MUCH FRICTION)		1	Y	
-1250	A-1851-T	• BEARING, RETENTION, BLADE	A	1		
-1250A	A-1851	• BEARING, RETENTION, BLADE, ALTERNATE FOR ITEM 1250	A	1		
1270	A-1851-TA A-1851-A	• • RACE, HUB SIDE (USE WITH ITEM 1250) • • RACE, HUB SIDE (USE WITH ITEM 1250A)		1 1		
1280	A-1851-TB A-1851-B	• • RACE, BLADE SIDE (USE WITH ITEM 1250) • • RACE, BLADE SIDE (USE WITH ITEM 1250A)		1 1		
1260	A-1877	• • RETAINER, BEARING WIRE		1	Y	
1290	B-6144-2 B-6144-2-450	• • BALL, BEARING, 9/16" DIA • • BALL, BEARING, 9/16" DIA, 450 PCS		19 RF	Y	
1300	A-1889	• BALL SPACER, SUPERSEDED BY ITEM 1300A		1	Y	
1300A	B-3742	• BALL SPACER, SUPERSEDES ITEM 1300		1	Y	
1310	A-1852	• RING, RETAINING, BEARING		1		
1320	A-1854	• RETAINER, RING, WIRE		1	Y	

EFFECTIVITY	MODEL	EFFECTIVITY	MODEL
A	Mixing old/new design A-1851-T(A,B) bearing race sets on the same propeller blade is not permitted. Mixing old/new design A-1851-T(A,B) bearing race sets in the same propeller is permitted.		

- ITEM NOT ILLUSTRATED

Blade Retention Parts

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