



STANDARD OVERHAUL PRACTICES MANUAL

BEARING AND BUSHING REPLACEMENT

**PART NUMBER
NONE**

BOEING PROPRIETARY, CONFIDENTIAL, AND/OR TRADE SECRET

Copyright © 1995 The Boeing Company
Unpublished Work - All Rights Reserved

Boeing claims copyright in each page of this document only to the extent that the page contains copyrightable subject matter. Boeing also claims copyright in this document as a compilation and/or collective work.

This document includes proprietary information owned by The Boeing Company and/or one or more third parties. Treatment of the document and the information it contains is governed by contract with Boeing. For more information, contact The Boeing Company, P.O. Box 3707, Seattle, Washington 98124.

Boeing, the Boeing signature, the Boeing symbol, 707, 717, 727, 737, 747, 757, 767, 777, 787, Dreamliner, BBJ, DC-8, DC-9, DC-10, KC-10, KDC-10, MD-10, MD-11, MD-80, MD-88, MD-90, P-8A, Poseidon and the Boeing livery are all trademarks owned by The Boeing Company; and no trademark license is granted in connection with this document unless provided in writing by Boeing.

PUBLISHED BY BOEING COMMERCIAL AIRPLANES GROUP, SEATTLE, WASHINGTON, USA
A DIVISION OF THE BOEING COMPANY
PAGE DATE: Jul 01/2009

20-50-03

Page 1
Jul 01/2009



STANDARD OVERHAUL PRACTICES MANUAL

Revision No. 88
Jul 01/2009

To: All holders of BEARING AND BUSHING REPLACEMENT 20-50-03.

Attached is the current revision to this STANDARD OVERHAUL PRACTICES MANUAL

The STANDARD OVERHAUL PRACTICES MANUAL is furnished either as a printed manual, on microfilm, or digital products, or any combination of the three. This revision replaces all previous microfilm cartridges or digital products. All microfilm and digital products are reissued with all obsolete data deleted and all updated pages added.

For printed manuals, changes are indicated on the List of Effective Pages (LEP). The pages which are revised will be identified on the LEP by an R (Revised), A (Added), O (Overflow, i.e. changes to the document structure and/or page layout), or D (Deleted). Each page in the LEP is identified by Chapter-Section-Subject number, page number and page date.

Pages replaced or made obsolete by this revision should be removed and destroyed.

ATTENTION

IF YOU RECEIVE PRINTED REVISIONS, PLEASE VERIFY THAT YOU HAVE RECEIVED AND FILED THE PREVIOUS REVISION. BOEING MUST BE NOTIFIED WITHIN 30 DAYS IF YOU HAVE NOT RECEIVED THE PREVIOUS REVISION. REQUESTS FOR REVISIONS OTHER THAN THE PREVIOUS REVISION WILL REQUIRE A COMPLETE MANUAL REPRINT SUBJECT TO REPRINT CHARGES SHOWN IN THE DATA AND SERVICES CATALOG.

20-50-03

TRANSMITTAL LETTER

Page 1

Jul 01/2009



STANDARD OVERHAUL PRACTICES MANUAL

Location of Change

20-50-03

PGBLK 20-50-03-0

Description of Change

Added more details for roller swaged sleeves.

Added tools for bushings 161A1133, 161A1204, 161A1211, 161A2109, 161A4103.

Added more tools for bearing outer race 293W2514-series.

Added bearings AS24461, MS24461.

Added proof load test tool for bearing S302T001-301.

20-50-03

HIGHLIGHTS

Page 1

Jul 01/2009



STANDARD OVERHAUL PRACTICES MANUAL

Subject/Page	Date	Subject/Page	Date	Subject/Page	Date
TITLE PAGE		20-50-03 SUBJECT (CONT)		20-50-03 SUBJECT (CONT)	
O 1	Jul 01/2009	16	Jul 01/2005	O 55	Jul 01/2009
2	BLANK	17	Jul 01/2005	O 56	Jul 01/2009
20-50-03 TRANSMITTAL LETTER		18	Jul 01/2005	O 57	Jul 01/2009
O 1	Jul 01/2009	19	Mar 01/2008	O 58	Jul 01/2009
2	BLANK	R 20	Jul 01/2009	R 59	Jul 01/2009
20-50-03 HIGHLIGHTS		21	Mar 01/2008	O 60	Jul 01/2009
O 1	Jul 01/2009	22	Mar 01/2008	O 61	Jul 01/2009
2	BLANK	23	Mar 01/2008	O 62	Jul 01/2009
20-50-03 EFFECTIVE PAGES		24	Mar 01/2008	O 63	Jul 01/2009
1 thru 2	Jul 01/2009	25	Mar 01/2008	O 64	Jul 01/2009
20-50-03 CONTENTS		26	Mar 01/2008	O 65	Jul 01/2009
O 1	Jul 01/2009	R 27	Jul 01/2009	O 66	Jul 01/2009
2	BLANK	R 28	Jul 01/2009	R 67	Jul 01/2009
20-50-03 REVISION RECORD		29	Mar 01/2008	O 68	Jul 01/2009
1	Jul 01/2005	30	Mar 01/2008	O 69	Jul 01/2009
2	Jul 01/2005	31	Mar 01/2007	O 70	Jul 01/2009
20-50-03 RECORD OF TEMPORARY REVISIONS		32	Mar 01/2007	O 71	Jul 01/2009
1	Jul 01/2005	33	Mar 01/2008	O 72	Jul 01/2009
2	Jul 01/2005	34	Mar 01/2008	O 73	Jul 01/2009
20-50-03 INTRODUCTION		35	Mar 01/2007	O 74	Jul 01/2009
1	Jul 01/2005	36	Mar 01/2007	O 75	Jul 01/2009
2	BLANK	37	Mar 01/2007	O 76	Jul 01/2009
20-50-03 SUBJECT		38	Mar 01/2007	O 77	Jul 01/2009
1	Jul 01/2008	39	Mar 01/2007	O 78	Jul 01/2009
2	Jul 01/2008	40	Mar 01/2008	R 79	Jul 01/2009
3	Nov 01/2007	41	Mar 01/2008	O 80	Jul 01/2009
4	Jul 01/2005	42	Mar 01/2008	O 81	Jul 01/2009
5	Jul 01/2005	43	Mar 01/2007	O 82	Jul 01/2009
6	Jul 01/2005	44	Mar 01/2007	O 83	Jul 01/2009
7	Mar 01/2008	45	Mar 01/2007	O 84	Jul 01/2009
8	Nov 01/2007	46	Mar 01/2007	O 85	Jul 01/2009
9	Mar 01/2007	47	Mar 01/2007	O 86	Jul 01/2009
10	Jul 01/2005	48	Mar 01/2007	O 87	Jul 01/2009
11	Mar 01/2008	49	Mar 01/2007	O 88	Jul 01/2009
12	Nov 01/2006	R 50	Jul 01/2009	O 89	Jul 01/2009
13	Mar 01/2007	R 51	Jul 01/2009	O 90	Jul 01/2009
14	Mar 01/2007	R 52	Jul 01/2009	O 91	Jul 01/2009
15	Jul 01/2005	O 53	Jul 01/2009	O 92	Jul 01/2009
		O 54	Jul 01/2009	O 93	Jul 01/2009

A = Added, R = Revised, D = Deleted, O = Overflow

20-50-03

EFFECTIVE PAGES

Page 1

Jul 01/2009



STANDARD OVERHAUL PRACTICES MANUAL

Subject/Page	Date	Subject/Page	Date	Subject/Page	Date
20-50-03 SUBJECT (CONT)		20-50-03 SUBJECT (CONT)		20-50-03 SUBJECT (CONT)	
O 94	Jul 01/2009	O 98.35	Jul 01/2009	A 98.74	Jul 01/2009
O 95	Jul 01/2009	O 98.36	Jul 01/2009		
O 96	Jul 01/2009	O 98.37	Jul 01/2009		
O 97	Jul 01/2009	O 98.38	Jul 01/2009		
O 98	Jul 01/2009	O 98.39	Jul 01/2009		
R 98.1	Jul 01/2009	O 98.40	Jul 01/2009		
O 98.2	Jul 01/2009	R 98.41	Jul 01/2009		
O 98.3	Jul 01/2009	O 98.42	Jul 01/2009		
O 98.4	Jul 01/2009	O 98.43	Jul 01/2009		
O 98.5	Jul 01/2009	O 98.44	Jul 01/2009		
O 98.6	Jul 01/2009	O 98.45	Jul 01/2009		
O 98.7	Jul 01/2009	R 98.46	Jul 01/2009		
O 98.8	Jul 01/2009	O 98.47	Jul 01/2009		
O 98.9	Jul 01/2009	O 98.48	Jul 01/2009		
O 98.10	Jul 01/2009	O 98.49	Jul 01/2009		
O 98.11	Jul 01/2009	O 98.50	Jul 01/2009		
O 98.12	Jul 01/2009	O 98.51	Jul 01/2009		
O 98.13	Jul 01/2009	O 98.52	Jul 01/2009		
O 98.14	Jul 01/2009	O 98.53	Jul 01/2009		
O 98.15	Jul 01/2009	O 98.54	Jul 01/2009		
O 98.16	Jul 01/2009	O 98.55	Jul 01/2009		
O 98.17	Jul 01/2009	O 98.56	Jul 01/2009		
O 98.18	Jul 01/2009	O 98.57	Jul 01/2009		
O 98.19	Jul 01/2009	O 98.58	Jul 01/2009		
O 98.20	Jul 01/2009	O 98.59	Jul 01/2009		
O 98.21	Jul 01/2009	O 98.60	Jul 01/2009		
O 98.22	Jul 01/2009	R 98.61	Jul 01/2009		
O 98.23	Jul 01/2009	R 98.62	Jul 01/2009		
O 98.24	Jul 01/2009	R 98.63	Jul 01/2009		
O 98.25	Jul 01/2009	O 98.64	Jul 01/2009		
O 98.26	Jul 01/2009	O 98.65	Jul 01/2009		
O 98.27	Jul 01/2009	O 98.66	Jul 01/2009		
O 98.28	Jul 01/2009	O 98.67	Jul 01/2009		
O 98.29	Jul 01/2009	O 98.68	Jul 01/2009		
O 98.30	Jul 01/2009	O 98.69	Jul 01/2009		
O 98.31	Jul 01/2009	O 98.70	Jul 01/2009		
O 98.32	Jul 01/2009	O 98.71	Jul 01/2009		
O 98.33	Jul 01/2009	O 98.72	Jul 01/2009		
O 98.34	Jul 01/2009	A 98.73	Jul 01/2009		

A = Added, R = Revised, D = Deleted, O = Overflow

20-50-03

EFFECTIVE PAGES

Page 2

Jul 01/2009

**STANDARD OVERHAUL PRACTICES MANUAL****TABLE OF CONTENTS**

<u>Paragraph Title</u>	<u>Page</u>
BEARING AND BUSHING REPLACEMENT	1
INTRODUCTION	1
DEFINITIONS	1
MATERIALS	2
BEARING REMOVAL	2
BENCH INSPECTION OF BEARINGS AND BUSHINGS	6
BEARING INSTALLATION	7
INTERFERENCE FIT INSTALLATION OF BEARINGS AND BUSHINGS	11
BEARING RETENTION BY MECHANICAL MEANS	19
BEARING RETENTION WITH ADHESIVES	57
TOOLS	59

20-50-03

CONTENTS

Page 1

Jul 01/2009

All revisions to this manual will be accompanied by transmittal sheet bearing the revision number. Enter the revision number in numerical order, together with the revision date, the date filed and the initials of the person filing.

[illegible]

BOEING PROPRIETARY - Copyright © Unpublished Work - See title page for details

[illegible]

BOEING PROPRIETARY - Copyright © Unpublished Work - See title page for details

When the temporary revision is incorporated or cancelled, and the pages are removed, enter the date the pages are removed and the initials of the person who removed the temporary revision.

[illegible]

BOEING PROPRIETARY - Copyright © Unpublished Work - See title page for details

[illegible]

BOEING PROPRIETARY - Copyright © Unpublished Work - See title page for details



STANDARD OVERHAUL PRACTICES MANUAL

INTRODUCTION

1. General

- A. The instructions in this manual tell how to do standard shop procedures during maintenance functions from simple checks and replacement to complete shop-type repair.
- B. This manual is divided into separate sections:
 - (1) Title Page
 - (2) Transmittal Letter
 - (3) Highlights
 - (4) Effective Pages
 - (5) Contents
 - (6) Revision Record
 - (7) Record of Temporary Revisions
 - (8) Introduction
 - (9) Procedures
- C. Refer to SOPM 20-00-00 for a definition of standard industry practices, vendor names and addresses, and an explanation of the True Position Dimensioning symbols used.
- D. The data is general. It is not about all situations or specific installations. Use it as a guide to help you write minimum standards.
- E. If the component overhaul instructions are different from the data in this subject, use the component overhaul instructions.

20-50-03

INTRODUCTION

Page 1

Jul 01/2005



STANDARD OVERHAUL PRACTICES MANUAL

BEARING AND BUSHING REPLACEMENT

1. INTRODUCTION

- A. The data in this subject comes from Boeing Process Specifications BAC5040 and BAC5435, Boeing drawing 66-19908, some tool drawings, and Boeing Document D-14780. The airline has a copy of the Boeing Process Specification Manual.
- B. This subject tells how to replace rolling-element (antifriction) bearings, sliding-surface (plain) bearings, self-lubricated (Teflon) bearings, sintered bearings, and bushings (journal bearings).
- C. The data is general. It is not about all situations or specific installations. Use it as a guide to help you write minimum standards.
- D. If the component overhaul instructions are different than the data in this subject, use the component overhaul instructions.
- E. Refer to SOPM 20-00-00 for a full list of all the vendor names and addresses.

2. DEFINITIONS

- A. Bearing – A general term used in this subject to refer to a component with inner and outer parts that can move one relative to the other. Rolling element bearings, sometimes also known as antifriction bearings, have rolling elements (balls, rollers, or needles) that send the load between the inner and outer race. Sliding surface bearings, also known as plain bearings, include all bearings in which one surface slides relative to another. Sliding surface bearings can be spherical bearings or journal bearings. Journal bearings are also known as bushings, which is the term used in this subject.
- B. Bushing – A lining of metal or similar material for a hole, to give the hole protection from wear, or to put replaceable material in the hole of a larger part not as economically replaceable.
- C. Expanded fit – An installation procedure where the bushing is installed in the housing as a clearance fit, and then a tool is put into the bore to expand the bushing to become an interference fit.
- D. Housing – The material around the hole in a larger part which gets a bushing, bearing, or similar part.
- E. Installation – A procedure that puts the mating parts together, without damage to either part.
- F. Installation finish – Grease, sealant, or other material applied to mating surfaces before assembly, for corrosion protection or to help the installation or retention process.
- G. Net fit bushing – A bushing made to tighter tolerances, to give acceptable assembled dimensions without adjustment after installation.
- H. Press fit – Installation of interference-fit mating parts when the amount of interference is sufficiently small that parts will not be damaged by the mechanical force that installs one part in the other.
- I. Retention – Any procedure, such as intentional deformation of one of the mating parts, which is used to hold parts together after installation.
- J. Shrink fit – An installation procedure in which one part is chilled, to temporarily change the interference fit to a clearance fit for installation without damage to the parts. Also known as temperature differential. Some component-specific overhaul instructions could also heat the mating part.
- K. Stake – To deform, usually by pressure or impact at isolated points, for retention purposes. Sometimes used interchangeably with swage.
- L. Swage – To deform, usually by pressure or impact over an extended area, for retention purposes.
- M. Substrate part – Same as housing.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

N. Temperature differential – Same as shrink fit.

3. MATERIALS

A. Adhesives

- (1) EA 913 or EA 913.1 (SOPM 20-60-04)
- (2) Type 54 (BMS 5-25, Grade 1) (SOPM 20-50-12)
- (3) Type 70 (BMS 5-92) (SOPM 20-50-12)

B. Coolants for shrink fit procedure

- (1) Dowanol DPM, V71984
- (2) Dry ice
- (3) Ethyl alcohol (SOPM 20-60-01)
- (4) Liquid nitrogen
- (5) Methanol (SOPM 20-60-01)

C. Grease (SOPM 20-60-03)

- (1) BMS 3-24
- (2) BMS 3-33
- (3) MIL-G-23827

D. Oil, lubricating, for sintered bearings – MIL-L-7870 (SOPM 20-60-03)

E. Paper, grease-proof – MIL-B-121 (SOPM 20-60-04)

F. Sealant – BMS 5-95 (SOPM 20-60-04)

G. Solvents

- (1) Methanol (methyl alcohol) (SOPM 20-60-01)
- (2) Series 98 (SOPM 20-30-98)

H. Strippers (SOPM 20-60-01)

- (1) Nuvite 631-3A
- (2) Pennwalt E-Z-Strip
- (3) Turco 4669

4. BEARING REMOVAL

A. Bearings retained by a staked or swaged outer race over the housing.

- (1) These bearings can be removed without housing damage with ST927 or equivalent tools. Swaged bushings or sleeve-staked bearings can be removed with the same procedure.
- (2) Removal is a two-step operation. The swaged lip material is removed with a hole saw. Then the bearing or sleeve is punched or pressed out of its housing (Figure 1).
 - (a) For F80118-27 kit, assemble the tool components around the installed bearing as shown.
 - (b) For ST927 or equivalent tools:
 - 1) Put the part on the anvil, with the bearing bore on the pilot bushing.
 - 2) Install the applicable hole saw on the cutter pilot or arbor. Some applications use a different hole saw, such as ST1212E- or A32091-series, to replace the saw that comes with the tool.

20-50-03

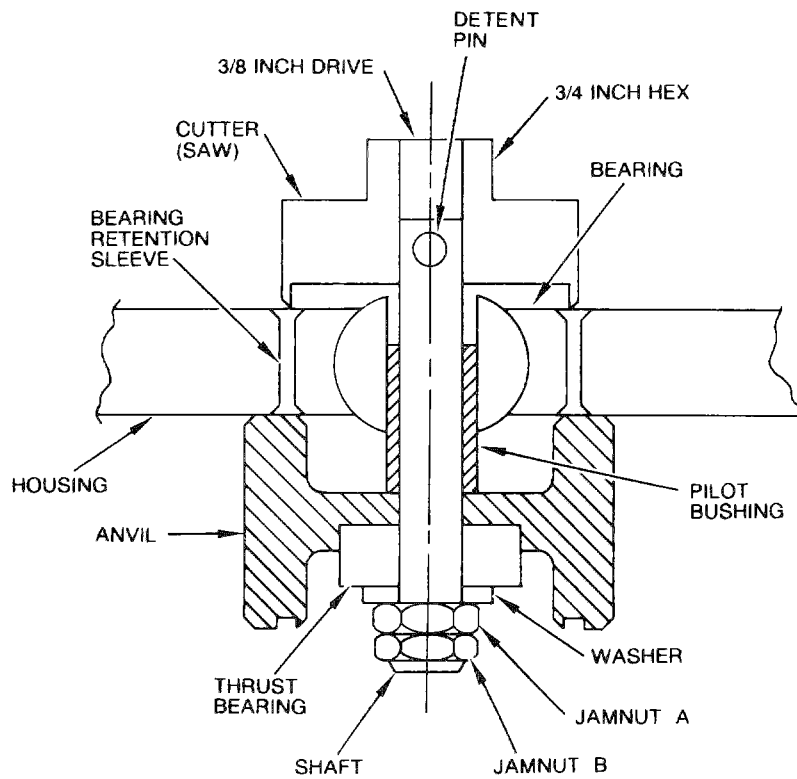


STANDARD OVERHAUL PRACTICES MANUAL

- (c) Turn the arbor or cutter pilot to saw away the deformed lip metal. Stop when the lip metal is removed to prevent damage to the housing bore.
 - (d) Lift off the cutter. Press or punch out the bearing, such as with a punch and a pilot as shown.
- B. Bearings installed by interference fit, swaged or staked sleeve, or swaged or staked housing.
 - (1) Press the bearing, bushing, or sleeve out of the housing with the same tool setup as for the proof load test, shown in Figure 9, Figure 13, or Figure 21, as applicable.
 - (2) Be sure to give the housing support to prevent damage.
- C. Bushings installed with swaged or flared end.
 - (1) Cut off the flange with a ream or cutter (such as the A20011-series tools specially made for some bushings).
 - (2) Push or punch out the bushing with a stepped mandrel (such as A20011 tools) that has a smaller OD to fit the bushing bore and a larger OD to push against the bushing end, but not larger than the mating hole in the housing.
 - (3) If the bushing was also installed with an interference fit, it could be necessary to make the bushing cold to decrease the interference fit to make removal easier.

20-50-03

STANDARD OVERHAUL PRACTICES MANUAL

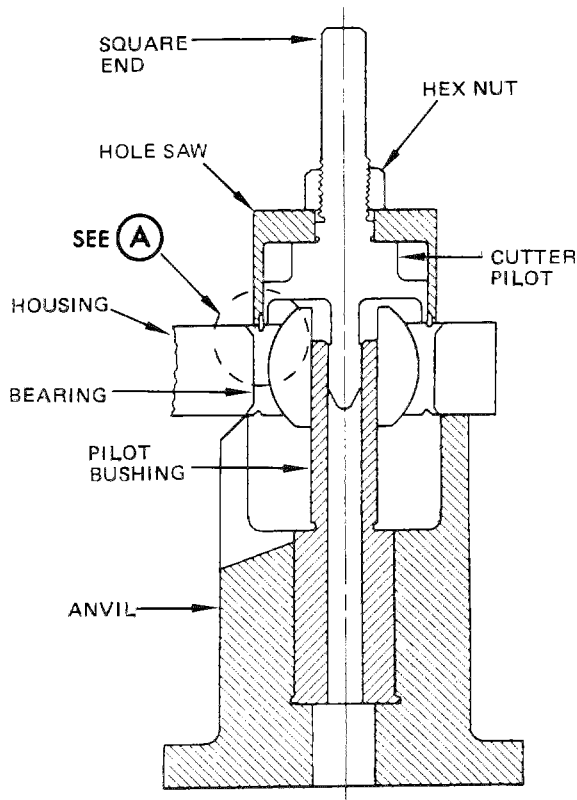


F80118-27 SHOWN
(F80118-38 REMOVAL KIT SIMILAR)

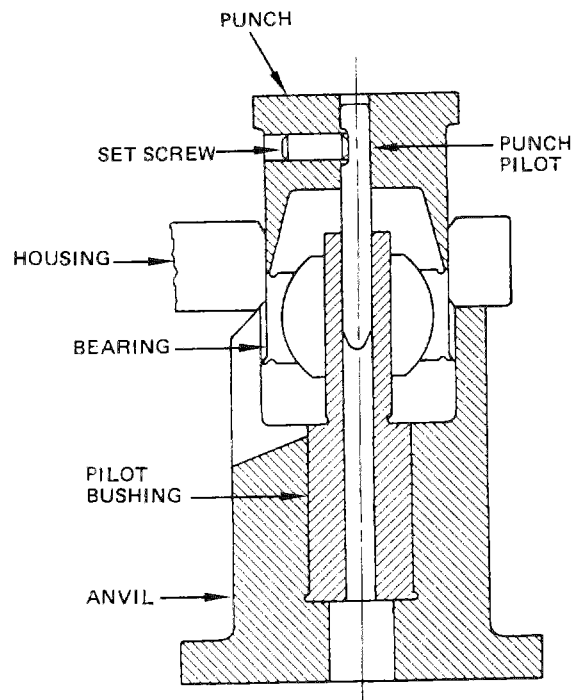
Typical Bearing Removal Details
Figure 1 (Sheet 1 of 2)

20-50-03

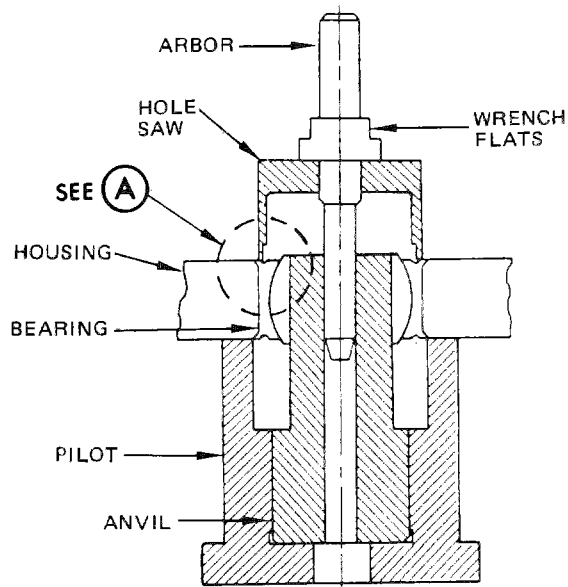
STANDARD OVERHAUL PRACTICES MANUAL



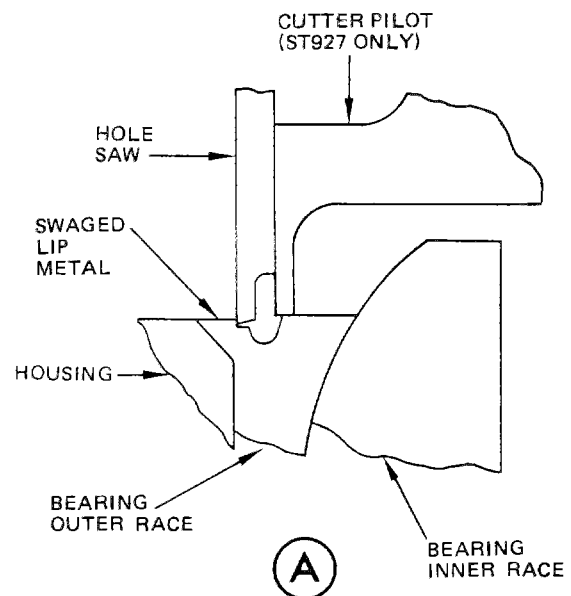
ST927-REMOVAL OF SWAGED LIP



ST927-REMOVAL OF BEARING



ST927C-REMOVAL OF SWAGED LIP



Typical Bearing Removal Details
Figure 1 (Sheet 2 of 2)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

5. BENCH INSPECTION OF BEARINGS AND BUSHINGS

A. Precautions

CAUTION: BE CAREFUL TO KEEP ADVERSE MATERIALS AWAY FROM SELF-LUBRICATED BEARINGS BEFORE, DURING OR AFTER INSTALLATION.

- (1) Materials which will chemically attack bearing components
 - (a) Acid brighteners for aluminum
 - (b) Phosphoric acid corrosion removers for aluminum or steel
 - (c) Paint strippers
- (2) Materials which will collect dust and dirt in the bearings, and increase friction and wear
 - (a) Oils and greases
 - (b) Cutting oils
 - (c) Antiseize compounds
- (3) Be careful not to misalign the bearing more than the angle specified in the bearing specification or drawing, or you could damage races, rolling elements, seals, or seal retainers.

B. General

- (1) Examine the bearing or bushing for damage, cracks, corrosion, or other defects on the bearing bore and outside diameter. If you find defects, make a check of the dimensions of the bearing or bushing to make sure they are within limits.
- (2) Turn the races of the bearings manually and look for roughness, unusual looseness, unusual drag (more than the usual preload drag), or drag that is not constant.

C. Teflon Liner Condition

- (1) Examine the liner for wear. Generally, wear to cause an internal diametrical play of 0.005 inch could make the bearing unserviceable. But you can use service experience with the wear limits for specific applications.

NOTE: On most spherical bearings, you can turn the ball to let you see the liner through the bearing bore. But be careful not to misalign the ball more than the angle specified in the bearing specification or drawing, or you could damage races, seals, rolling elements, or seal retainers.

- (2) Examine the mating surfaces of the liner and ball. If the bearing was incorrectly swaged, local wear can occur at the edges of the liner. Such bearings are usually not serviceable.
- (3) Examine the liner for rubbed-in unwanted material.
- (4) Examine the liner and its bond for signs of damage from chemical agents.

D. Special Configurations

- (1) Examine aluminum bearing races for the quality of the surface treatment or plating, and for corrosion, cracks and other defects.
- (2) Look for cracks in such areas as threads, holes, keyways, and flanges, which are local stress risers.

E. Finite Wear

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

- (1) To find how much wear there is, you can manually apply a reversing load of 10-15 pounds to the bearing in a holding fixture and measure the play with a dial indicator. First apply the load radially and measure total diametrical play. Then apply this load in an axial (thrust) direction and measure the axial play.
- (2) When you measure radial play, do it at several positions. Turn the outer race relative to the inner race to find the point of maximum play before you try to make an accurate wear reading.

F. Breakaway and Rotational Torque

- (1) To measure breakaway and rotational preload torques, measure the torque which will turn one race with the other race held stopped. The bearing must be free of lubricants and all other contaminants. Make all tests at room temperature.
- (2) Measure the breakaway torque before you measure the rotational torque. For rotational torque tests, turn the bearing through two or three revolutions immediately before you measure the torque.
- (3) Refer to the bearing specification or standard for the permitted rotational preload torques. These torque values are for new bearings only. For used bearings, only the maximum torque value is important. Because some friction will go away during the break-in, the minimum torque of a used bearing can be less than that specified for the new bearing.

6. BEARING INSTALLATION

A. General

- (1) Antifriction bearings
 - (a) Do not remove the bearing from its package until all parts are prepared for the installation of the bearing.
 - (b) Before installation, examine the bearings for damage, corrosion, and contamination. Clean and lubricate them per SOPM 20-30-01, if necessary.
 - (c) Bearings must be installed within 6 years of their date of lubrication. Sealed bearings with lubrication dates more than 6 years old must be returned to the manufacturer to be cleaned and lubricated again. Examine other bearings with lubrication dates more than 6 years old by the storage procedure in SOPM 20-30-01.
 - (d) The assembly area must be free from dust and dirt.
- (2) Plain and spherical bearings
 - (a) Give protection to these bearings and put them away without lubrication (unless specified by the overhaul instructions) by standard industry practices.
 - (b) Immediately before installation, examine, clean and lubricate these bearings per SOPM 20-50-07.

B. Unless specified by the overhaul instructions, apply installation finish as follows:

- (1) For bearings that operate in system fluids such as oil or hydraulic fluid, apply the system fluid as an installation finish to the mating surfaces. Do not use grease or sealants on these parts.
- (2) For Teflon-lined bushings installed on shafts, install the bushing dry, with no installation finish. For other bushings installed on shafts, apply BMS 3-24, BMS 3-33 or MIL-G-23827 grease on the mating surfaces.
- (3) For all other bearings and bushings, if the installation finish is not specified by the overhaul instructions, see Table 1.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 1: Installation Finish Selections

Housing Material	Bearings Outer Race or Bushing Material	Installation Finish	
		Lubrication Through Housing ^{*[1]}	No Lubrication Through Housing
Aluminum or Low-alloy steel	Low-alloy steel Carbon steel CRES Copper Bronze	BMS 3-24 or BMS 3-33 grease	BMS 5-95 sealant ^{*[2]}
	Aluminum	None	BMS 5-95 sealant ^{*[2]}
CRES or Nickel-Cobalt	CRES Bronze Copper	BMS 3-24 or BMS 3-33 grease	^{*[3]}
	Carbon steel	BMS 3-24 or BMS 3-33 grease	BMS 5-95 sealant ^{*[2]}
	Aluminum	None	BMS 5-95 sealant ^{*[2]}
Titanium	CRES Bronze Copper	BMS 3-24 or BMS 3-33 grease	^{*[3]}
	Carbon steel	BMS 3-24 or BMS 3-33 grease	BMS 5-95 sealant ^{*[2]}
	Aluminum	None	BMS 5-95 sealant ^{*[2]}

^{*[1]} For double bushings with lubrication through the housing to the gap between the bushing ends, install bushings with sealant. If the gap between the bushing ends is less than 0.300 inch, apply the sealant only under the bushing flange, and not to the bushing OD or the housing bore. If the gap between the bushing ends is 0.300 inch or more, apply the sealant under the bushing flange and also to the housing bore. After installation, make sure the lube passages are open.

^{*[2]} For bushings installed by the expanded fit procedure with sealant, apply the sealant only under the bushing flange and the mating surfaces of the housing, and not to the bushing OD or the housing bore.

^{*[3]} Installation finish is not necessary for corrosion protection. BMS 3-24 or BMS 3-33 grease can be used to help a press-fit installation only.

C. Sintered Bearings (Figure 2)

- (1) Wipe the mandrel and the housing ID with a clean, lint-free cloth.
- (2) Apply a thin layer of BMS 3-33 or MIL-G-23827 grease to the housing ID and the bushing OD, unless specified by the overhaul instructions.
- (3) Install the mandrel on the ram. Align the housing bore with the ram stroke.
- (4) Install the bearing on the mandrel. Make sure the bearing is aligned with the mating bore in the housing.
- (5) Set the stops between the ram and the press bed to control the ram stroke.
- (6) Press the bearing into the housing. Remove the mandrel.
- (7) Carefully remove the unwanted grease or other installation finish with a clean, dry cloth. Do other operations as necessary.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

- (8) If necessary to machine the bore of a sintered bearing after installation, use button sizing, broaching, or reaming procedure. Lubrication of the bearing after the operation is not necessary unless the bearing gets contamination such as dirt or other unwanted material during the procedure. Refer to BAC5040 for more details about these operations.
- (9) Lubricate and give these bearings protection as specified in SOPM 20-30-01 for Type 6 bearings.

D. Rod End Bearings

- (1) Make sure the threads of the rod end bearings and of the terminal ends have no dust, dirt, chips, or similar material. Clean as necessary.
- (2) By hand, turn the threaded portion of the rod end bearing into or onto the threaded terminal fitting until the bearing gets to the bottom or the threads are fully engaged. Let the assembly stay here until the final installation adjustment.

CAUTION: CAUTION: DO NOT USE A CRESCENT WRENCH, BECAUSE THE ADJUSTABLE JAWS COULD SLIP AND DAMAGE THE SEALS, PLATING, OR THREADS OF THE ROD END BEARING. DO NOT ASSEMBLE ROD END BEARINGS TO TERMINALS WITH FORCE ON A BOLT OR SHAFT THROUGH THE BEARING BORE, BECAUSE THE INNER RACE WILL COME OUT OF ALIGNMENT AND CAUSE DAMAGE TO SEALS AND INTERNAL SURFACES.

- (3) For the final adjustment, turn the rod end bearing by hand to get the correct distance or until the torque increase does not let you turn it more. Then tighten the rod end bearing the specified distance with the applicable tool such as F71313 or ST2580-103 series.
- (4) Use the applicable tool, such as F71313 or ST2580-103 series, to hold the rod end bearing when you tighten checknuts or similar locking devices.

E. Studded Track Roller Bearings

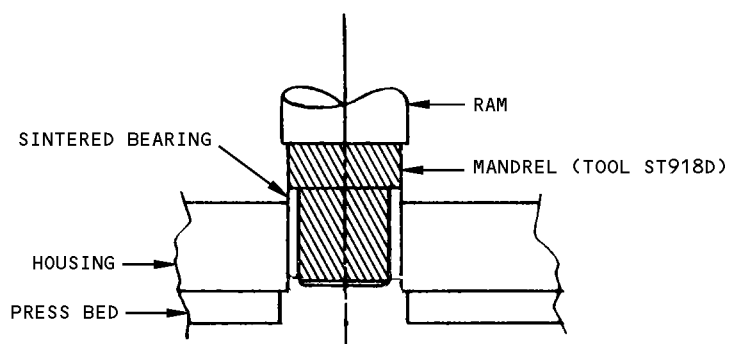
- (1) Install the bearing into the housing with BMS 3-33 grease on the threads.
- (2) Turn the nut on the threads. While the nut turns, measure and record the run-on torque of the nut.
- (3) Tighten the nut to fully install the bearings, but do not tighten more than these values:

BEARING SIZE	MAXIMUM TORQUE (POUND-INCHES) (RUN-ON TORQUE PLUS THIS VALUE)
03	8
04	20
05	30
06	55
07	110
08	205

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL



Sintered Bearing Installation
Figure 2

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

7. INTERFERENCE FIT INSTALLATION OF BEARINGS AND BUSHINGS

- A. When the dimensions in the overhaul instructions show an interference fit between the bearing or bushing and the housing, you can install the part with a shrink fit or a press fit, unless specified by the overhaul instructions. The shrink fit procedure is preferred. Also, the shrink fit procedure must be used:
- (1) If one of the parts is titanium or titanium alloy.
 - (2) If the press fit procedure could damage the bearing or housing mating surfaces.
 - (3) If the mating surfaces of the bearing or the housing have protective finishes or plating.
- B. Shrink Fit (Temperature Differential) Procedure
- (1) Coolants
 - (a) Liquid nitrogen – This coolant is preferred for installation of most metal and metal-backed bearings and bushings. Temperature is -320°F and gives the part more shrinkage than with dry ice in methyl alcohol. But liquid nitrogen is not recommended for installation of phenolic backed parts because the chilled phenolic material becomes brittle and could break.
 - (b) Dry ice in methanol, ethyl alcohol or Dowanol DPM – This coolant is recommended for nonmetallic bushings, and can be used for installation of metal or metal-backed bearing or bushing where the temperature of -120°F will make the part sufficiently small. But Dowanol DPM is not permitted on Teflon-lined bushings, and dry ice in methanol is not permitted if the bearing or the housing is titanium.
 - (c) Other coolants can be acceptable if approved by Boeing. Such coolants must not cause too much frost and must not damage the bearing, bushing, or housing.
 - (2) Get the applicable mandrel, such as one of the F70321-series.
 - (3) Put the bearing or the bushing, and the mandrel, in the coolant until the coolant stops boiling to get all of these items cold.
 - (4) Apply the specified installation finish (Paragraph 7.B.) to the inside diameter surfaces of the mating housing or lug.
 - (5) Remove the bearing or bushing and the mandrel from the coolant, and immediately (within 30 seconds) install the bearing or bushing in the housing or lug with the mandrel. Then let the installed bearing or bushing warm to 65°F minimum.
 - (6) After the parts are back at room temperature, remove unwanted installation finish with a clean, dry cloth. Make sure the bearing or bushing is aligned or installed correctly, and that flanged bushings are against the mating surfaces of the housing or lug within the limits of Paragraph 7.B.(10) below. Make sure that lubrication passages or cavities are not blocked by sealant.
 - (7) Push on the bushing with your hand. It must not be loose in the housing. A proof load test is not necessary unless specified by the overhaul instructions.
 - (8) An installed bearing or bushing must not be pushed or hit to correct an incorrect installation after it is sufficiently warm to be an interference fit. A bearing or bushing removed by force must not be used again.
 - (9) Refer to the overhaul instructions for applicable operations that machine the bushing surfaces or apply special finishes or sealant fillets.
 - (10) For flanged bushings:

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

- (a) The installation finish must fill all of the gap between the flange and the mating surface. Unless specified by the overhaul instructions, the location of the flange compared with the housing surface must be as follows:
 - 1) For bushings installed with sealant, the distance from the top of the flange to the top of the housing surface must not be more than
 - a) the minimum flange thickness plus 0.008 inch, or
 - b) the actual measured flange thickness plus 0.005 inch.
 - 2) For all other bushings, the gap between the bottom of the flange and the top of the housing must not be more than 0.0025 inch.
- (b) If installed with sealant, fillet seal the ends of the bushing to the mating surface with the same sealant, by the procedure for Sealing of Bushings for Corrosion Prevention in BAC5000 (SOPM 20-50-19).
- (c) Seal the ends of bushings in two-bushing installations with sealant unless the gap is used as a lubricant path. The minimum requirement is a fillet, but the gap can be filled fully if the sealant does not extend above or onto the bushing ID surface. If the gap is used as a lubrication path, seal the bushing ends only if the gap is 0.300 inch or longer. Then only a fillet is necessary at the ends of the bushings. Keep the lubrication passages and the remaining gap between the bushings open to let the lubricant flow around the complete circumference.

C. Press Fit Procedure (Figure 3)

- (1) Examine the bearing or bushing OD and the housing ID for sharp edges and burrs which could cause scratches or remove metal from the mating parts during installation. If necessary, break sharp edges 0.005 inch.
- (2) Apply the specified installation finish to the mating parts before installation.
- (3) Install the bearing or bushing with tools that apply the force only to the bearing race that will touch the housing or shaft. Make sure the tools keep the bearing or bushing correctly aligned with the mating part. The press fit operation must not remove metal as the parts come together.
- (4) Push on the installed bearing or bushing with your hand. It must not be loose in the housing. A proof load test is not necessary unless specified by the overhaul instructions.
- (5) Refer to the overhaul instructions for applicable operations that machine the bushing surfaces or apply special finishes or sealant fillets.
- (6) Flanged bushings installed by press fit have the same gap and sealing requirements as flanged bushings installed by shrink fit. Refer to Paragraph 7.B.(10) above for details.

D. Expanded Fit Procedure

- (1) This procedure installs bushings into housings with a mandrel which becomes larger in the bore of the installed bushing. This force makes the bushing outer diameter larger to become an interference fit. Special bushings and tools must be used. The overhaul instructions will give details.
- (2) Get the necessary bushings and tools. Example tools are given in Table 2. The overhaul instructions will give the part numbers of the applicable replacement and oversize bushings.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

- (3) Make sure the mating hole in the housing is within the specified design dimensions (to let you install the standard bushing) or repair limit (to let you install an oversize bushing) and surface finish. If the overhaul instructions do not give the surface finish, make sure it is 63 microinches or smoother.
- (4) If an oversize bushing will be installed, machine the OD of the bushing to give a clearance fit with the mating oversize hole in the housing, as shown in Table 2.
- (5) Assemble the tool parts. Be sure to use an oversize mandrel if the oversize hole is larger than the limits shown in Table 2.
- (6) Apply the specified installation finish to the bushing.
- (7) Put the bushing on the mandrel, then put the bushing-mandrel unit into the hole in the housing (Figure 4).
- (8) Push the nose cap assembly tightly against the housing. The detent on the face of the jaw will put the bushing end lower than the housing face if this is a plain bushing (without a flange) or a flanged bushing installed from the end opposite the flange. If this is a flanged bushing installed from the flanged end, be sure to push the tool against the bushing flange to keep the flange tightly against the housing.
- (9) Operate the puller to pull the mandrel back through the bushing. This will put force on the bushing walls to make it tight in the hole and locally cold-work the housing material around the hole.
- (10) If this is a flanged bushing, make sure the flange is tightly against the mating surface of the housing. If there is a gap no wider than 0.025 inch, you can use a secondary procedure such as shown in Figure 5. If the gap is more than 0.025 inch, remove the bushing and try again with a new bushing.
- (11) If applicable, machine the bore of the bushing and apply sealant and other finish as specified by the overhaul instructions.

Table 2: Expanded - Fit Tools and Hole Size Data

NOMINAL BUSHING BORE DIA (REF)	FORCEMATE TOOLS (V51439)				MATING HOLE DESIGN DIAMETER (REF)	
	STANDARD MANDREL DIAMETER CODE	JAW CODE	NOSECAP CODE	CHUCK ASSEMBLY CODE	MIN	MAX
0.625	FMM-10-A	FMJ-10	FMN-10	MB-CA-11	0.8118	0.8138
0.750	FMM-12-A	FMJ-12	FMN-12	MB-CA-11	0.9368	0.9388
0.875	FMM-14-A	FMJ-14	FMN-14	BB-CA-16	1.0618	1.0638
1.000	FMM-16-A	FMJ-16	FMN-16	BB-CA-16	1.1868	1.1888
1.125	FMM-18-A	FMJ-18	FMN-18	BB-CA-16	1.3119	1.3139
1.250	FMM-20-A	FMJ-20	FMN-20	BB-CA-16	1.4369	1.4389
1.375	FMM-22-A	FMJ-22	FMN-22	BB-CA-20	1.5619	1.5639
1.500	FMM-24-A	FMJ-24	FMN-24	BB-CA-20	1.6869	1.6889
1.625	FMM-26-A	FMJ-26	FMN-26	BB-CA-20	1.8120	1.8140
1.750	FMM-28-A	FMJ-28	FMN-28	BB-CA-20	1.9370	1.9390

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

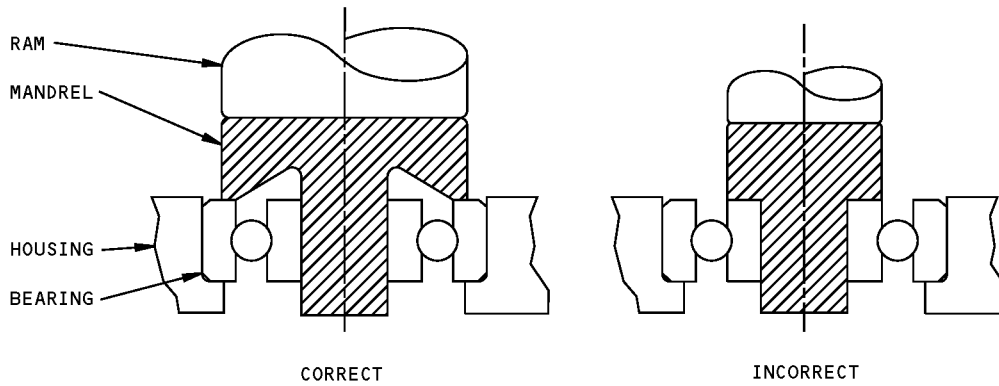
Table 2: Expanded - Fit Tools and Hole Size Data (Continued)

NOMINAL BUSHING BORE DIA (REF)	FORCEMATE TOOLS (V51439)				MATING HOLE DESIGN DIAMETER (REF)	
	STANDARD MANDREL DIAMETER CODE	JAW CODE	NOSECAP CODE	CHUCK ASSEMBLY CODE	MIN	MAX
1.875	FMM-30-A	FMJ-30	FMN-30	BB-CA-20	2.0620	2.0640
2.000	FMM-32-A	FMJ-32	FMN-32	BB-CA-20	2.1870	2.1890
NOMINAL BUSHING BORE DIA (REF)		MATING HOLE SIZE LIMIT FOR STANDARD MANDREL ^{*[1]}			DIAMETRICAL CLEARANCE BETWEEN BUSHING O.D. AND MATING HOUSING HOLE	
0.625		0.8451			0.003 0.001	
0.750		0.9701			0.003 0.001	
0.875		1.0951			0.003 0.001	
1.000		1.2201			0.003 0.001	
1.125		1.3452			0.004 0.002	
1.250		1.4702			0.004 0.002	
1.375		1.5952			0.004 0.002	
1.500		1.7202			0.004 0.002	
1.625		1.8453			0.005 0.003	
1.750		1.9683			0.005 0.003	
1.875		2.0933			0.005 0.003	
2.000		2.2183			0.005 0.003	

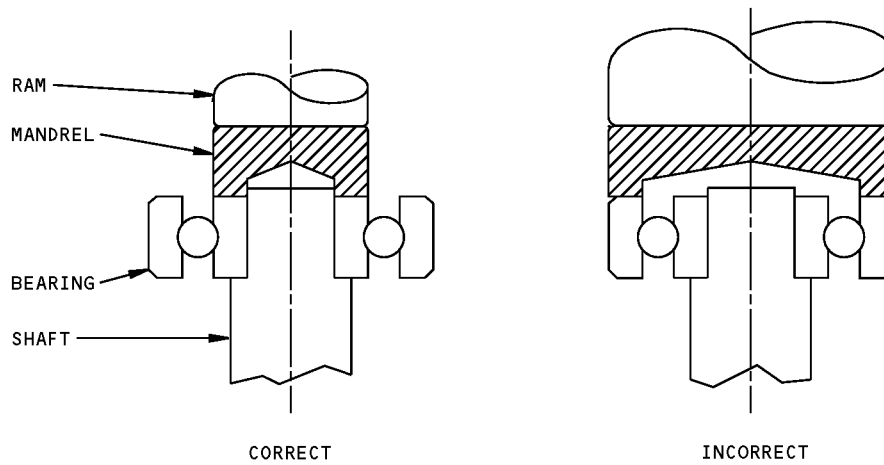
^{*[1]} IF THE OVERSIZE HOLE IS LARGER THEN THE LIMIT, USE AN OVERSIZE MANDREL. (ALL DIMENSIONS ARE IN INCHES)

20-50-03

STANDARD OVERHAUL PRACTICES MANUAL



BEARING IN HOUSING

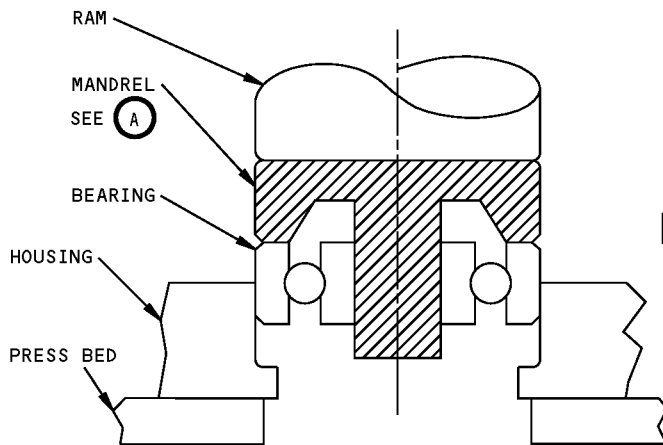


BEARING ON SHAFT

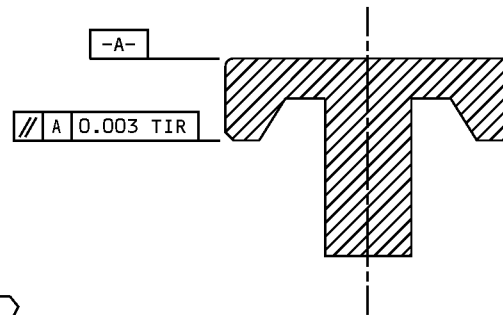
Press Fit Bearing and Bushing Installation
Figure 3 (Sheet 1 of 2)

20-50-03

STANDARD OVERHAUL PRACTICES MANUAL

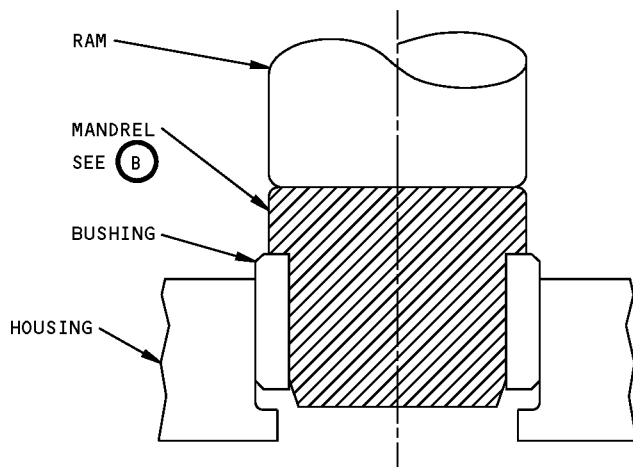


ROLLING ELEMENT OR SPHERICAL BEARING INSTALLATION

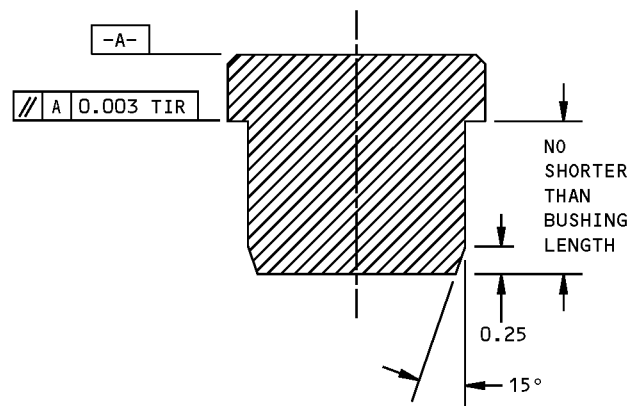


EXAMPLE MANDREL

(A)



BUSHING INSTALLATION

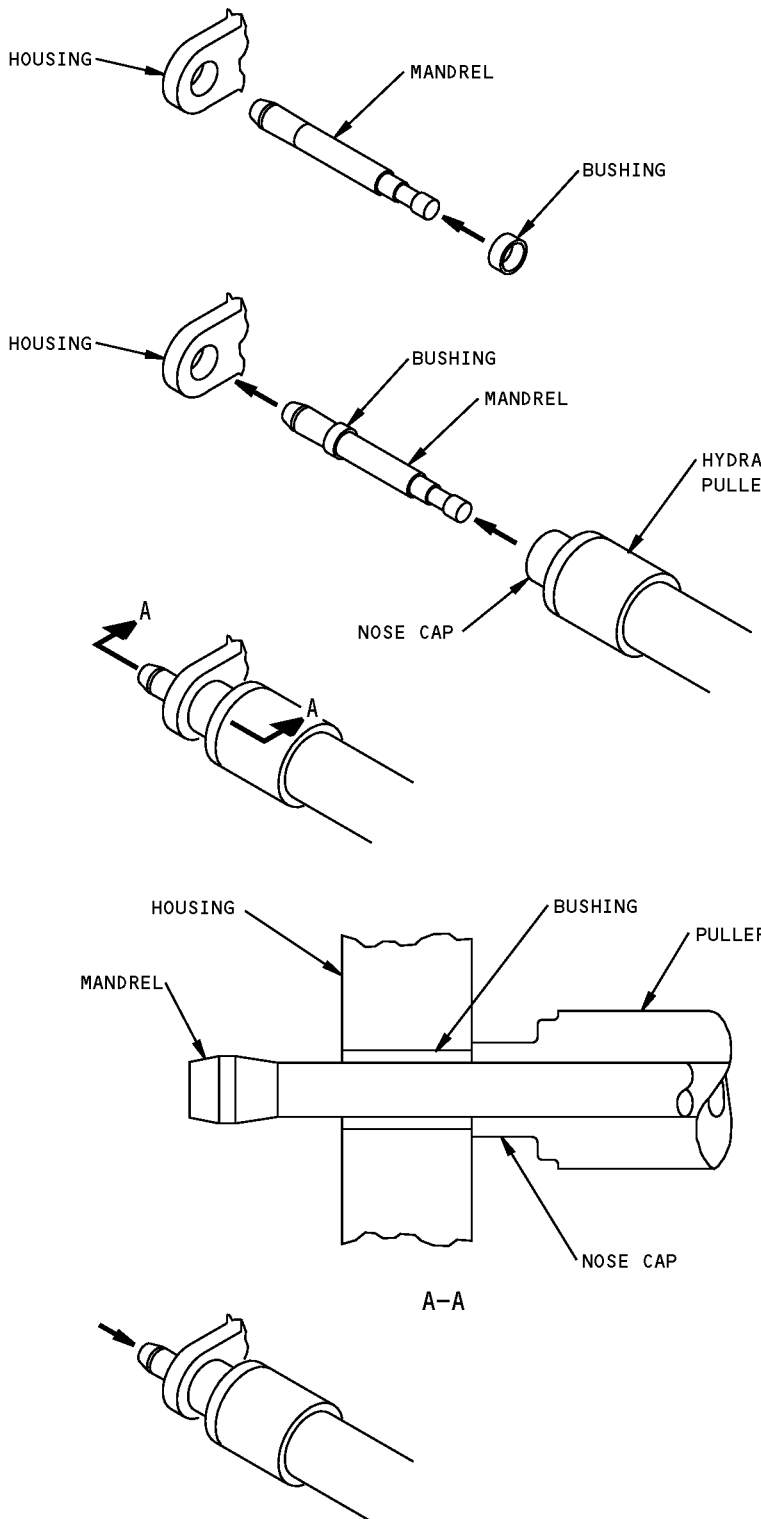


EXAMPLE MANDREL

(B)

Press Fit Bearing and Bushing Installation
Figure 3 (Sheet 2 of 2)**20-50-03**

STANDARD OVERHAUL PRACTICES MANUAL



1. PUT THE BUSHING ON THE MANDREL.
2. PUT THE MANDREL AND BUSHING UNIT INTO THE HOLE.
3. PUT THE END OF THE MANDREL INTO THE PULLER, WITH THE NOSE CAP AGAINST THE HOUSING.
4. MAKE SURE THE NOSECAP IS AGAINST THE HOUSING.

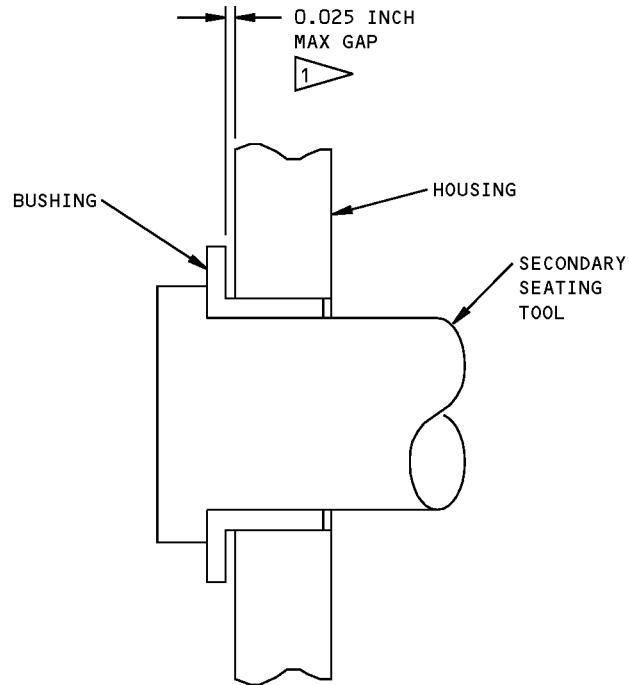
5. OPERATE THE PULLER TO PULL THE MANDREL BACK THROUGH THE BUSHING TO LOCK IT IN POSITION.

Expanded Fit Bushing Installation
Figure 4

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL



1 LIMIT TO LET YOU USE SECONDARY OPERATIONS

Flanged Bushing Gap Requirements
Figure 5

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

8. BEARING RETENTION BY MECHANICAL MEANS

NOTE: Unless specified by the overhaul instructions, use the same type of bearing retention for assembly or replacement as when the parts were first made.

CAUTION: IF THE BEARING RETENTION PROCEDURE CAUSES CRACKS IN THE BEARING, HOUSING, OR SLEEVE, THE PARTS WITH THE CRACKS MUST BE REPLACED.

A. Point Staked Housing Retention (Figure 6)

- (1) Assemble the staking tool with the number of inserts N per Table 3. For the number of stakes S, use the number given by the overhaul instructions or the original number of stakes found on the bearing housing.
- (2) Apply the specified installation finish to the bearing OD and the housing ID. Install the bearing in the housing. Make sure dimension A is within the limits shown. The bearing must be down against the shoulder of the housing bore. For bearings to be swaged on two sides, make sure the bearing is centered in the housing within 0.010 inch.
- (3) Move the staking tool down to the housing surface to be staked, with the tool pilot in the bore of the bearing.
- (4) Push the stakes into the housing surface to the staking depth shown. For bearing replacement, put the new stakes between the old ones.
- (5) Make sure the staked bearing turns freely by hand.
- (6) Push on the bearing with your hand. It must not be loose in the housing (that is, the outer race must not be movable). A proof load test is not necessary unless specified by the overhaul instructions.
- (7) Touch up protective finishes as necessary.

B. Ball Staked Housing Retention (Figure 7)

- (1) Assemble the staking tool with the number of inserts N per Table 3. For the number of stakes S, use the number given by the overhaul instructions or the original number of stakes found on the bearing housing.
- (2) Apply the specified installation finish to the bearing OD and the housing ID. Install the bearing in the housing. Make sure Dimension A is within the limits shown. The bearing must be down against the shoulder of the housing bore. For bearings to be swaged on two sides, make sure the bearing is centered in the housing within 0.010 inch.
- (3) Move the staking tool down to the housing surface to be staked, with the tool pilot in the bore of the bearing.
- (4) Push the stakes into the housing surface to the staking depth shown. For bearing replacement, put the new stakes between the old ones.
- (5) Unless this is a Teflon-lined spherical bearing, the staked bearing must turn freely by hand, and not catch. Unless specified by the overhaul instructions, the no-load breakaway torque for an installed Teflon-lined spherical bearing must not be more than two times the uninstalled maximum breakaway torque specified in the bearing specification or standard.
- (6) Push on the bearing with your hand. It must not be loose in the housing (that is, the outer race must not be movable). A proof load test is not necessary unless specified by the overhaul instructions.
- (7) Touch up protective finishes as necessary.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 3: Point or Ball Staking Variables

Bearing OD (inch)	Number of Inserts N	Number of Stakes S
Up to 0.750	5	5
0.751-1.000	6	6
1.001-1.250	4	4 or 8
1.251-1.625	5	5 or 10
1.626-2.000	6	6 or 12
2.001-2.250	7	7 or 14
2.251-2.500	8	8 or 16
2.501-2.875	6	6, 12, or 18
2.876-3.250	5	5, 10, 15, or 20
3.251-3.750	6	6, 12, 18, or 24
3.751-4.500	7	7, 14, 21, or 28
4.501-5.000	8	8, 16, 24, or 32
5.001-5.750	6	6, 12, 18, 24, 30, or 36

C. Roller Swaged Housing Retention (Figure 8, Figure 9)

NOTE: Use this procedure to roller swage the housing over the bearing with ST932 tools. Refer to Paragraph 8.D. below to roller swage the bearing outer race over the housing with F80113 and F80117 tools. Refer to Paragraph 8.E. below to roller swage the outer race of a self-lubricated spherical bearing over the housing with ST926 tools.

- (1) Set the speed of the drill press to make the rollers have a surface speed of approximately 50 feet per minute. (Spindle RPM = 200 divided by bearing OD in inches.)
- (2) Install the swaging tool into the driving chuck.
- (3) Apply the specified installation finish to the bearing OD and the housing ID.
- (4) Install the bearing into the housing per Figure 9 . The bearing must be down against the housing shoulder, but double-swaged bearings must be centered in the housing as shown.
- (5) Apply BMS 3-33, BMS 3-24 or MIL-G-23827 grease or other lubricant to the area to be swaged to prevent galling.
- (6) Set the surface to be swaged perpendicular to the axis of the spindle.
- (7) Move the tool down to the surface to be swaged, start the drill press, and apply sufficient force to swage the housing. The swage is complete when the rollers burnish the surface of the groove.
- (8) The roller swaged housing must agree with the configuration shown in Figure 9. Galling of the swaged surface is not acceptable.
- (9) After the housing is swaged, the inner race of the bearing (unless it is a Teflon-lined spherical bearing) must turn freely by hand and must not catch. Unless specified by the overhaul instructions, the no-load breakaway torque of an installed Teflon-lined bearing must not be more than two times the uninstalled maximum breakaway torque specified in the bearing specification or standard. The torque necessary to misalign KP-BS type self-aligning torque tube bearings must not be more than 75 in-lbs per inch of bore diameter.

20-50-03

**STANDARD OVERHAUL PRACTICES MANUAL**

- (10) Push on the bearing with your hand. It must not be loose in the housing (that is, the outer race must not be movable). A proof load test is not necessary unless specified by the overhaul instructions.
 - (11) Touch up protective finishes as necessary.
- D. Roller Swaged Bearing Retention with F80113 or F80117-1 tools (Figure 10, Figure 13).
- (1) These tools can sometimes be better or easier to use than ST926 standard tools. The F80113-series kits are adaptable to many different bearing sizes. Both F80113 and F80117 tools are manually operated. A drill press is not necessary.
 - (2) The F80113-series roller swage kits each include body, spacers, rollers, retaining rings, pilot, anvil, thrust bearing, tension bolt and lockbolt. The F80113-50 kit uses a special hex-head body used with two jamnuts, but its operation is equivalent to the other F80113-series kits. The F80117-1 roller swage tool is almost the same as the F80113-series kits, but it does not have spacers or other components to let it be used on bearings of different sizes.
 - (3) When you use F80113-series kits:
 - (a) Measure the diameter of the swaging groove of the bearing to find the swaging diameter.
 - (b) Get the correct body and install the spacers and the rollers on the shaft to make the tool agree with the swaging diameter.
 - (c) Use the correct pilot for the bearing ID and anvil.

CAUTION: DO NOT LET GREASE OR OTHER LUBRICANTS GET INTO TEFLON-LINED BEARINGS. LUBRICANTS CAN COLLECT CONTAMINATION WHICH COULD DAMAGE THE TEFLON SURFACES.

- (4) Assemble and install swaging tool components as shown in Figure 10. Apply a thin layer of lubricating oil to the anvil, rollers, pilot and body before assembly.
- (5) Apply a thin layer of BMS 3-33 or MIL-G-23827 or BMS 3-24 grease or other lubricant to the area to be swaged to prevent damage to the surface.
- (6) Tighten the tension bolt or jamnut A, lock in place with the lockbolt or jamnut B, and turn the tool assembly with wrench.

CAUTION: DO NOT OVERSWAGE.

- (7) Tighten the lockbolt or the jamnuts and turn the tool assembly again. Do this again as necessary to complete the swage. The swage is completed when you can feel the load increase as you try to continue. The swage must have the dimensions shown in Figure 13.
- (8) If the bearing is to be swaged on the other side also, remove the swaging tool and install it on the reverse side to do the second swage.
- (9) After you remove the swaging tool, wipe off the lubricant that was applied in the swaging procedure.
- (10) Make sure the swaged bearing turns freely. Unless specified by overhaul instructions, the no-load breakaway torque of an installed Teflon-lined bearing must not be more than two times the uninstalled maximum breakaway torque specified in the bearing specification or standard.
- (11) Touch up protective finishes as necessary.

20-50-03

**STANDARD OVERHAUL PRACTICES MANUAL**

- (12) Give the bearing a push-out load test. Apply the load only to the outer race, as shown in Figure 13. The bearing must not move in the housing more than 0.003 inch axially, or come loose. If the overhaul instructions do not give the load value, you can calculate it. The load value in pounds equals the bearing OD in inches multiplied by the applicable push-out load factor in Figure 13.

E. Roller Swaged Bearing Retention with ST926-type tools (Figure 11, Figure 12, Figure 13)

NOTE: If the side clearance is limited, ST926A tools can be used. Spherical bearings can also be roller swaged per par. D. above with F80113 or F80117 tools.

CAUTION: DO NOT LET GREASE OR OTHER LUBRICANTS GET INTO TEFLON-LINED BEARINGS. LUBRICANTS CAN COLLECT CONTAMINATION WHICH COULD DAMAGE THE TEFLON SURFACES.

- (1) This procedure is applicable to spherical bearings, rolling element bearings, and bushings with the V-groove retention design. You can use ST926A-type tools, or equivalent tools, such as those from vendors such as Rexnord or Cabco. These tools could be used with a drill press, a radial drill, or the tools could be hand-operated. These instructions are for the general ST926-type tool with primary and secondary anvils, used with a drill press. If you use alternative tools, use the equivalent instructions for the tools you do use.
- (2) If you use a drill press, use a heavy duty drill press with a quill diameter of not less than 2 inches, and gearing that will give not less than 200 pounds of force at the chuck with the usual operator input. Set the drill press for approximately 150 rpm for 1 inch or smaller bore diameters, or proportionately slower for larger bearings.
- (3) Set the rollers of the swaging tool to agree with the diameter of the bearing swage groove. Make sure the rollers turn freely. Examine the fit of the pilot in the guides of the primary and the secondary anvils.
- (4) Install the swaging tool in the chuck of the drill press.
- (5) Apply the specified installation finish to the ID of the housing and the OD of the bearing.
- (6) Install the bearing in the housing. Make sure the outer race of the bearing is 0.010 inch above the housing surface to 0.005 inch below the housing surface (Figure 13).
- (7) Apply a thin layer of BMS 3-33 or MIL-G-23827 or BMS 3-24 grease or other lubricant to the swaging groove to prevent damage to the surface. If the bearing has Teflon-coated surfaces, be sure to keep the grease away from them, or the grease could collect dirt and other contamination which could damage the Teflon.
- (8) Set the surface to be swaged perpendicular to the axis of the spindle.
- (9) With the primary anvil, swage the first side of bearing with approximately 100 pounds of force and 10 revolutions of the chuck.
- (10) Change to the secondary anvil (if applicable) and swage the second side with approximately 200 pounds of force and 15 revolutions of the chuck. Do not let the rollers touch the inner face of the swaging groove in the bearing outer race.
- (11) Clean the lubricant from the bearing with a rag wet with a small amount of a Series 98 solvent (SOPM 20-30-98). Give the inner race protection from the solvent and all lubricants.
- (12) Examine the swaged lip for clearance and damage. Gall marks are not permitted. Such damage can be caused when the rollers did not turn or the roller lubrication was insufficient.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

- (13) The stake is completed when you can feel the load increase as you try to continue. The swage must have the dimensions shown in Figure 13.
- (14) Unless specified by the overhaul instructions, the no-load breakaway torque of an installed Teflon-lined spherical bearing must not be more than two times the uninstalled maximum breakaway torque specified in the bearing specification or standard.
- (15) Give the bearing a push-out load test (on each side unless specified by the overhaul instructions). Apply the load only to the outer race, as shown in Figure 13. The bearing must not move in the housing more than 0.003 inch axially, or come loose. If the overhaul instructions do not give the load value, you can calculate it. The load value in pounds equals the bearing OD in inches multiplied by the applicable push-out load factor in Figure 13.

F. Anvil Swaged Bearing or Bushing Retention

NOTE: This procedure uses a ST930B or C type tool, a guide pilot, and a hydraulic press that can measure the load. If you use other tools, be sure they swage with a 60-degree angle, because tools with a 45-degree swage angle will not swage the lip of the bearing or bushing sufficiently over the housing chamfer.

- (1) Apply the specified installation finish to the housing ID and the bearing or bushing OD.
- (2) Install the bearing or bushing in the housing. The bearing outer race or bushing must be aligned with the housing within the limits specified by the overhaul instructions.
- (3) Apply a thin layer of BMS 3-33 or MIL-G-23827 or BMS 3-24 grease or other lubricant to the swaging lips of the tool.
- (4) Put the tools and the parts in the hydraulic press.
 - (a) Calculate the swaging force. The swaging force in pounds equals the nominal OD of the bearing in inches multiplied by the applicable swage force factor in Figure 13. Example: For a 2-inch-OD bearing with a Type II groove and an aluminum race, the swaging force is $2 \times 9000 = 18000 \pm 2000$ pounds. Note that the tolerance in the table is applied to the calculated swaging force after the multiplication.
 - (b) Apply the correct swaging force to the bearing or bushing. On bearings, be sure that the swaging tool does not touch the inner face of the groove in the outer bearing race, or the bearing races could become caught.
- (5) After swaging:
 - (a) The groove dimensions and edge gap must agree with Figure 13.
 - (b) The swaged lip must touch a minimum of one third of the housing chamfer.
 - (c) The swaged surface of the lip must not be damaged by the tool.
 - (d) Unless this is a Teflon-lined spherical bearing, the inner race of the bearing must turn freely by hand, and not catch. Unless specified by the overhaul instructions, the no-load breakaway torque of an installed Teflon-lined spherical bearing must not be more than two times the uninstalled maximum breakaway torque specified in the bearing specification or standard.
 - (e) Give the bearing or bushing a push-out load test (on each side unless specified by the overhaul instructions). On bearings, apply the load only to the outer race. The bearing or bushing must not move in the housing more than 0.003 inch axially, or come loose. If the overhaul instructions do not give the load value, you can calculate it. The load value in pounds equals the bearing OD in inches multiplied by the applicable push-out load factor in Figure 13.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

- (6) Touch up protective finishes as necessary.

G. Anvil Swaged Ring Retention (Figure 14 thru Figure 17)

- (1) Apply the specified installation finish to the ring and the mating part before you put them together.
- (2) Assemble parts and tool components as shown in Figure 14 or Figure 15.

NOTE: Use a ST933-series tool to swage the ring in a housing. Use a ST933-100-series tool to swage the ring on a shaft.

- (3) Put the tool setup in a press and apply sufficient pressure to make sure that the swaged ring agrees with the configuration shown in Figure 16 or Figure 17.
- (4) Make sure the bearing inner race turns freely.
- (5) Push on the bearing with your hand. It must not be loose in the housing (that is, the outer race must not be movable). A proof load test is not necessary unless specified by the overhaul instructions.

H. Installation of Retaining (Snap) Rings NAS669 and NAS670 (Figure 18)

- (1) Be careful not to put a set in the snap ring during installation. A compressing sleeve or an expansion shaft is preferred for snap ring installation (Figure 18). As an option, ST2597 pliers can be used for snap ring installation and removal.
- (2) The NAS669 snap rings can be contracted until the lugs touch. Do not let the lugs cross.
- (3) The NAS670 snap rings must not be expanded more than is necessary to slip them onto a shaft (nominally 1% greater than shaft diameter).
- (4) Examine the mating grooves in the housing or shaft for corrosion, damage or contamination before you install the new rings.
- (5) After installation, make a check of NAS669 dimension A, or NAS670 dimension B, to be sure the ring is correctly seated (Figure 19).
- (6) Discard the removed retaining rings. Do not try to use them again.

Table 4: Seating Dimensions of Installed Retaining Rings

NAS669 or NAS670 Dash No.	NAS669 A Min. Gap	NAS670 B Max. OD
12		0.148
15		0.189
18		0.218
19		0.229
21		0.252
23		0.272
25	0.047	0.290
27		0.315
28		0.326
31	0.055	0.357
34		0.390

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 4: Seating Dimensions of Installed Retaining Rings (Continued)

NAS669 or NAS670 Dash No.	NAS669 A Min. Gap	NAS670 B Max. OD
35		0.405
37	0.063	0.433
39		0.452
40		0.468
43	0.063	0.501
45	0.071	
46		0.540
50	0.090	0.574
51	0.092	
55		0.611
56	0.095	0.644
59		0.680
62	0.104	0.715
66		0.756
68	0.118	0.779
75	0.143	0.850
77	0.145	
78		0.883
81	0.153	0.914
86	0.172	
87	0.179	0.987
90	0.188	
93	0.200	1.054
98		1.106
100	0.202	1.122
102	0.218	1.147
106	0.207	1.192
112	0.228	1.261
118	0.249	1.325
125	0.272	1.396
131	0.282	1.458
137	0.296	1.529
143	0.312	1.600
145	0.325	

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 4: Seating Dimensions of Installed Retaining Rings (Continued)

NAS669 or NAS670 Dash No.	NAS669 A Min. Gap	NAS670 B Max. OD
150	0.329	1.668
156	0.338	1.740
162	0.362	1.812
165	0.365	
168	0.373	1.877
175	0.388	1.945
177		1.967
181	0.387	2.010
185	0.399	
187	0.406	2.076
193	0.424	
196		2.170
200	0.455	2.205
206	0.449	2.275
212	0.451	2.337
215		2.366
218	0.459	
225	0.470	2.466
231	0.500	2.528
237	0.532	2.591
243		2.657
244	0.534	
250	0.535	2.724
253	0.553	
255		2.792
256	0.576	
262	0.572	2.860
268	0.582	2.926
275	0.592	2.992
281	0.615	
283	0.627	3.122
287	0.653	3.187
293		3.252
300	0.721	3.294

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 4: Seating Dimensions of Installed Retaining Rings (Continued)

NAS669 or NAS670 Dash No.	NAS669 A Min. Gap	NAS670 B Max. OD
306	0.744	3.383
312	0.764	3.415
315	0.784	3.515
325	0.794	3.613
334	0.817	3.712
343	0.817	
347	0.854	3.764
350	0.867	3.809
354	0.870	
356	0.870	3.898
362	0.871	3.966
368		4.037
375	0.891	4.169
387	0.900	4.230
393	0.897	4.288
400	0.904	
412	0.840	
425	0.850	
433	0.860	
450	0.920	
462	0.930	
475	0.980	

I. Line Staked Sleeve Retention (Figure 20)

- (1) Get the correct guide and pilot for the sleeve staking tool.
- (2) Apply the specified installation finish on the housing ID, the bearing OD, and the sleeve ID and OD.
- (3) At the two ends of the split sleeve, fill the gap with the specified installation finish.
- (4) Put the sleeve into the housing. Wipe out unwanted installation finish. Put the bearing into the sleeve.
- (5) Make sure the assembly is tightly installed down against the housing shoulder (if applicable) and the bearing outer race, sleeve and housing surfaces are all aligned within plus or minus 0.005 inch.
- (6) Use a press with approximately a 5000-pound capacity to apply the staking force. The surface to be staked must be perpendicular to the direction of the load. Stake the sleeve to the dimensions shown. The stake is completed when the tool touches the housing surface.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

- (7) Make sure the bearing turns freely and is correctly aligned. Unless specified by the overhaul instructions, the no-load breakaway torque of an installed Teflon-lined bearing must not be more than two times the uninstalled maximum breakaway torque as specified in the bearing specification or standard.
- (8) Remove unwanted installation finish. Touch up protective finishes as necessary.
- (9) Push on the bearing with your hand. It must not be loose in the housing (that is, the outer race must not be movable). A proof load test is not necessary unless specified by the overhaul instructions.

J. Roller Swaged Sleeve Retention (Figure 21)

NOTE: This procedure uses standard tools such as ST928 or ST929-1. (ST928 tools are for aluminum sleeves and ST929-1 tools are for CRES sleeves.) As an alternative, you can use F80118 tools and the roller swage sleeve retention method per Paragraph 8.K. below.

- (1) Get the correct collar and pilot for the roller swaging tool. Install the swaging tool into the drill press or equivalent machine.
- (2) Apply the specified installation finish on the housing ID, the bearing OD, and the sleeve.
- (3) At the two ends of the split sleeve, fill the gap with the specified finish material.
- (4) Put the sleeve into the housing. Wipe out unwanted installation finish. Put the bearing into the sleeve.
- (5) Make sure the assembly is tightly installed down against the housing shoulder (if applicable) and that the bearing outer race, sleeve, and housing surfaces are correctly aligned. Make sure the sleeve is at the correct height above the housing and bearing surfaces as shown.
- (6) Set the speed of the drill press to make the rollers have a surface speed of approximately 50 feet per minute. ($\text{Spindle RPM} = 200 \text{ divided by bearing OD in inches.}$)
- (7) Move the tool down to the surface to be swaged. Start the drill press and apply sufficient force to swage the sleeve. The swage is completed when the rollers touch the housing.
- (8) Make sure the bearing turns freely and is correctly aligned. Unless specified by the overhaul instructions, the no-load breakaway torque of an installed Teflon-lined bearing must not be more than two times the uninstalled maximum breakaway torque as specified in the bearing specification or standard.
- (9) Remove unwanted installation finish. Touch up protective finishes as necessary.
- (10) The completed swaged sleeve configuration must be made by the specified tooling. No removal of feathered edges or burrs is permitted.
- (11) Give the bearing a push-out load test (unless you can measure the width of the swaged sleeve as shown). Do the test on each side of the bearing, unless specified by the overhaul instructions. Apply the load only to the outer race, as shown. The bearing must not move in the housing more than 0.003 inch axially, or come loose. If the overhaul instructions do not give the load value, use 10% of the specified bearing radial load limit or 100% of the specified axial load limit, whichever is less. The load limit values are specified in the bearing specification or standard.

K. Roller Swaged Sleeve Retention with F80118-Series Tools

- (1) The F80118-series tools sometimes can be better or easier to use than standard tools. For example, the F80118 kits are manually operated. A drill press is not necessary.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

- (2) The F80118-1 roller swaging kit includes a body, rollers, retaining rings, pilot, thrust bearing, anvil, tension bolt, and lockbolt. The F80118-15 kit has jamnuts and a shaft, not a lockbolt and tension bolt, and is used with a separate ratchet wrench; otherwise, its operation is equivalent to the F80118-1 kit.

CAUTION: DO NOT LET GREASE OR OTHER LUBRICANTS GET INTO TEFLON-LINED BEARINGS. LUBRICANTS CAN COLLECT CONTAMINATION WHICH COULD DAMAGE THE TEFLON SURFACES.

- (3) Apply the specified installation finish on the housing ID, the bearing OD, and the sleeve ID and OD.
- (4) Install the sleeve in the housing. Wipe out unwanted installation finish. Install the bearing in the sleeve. Make sure the bearings and the sleeve are correctly in the center of the housing.
- (5) Assemble the swaging tool components as shown in Figure 22. Use the pilot that agrees with the bearing ID. Apply a thin layer of lubricating oil to rollers, anvil, pilot, body assembly, and threads to decrease friction during the swaging operation.
- (6) Tighten the tension bolt or jamnut A until the rollers start to change the shape of the sleeve.
- (7) Tighten the lockbolt or jamnut B and turn the tool assembly with a wrench. Continue until the sleeve is swaged to agree with Figure 21.
- (8) Remove the swage tool and install it on the reverse side to do the second swage. Use the flat side of the anvil for the second swage.
- (9) Wipe off unwanted installation finish. Touch up protective finishes as necessary.
- (10) Give the bearing a push-out load test (unless you can measure the width of the swaged sleeve, as shown in Figure 21). Do this test on each side of the bearing, unless specified by the overhaul instructions. Apply the load only to the outer race, as shown in Figure 21. The bearing must not move in the housing more than 0.003 inch axially, or come loose. If the overhaul instructions do not give the load value, use 10% of the specified bearing radial load limit or 100% of the specified axial load limit, whichever is less. The load limit values are specified in the bearing specification or standard.

L. Staked Flanged Bushings (Figure 23)

NOTE: This procedure is for BACB28B-series bushings, and some equivalent special bushings, which have a tail end specially cut to be bent over the housing. The procedure uses the CP 450 squeeze riveter and ST922-type bushing staking tools.

- (1) Install the bushing into the housing by the shrink-fit or press-fit procedure, Paragraph 7. Be sure to use the applicable installation finish on the mating parts.
- (2) Put the curling punch and the flat anvil in the squeeze riveter. Adjust the stroke of the press to curl the bushing end tightly against the housing, as shown.
- (3) Replace the curling punch with the flattening punch. Apply the punch to give a final set to the bushing to make sure it will not turn in the housing.
- (4) Push on the bushing with your hand. It must not be loose in the housing. A proof load test is not necessary unless specified by the overhaul instructions.

M. Swaged Flanged Bushing (Figure 24)

NOTE: This procedure is for BACB28AT, AU, AV and AY-series bushings, and some equivalent special bushings, which have a tail end specially cut to be bent over the chamfer in the mating bore of the housing.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

- (1) Install the bushing into the housing by the shrink fit or press fit procedure, Paragraph 7. Be sure to use the applicable installation finish on the mating parts.
- (2) Roller swage or anvil swage the tail end of the bushing (Paragraph 8.D., Paragraph 8.E. or Paragraph 8.F.).
- (3) Push on the bushing with your hand. It must not be loose in the housing. A proof load test is not necessary unless specified by the overhaul instructions.

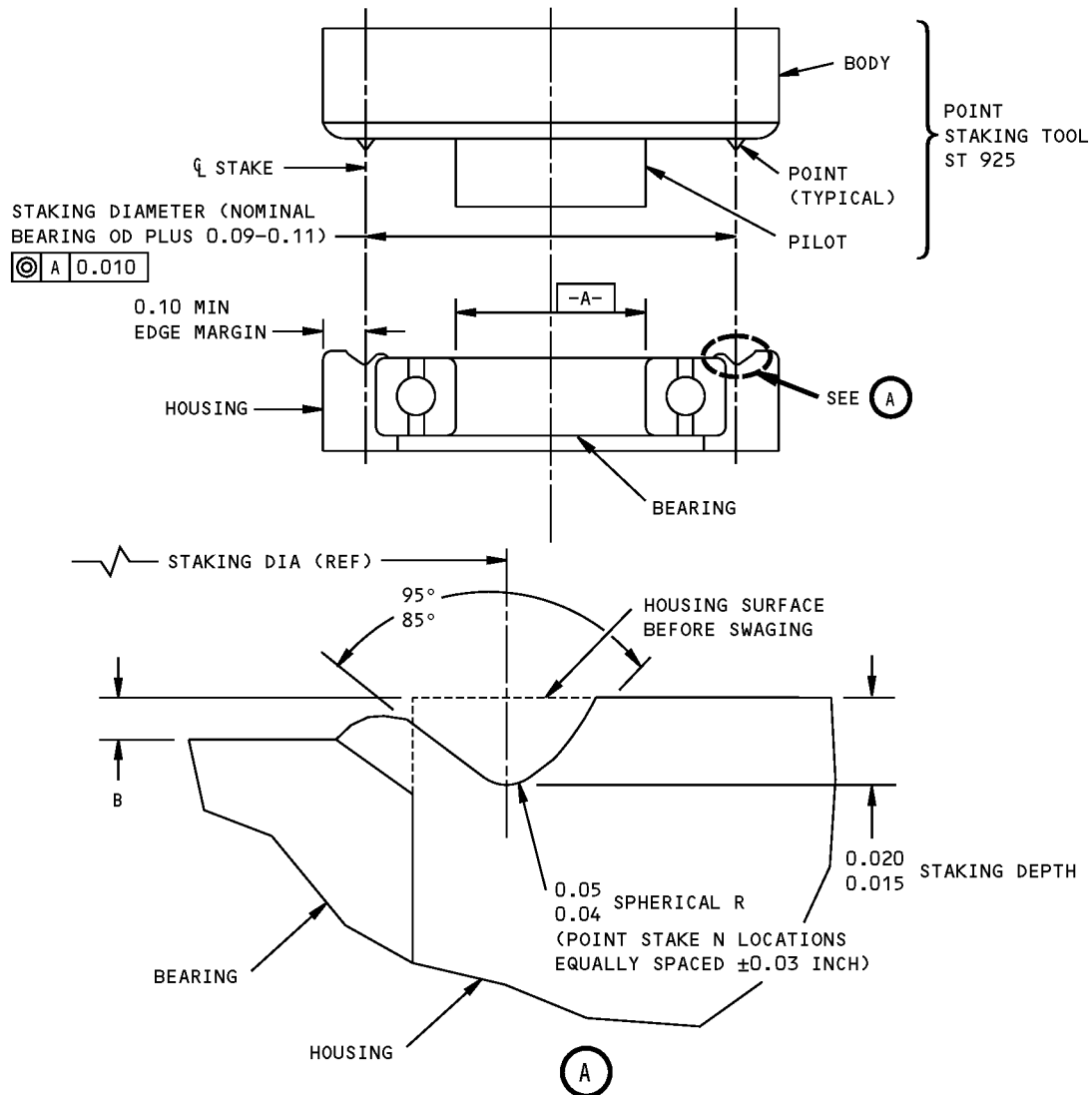
N. Flared Flanged Bushings (Figure 25)

NOTE: This procedure uses a special tool, such as A20011 equipment, to bend the tail end of the bushing over the chamfer in the mating bore of the housing.

- (1) Install the bushing into the housing by the shrink fit or press fit procedure, Paragraph 7. Be sure to use the applicable installation finish on the mating parts.
- (2) Bend (flare, expand) the tail end of the bushing over the chamfer of the housing bore, as shown.
- (3) Push on the bushing with your hand. It must not be loose in the housing. A proof load test is not necessary unless specified by the overhaul instructions.

20-50-03

STANDARD OVERHAUL PRACTICES MANUAL

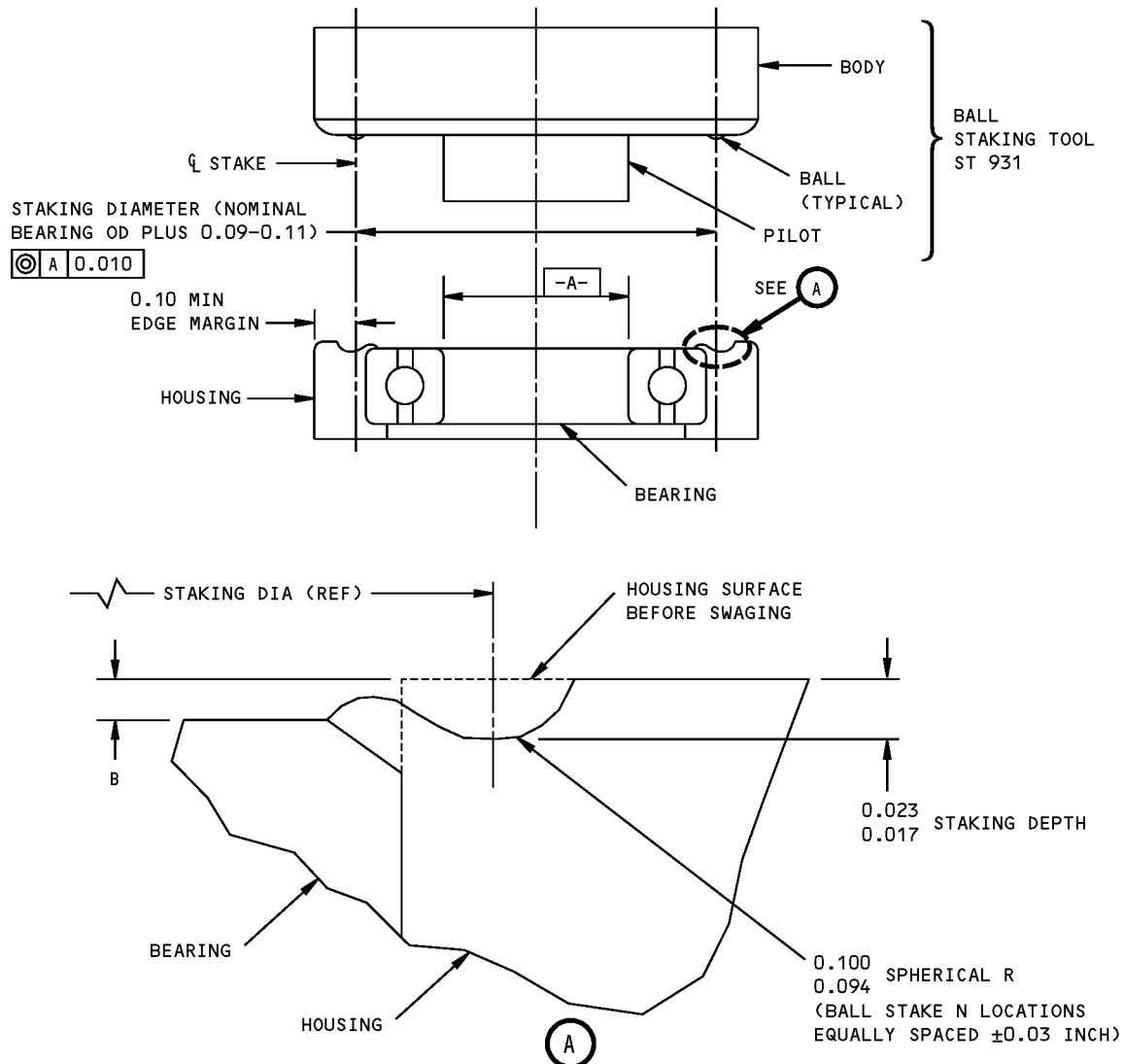


APPLICATION	B (BEFORE STAKING)
LIGHTWEIGHT AND SELF-ALIGNING BEARINGS, FIRST SWAGE ONLY	0.005 0.003
SPHERICAL BEARINGS, STANDARD ANTIFRICTION BEARINGS, AND ALL RESWAGED BEARINGS	0.009 0.005
LIGHTWEIGHT AND SELF-ALIGNING BEARINGS AND STEEL HOUSINGS (OPTIONAL)	0.009 0.005

ALL DIMENSIONS ARE IN INCHES

Point Staking Housing
Figure 6**20-50-03**

STANDARD OVERHAUL PRACTICES MANUAL



APPLICATION	B (BEFORE STAKING)
LIGHTWEIGHT AND SELF-ALIGNING BEARINGS, FIRST SWAGE ONLY	0.005 0.003
SPHERICAL BEARINGS, STANDARD ANTI-FRICTION BEARINGS, AND ALL RESWAGED BEARINGS	0.009 0.005
LIGHTWEIGHT AND SELF-ALIGNING BEARINGS AND STEEL HOUSINGS (OPTIONAL)	0.009 0.005

ALL DIMENSIONS ARE IN INCHES

Ball Staking Housing
Figure 7**20-50-03**



STANDARD OVERHAUL PRACTICES MANUAL

USE OF ST932 TOOLS

1. CURRENT SYSTEM - USES COMPLETE TOOL ST932-WWW-XXX-Y-Z.
REFER TO PAR. 10.B (2) FOR EXPLANATION
OF PART NUMBER ELEMENTS.
2. OBSOLETE SYSTEM - USES SEPARATE ROLLERS (ST932-R, ST932A-R),
SPINDLE (ST932-S), PILOT (ST932-P), COLLAR (ST932-C).

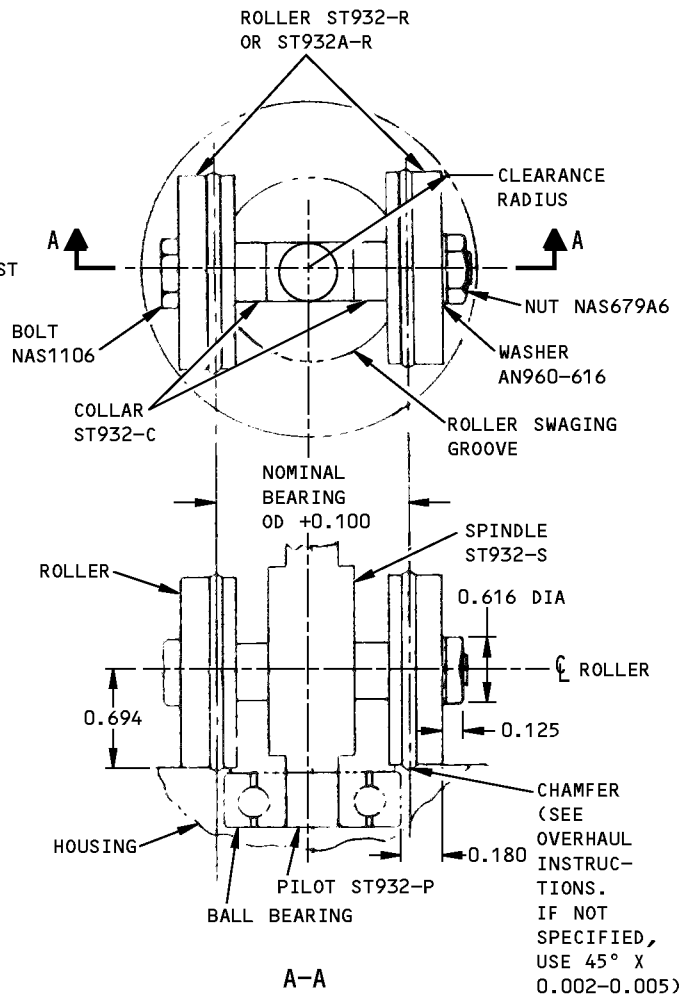
NOTE: THE COMPONENT PART NUMBERS
ARE TO LET YOU USE THE OLD TOOL
PARTS ONLY. REPLACEMENT OLD PARTS ARE
NOT AVAILABLE. WHEN THE OLD
TOOL PARTS BECOME UNSERVICEABLE,
ORDER COMPLETE TOOL PER NEW
(CURRENT) SYSTEM ABOVE.

**A. FIND THE TOOL NUMBER FOR ROLLERS
AS FOLLOWS:**

- (1) ST932-R-1-006 OR ST932-R-2-006 FOR ALL
RESWAGE AND FIRST STAKE OF
STANDARD ANTIFRICTION BEARINGS.
- (2) ST932-R-3-004 OR ST932-R-4-004 FOR FIRST
SWAGE OF LIGHT AND SELF-ALIGNING
BEARINGS IN HOUSINGS OF ALUMINUM
AND SOFTER ALLOYS.
- (3) ST932A-R-1-006 OR ST932A-R-2-006 FOR FIRST
SWAGE OF LIGHT AND SELF-ALIGNING
BEARINGS IN HOUSINGS OF STEEL
HEAT-TREATED UP TO 140 KSI.

B. FIND THE TYPE OF ST932-S SPINDLE

- (1) FOR BEARING OD 0.56-1.75, USE TYPE 1
SPINDLE.
- (2) FOR BEARING OD 1.76-3.00, USE TYPE 2
SPINDLE.
- (3) FOR BEARING OD LARGER THAN 3.00,
USE TYPE 3 SPINDLE.



(DIMENSIONS AND TOOL PART NUMBERS REFER TO THE
OBSOLETE ST932 SYSTEM ONLY)

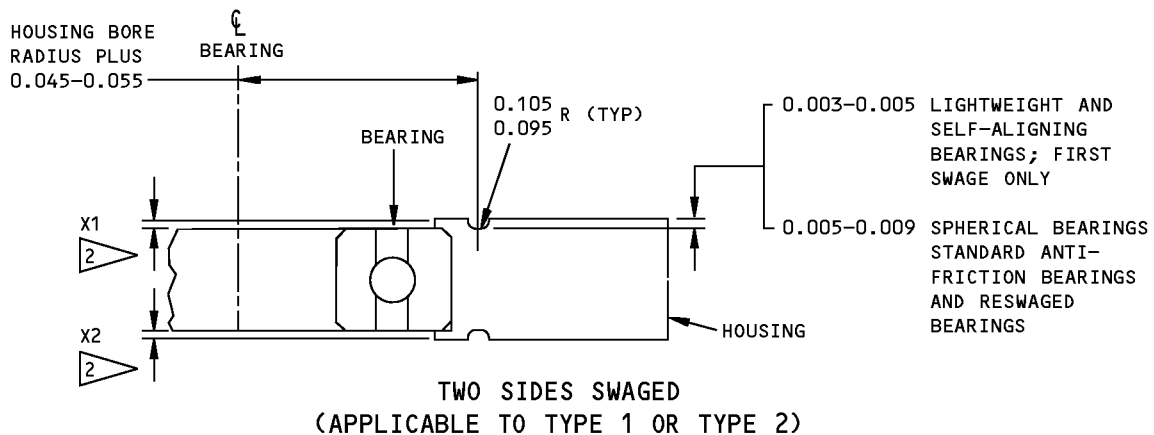
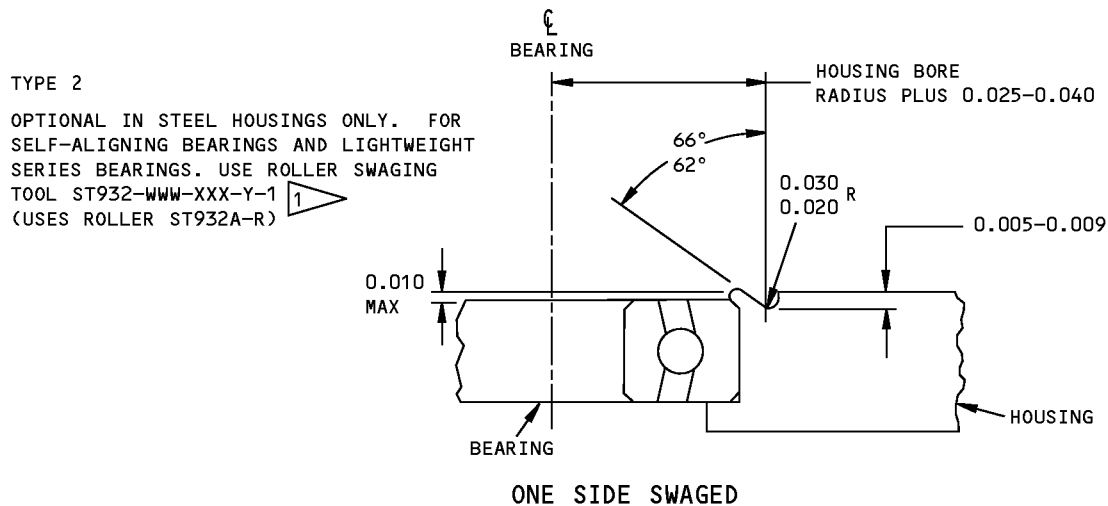
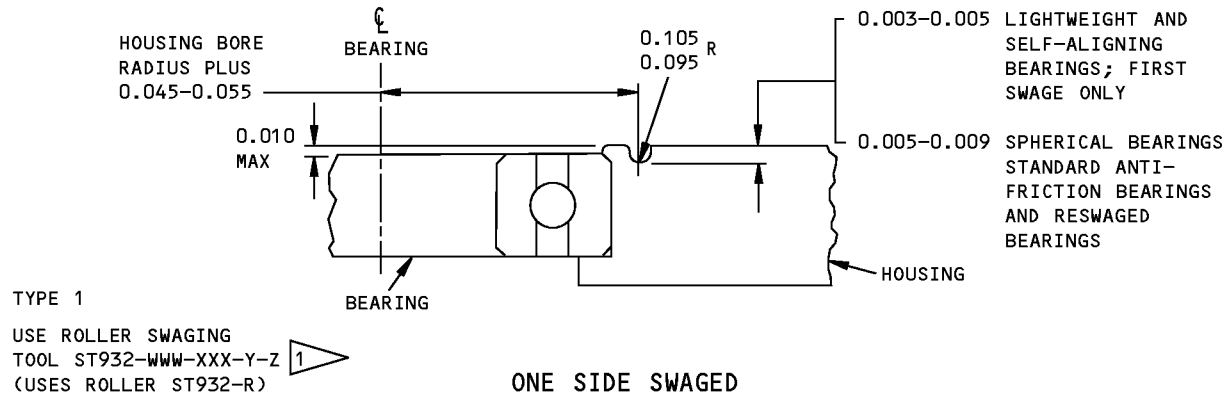
ALL DIMENSIONS ARE IN INCHES
D55168 S0000159974_V3

Use of ST932 Roller Swaging Tools
Figure 8

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL



1 REFER TO PAR. 10.B.(2) FOR APPLICABLE
TOOL DASH NUMBERS

2 X1 AND X2 MUST BE EQUAL WITHIN 0.010 INCH

ALL DIMENSIONS ARE IN INCHES

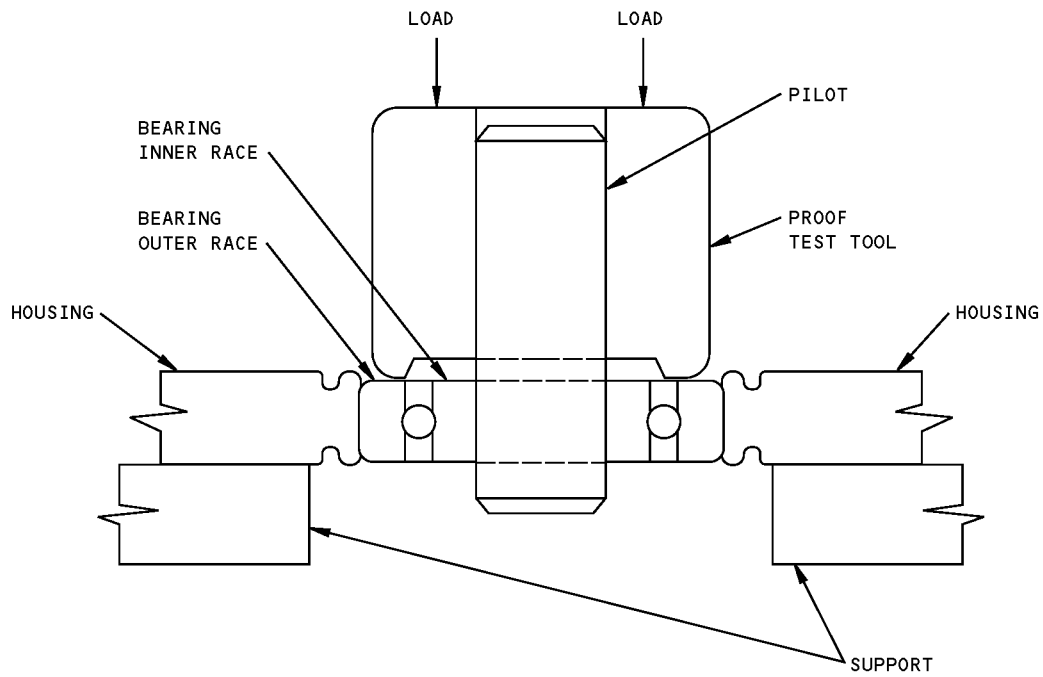
D55185 S0000159975_V3

Roller Swaged Housing Requirements
Figure 9 (Sheet 1 of 2)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL



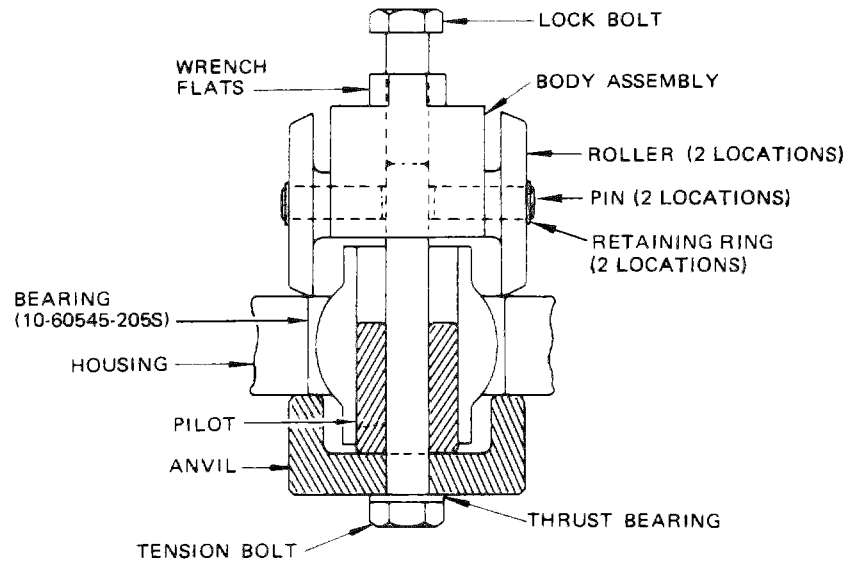
PROOF LOAD TEST

Roller Swaged Housing Requirements
Figure 9 (Sheet 2 of 2)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL



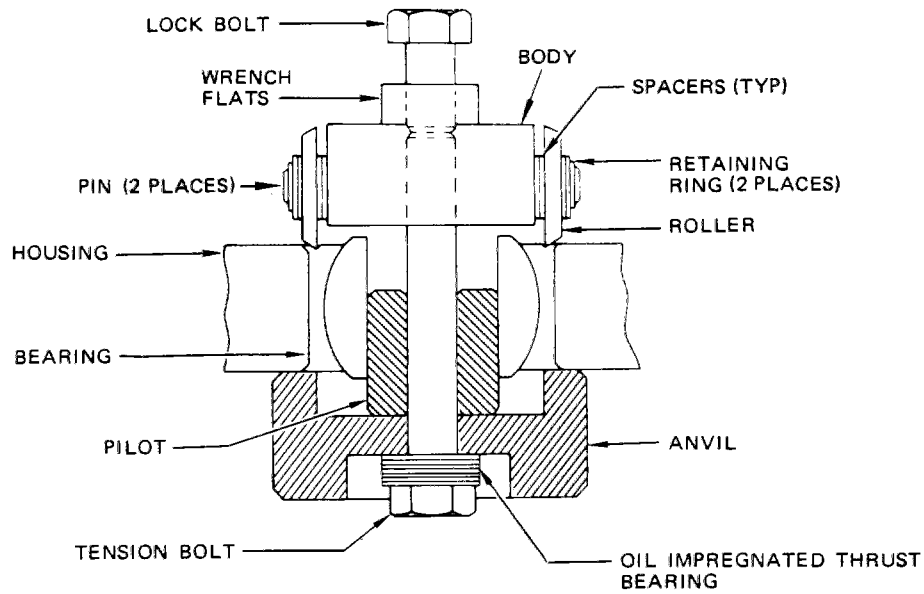
F 80117 - 1

Use of F80113 and F80117 Roller Swage Tools
Figure 10 (Sheet 1 of 2)

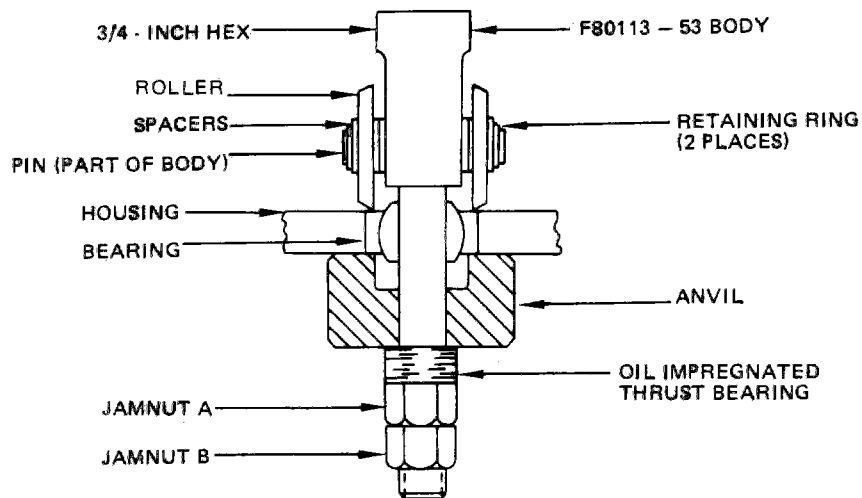
20-50-03



STANDARD OVERHAUL PRACTICES MANUAL



F80113-SERIES



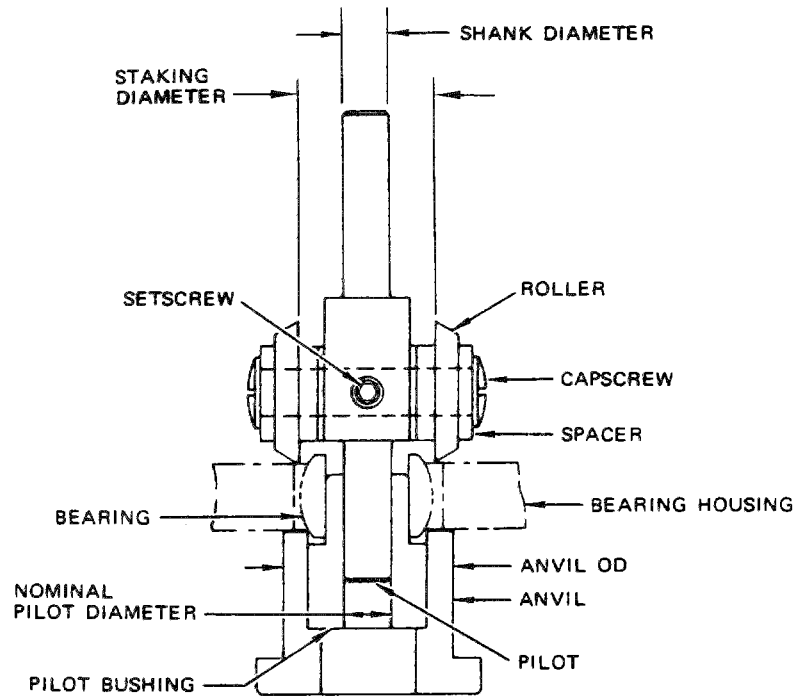
F80113 - 50 SETUP FOR 5/8 - 7/8 SWAGE DIA RANGE

Use of F80113 and F80117 Roller Swage Tools
Figure 10 (Sheet 2 of 2)

20-50-03



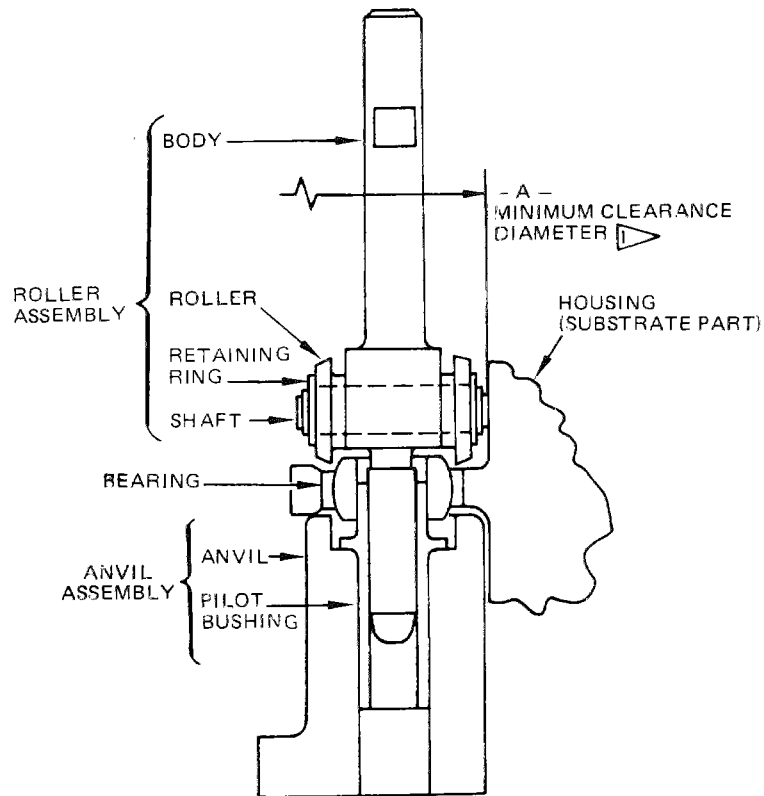
STANDARD OVERHAUL PRACTICES MANUAL



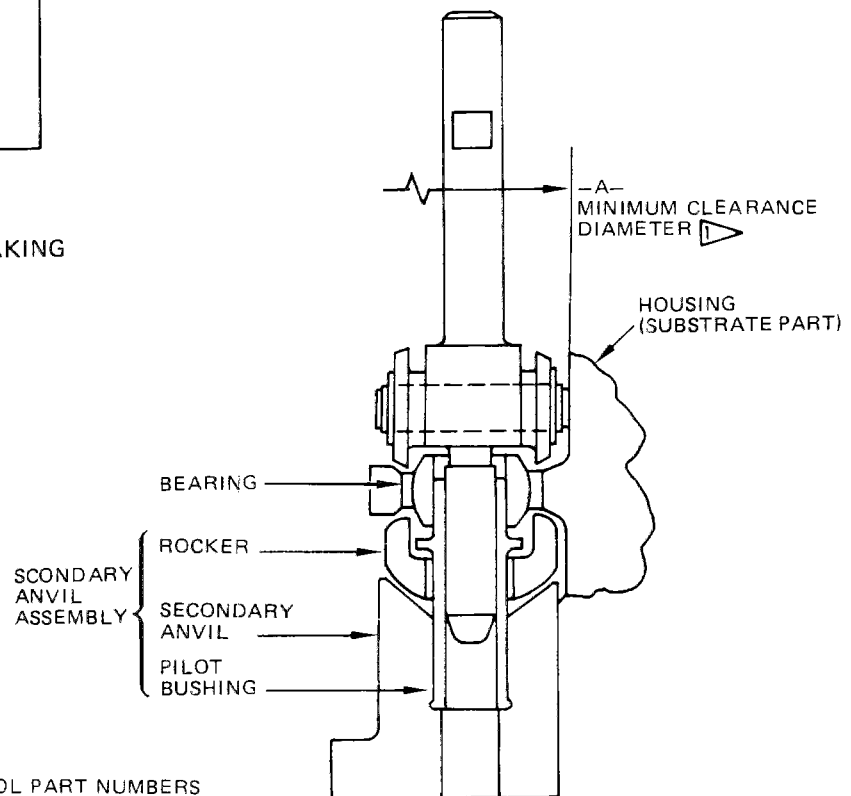
Use of ST926 Roller Swaging Tool
Figure 11

20-50-03

STANDARD OVERHAUL PRACTICES MANUAL



FIRST SIDE STAKING



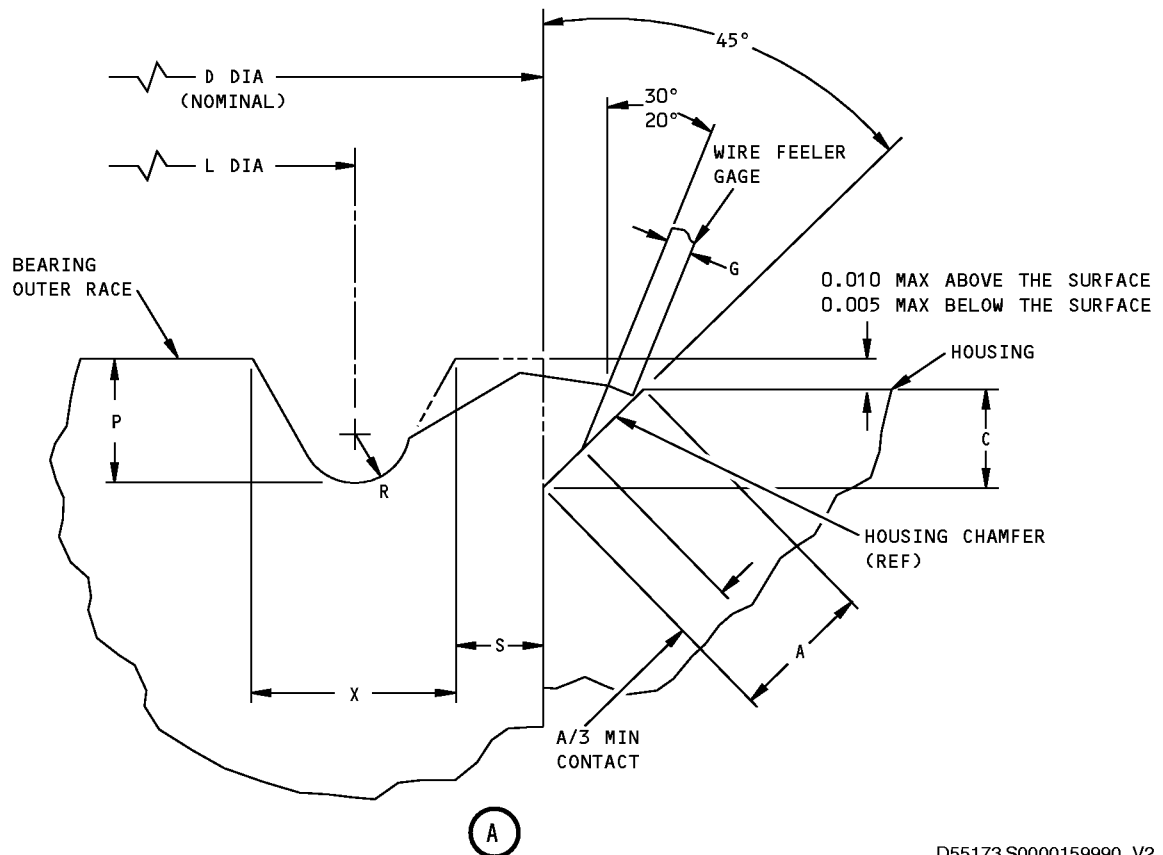
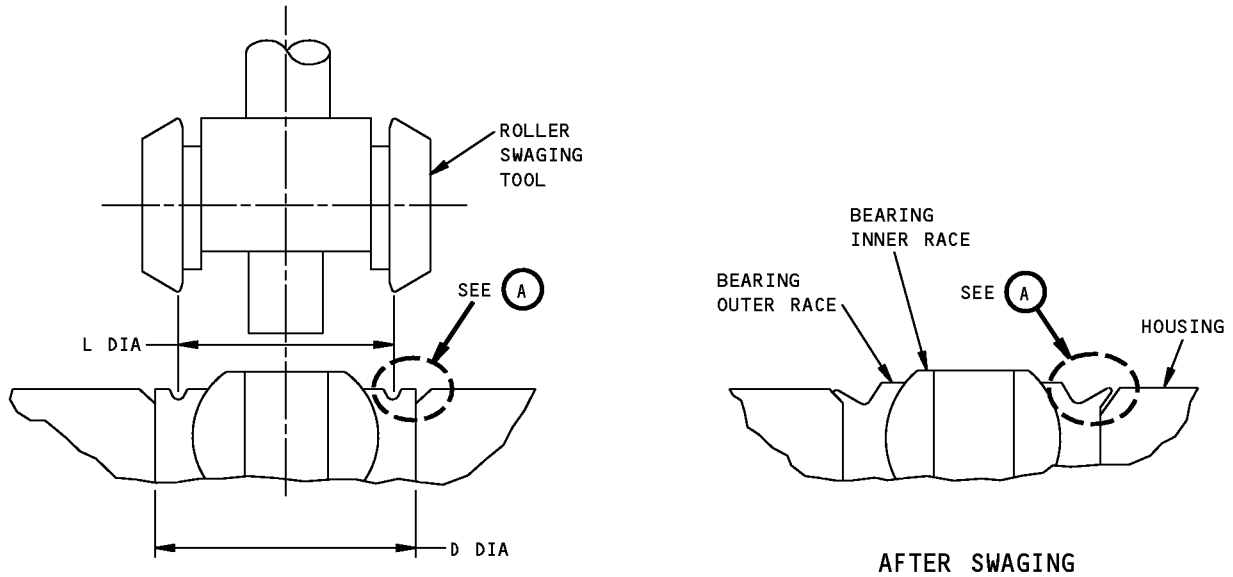
SECOND SIDE STAKING

Use of ST926A Roller Swaging Tool in Limited Side Clearance Applications
Figure 12

1 SEE FIG. 24 FOR LISTINGS VS. TOOL PART NUMBERS

20-50-03

STANDARD OVERHAUL PRACTICES MANUAL

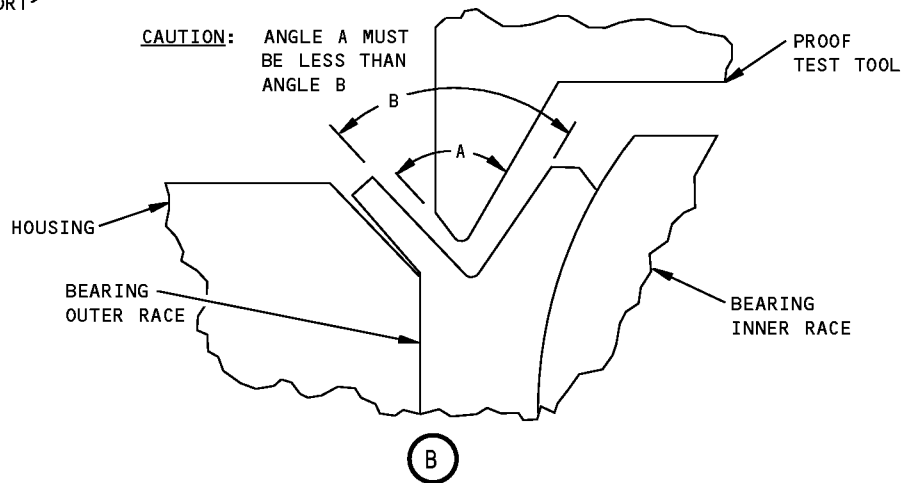
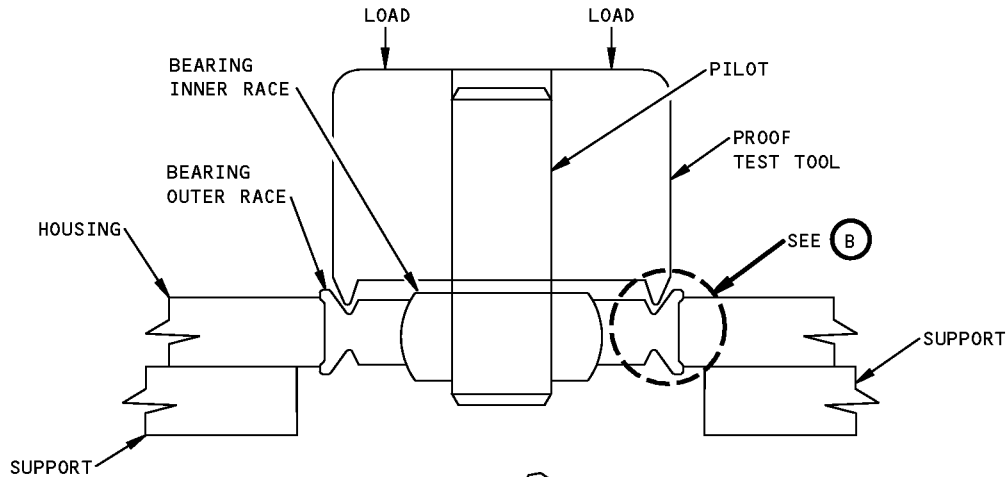


D55173 S0000159990_V2

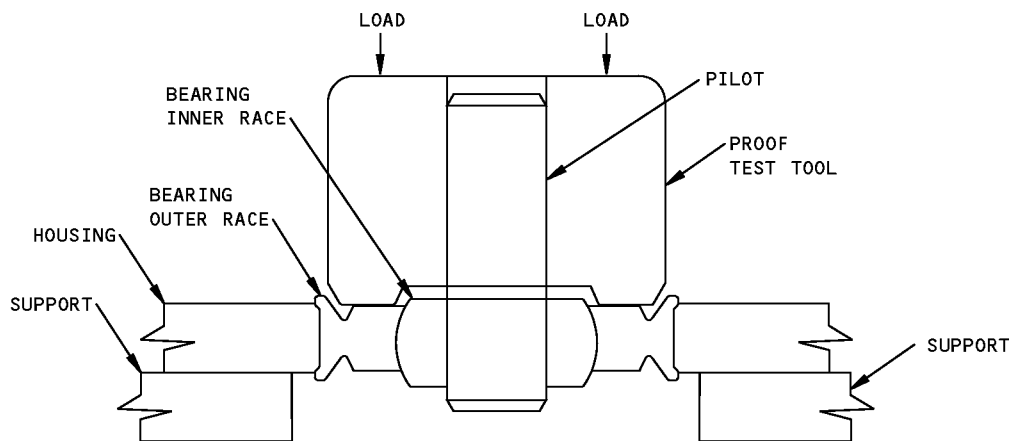
Swaged Bearing Outer Race or Bushing Requirements
Figure 13 (Sheet 1 of 3)

20-50-03

STANDARD OVERHAUL PRACTICES MANUAL



PROOF LOAD TEST - PREFERRED METHOD



PROOF LOAD TEST - OPTIONAL METHOD

CAUTION: WITH THIS OPTIONAL METHOD THERE IS GREATER RISK OF BEARING DAMAGE.

D55324 S0000159993_V2

Swaged Bearing Outer Race or Bushing Requirements
Figure 13 (Sheet 2 of 3)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

GROOVE INDENTIFICATION, INCH							
BAC5435 GROOVE CONFIG *[1]	GROOVE DIMENSIONS				SWAGE DIA L	EDGE GAP G	HOUSING CHAMFER C (REF) *[4]
	X	S	P	R			
TYPE I	0.045 0.035	0.020 0.010	0.030 0.020	0.015 0.005	D-0.075	0.006 MAX	0.030 0.025
TYPE II	0.055 0.045	0.030 0.020	0.040 0.030	0.020 0.010	D-0.105	0.006 MAX	0.035 0.030
TYPE III	0.080 0.070	0.030 0.020	0.060 0.050	0.020 0.010	D-0.130	0.006 MAX	0.055 0.050

ANVIL SWAGE FORCE FACTORS, POUNDS/INCH *[3]			
OUTER RACE MATERIAL	BAC5435 GROOVE CONFIG *[1]		
	TYPE I	TYPE II	TYPE III
17-4PH OR 15-5PH CRES (RC 23-37)	15000 ±2000 *[2]	18000 ±2000 *[2]	25000 ±2000 *[2]
ALUMINUM	7500 ±2000 *[2]	9000 ±2000 *[2]	12000 ±2000 *[2]
ALUMINUM-BRONZE	9400 ±2000 *[2]	11300 ±2000 *[2]	15600 ±2000 *[2]
COPPER-BERYLLIUM (BMS 7-353 TYPE II)	16500 ±2000 *[2]	25000 ±2000 *[2]	28000 ±2000 *[2]

AXIAL PROOF LOAD FACTORS (MINIMUM), POUNDS/INCH *[3]			
OUTER RACE MATERIAL	BAC5435 GROOVE CONFIG *[1]		
	TYPE I	TYPE II	TYPE III
17-4PH OR 15-5PH CRES OR NICKEL ALLOY 718	1670	2000	2335
ALUMINUM	835	1000	1168
ALUMINUM-BRONZE	1100	1330	1560
COPPER-BERYLLIUM (BMS 7-353 TYPE II)	1670	2000	2300

*[1] IN SOME BEARING DRAWINGS (SUCH AS 10-60545), THERE COULD BE DIFFERENT GROOVE-TYPE DESIGNATIONS

*[2] APPLY THIS TOLERANCE TO THE CALCULATED SWAGING FORCE

*[3] TO CALCULATE THE FORCE OR LOAD IN POUNDS, MULTIPLY THESE FACTORS BY THE BEARING NOMINAL OD IN INCHES

*[4] EXAMPLES ONLY. REFER TO COMPONENT-SPECIFIC OVERHAUL DATA FOR EXACT VALUES

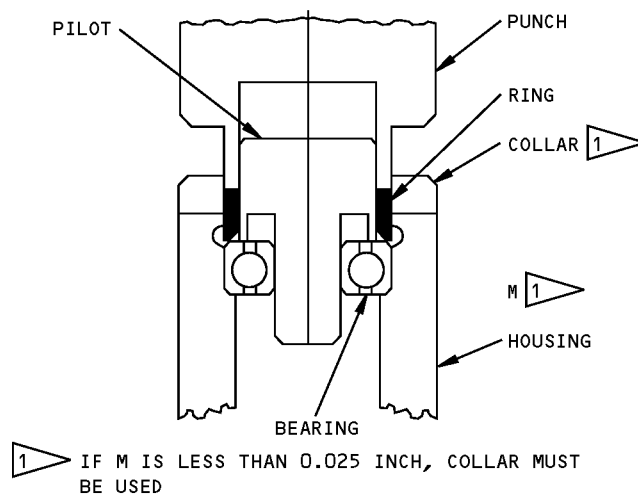
D62499 S0000161899_V2

Swaged Bearing Outer Race or Bushing Requirements
Figure 13 (Sheet 3 of 3)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

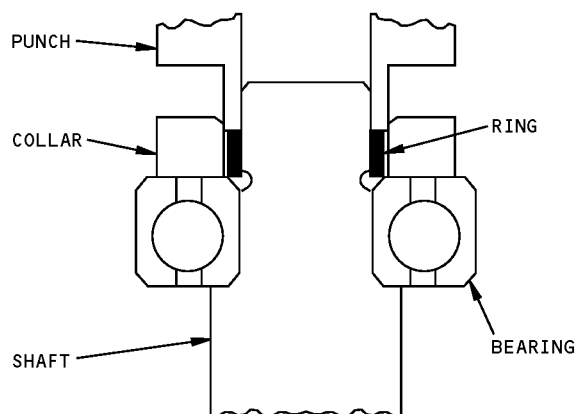


Swaging Tool Setup for Housing
Figure 14

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

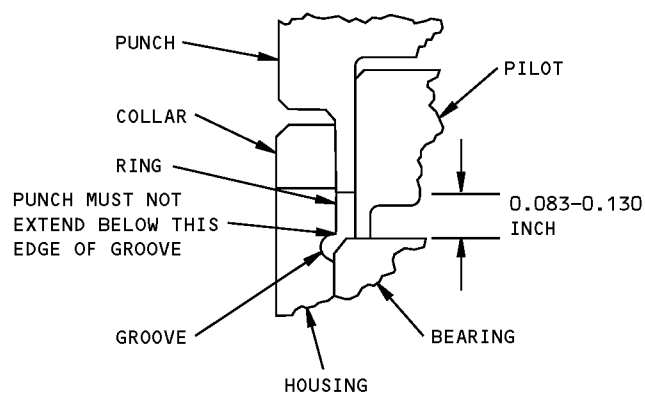


Swaging Tool Setup for Shaft
Figure 15

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

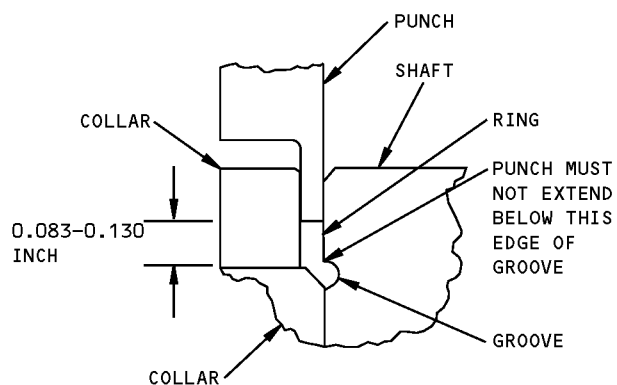


Swaged Ring in Housing
Figure 16

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

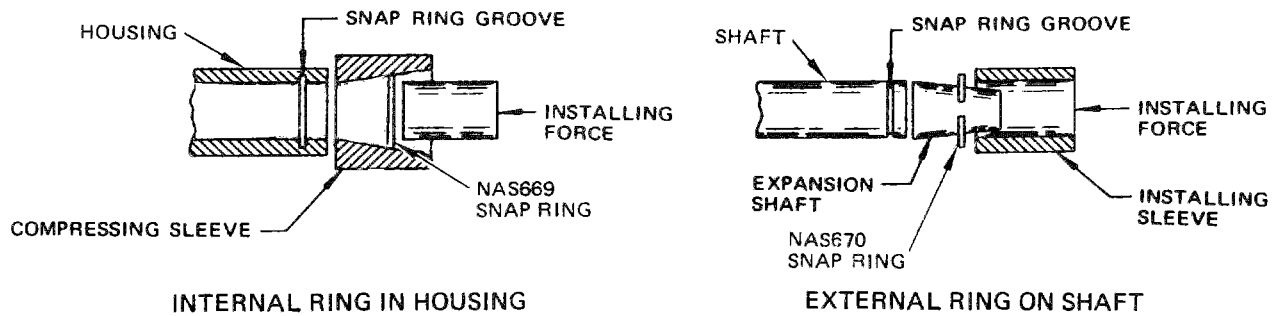


Swaged Ring in Shaft
Figure 17

20-50-03



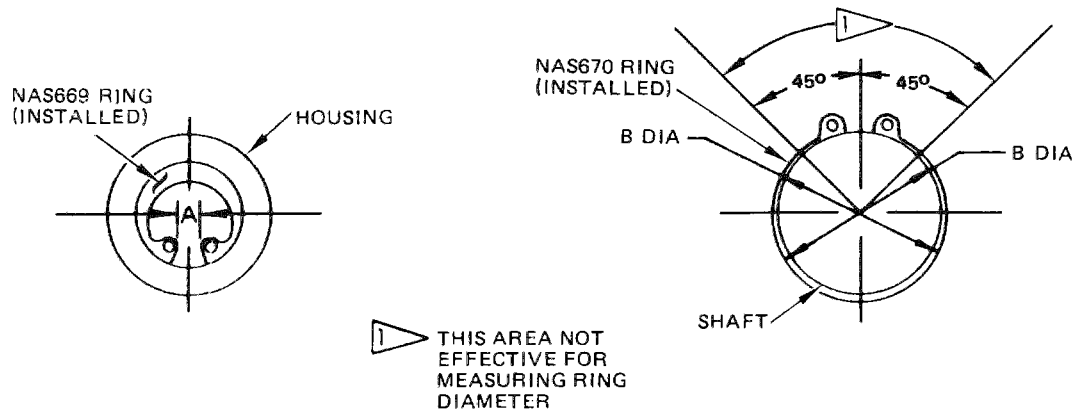
STANDARD OVERHAUL PRACTICES MANUAL



Retaining Ring Installation
Figure 18

20-50-03

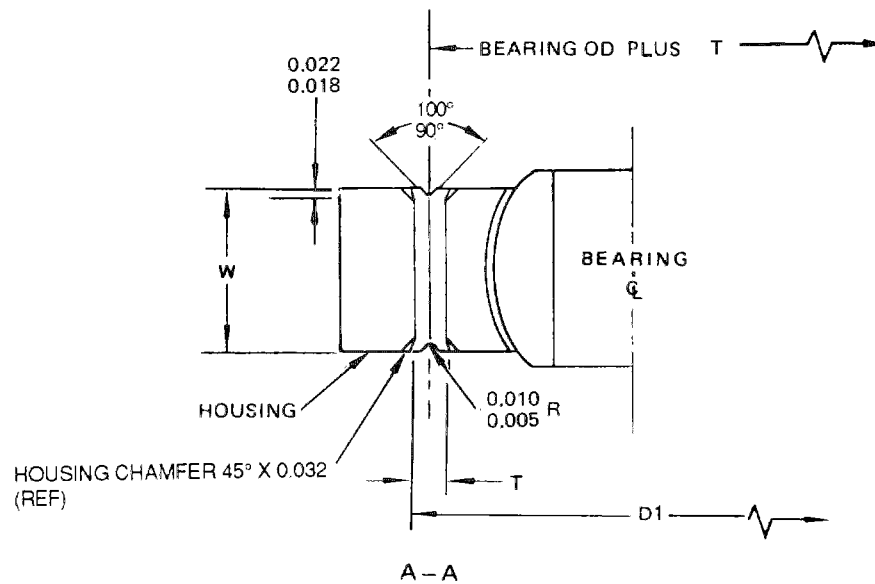
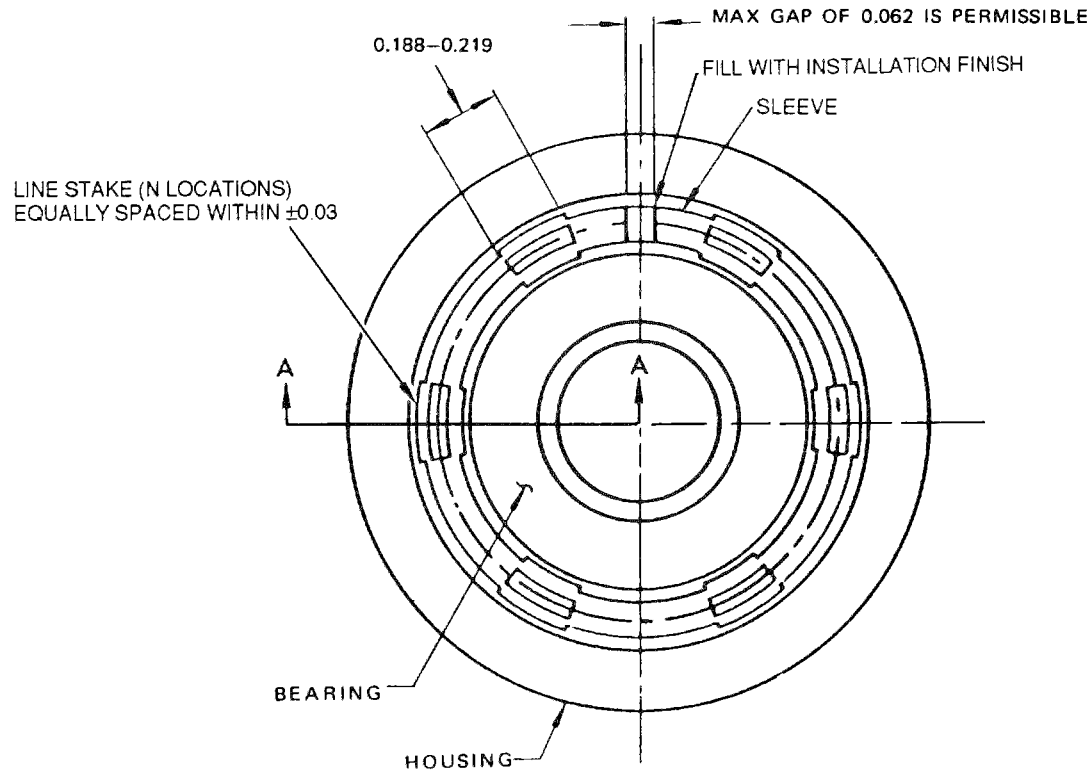
STANDARD OVERHAUL PRACTICES MANUAL



Seating Dimensions of Installed Retaining Rings
Figure 19

20-50-03

STANDARD OVERHAUL PRACTICES MANUAL



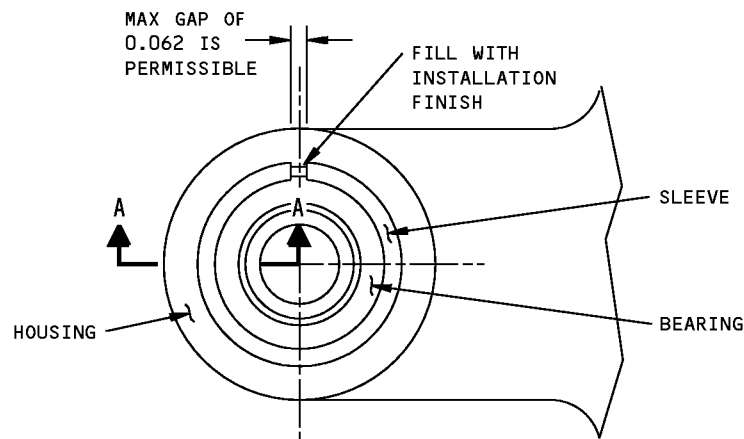
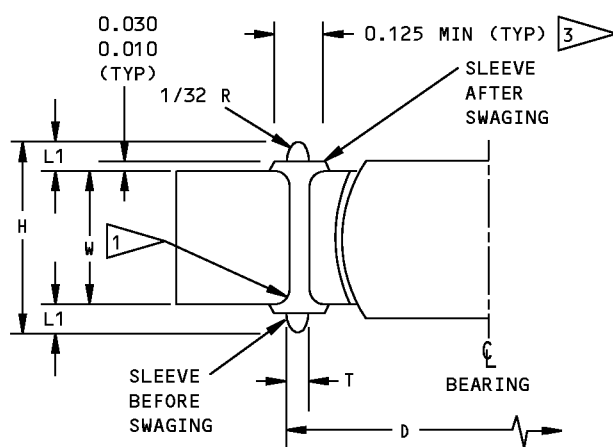
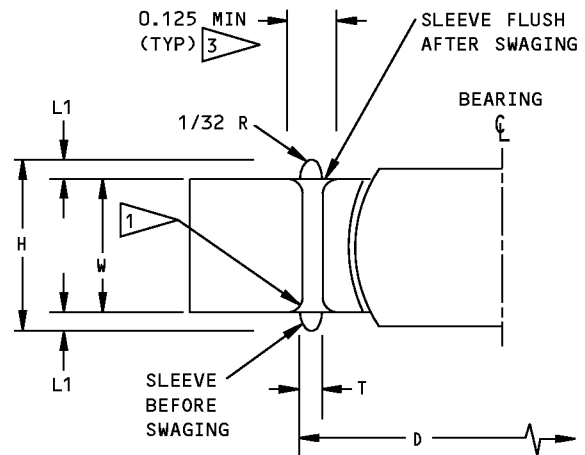
ALL DIMENSIONS ARE IN INCHES

D1 = ID OF HOUSING = NOMINAL BEARING OD PLUS 2 X SLEEVE WALL THICKNESS
 W = WIDTH OF HOUSING = HEIGHT OF SLEEVE = NOMINAL BEARING WIDTH
 T = SLEEVE WALL THICKNESS = 0.039-0.041 (NOMINAL)

Line Staked Sleeve Requirements
 Figure 20

20-50-03

STANDARD OVERHAUL PRACTICES MANUAL

FULL OR SPLIT SLEEVES
ROLLER SWAGEDA-A
FOR ALUMINUM SLEEVEA-A
FOR CRCS SLEEVE

D55325 S0000160036_V2

Roller Swaged Sleeve Requirements
Figure 21 (Sheet 1 of 3)**20-50-03**



STANDARD OVERHAUL PRACTICES MANUAL

D = ID OF HOUSING (SEE TABLE A) 

T = SLEEVE THICKNESS (SEE TABLE A) 

W = WIDTH OF HOUSING (BEARING WIDTH ± 0.005) 

L1 = SLEEVE HEIGHT ABOVE LUG FACE (SEE TABLE B) 

H = SLEEVE WIDTH = W + 2L1 ± 0.003 

AL SLEEVE		CRES SLEEVE	
D	MAXIMUM BEARING OD + $\frac{0.127}{0.125}$	MAXIMUM BEARING OD + $\frac{0.081}{0.079}$	
T	$\frac{0.063}{0.062}$	$\frac{0.040}{0.039}$	

TABLE A

BEARING/HOUSING CHAMFER SIZE	L1 (AL SLEEVE)	L1 (CRES SLEEVE)
LESS THAN 0.030	0.030	0.013
0.030-0.040	0.050	0.018
0.040-0.050	0.060	0.023
0.050-0.060	0.075	0.028

TABLE B

 1 CHAMFER (RADIUS OPTIONAL) (TYPICAL)
(SEE OVERHAUL INSTRUCTIONS)

 2 UNLESS SPECIFIED BY OVERHAUL INSTRUCTIONS

 3 APPLICABLE ONLY WHEN YOU DO NOT DO A
PROOF LOAD TEST

$\frac{125}{\sqrt{\quad}}$ ALL MACHINED SURFACES UNLESS SHOWN
DIFFERENTLY

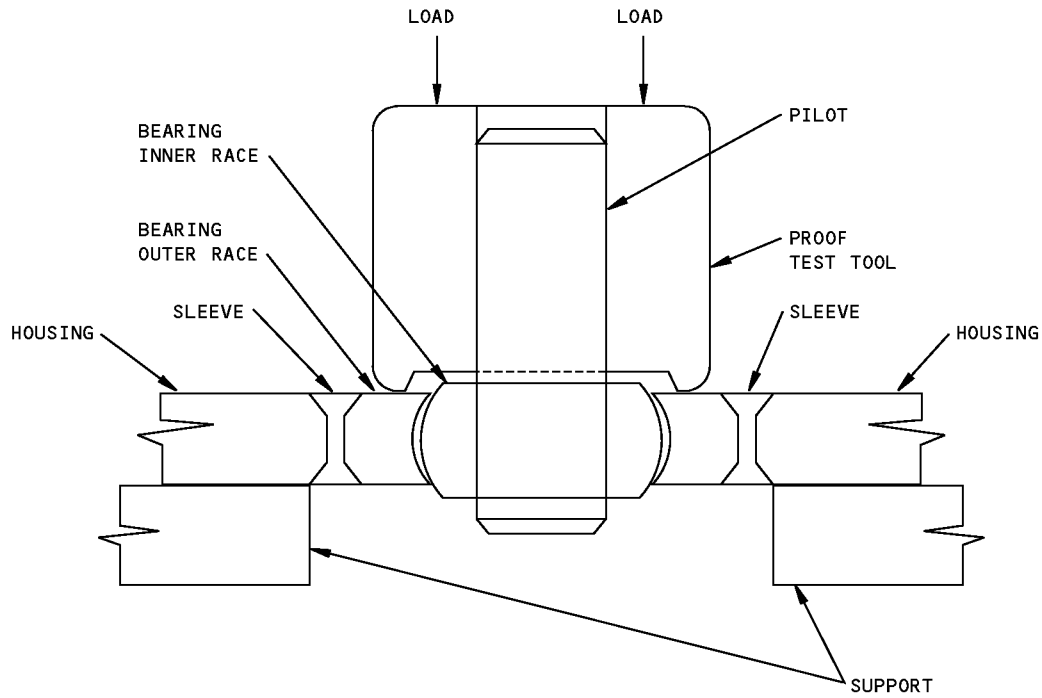
ALL DIMENSIONS ARE IN INCHES

1843634 S0000326669_V1

Roller Swaged Sleeve Requirements
Figure 21 (Sheet 2 of 3)

20-50-03

STANDARD OVERHAUL PRACTICES MANUAL



PROOF LOAD TEST

I

D55323 S0000160039_V2

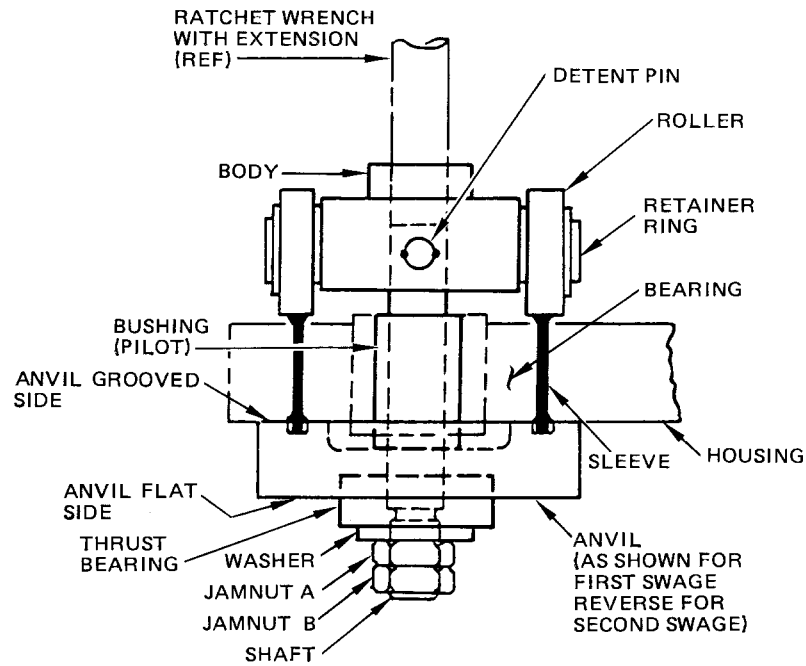
Roller Swaged Sleeve Requirements
Figure 21 (Sheet 3 of 3)

20-50-03

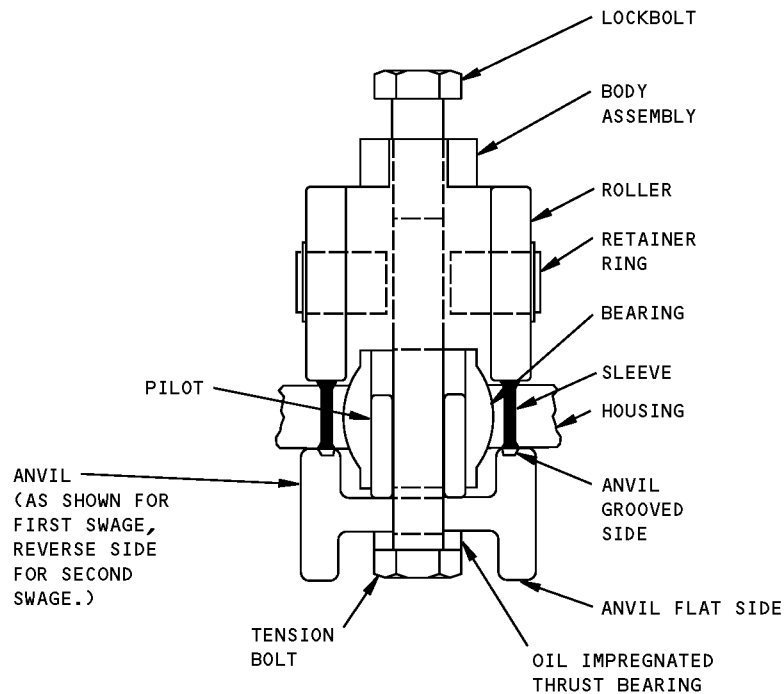
Page 52
Jul 01/2009



STANDARD OVERHAUL PRACTICES MANUAL



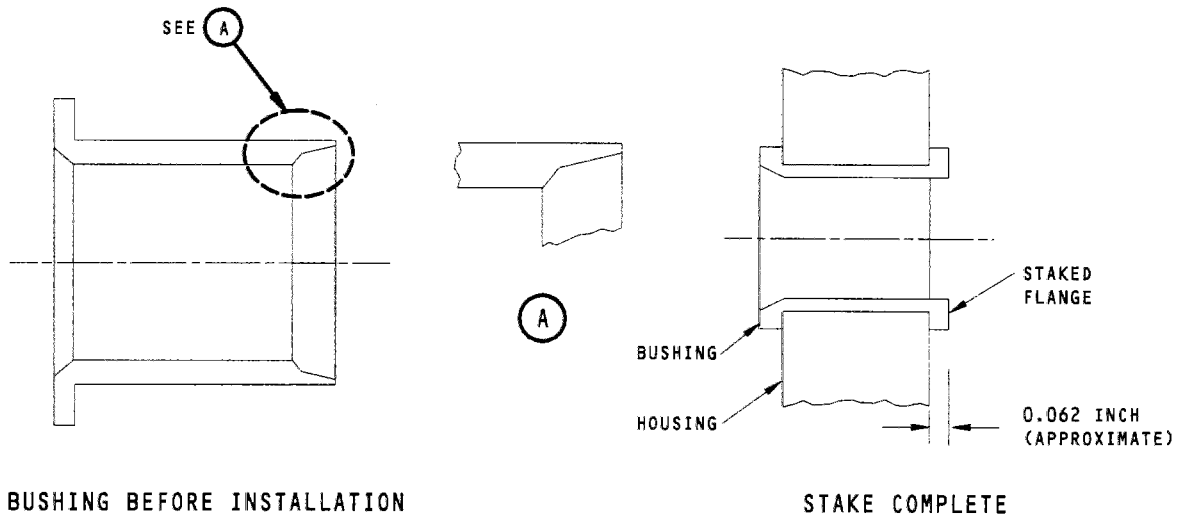
F80118-15,-31



F80118-1

Use of F80118 Roller Swage Tools
Figure 22**20-50-03**

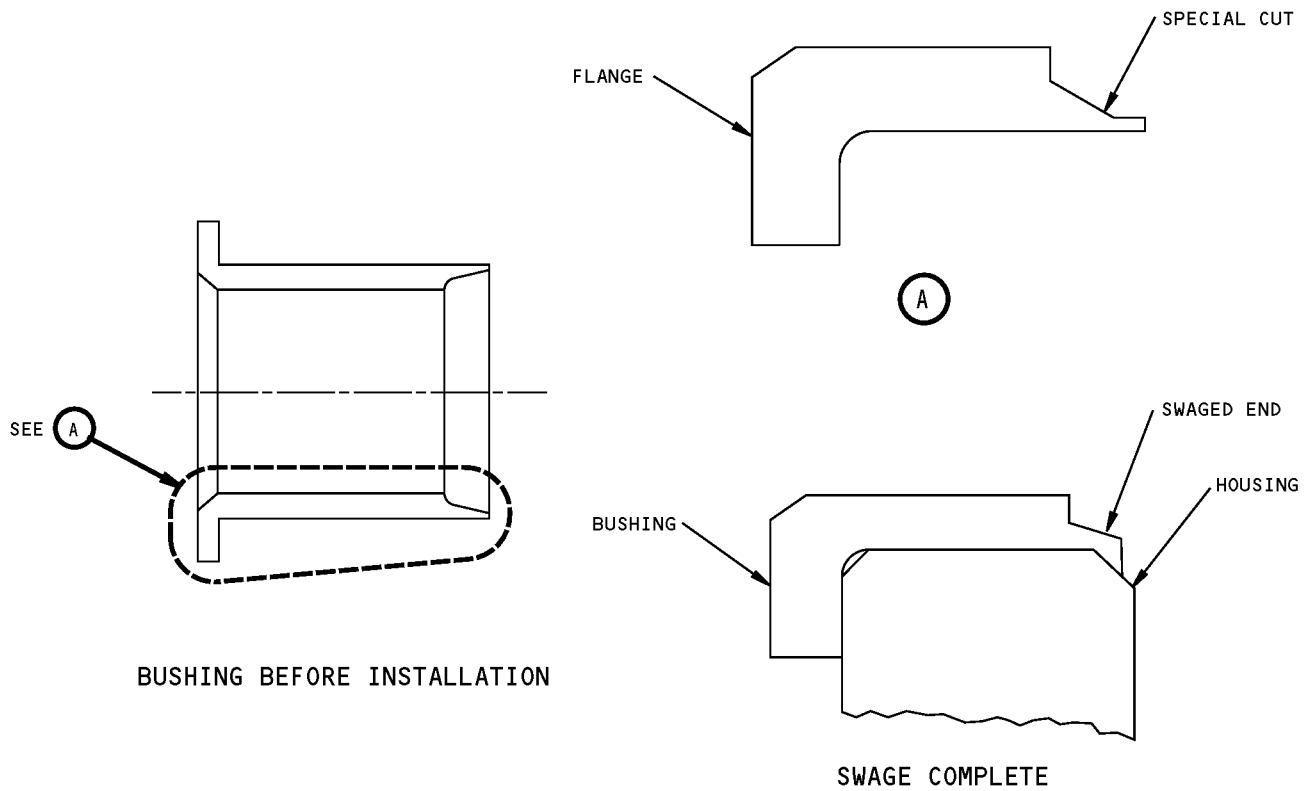
STANDARD OVERHAUL PRACTICES MANUAL



Staked Flanged Bushing
Figure 23

20-50-03

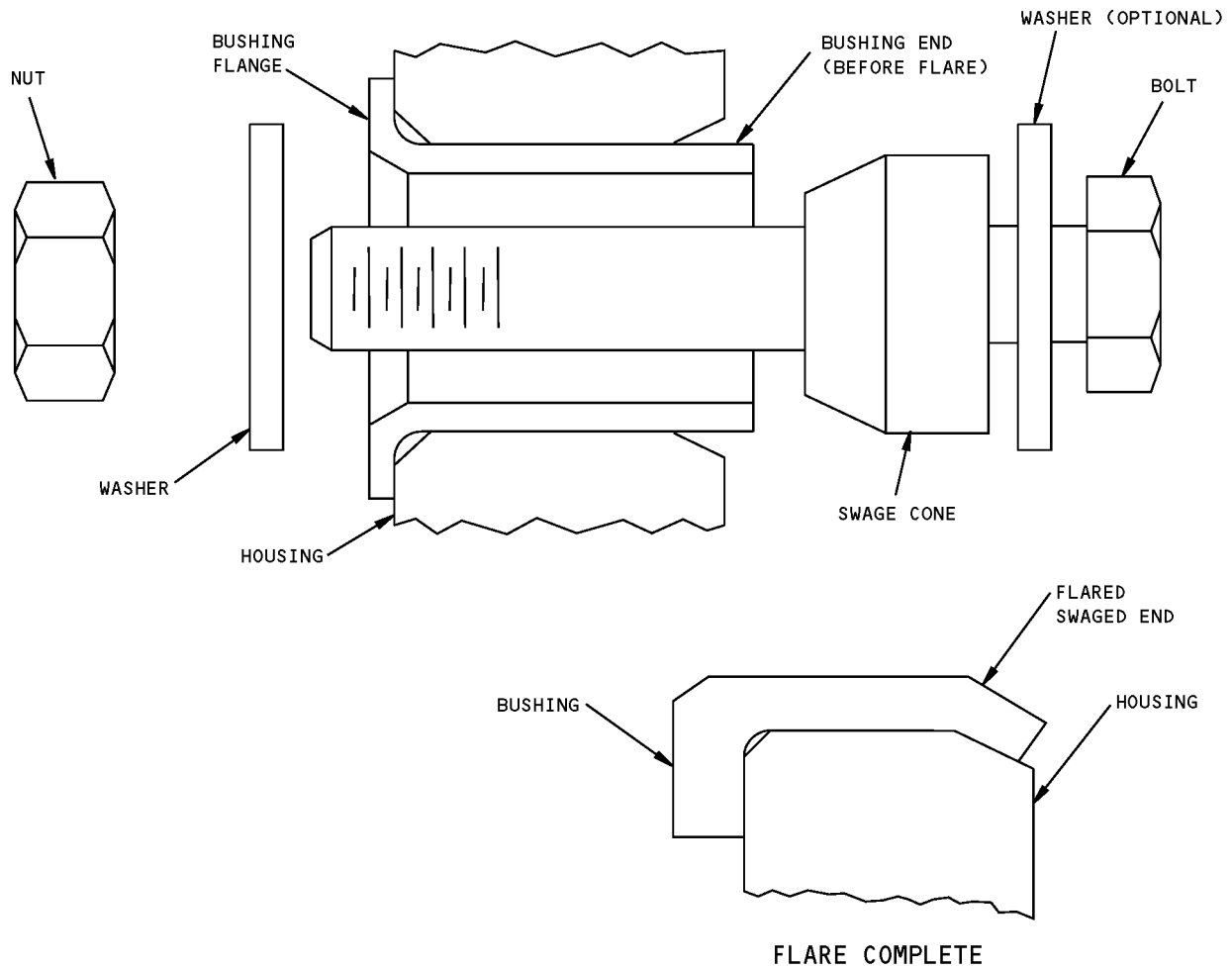
STANDARD OVERHAUL PRACTICES MANUAL



Swaged Flanged Bushing
Figure 24

20-50-03

STANDARD OVERHAUL PRACTICES MANUAL



Flared Flanged Bushing
Figure 25

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

9. BEARING RETENTION WITH ADHESIVES

- A. If the overhaul instructions tell you to bond a bearing in the housing with EA913 adhesive, Type 70 (BMS 5-92) adhesive or Type 54 (BMS 5-25, Grade 1) adhesive, use these procedures. Methods 1 and 2 come from Boeing drawing 66-19908. Method 3 comes from Boeing document D-14780.
- B. Method 1 – Installation with EA913 adhesive (optional to Method 2)

WARNING: THIS ADHESIVE CONTAINS ASBESTOS FIBERS. DO NOT MAKE OR BREATHE DUST. ASBESTOS DUST CAN CAUSE SERIOUS BODILY HARM.

- (1) If the housing is aluminum, lightly sand the faying surface with 400 grit paper, solvent clean with a Series 88 solvent (SOPM 20-30-88), and then chemical treat per SOPM 20-43-03. If the housing is bare steel, lightly sand the faying surface with 400 grit paper and wipe with solvent. If the faying surface is cadmium plated steel, do not sand the surface, but wipe it with solvent.
- (2) Lightly sand the faying surfaces of a steel or aluminum bearing with 400 grit paper and then wipe with solvent. Then chemical treat the faying surfaces of the aluminum bearing.
- (3) Give protection to the ball edges of the bearing outer race.

WARNING: USE RUBBER GLOVES WHEN YOU WORK WITH THE ADHESIVE INGREDIENTS. COMPONENT C IS GLACIAL ACETIC ACID AND CAUSES SEVERE BURNS. DO NOT BREATHE THE VAPORS. USE ONLY WITH SUFFICIENT VENTILATION. DO NOT GET IN EYES, ON SKIN OR ON CLOTHING. KEEP AWAY FROM FIRE.

- (4) Two adhesive systems are available, EA913 or EA913.1. Refer to Table 5 for mixing proportions and pot life. If applicable, mix accelerator (component C) into hardener (component B), then add this mixture to resin (component A). Mix thoroughly.
- (5) Apply a layer of the adhesive to the faying surfaces of the housing and the bearing. Install the bearing in the housing. Immediately wipe off unwanted adhesive to let a fillet of the adhesive stay at the bondline. Cure per Table 5.

Table 5: Method 1 Adhesive Preparation and Usage

Adhesive Systems		EA 913		EA 913.1
Mixing Proportions (by Weight)				
Component A (Resin)		99-101		99-101
Component B (Hardener)		11.5-12.5		11.5-12.5
Component C (Accelerator)		None		1.7-1.9
Pot Life (Hours)		2		0.5
Cure Schedule		65-80°F	190°F	65-80°F
Boeing 10-60545 Bearing Material	Housing Material			
Steel	Aluminum	5 Days	Not Permitted	24 Hours
Steel	Steel	5 Days	2 Hours	24 Hours
Aluminum	Aluminum	5 Days	2 Hours	24 Hours

- C. Method 2 – Installation with BMS 5-92 adhesive (Preferred to Method 1).

20-50-03

**STANDARD OVERHAUL PRACTICES MANUAL**

- (1) Bond the bearing with Type 70 adhesive (SOPM 20-50-12).

D. Method 3 – Installation with BMS 5-25, Grade 1 adhesive

WARNING: THIS ADHESIVE CONTAINS ASBESTOS FIBERS. DO NOT MAKE OR BREATHE DUST. ASBESTOS DUST CAN CAUSE SERIOUS BODILY HARM.

- (1) Remove the bearing with an arbor press or some equivalent device which can apply pressure to the bearing and give support to the housing at the same time.
- (2) You can use heat to make the adhesive soft to help remove it. Heat to a maximum of 200°F in areas where materials such as paint or sealants could be damaged by heat, and to a maximum of 250°F in other areas.
- (3) If you will use the old bearing again, mask the sides of the bearing with aluminum tape or equivalent to give it protection from cleaning solvents, abrasives and adhesives.

WARNING: STRIPPERS CONTAIN CHLORINATED HYDROCARBONS. AVOID PROLONGED OR REPEATED BREATHING OF VAPORS. USE ONLY WITH ADEQUATE VENTILATION. AVOID CONTACT WITH SKIN, EYES, OR CLOTHING.

- (4) To remove old adhesive from all faying surfaces, apply a layer of stripper. The adhesive will become soft and can be scraped from the surface. Do this again and again if the layers of adhesive are thick.
- (5) After removal of old adhesive, remove oil or grease with a clean, lint-free cloth wet with a Series 98 solvent (SOPM 20-30-98).
- (6) Sand faying surfaces lightly with silicon carbide paper, 280 grit or finer, to get a satin finish.

WARNING: SOLVENTS ARE FLAMMABLE AND TOXIC. DO NOT BREATHE THE VAPORS. USE ONLY WITH VENTILATION. KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME. KEEP AWAY FROM SKIN, EYES, AND CLOTHING.

- (7) Wipe all mating surfaces with a clean, lint-free cloth wet with a Series 98 solvent (SOPM 20-30-98). Use clean solvents in all cleaning operations.
- (8) Prepare Type 54 adhesive per SOPM 20-50-12.
- (9) Apply a thin smooth layer of adhesive with a small spatula to all surfaces which are to be bonded.
- (10) After all the surfaces have adhesive on them, immediately install and push the bearing into position in the housing. Make sure there is a continuous bead of extruded adhesive at the bond line. If you see gaps in the bond line, remove the bearing and try again.
- (11) Wipe off unwanted adhesive, before it cures, with a clean cheesecloth wet with a Series 98 solvent (SOPM 20-30-98).
- (12) After the bearing is installed, precure it for 16-24 hours at room temperature without any bearing movement. At the end of the precure period the adhesive will still be a semiplastic condition. Remove unwanted adhesive at this time.
- (13) Cure self-aligning bearings at 85°F maximum, because the adhesive expands slightly when heat cured, which could tighten the outer race of the bearing.
- (14) Cure other installations for at least 12 hours at 65-100°F, at least 2 hours at 115-135°F, or 55-65 minutes at 190-210°F. This adhesive will not cure satisfactorily below 65°F.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

10. TOOLS

- A. This section tells about Boeing standard tools for bearing removal, installation and retention. These tools are used along with the procedures given earlier to replace bearings as specified in the applicable component overhaul instructions. Also, some tools come with special instructions, frequently on a placard attached to the tool storage box.
- B. Tool Descriptions (Table 6 thru Table 10.)
- (1) See Table 6 for descriptions of some of the usual bearing tools, with some examples of dash number codes. References to airplane component locations by part name or number are only examples. Do not use the data in Table 6 to try to find the correct tool by name or location. Because component overhaul must start with component identification, you must know the part number of the bearing before you can identify the correct tools to use. After you know the bearing part number, see Table 11 to identify the tools for it.

Table 6: Tool Descriptions

TOOL NO.	NAME	DESCRIPTION
A20011	Removal/Installation Kit, Landing Gear Bushing	Cutters, removal mandrels and swage cones to remove and swage bushings in some landing gear components.
A32091	Hole Saw	Used with ST927C arbor, pilot and anvil to remove roller swaged bearings. Typical tool part number is A32091-4110 where -4110 is OD of saw in thousandths. The hole saw is used to remove swaged lip metal to free bearing from its housing.
A52020-2	Mandrel	Installs bearing set in entry door roller assembly 141T6175-series.
F70150	Puller, Control Actuator Bearing	Removes bearings from the 707 and 720 inboard aileron tab control actuator and rudder trim actuator.
F70321	Installation Mandrel, Shrink Fit Bushing	Holds, aligns, and installs chilled shrink fit bushings. Also helps keep the bushing cold until installed.
F71313	Socket Wrench, Rod End Bearing	Holds or turns rod end bearings during assembly or disassembly.
F72865-1	Pressure Staking Tool	Pressure stakes bearing 69-57625-1 in thrust reverser deflector door forward link assembly 65-65698-1.
F72896	Bushing Staking Tool	Stakes bushings BACB28B4-239 in the 66-18770-1 flanged support on the 727 APU air duct.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 6: Tool Descriptions (Continued)

TOOL NO.	NAME	DESCRIPTION
F72916-1	Roller Swaging Assy, Control Crank Bearing Housing	Swages bearing in the 65-21805 rudder trim coordination control crank. Replaces tool SE27-2001. Also roller swages bearing 10-61905-6 in barrel assembly 65-26414-17, which has limited side clearance.
F73012-1	Roller Swaging Equipment, Main Landing Gear Lock Actuator Barrel	Roller swages bearing 10-61905-6 in barrel assembly 65-26414-17, which has limited side clearance.
F80113-1	Roller Swage Kit	Roller swages bearings with a swaging diameter range of 0.875 - 2.125 inches.
NOTE: F80113-1 becomes equivalent to F80113-34 when you add -31 anvil and -32 body.		
F80113-34	Roller Swage Kit	Roller swages bearings with a swaging diameter range of 0.875-2.375 inches.
NOTE: F80113-34 becomes equivalent to F80113-50 when you add -53 body, -56 anvil, and two MS35650-3382 nuts. This extends swaging diameter down to 0.625 inch.		
F80113-37	Roller Swage Kit	Roller swages bearings with a swaging diameter range of 2.375 - 2.625 inches.
F80113-44	Roller Swage Kit	Roller swages bearings with a swaging diameter range of 3.875 - 4.125 inches. Replaced by F80113-61.
F80113-50	Roller Swage Kit	Roller swages bearings with a swaging diameter range of 0.625 - 2.375 inches. Replaced by F80113-64, -105.
F80113-61	Roller Swage Kit	Roller swages bearings with a swaging diameter range of 3.875 - 4.125 inches.
F80113-64	Roller Swage Kit	Roller swages bearings with a swaging diameter range of 0.625 - 2.375 inches. Replaced by F80113-105.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 6: Tool Descriptions (Continued)

TOOL NO.	NAME	DESCRIPTION
F80113-70	Roller Swage Kit	Roller swages bearings with a swaging diameter range of 3.000 - 3.375 inches. Replaced by F80113-88.
F80113-88	Roller Swage Kit	Roller swages bearings with a swaging diameter range of 3.000 - 3.625 inches.
F80113-95	Roller Swage Kit	Roller swages bearings with a swaging diameter of 5.2500 inches.
F80113-105	Roller Swage Kit	Roller swages bearings with a swaging diameter range of 0.46875 - 2.37500 inches.
F80117-1	Roller Swage Assembly	Roller swages bearing 10-60545-205S.
F80117-10	Roller Swage Kit	Roller swages aluminum sleeve to hold bearing 10-60545-205S.
F80118-1	Sleeve Swage Kit	Swages sleeve to hold bearings 10-60545-148, BACB10A30DDM, YD134, YD134A, BR8P81, and BR8N71.
F80118-15	Sleeve Swage Kit	Swages sleeve to hold bearings DAS10-26A1 and -26B1 in limited clearance areas.
F80118-27	Removal Kit	Removes bearings DAS10-26A1 and -26B1.
F80118-31	Sleeve Swage Kit	Swages bearings of elevator control mast.
F80118-38	Swage and Removal Kit	Removes or swages bearings of the elevator control mast.
MIT314T3281-3	Spanner	Removes or installs bearings S302T001-406 and -411 on the 314T3281-series core cowl hinge toggle fittings. Used in pairs, to hold the race and tighten or loosen the mating nut or retaining ring.
MIT65B90361	Roller Swage Tool	Roller swages bearing 60B00180-302 in the 65B90361 engine mount link.
MIT65B97321	Installation and Removal Tool	Roller swages or removes bearings 60B97207-1 and 60B97208-1.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 6: Tool Descriptions (Continued)

TOOL NO.	NAME	DESCRIPTION
2MIT65B02070	Installation and Removal Tool	Removes, or installs and roller swages bearing 10-60545-158S in the yoke fitting of the inboard trailing edge aft flap front spar.
2MIT65B90361	Bearing Removal Tool	Removes bearing 60B00180-302 from the 65B90361 engine mount link.
ST1064	Bushing Staking Tool	Stakes bushing BACB28B-7 with Huck pull gun 353-RP.
ST1212	Arbor, Hole Saw	Mates with hole saws ST1212E.
ST1212E	Hole Saw	Used with ST1212-2-series arbor or ST927-series tools to remove roller swaged bearings. Example tool part number is ST1212E-625 where -625 is the OD of the saw in thousandths
ST2570-28	Bearing Screwdriver	Holds cam follower bearing BACB10B while nut is tightened.
ST2580-103	Rod End Wrench	Used with a torque wrench or socket wrench to tighten BACB10A-series or BACB10C-series rod end bearing on rod assemblies.
ST2597	Snap Ring Pliers	Holds snap ring lugs during ring installation and removal.
ST30-8783	Road Map, Test Tool, Bearing Proof Load Test	A tool drawing which shows kits of tools to do the proof load test on some bearings. Each kit includes a drawbar ST8783-A series, a load ring ST8783-B series, an anvil ST8783-C series, a retainer ST8783-D series, and a pin ST8783-E series.
ST30-8783A	Roadmap for Bearing Proof Load Testing	A tool drawing which shows kits of tools to do the proof load test on some bearings. Each kit includes a drawbar ST8783A-A series, a load ring ST8783A-B series, an anvil ST8783A-C series, and a sleeve ST8783A-D series.
ST321-A	Support	Holds parts during bearing installation. Used on arbor press.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 6: Tool Descriptions (Continued)

TOOL NO.	NAME	DESCRIPTION
ST8783-A	Drawbar, Bearing Proof Load Test	Part of each ST30-8783-series tool kit.
ST8783-B	Load Ring, Bearing Proof Load Test	Part of each ST30-8783-series tool kit.
ST8783-C	Anvil, Bearing Proof Load Test	Part of each ST30-8783-series tool kit.
ST8783-D	LVDT Retainer, Bearing Proof Load Test	Part of each ST30-8783-series tool kit.
ST8783-E	Pin, Bearing Proof Load Test	Part of each ST30-8783-series tool kit.
ST8783A-A	Drawbar, Proof Load Bearing	Part of each ST30-8783A-series tool kit.
ST8783A-B	Load Ring, Proof Load Bearing	Part of each ST30-8783A-series tool kit.
ST8783A-C	Anvil Assembly, Proof Load Bearing	Part of each ST30-8783A-series tool kit.
ST8783A-D	Sleeve, Proof Load Bearing	Part of each ST30-8783A-series tool kit.
ST8783F	Standard Tool, Bearing Retention Proof Test	Does the proof load test on installed bearings. Typical tool part number is ST8783F-XXXX-YY where XXXX is the bearing OD in thousandths of an inch, and YY is the tool assembly dash number, -1 for bearings with ID 0.375-inch or larger, and -16 for bearings with ID smaller than 0.375 inch.
ST918A	Mandrel, Ball Bearing Pressing	Presses bearing into housing before staking. Typical tool number is ST918A-1563-2312 where -1563 is bearing ID in thousandths and -2312 is bearing OD in thousandths.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 6: Tool Descriptions (Continued)

TOOL NO.	NAME	DESCRIPTION
ST918B	Mandrel, Needle Bearing Pressing	Presses bearing into housing before staking. Example tool number is ST918B-1-750-1000 where -1 is mandrel type, -750 is bearing ID in thousandths and -1000 is bearing OD in thousandths. Mandrel types permit a selection of the thickness of the annular tool surface that touches the bearing outer race. Types 1 and 4 are for bearings with thin outer race. Types 2 and 3 are for bearings with heavy outer race.
ST918C	Mandrel, Roller Bearing Pressing	Presses bearing into housing before staking. Typical tool number is ST918C-250-1250 where -250 is bearing ID in thousandths and -1250 is bearing OD in thousandths.
ST918CA-1000-1625	Bearing Installation Tool	Installs bearing BACB10C150H in torque tube support 65-20951 and on drive shaft 69-16332-1. In tool number, -1000 is bearing ID in thousandths and -1625 is bearing OD in thousandths.
ST918D	Mandrel, Sintered Bearing Pressing	Presses bearing into housing before staking. Two numbering systems are in use. In the current system, typical tool number is ST918D-750-1250-620 where -750 is bearing ID in thousandths, -1250 is bearing OD in thousandths, and -620 is bearing length in thousandths. In the obsolete system, tool dash number corresponds to bearing BACB10D dash number application; i.e., mandrel ST918D-154 fits bearing BACB10D154.
ST918E	Bearing Installation Tool	Install bearings in leading edge struts (65B14126, 65B14127, 65B14476, 65B15156) and fittings.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 6: Tool Descriptions (Continued)

TOOL NO.	NAME	DESCRIPTION
ST919	Support, Bearing Installation	Backs up substrate part during pressing of bearing with ST918-type mandrels. Typical tool number is ST919-2000 where -2000 is bearing OD in thousandths.
ST919MP	Mounting Plate, Bearing Installation	Mount for support ST919.
ST920	Mandrel, Bushing Installation	Installs press fit bushings. Tool dash number is same as bushing dash number, which represents bushing nominal ID in sixteenths.
ST920A	Bushing Mandrel Insertion Tool	Inserts press-fit bushings (BACB28X4B28 and BACB28X7B31) in clevis.
ST920B	Bushing Mandrel Insertion Tool	Installs actuator mechanism arm bushings on 60B00305-series cargo door actuators.
ST921B	Bushing Puller	Removes press-fit bushings from bushing plate and removes blind bushings. Can remove bearings BACB10D and bushings NAS75, NAS77, NAS537, NAS538, and UT7000, UT7001, UT7004, and UT7005 with minimum ID of 5/8 inch, maximum ID of 2 inches, and maximum length of 2 inches.
ST921C	Bushing Removal Tool	Removes bushings. Typical tool number is ST921 C-2430-2210-28 where -2430 is OD of bushing minus 0.005 in thousandths, -2210 is ID of bushing minus 0.005 in thousandths, and -28 is bushing length plus 3/4 in 1/8-inch increments.
ST922	Bushing Staking Tool	Stakes bushings BACB28B. Tool dash number is same as bushing dash number, which represents bushing nominal ID in sixteenths.
ST922A-6	Bushing Staking Tool	Stakes bushing BACB28B-6 in substrate part with ST1020-29 anvil on CP450 squeezer.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 6: Tool Descriptions (Continued)

TOOL NO.	NAME	DESCRIPTION
ST922C	Bushing Staking Tools	Flattener, punch and anvil for staking bushings BACB28B4. Used with CP450 EA compression riveter.
ST922E	Anvil Block	Used for staking bushing BACB28B4-239P in channel part. Used with ST922B-4 staking tools in CP450 EA riveter.
ST922F-4	Bushing Staking Tool	Stakes 1/4-inch diameter bushing BACB28B4-series. Used on CP450 EA riveter.
ST923	Adapter	Adapts 0.374-inch shank tools to 0.750-inch diameter shank for installations on presses.
ST925	Point Staking Tool	Point stakes bearing in 140-210 ksi steel housings. Typical tool number is ST925-190-562 where -190 is bearing ID in thousandths, and -562 is bearing OD in thousandths.
ST926	Roller Staking Tool	Roller stakes self-lubricating (Teflon lined) spherical bearings, such as BACB10M series. See Table 7 for tool dash numbers related to bearing sizes.
ST926A	Roller Staking Tool	Roller stakes spherical bearings in limited side clearance applications. See Table 8 for tool dash numbers related to bearing sizes and side clearances.
ST926B	Roller Staking Tool	Roller stakes 69B13953-2 and certain 60B00180 spherical bearings.
ST926C	Roller Staking Tool	Roller stakes 60B80067 or similar spherical bearings. Typical tool number is ST926C-750-1427-1362 where -750 is bearing ID in thousandths, and -1437 is bearing OD in thousandths, and -1362 is diameter of staking groove in thousandths.
ST926D	Roller Staking Tool	Roller stakes MS21230-12 or similar spherical bearings.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 6: Tool Descriptions (Continued)

TOOL NO.	NAME	DESCRIPTION
ST926E	Roller Swaging Tool	Roller swaging tool with roller assembly, pilot, roller, shaft, retaining rings and anvil.
ST926G	Bearing Remove / Install / Swage Standard Tool	Removes, installs and Type III (race) swages bearings of 0.500-4.000 inch outside diameter. Typical tool part number is ST926G-WWW-XXX-Y-ZZZZ where W is bearing OD in thousandths, X is bearing ID in thousandths, Y is bearing thickness in tenths, and Z is swaging groove centerline diameter in thousandths.
ST927	Bearing Removal Tool	Removes staked spherical bearings. See Table 9 for tool dash numbers related to bearing sizes.
ST927B & C	Bearing Removal Tool	Removes roller swaged bearings.
ST928	Roller Staking Hand Tool	Roller swages bearing sleeves. Typical tool number is ST928-1750-625 where -1750 is bearing OD in thousandths and -625 is bearing ID in thousandths.
ST928-A	Roller Swaging Aluminum Sleeve Standard Tool	Roller swages aluminum sleeves. A different tool than ST928A. Typical tool number is ST928-A-9, which swages a 69-38919-19 sleeve.
ST928A	Roller Staking Hand Tool	Roller swages bearing sleeves. Typical tool number is ST928A-1750-625 where -1750 is sleeve OD in thousandths and -625 is bearing ID in thousandths.
ST928B	Roller Swaging Tool	Roller swages bearing sleeve in 65B05326 spindle assembly.
ST928C	Roller Swaging Tool	Roller swages bearing sleeves.
ST928D	Roller Swaging Tool	Roller swages sleeve 69-47811-2 to hold bearing BACB10C94H on aft airstair program cam 65-60515.
ST928E	Roller Staking Tool for Aluminum Sleeve	Stakes 69-38919-2 sleeve to hold bearing 10-60545-102.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 6: Tool Descriptions (Continued)

TOOL NO.	NAME	DESCRIPTION
ST928F	Aluminum Sleeve Roller Staking Tool	Roller swages sleeves 69-38919-1, -20 to hold bearings BACB10AR4, BACB10AR5.
ST928G	Roller Swaging Accessories for ST928	Mandrel and press equipment used with ST928 tools.
ST929-1	Bearing Sleeve Staking Tool	Roller stakes bearing retaining sleeve into matching chamfers on bearing and housing.
ST929-1A	Roller Swaging Tool, Bearing Sleeve	Roller swages steel sleeves to hold bearings.
ST929-1B	Rod End Roller Swaging Tool	Swages ball 412T2050-2 into rod end 412T2051-5,-6.
ST929-2	Bearing Sleeve Staking Tool, 3 Point (obsolete)	Line stakes bearing sleeves. Typical tool number is ST929-2-750-250 where -750 is bearing OD in thousandths and -250 is bearing ID in thousandths. (Replaced by ST929-2A series tools.)
ST929-2A	Bearing Sleeve Staking Tool, 3 point	Line stakes bearing sleeves. (Replaces ST929-2).
ST929-2B	Bearing Sleeve Staking Tool, 12 point	Line stakes 69B80028 bearing retainer in wing gear hydraulic actuator head end 65B01520.
ST929-2C	Bearing Sleeve Staking Tool, 6 Point	Line stakes bearings BACB10CA or similar.
ST929-3A	Bearing sleeve Staking Tool, 3 Point	Line stakes sleeves to hold bearings BACB10B105ZP and BACB10B106ZP.
ST929-4	Line Staking Tool	Line stakes housing over bearing, 4 places.
ST930	Bushing Staking Tool	Stakes BACB28AB bushings. Tool dash number is same as bushing dash number, which is the bushing nominal ID in sixteenths.
ST930B	Pressure Type Staking Tool	Press stakes Heim bearing WSSG8A or equivalent into thrust reverser link. Typical tool number is ST930B-500 where -500 is bearing ID in thousandths.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 6: Tool Descriptions (Continued)

TOOL NO.	NAME	DESCRIPTION
ST930C-series	Anvil Swaging Tool	Anvil swages bearings. Typical tool number is ST930C-375-812-I where -375 is bearing ID in thousandths, -812 is bearing OD in thousandths, and -I is bearing groove type (I, II, or III) per BAC5435, as shown in Figure 13. (Sometimes the letter I could be shown as a numerical 1.)
ST930C-1	Anvil Swaging Tool	Replaced by ST930C-250-656-I (or -1).
ST930-LT	Load Test Tool	Load tests bearings after installation and swaging. Typical tool number is ST930-LT-375-906-801 where -375 is bearing ID in thousandths, -906 is bearing OD in thousandths, and -801 is swaging diameter in thousandths.
ST931	Ball Point Multiple- Bearing Staking Tool	Ball stakes housing to hold bearing. Used with ST918 mandrels. Typical tool number is ST931-750-1375 where -750 is bearing ID in thousandths and -1375 is bearing OD in thousandths.
ST931A	Ball Staking Tool, Adjustable	For individual ball point staking in material up to 240 ksi in areas of limited access.
ST931B	Ball Point Bearing Staking Yoke	Stakes bearing in areas of limited access. Used with CP505 Pneudraulic Cylinder. Tool number codes are same as ST931.
ST931C-250-750	Ball Point Staking Tool	Stakes AN201KP4A bearing with a press in areas of limited access.
ST931D	Ball Staking Tool	Ball stakes bearing in areas of limited access.
ST931E-500-1000	Swagging [sic] Tool, Thrust Link Fitting, Fwd. Engine Mount	A mandrel with an installed dowel pin for installation of spherical bearings. (Not a roller-swaging tool.)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 6: Tool Descriptions (Continued)

TOOL NO.	NAME	DESCRIPTION
ST932	Roller Staking Tool	Roller swages housing, with drill press and ST918A mandrel, to hold self-aligning bearing. Available only as complete tool including rollers, pilot, collar spindle, for a specific bearing size and application. This complete tool now replaces individually-selected components. See Paragraph 10. B.(2) for further details.
ST932A-R	Rollers	Stakes bearings in steels of 140 ksi or less. Replaced by complete ST932 tool.
ST932B	Roller Swaging Tool	Roller swages bearings with small ID (0.361 inch and less), when access is too tight for ST932 tools.
ST932C	Roller Swaging Tool	Roller swages bearing BACB10A38. Includes anvils and rollers. (Replaces ST932-1875-500.)
ST932-C-series	Collar (Obsolete designation)	Replaced by complete ST932 roller staking tool.
ST932E	Roller Swaging Tool	Swages bearing in autothrottle resolver brackets 253T7511.
ST932-P	Pilot	Replaced by complete ST932 roller staking tool.
ST932-R	Rollers	Stakes bearings in aluminum and softer alloys. Replaced by complete ST932 tool.
ST932-S	Spindle	Replaced by complete ST932 roller staking tool.
ST933	Swaging Tool	Swages staking ring BACR12Y to hold bearing in housing. There are two numbering systems. In the current system, typical tool number is ST933-750-250, where -750 is bearing OD in thousandths, -250 is bearing ID in thousandths. In the obsolete system, typical tool number is ST933-12-4 where -12 is bearing OD to the nearest sixteenth, and -4 is bearing ID to the nearest sixteenth.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 6: Tool Descriptions (Continued)

TOOL NO.	NAME	DESCRIPTION
ST933-100	Swaging Tool	Swages staking ring BACR12Y to retain bearing to shaft. This tool has two numbering systems. In the current system, typical tool number is ST933-100-250, where -250 is bearing ID in thousandths. In the obsolete system, typical tool number is ST933-100-4 where -4 is bearing ID to the nearest sixteenth.
ST934	Bearing Roller Staking Tool	Roller stakes Al-bronze bearings.

Table 7: ST926 Tool Details

Bearing		Tool No.	Pilot Nominal ID	Shank Dia.	Spacer Thickness	Staking Dia.	Anvils			
							Primary		Secondary	
							ST926	OD	ST926	OD
0.250	0.6562	ST926-1	0.250	0.500	0	0.580	-1A-250	0.85	-1B-250	0.875
0.312	0.7500				0.047	0.675	-1A-312	0.95	-1B-312	1.000
0.375	0.8125				0.078	0.078	-1A-375	1.02	-1B-375	1.062
0.438	0.9062	ST926-2	0.375	0.500	0	0.830	-2A-438	1.10	-2B-437	1.125
0.500	1.0000				0.035	0.900	-2A-500	1.20	-2B-500	1.250
0.562	1.0937				0.082	0.994	-2A-562	1.30	-2B-562	1.375
0.625	1.1875				0.129	1.088	-2A-625	1.40	-2B-625	1.500
0.750	1.4375	ST926-3	0.500	0.500	0	1.338	-3A-750	1.64	-3B-75-	1.750
0.875	1.5625				0.063	1.462	-3A-875	1.76	-3B-875	1.875
1.000	1.7500				0.156	1.650	-3A-1000	1.95	-3B-1000	2.062
1.250	2.0000				0.280	1.870	-3A-1250	2.375	-3B-1250	2.375
2.500	3.9375	ST926-4	1.500	1.000	0	3.830	-4A-2500	4.50	-4B-2500	4.250
0.312	0.7500	ST926-5	0.250	0.500	0	0.610	-5A-312	0.89	-5B-312	0.875
0.562	1.0937	ST926-6	0.375	0.500	0	1.026	-6A-562	1.375	-6B-562	1.375

Table 8: ST926A Tool Details

Bearing Dimension		Tool No.	Minimum Side Clearances Dia -A- ⁽¹⁾
ID	OD		
0.2500	0.656	ST926A-1	0.925
0.2500	0.656	ST926A-2	1.062
0.3125	0.750	ST926A-3	1.050

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 8: ST926A Tool Details (Continued)

Bearing Dimension		Tool No.	Minimum Side Clearances Dia -A- ^{*[1]}
ID	OD		
0.3125	0.6875	ST926A-4	0.984
0.3750	0.8125	ST926A-5	1.125
0.4375	0.906	ST926A-6	1.187
0.5000	1.000	ST926A-7	1.281
0.5000	1.000	ST926A-8	1.438
0.5625	1.0937	ST926A-9	1.421
0.5625	1.1250	ST926A-10	1.438
0.6250	1.1875	ST926A-11	1.500
0.6250	1.1875	ST926A-12	1.594
0.7500	1.4375	ST926A-13	1.750
0.8750	1.5625	ST926A-14	1.875
1.0000	1.7500	ST926A-15	2.031
2.5000	3.9375	ST926A-16	4.500
0.7500	2.125	ST926A-17	2.500
2.253	3.000	ST926A-18	3.625

*[1] Minimum to preclude interference of roller shaft with part receiving bearing. See Figure 12 for tool usage details.

Table 9: ST927 Tool Details

BEARING DIMENSION		TOOL NO.	CUTTER OD	PUNCH OD
ID	OD			
0.2500	0.656	ST927-1	0.651	0.648
0.3125	0.750	ST927-2	0.744	0.740
0.3125	0.6875	ST927-3	0.681	0.678
0.3750	0.8125	ST927-4	0.805	0.800
0.4375	0.906	ST927-5	0.900	0.895
0.5000	1.000	ST927-6	0.992	0.987
0.5625	1.0937	ST927-7	1.085	1.080
0.5625	1.1250	ST927-8	1.117	1.112
0.6250	1.1875	ST927-9	1.180	1.175
0.7500	1.4375	ST927-10	1.430	1.425
0.8750	1.5625	ST927-11	1.552	1.547
1.0000	1.7500	ST927-12	1.740	1.734
0.7500	2.1250	ST927-13	2.118	2.113

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

(2) ST932 - Series tools

NOTE: The ST932P (pilot) and ST932C (collar) designations, and the buildup of the required tool by selection of rollers and spindle, have been replaced by a system similar to that of ST925 and ST931 tools.

- (a) Current System – Pilot, collar, rollers and spindle are included in a single tool part number defined by quoting bearing ID, bearing OD, diameter of swaging rollers, and housing material. The tool part number is as follows:

1) ST932-WWW-XXX-Y-Z, where:

- a) ST932 is the basic number.
- b) WWW is the bearing ID, in thousandths of an inch.
- c) XXX is the bearing OD, in thousandths of an inch.
- d) Y is the diameter of swaging rollers

<1> -1 or -3: 1.500 in.

<2> -2 or -4: 1.875 in.

- e) Z is the housing material

<1> -1: steel (up to 140 ksi)

<2> -2: aluminum or other soft metal.

NOTE: As an example, to roller swage bearing BACB10CF10PP in an aluminum housing, the ST932 tool part number to use is ST932-625-1062-1-2 because the bearing ID is 0.625 inch, the bearing OD is 1.062 inches, the tool comes with 1.500 inch diameter rollers unless otherwise specified, and the tool will be used to swage the bearing into an aluminum part.

(b) Obsolete System

NOTE: The part numbers given below for pilot and collar are for use of existing tool components only, and are no longer procurable separately. When replacement is necessary, order the complete ST932 tool per par. (2)(a).

- 1) Pilot ST932-P: Dash number is bearing ID in thousandths, minus 0.001 inch.
- 2) Collar ST932-C: Dash number is related to bearing OD as shown in Table 10.

Table 10: Obsolete ST932-C Collar Details

Bearing OD	Obsolete ST932-C Collar
0.625	-016
0.656	-031
0.687	-047
0.748	-0775
0.750	-078
0.777	-092
0.812	-110
0.875	-141
0.901	-154

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 10: Obsolete ST932-C Collar Details (Continued)

Bearing OD	Obsolete ST932-C Collar
0.906	-154
0.937	-172
1.000	-203
1.024	-215
1.062	-235
1.125	-266
1.187	-297
1.250	-328
1.259	-333
1.260	-333
1.312	-360
1.375	-391
1.378	-391
1.437	-422
1.500	-454
1.562	-485
1.574	-491
1.580	-1580
1.625	-516
1.687	-547
1.750	-078
1.850	-129
1.875	-641
2.000	-704 or -203
2.062	-735
2.187	-279
2.250	-629 or -328
2.375	-391
2.437	-422
2.440	-424
2.500	-454 or -141
2.531	-468
2.562	-485
2.625	-016 or -516
2.677	-542

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 10: Obsolete ST932-C Collar Details (Continued)

Bearing OD	Obsolete ST932-C Collar
2.750	-078
2.812	-610
2.875	-141
2.952	-680
3.000	-704
3.062	-235
3.149	-776
3.250	-323
3.875	-641
3.937	-172 or -672
4.001	-704
4.125	-766
4.250	-829
4.921	-704

C. Tool Selector Guide (Table 11)

- (1) This is a list, by bearing part number, of tools that can be used for the different overhaul operations. The tool vendor is Boeing (V81205) unless identified by a different vendor code.
 - (a) Specification-controlled bearings are in the list only with the applicable Boeing, military, or Federal Specification part number and not with the equivalent vendor part number.
 - 1) For cross references between specification numbers and vendor equivalent part numbers, refer to the parts list in the applicable overhaul instructions, or an equivalent document.
 - 2) For cross references between Boeing specification part numbers (10-series, 60B-series, or S-series) and vendor equivalent part numbers, refer to the Boeing Specification Cross-Reference Index, Document D6-42448, or the equivalent site on-line.
 - (b) Bearing part numbers are in the list without letter suffixes, such as the A in S302T001-302A, if the bearing with the letter suffix uses the same tools as the bearing without the letter suffix.
- (2) The tools in the list are not the only ones that could be used in a given situation.
 - (a) Equivalent substitutes can be used. Some vendors can supply alternatives to the tools in the list, or if there is no tool in the list for a specific application. Try these vendors:
 - 1) Aero Staking, Inc., V4M6P3
 - 2) Cabco Industries, Inc., V50830
 - 3) Rexnord Industries, Inc., V77896
 - (b) Multiple tool numbers in the list for one operation generally identify alternative tools, or tools for special applications, such as when the clearance is too tight for the standard tools.

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

- (3) Some of the bearings in this list could be installed by different procedures when a given bearing is used in different components in the airplanes. For example, a bearing shown in this list with tools for roller swaging could be roller swaged in one installation or location, but in a different location it could be held in position with special hardware or mating parts or with a press fit. You must refer to the applicable overhaul instructions for the component or installation to identify the correct procedure for your specific situation. Do not try to use this list to make the decision about the correct procedure.
- (4) If a bearing is installed with a sleeve which is then swaged, the applicable tools are in the list under the bearing part number, not the sleeve part number. This is because a given sleeve could be used with many different bearings of different shapes and sizes.

Table 11: Bearing Replacement Tools

BEARING PART NO.	OPERATION	TOOL PART NUMBER
A-6Y	Install	ST918C-375-1562
	Ball Stake	ST931D-375-1562
	Roller Swage	ST932-P-374 and ST932-C-485 ^{*[1]}
A-8F	Install	ST918C-500-2000
	Roller Swage	ST932-P-499 and ST932-C-203 ^{*[1]}
AA397-1	Install	ST918D-250-312-250
AA741	Install	ST918D-625-750-500
AA880-4	Install	ST918D-203
ABG4V105	Roller Swage	RST2781 (V77896)
ABW4V110	Roller Swage	C57001, or RST2536 (V77896)
AG4V35	Roller Swage	RST2781 (V77896)
AMB20-1001	Remove	ST927C-5
	Roller Swage	F80113-1, -34, -50, -64 or -105, or ST926E-162 or RST2453 (V77896)
AMB22-1001	Remove	ST927C-11
	Roller Swage	F80113-34, -50, -64 or -105, or ST926C-1375-2250-2127
AMB5V4002	Roller Swage	C57001, or RST2536 (V77896)
AN200KP10	Install	ST918A-625-1937
	Roller Swage	ST932-P-624 and ST932-C-172 ^{*[1]}
AN200KP37B	Install	ST918A-2312-2062
	Point Stake	ST925-2312-2062
AN200KP4	Remove	ST919-901
	Install	ST918A-250-901
	Ball Stake	ST931-250-901
	Roller Swage	ST932-P-249 and ST932-C-154 ^{*[1]}
AN200KP5	Remove	ST919-1250
	Install	ST918A-312-1250 and ST919-1250
	Point Stake	ST925-312-1250
	Roller Swage	ST932-P-311 and ST932-C-328 ^{*[1]}
	Sleeve Swage	ST928C-5

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
AN200KP6	Install	ST918A-375-1437
	Roller Swage	ST932-P-374 and ST932-C-422 ^{*[1]}
AN200KP8	Install	ST918A-500-1687
	Roller Swage	ST932-P-499 and ST932-C-547 ^{*[1]}
	Sleeve Swage	ST928C-14
AN200KS10	Install	ST918A-625-1937
	Roller Swage	ST932-P-624 and ST932-C-172 ^{*[1]}
AN200KS3	Install	ST918A-190-625
	Roller Swage	ST932-P-189 and ST932-C-016 ^{*[1]}
AN200KS3L	Install	ST918A-190-625 and ST919-625
	Ball Stake	ST931-190-625
	Roller Swage	ST932-P-189 and ST932-C-016 ^{*[1]}
	Sleeve Swage	ST929-2A-625-190-18
AN200KS4	Install	ST918A-250-901
	Ball Stake	ST931-250-901
	Roller Swage	ST932B-250-901
	Roller Swage	ST932-P-249 and ST932-C-154 ^{*[1]}
AN200KS5	Install	ST918A-312-1250
	Ball Swage	ST931-312-1250
	Roller Swage	ST932-P-311 and ST932-C-328 ^{*[1]}
	Sleeve Swage	ST928C-5
AN200KS6	Install	ST918A-375-1437 and ST919-1437
	Ball Stake	ST931-375-1437
	Roller Swage	ST932-P-374 and ST932-C-422 ^{*[1]}
	Sleeve Swage	ST928C-11
AN200K3L	Install	ST918A-190-625
	Roller Swage	ST932-P-189 and ST932-C-016 ^{*[1]}
AN201KP10A	Install	ST918A-625-1375
	Point Stake	ST925-625-1375
	Roller Swage	ST932-P-624 and ST932-C-391 ^{*[1]}
	Ring Swage	ST933-100-625
AN201KP12A	Install	ST918A-750-1625
	Roller Swage	ST932-P-749 and ST932-C-516 ^{*[1]}
	Sleeve Swage	ST933-100-12
AN201KP16A	Remove	ST927-6
	Install	ST918A-1000-2000
	Roller Swage	ST932-P-999 and ST932-C-704 ^{*[1]}
	Ring Swage	ST933-32-16
AN201KP16B5	Install	ST918A-1000-2000
	Roller Swage	ST932-P-999 and ST932-C-704 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
AN201KP20A	Install Roller Swage Ring Swage Special Jig	ST918A-1250-2250 ST932-P-1249 and ST932-C-829 ^{*[1]} ST933-36-20 3AJ65B81667
AN201KP3	Install Roller Swage	ST918A-190-625 ST932-P-189 and ST932-C-016 ^{*[1]}
AN201KP3A	Install Ball Stake Point Stake Roller Swage	ST918A-190-625 ST931-190-625 ST925-190-625 ST932-P-189 and ST932-C-016 ^{*[1]}
AN201KP4	Install Point Stake Roller Swage	ST918A-250-750 ST925-250-750 ST932-P-249 and ST932-C-078 ^{*[1]}
AN201KP4A	Install Ball Stake Point Stake Roller Swage	ST918A-250-750 ST931-250-750 ST925-250-750 ST932-P-249 and ST932-C-078 ^{*[1]}
AN201KP5	Install Roller Swage	ST918A-312-812 and ST919-812 ST932-P-311 and ST932-C-110 ^{*[1]}
AN201KP5A	Install Roller Swage Roller Swage Sleeve Swage	ST918A-312-812 and ST919-812 ST932-P-311 and ST932-C-110 ^{*[1]} SE-27-2001 or F72916-1 ST928C-4
AN201KP6A	Install Roller Stake Roller Swage Sleeve Swage	ST918 A-375-875 and ST919-875 ST931-375-875 ST932-P-374 and ST932-C-141 ^{*[1]} ST928C-8
AN201KP8	Install Roller Swage	ST918A-500-1125 ST932-P-499 and ST932-C-266 ^{*[1]}
AN201KP8A	Install Point Stake Roller Swage	ST918A-500-1125 ST925-500-1125 ST932-P-499 and ST932-C-266 ^{*[1]}
AN202KP21B	Install Roller Swage Sleeve Swage	ST918A-1313-2062 ST932-P-1312 and ST932-C-735 ^{*[1]} ST929-1-3
AN202KP23B	Remove Install Sleeve Swage	F70150 ST918A-1438-2187 and ST919-2187 ST932-P-1437 and ST932-C-297 ^{*[1]}
AN202KP25B	Install Roller Swage	ST918A-1563-2312 and ST919-2312 ST932-P-1562 and ST932-C-360 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
AN202KP29B	Install Roller Swage Sleeve Swage	ST918A-1812-2562 ST932-P-1812 and ST932-C-485 ^{*[1]} ST928C-90
AN202KP33B	Remove Install Roller Swage	ST919-2812 ST918A-2063-2812 ST932-P-2062 and ST932-C-610 ^{*[1]}
AN202KP37B	Install Point Stake Roller Swage	ST918A-2313-3062 ST925-2313-3062 ST932-P-2312 and ST932-C-235 ^{*[1]}
AN202KP49B	Install Roller Swage Ring Swage	ST918A-3063-4000 ST932-P-3062 and ST932-C-704 ^{*[1]} MIT65B81126 and MIT65B81127
AN206DSP4	Install Ball Stake Roller Swage Sleeve Swage	ST918A-250-901 and ST919-901 ST931-250-901 ST932-P-249 and ST932-C-154 ^{*[1]} ST925-250-901
AN206DSP6	Install Roller Swage	ST918A-375-1437 ST932-P-374 and ST932-C-422 ^{*[1]}
AN206DSP8	Install Ball Stake Roller Swage	ST918A-500-1687 ST931-500-1687 ST932-P-499 and ST932-C-547 ^{*[1]}
AN207DPP4	Install Point Stake Roller Swage Sleeve Swage	ST918A-250-901 and ST919-901 ST925-250-901 ST932-P-249 and ST932-C-154 ^{*[1]} ST928C-3
AN207DPP5	Install	ST918A-312-1250
AS24461-10	Install Sleeve Swage	ST918B-4-625-1250 and ST919-1250 ST928C-10
AS24461-12	Install Line Swage	ST918B-4-750-1375 ST929-3A-5
AS24461-20	Install Sleeve Swage	ST918B-4-1250-2000 and ST919-2000 ST928C-20
AS24461-24	Install Sleeve Swage	ST918B-4-1500-2500 and ST919-2500 ST928C-24
AS24461-8	Install Line Swage	ST918B-4-500-1125 ST929-3A-1
AW4V73	Roller Swage	C57001
AW6SP20	Special Jig	173-1030-PRDA
A10	Install Roller Swage	ST918C-625-2375 ST932-P-624 and ST932-C-891 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
A10Y	Install	ST918C-625-2375
	Roller Swage	ST932-P-624 and ST932-C-891 ^{*[1]}
A397	Install	ST918D-130
BACB10AB10	Remove	ST927-9
	Install	ST918A-625-1187
	Roller Swage	ST926A-12, or F80113-1, -34, -50, -64 or -105, or RST1014 or RST2614 or RST2672 or RST3014 (V77896)
	Proof Load Test	ST30-8783A-67 or ST8783F-1187-1
BACB10AB20	Remove	ST927C-5
	Install	ST918A-1250-2000
	Roller Swage	F80113-1, -34, -50, -64 or -105
	Proof Load Test	ST30-8783-12 or ST30-8783A-5 or ST8783F-2000-1
BACB10AB20M	Remove	ST927C-5
	Install	ST918A-1250-2000
	Roller Swage	F80113-1, -34, -50, -64 or -105
	Proof Load Test	ST30-8783-12 or ST8783F-2000-1
BACB10AB4	Remove	ST927B-3
	Install	ST918A-250-625
	Roller Swage	ST926E-13, or F80113-50, -64 or -105, or RST1002 or RST2602 (V77896)
BACB10AB4M	Remove	ST927B-3
	Install	ST918A-250-625
	Roller Swage	ST926E-13, or F80113-50, -64 or -105, or RST1002 or RST2602 (V77896)
BACB10AB5	Remove	ST927-3
	Install	ST918A-312-687
	Roller Swage	RST2604 or RST3004 (V77896)
	Proof Load Test	ST30-8783A-19 or ST8783F-812-16
BACB10AB6M	Remove	ST927-4
	Install	ST918A-375-812
	Roller Swage	ST926A-5, or F80113-50, -64 or -105, or RST1006 or RST2606 or RST3006 (V77896)
	Proof Load Test	ST30-8783A-36 or ST8783F-812-1
BACB10AB7	Roller Swage	RST3008 (V77896)
BACB10AB8M	Remove	ST927-6
	Install	ST918A-500-1000
	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2449 (V77896)
	Proof Load Test	ST30-8783-4 or ST8783F-1000-1
BACB10AC10	Install	ST918A-625-1937
	Ball Stake	ST931-625-1937
	Roller Swage	ST932-P-624 and ST932-C-172 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10AC3L	Install Ball Stake Roller Swage Sleeve Swage	ST918A-190-625 and ST919-625 ST931-190-625 ST932-P-189 and ST932-C-016 ^{*[1]} ST929-2A-625-190-18 or ST928-A-1 or ST928-A-28
BACB10AC4	Install Ball Stake Roller Swage Roller Swage Sleeve Swage	ST918A-250-901 ST931-250-901 ST932B-250-901 ST932-P-249 and ST932-C-154 ^{*[1]} ST928-901-250
BACB10AC4A	Install Ball Stake Point Stake Roller Swage Sleeve Point Stake	ST918A-250-750 and ST919-750 ST931-250-750 ST925-250-750 ST932-P-249 and ST932-C-078 ^{*[1]} ST929-2C-250-750
BACB10AC5	Remove Install Roller Swage Sleeve Swage	RKC7025 (V77896) ST918A-312-1250 and ST919-1250 ST932-P-311 and ST932-C-328 ^{*[1]} ST928C-5
BACB10AC5A	Install Sleeve Swage	ST918A-312-812 and ST919-812 ST928C-4
BACB10AC6	Install Ball Stake Roller Swage Sleeve Swage	ST918A-375-1437 and ST919-1437 ST931-375-1437 TBD TBD
BACB10AC6A	Install Roller Swage Sleeve Swage	ST918A-375-875 and ST919-875 ST932-P-374 and ST932-C-141 ^{*[1]} ST928-A-9
BACB10AC8	Install Ball Stake	ST918A-500-1687 ST931-500-1687
BACB10AD5K	Special Jig	3AJ65B81667
BACB10AG10	Proof Load Test	ST30-8783A-37 or ST8783F-1187-1
BACB10AG22	Remove Install Roller Swage Proof Load Test	ST927C-11 and A32091-2374 ST918A-1375-2375 ST926C-1375-2375-2301 or RST2432 (V77896) ST30-8783-30 or ST8783F-2375-1
BACB10AG4	Remove Install Roller Swage Proof Load Test	ST927AA-2 ST918A-250-656 ST926-1, or ST926A-1 or -2, or RST1007 (V77896) ST30-8783-18 or ST30-8783A-10 or ST8783F-0656-16
BACB10AG7	Remove Install Roller Swage	ST927-5 ST918A-437-906 ST926A-6 or RST1007 (V77896)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10AG8	Remove Install Roller Swage	ST927-6 ST918A-500-1000 F80113 or RST2609 (V77896)
BACB10AH10	Install Ball Stake Roller Swage	ST918A-625-1937 ST931-625-1937 ST932-P-624 and ST932-C-172 ^{*[1]}
BACB10AH3L	Install Ball Stake Roller Swage Sleeve Swage	ST918A-190-625 and ST919-625 ST931-190-625 ST932-P-189 and ST932-C-016 ^{*[1]} ST929-2A-625-190-18
BACB10AH5	Install Roller Swage Sleeve Swage	ST918A-312-1250 ST932-P-311 and ST932-C-328 ^{*[1]} ST928C-5
BACB10AH6	Install Ball Stake Roller Swage Sleeve Swage	ST918A-375-1437 and ST919-1437 ST931-375-1437 ST932-P-374 and ST932-C-422 ^{*[1]} ST928C-11
BACB10AN4	Install Roller Swage	ST918A-250-901 and ST919-901 ST932-P-249 and ST932-C-154 ^{*[1]}
BACB10AP10	Install Roller Stake Sleeve Swage	ST918A-625-1375 and ST919-1375 ST932-P-624 and ST932-C-391 ^{*[1]} ST928C-17 or ST928-A-15
BACB10AP12	Install Roller Swage	ST918A-750-1625 ST932-P-749 and ST932-C-516 ^{*[1]}
BACB10AP16	Install Roller Swage	ST918A-1000-2000 ST932-P-999 and ST932-C-203 ^{*[1]}
BACB10AP3	Install Roller Swage	ST918A-190-625 ST932-P-189 and ST932-C-016 ^{*[1]}
BACB10AP4	Install Ball Stake Roller Swage	ST918A-250-750 and ST919-750 ST931-250-750 ST932-P-249 and ST932-C-078 ^{*[1]}
BACB10AP5	Install Ball Stake Sleeve Swage	ST918A-312-812 and ST919-812 ST931-312-812 ST928C-4
BACB10AP6	Install Sleeve Swage	ST918A-375-875 and ST919-875 ST928C-8
BACB10AP8	Install Roller Swage	ST918A-500-1125 and ST919-1125 ST932-P-499 and ST932-C-266 ^{*[1]}
BACB10AR4	Install Sleeve Swage	ST918A-250-901 and ST919-901 ST928C-2 or ST928F-4

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10AR5	Install Roller Swage Sleeve Swage	ST918A-312-1250 ST932P-311 and ST932-C-328 ^{*[1]} ST928F-5
BACB10AR6	Install Sleeve Swage	ST918A-375-1437 and ST919-1437 ST928C-11
BACB10AS10	Install Roller Swage Sleeve Swage Ring Swage	ST918A-625-1062 and ST919-1062 ST932-P-624 and ST932-C-235 ^{*[1]} ST928C-15 ST933-17-10 or ST933-1062-625
BACB10AS12	Install Roller Swage	ST918A-750-1187 and ST919-1187 ST932-P-749 and ST932-C-297 ^{*[1]}
BACB10AS14	Install Roller Swage	ST918A-875-1312 and ST919-1312 ST932-P-874 and ST932-C-360 ^{*[1]}
BACB10AS17	Install Roller Swage Ring Swage	ST918A-1062-1500 and ST919-1500 ST932-P-1061 and ST932-C-454 ^{*[1]} ST933-100-17 or ST933-100-1062
BACB10AS21	Install Roller Swage Sleeve Swage Ring Swage	ST918A-1312-1750 and ST919-1750 ST932-P-1311 and ST932-C-078 ^{*[1]} ST928C-23 ST933-28-21 or ST933-1750-1312
BACB10AS25	Install Roller Swage Sleeve Swage	ST918A-1562-2000 and ST919-2000 ST932-P-1561 and ST932-C-203 ^{*[1]} ST928C-24
BACB10AS29	Install Roller Swage	ST918A-1812-2250 and ST919-2250 ST932-P-1811 and ST932-C-328 ^{*[1]}
BACB10AS33	Install Sleeve Swage	ST918A-2062-2625 and ST919-2625 ST928C-25
BACB10AT12PP	Install Roller Swage	ST918A-750-1625 and ST919-1625 ST932-750-1625 ^{*[1]}
BACB10AT3MM	Install Roller Swage	ST918A-187-500 ST932-187-500 ^{*[1]}
BACB10AT4	Install Roller Swage	ST918A-250-625 ST932-P-249 and SB932-C-016 ^{*[1]}
BACB10AT4MM	Install Roller Swage	ST918A-250-625 ST932-P-249 and ST932-C-016 ^{*[1]}
BACB10AT6PP	Ring Swage	ST933-100-6 or ST933-100-375
BACB10AT8	Install Roller Swage	ST918A-500-1125 ST932-500-1125 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10AU16	Install Ball Stake Roller Swage	ST918A-1000-1750 and ST919-1750 ST931-1000-1750 ST932-P-999 and ST932-C-078 ^{*[1]}
BACB10AU21	Install Roller Swage Sleeve Swage	ST918A-1313-2062 and ST919-2062 ST932-P-1312 and ST932-C-235 ^{*[1]} ST929-1-3
BACB10AU23	Install Roller Swage	ST918A-1438-2187 and ST919-2187 ST932-P-1437 and ST932-C-297 ^{*[1]}
BACB10AU25	Install Roller Swage	ST918A-1563-2312 and ST919-2312 ST932-P-1562 and ST932-C-360 ^{*[1]}
BACB10AU29	Install Roller Swage Sleeve Swage	ST918A-1813-2562 and ST919-2562 ST932-P-1812 and ST932-C-485 ^{*[1]} ST928C-90
BACB10AU33	Install Roller Swage	ST918A-2063-2812 and ST919-2812 ST932-P-2062 and ST932-C-610 ^{*[1]}
BACB10AU37	Install Roller Swage Point Stake	ST918A-2313-3062 ST932-P-2312 and ST932-C-235 ^{*[1]} ST925-2313-3062
BACB10AU47	Install Roller Swage	ST918A-2938-3875 ST932-P-2937 and ST932-C-641 ^{*[1]}
BACB10AU49	Install Roller Swage Ring Swage	ST918A-3063-4000 ST932-P-3062 and ST932-C-704 ^{*[1]} MIT65B81126, MIT65B81127
BACB10AU72	Install Point Stake Roller Swage	ST918A-4500-5562 ST925-4500-5562 ST932-P-4499 and ST932-C-485 ^{*[1]}
BACB10AW16	Install Roller Swage	ST918A-1000-1937 and ST919-1937 ST932-1000-1937 ^{*[1]}
BACB10AW21	Install Roller Swage	ST918A-1313-2250 and ST919-2250 ST932-P-1311 and ST932-C-328 ^{*[1]}
BACB10AW37	Install	ST918A-2313-3250 and ST919-3250
BACB10AZ17PP	Install Roller Swage	ST918A-669-1574 and ST919-1574 ST932-669-1574 ^{*[1]}
BACB10AZ35PP	Install Roller Swage	ST918A-1378-2834 and ST919-2834 ST932-P-1377 and ST932-C-121 ^{*[1]}
BACB10A102	Install Roller Swage	ST918A-250-750 ST932-P-249 and ST932-C-078 ^{*[1]}
BACB10A103	Install Roller Swage	ST918A-312-875 and ST919-875 ST932-P-311 and ST932-C-141 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10A103H	Install Roller Swage	ST918A-312-875 and ST919-875 ST932-P-311 and ST932-C-141 ^{*[1]}
BACB10A105H	Install Roller Swage	ST918A -625-1187 and ST919-1187 ST932-625-1187 ^{*[1]}
BACB10A117H	Install Roller Swage	ST918A-984-1850 ST932-P-983 and ST932-C-129 ^{*[1]}
BACB10A119	Install Roller Swage	ST918A-375-1062 ST932-P-374 and ST932-C-235 ^{*[1]}
BACB10A120	Install Point Stake Roller Swage Sleeve Swage	ST918A-250-750 and ST919-750 ST925-250-750 ST932-P-249 and ST932-C-078 ^{*[1]} ST928C-1
BACB10A122	Install Ball Stake Roller Swage	ST918A-190-500 ST931-190-500 ST932B-190-500
BACB10A122A	Install Ball Stake Roller Swage	ST918A-190-500 ST931-190-500 ST932B-190-500
BACB10A127	Install Ball Stake Roller Swage	ST918A-250-625 and ST919-625 ST931-250-625 or ST931D-250-625 ST932-P-249 and ST932-C-016 ^{*[1]}
BACB10A130	Install Roller Swage	ST918A-500-1437 ST932-P-499 and ST932-C-422 ^{*[1]}
BACB10A131H	Install Ball Stake	ST918A-787-1653 ST931-787-1653
BACB10A136	Install Roller Swage	ST918A-669-1574 and ST919-1574 ST932-669-1574 ^{*[1]}
BACB10A136H	Install Roller Swage	ST918A-669-1574 and ST919-1574 ST932-669-1574 ^{*[1]}
BACB10A137	Install Point Stake	ST918A-1771-2952 ST925-1771-2952
BACB10A141	Install Roller Swage	ST918A-1378-2834 and ST919-2834 ST932-P-1377 and ST932-C-121 ^{*[1]}
BACB10A141H	Install Roller Swage	ST918A-1378-2834 and ST919-2834 ST932-P-1377 and ST932-C-121 ^{*[1]}
BACB10A147	Install Roller Swage	ST918A-2750-4500 ST932-2750-4500 ^{*[1]}
BACB10A151	Install Roller Swage	ST918A-250-625 ST932-P-249 and ST932-C-016 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10A151GC	Install Roller Swage	ST918A-250-625 ST932-P-249 and ST932-C-016 ^{*[1]}
BACB10A153	Install Roller Swage	ST918C-1750-2688 ST932-P-1749 and ST932-C-548 ^{*[1]}
BACB10A155GC	Install Roller Swage	ST918A-500-1000 and ST919-1000 ST932-500-1000 ^{*[1]}
BACB10A156GC	Install Roller Swage	ST918A-625-1187 ST932-P-624 and ST932-C-297 ^{*[1]}
BACB10A163GC	Install Roller Swage	ST918A-750-1437 ST932-P-749 and ST932-C-422 ^{*[1]}
BACB10A170GC	Install Roller Swage	ST918A-625-1187 and ST919-1187 ST932-625-1187 ^{*[1]}
BACB10A174	Install Roller Swage	ST918A-312-687 ST932-P-311 and ST932-C-047 ^{*[1]}
BACB10A174GC	Install Roller Swage	ST918A-312-687 ST932-P-311 and ST932-C-047 ^{*[1]}
BACB10A176GC	Install Roller Swage	ST918A-375-812 ST932-P-374 and ST932-C-110 ^{*[1]}
BACB10A177	Install Roller Swage	ST918A-437-906 ST932-P-436 and ST932-C-157 ^{*[1]}
BACB10A177GC	Install Roller Swage	ST918A-437-906 ST932-P-436 and ST932-C-157 ^{*[1]}
BACB10A180M2	Install Ball Stake	ST918A-250-781 ST931-250-781
BACB10A19	Install Roller Swage	ST918A-1378-2440 ST932-P-1377 and ST932-C-424 ^{*[1]}
BACB10A201	Install Ball Stake	ST918A-250-625 ST931-250-625
BACB10A201G	Install Ball Stake	ST918A-250-625 ST931-250-625
BACB10A203GCM2	Install Roller Swage	ST918A-312-687 ST932-P-311 and ST932-C-047 ^{*[1]}
BACB10A203GD	Install Point Stake Roller Swage	ST918A-312-687 and ST919-687 ST925-312-687 ST932-P-311 and ST932-C-047 ^{*[1]}
BACB10A203GM2	Install Ball Stake Roller Swage	ST918A-312-687 and ST919-687 ST931-312-687 ST932-P-311 and ST932-C-047 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10A204GM2	Install Ball Stake Roller Swage	ST918A-375-812 and ST919-812 ST931-375-812 ST932-P-374 and ST932-C-110 ^{*[1]}
BACB10A208GM2	Install Ball Stake Roller Swage	ST918A-625-1187 and ST919-1187 ST931-625-1187 ST928C-16 or MIT65B02505
BACB10A21	Install Roller Swage	ST918A-1574-2677 ST932-P-1574 and ST932-C-542 ^{*[1]}
BACB10A211GM2	Install Ball Stake Point Stake	ST918A-190-562 ST931B-190-562 ST925-190-562
BACB10A212G	Install Roller Swage	ST918C-250-656 and ST919-656 ST932-P-249 and ST932-C-031 ^{*[1]}
BACB10A213GM2	Install Point Stake	ST918A-312-750 ST925-312-750
BACB10A214GM2	Install Ball Stake Point Stake Roller Swage	ST918A-375-812 ST931-375-812 or ST931B-375-812 ST925-375-872 ST932-P-374 and ST932-C-110 ^{*[1]}
BACB10A215GM2	Install Roller Swage	ST918A-437-906 ST932-P-436 and ST932-C-157 ^{*[1]}
BACB10A217GM2	Install Ball Stake	ST918A-562-1093 ST931-562-1093
BACB10A220GM2	Install Roller Swage Point Stake	ST918A-1000-1750 ST932-P-999 and ST932-C-078 ^{*[1]} ST925-1000-1750
BACB10A235	Install Roller Swage	ST918A-1313-2250 and ST919-2250 ST932-P-1312 and ST932-C-328 ^{*[1]}
BACB10A236	Install Roller Swage	ST918A-1438-2375 ST932-P-1437 and ST932-C-391 ^{*[1]}
BACB10A237	Install Roller Swage	ST918A-1563-2500 ST932-P-1562 and ST932-C-454 ^{*[1]}
BACB10A238	Install Roller Swage	ST918A-1813-2750 ST932-P-1812 and ST932-C-078 ^{*[1]}
BACB10A239	Install Roller Swage	ST918A-2063-3000 and ST919-3000 ST932-2063-3000 ^{*[1]}
BACB10A240	Install Roller Swage	ST918A-2313-3250 and ST919-3250 ST932-P-2312 and ST932-C-328 ^{*[1]}
BACB10A242	Install Roller Swage	ST918A-3063-4250 ST932-P-3062 and ST932-C-829 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10A243GCM2	Install Sleeve Swage	ST918A-625-1187 and ST919-1187 ST928C-16 or MIT65B02505
BACB10A252GC	Install Ball Stake	ST918A-312-687 ST931-312-687
BACB10A252GCM2	Install Ball Stake Roller Swage	ST918A-312-687 and ST919-687 ST931-312-687 ST932-P-311 and ST932-C-047 ^{*[1]}
BACB10A253GC	Install Roller Swage	ST918A-375-812 ST932-P-374 and ST932-C-110 ^{*[1]}
BACB10A253GCM2	Install Ball Stake Roller Swage	ST918A-375-812 and ST919-812 ST931-375-812 ST932-P-374 and ST932-C-110 ^{*[1]}
BACB10A27DD	Install Point Stake Roller Swage	ST918A-625-1062 and ST919-1062 ST925-625-1062 ST932-P-624 and ST932-C-235 ^{*[1]}
BACB10A27DDH	Install Point Stake Roller Swage	ST918A-625-1062 and ST919-1062 ST925-625-1062 ST932-P-624 and ST932-C-235 ^{*[1]}
BACB10A28	Install Roller Swage	ST918A-875-1312 ST932-P-874 and ST932-C-360 ^{*[1]}
BACB10A28DD	Install Roller Swage	ST918A-875-1312 and ST919-1312 ST932-P-874 and ST932-C-360 ^{*[1]}
BACB10A28DDH	Install Roller Swage	ST918A-875-1312 and ST919-1312 ST932-P-874 and ST932-C-360 ^{*[1]}
BACB10A29DD	Install Ball Stake Roller Swage Ring Swage	ST918A-1062-1500 and ST919-1500 ST931A or ST931-1062-1500 ST932-P-1061 and ST932-C-454 ^{*[1]} ST933-24-17 or ST933-1500-1062
BACB10A29DDH	Install Ball Stake Roller Swage Ring Swage	ST918A-1062-1500 and ST919-1500 ST931A ST932-P-1061 and ST932-C-454 ^{*[1]} ST933-24-17 or ST933-1500-1062
BACB10A30DD	Install Ball Stake Roller Swage Sleeve Swage Ring Swage	ST918A-1312-1750 and ST919-1750 ST931-1312-1750 ST932-P-1311 and ST932-C-078 ^{*[1]} ST928C-22 ST933-28-21 or ST933-1750-1312

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10A30DDH	Install Ball Stake Roller Swage Sleeve Swage Ring Swage	ST918A-1312-1750 and ST919-1750 ST931-1312-1750 ST932-P-1311 and ST932-C-078 ^{*[1]} ST928C-22 ST933-28-21 or ST933-1750-1312
BACB10A30DDM	Install Roller Swage	ST918A-1312-1750 F80118-1
BACB10A300	Install Roller Swage	ST918A-1562-2000 ST932-P-1561 and ST932-C-203 ^{*[1]}
BACB10A300DD	Install Roller Swage Sleeve Swage	ST918A-1562-2000 ST932-P-1561 and ST932-C-203 ^{*[1]} ST928C-24
BACB10A300DDH	Install Roller Swage	ST918A-1562-2000 ST932-P-1561 and ST932-C-203 ^{*[1]}
BACB10A31DD	Install Roller Swage	ST918A-1812-2500 ST932-P-1811 and ST932-C-328 ^{*[1]}
BACB10A31DDH	Install Roller Swage	ST918A-1812-2500 ST932-P-1811 and ST932-C-328 ^{*[1]}
BACB10A313	Install Roller Swage Point Stake	ST918A-250-750 ST932-P-249 and ST932-C-078 ^{*[1]} ST925-250-750
BACB10A314	Install Ball Stake Roller Swage	ST918A-375-875 ST931-375-875 ST932-P-374 and ST932-C-141 ^{*[1]}
BACB10A32DD	Install Point Stake Roller Swage	ST918A-2312-2875 and ST919-2875 ST925-2312-2875 ST932-P-2311 and ST932-C-141 ^{*[1]}
BACB10A32DDH	Install Point Stake Roller Swage	ST918A-2312-2875 ST925-2312-2875 ST932-P-2311 and ST932-C-141 ^{*[1]}
BACB10A322	Install Ball Stake Roller Swage	ST918A-250-625 ST931-250-625 ST932-P-249 and ST932-C-016 ^{*[1]}
BACB10A324	Install Roller Swage	ST918A-2559-3937 ST932-2559-3937-2 ^{*[1]}
BACB10A327	Install Roller Swage	ST918A-2165-3937 ST932-P-2164 and ST932-C-172 ^{*[1]}
BACB10A33DDH	Install Roller Swage	ST918A-2062-2625 and ST919-2625 ST932-P-2061 and ST932-C-016 ^{*[1]}
BACB10A331	Install Roller Swage	ST918A-312-937 and ST919-937 ST932-P-311 and ST932-C-172 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10A338	Install	ST918A-250-1000
	Roller Swage	ST931-250-1000
BACB10A345	Install	ST918A-984-1653
	Point Stake	ST925-984-1653
BACB10A346	Install	ST918A-1181-1850
	Ball Stake	ST931D-1181-1850 or ST931-1181-1850
	Point Stake	ST925-1181-1850
BACB10A347	Install	ST918A-1378-2165
BACB10A35DD	Install	ST918A-750-1187 and ST919-1187
	Roller Swage	ST932-P-749 and ST932-C-297 ^{*[1]}
BACB10A35DDH	Install	ST918A-750-1187 and ST919-1187
	Roller Swage	ST932-P-749 and ST932-C-297 ^{*[1]}
BACB10A356GCM2	Install	ST918A-190-562
	Ball Stake	ST931B-190-562
	Point Stake	ST925B-190-562
BACB10A357GC	Install	ST918C-250-656 and ST919-656
	Roller Swage	ST932-P-249 and ST932-C-031 ^{*[1]}
BACB10A357GCM2	Install	ST918A-250-656
	Ball Stake	ST931-250-656
BACB10A358GCM	Install	ST918A-312-750
	Point Stake	ST925-312-750
BACB10A358GCM2	Install	ST918A-312-750
	Point Stake	ST925-312-750
	Ball Stake	ST931-312-750
BACB10A359GCM2	Install	ST918A-375-812
	Ball Stake	ST931B-375-812
	Point Stake	ST925-375-812
	Roller Swage	ST932-P-374 and ST932-C-110 ^{*[1]}
BACB10A360GCM2	Install	ST918A-437-906
	Roller Swage	ST932-P-436 and ST932-C-157 ^{*[1]}
BACB10A363GCM2	Install	ST918A-625-1187
	Roller Swage	ST932-P-624 and ST932-C-297 ^{*[1]}
BACB10A366GCM2	Install	ST918A-1000-1750
	Point Stake	ST925-1000-1750(6)
	Roller Swage	ST932-P-999 and ST932-C-078 ^{*[1]}
BACB10A371	Install	ST918-1000-1937
	Roller Swage	ST932-P-999 and ST932-C-172 ^{*[1]}
BACB10A375	Install	ST918A-250-625

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10A38	Install Roller Swage Roller Swage	ST918A-187-500 and ST919-500 ST932-187-500 ^{*[1]} ST932C (complete tool assy)
BACB10A396M3	Install Point Stake Point Swage	ST918A-1000-1750 ST925-1000-1750 ST932-P-999 and ST932-C-078 ^{*[1]}
BACB10A397GCM	Install Roller Swage	ST918A-1000-1375 ST932-P-999 and ST932-C-391 ^{*[1]}
BACB10A397GCM2	Install Roller Swage	ST918A-1000-1375 ST932-P-999 and ST932-C-391 ^{*[1]}
BACB10A398GCM	Install Roller Swage	ST918A-750-1375 ST932-P-749 and ST932-C-391 ^{*[1]}
BACB10A40	Install Roller Swage	ST918A-315-866 ST932-P-314 and ST932-C-137 ^{*[1]}
BACB10A407	Install Point Stake	ST918A-984-1653 ST925-984-1653
BACB10A445	Install Ball Stake Point Stake	ST918A-250-625 ST931-250-625 ST925-250-625
BACB10A446	Install Ball Stake	ST918A-250-938 ST931-250-938
BACB10A446H	Special Jig	3AJ65B81667
BACB10A47	Install Ball Stake Roller Swage Sleeve Swage	ST918A-190-625 and ST919-625 ST931-190-625 ST932-P-189 and ST932-C-016 ^{*[1]} ST929-2A-625-190-18
BACB10A516	Install Roller Swage Ring Swage	ST918A-375-875 ST932-P-374 and ST932-C-141 ^{*[1]} ST933-100-6 or ST933-100-375
BACB10A518	Install Roller Swage	ST918A-625-1375 ST932-P-624 and ST932-C-391 ^{*[1]}
BACB10A519	Install Roller Swage	ST918A-750-1625 and ST919-1625 ST932-P-749 and ST932-C-516 ^{*[1]}
BACB10A519H	Install Roller Swage	ST918A-750-1625 and ST919-1625 ST932-P-749 and ST932-C-516 ^{*[1]}
BACB10A522	Install Roller Swage	ST918A-394-1023 ST932-P-393 and ST932-C-215 ^{*[1]}
BACB10A523	Install Roller Swage	ST918A-590-1259 ST932-P-589 and ST932-C-333 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10A525	Install Roller Swage	ST918A-2559-3937 ST932-P-2558 and ST932-C-672 ^{*[1]}
BACB10A533	Install Roller Swage	ST918A-1438-2375 ST932-P-1437 and ST932-C-391 ^{*[1]}
BACB10A538	Install Roller Swage	ST918A-750-1187 and ST919-1187 ST932-P-749 and ST932-C-297 ^{*[1]}
BACB10A539	Install Roller Swage	ST918A-875-1312 ST932-P-874 and ST932-C-360 ^{*[1]}
BACB10A543	Install Roller Swage Sleeve Swage Ball Stake	ST918A-375-875 and ST919-875 ST932-P-374 and ST932-C-141 ^{*[1]} ST928C-8 ST931-375-875
BACB10A544	Install Point Stake Roller Swage	ST918A-500-1125 and ST919-1125 ST925-500-1125 ST932-P-499 and ST932-C-266 ^{*[1]}
BACB10A553	Install Roller Swage Sleeve Swage	ST918A-1000-1037 and ST919-2562 ST932-P-999 and ST932-C-172 ^{*[1]} ST928C-90
BACB10A554	Install Roller Swage	ST918A-2063-2812 and ST919-2812 ST932-P-2062 and ST932-C-610 ^{*[1]}
BACB10A557	Install Roller Swage Ring Swage	ST918A-3063-4000 ST932-P-3062 and ST932-C-704 ^{*[1]} MIT65B81126 MIT65B81127
BACB10A558	Install Roller Swage	ST918A-1000-1937 ST932-P-999 and ST932-C-172 ^{*[1]}
BACB10A559	Install Roller Swage	ST918A-1562-2000 ST932-P-1561 and ST932-C-203 ^{*[1]}
BACB10A560	Install Roller Swage	ST918A-190-777 ST932-P-189 and ST932-C-092 ^{*[1]}
BACB10A561	Install Point Stake Roller Swage	ST918A-250-901 and ST919-901 ST925-250-901 ST932-P-249 and ST932-C-154 ^{*[1]}
BACB10A563	Install Sleeve Swage	ST918A-375-1437 and ST919-1437 ST928C-9
BACB10A564	Install Ball Stake Roller Swage	ST918A-500-1687 ST931-500-1687 ST932-P-499 and ST932-C-547 ^{*[1]}
BACB10A574	Install Ball Stake	ST918A-1181-1850 ST931-1181-1850

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10A581	Install Point Stake Sleeve Swage	ST918A-250-901 and ST919-901 ST925-250-901 ST928C-3
BACB10A583	Install Sleeve Swage	ST918A-375-1437 and ST919-1437 ST928C-10
BACB10A610	Install Ball Stake Sleeve Swage	ST918A-1313-1750 ST931-1313-1750 ST932-P-1312 and ST932-C-579 ^{*[1]}
BACB10A620	Install Roller Swage Sleeve Swage	ST918A-250-750 ST925-250-750 ST932-P-249 and ST932-C-078 ^{*[1]}
BACB10A629	Install Ball Stake Roller Swage	ST918A-250-625 and ST919-625 ST931D-250-625 or ST931-250-625 ST932-P-249 and ST932-C-016 ^{*[1]}
BACB10A630	Install Roller Swage	ST918A-190-777 ST932-P-189 and ST932-C-092 ^{*[1]}
BACB10A649	Install Roller Swage Roller Swage Sleeve Swage	ST918A-375-875 ST932-P-374 and ST932-C-141 ^{*[1]} ST936-14-6 ST929-1A-375-875
BACB10A651	Install Roller Swage	ST918A-375-812 ST932-P-374 and ST932-C-110 ^{*[1]}
BACB10A652	Install Roller Swage	ST918A-375-812 ST932-P-374 and ST932-C-110 ^{*[1]}
BACB10A659	Install Ball Stake Roller Swage	ST918A-1313-1750 ST931-1313-1750 ST932-P-1312 and ST932-C-579 ^{*[1]}
BACB10A659A	Install Ball Stake Roller Swage	ST918A-1313-1750 ST931-1313-1750 ST932-P-1312 and ST932-C-579 ^{*[1]}
BACB10A660	Install Ball Stake Roller Swage Sleeve Swage	ST918A-312-875 ST931-312-875 ST932-P-311 and ST932-C-141 ^{*[1]} ST928-875-312 or ST928C-105
BACB10A661	Install Point Stake Roller Swage	ST918A-250-750 ST925-250-750 ST932-P-249 and ST932-C-078 ^{*[1]}
BACB10A664	Install Roller Swage	ST918A-750-1187 and ST919-1187 ST932-P-749 and ST932-C-297 ^{*[1]}
BACB10A665	Install Roller Swage	ST918A-875-1312 ST932-P-874 and ST932-C-360 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10A666	Install Roller Swage Ring Swage	ST918A-1312-1750 and ST919-1750 ST932-P-1311 and ST932-C-078 ^{*[1]} ST933-28-21 or ST933-1750-1312
BACB10A667	Install Roller Swage	ST918A-1562 -2000 ST932-P-1562 and ST932-C-203 ^{*[1]}
BACB10A669	Install Roller Swage	ST918A-250-750 ST932-P-249 and ST932-C-078 ^{*[1]}
BACB10A671	Install Point Stake Roller Swage Sleeve Swage	ST918A-250-750 and ST919-750 ST925-250-750 ST932-P-249 and ST932-C-078 ^{*[1]} ST928C-1
BACB10A672	Install Roller Swage	ST918A-312-875 and ST919-875 ST932-P-311 and ST932-C-141 ^{*[1]}
BACB10A682	Install Ball Stake Point Stake Roller Swage	ST918A-190-625 ST931-190-625 ST925-190-625 ST932-P-189 and ST932-C-016 ^{*[1]}
BACB10A683	Install Roller Swage Roller Swage Ring Swage	ST918A-312-812 and ST919-812 ST932-P-311 and ST932-C-110 ^{*[1]} SE-27-2001 or F72916-1 ST928C-4
BACB10A684	Install Roller Swage Ring Swage	ST918A-625-1375 ST932-P-624 and ST932-C-391 ^{*[1]} ST933-100-625
BACB10A685	Install Roller Swage Ring Swage	ST918A-750-1625 ST932-P-749 and ST932-C-516 ^{*[1]} ST933-100-12 or ST933-100-750
BACB10A686	Remove Install Roller Swage Ring Swage	ST927-6 ST918A-1000-2000 ST932-P-999 and ST932-C-704 ^{*[1]} ST933-32-16 or ST933-2000-1000
BACB10A687	Install Roller Swage Ring Swage Special Jig	ST918A-1250-2250 ST932-P-1249 and ST932-C-829 ^{*[1]} ST933-36-20 or ST933-2250-1250 3AJ65B81667
BACB10A689	Install Ball Stake Roller Swage	ST918A-250-901 and ST919-901 ST931-250-901 ST932-P-249 and ST932-C-154 ^{*[1]}
BACB10A690	Install Point Stake Roller Swage Sleeve Swage	ST918A-312-1250 and ST919-1250 ST925-312-1250 ST932-P-311 and ST932-C-328 ^{*[1]} ST928C-5

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10A691	Install Roller Swage	ST918A-375-1437 ST932-P-374 and ST932-C-422 ^{*[1]}
BACB10A692	Install Roller Swage Sleeve Swage	ST918A-500-1687 ST932-P-499 and ST932-C-547 ^{*[1]} ST928C-14
BACB10A694	Install Ball Stake Roller Swage Sleeve Swage	ST918A-190-625 and ST919-625 ST931-190-625 ST932-P-189 and ST932-C-016 ^{*[1]} ST929-2A-625-190-18
BACB10A70	Install Roller Swage	ST918A-312-875 ST932-P-311 and ST932-C-141 ^{*[1]}
BACB10A79H	Install Roller Swage	ST918A-250-1000 ST932-P-249 and ST932-C-203 ^{*[1]}
BACB10A81	Install Point Stake	ST918A-1968-3149 ST925-1968-3149
BACB10A821	Install Ball Stake Point Stake Roller Swage	ST918A-1000-1750 and ST919-1750 ST931-1000-1750 ST925-1000-1750 ST932-P-999 and ST932-C-078 ^{*[1]}
BACB10A822	Install Roller Swage Sleeve Swage	ST918A-1313-2062 and ST919-2062 ST932-P-1312 and ST932-C-235 ^{*[1]} ST929-1-3
BACB10A823	Remove Install Roller Swage	F70150 ST918A-1438-2187 and ST919-2187 ST932-P-1437 and ST932-C-297 ^{*[1]}
BACB10A824	Install Roller Swage	ST918A-1563-2312 and ST919-2312 ST932-P-1562 and ST932-C-360 ^{*[1]}
BACB10A825	Install Point Stake Roller Swage	ST918A-2313-3062 ST925-2313-3062 ST932-P-2312 and ST932-C-235 ^{*[1]}
BACB10A826	Install Roller Swage	ST918A-2938-3875 ST932-P-2937 and ST932-C-641 ^{*[1]}
BACB10A827	Install Roller Swage	ST918A-1000-1937 and ST919-1937 ST932-P-999 and ST932-C-172 ^{*[1]}
BACB10A828	Install Roller Swage	ST918A-1313-2250 and ST919-2250 ST932-P-1312 and ST932-C-829 ^{*[1]}
BACB10A829	Install Roller Swage	ST918A-1438-2375 and ST919-2375 ST932-P-1437 and ST932-C-391 ^{*[1]}
BACB10A830	Install Roller Swage	ST918A-1563-2500 and ST919-2500 ST932-P-1562 and ST932-C-454 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10A832	Install	ST918A-2063-3000
	Roller Swage	ST932-P-2062 and ST932-C-704 ^{*[1]}
BACB10A833	Install	ST918A-2313-3250
	Roller Swage	ST932-P-2312 and ST932-C-323 ^{*[1]}
BACB10A88	Remove	ST927-6
	Install	ST918A-500-1000 or ST931E-5000-1000
	Roller Swage	F80113-1, -34, -50, -64 or -105
BACB10A90	Install	ST918A-984-1850
	Ball Stake	ST931D-984-1850-6
	Point Stake	ST925-984-1850
	Roller Swage	ST932-P-983 and ST932-C-129 ^{*[1]}
BACB10A95H	Install	ST918A-1181-2165
	Ball Stake	ST931-1181-2165
BACB10BA20PP	Install	ST918A-787-1653
BACB10BA25	Install	ST918A-984-1850
	Ball Stake	ST931D-984-1850
	Point Stake	ST925-984-1850
	Roller Swage	ST932-P-983 and ST932-C-129 ^{*[1]}
BACB10BA25PP	Install	ST918A-984-1850
	Roller Swage	ST932-P-983 and ST932-C-129
BACB10BA30PP	Install	ST918A-1181-2165
BACB10BA35	Install	ST918A-1378-2440
BACB10BA40	Install	ST918A-1574-2677
	Roller Swage	ST932-P-1574 and ST932-C-542 ^{*[1]}
BACB10BA45PP	Install	ST918A-1771-2952
	Point Stake	ST925-1771-2952
BACB10BB10	Install	ST918A-393-866
BACB10BB15	Install	ST918A-590-1102
BACB10BB17	Install	ST918A-669-1181
BACB10BB20	Install	ST918A-787-1456
BACB10BB25	Install	ST918A-984-1653
	Point Stake	ST925-984-1653
BACB10BB30	Install	ST918A-1181-1850
	Ball Stake	ST931D-1181-1850 or ST931-1181-1850
	Point Stake	ST925-1181-1850
BACB10BB35	Install	ST918A-1378-2165
BACB10BF30	Install	ST918A-1181-1850
	Ball Stake	ST931-1181-1850

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10BG1M	Install Ball Stake Roller Swage	ST918A-190-500 ST931-190-500 ST932B-190-500
BACB10BG1S	Install Roller Swage	ST918C-190-625 and ST919-625 ST932-P-189 and ST932-C-016 ^{*[1]}
BACB10BG3D	Install Roller Swage	ST918A-312-937 and ST919-937 ST932-P-311 and ST932-C-172 ^{*[1]}
BACB10BG3S	Install Roller Swage	ST918A-312-875 and ST919-875 ST932-P-311 and ST932-C-141 ^{*[1]}
BACB10BG5S	Install	ST918A-625-1187 and ST919-1187
BACB10BH59 ^{*[2]}	Install Roller Swage	ST918B-3-312-750 ST932-P-311 and ST932-C-078 ^{*[1]}
BACB10BH64 ^{*[2]}	Install Roller Swage	ST918B-3-500-1125 ST932-P-499 and ST932-C-266 ^{*[1]}
BACB10BM28-16	Install	ST918B-4-1750-2125 and ST919-2125
BACB10BW16	Install Ball Stake Roller Swage	ST918A-1000-1750 and ST919-1750 ST931-1000-1750 ST932-P-999 and ST932-C-078 ^{*[1]}
BACB10BW21	Install Roller Swage Sleeve Swage	ST918A-1313-2062 and ST919-2062 ST932-P-1312 and ST932-C-235 ^{*[1]} ST929-1-3
BACB10BW23	Install Roller Swage	ST918A-1438-2187 and ST919-2187 ST932-P-1437 and ST932-C-297 ^{*[1]}
BACB10BW25	Install Roller Swage	ST918A-1563-2312 and ST919-2312 ST932-P-1562 and ST932-C-360 ^{*[1]}
BACB10BW29	Install Roller Swage Sleeve Swage	ST918A-1813-2562 and ST919-2562 ST932-P-1812 and ST932-C-485 ^{*[1]} ST928C-90
BACB10BW33	Install Roller Swage	ST918A-2063-2812 and ST919-2812 ST932-P-2062 and ST932-C-610 ^{*[1]}
BACB10BW37	Install Roller Swage Point Stake	ST918A-2313-3062 ST932-P-2312 and ST932-C-235 ^{*[1]} ST925-2313-3062
BACB10BW47	Install Roller Swage	ST918A-2938-3875 ST932-P-2937 and ST932-C-641 ^{*[1]}
BACB10BW49	Install Roller Swage Ring Swage	ST918A-3063-4000 ST932-P-3062 and ST932-C-704 ^{*[1]} MIT65B81126, MIT65B81127

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10BW72	Install Point Stake Roller Swage	ST918A-4500-5562 ST925-4500-5562 ST932-P-4499 and ST932-C-485 ^{*[1]}
BACB10BX10	Install Roller Swage Ring Swage	ST918A-625-1375 ST932-P-624 and ST932-391 ^{*[1]} ST933-100-625
BACB10BX12	Install Roller Swage Ring Swage	ST918A-750-1625 ST932-P-749 and ST932-C-516 ^{*[1]} ST933-100-12
BACB10BX16	Remove Install Roller Swage Ring Swage	ST927-6 ST918A-1000-2000 ST932-P-999 and ST932-C-704 ^{*[1]} ST933-32-16 or ST933-2000-1000
BACB10BX20	Install Roller Swage Ring Swage Special Jig	ST918A-1250-2250 ST932-P-1249 and ST932-C-829 ^{*[1]} ST933-36-20 or ST933-2250-1250 3AJ65B81667
BACB10BX3	Install Ball Stake Point Stake Roller Swage	ST918A-190-625 ST931-190-625 ST925-190-625 ST932-P-189 and ST932-C-016 ^{*[1]}
BACB10BX4	Install Point Stake Roller Swage	ST918A-250-750 ST925-250-750 ST932-P-249 and ST932-C-078 ^{*[1]}
BACB10BX5	Install Roller Swage Roller Swage Sleeve Swage	ST918A-312-812 and ST919-812 ST932-P-311 and ST932-C-110 ^{*[1]} SE-27-2001 or F72916-1 ST928C-4
BACB10BX6	Install Roller Swage Sleeve Swage Ball Stake	ST918A-375-875 and ST919-875 ST932-P-374 and ST932-C-141 ^{*[1]} ST928C-8 ST931-375-875
BACB10BX8	Install Point Stake Roller Swage	ST918A-500-1125 and ST919-1125 ST925-500-1125 ST932-P-499 and ST932-C-266 ^{*[1]}
BACB10BY3L	Install Ball Stake Roller Swage Sleeve Swage	ST918A-190-625 and ST919-625 ST931-190-625 ST932-P-189 and ST932-C-016 ^{*[1]} ST929-2A-625-190-18
BACB10BY4	Install Ball Stake Roller Swage	ST918A-250-901 and ST919-901 ST931-250-901 ST932-P-249 and ST932-C-154 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10BY5	Install Point Stake Roller Swage Sleeve Swage	ST918A-312-1250 and ST919-1250 ST925-312-1250 ST932-P-311 and ST932-C-328 ^{*[1]} ST928C-5
BACB10BY6	Install Roller Swage	ST918A-375-1437 ST932-P-374 and ST932-C-422 ^{*[1]}
BACB10BY8	Install Roller Swage Sleeve Swage	ST918A-500-1687 ST932-P-499 and ST932-C-547 ^{*[1]} ST928C-14
BACB10B101S	Install	ST918B-4-250-750 and ST919-750
BACB10B103ZP	Install Ball Stake Roller Swage	ST918B-4-375-875 ST931A ST932-P-374 and ST932-C-141 ^{*[1]}
BACB10B104ZP	Install Ring Swage	ST918B-4-437-937 and ST919-937 ST928C-13
BACB10B105J	Install Line Swage	ST918B-4-500-1125 ST929-3A-1
BACB10B105ZP	Install Line Swage	ST918B-4-500-1125 ST929-3A-1
BACB10B107J	Install	ST918B-4-624-1252
BACB10B108ZP	Install Line Swage	ST918B-4-750-1375 ST929-3A-5
BACB10B112ZP	Install Sleeve Swage	ST918B-4-1000-1750 and ST919-1750 ST928C-19
BACB10B114ZP	Install Sleeve Swage	ST918B-4-1250-2000 and ST919-2000 ST928C-20
BACB10B115ZP	Install Sleeve Swage	ST918B-4-1500-2500 and ST919-2500 ST928C-24
BACB10B130	Install Roller Swage	ST918B-4-190-750 ST932-P-189 and ST932-C-078 ^{*[1]}
BACB10B131	Install Roller Swage	ST918B-3-250-875 ST932-P-249 and ST932-C-141 ^{*[1]}
BACB10B132	Install Ball Stake	ST918B-3-375-1062 ST931-375-1062
BACB10B135	Install Roller Swage	ST918B-3-750-1625 ST932-P-749 and ST932-C-516 ^{*[1]}
BACB10B136	Install Roller Swage	ST918B-4-875-2000 ST932-P-874 and ST932-C-704 ^{*[1]}
BACB10B137	Install Roller Swage	ST918B-3-375-1125 ST932-P-374 and ST932-C-141 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10B145	Install Ball Stake	ST918B-2-190-875 ST931A 190 875 or ST931D-190-875
BACB10B146	Install Roller Swage	ST918B-3-250-937 ST932-P-249 and ST932-C-172 ^{*[1]}
BACB10B147	Install Ball Stake Roller Swage Line Swage	ST918B-2-312-1062 ST931-312-1062 ST932-P-312 and ST932-C-235 ^{*[1]} ST929-2-1062-312
BACB10B148	Install Roller Swage	ST918B-2-375-1185 ST932-P-374 and ST932-C-297 ^{*[1]}
BACB10B149	Install Roller Swage	ST918B-3-437-1312 ST932-P-436 and ST932-C-360 ^{*[1]}
BACB10B150	Install Roller Swage	ST918B-2-500-1500 ST932-P-499 and ST932-C-454 ^{*[1]}
BACB10B151	Install Ball Stake	ST918B-3-562-1687 ST931A
BACB10B153	Install Point Stake	ST918B-3-750-1875 ST925-750-1875
BACB10B154	Install Roller Swage	ST918B-3-875-2125 ST932-P-874 and ST932-C-766 ^{*[1]}
BACB10B158	Install Roller Swage	ST918B-3-2000-3250 ST932-P-1999 and ST932-C-829 ^{*[1]}
BACB10B160	Install	ST918B-3-3000-4250
BACB10B161	Install	ST918B-3-3500-4875
BACB10B162	Install Roller Swage	ST918B-3-2000-3250 ST932-P-1999 and ST932-C-328 ^{*[1]}
BACB10B168P	Install	ST918B-4-250-625
BACB10B171P	Install	ST918B-4-437-812
BACB10B262R	Install Roller Swage	ST918B-3-375-1125 ST932-P-374 and ST932-C-141 ^{*[1]}
BACB10B28PLT	Install	ST918B-4-1750-2125 and ST919-2125
BACB10B317	Install Roller Swage	ST918B-3-375-1000 ST932-P-374 and ST932-C-203 ^{*[1]}
BACB10B45	Install Ball Stake Roller Swage	ST918B-4-375-875 ST931A ST932-P-374 and ST932-C-141 ^{*[1]}
BACB10B70PLT	Install	ST918B-4-3500-4000 and ST919-4000

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10CA4	Install Point Stake Roller Swage	ST918A-250-901 and ST919-901 ST925-250-901 ST932-P-249 and ST932-C-154 ^{*[1]}
BACB10CA6	Install Sleeve Swage Roller Swage	ST918A-375-1437 and ST919-1437 ST928C-9 ST932-P-374 and ST932-C-422 ^{*[1]}
BACB10CA8	Install Ball Stake Roller Swage	ST918A-500-1687 ST931-500-1687 ST932-P-499 and ST932-C-547 ^{*[1]}
BACB10CB4	Install Point Stake Sleeve Swage Roller Swage	ST918A-250-901 and ST919-901 ST925-250-901 ST928C-8 ST932-P-249 and ST932-C-154 ^{*[1]}
BACB10CB6	Install Sleeve Swage	ST918A-375-1437 and ST919-1437 ST928C-10
BACB10CC10	Install	ST918B-4-624-1252
BACB10CC12	Install Link Swage	ST918B-4-750-1375 ST929-3A-5
BACB10CC16	Install Sleeve Swage	ST918B-4-1000-1750 and ST919-1750 ST928C-19
BACB10CC20	Install Sleeve Swage	ST918B-4-1250-2000 and ST919-2000 ST928C-20
BACB10CC4	Install	ST918B-4-250-750 and ST919-750
BACB10CC6	Install Ball Stake Sleeve Swage	ST918B-4-375-875 ST931A ST929-2C-375-875-562
BACB10CC7	Install Sleeve Swage	ST918B-4-437-937 and ST919-937 ST928C-13
BACB10CC8	Install Line Swage	ST918B-4-500-1125 ST929-3A-1
BACB10CD7	Install	ST918B-4-437-812
BACB10CE12	Install Point Stake	ST918B-3-750-1875 ST925-750-1875
BACB10CE14	Install Roller Swage	ST918B-3-875-2125 ST932-P-874 and ST932-C-766 ^{*[1]}
BACB10CE3	Install Ball Strike	ST918B-2-190-875 ST931D-875-4
BACB10CE32	Install Roller Swage	ST918B-3-2000-3250 ST932-P-1999 and ST932-C-829 ^{*[1]}
BACB10CE48	Install	ST918B-3-3000-4250

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10CE5	Install Line Swage	ST918B-2-312-1062 ST929-2-1062-312
BACB10CE56	Install	ST918B-3-3500-4875
BACB10CF10PP	Install Point Stake Roller Swage	ST918-A625-1062 and ST919-1062 ST925-625-1062 ST932-P-624 and ST932-C-235 ^{*[1]}
BACB10CF12PP	Install Roller Swage	ST918A-750-1187 and ST919-1187 ST932-P-749 and ST932-C-297 ^{*[1]}
BACB10CF14	Install Roller Swage	ST918A-875-1312 ST932-P-874 and ST932-C-360 ^{*[1]}
BACB10CF14PP	Install Roller Swage	ST918A-875-1312 and ST919-1312 ST932-P-874 and ST932-C-360 ^{*[1]}
BACB10CF17PP	Install Ball Stake Roller Swage Ring Swage	ST918A-1062-1500 and ST919-1500 ST931A ST932-P-1061 and ST932-C-454 ^{*[1]} ST933-24-17 or ST933-1500-1062
BACB10CF21PP	Install Ball Stake Roller Swage Sleeve Swage Ring Swage	ST918A-1312-1750 and ST919-1750 ST931-1312-1750 ST932-P-1311 and ST932-C-078 ^{*[1]} ST928C-22 ST933-28-21 or ST933-1750-1312
BACB10CF25	Install	ST918A-1562-2000
BACB10CF25PP	Install Roller Swage Ring Swage	ST918A-1562-2000 ST932-P-1562 and ST932-C-203 ^{*[1]} ST938C-24
BACB10CF29PP	Install Roller Swage	ST918A-1812-2500 ST932-P-1811 and ST932-C-328 ^{*[1]}
BACB10CF33PP	Install Roller Swage	ST918A-2062-2625 and ST919-2625 ST932-P-2061 and ST932-C-016 ^{*[1]}
BACB10CF37PP	Install Roller Swage	ST918A-2312-2875 and ST919-2875 ST932-P-2311 and ST932-C-141 ^{*[1]}
BACB10CG4	Install Ball Stake Ball Stake Roller Swage	ST918A-250-625 and ST919-625 ST931-250-625 ST931D-250-625 ST932-P-249 and ST932-C-016 ^{*[1]}
BACB10CG4A	Install Point Stake Roller Swage Ring Swage	ST918A-250-750 and ST919-750 ST925-250-750 ST932-P-249 and ST932-C-078 ^{*[1]} ST928C-1
BACB10CG5	Install Roller Swage	ST918A-312-875 and ST919-875 ST932-P-311 and ST932-C-141 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10CH10	Install Roller Swage	ST918C-625-2375 ST932-625-2375-X-X ^{*[1]}
BACB10CH100	Install Roller Swage	ST918C-625-1937 ST932-625-1937-X-X ^{*[1]}
BACB10CH12	Install Roller Swage	ST918C-750-2625 ST932-750-2625-X-X ^{*[1]}
BACB10CH120	Install Sleeve Swage Roller Swage	ST918C-750-2375 ST928C-107 ST932-750-2375-X-X ^{*[1]}
BACB10CH14	Install Roller Swage	ST918C-875-3000 ST932-875-3000-X-X ^{*[1]}
BACB10CH4	Install Roller Swage	ST918C-250-1250 ST932-250-1250-X-X ^{*[1]}
BACB10CH40	Install Roller Swage	ST918C-250-901 ST932-250-901-X-X ^{*[1]}
BACB10CH5	Install Roller Swage Proof Load Test	ST918C-312-1562 ST932-312-1562-X-X ^{*[1]} ST30-8783A-24 or ST8783F-1562-16
BACB10CH50	Install Roller Swage	ST918C-312-1250 ST932-312-1250-X-X ^{*[1]}
BACB10CH53	Install Roller Swage	ST918C-312-1562 ST932-312-1562-X-X ^{*[1]}
BACB10CH55	Install Roller Swage	ST918C-312-1562 ST932-312-1562-X-X ^{*[1]}
BACB10CH6	Install Roller Swage	ST918C-375-1562 ST932-375-1562-X-X ^{*[1]}
BACB10CH60	Install Roller Swage	ST918C-375-1437 ST932-375-1437-X-X ^{*[1]}
BACB10CH65	Install Roller Swage	ST918C-375-1562 ST932-375-1562-X-X ^{*[1]}
BACB10CH650	Install Roller Swage	ST918C-375-1437 ST932-375-1437-X-X ^{*[1]}
BACB10CH7	Install Roller Swage	ST918C-437-2000 ST932-437-2000-X-X ^{*[1]}
BACB10CH8	Install Roller Swage	ST918C-500-2000 ST932-500-2000-X-X ^{*[1]}
BACB10CH80	Install Roller Swage	ST918C-500-1687 ST932-500-1687-X-X ^{*[1]}
BACB10CH85	Install Roller Swage	ST918C-500-1687 ST932-500-1687-X-X ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10CH9	Install Roller Swage	ST918C-562-2375 ST932-562-2375-X-X ^{*[1]}
BACB10CJ16	Install Roller Swage	ST918C-1000-1625 and ST919-1625 ST932-P-999 and ST932-C-516 ^{*[1]}
BACB10CK4	Install Ball Stake Roller Swage	ST918A-250-1000 ST931-250-1000 ST932-P-249 and ST932-C-203 ^{*[1]}
BACB10CK5	Install Sleeve Swage	ST918C-312-1250 and ST919-1250 ST928C-5
BACB10CK6	Install Sleeve Swage	ST918C-375-1437 and ST919-1437 ST928-1437-375 or RST2532 (V77896)
BACB10CK8	Install Roller Swage Special Jig	ST918C-500-1625 ST932-500-1625-1-2 TBD
BACB10CL10	Install Roller Swage	ST918C-625-2375 ST932-P-624 and ST932-C-891 ^{*[1]}
BACB10CL12	Remove Install Roller Swage	ST927-10 ST918A-750-1437 ST932-P-749 and ST932-C-422 ^{*[1]}
BACB10CL7	Install Roller Swage	ST918A-437-906 ST932-P-436 and ST932-C-157 ^{*[1]}
BACB10CN3	Remove Roller Swage	ST927AA-1 ST926A-27 or RST1000 (V77896)
BACB10CN4	Proof Load Test	ST30-8783A-29 or ST8783F-1562-1
BACB10CN6	Remove Roller Swage	TBD F80113-50, -64 or -105, or RST2606 (V77896)
BACB10CN9	Proof Load Test	ST30-8783A-34 or ST8783F-1094-1
BACB10C130H	Install Roller Swage Sleeve Swage	ST918C-2362-4251 ST932-P-2361 and ST932-C-829 ^{*[1]} F70292-1
BACB10C134H	Install Point Stake Roller Swage	ST918C-250-901 and ST919-901 ST932-P-249 and ST932-C-154 ^{*[1]} ST928C-92
BACB10C134HR	Install Point Stake Roller Swage	ST918C-250-901 and ST919-901 ST932-P-249 and ST932-C-154 ^{*[1]} ST928C-92
BACB10C134R	Install Ball Stake Roller Swage	ST918A-250-901 ST931-250-901 ST932-P-249 and ST932-C-154 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10C135	Install Ball Stake Ball Stake Roller Swage Sleeve Swage	ST918C-312-1250 and ST919-1250 ST931-312-1250 ST931D-312-1250 ST932-P-311 and ST932-C-328 ^{*[1]} ST928C-6
BACB10C135H	Install Ball Stake Ball Stake Point Stake Roller Swage Sleeve Swage	ST918C-312-1250 and ST919-1250 ST931-312-1250 ST931D-312-1250 ST925 ST932-P-311 and ST932-C-328 ^{*[1]} ST928C-6
BACB10C136H	Sleeve Swage	ST928C-107
BACB10C137Y	Install	ST918C-500-1687
BACB10C150H	Install Install Roller Swage	ST918C-1000-1625 and ST919-1625 ST918CA -1000-1625 ST932-P-999 and ST932-C-516 ^{*[1]}
BACB10C151	Install	ST918C-1250-1875
BACB10C153	Install Roller Swage	ST918C-1750-2688 ST932-P-1749 and ST932-C-548 ^{*[1]}
BACB10C16H	Install Roller Swage	ST918C-312-1250 and ST919-1250 ST932-P-311 and ST932-C-328 ^{*[1]}
BACB10C160	Install	ST918A-250-901
BACB10C160GH	Install	ST918C-250-901 and ST919-901
BACB10C160H	Install Point Stake Roller Swage	ST918C-250-901 ST925-250-901 ST932-P-249 and ST932-C-154 ^{*[1]}
BACB10C161	Install Ball Stake Roller Swage	ST918A-312-1250 ST931D-312-1250 ST932-P-311 and ST932-C-328 ^{*[1]}
BACB10C161GH	Install Ball Stake Roller Swage	ST918C-312-1250 and ST919-1250 ST931D-312-1250 ST932-P-311 and ST932-C-328 ^{*[1]}
BACB10C161H	Install Ball Stake Roller Swage	ST918C-312-1250 and ST919-1250 ST931D-312-1250 ST932-P-311 and ST932-C-328 ^{*[1]}
BACB10C162	Install Roller Swage	ST918C-375-1437 ST932-P-374 and ST932-C-422 ^{*[1]}
BACB10C163	Install Point Stake Roller Swage	ST918A-500-1687 ST925-500-1687 ST932-P-499 and ST932-C-547 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10C182	Install	ST918C-250-1000
	Ball Stake	ST931-250-1000
BACB10C196	Install	ST918C-3000-4000
	Roller Swage	ST932-P-2999 and ST932-C-704 ^{*[1]}
	Roller Swage	F70297-1
BACB10C201	Install	ST918C-250-1000
	Ball Stake	ST931-250-1000
BACD10C207H	Install	ST918C-4500-5625
	Ball Stake	ST931-4500-5625
BACB10C226	Install	ST918C-375-1437
	Roller Swage	ST932-P-374 and ST932-C-235 ^{*[1]}
BACB10C228	Install	ST918C-874-2062
	Roller Swage	ST932-P-873 and ST932-C-235 ^{*[1]}
BACB10C23Y	Install	ST918C-375-1562
	Roller Swage	ST932-P-347 and ST932-C-485 ^{*[1]}
BACB1026H	Install	ST918C-625-2000 and ST919-2000
	Roller Swage	ST932-P-624 and ST932-C-203 ^{*[1]}
BACB10C34H	Install	ST918C-312-1250 and ST919-1250
	Sleeve Swage	ST928C-5
BACB10C645	Install	F70071, F70073
	Point Stake	Hand Point Stake
BACB10C78Y	Install	ST918C-312-1562
	Roller Swage	ST932-P-311 and ST932-C-485 ^{*[1]}
BACB10C79	Install	ST918C-250-1000
	Ball Stake	ST931-250-1000
	Point Stake	ST925A
	Roller Swage	ST932-P-249 and ST932-C-203 ^{*[1]}
BACB10C79H	Install	ST918A-250-1000
	Ball Stake	ST931-250-1000
	Point Stake	ST925A
	Roller Swage	ST932-P-249 and ST932-C-203 ^{*[1]}
BACB10C79HR	Install	ST918C-250-1000 and ST919-1000
	Roller Swage	ST932-P-249 and ST932-C-203 ^{*[1]}
BACB10C85	Install	ST918C-375-1562
	Roller Swage	ST932-P-374 and ST932-C-485 ^{*[1]}
BACB10C85R	Install	ST918C-375-1562
	Ball Stake	ST931-375-1562
	Ball Stake	ST931D-375-1562
	Roller Swage	ST932-P-374 and ST932-C-485 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10C85Y	Install Ball Stake Ball Stake Roller Swage	ST918C-375-1562 ST931-375-1562 ST931D-375-1562 ST932-P-374 and ST932-C-485 ^{*[1]}
BACB10C92	Install Ball Stake Ball Stake Roller Swage	ST918C-375-1437 ST931C-375-1437 ST931D-375-1437 ST932-P-374 and ST932-C-422 ^{*[1]}
BACB10C92H	Install Ball Stake Ball Stake Roller Swage	ST918C-375-1437 and ST919-1437 ST931-375-1437 ST931D-375-1437 ST932-P-374 and ST932-C-422 ^{*[1]}
BACB10C93	Install Ball Stake Roller Swage Sleeve Swage	ST918A-500-1687 ST931-500-1687 ST932-P-499 and ST932-C-547 ^{*[1]} ST928C-14
BACB10C93H	Install Ball Stake Roller Swage Sleeve Swage	ST918C-500-1687 and ST919-1687 ST931-500-1687 ST932-P-499 and ST932-C-547 ^{*[1]} ST928C-14
BACB10C93R	Install Roller Swage	ST918A-500-1687 ST932-P-499 and ST932-C-547 ^{*[1]}
BACB10C94H	Install Ball Stake Roller Swage Sleeve Swage	ST918C-625-1937 and ST919-1937 ST931-625-1937 ST932-P-624 and ST932-C-172 ^{*[1]} ST928C-91 or ST928D
BACB10C95	Install Roller Swage	ST918C-500-2000 ST932-P-499 and ST932-C-203 ^{*[1]}
BACB10C95Y	Install Roller Swage	ST918C-500-2000 ST932-P-499 and ST932-C-203 ^{*[1]}
BACB10C97	Install Roller Swage	ST918C-625-2375 ST932-P-624 and ST932-C-891 ^{*[1]}
BACB10C97Y	Install Roller Swage	ST918C-625-2375 ST932-P-624 and ST932-C-891 ^{*[1]}
BACB10C99AYT	Install	ST918C-875-3000
BACB10D108	Install	ST918D-108
BACB10D113	Install	ST918D-113
BACB10D12F	Install	ST918D-12F
BACB10D124	Install Point Stake	ST918D-124 ST925-436-628

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10D130	Install	ST918D-130
BACB10D131	Install	ST918D-131
BACB10D149F	Install	ST918D-149F
BACB10D15F	Install	ST918D-15F
BACB10D154	Install	ST918D-154
BACB10D155	Install	ST918D-155
BACB10D158	Install	ST918D-158
BACB10D165	Install	ST918D-165
BACB10D168	Install	ST918D-168
BACB10D172	Install	ST918D-172
BACB10D175	Install	ST918D-175
BACB10D2	Install	ST918D-2
BACB10D20F	Install	ST918D-20F
BACB10D203	Install	ST918D-203
BACB10D31F	Install	ST918D-31F
BACB10D33F	Install	ST918D-33F
BACB10D42F	Install	ST918D-42F
BACB10D45F	Install	ST918D-45F
BACB10D46F	Install	ST918D-46F
BACB10D5F	Install	ST918D-5F
BACB10D52	Install	ST918D-52
BACB10D58F	Install	ST918D-58F
BACB10D6F	Install	ST918D-6F
BACB10D61T	Install	ST918D-61T
BACB10D67T	Install	ST918D-67T
BACB10D71SF	Install	ST918D-71SF
BACB10D75F	Install	ST918D-75F
BACB10D87F	Install	ST918D-87F
BACB10D90	Install	ST918D-90
BACB10D92	Install	ST918D-92
BACB10EN04G	Roller Swage	F80113-50, -64 or -105, or RST2642 (V77896)
BACB10EN05G	Roller Swage	F80113-50, -64 or -105, or RST2447 (V77896)
BACB10EN06G	Remove Roller Swage	RKC7083 (V77896) F80113-50, -64 or -105, or RST2448 (V77896)
BACB10EN07G	Roller Swage	F80113-1, -34, -50, -64 or -105

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10EN08G	Remove	RKC7013 (V71896)
	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2597 (V77896)
BACB10EN09G	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2497 (V77896)
BACB10EN10G	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2463 (V77896)
BACB10EN12G	Remove	ST927-137 and A32091-1745
	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2464 (V77896)
BACB10EP05G	Roller Swage	RST2436 or RST2756 (V77896)
BACB10EP08G	Roller Swage	ST926C-500-1094-9638 or RST2442 (V77896)
BACB10EP10G	Roller Swage	ST926C-625-1312-1182 or RST2443 (V77896)
BACB10ER04G	Roller Swage	RST2428 (V77896)
	Proof Load Test	ST30-8783A-39 or ST8783F-0750-16
BACB10ER05G	Roller Swage	RST2447 (V77896)
BACB10ES04G	Proof Load Test	ST30-8783A-38 or ST8783F-0687-16
BACB10ES05G	Roller Swage	RST2436 or RST2756 (V77896)
	Proof Load Test	ST30-8783A-30 or ST8783F-0781-16
BACB10ES06AG	Remove	ST927B-7
	Install	ST918A-375-906 or ST918-375-875
	Roller Swage	F80113-50, -64 or -105, or RST2654 or RST2744 (V77896)
	Proof Load Test	ST30-8783A-55 or ST930-LT-375-906-801 or ST8783F-0906-1
BACB10ES06G	Remove	ST927C-134 and A32091-0872
	Roller Swage	F80113-50, -64 or -105, or RST2652 (V77896)
BACB10ES08G	Roller Swage	ST926C-500-1094-9638 or RST2442 (V77896)
BACB10ES10G	Roller Swage	ST926C-625-1312-1182 or RST2443 (V77896)
BACB10EX16	Install	ST918A-1000-1937 and ST919-1937
	Roller Swage	ST932-P-999 and ST932-C-172 ^{*[1]}
BACB10EX23	Install	ST918A-1438-2375 and ST919-2375
	Roller Swage	ST932-P-1437 and ST932-C-391 ^{*[1]}
BACB10FA04G	Roller Swage	ST926C-250-750-680 or RST2428 or RST2758 (V77896)
	Proof Load Test	ST30-8783-21 or ST30-8783A-33 or ST8783F-0750-16
BACB10FA05G	Roller Swage	ST926C-312-844-743 or RST2311 or RST2447 (V77896)
		or RT-5-333 (V50830)
	Proof Load Test	ST30-8783A-24 or ST8783F-0844-16
BACB10FA06G	Remove	RKC7083 (V77896)
	Roller Swage	ST926C-375-969-868 or RST2429 or RST2448 (V77896)
		or RT-6-320 (V50830)
	Proof Load Test	ST30-8783-20 or ST30-8783A-44 or ST8783F-0969-16

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10FA07G	Remove Roller Swage	RKC7125 (V77896) ST926C-437-1093-993 or RST2521 or RST2684 (V77896)
BACB10FA08G	Remove Roller Swage	RKC7013 (V77896) ST926C-500-1218-1093 or RST2522 or RST2597 (V77896)
	Proof Load Test	ST30-8783A-43 or ST8783F-1218-1
BACB10FA09G	Roller Swage	ST926C-562-1343-1218 or RST2445 or RST2497 (V77896)
BACB10FA10G	Remove Roller Swage	RKC7124 (V77896) ST926C-625-1469-1343 or RST2523 or RST2463 (V77896)
	Proof Load Test	ST30-8783-19 or ST8783F-1469-1
BACB10FA12G	Roller Swage Proof Load Test	ST926C-750-1750-1625 or RST2446 (V77896) ST30-8783-8 or ST8783F-1750-1
BACB10FB04G	Remove Anvil Swage Roller Swage	ST927-1, or RKC7082 (V77896) ST930C-250-687-1 RST2512 or RST2641 or RST4079 (V77896)
BACB10FB05G	Roller Swage Proof Load Test	RST2436 or RST2756 (V77896) ST30-8783A-30 or ST8783F-0781-16
BACB10FB06G	Roller Swage	F80113-50, -64 or -105, or RST2431 (V77896)
BACB10FB07G	Remove Roller Swage	RKC7069 (V77896) F80113-1, -34, -50, -64 or -105, or RST2832 or RST2852 (V77896)
BACB10FB08G	Remove Roller Swage	RKC7070 (V77896) F80113-1, -34, -50, -64 or -105, or RST2442 or RST2462 (V77896)
	Proof Load Test	ST30-8783-5 or -6 or ST8783F-1094-1
BACB10FB09G	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2541 (V77896)
BACB10FB10G	Remove Roller Swage Proof Load Test	ST927C-136 and A32091-1312 F80113-1, -34, -50, -64 or -105, or RST2443 (V77896) ST30-8783-7 or ST8783F-1312-1
BACB10FB12G	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2444 (V77896)
BACB10FB14G	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2441 (V77896)
BACB10FB16G	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2564 (V77896)
BACB10FB18G	Roller Swage	F80113-34, -50, -64 or -105
BACB10FB20G	Roller Swage	F80113-37
BACB10FB22G	Roller Swage	RST2645 (V77896)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10FC04	Remove	ST927-1
	Anvil Swage	ST930C-1, ST930C-250-656-1, or KMT0202-4 (V97613) or RKS4101-4 (V77896)
	Roller Swage Proof Load Test	RST1003 or RST2455 or RST2609 or RST3003 (V77896) ST30-8783A-14 or ST8783F-0656-16
BACB10FC05	Roller Swage	F80113-50, -64 or -105, or RST1005 or RST3005 (V77896)
	Anvil Swage	KMT0202-5 (V97613) or RKS4101-5 (V77896)
	Proof Load Test	ST30-8783A-25 or ST8783F-0750-16
BACB10FC06	Roller Swage	F80113-50, -64 or -105, or RST1006 or RST2456 or RST3006 (V77896)
	Anvil Swage	KMT0202-6 (V97613) or RKS4101-6 (V77896)
	Proof Load Test	ST30-8783A-26 or ST8783F-0812-1
BACB10FC07	Roller Swage	F80113-50, -64, or -105, or RST1007 or RST2440 or RST3007 (V77896)
	Anvil Swage	KMT0202-7 (V97613) or RKS4101-7 (V77896)
BACB10FC08	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST1009 or RST2609 or RST3009 (V77896)
	Anvil Swage	KMT0202-8 (V97613) or RKS4101-8 (V77896)
BACB10FC09	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST1011 or RST2611 or RST2874 or RST3011 (V77896)
	Anvil Swage	KMT0202-9 (V97613) or RKS4101-9 (V77896)
BACB10FC10	Remove	ST927C-136 and A32091-1178, or ST927-9
	Roller Swage	F80113-1, -34, -50, -64 or -105, or ST926A-11, or RST1013 or RST2613 or RST3013 (V77896)
	Anvil Swage	KMT0202-10 (V97613) or RKS4101-10 (V77896)
	Proof Load Test	ST30-8783A-6 or ST8783F-1187-1
BACB10FC12	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST1015 or RST2615 or RST3015 (V77896)
	Anvil Swage	KMT0202-12 (V97613) or RKS4101-12 (V77896)
BACB10FC14	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST1017 or RST2617 or RST3017 (V77896)
	Anvil Swage	KMT0202-14 (V97613) or RKS4101-14 (V77896)
BACB10FC16	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST1019 or RST2619 or RST3019 (V77896)
	Anvil Swage	KMT0202-16 (V97613) or RKS4101-16 (V77896)
BACB10FE03	Roller Swage	RST1001 or RST2667 or RST3001 (V77896)
	Anvil Swage	ST930

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10FE04	Remove	ST927B-3
	Install	ST918A-250-625
	Roller Swage	ST926E-13, or RST1002 or RST2531 or RST3002 (V77896)
	Anvil Swage	KMT0203-4 (V97613) or RKS4103-4 (V77896)
BACB10FE05	Proof Load Test	ST30-8783A-68 or ST8783F-0625-16
	Remove	ST927-3
	Install	ST918A-312-687
	Roller Swage	ST926A-4, or RST1004 or RST2668 or RST3004 (V77896)
BACB10FE06	Anvil Swage	KMT0203-5 (V97613) or RKS4103-5 (V77896)
	Remove	ST927-4
	Install	ST918A-375-812
	Roller Swage	ST926A-5, or RST1006 or RST2456 or RST3006 (V77896)
BACB10FE07	Anvil Swage	KMT0203-6 (V97613) or RKS4101-6 (V77896)
	Roller Swage	RST1007 or RST2440 or RST3007 (V77896)
	Anvil Swage	KMT0202-7 (V97613) or RST4101-7 (V77896)
	Proof Load Test	ST30-8783-3 or ST30-8783A-13 or ST8783F-1187-1
BACB10FE07H	Remove	ST927B-8
	Install	ST918A-437-937
	Roller Swage	ST926E-38, or RST1008 or RST2669 or RST3008 (V77896)
	Anvil Swage	KMT0203-7 (V97613) or RKS4103-7 (V77896)
BACB10FE08	Remove	ST927-6
	Install	ST918A-500-1000
	Roller Swage	ST926A-7 or F80113-1, -34, -50, -64 or -105, or RST1010 or RST2449 or RST2670 or RST3010 (V77896)
	Anvil Swage	KMT0203-8 (V97613) or RKS4103-8 (V77896)
BACB10FE09	Proof Load Test	ST30-8783A-35 or ST8783F-1000-1
	Roller Swage	RST1012 or RST2671 or RST3012 (V77896)
BACB10FE10	Anvil Swage	KMT0203-9 (V97613) or RKS4103-9 (V77896)
	Remove	ST927-9
	Install	ST918A-625-1187
	Roller Swage	ST926A-12, or F80113-1, -34, -50, -64 or -105, or RST1014 or RST2614 or RST2672 or RST3014 (V77896)
BACB10FE12	Anvil Swage	KMT0203-10 (V97613) or RKS4103-10 (V77896)
	Remove	ST927C-3
	Install	ST918A-750-1375
	Roller Swage	F80113-1, -34, -50, -64 or -105, or G20001-1, or MIT65B02023, or RST1016 or RST2465 or RST2616 or RST3016 (V77896)
	Anvil Swage	KMT0203-12 (V97613) or RKS4103-12 (V77896)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10FE14	Remove	ST927-11
	Install	ST918A-875-1625
BACB10FE16	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST1018 or RST2618 or RST2639 or RST3018 (V77896)
	Anvil Swage	KMT0203-14 (V97613) or RKS4103-14 (V77896)
BACB10FF03	Remove	ST927-12
	Install	ST918A-1000-1750
BACB10FF04	Roller Swage	ST926A-15, or RST1020 or RST2673 or RST3020 (V77896)
	Anvil Swage	KMT0203-16 (V97613) or RKS4103-16 (V77896)
BACB10FF05	Install	ST918A-190-562 and ST919-562
	Ball Stake	ST931-190-562
BACB10FF06	Sleeve Stake	ST929-1A-190-562
	Install	ST918A-250-656 and ST919-656
BACB10FF07	Ball Stake	ST931-250-656
	Roller Swage	ST932-P-249 and ST932-C-031 ^{*[1]}
BACB10FF08	Roller Swage	ST932B-250-656
	Install	ST918A-312-750
BACB10FF09	Ball Stake	ST931-312-750
	Point Stake	ST925-312-750
BACB10FF10	Roller Swage	ST932-P-311 and ST932-C-078 ^{*[1]}
	Install	ST918A-375-812 and ST919-812
BACB10FF11	Point Stake	ST925-375-812
	Roller Stake	ST932-P-374 and ST932-C-110 ^{*[1]}
BACB10FF12	Sleeve Swage	ST928C-7
	Sleeve Line Stake	ST929-2A-812-375-3
BACB10FF13	Install	ST918A-437-906 and ST919-906
	Sleeve Swage	ST928C-12
BACB10FF14	Point Stake	ST925-437-906
	Roller Swage	ST932-P-437 and ST932-C-156 ^{*[1]}
BACB10FF15	Install	ST918A-500-1000
	Point Stake	ST925-500-1000
BACB10FF16	Roller Swage	ST932-P-499 and ST932-C-203 ^{*[1]} or RST2666 (V77896)
	Sleeve Swage	Refer to V50830
BACB10FF17	Install	ST918A-562-1093
	Point Stake	ST925-562-1093
BACB10FF18	Install	ST918A-625-1187 and ST919-1187
	Roller Swage	ST932-P-624 and ST932-C-297 ^{*[1]}
BACB10FF19	Install	ST918A-750-1437
	Roller Swage	ST932-P-749 and ST932-C-422 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10FF14	Install Roller Swage Sleeve Swage	ST918A-875-1562 and ST919-1562 ST932-C-874 and ST932-C-485 ^{*[1]} ST928-C-18 or RST2530 (V77896)
BACB10FF16	Install Roller Swage Sleeve Swage	ST918A-1000-1750 ST926A-15 MIT65B10901
BACB10FH04G	Roller Swage	RST2642 (V77896)
BACB10FH05G	Roller Swage Proof Load Test	RST2447 (V77896) ST30-8783A-24 or ST8783F-0844-16
BACB10FH06G	Roller Swage	F80113-50, -64 or -105, or RST2448 (V77896)
BACB10FH07G	Remove Roller Swage	RKC7125 (V77896) F80113-1, -34, -50, -64 or -105, or RST2684 (77896)
BACB10FH08G	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2597 (V77896)
BACB10FH09G	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2497 (V77896)
BACB10FH10G	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2463 (V77896)
BACB10FH12G	Remove Roller Swage Proof Load Test	ST927C-137 and A32091-1745 F80113-1, -34, -50, -64 or -105, or RST2464 (V77896) ST30-8783-8 or ST8783F-1750-1
BACB10FJ05G	Roller Swage	RST2436 or RST2756 (V77896)
BACB10FJ06G	Proof Load Test	ST30-8783A-31 or ST8783F-0875-1
BACB10FJ08G	Roller Swage	ST926C-500-1094-9638, or RST2442 (V77896)
BACB10FJ10G	Roller Swage Proof Load Test	ST926C-625-1312-1182, or RST2443 (V77896) ST8783-7 ^{*[2]} or ST8783F-1312-1
BACB10FJ12G	Remove Roller Swage	RKC7037 (V77896) RST2590 (V77896)
BACB10FM33	Sleeve Swage	ST928-A-21
BACB10FP03L	Sleeve Swage	ST928-A-1
BACB10FP04A	Install Ball Stake Point Stake Roller Swage Sleeve Point Stake	ST918A-250-750 and ST919-750 ST931-250-750 ST925-250-750 ST932-P-249 and ST932-C-078 ^{*[1]} ST929-2C-250-750
BACB10FP5	Remove Install Roller Swage Sleeve Swage	RKC7025 (V77896) ST918A-312-1250 and ST919-1250 ST932-P-311 and ST932-C-328 ^{*[1]} ST928C-5
BACB10FP05A	Install Sleeve Swage	ST918A-312-812 and ST919-812 ST928C-4

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10FP06	Install Ball Stake Roller Swage Sleeve Swage	ST918A-375-1437 and ST919-1437 ST931-375-1437 ST932-P-374 and ST932-C-422 ^{*[2]} ST928-1437-375 or RST2532 (V77896)
BACB10FP06A	Install Roller Swage Sleeve Swage	ST918A-375-875 and ST919-875 ST932-P-374 and ST932-C-141 ^{*[2]} ST928-A-9
BACB10FP08	Install Ball Stake	ST918A-500-1687 ST931-500-1687
BACB10FR16	Install Ball Stake Roller Swage	ST918A-1000-1750 and ST919-1750 ST931-1000-1750 ST932-P-999 and ST932-C-078 ^{*[1]}
BACB10FR21	Install Roller Swage Sleeve Swage	ST918A-1313-2062 and ST919-2062 ST932-P-1312 and ST932-C-235 ^{*[1]} ST929-1-3
BACB10FR23	Install Roller Swage	ST918A-1438-2187 and ST919-2187 ST932-P-1437 and ST932-C-297 ^{*[1]}
BACB10FR25	Install Roller Swage	ST918A-1563-2312 and ST919-2312 ST932-P-1562 and ST932-C-360 ^{*[1]}
BACB10FR29	Install Roller Swage Sleeve Swage	ST918A-1813-2562 and ST919-2562 ST932-P-1812 and ST932-C-485 ^{*[1]} ST928C-90
BACB10FR33	Install Roller Swage	ST918A-2063-2812 and ST919-2812 ST932-P-2062 and ST932-C-610 ^{*[1]}
BACB10FR37	Install Roller Swage Point Stake	ST918A-2313-3062 ST932-P-2312 and ST932-C-235 ^{*[1]} ST925-2313-3062
BACB10FR47	Install Roller Swage	ST918A-2938-3875 ST932-P-2937 and ST932-C-641 ^{*[1]}
BACB10FR49	Install Roller Swage Ring Swage	ST918A-3063-4000 ST932-P-3062 and ST932-C-704 ^{*[1]} MIT65B81126, MIT65B81127
BACB10FR72	Install Point Stake Roller Swage	ST918A-4500-5562 ST925-4500-5562 ST932-P-4499 and ST932-C-485 ^{*[1]}
BACB10FS10	Install Roller Swage Ring Swage	ST918A-625-1375 ST932-P-624 and ST932-C-391 ^{*[1]} ST933-100-625
BACB10FS12	Install Roller Swage Ring Swage	ST918A-750-1625 ST932-P-749 and ST932-C-516 ^{*[1]} ST933-100-12 or ST933-100-750

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10FS16	Remove Install Roller Swage Ring Swage	ST927-6 ST918A-1000-2000 ST932-P-999 and ST932-C-704 ^{*[1]} ST933-32-16 or ST933-2000-1000
BACB10FS20	Install Roller Swage Ring Swage Special Jig	ST918A-1250-2250 ST932-P-1249 and ST932-C-829 ^{*[1]} ST933-36-20 or ST933-2250-1250 3AJ65B81667
BACB10FS3	Install Ball Stake Point Stake Roller Swage	ST918A-190-625 ST931-190-625 ST925-190-625 ST932-P-189 and ST932-C-016 ^{*[1]}
BACB10FS4	Install Point Stake Roller Swage	ST918A-250-750 ST925-250-750 ST932-P-249 and ST932-C-078 ^{*[1]}
BACB10FS5	Install Roller Swage Roller Swage Sleeve Swage	ST918A-312-812 and ST919-812 ST932-P-311 and ST932-C-110 ^{*[1]} SE-27-2001 or F72916-1 ST928C-4
BACB10FS6	Install Roller Swage Sleeve Swage Ball Stake	ST918A-375-875 and ST919-875 ST932-P-374 and ST932-C-141 ^{*[1]} ST928C-8 ST931-375-875
BACB10FS8	Install Point Stake Roller Swage	ST918A-500-1125 and ST919-1125 ST925-500-1125 ST932-P-499 and ST932-C-266 ^{*[1]}
BACB10FT4	Install Roller Swage	ST918A250-901 and ST919-901 ST932-P-249 and ST932-C-154 ^{*[1]}
BACB10FU10	Install Roller Swage Sleeve Swage Ring Swage	ST918A-625-1062 and ST919-1062 ST932-P-624 and ST932-C-235 ^{*[1]} ST928C-15 ST933-17-10 or ST933-1062-625
BACB10FU12	Install Roller Swage	ST918A-750-1187 and ST919-1187 ST932-P-749 and ST932-C-297 ^{*[1]}
BACB10FU14	Install Roller Swage	ST918A-875-1312 and ST919-1312 ST932-P-874 and ST932-C-360 ^{*[1]}
BACB10FU17	Install Roller Swage Ring Swage	ST918A-1062-1500 and ST919-1500 ST932-P-1061 and ST932-C-454 ^{*[1]} ST933-100-17 or ST933-100-1062

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10FU21	Install Roller Swage Sleeve Swage Ring Swage	ST918A-1312-1750 and ST919-1750 ST932-P-1311 and ST932-C-078 ^[1] ST928C-23 ST933-28-21 or ST933-1750-1312
BACB10FU25	Install Roller Swage Sleeve Swage	ST918A-1562-2000 and ST919-2000 ST932-P-1561 and ST932-C-203 ^[1] ST928C-24
BACB10FU29	Install Roller Swage	ST918A-1812-2250 and ST919-2250 ST932-P-1811 and ST932-C-328 ^[1]
BACB10FU33	Install Sleeve Swage	ST918A-2062-2625 and ST919-2625 ST928C-25
BACB10FV16	Install Roller Swage	ST918A-1000-1937 and ST919-1937 ST932-1000-1937 ^[1]
BACB10FV21	Install Roller Swage	ST918A-1313-2250 and ST919-2250 ST932-P-1311 and ST932-C-328 ^[1]
BACB10FV37	Install	ST918A-2313-3250 and ST919-3250
BACB10FW6	Roller Swage	ST932-P-374 and ST932-C-442 ^[1]
BACB10FY4	Install Ball Stake Ball Stake Roller Swage	ST918A-250-625 and ST919-625 ST931-250-625 ST931D-250-625 ST932-P-249 and ST932-C-016 ^[1]
BACB10FY4A	Install Point Stake Roller Swage Ring Swage	ST918A-250-750 and ST919-750 ST925-250-750 ST932-P-249 and ST932-C-078 ^[1] ST928C-1
BACB10FY5	Install Roller Swage	ST918A-312-875 and ST919-875 ST932-P-311 and ST932-C-141 ^[1]
BACB10F1	Install	ST918A-1374-2562
BACB10F12	Install Ball Stake Point Stake Roller Swage	ST918A-312-750 ST931-312-750 ST925-312-750 ST932-P-311 and ST932-C-078 ^[1]
BACB10F13	Install Roller Swage Sleeve Swage	ST918A-375-812 and ST919-812 ST932-P-374 and ST932-C-110 ^[1] ST928C-7
BACB10F14	Install Ball Stake Roller Swage Sleeve Swage	ST918A-190-562 and ST919-562 ST931-190-562 ST932B-190-562 ST929-1A-190-562

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10F16	Install Point Stake Sleeve Swage	ST918A-500-1000 ST925-500-1000 F80118
BACB10F2	Install Ball Stake Ball Stake Roller Swage	ST918A-250-625 ST931-250-625 ST931D-250-625 ST932-P-249 and ST932-C-016 ^{*[1]}
BACB10F6	Install Roller Swage	ST918C-750-2125 ST932-P-749 and ST932-C-266 ^{*[1]}
BACB10F7	Install Point Stake Roller Swage Sleeve Swage	ST918A-437-906 and ST919-906 ST925-437-906 ST932-P-437 and ST932-C-156 ^{*[1]} ST928C-12
BACB10F8	Install Roller Swage	ST918A-250-656 ST932-P-249 and ST932-C-031 ^{*[1]}
BACB10GB04G	Remove Anvil Swage Roller Swage	ST927-1 ST930C-250-687-1 RST2512 (V77896)
BACB10GB05G	Roller Swage Proof Load Test	RST2436 or RST2756 (V77896) ST30-8783A-30 or ST8783F-0781-16
BACB10GB06G	Roller Swage	F80113-50, -64 or -105, or RST2431 (V77896)
BACB10GB07G	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2832 (V77896)
BACB10GB08G	Roller Swage Proof Load Test	F80113-1, -34, -50, -64 or -105, or RST2442 (V77896) ST8783-5 or -6 ^{*[2]} or ST8783F-1094-1
BACB10GB09G	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2541 (V77896)
BACB10GB10G	Remove Roller Swage Proof Load Test	ST927C-136 and A32091-1312 F80113-1, -34, -50, -64 or -105, or RST2443 (V77896) ST8783-7 ^{*[2]} or ST8783F-1312-1
BACB10GB12G	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2444 (V77896)
BACB10GB14G	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2441 (V77896)
BACB10GB16G	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2564 (V77896)
BACB10GB18G	Roller Swage	F80113-34, -50, -64 or -105
BACB10GB20G	Roller Swage	F80113-37
BACB10GB22G	Roller Swage	RST2645 (V77896)
BACB10GC04G	Roller Swage Proof Load Test	ST926C-250-750-680 or RST2428 (V77896) ST30-8783-21 or ST8783F-0750-16
BACB10GC05G	Roller Swage	ST926C-312-844-743 or RST2311 (V77896)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10GC06G	Roller Swage	F80113-1, -34, -50, -64 or -105, or ST926C-375-969-868 or RST2429 (V77896)
	Proof Load Test	ST30-8783-20 or ST8783F-0969-1
BACB10GC07G	Roller Swage	F80113-1, -34, -50, -64 or -105, or ST926C-437-1093-993 or RST2521 (V77896)
BACB10GD04G	Remove	ST927-1, or RKC7082 (V77896)
	Anvil Swage	ST930C-250-687-1
	Roller Swage	RST2512 or RST2641 or RST4079 (V77896)
BACB10GD05G	Roller Swage	RST2436 or RST2756 (V77896)
	Proof Load Test	ST30-8783A-30 or ST8783F-0781-16
BACB10GD06G	Roller Swage	F80113-50, -64 or -105, or RST2431 (V77896)
BACB10GD07G	Remove	RKC7069 (V77896)
	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2832 or RST2852 (V77896)
BACB10GD08G	Remove	RKC7070 (V77896)
	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2442 or RST2462 (V77896)
	Proof Load Test	ST30-8783-5 or -6 or ST8783F-1094-1
BACB10GD09G	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2541 (V77896)
BACB10GD10G	Remove	ST927C-136 and A32091-1312
	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2443 (V77896)
	Proof Load Test	ST30-8783-7 or ST8783F-1312-1
BACB10GD12G	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2444 (V77896)
BACB10GD14G	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2441 (V77896)
BACB10GD16G	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2564 (V77896)
BACB10GD18G	Roller Swage	F80113-34, -50, -64 or -105
BACB10GD20G	Roller Swage	F80113-37
BACB10GD22G	Roller Swage	RST2645 (V77896)
BACB10GG10	Sleeve Swage	ST928-1062-625 or ST928C-15
BACB10GN1MJ	Install	ST918A-190-500
	Ball Stake	ST931-190-500
	Roller Swage	ST932B-190-500
BACB10GX122RJ	Remove	TBD
	Install	ST918A-750-2625
	Sleeve Swage	RST2927 (V77896)
BACB10GX60RJ	Remove	RKC7415 (V77896)
	Install	ST918A-375-1437
	Sleeve Swage	RST2103 or RST4796 (V77896)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10GX80RJ	Remove Install Sleeve Swage	RKC7418 (V77896) ST918A-500-1687 RST2824 or ST2917 or RST4793 (V77896)
BACB10HA08	Install Roller Swage	ST918A-500-1094 F80113-1, -34, -50, -64 or -105
BACB10HA10	Install Roller Swage	ST918A-625-1312 F80113-1, -34, -50, -64 or -105
BACB10JG04BCJ 02F	Install	ST2580-286-8
BACB10JG06ACJ 02G	Remove Install Roller Swage	TBD ST918A-375-1437 TBD
BACB10M11	Install Ball Stake Point Stake Roller Swage	ST918A-312-750 ST931-312-750 ST925-312-750 ST932-P-311 and ST932-C-078 ^{*[1]}
BACB10M12	Install Ball Stake Sleeve Swage	ST918A-190-562 and ST919-562 ST931-190-562 ST929-1A-190-562
BACB10M20	Roller Swage	ST926A-16
BACB10M24	Anvil Swage	F72813-1
BACB10M28	Install Roller Swage	ST918C-750-2125 ST932-P-749 and ST932-C-266 ^{*[1]}
BACB10M32	Install Point Stake Sleeve Swage	ST918A-500-1000 ST925-500-1000 F80118
BACB10M34	Install Point Stake	ST918A-562-1093 ST925-562-1093
BACB10M4	Install Sleeve Swage	ST918A-1250-2000 ST928C-21
BACB10M8	Install Ball Stake Point Stake Sleeve Line Stake	ST918A-375-812 ST931-375-812 ST925-375-812 ST929-2A-812-375-3
BACB10M9	Install Roller Swage	ST918A-250-656 and ST919-656 ST932-P-249 and ST932-C-031 ^{*[1]}
BACB10W1TM	Install Ball Stake Point Stake	ST918A-190-562 ST931B-190-562 ST925-190-562

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10W12M	Install Point Stake Roller Swage	ST918A-1000-1750 ST925-1000-1750 ST932-P-999 and ST932-C-078 ^{*[1]}
BACB10W12TM	Install Point Stake Roller Swage	ST918A-1000-1750 ST925-1000-1750 ST932-P-999 and ST932-C-078 ^{*[1]}
BACB10W13TM	Install	ST918A-2750-4500 and ST919-4500
BACB10W2	Install Roller Swage	ST918C-250-656 and ST919-656 ST932-P-249 and ST932-C-031 ^{*[1]}
BACB10W2T	Install Roller Swage	ST918C-250-656 and ST919-656 ST932-P-249 and ST932-C-031 ^{*[1]}
BACB10W3M	Install Point Stake Ball Stake	ST918A-312-750 and ST919-750 ST925-312-750 ST931-312-750
BACB10W3TM	Install Point Stake	ST918A-312-750 and ST919-750 ST925-312-750
BACB10W4TM	Install Ball Stake Point Stake Roller Swage	ST918A-375-812 and ST919-812 ST931B-375-812 ST925-375-812 ST932-P-374 and ST932-C-110 ^{*[1]}
BACB10W5M	Install Roller Swage	ST918A-437-906 and ST919-906 ST932-P-436 and ST932-C-157 ^{*[1]}
BACB10W5TM	Install Roller Swage	ST918A-437-906 and ST919-906 ST932-P-436 and ST932-C-157 ^{*[1]}
BACB10X11M	Install Roller Swage Sleeve Swage	ST918A-625-1187 and ST919-1187 MIT65B02505 ST928C-16 or 2MIT65B02661
BACB10X11MT	Install Roller Swage Sleeve Swage	ST918A-625-1187 and ST919-1187 MIT65B02505 ST928C16 or 2MIT65B02661
BACB10X3DT	Remove Install Line Stake	ST927-1 ST918A-250-625 and ST919-625 ST929-2C-250-625-322
BACB10X3MT	Remove Install Line Stake	ST927-1 ST918A-250-625 and ST919-625 ST929-2C-250-625-322
BACB10X3T	Remove Install Line Stake	ST927-1 ST918A-250-625 and ST919-625 ST929-2C-250-625-322

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB10X4D	Install Point Stake Roller Swage	ST918A-312-687 and ST919-687 ST925-312-687 ST932-P-311 and ST932-C-047 ^{*[1]}
BACB10X4DT	Install Point Stake Roller Swage	ST918A-312-687 and ST919-687 ST925-312-687 ST932-P-311 and ST932-C-047 ^{*[1]}
BACB10X4M	Install Ball Stake Roller Swage	ST918A-312-687 and ST919-687 ST931-312-687 ST932-P-311 and ST932-C-047 ^{*[1]}
BACB10X4MT	Install Ball Stake Roller Swage	ST918A-312-687 and ST919-687 ST931-312-687 ST932-P-311 and ST932-C-047 ^{*[1]}
BACB10X5M	Install Roller Swage	ST918A-375-812 and ST919-812 ST932-P-374 and ST932-C-110 ^{*[1]}
BACB10X5MT	Install Roller Swage	ST918A-375-812 and ST919-812 ST932-P-374 and ST932-C-110 ^{*[1]}
BACB28AB10	Remove Anvil Swage	ST927B-53 ST930C-625-937
BACB28AB11	Remove Anvil Swage	ST927B-53 ST930C-687-1000
BACB28AB12	Remove Anvil Swage	ST927B-4 ST930C-750-1062
BACB28AB14	Remove Anvil Swage	ST927B-49 ST930C-875-1187
BACB28AB16	Remove Anvil Swage	ST927B-5 ST930C-1000-1312
BACB28AB18	Remove Anvil Swage	ST927B-5 and ST1212E812 ST930C-1125-1437
BACB28AB20	Remove Anvil Swage	ST927B-51 ST930C-1250-1562
BACB28AB4	Remove Install Anvil Swage	ST927B-1 ST918A-250-562 and ST919-562 ST930C-250-562
BACB28AB5	Remove Anvil Swage	ST927B-4 ST930C-312-625
BACB28AB6	Remove Anvil Swage	ST927B-49 ST930C-375-687
BACB28AB7	Remove Anvil Swage	ST927B-5 ST930C-437-750

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BACB28AB8	Remove Anvil Swage	ST927B-5 and ST1212E812 ST930C-500-812
BACB28AB9	Remove Anvil Swage	ST927B-51 ST930C-562-875
BACB28AT10E()CG	Remove Roller Swage	MIT315W3402 MIT315W3402
BACB28B()	Stake	ST922C()
BACB28B4-239	Stake	F72896
BACB28X4B28	Install	ST920A-1,-2
BACB28X7B31	Install	ST920A-1,-2
BACB28X8C32	Install	ST920B-1
BACB28Y11B32	Install	ST920B-1
BACR12Y()	Swage in Housing Swage on Shaft	ST933-OD-ID ^{*[3]} ST933-100-ID ^{*[3]}
BAN10696	Remove Install Anvil Swage	ST927C-80 ST918C-625-1461 F72865-1
BAN6798	Remove Install Roller Swage	ST927B-36 ST918A-375-750 ST926E-127
BAR8708	Install	ST918A-500-1000
BHDR	Remove Install Roller Swage	ST927C-7 ST918A-1250-2094 ST926A-9
BLFN48-027	Remove Install Roller Swage	ST927C-23 ST918A-3000-3850 ST926E-104
BLFR20-097	Remove Install Roller Swage	ST927C-10 ST918A-1250-2250 F80113-34, -50, -64 or -105
BLFR8-148	Remove Install Roller Swage	F70197-1 ST918A-500-1373 F80113-1, -34, -50, -64 or -105
BLR34016	Remove Roller Swage	ST927C-108 ST926E-136
BNG20E119P016	Roller Swage	F80118-1, -34, -50, -64 or -105
BNG20E119P032	Roller Swage	F80113-1, -34, -50, -64 or -105
BNG20E119P093	Roller Swage	F80113-1, -34, -50, -64 or -105
BNG20E119P125	Roller Swage	F80113-1, -34, -50, -64 or -105

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BR10H	Install Ball Stake Roller Swage Sleeve Swage	ST918C-625-1937 and ST919-1937 ST931-625-1937 ST932-625-1937 ST928C-91 or ST928D
BR5	Install Ball Stake Ball Stake Roller Swage Sleeve Swage	ST918C-312-1250 and ST919-1250 ST931-312-1250 ST931D-312-1250 ST932-P-311 and ST932-C-328 ^[1] ST928C-6
BR6	Install Ball Stake Ball Stake Roller Swage	ST918C-375-1437 and ST919-1437 ST931-375-1437 ST931D-375-1437 ST932-P-374 and ST932-C-422 ^[1]
BR6H	Install Ball Stake Ball Stake Roller Swage	ST918C-375-1437 and ST919-1437 ST931-375-1437 ST931D-375-1437 ST932-P-374 and 932-C-422 ^[1]
BR8	Install Ball Stake Roller Swage Sleeve Swage	ST918C-500-1687 and ST919-1687 ST931-500-1687 ST932-P-499 and ST932-C-547 ^[1] ST928C-14
BR8H	Install Ball Stake Roller Swage	ST918C-500-1687 and ST919-1687 ST931-500-1687 ST932-P-499 and ST932-C-547 ^[1]
BR8N	Remove Install Sleeve Swage	TBD TBD RST2824 (V77896)
BR8N71	Roller Swage	F80118-1
BR8P	Remove Install Sleeve Swage	TBD TBD RST2824 (V77896)
BR8P81	Roller Swage	F80118-1
BR8S	Remove Install Sleeve Swage	TBD TBD RST2824 (V77896)
BSK8213	Install	ST918A-500-1000
BSR4673	Install Ball Stake	ST918A-250-740 ST931-250-740
BSR8213	Install	ST918A-500-1000

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
BSSN3465G	Install Ball Stake Point Stake	ST918A-190-562 ST931B-190-562 ST925-190-562
BSSN6345G	Install Ball Stake Point Stake Roller Swage	ST918A-375-812 ST931B-375-812 ST925-375-812 ST932-P-374 and ST932-C-110 ^{*[1]}
BSSR5280G1	Install Ball Stake Roller Swage	ST918A-312-687 and ST919-687 ST931-312-687 ST932-P-311 and ST932-C-047 ^{*[1]}
B38DD	Install Ball Stake Roller Swage	ST918B-625-1062 and ST919-1062 ST925-625-1062 ST932-P-624 and ST932-C-235 ^{*[1]}
B4H	Install Ball Stake Roller Swage	ST918A-250-1000 ST931-250-1000 ST932-P-249 and ST932-C-203 ^{*[1]}
B540DD	Install Roller Swage	ST918A-875-1312 and ST919-1312 ST932-P-874 and ST932-C-360 ^{*[1]}
B542DD	Install Ball Stake Roller Swage Sleeve Swage Ring Swage	ST918A-1312-1750 ST931-1312-1750 ST932-P-1311 and ST932-C-078 ^{*[1]} ST928C-22 ST933-28-21 or ST933-1750-1312
B543DD	Install Roller Swage	ST918A-1562-2000 ST932-P-1562 and ST932-C-203 ^{*[1]}
B5538WZZFS428	Roller Swage	ST932E
B5539WZZFS428	Install Roller Swage	ST918C-750-1187 ST932-750-1187-1-2
C316K-0125	Install	ST918D-158
C792A0450	Install	ST918D-165
DAS10-26A1-4	Remove Sleeve Swage	F80118-27 F80118-1,-15, ST928-1750-625, or ST928A-1750-625
DAS10-26A1-501	Remove Sleeve Swage	F80118-27 F80118-1,-15, ST928-1750-625, or ST928A-1750-625
DAS10-26B1-4	Remove Sleeve Swage	F80118-27 F80118-1,-15, ST928-1750-625, or ST928A-1750-625
DAS10-26B1-502	Remove Sleeve Swage	F80118-27 F80118-1,-15, ST928-1750-625, or ST928A-1750-625
DAS10-26B1-7	Remove Sleeve Swage	F80118-27 F80118-1,-15, ST928-1750-625, or ST928A-1750-625

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
DAS10-27A1-501	Remove	TBD
	Install	TBD
	Sleeve Swage	RST2909 or RST2916 (V77896)
DAS10-27A1-502	Remove	TBD
	Install	TBD
	Sleeve Swage	RST2909 or RST2916 (V77896)
DAS10-31A1-505	Roller Swage	RST2184 (V77896)
DAS12-30A1-504	Remove	TBD
	Install	ST918A-750-1875
	Roller Swage	F80113-1, -34, -50, -64, -105
DAS12-30A1-505	Remove	TBD
	Install	ST918A-750-1875
	Roller Swage	F80113-1, -34, -50, -64, -105
DAS12-38A1-518	Remove	TBD
	Install	ST918A-750-2375
	Sleeve Swage	ST928C-107
DAS4-14A1-506	Roller Swage	ST928-901-250 or ST932B-250-901
DAS4-14A1-508	Roller Swage	ST928-901-250 or ST932B-250-901
DAS4-16A1-502	Roller Swage	RST4093 (V77896)
DAS4-23A1-511	Roller Swage	RT-4-337 (V50830)
DAS5-20A1-506	Roller Swage	ST928-1250-312 or ST932B-312-1250
DAS6-23A1-511	Roller Swage	RT-6-339 (V50830)
DAS6-24A1-518	Remove	TBD
	Install	ST918A-375-1500
	Roller Swage	F80113-1, -34, -50, -64, -105
DAS8-27B	Remove	TBD
	Install	TBD
	Sleeve Swage	RST2824 (V77896)
DAS8-27B1-502	Remove	TBD
	Install	TBD
	Sleeve Swage	RST2917 (V77896)
DAS8-27B7	Remove	TBD
	Install	TBD
	Sleeve Swage	RST2824 (V77896)
DAS8-28A1-518	Remove	TBD
	Install	ST918A-500-1750
	Roller Swage	F80113-1, -34, -50, -64, -105
DAT64-82B1-501	Remove	3MIT65B01519
DAT64-82B1-502	Remove	3MIT65B01519

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
DAT64-82B1-504	Remove	3MIT65B01519
DAT64-82B1-505	Remove	3MIT65B01519
DAT64-82B1-506	Remove	3MIT65B01519
DAT64-82B1-507	Remove	3MIT65B01519
DAT64-82B1-508	Remove	3MIT65B01519
DAT64-82B1-509	Remove	3MIT65B01519
DP138H	Sleeve Swage	F70292-1
DSP8	Install	ST918A-500-1687
	Ball Swage	ST931-500-1687
	Roller Swage	ST932-P-499 and ST932-C-547 ^{*[1]}
DSRP5	Install	ST918C-312-1250 and ST919-1250
	Ball Swage	ST931D-312-1250
	Roller Swage	ST932-P-311 and ST932-C-328 ^{*[1]}
DW4K	Install	ST918A-250-750 and ST919-750
	Roller Swage	ST932-P-249 and ST932-C-078 ^{*[1]}
	Point Stake	ST925-250-750
	Sleeve Swage	ST928C-1
DW4K2	Install	ST918A-250-625 and ST919-625
	Ball Stake	ST931-250-625
	Ball Stake	ST931D-250-625
	Roller Swage	ST932-P-249 and ST932-C-016 ^{*[1]}
DW4K2-15-6531	Install	ST918A-250-625
	Ball Stake	ST931-250-625
	Ball Stake	ST931D-250-625
	Roller Swage	ST932-P-249 and ST932-C-016 ^{*[1]}
FS1PP7DBE9927A	Install	A52020-2
F212-1	Install	ST918A-375-875 and ST919-875
	Roller Swage	ST932-P-374 and ST932-C-141 ^{*[1]}
	Sleeve Swage	ST928C-8
	Ball Stake	ST931-375-875
GB98	Install	F72975-1
GDPP6WFS428	Sleeve Swage	ST928-1437-375
GDPP8WFS428	Sleeve Swage	ST928-1687-500
GDPP8WSD629	Sleeve Swage	ST928-1687-500
HBR286-041	Remove	ST927B-49
	Anvil Swage	ST930C-375-687
HBR289-072	Remove	ST927B-51
	Anvil Swage	ST930-C-562-875

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
HHDSP8	Install	ST918A-500-1687
	Ball Stake	ST931-500-1687
	Roller Swage	ST932-P-499 and ST932-C-547 ^{*[1]}
HSP34-101	Remove	ST927C-108
	Roller Swage	ST926E-136
HUDL24-101	Remove	ST927C-125
KB030CPO	Install	TBD
KB035CPO	Install	TBD
KP3AL	Install	ST918A-190-500 and ST919-500 ST
	Ball Stake	931-190-500
	Roller Swage	ST932B-190-500
KRP141608V	Roller Swage	TBD
KR10CEGB	Roller Swage	GE144-14 and GE144-52, V39661
	Proof Load Test	ST30-8783A-41 or ST8783F-TBD
KR10CNGB	Roller Swage	GE144-14 and GE144-52, V39661
	Proof Load Test	ST30-8783A-42 or ST8783F-TBD
KR3CNGB11	Roller Swage	RST1000 or RST3000 (V77896)
	Anvil Swage	ST930
KR4CNGV	Install	ST918A-250-656
	Roller Swage	ST926-1, or ST926A-1 or -2
KR8CNGV03	Remove	ST927C-78 and A32091-1000
	Roller Swage	F80113-1, -34, -50, -64 or -105
KSBG10-9	Remove	ST927-9
	Install	ST918A-625-1187
	Roller Swage	ST926A-12
KSBG14N25SSD3	Remove	ST927-11
	Install	ST918A-875-1562
	Roller Swage	ST926A-14
KSBG14N3	Remove	ST927-11
	Install	ST918A-875-1562
	Roller Swage	ST926A-14
KSBG4-27	Roller Swage	RST2781 (V77896)
KSBG8N3	Remove	ST927-6
	Install	ST918A-500-1000
	Roller Swage	ST926-2
KSBN12-18	Remove	ST927-13
	Roller Swage	ST926A-17
KSBN8	Install	ST918A-500-1000
	Roller Swage	ST932-P-499 and ST932-C-203 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
KSB10-9	Remove Install Roller Swage	ST927-9 ST918A-625-1187 ST926A-12
KSC111008V	Remove Install Roller Swage	ST927-6 or ST927B-56 ST918A-500-1000 ST926A-7 -8, or F80113-1, -34, -50, -64 or -105
KSC135216B	Remove Install Roller Swage	ST927C-81 ST918A-1000-1875 F80113-1, -34, -50, -64 or -105
KSC145700BZ12G	Remove Install Roller Swage	TBD ST918A-750-1562 RST 2444 (V77896)
KSC218124B	Remove Roller Swage Sleeve Swage	ST927C-85 F80117-1, or RST2571 (V77896) F80117-10
KSC234708V	Remove Install Roller Swage	ST927-6 or ST927B-56 ST918A-500-1000 ST926A-7, -8 or F80113-1, -34, -50, -64 or -105
KSC277705B	Remove Install Roller Swage	ST927-2 ST918A312-750 and ST 919-750 ST926A-3 or ST932A-312-750-1-1, or RST1005 (V77896)
KSC312312BZG	Remove Install Roller Swage	TBD ST918A-750-1562 RST 2444 (V77896)
KSC401605B	Remove Install Roller Swage	TBD ST918A-315-914 F80113-50, -64 or -105
KSC401707B	Remove Install Roller Swage	TBD ST918A-437-1124 F80113-50, -64 or -105
KSSB2025	Remove Install Roller Swage	ST927C-7 ST918A-1250-2094 ST926A-19
KSSB4-13D	Remove Anvil Swage	ST1212E and ST1212-2-5 ST930C-250-531-1
KSSN48-6	Install Roller Swage	ST918A-3000-4750 ST926E-111
KWB428	Roller Swage	C57001
LA3624A	Install Roller Swage	ST918A-1000-1937 ST932-P-999 and ST932-C-172 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
LHSSG10AD	Remove Roller Swage	ST927C-1 F80113-1, -34, -50, -64 or -105
LHSSG10AE	Remove Install	ST927C-80 ST918C-625-1461
LHSSG10AP	Line Swage Remove Install Line Swage	F72865-1 ST927C-80 ST918C-625-1461 F72865-1
LHSSG4-11A	Remove Anvil Swage	ST1212E and ST1212-2-5 ST930C-250-531-1
LHSSG4-8D	Remove Anvil Swage	ST927B-45 ST930C-250-406-1
LHSSG4-8N	Remove Anvil Swage	ST927B-45 ST930C-250-406-1
LHSSG6AJ	Remove Install Roller Swage	ST927B-36 ST918A-375-750 ST926E-127
LHSS3R	Install Roller Swage	ST918A-190-777 ST932-P-189 and ST932-C-092 ^{*(1)}
LHSS8AD	Install	ST918A-500-1000
LM321-57	Special Jig	MIT311A1550
L3119	Remove Install Roller Swage	ST927-4 ST918A-375-812 ST926A-5
MB538DDE9595	Install Roller Swage	ST918A-624-10625 ST932-624-10625-1-1
MB538DDFS428	Install Roller Swage	ST918A-624-10625 ST932-624-10625-1-1
MB538E9595	Install Roller Swage	ST918A-624-10625 ST932-624-10625-1-1
MB538FS428	Install Roller Swage	ST918A-624-10625 ST932-624-10625-1-1
MB540ZZ	Install Roller Swage	ST918A-875-1312 ST932-P-874 and ST932-C-360 ^{*(1)}
MB543DDSD610	Install Roller Swage Sleeve Swage	ST918A-1562-2000 and ST919-2000 ST932-P-1561 and ST932-C-203 ^{*(1)} ST928C-24
MKP4A	Install Roller Swage	ST918A-250-675 ST932-250-774-1-1

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
MKP5A	Install	ST918A-312-812 and ST919-812
	Ball Stake	ST931-312-812
	Sleeve Swage	ST928C-4
MKP6A	Install	ST918A-375-875 and ST919-875
	Ball Stake	ST931-375-875
	Sleeve Swage	ST928C-8
MKSP4AFS428	Install	ST918C-250-750
	Roller Swage	ST932-250-750-1-2
	Sleeve Swage	ST928C-4
MKSP5A	Install	ST918A-312-812 and ST919-812
	Ball Stake	ST931-312-812
	Sleeve Swage	ST928C-4
MKSP5AFS428	Sleeve Swage	ST929-2C-312-812-390 or C20001-1
MKSP5AFS464	Sleeve Swage	ST929-2C-312-812-390 or C20001-1
MKSP5E9104	Install	ST918A-312-1250
	Roller Swage	ST932-P-311 and ST932-C-328 ^{*[1]}
MS14101-10	Remove	ST927-9
	Install	ST918A-625-1187 or 65-44834-F6
	Roller Swage	ST926A-11, or RST1013 or RST3013 (V77896)
	Anvil Swage	KMT0202-10 (V97613) or RKS4101-10 (V77896)
	Proof Load Test	ST30-8783A-6 or ST8783F-1187-1
MS14101-12	Remove	ST927-10
	Install	ST918A-750-1437
	Roller Swage	ST926A-13, or RST1016 or RST3016 (V77896)
	Anvil Swage	KMT0202-12 (V97613) or RKS4101-12 (V77896)
	Proof Load Test	ST30-8783A-16 or ST8783F-1437-1
MS14101-14	Remove	ST927-11
	Install	ST918A-875-1562
	Roller Swage	ST926A-14, or RST1017 or RST3017 (V77896)
	Anvil Swage	KMT0202-14 (V97613) or RKS4101-14 (V77896)
MS14101-16	Remove	ST927-12
	Install	ST918A-1000-1750
	Roller Swage	ST926A-15, or RST1019 or RST3019 (V77896)
	Anvil Swage	KMT0202-16 (V97613) or RKS4101-16 (V77896)
MS14101-3	Roller Swage	RST1000 or RST3000 (V77896)
	Anvil Swage	ST930
MS14101-4	Remove	ST927-1 or RKC4101 (V77896)
	Install	ST918A-250-656
	Roller Swage	ST926A-1, or RST1003 or RST3003 (V77896)
	Anvil Swage	ST930C-1, or KMT0202-4 (V97613) or RKS4101-4 (V77896)
	Proof Load Test	ST30-8783A-1 or ST8783F-0656-16

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
MS14101-5,-5A	Remove Install Roller Swage Anvil Swage Proof Load Test	ST927-2 ST918A-312-750 ST926A-3, or RST1005 or RST3005 (V77896) KMT0202-5 (V97613) or RKS4101-5 (V77896) ST30-8783A-21 or ST8783F-0750-16
MS14101-6	Remove Install Roller Swage Anvil Swage Proof Load Test	ST927-4 ST918A-375-812 ST926A-5, or RST1006 or RST3006 (V77896) KMT0202-6 (V97613) or RKS4101-6 (V77896) ST30-8783A-17 or ST8783F-0812-1
MS14101-7	Remove Install Roller Swage Anvil Swage	ST927-5 ST918A-437-906 ST926A-6, or RST1007 or RST3007 (V77896) KMT0202-7 (V97613) or RKS4101-7 (V77896)
MS14101-8	Remove Install Roller Swage Anvil Swage	ST927-6 ST918A-500-1000 ST926A-7, or RST1009 or RST3009 (V77896) KMT0202-8 (V97613) or RKS4101-8 (V77896)
MS14101-9	Remove Install Roller Swage Anvil Swage	ST927-7 ST918A-562-1093 ST926A-9, or RST1011 or RST3011 (V77896) KMT0202-9 (V97613) or RKS4101-9 (V77896)
MS14103-10	Remove Install Roller Swage Anvil Swage Proof Load Test	ST927-9 ST918A-625-1187 ST926A-12, or F80113-1, -34, -50, -64 or -105, or RST1014 or RST2614 or RST3014 (V77896) KMT0203-10 (V97613) or RKS4103-10 (V77896) ST30-8783A-7 or ST8783F-1187-1
MS14103-12	Remove Install Roller Swage Anvil Swage	ST927C-3 ST918A-750-1375 F80113-1, -34, -50, -64 or -105, or G20001-1, or MIT65B02023, or RST1015 or RST2616 or RST3015 (V77896) KMT0203-12 (V97613) or RKS4103-12 (V77896)
MS14103-14	Remove Install Roller Swage Anvil Swage	ST927-11 ST918A-875-1625 F80113-1, -34, -50 or -64, or RST1018 or RST2618 or RST3018 (V77896) KMT0203-14 (V97613) or RKS4103-14 (V77896)
MS14103-16	Remove Install Roller Swage Anvil Swage	ST927-12 ST918A-1000-1750 ST926A-15, or RST1020 or RST3020 (V77896) KMT0203-16 (V97613) or RKS4103-16 (V77896)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
MS14103-3	Roller Swage Anvil Swage	RST1001 or RST3001 (V77896) ST930
MS14103-4	Remove Install Roller Swage Anvil Swage	ST927B-3 ST918A-250-625 ST926E-13, or RST1002 or RST3002 (V77896) KMT0203-4 (V97613) or RKS4103-4 (V77896)
MS14103-5	Remove Install Roller Swage Anvil Swage Proof Load Test	ST927-3 ST918A-312-687 ST926A-4, or RST1004 or RST3004 (V77896) KMT0203-5 (V97613) or RKS4103-5 (V77896) ST30-8783A-19 or ST8783F-0687-16
MS14103-6	Remove Install Roller Swage Anvil Swage Proof Load Test	ST927-4 ST918A-375-812 ST926A-5, or RST1006 or RST3006 (V77896) KMT0203-6 (V97613) or RKS4103-6 (V77896) ST30-8783A-23 or ST8783F-0812-16
MS14103-7	Remove Install Roller Swage Anvil Swage	ST927B-8 ST918A-437-937 ST926E-38, or RST1008 or RST3008 (V77896) KMT0203-7 (V97613) or RKS4103-7 (V77896)
MS14103-7A	Roller Swage Anvil Swage	RST1007 or RST3007 (V77896) KMT0202-7 (V97613) or RKS4101-7 (V77896)
MS14103-8	Remove Install Roller Swage Anvil Swage	ST927-6 ST918A-500-1000 ST926A-7 or F80113-1, -34, -50, -64 or -105, or RST1010 or RST2610 or RST3010 (V77896) KMT0203-8 (V97613) or RKS4103-8 (V77896)
MS14103-9	Roller Swage Anvil Swage	RST1012 or RST3012 (V77896) KMT0203-9 (V97613) or RKS4103-9 (V77896)
MS14104-10	Install Roller Swage	ST918A-625-1187 and ST919-1187 ST932-P-624 and ST932-C-297 ^{*[1]}
MS14104-12	Install Roller Swage	ST918A-750-1437 ST932-P-749 and ST932-C-422 ^{*[1]}
MS14104-14	Install Roller Swage Sleeve Swage	ST918A-875-1562 and ST919-1562 ST932-C-874 and ST932-C-485 ^{*[1]} or RST2530 (V77896) ST928C-18
MS14104-16	Install Roller Swage Sleeve Swage	ST918A-1000-1750 ST926A-15 MIT65B10901
MS14104-3	Install Ball Stake Sleeve Stake	ST918A-190-562 and ST919-562 ST931-190-562 ST929-1A-190-562

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
MS14104-4	Install Ball Stake Roller Swage Roller Swage	ST918A-250-656-and ST919-656 ST931-250-656 ST932-P-249 and ST932-C-031 ^{*[1]} ST932B-250-656
MS14104-5	Install Ball Stake Point Stake Roller Swage	ST918A-312-750 ST931-312-750 ST925-312-750 ST932-P-311 and ST932-C-078 ^{*[1]}
MS14104-6	Install Point Stake Roller Stake Sleeve Swage Sleeve Line Stake	ST918A-375-812 and ST919-812 ST925-375-812 ST932-P-374 and ST932-C-110 ^{*[1]} ST928C-7 ST929-2A-812-375-3
MS14104-7	Install Sleeve Swage Point Stake Roller Swage	ST918A-437-906 and ST919-906 ST928C-12 ST925-437-906 ST932-P-437 and ST932-C-156 ^{*[1]}
MS14104-8	Install Point Stake Roller Swage Sleeve Swage	ST918A-500-1000 ST925-500-1000 ST932-P-499 and ST932-C-203 ^{*[1]} or RST2666 (V77896) Refer to V50830
MS14104-9	Install Point Stake	ST918A-562-1093 ST925-562-1093
MS20200KP4	Install Ball Stake Roller Swage	ST918A-901 and ST919-901 ST931-250-901 ST932-P-249 and ST932-C-154 ^{*[1]}
MS20200KP5	Install Point Stake Roller Swage	ST918A-312-1250 and ST919-1250 ST925-312-1250 ST932-P-311 and ST932-C-328 ^{*[1]}
MS20200K3L	Install Ball Stake Roller Swage Sleeve Swage	ST918A-190-625 and ST919-625 ST931-190-625 ST932-P-189 and ST932-C-016 ^{*[1]} ST929-2A-625-190-18
MS20201KP10A	Install Roller Swage Ring Swage	ST918A-625-1375 ST932-P-624 and ST932-C-391 ^{*[1]} ST933-100-625
MS20201KP12A	Install Roller Swage Ring Swage	ST918A-750-1625 ST932-P-749 and ST932-C-516 ^{*[1]} ST933-100-12

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
MS20201KP20A	Install Roller Swage Ring Swage Special Jig	ST918A-1250-2250 ST932-P-1249 and ST932-C-829 ^{*[1]} ST933-36-20 3AJ65B81667
MS20201KP3A	Install Ball Stake Roller Swage Point Stake	ST918A-190-625 ST931-190-625 ST932-P-189 and ST932-C-016 ^{*[1]} ST925-190-625
MS20201KP4A	Install Ball Stake Point Stake Roller Swage	ST918A-250-750 ST931-250-750 ST925-250-750 ST932-P-249 and ST932-C-078 ^{*[1]}
MS20201KP5A	Install Roller Swage Roller Swage Sleeve Swage	ST918A-312-812 and ST919-812 ST932-P-311 and ST932-C-110 ^{*[1]} SE-27-2001 or F72916-1 ST928C-4
MS20201KP6A	Install Ball Stake Roller Swage Sleeve Swage	ST918A-375-875 and ST919-875 ST931-375-875 ST932-P-374 and ST932-C-141 ^{*[1]} ST928C-8
MS20201KP8A	Install Point Stake Roller Swage	ST918A-500-1125 ST925-500-1125 ST932-P-499 and ST932-C-266 ^{*[1]}
MS20202KP10A	Install Roller Swage Ring Swage	ST918A-625-1375 ST932-P-624 and ST932-C-391 ^{*[1]} ST933-100-625
MS20202KP12A	Install Roller Swage Ring Swage	ST918A-750-1625 ST932-P-749 and ST932-C-516 ^{*[1]} ST933-100-12
MS20202KP20A	Install Roller Swage Ring Swage	ST918A-1250-2250 ST932-P-1249 and ST932-C-829 ^{*[1]} ST933-36-20 or ST933-2250-1250
MS20202KP21B	Install Roller Swage Sleeve Swage	ST918A-1313-2062 ST932-P-1312 and ST932-C-735 ^{*[1]} ST929-1-3
MS20202KP23B	Remove Install Roller Stake	F70150 ST918A-1438-2187 and ST919-2187 ST932-P-1437 and ST932-C-297 ^{*[1]}
MS20202KP25B	Install Roller Swage	ST918A-1563-2312 and ST919-2312 ST932-P-1562 and ST932-C-360 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
MS20202KP29B	Install Roller Swage Sleeve Swage	ST918A-1812-2562 ST932-P-1812 and ST932-C-485 ^{*[1]} ST928C-90
MS20202KP33B	Install Roller Swage	ST918A-2063-2812 and ST919-2812 ST932-P-2062 and ST932-C-610 ^{*[1]}
MS20202KP37B	Install Point Stake Roller Swage	ST918A-2313-3062 ST925-2313-3062 ST932-P-2312 and ST932-C-235 ^{*[1]}
MS20202KP49B	Install Roller Swage Ring Swage	ST918A-3063-4000 ST932-P-3062 and ST932-C-704 ^{*[1]} MIT65B81126; MIT65B81127
MS20206DSP4	Install Roller Swage	ST918A-250-901 and ST919-901 ST932-P-249 and ST932-C-154 ^{*[1]}
MS20206DSP8	Install Ball Stake Roller Swage	ST918A-500-1687 ST931-500-1687 ST932-P-499 and ST932-C-547 ^{*[1]}
MS20207DPP4	Install Sleeve Swage	ST918A-250-901 and ST919-901 ST928C-3
MS20207DPP5	Install	ST918A-312-1250
MS21154B6	Remove Roller Swage	TBD F80113-50, -64 or -105, or RST2606 (V77896)
MS21230-10	Remove Install Roller Swage	ST927-9 ST918A-625-1187 ST926A-12 or F80113-1,-34,-50, -64 or -105, or RST1014 or RST2614 or RST3014 (V77896)
MS21230-12	Remove Install Roller Swage	ST927C-3 ST918A-750-1375 F80113-1,-34,-50, -64 or -105, or G20001-1, or MIT65B02023 or ST926D-1, or RST1015, or RST2615 or RST3015 (V77896)
MS21230-14	Roller Swage	ST926A-20 or RST1018 or RST3018 (V77896)
MS21230-16	Roller Swage	RST1020 or RST3020 (V77896)
MS21230-3	Roller Swage	RST1001 or RST3001 (V77896)
MS21230-4	Remove Install Roller Swage	ST927B-3 ST918A-250-625 ST926E-13 or RST1002 or RST3002 (V77896)
MS21230-5	Remove Install Roller Swage	ST927-3 ST918A-312-687 ST926A-4 or RST1004 or RST3004 (V77896)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
MS21230-6	Remove Install Roller Swage	ST927-4 ST918A-375-812 ST926A-5 or RST1006 or RST3006 (V77896)
MS21230-7	Remove Install Roller Swage	ST927B-8 ST918A-437-937 ST926E-38 or RST1008 or RST3008 (V77896)
MS21230-7A	Roller Swage	RST1007 or RST3007 (V77896)
MS21230-8	Remove Install Roller Swage	ST927-6 ST918A-500-1000 ST926A-7 or F80113-1,-34,-50, -64 or -105, or RST1010 or RST2610 or RST3010 (V77896)
MS21230-9	Roller Swage	RST1012 or RST3012 (V77896)
MS21231-4	Remove Install	F80197-1 ST918A-250-625
MS21231-7	Sleeve Swage	ST932B-250-937
MS21232-10	Remove Install Roller Swage Proof Load Test	ST927-9 ST918A-625-1187 or 65-44834-F6 ST926A-11 or RST1013 or RST3013 (V77896) ST30-8783A-6 or ST8783F-1187-1
MS21232-12	Remove Install Roller Swage	ST927-10 ST918A-750-1437 ST926A-13 or RST1016 or RST3016 (V77896)
MS21232-14	Remove Install Roller Swage	ST927-11 ST918A-875-1562 ST926A-14 or RST1017 or RST3017 (V77896)
MS21232-16	Remove Install Roller Swage	ST927-12 ST918A-1000-1750 ST926A-15 or RST1019 or RST3019 (V77896)
MS21232-4	Remove Install Roller Swage Anvil Swage	ST927-1 ST918A-250-656 ST926A-1 or RST1003 or RST3003 (V77896) ST930C-1 or RKS4101-4 (V77896)
MS21232-5	Remove Install Roller Swage Proof Load Test	ST927-2 ST918A-312-750 ST926A-3 or RST1005 or RST3005 (V77896) ST30-8783A-4 or ST8783F-750-16
MS21232-6	Remove Install Roller Swage	ST927-4 ST918A-375-812 ST926A-5 or RST1006 or RST3006 (V77896)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
MS21232-7	Remove Install Roller Swage	ST927-5 ST918A-437-906 ST926A-6 or RST1007 or RST3007 (V77896)
MS21232-8	Remove Install Roller Swage	ST927-6 ST918A-500-1000 ST926A-7 or RST1009 or RST3009 (V77896)
MS21232-9	Remove Install Roller Swage	ST927-7 ST918A-562-1093 ST926A-9 or RST1011 or RST3011 (V77896)
MS21233-10	Install Roller Swage	ST918A-625-1187 and ST919-1187 ST932-P-624 and ST932-C-297 ^{*[1]}
MS21233-12	Install Roller Swage	ST918A-750-1437 ST932-P-749 and ST932-C-422 ^{*[1]}
MS21233-14	Install Roller Swage Sleeve Swage	ST918A-875-1562 and ST919-1562 ST932-P-874 and ST932-C-485 ^{*[1]} or RST2530 (V77896) ST928C-18
MS21233-16	Install Roller Swage Sleeve Swage	ST918A-1000-1750 ST926A-15 MIT65B10901
MS21233-3	Install Ball Stake Roller Swage Sleeve Swage	ST918A-190-562 and ST919-562 ST931-190-562 ST932B-190-562 ST929-1A-190-562
MS21233-4	Install Ball Stake Roller Swage Roller Swage	ST918A-250-656 and ST919-656 ST931-250-656 ST932-P-249 and ST932-C-031 ^{*[1]} ST932B-250-656
MS21233-5	Install Ball Stake Point Stake Roller Swage	ST918A-312-750 ST931-312-750 ST925-312-750 ST932-P-311 and ST932-C-078 ^{*[1]}
MS21233-6	Install Point Stake Roller Swage Sleeve Swage Sleeve Line Stake	ST918A-375-812 and ST919-812 ST925-375-812 ST932-P-374 and ST932-C-110 ^{*[1]} ST928C-7 ST929-2A-812-375-3
MS21233-7	Install Sleeve Swage Point Stake Roller Swage	ST918A-437-906 and ST919-906 ST928C-12 ST925-437-906 ST932-P-437 and ST932-C-156 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
MS21233-8	Install Point Stake Roller Swage Sleeve Swage	ST918A-500-1000 ST925-500-1000 ST932-P-499 and ST932-C-203 ^{*[1]} or RST2666 (V77896) Refer to V50830
MS21233-9	Install Point Stake	ST918A-562-1093 ST925-562-1093
MS24461-10	Install Sleeve Swage	ST918B-4-625-1250 and ST919-1250 ST928C-10
MS24461-12	Install Line Swage	ST918B-4-750-1375 ST929-3A-5
MS24461-20	Install Sleeve Swage	ST918B-4-1250-2000 and ST919-2000 ST928C-20
MS24461-24	Install Sleeve Swage	ST918B-4-1500-2500 and ST919-2500 ST928C-24
MS24461-8	Install Line Swage	ST918B-4-500-1125 ST929-3A-1
MS27261KSP10	Install Ball Stake Roller Swage	ST918A-625-1937 ST931-625-1937 ST932-P-624 and ST932-C-172 ^{*[1]}
MS27261KSP3L	Install Ball Stake Roller Swage Sleeve Swage	ST918A-190-625 and ST919-625 ST931-190-625 ST932-P-189 and ST932-C-016 ^{*[1]} ST929-2A-625-190-18
MS27261KSP5	Install Roller Swage Sleeve Swage	ST918A-312-1250 ST932-P-311 and ST932-C-328 ^{*[1]} ST928C-5
MS27261KSP5A	Install Sleeve Swage	ST918A-312-812 and ST919-812 ST928C-4
MS27261KSP6	Install Ball Stake Roller Swage Sleeve Swage	ST918A-375-1437 and ST919-1437 ST931-375-1437 ST932-P-375 and ST932-C-422 ^{*[1]} ST928C-11
MS27261KSP6A	Install Roller Swage	ST918A-375-875 and ST919-875 ST932-P-374 and ST932-C-141 ^{*[1]}
MS27261KSP8	Install Ball Stake	ST918A-500-1687 ST931-500-1687
MS27645-5AR	Install Ball Stake Sleeve Swage	ST918A-312-812 and ST919-812 ST931-312-812 ST928C-4 or ST929-2C-312-812-390 or C20001-1

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
MS27645-5ARG	Install Ball Stake Sleeve Swage	ST918-312-812 and ST919-812 ST931-312-812 ST928C-4 or ST929-2C-312-812-390 or C20001-1
MS28913-12C	Sleeve Swage	ST928C-107
M81936/1-10R	Sleeve Swage	F80113-1, -34, -50, -64 or -105, or RST2613 (V77896)
M81936/1-12	Remove Roller Swage	RKC4101-12 (V77896) RST1016 or RST3016 (V77896)
M81936/1-22	Remove Install Roller Swage	ST927C-11 or -15, and A32091-2562 ST918A-1375-2562 RST4058 (V77896)
M81936/1-24	Roller Swage	ST926B-601B or ST926E-172 or RST2544 (V77896)
M81936/1-5R	Roller Swage	TBD
M930EK	Install Ball Stake Ball Stake Point Stake	ST918A-1181-1850 ST931-1181-1850 ST931D-1181-1850 ST925-1181-1850
NC4DG3	Remove Anvil Swage	ST1212E and ST1212-2-5 ST930C-250-531-1
PD5FS428	Roller Swage	ST932-312-937-1-1 ^{*[1]}
PSBS14-1	Special Jig	173-1030-PRDA (V51563)
P20240	Remove Roller Swage	ST927B-3 ST926E-17, or MIT65B97208, or RST1002 (V77896)
P20280	Remove Install Roller Swage	ST927B-35 or RKC7076 (V77896) ST918A-315-656 ST926E-119 or RST2542 (V77896)
P20280P40	Remove Install Roller Swage	TBD TBD RST1004 (V77896)
P20280P80	Remove Install Roller Swage	TBD TBD TBD
P20350	Remove Roller Swage	TBD RST4268 (V77896)
P20360	Remove Roller Swage	ST927C-5 F80113-1, -34, -50, -64 or -105, or ST926E-162 or RST2453 (V77896)
P20370	Remove Roller Swage	ST927C-11 or RKC7120 (V77896) F80113-1, -34, -50, -64 or -105, or RST2411 or RST2549 (V77896)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
P21460	Remove Roller Swage	G78004-13 and -7 G78004-2 and -7
P21760	Roller Swage	ST926C-1125-2000-1877, or RST2550 (V77896)
P21790	Proof Load Test	ST30-8783A-64 or ST8783F-TBD
P21920	Roller Swage	F80113-1, -34, -50, -64 or -105, or ST926-2 or ST926A-11 or -12, or RST1013 or RST2613 (V77896)
P21920-1	Roller Swage	F80113-1, -34, -50, -64 or -105, or ST926-2 or ST926A-11 or -12, or RST1013 or RST2613 (V77896)
P22960	Remove Roller Swage Proof Load Test	ST927C-5 or RKC7009 (V77896) F80113-1, -34, -50, -64 or -105, or ST926E-162 or RST2453 (V77896) ST30-8783A-60 or ST8783F-TBD
P22970	Remove Roller Swage Proof Load Test	ST927C-11 or RKC7066 (V77896) F80113-34, -50, -64 or -105, or ST926C-1375-2250-2127 or RST2309 (V77896) ST30-8783A-59 or ST8783F-TBD
P26290	Remove Roller Swage	TBD RST2405 (V77896)
P27850	Roller Swage	C57001, or RST2536 (V77896)
P29820	Remove Roller Swage	TBD F80113-50, -64 or -105, or RST2354 (V77896)
P29820P30	Remove Roller Swage	TBD F80113-50, -64 or -105
P29820P60	Remove Roller Swage	TBD F80113-50, -64 or -105
SA4-14A	Roller Swage	ST932B-250-1111 (HAP-HAJ-96-0046RR)
SA4-14A4	Roller Swage Sleeve Swage	ST932B-250-1111 (HAP-HAJ-96-0046RR) ST928-901-250 or ST932B-250-901
S012T236-400	Remove Install Sleeve Swage	TBD ST918C-375-1437 and ST919-1437 ST928-1437-375 or RST2532 (V77896)
S012T236-401	Install Roller Swage Sleeve Swage	ST918C-250-1000 and ST919-1000 ST932-250-1000-1-2 ST928-1000-250
S012T236-402	Remove Install Roller Swage	TBD ST918A-375-1437 F80113-1, -34, -50, -64 or -105
S012T236-700	Remove Install Roller Swage	ST927J-1 ST918A-250-1000 F80113-1, -34, -50, -64 or -105, or RST2364 (V77896)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
S012T236-701	Remove Install Roller Swage	RKC7416 (77896) ST918A-375-1500 F80113-1, -34, -50, -64 or -105, or ST926C-375-1500-1400, or RST2380 or RST4795 (V77896)
S012T236-702	Remove Install Roller Swage	TBD ST918A-750-1937 RST2369 (V77896)
S012T236-703	Remove Install Sleeve Swage	RKC7415 (V77896) ST918A-375-1437 RST2103 or RST4796 (V77896)
S012T236-704	Remove Install Sleeve Swage	RKC7417 (V77896) ST918A-625-1937 RST2484 or RST4794 (V77896)
S012T236-705	Remove Install Roller Swage	TBD ST918A-500-1750 RST2384 (V77896)
S012T236-706	Remove Install Sleeve Swage	RKC7415 (V77896) ST918A-375-1437 RST2484 or RST4794 (V77896)
S012T236-707	Remove Install Sleeve Swage	RKC7417 (V77896) ST918A-625-1937 RST2484 or RST4794 (V77896)
S012T236-708	Remove Install Sleeve Swage	TBD ST918A-750-2625 RST2927 (V77896)
S012T236-709	Remove Install Sleeve Swage	RKC7418 (V77896) ST918A-500-1687 RST2824 or ST2917 or RST4793 (V77896)
S012T236-710	Remove Install Roller Swage	RKC7416 (77896) ST918A-375-1500 F80113-1, -34, -50, -64 or -105, or ST926C-375-1500-1400, or RST2380 or RST4795 (V77896)
S012T236-711	Remove Install Roller Swage	TBD ST918A-500-1750 RST2384 (V77896)
S251N214-4	Roller Swage	ST928-1250-312 or ST932B-312-1250
S251N214-5	Roller Swage	ST928-901-250 or ST932B-250-901
S302A006-1	Special Jig	MIT311A1550
S302A006-2	Special Jig	MIT311A1550

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
S302A006-3	Remove Install Roller Swage	ST927C-139 and A32091-1930 ST918A-750-1930 RST2209 or RST2795 (V77896)
S302A006-4	Special Jig	MIT311A1550
S302T001-200	Remove Install Roller Swage Proof Load Test	ST927-12 ST918A-1000-1750 ST926A-15, or RST1019 (V77896) ST30-8783A-47 or ST8783F-1750-1
S302T001-202	Remove Install	MIT314T3281-3 MIT314T3281-3
S302T001-207	Install Roller Swage Proof Load Test	ST918A-375-812 RST1006 or RST3006 (V77896) ST30-8783A-53 or ST8783F-0812-1
S302T001-209	Remove Install Roller Swage Proof Load Test	ST927C-139 and A32091-1437 ST918A-750-1437 F80113-1, -34, -50, -64 or -105, or RST2616 (V77896) ST30-8783-13 or ST30-8783A-51 or ST8783F-1437-1
S302T001-211	Remove Install	MIT314T3281-3 MIT314T3281-3
S302T001-212	Proof Load Test	ST30-8783A-65 or ST8783F-TBD
S302T001-213	Remove Install	TBD TBD
S302T001-214	Remove Roller Swage	ST927-9 ST926A-11 or -12, or RST1013 (V77896)
S302T001-215	Remove Install Roller Swage Proof Load Test	ST927C-139 and A32091-1065 ST918A-750-1065 F80113-1, -34, -50, -64 or -105 ST30-8783A-57 or ST8783F-1065-1
S302T001-216	Remove Install Roller Swage Proof Load Test	A32091-1562 ST918A-875-1562 F80113-1, -34, -50, -64 or -105 ST30-8783-32 or ST30-8783A-45 or ST8783F-1562-1
S302T001-217	Remove Install	MIT314T3281-3 MIT314T3281-3
S302T001-218	Remove Install Roller Swage	A32091-1437 ST918A-750-1437 F80113, -34, -50, -64 or -105
S302T001-219	Remove Install Roller Swage Proof Load Test	ST927C-142 and A32091-3000 ST918A-1800-3000 ST926C-1800-3000-2875 or RST2567 (V77896) ST30-8783A-TBD or ST8783F-3000-1

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
S302T001-220	Proof Load Test	ST30-8783A-54 or ST8783F-TBD
S302T001-223	Remove	ST927-4
	Install	ST918A-375-875
	Roller Swage	F80113-50, -64 or -105, or RST2652 (V77896)
S302T001-224	Remove	MIT314T3281-3 or C54015-1
	Install	MIT314T3281-3 or C54015-1
S302T001-225	Remove	MIT314T3281-3 or C54015-1
	Install	MIT314T3281-3 or C54015-1
S302T001-226	Remove	MIT314T3281-3 or C54015-1
	Install	MIT314T3281-3 or C54015-1
S302T001-227	Remove	ST927C-139 and A32091-1065
	Install	ST918A-772-1065
	Roller Swage	F80113-1, -34, -50, -64 or -105
S302T001-229	Remove	TBD
	Install	ST918A-625-1187
	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST1019 (V77896)
	Proof Load Test	ST30-8783A-58 or ST8783F-1187-1
S302T001-231	Remove	MIT314T3281-3
	Install	MIT314T3281-3
S302T001-232	Remove	ST927-12
	Install	ST918A-1000-1750
	Roller Swage	ST926A-15, or RST2265 (V77896)
	Proof Load Test	ST30-8783A-49 or ST8783F-1750-1
S302T001-233	Remove	MIT314T3281-3
	Install	MIT314T3281-3
S302T001-236	Install	ST918A-375-812
	Roller Swage	RST1006 or RST3006 (V77896)
	Proof Load Test	ST30-8783A-3 or ST8783F-0812-1
S302T001-300	Remove	ST1212E-937 and ST1212-2-5
	Install	ST918A437-937
	Roller Swage	ST926A-6 or F80113-50, -64 or -105
S302T001-301	Remove	ST1212E-625 and ST1212-2-5
	Install	ST918A-250-625
	Roller Swage	ST926A-1 or F80113-50, -64 or -105, or RST2591 or RST2592 (V77896)
	Proof Load Test	ST8783F-625-16

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
S302T001-302	Remove	ST927B-7
	Install	ST918A-375-906 or ST918-375-875
	Roller Swage	A20012-16, or F80113-50 or -64, or RST2654 or RST2744 (V77896)
	Proof Load Test	ST30-8783A-55 or ST930-LT-375-906-801 or ST8783F-0906-1
S302T001-303	Remove	ST927-6
	Install	ST918A-500-1000 or ST931E-500-1000
	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST2609 (V77896)
	Proof Load Test	ST30-8783-22 or ST8783F-1000-1
S302T001-305	Roller Swage	A20012-1, A20012-10, or RST1008 or RST2608 or RST3008 (V77896)
S302T001-306	Remove	TBD
	Install	TBD
S302T001-307	Remove	TBD
	Install	TBD
S302T001-309	Remove	ST927-6
	Install	ST918A-500-1000 or ST931E-500-1000
	Roller Swage	F80113-1, -34, -50, -64 or -105, or RST1009 or RST2609 (V77896)
S302T001-404	Remove	ST1212E-725 and ST1212-5
	Install	ST918A-310-750
	Roller Swage	F80113-50, -64 or -105, or RST2428 (V77896)
S302T001-406	Remove	MIT314T3281-3
	Install	MIT314T3281-3
S302T001-408	Remove	ST1212E-625 and ST1212-2-5
	Install	ST918A-250-625
	Roller Swage	ST926A-1 or F80113-50, -64 or -105, or RST1002 or RST2885 or RST2592 (V77896)
S302T001-409	Remove	TBD
	Install	TBD
S302T001-410	Remove	ST1212E-937 and ST1212-2-5
	Install	ST918A437-937
	Roller Swage	ST926A-6 or F80113-50, -64 or -105
S302T001-411	Remove	MIT314T3281-3
	Install	MIT314T3281-3
S302T001-413	Proof Load Test	ST30-8783A-66 or ST8783F-TBD
S302T001-414	Remove	A32091-2214
	Install	ST918A-1125-2214
	Roller Swage	F80113-1, -34, -50, -64 or -105
	Proof Load Test	ST30-8783-23 or ST8783F-2214-1

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
S302T001-415	Remove	TBD
	Install	TBD
S302T001-416 ^{*[4]}	Remove	ST918A-2250-3441
	Install	ST918A-2250-3441
	Proof Load Test	ST8783F-3441-1 or ST8783F-TBD
S302T001-417	Remove	TBD
	Install	TBD
S302T001-419	Roller Swage	F80113-1, -34, -50, -64 or -105
	Proof Load Test	ST30-8783-27 or ST8783F-TBD
S302T001-420	Remove	A32091-1359
	Install	ST918A-625-1359
	Roller Swage	F80113-1, -34, -50, -64 or -105
	Proof Load Test	ST8783F-1359-1 or ST8783F-TBD
S302T001-421	Proof Load Test	ST30-8783A-56 or ST8783F-TBD
S302T001-423	Roller Swage	F80113-34, -50, -64 or -105
	Proof Load Test	ST30-8783-23 or ST8783F-TBD
S302T001-425	Remove	TBD
	Install	TBD
S302T001-428	Remove	TBD
	Install	TBD
S302T001-429	Roller Swage	RST2420 (V77896)
S302T001-430	Roller Swage	RST2420 (V77896)
S302T001-433	Remove	TBD
	Install	TBD
S302T001-434	Remove	TBD
	Install	TBD
S302T001-435	Remove	F71290-TBD
	Install	F71290-TBD
S302T001-436	Remove	MIT314T3281-3
	Install	MIT314T3281-3
S302T001-437	Remove	TBD
	Install	TBD
S302T001-438	Remove	TBD
	Install	TBD
S302T001-701	Remove	ST927C-10 and A32091-2360
	Install	ST918A-1250-2360
	Roller Swage	F80113-1, -34, -50, -64 or -105
S302T001-702	Remove	ST927A-12 and A32091-1912
	Install	ST918A-1000-1912
	Roller Swage	F80113-1, -34, -50, -64 or -105

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
S302T001-703	Remove Install Roller Swage	ST927C-142 and A32091-2064 ST918A-1180-2064 F80113-1, -34, -50, -64 or -105
S302T001-801	Remove Install Roller Swage Proof Load Test	A32091-3098 ST918A-1562-3098 F80113-70 or -88 ST30-8783-25 or ST8783F-3098-1
S302T001-802	Proof Load Test	ST30-8783-9 or ST8783F-TBD
S302T001-803	Install Roller Swage	ST918A-1250-2452 F80113-37
S302T001-804	Install Roller Swage	ST918A-375-875 F80113-50, -64 or -105, or RST2652 (V77896)
S302T001-805	Install Roller Swage	ST918A-250-625 F80113-50, -64 or -105, or RST2885 (V77896)
S302T001-806	Install Roller Swage	ST918A-1600-2676 F80113-37
S302T001-807	Roller Swage Proof Load Test	F80113-70 or -88 ST30-8783-29 or ST8783F-TBD
S302T001-808	Roller Swage Proof Load Test	RST2458 (V77896) ST30-8783A-63 or ST8783F-TBD
S302T001-810	Remove Install Roller Swage Proof Load Test	A32091-3098 ST918A-1700-3098 ST926C-1700-3098-2965 ST30-8783-24 or ST8783F-3098-1
S302T001-811	Proof Load Test	ST30-8783-28 or ST8783F-TBD
S302T001-813	Remove Install Roller Swage Proof Load Test	A32091-2937 ST918A-1437-2937 ST926C-1437-2937-2804 ST30-8783-9 or ST8783F-2937-1
S302T001-816	Remove Install Roller Swage Proof Load Test	A32091-3098 ST918A-1700-3098 ST926C-1700-3098-2965 ST30-8783-24 or ST8783F-3098-1
S302T001-817	Remove Install Roller Swage Proof Load Test	A32091-3098 ST918A-1800-3098 ST926C-1800-3098-2965 ST30-8783-26 or ST8783F-3098-1
S302T001-818	Remove Install Roller Swage	A32091-3098 ST918A-1562-3098 ST926C-1562-3098-2965

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
S302T001-820	Proof Load Test	ST30-8783-25 or ST8783F-3098-1
	Proof Load Test	ST30-8783A-50 or ST8783F-TBD
S302T001-821	Remove	ST927C-10 and A32091-2360
	Install	ST918A-1250-2360
	Roller Swage	F80113-34, -50, -64 or -105
	Proof Load Test	ST30-8783-14 or ST8783F-2360-1
S302T001-822	Remove	ST927A-12 and A32091-1912
	Install	ST918A-1000-1912
	Roller Swage	F80113-1, -34, -50, -64 or -105
	Proof Load Test	ST30-8783-15 or ST8783F-1912-1
S302T001-823	Proof Load Test	ST30-8783-16 or ST8783F-TBD
S302T001-824	Proof Load Test	ST30-8783-17 or ST8783F-TBD
S302T001-825	Remove	TBD
	Install	ST918A-1050-2111
	Roller Swage	F80113-1, -34, -50, -64 or -105
	Proof Load Test	ST30-8783-31 or ST8783F-2111-1
S374BIE3LY198	Install	TBD
	Remove	TBD
	Roller Swage	TBD
USB10-104	Remove	ST927C-1
	Install	ST918A-625-1250
	Roller Swage	F80113-1, -34, -50, -64 or -105
USB10-105	Remove	ST927C-80
	Install	ST918C-625-1461
	Roller Swage	F72865-1
	(Pressure Stake)	
USB6-106	Remove	ST927B-36
	Install	ST918A-375-750
	Roller Swage	ST926E-123
USB6-107	Remove	ST927-4
	Install	ST918A-375-812
	Roller Swage	ST926A-5
U350	Install	TBD
U351	Install	TBD
VTB00030	Remove	ST927C-1
	Install	ST918A-625-1250
	Roller Swage	F80113-1, -34, -50, -64 or -105
VTB00040	Remove	ST927B-36
	Install	ST918A-375-750
	Roller Swage	ST926E-123

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
VTB00050	Remove Install Roller Swage	ST927-4 ST918A-375-812 ST926A-5 or RST1006 (V77896)
VTB00970	Remove Roller Swage	ST927B-3 ST926E-17 or MIT65B97208 or RST1002 (V77896)
VTB01130	Remove Roller Swage	ST927C-5 F80113-1, -34, -50, -64 or -105
VTB01140	Remove Roller Swage Proof Load Test	ST927C-11 F80113-34, -50, -64 or -105, or ST926C-1375-2250-2127 or RST2309 (V77896) ST30-8783-10 or ST8783F-2250-1
VTB02240	Remove Install Roller Swage	ST927-6 ST918A-500-1000 F80113-1, -34, -50, -64 or -105, or RST2609 (V77896)
VTB08550	Roller Swage	F80113-1, -34, -50, -64 or -105, or ST926-2, or ST926A-11 or -12, or RST2550 (V77896)
VTB08590	Roller Swage Proof Load Test	ST926C-1125-2000-1877 or RST2308 (V77896) ST30-8783-11 or ST30-8783A-46 or ST8783F-2000-1
VTB10200	Remove Install Roller Swage	ST927-12 ST918A-1000-1750 ST926A-15
VTB10820	Remove Roller Swage	TBD F80113-50, -64 or -105
VTB10820P30	Remove Roller Swage	TBD F80113-50, -64 or -105
VTB10820P60	Remove Roller Swage	TBD F80113-50, -64 or -105
YD134	Sleeve Swage	F80118-1, ST928-1625-625, or ST928A-1750-625
YD134A	Sleeve Swage	F80118-1, ST928-1625-625, or ST928A-1750-625
YD134B	Sleeve Swage	F80118-1, ST928-1625-625, or ST928A-1750-625
YD170A	Install Ball Stake	ST918C-4500-5625 ST931-4500-5625
YN44WOPP2FTA114	Ball Stake	MIT65B63429
YN55WOPP2FTA1144	Roller Swage	ST932-3437-4000-3-1 ^{*[1]}
YN56WOPP2CRA1144	Roller Swage	ST932-3500-4000-3-1 ^{*[1]}
YS211B	Install Roller Swage Sleeve Swage	ST918A-375-1500 ST932-P-374 and ST392-C-454 ^{*[1]} ST928C-93

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
YTA261	Remove Install Roller Swage	ST927C-10 ST918A-1250-2250 F80113-34, -50, -64 or -105
YTA263	Remove Install Roller Swage	ST927C-23 ST918A-3000-3850 ST926E-104 or RST2069 (V77896)
YTA286	Remove Install Roller Swage Anvil Swage	ST927-1 ST918A-250-656 ST926A-2 or RST1002 (V77896) ST930C-1 or RKS4101-4 (V77896)
YTS828	Remove Anvil Swage	ST927B-5 ST930C-437-750
YTS829	Remove Anvil Swage	TBD ST930C-1250-1562
ZB538DDL498	Install Ball Stake Roller Swage	ST918-A625-1062 and ST919-1062 ST925-625-1062 ST932-P-624 and ST932-C-235 ^{*[1]}
ZB539DDL498	Install Roller Swage	ST918A-750-1187 and ST919-1187 ST932-P-749 and ST932-C-297 ^{*[1]}
ZB541DDL498	Install Ball Stake Roller Swage Ring Swage	ST918A-1062-1500 and ST919-1500 ST931A ST932-P-1061 and ST932-C-454 ^{*[1]} ST933-24-17 or ST933-1500-1062
03-505-04E021	Roller Swage	RST2781 (V77896)
03-506-04E005	Roller Swage	C57001
10-60516-17	Remove Install Roller Swage	A32091-4320 ST918A-3945-4320 TBD
10-60516-37	Install	ST918D-1177-1316-680
10-60516-39	Install Install	ST918B-3-1000-1750 ST918D-753-1002-745
10-60516-95	Install	ST918D-1177-1316-1070
10-60516-104	Install Ball Stake	ST918D-252-376-195 ST931D-252-376
10-60545-100	Install Ball Stake Roller Swage	ST918A-250-656 and ST919-656 ST931-250-656 ST932-P-249 and ST932-C-031 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
10-60545-101	Install Ball Stake Point Stake Roller Swage	ST918A-312-750 ST931-312-750 ST925-312-750 ST932-P-311 and ST932-C-078 ^[1]
10-60545-102	Install Point Stake Roller Swage Sleeve Stake Sleeve Line Stake	ST918A-375-812 and ST919-812 ST925-375-812 ST932-P-374 and ST932-C-110 ^[1] ST928C-7 ST929-2A-812-375-3
10-60545-103	Install Point Stake Roller Swage Sleeve Swage	ST918A-437-906 and ST919-906 ST925-437-906 ST932-P-437 and ST932-C-156 ^[1] ST928C-12
10-60545-104	Install Point Stake Sleeve Swage	ST918A-500-1000 ST925-500-1000 or RST2666 (V77896) Refer to V50830
10-60545-105	Install Point Stake	ST918A-562-1093 ST925-562-1093
10-60545-106	Install Roller Swage	ST918A-625-1187 and ST919-1187 ST932-P-624 and ST932-C-297 ^[1]
10-60545-107	Install	ST918A-750-1437
10-60545-108	Install Roller Swage Sleeve Swage	ST918A-875-1562 and ST919-1562 ST932-P-874 and ST932-C-485 ^[1] , or RST2530 (V77896) ST928C-18
10-60545-11	Remove Install Roller Swage	ST927C-86 ST918C-2500-3937 ST926A-16
10-60545-110	Install Ball Stake Roller Swage Roller Swage Sleeve Stake	ST918A-190-562 and ST919-562 ST931-190-562 ST932-P-189 ^[1] ST932B-190-562 ST929-1A-190-562
10-60545-111S	Remove Install Roller Swage Anvil Swage Proof Load Test	ST927-1 ST918A-250-656 ST926A-1 or RST1003 (V77896) F72813-1 or ST930C-250-656-1 (Replaces ST930C-1), or RKS4101-4 (V77896) ST30-8783A-18 or ST8783F-0656-16
10-60545-112S	Remove Install Roller Swage	ST927-2 ST918A-312-750 ST926A-3 or RST1005 (V77896)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
10-60545-113S	Remove Install Roller Swage	ST927-4 ST918A-375-812 ST926A-5 or RST1006 (V77896)
10-60545-114S	Remove Install Roller Swage Proof Load Test	ST927-5 ST918A-437-906 ST926A-6 or RST1007 (V77896) ST30-8783A-11 or ST8783F-0906-1
10-60545-115S	Remove Install Roller Swage	ST927-6 ST918A-500-1000 ST926A-7 or RST1009 (V77896)
10-60545-116S	Remove Install Roller Swage	ST927-7 ST918A-562-1093 ST926A-9 or RST1011 (V77896)
10-60545-117S	Remove Install Roller Swage Proof Load Test	ST927-9 ST918A-625-1187 or 65-44834-F6 ST926A-11 or RST1013 or RST3013 (V77896) ST30-8783A-6 or ST8783F-1187-1
10-60545-118S	Remove Install Roller Swage	ST927-10 ST918A-750-1437 ST926A-13 or RST1016 or RST3016 (V77896)
10-60545-119S	Remove Install Roller Swage	ST927-11 ST918A-875-1562 ST926A-14 or RST1017 or RST3017 (V77896)
10-60545-120S	Remove Install Roller Swage	ST927-12 ST918A-1000-1750 ST926A-15 or RST1019 or RST3019 (V77896)
10-60545-121S	Roller Swage	ST926A-16
10-60545-123	Install Roller Swage	ST918C-750-2125 ST932-P-749 and ST932-C-266 ^{*[1]}
10-60545-124	Remove Install Sleeve Swage	RKC7295 (V77896) ST918A-1250-2000 ST928C-21 or RST2588 ^{*[4]}
10-60545-127	Install Point Stake	ST918A-1000-1375 ST925-1000-1375
10-60545-134	Install	ST918A-1375-2562 and ST919-2562
10-60545-136	Remove Install Roller Swage	F80197-1 ST918A-250-625 TBD

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
10-60545-140S	Remove Install Roller Swage Proof Load Test	ST927-6 ST918A-500-1000 ST926A-7 or RST1009 (V77896) ST30-8783A-9 or ST8783F-1000-1
10-60545-140SA	Remove Install Roller Swage Proof Load Test	ST927-6 ST918A-500-1000 ST926A-7 or RST1009 (V77896) ST30-8783A-9 or ST8783F-1000-1
10-60545-141S	Remove Install Roller Swage	ST927-8 ST918A-562-1125 ST926A-10 or RST1004 (V77896)
10-60545-141SA	Remove Install Roller Swage	ST927-8 ST918A-562-1125 ST926A-10 or RST1004 (V77896)
10-60545-142S	Remove Install Roller Swage	ST927-3 ST918A-312-687 ST926A-4
10-60545-143	Install	ST918A-3500-4875
10-60545-143S	Remove Install Roller Swage Anvil Swage	ST927-1 ST918A-250-656 ST926A-2 or RST1002 (V77896) ST930C-250-656-1(Replaces ST930C-1) or RKS4101-4 (V77896)
10-60545-144	Remove Install Roller Swage	ST927-6 ST918A-500-1000 ST932-P-499 and ST932-C-203 ^{*[1]}
10-60545-144S	Remove Install Roller Swage	ST927C-83 ST918A-1500-2437 F80113-34, -50, -64 or -105
10-60545-145	Install Roller Swage	ST918A-1562-2312 ST932-1562-2312 ^{*[1]}
10-60545-145S	Remove Install Roller Swage	ST927-9 ST918A-625-1187 ST926A-12 or F80113-1, -34, -50, -64 or -105, or RST1014 or RST2614 (V77896)
10-60545-146S	Remove Install Roller Swage	ST927C-82 ST918A-1250-2375 F80113-34, -50, -64 or -105, or ST926F-34, or RST2044 or RST2736 or RST2859 (V77896)
10-60545-147S	Remove Install Roller Swage	ST927-4 ST918A-375-812 ST926A-5 or RST1006 (V77896)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
10-60545-148	Remove Install Roller Swage	ST927C-121 ST918C-875-1750 F80118-1
10-60545-149	Remove Install Roller Swage	ST927-1 ST918A-625-1187 and ST919-1187 ST932-P-624 and ST932-C-297 ^{*[1]} ; or ST926A-19
10-60545-149S	Remove Install Roller Swage	ST927C-7 ST918A-1250-2094 ST926A-19 or RST2656 (V77896)
10-60545-150	Ball Stake Roller Swage	ST925-156-468, ST931-156-468, or ST931D-156-468 ST932-156-468 ^{*[1]}
10-60545-150S	Remove Roller Swage	ST927-11 F80113-34, -50, -64 or -105, or RST2618 (V77896)
10-60545-151	Remove Install Roller Swage	ST927C-6 ST918A-1500-2000 and ST919-2000 F80113-1, -34, -50, -64 or -105
10-60545-151S	Remove Install Roller Swage	ST927B-37 ST918A-375-1000 F80113-1, -34, -50, -64 or -105
10-60545-154S	Remove Install Roller Swage	ST927C-4 ST918A-1250-1700 F80113-1, -34, -50, -64 or -105
10-60545-155S	Remove Install Roller Swage	ST927C-6 ST918A-1500-2000 F80113-1, -34, -50, -64 or -105
10-60545-156S	Remove Install Roller Swage	ST926E-63ST927C-14 ST918A-2000-2420 F80113-1, -34, -50, -64 or -105
10-60545-157S	Remove Install Roller Swage	ST927-6 ST918A-500-1000 ST926A-8 or F80113, or RST1010 or RST2610 (V77896)
10-60545-158S	Remove Install Roller Swage	2MIT65B02070 ST918A-2256-2875 2MIT65B02070 or RST4046 (V77896)
10-60545-159S	Remove Roller Swage	ST927B-55 ST926A-21 or RST1000 (V77896)
10-60545-161S	Remove Install Roller Swage	ST927C-12 ST918A-1625-2250 ST926E-53

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
10-60545-163S	Remove Install Roller Swage Proof Load Test	ST927C-81 ST918A-1000-1875 F80113-1, -34, -50, -64 or -105 ST30-8783A-2 or ST8783F-1875-1
10-60545-163SA	Remove Install Roller Swage Proof Load Test	ST927C-81 ST918A-1000-1875 F80113-1,-34,-50, -64 or -105 ST30-8783A-2 or ST8783F-1875-1
10-60545-164S	Remove Install Roller Swage	ST927-1 ST918A-250-656 ST926A-1 or RST2455 (V77896)
10-60545-165	Remove Install Point Stake	ST927-4 ST918A-375-812 ST925-375-812
10-60545-166S	Remove Install Roller Swage Anvil Swage	ST927-1 ST918A-250-656 ST926A-2 or RST1002 (V77896) ST930C-250-656-1 (Replaces ST930C-1), or RKS4101-4 (V77896)
10-60545-167S	Remove Install Roller Swage Anvil Swage	ST927-1 ST918A-250-656 ST926A-1 or RST1002 (V77896) ST930C-250-656-1 (Replaces ST930C-1), or RKS4101-4 (V77896)
10-60545-200S	Remove Install Roller Swage Proof Load Test	ST927-6 ST918A-500-1000 ST926A-7, or -8, or F80113-1, -34, -50, -64 or -105 ST30-8783A-8 or ST8783F-1000-1
10-60545-201S	Remove Install Roller Swage Proof Load Test	ST927-9 ST918A-625-1187 ST926A-12 ST30-8783A-62 or ST8783F-1187-1
10-60545-202S	Remove Install Roller Swage	ST927-1 ST918A-250-656 ST926A-2
10-60545-203S	Remove Install Roller Swage Proof Load Test	ST927-4 ST918A-375-812 ST926A-5 or RST2633 (V77896) ST30-8783A-20 or ST8783F-0812-1
10-60545-204S	Remove Roller Swage	ST927C-114 ST926E-156

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
10-60545-205S	Remove Roller Swage Sleeve Swage	ST927C-85 F80117-1 or RST2571 (V77896) F80117-10
10-60545-205SA	Remove Roller Swage Sleeve Swage	ST927C-85 F80117-1, or RST2571 (V77896) F80117-10
10-60545-206S	Remove Install Roller Swage	ST927B-7 ST918A-375-906 ST926E-33 or RST2276 (V77896)
10-60545-207S	Remove Install Roller Swage	ST927C-2 ST918C-625-1375 MIT65B02023, ST926-2-625, or G20001-18, or F80113-1, -34, -50, -64 or -105, or RST1037 (V77896)
10-60545-208S	Remove Roller Swage	ST927B-7 ST926E-33 or RST2276 (V77896)
10-60545-25	Install	ST918A-2501-4875
10-60545-36	Remove Install Roller Swage	F70197-1 ST918A-500-1373 ST926-2-500 or F80113-1, -34, -50, -64 or -105
10-60545-40	Remove Install Roller Swage	ST927C-81 ST918A-1000-1875 F80113-1, -34, -50, -64 or -105
10-60545-42	Install Roller Swage	ST918A-1080-1750 ST932-P-1079 and ST932-C-078 ^{*[1]}
10-60545-43	Remove Roller Swage	ST927C-112 ST926A-18
10-60545-44	Remove	ST927C-113
10-60545-45	Remove Install Roller Swage	ST927-6 or ST927B-56 ST918A-500-1000 ST926A-7 or -8, or F80113-1,-34,-50, -64 or -105, or RST2635 (V77896)
10-60545-48	Install	F72820-1
10-60545-50	Install Roller Swage	ST918A-1562-2312 ST932-1562-2312
10-60545-54	Install Point Stake	ST918A-1000-1750 ST925-1000-1750
10-60545-57	Remove Install Roller Swage	F70197-1 ST918A-375-1375 F80113-1,-34,-50, -64 or -105

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
10-60545-59	Install	ST918A-3000-4750
	Roller Swage	ST926E-111
10-60545-60	Remove	ST927C-17
	Install	ST918A-1500-2687
	Roller Swage	ST926E-70 or RST2046 (V77896)
10-60545-63	Remove	ST927C-19
	Install	ST918A-1750-3000
	Roller Swage	ST926E-84 or RST2048 (V77896)
10-60545-64	Remove	ST927C-10
	Install	ST918A-1250-2250
	Roller Swage	ST926A-22, or F80113-34, -50, -64 or -105, or RST2075 (V77896)
10-60545-66	Remove	ST927C-23
	Install	ST918A-3000-3850
	Roller Swage	ST926E-104 or ST926A-23, or RST2069 (V77896)
10-60545-71	Remove	ST927C-20
	Install	ST918A-1500-3125
	Roller Swage	ST926E-90 or ST926A-24, or RST2305 (V77896)
10-60545-72	Remove	ST927C-84
	Install	ST918A-1750-2500
	Roller Swage	ST926E-130
10-60545-76	Install	ST918C-750-1750
	Roller Swage	ST932-P-749 and ST932-C-078 ^[1]
10-60545-77	Remove	ST927-11
	Roller Swage	F80113-34, -50, -64 or -105, or RST2618 (V77896)
10-60545-78	Install	ST918A-3000-4750
	Roller Swage	ST926E-111
10-60545-82	Remove	ST927-3
	Install	ST918A-312-687
	Roller Swage	ST926A-4
10-60545-87	Remove	ST927C-17
	Install	ST918A-1500-2687
	Roller Swage	ST926E-70 or RST2046 (V77896)
10-61345-1	Install	ST918A-250-750
	Ball Stake	ST931-250-750
10-61846-1	Remove	ST927-11
	Install	ST918A-875-1562
	Roller Swage	ST926A-14 or RST1017 (V77896)
10-61846-2	Remove	ST927C-121
	Install	ST9185-875-1750
	Roller Swage	F80118-1, -34, -50, -64 or -105

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
10-61846-3	Remove Roller Swage	ST927C-121 F80205-1
10-61903-5	Remove Install Roller Swage Proof Load Test	ST927C-82 ST918A-1250-2375 F80113-34, -50, -64 or -105 ST30-8783A-15 or ST8783F-2375-1
10-61905-1	Remove Install Roller Swage	ST927-4 ST918A-375-812 ST926A-5 or RST1006 (V77896)
10-61905-2	Remove Install Roller Swage Proof Load Test	ST927-5 ST918A-437-906 ST926A-6 or RST1007 (V77896) ST30-8783A-22 or ST8783F-0906-1
10-61905-3	Remove Install Roller Swage	ST926A-7ST927-6 ST918A-500-1000 ST926A-7, or RST1009 (V77896)
10-61905-5	Remove Install Roller Swage	ST927-10 ST918A-750-1437 ST927A-13 or RST1016 (V77896)
10-61905-6	Remove Install Roller Swage	ST927B-37 ST918A-375-1000 F80113-1, -34, -50, -64 or -105, or F73012-1
10-61905-7	Remove Install Roller Swage	ST927-1 ST918A-250-656 ST926A-1 or RST1003 (V77896)
10-61970-2	Remove Roller Swage Proof Load Test	ST927C-121 F80205-1 or RST2677 (V77896) ST30-8783A-12 or ST8783F-TBD
10-61970-3	Remove Roller Swage	ST927C-121 F80205 or RST2677 (V77896) or RST2755
10-61970-4	Remove Roller Swage	ST927C-121 C32009-1 or RST2424 (V77896)
10-61970-5	Remove Roller Swage	ST927C-123,-124 and A32091-1848 RST2629 (V77896)
10-61970-6	Remove Roller Swage	ST927C-123,-124 and A32091-1887 RST2630 (V77896)
10-61970-7	Remove Roller Swage	ST927C-123,-124 and A32091-1926 RST2631 (V77896)
10-61975-1	Roller Swage	TBD
10-61975-2	Roller Swage	RST2789 (V77896)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
10-61975-3	Roller Swage	RT-6-312 (V5F899) or RST2566 (V77896)
10-62000-1	Install	ST918A-1000-2250
	Roller Swage	F80113-34 , -50 , -64 or -105
106R	Install	ST918A-500-1000
107-3306-041	Remove	ST927B-49
	Ring Swage	ST930C-375-687
107-3309-072	Remove	ST927B-51
	Ring Swage	ST930C-562-875
117R	Remove	ST927B-36
	Install	ST918A-375-750
	Roller Swage	ST926E-127
12893	Remove	ST927B-36
	Install	ST918A-375-750
	Roller Swage	ST926-123
12897	Remove	ST927C-1
	Install	ST918A-625-1250
	Roller Swage	F80113-1, -34, -50, -64 or -105
12903	Remove	ST927C-80
	Install	ST918C-625-1461
	Ring Swage	F72865-1
140N2623-1	Remove	TBD
	Swage	TBD
140N2623-2	Remove	TBD
	Swage	TBD
140N2623-3	Remove	TBD
	Swage	TBD
140N2623-4	Remove	TBD
	Swage	TBD
140N2623-6	Remove	TBD
	Swage	TBD
140N2623-7	Remove	TBD
	Swage	TBD
141U6047-()	Sleeve Swage	See mating bearing
161A1133-1	Remove	A20011-95
	Swage	A20011-TBD
161A1133-2	Remove	A20011-96
	Swage	A20011-TBD
161A1204-1	Remove	A20011-24
	Swage	A20011-TBD

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
161A1204-3	Remove Swage	A20011-124 A20011-TBD
161A1204-5	Remove Swage	A20011-139 A20011-
161A1211-1	Remove Swage	A20011-97 A20011-33 (30°)
161A1211-2	Remove Swage	A20011-98 A20011-33 (30°)
161A2109-10	Remove Swage	A20011-77 and -8113, or -126 A20011-67 (15°)
161A2109-11	Remove Swage	A20011-77 and -114, or -2, or -127 A20011-67 (15°)
161A4103-1	Remove Swage	A20011-126 A20011-34 (45°)
161T1210-19	Remove Swage	A20011-23 and -36 A20011-31 (15°), -30 (30°)
161T1210-20	Remove Swage	A20011-2 and -9 A20011-67 (15°)
161T1210-56	Remove Swage	A20011-24 and -36 A20011-31 (15°)
161T2043-1	Remove Swage	A20011-3 and -10 A20011-32 (30°)
161T2043-2	Remove Swage	A20011-3 and -10 A20011-32 (30°)
161T2043-3	Remove Swage	A20011-3 and -10 A20011-32 (30°)
161T2043-4	Remove Swage	A20011-3 and -10 A20011-32 (30°)
161T2043-5	Remove Swage	A20011-3 and -10 A20011-32 (30°)
161T2043-6	Remove Swage	A20011-3 and -10 A20011-32 (30°)
161T2043-7	Remove Swage	A20011-3 and -10 A20011-32 (30°)
161W1128-1	Remove Swage	TBD TBD
161W3030-2	Remove Swage	A20011-26 and -38 A20011-33 (15°)

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
161W3033-1	Remove Swage	A20011-27 and -39 A20011-34 (45°)
161W3128-7	Remove Swage	A20011-28 and -39 A20011-34 (45°)
161W3128-8	Remove Swage	A20011-28 and -39 A20011-34 (45°)
161W3228-5	Remove Swage	A20011-28 and -39 A20011-34 (45°)
161W4035-2	Remove Swage	A20011-28 and -39 A20011-33 (15°)
162T3032-1	Remove Swage	A20011-4 and -11 A20011-35 (22.5°)
162W2035-4	Remove Swage	A20011-2 and -9 A20011-34 (45°)
162W2035-7	Remove Swage	TBD TBD
162W2035-8	Remove Swage	A20011-25 and -37 A20011-32 (30°)
22075-78	Install Anvil Swage	ST918A-312-1250 ST929-4-312-1250
251T1362	Sleeve Swage	See mating bearing
251W1221-1	Remove Install Roller Swage	TBD TBD TBD
254W2002-5	Install Roller Swage	ST918C-625-1062 ST932-625-1062-1-2
257U0004-4	Install	ST918D-149F
293W2514-1	Remove Install Roller Swage	ST926G-4000-2252-1875-3988 ST926G-4000-2252-1875-3988 F80113-61 or RST2555 (V77896) or ST926G-4000-2252-1875-3988
293W2514-2	Remove Install Roller Swage	TBD TBD F80113-95 or RST2556 (V77896)
293W2514-3	Remove Install Roller Swage	TBD TBD F80113-95 or RST2556 (V77896)
3-71003	Install	ST918D-680-1000-1140
3NBE514ZP	Install Ball Stake	ST918B-2-190-875 ST931D-190-875

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
3TWF37-46PLY198	Install	TBD
	Ball Stake	TBD
	Roller Swage	TBD
3TWF37-46SLY198	Install	TBD
	Ball Stake	TBD
	Roller Swage	TBD
3TWF37-46ULY198	Install	TBD
	Ball Stake	TBD
	Roller Swage	TBD
3TWF37-465	Sleeve Swage	ST929-1-4
30-1917	Install	ST918D-1470-1750-4
315W3145-10	Install	F70321-7 or ST918A-359-690
4-80142	Install	ST918D-502-627-396
422687	Ring Swage	173-1030-PRDA, V51563
50068	Ring Swage	173-1030-PRDA, V51563
55045	Install	ST918A-500-1000
55393	Remove	ST927C-7
	Install	ST918A-1250-2094
	Roller Swage	ST926A-19
55505	Install	ST918A-500-1000
55510	Remove	ST927B-36
	Install	ST918A-375-750
	Roller Swage	ST926E-127
55530	Remove	ST927C-1
	Roller Swage	F80113-1, -34, -50 or -64
55562	Remove	ST927C-80
	Install	ST918C-625-1461
	Roller Swage (Pressure Swage)	F72865-1
55656	Install	ST918A-190-777
	Roller Swage	ST932-P-189 and ST932-C-092 ^{*[1]}
55699	Remove	ST927C-80
	Install	ST918C-625-1461
	Ring Swage	F72865-1
568A	Install	ST918A-312-1250
	Anvil Swage	ST929-4-312-1250
594	Install	ST918A-312-750
	Roller Swage	ST932-P-311 and ST932-C-078 ^{*[1]}
	Anvil Swage	ST929-4-312-750

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
6-61581	Install Roller Swage	ST918A-1625-1945 ST932-P-1624 and ST932-C-177 ^{*[1]}
6-68012	Install	ST918D-1980-2250-885
6-68012-1	Install	ST918D-1980-2250-885
6-68066	Install	ST918D-1440-1750-1350
6-68066-1	Install	ST918D-1440-1750-1350
60B00178-10	Install Ring Swage Special Jig	ST918A-1375-3500 ST929-2-3500-1375 7MIT65B01500
60B00178-2	Remove	3MIT65B01519
60B00178-4	Install Ring Swage Special Jig	ST918A-2500-4800 ST929-2-4800-2500 4MIT65B01501 or G20004-1
60B00178-5	Install Ring Swage Special Jig	ST918A-3000-5000 ST929-2B-5000-3000 7MIT65B01502 or G20003-15 or G20004-1
60B00178-9	Install	ST918A-2625-3500 and ST919-3500
60B00179-1	Install Ball Stake	ST918A-1437-1875 ST931-1438-1875
60B00179-100	Install Roller Swage	ST918A-1000-1600 ST932-P-999 and ST932-C-503 ^{*[1]}
60B00179-2	Install Ball Stake Roller Swage	ST918A-500-937 and ST919-937 ST931-500-937 ST932-P-499 and ST932-C-172 ^{*[1]}
60B00179-3	Install Roller Swage	ST918A-1250-1687 ST932-P-1249 and ST932-C-047 ^{*[1]}
60B00179-501	Install	ST918C-1000-2000
60B00179-505	Install	ST918A-750-1625
60B00179-506	Install	ST918A-1378-2440
60B00180-1	Remove Install Roller Swage	ST927C-8 ST918A-875-2125 ST926B or ST926B-1B
60B00180-100	Remove Roller Swage	ST927B-53 ST926E-143
60B00180-101	Roller Swage Sleeve Swage	ST928-1500-625 F80118-1
60B00180-102	Remove Roller Swage	ST927B-54 ST926E-147

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
60B00180-103	Remove Install Roller Swage	ST927C-14 and A32091-3188 ST918A-2000-3188 F80113-70 or -88
60B00180-105	Remove Install Roller Swage	ST927C-108 and A32091-3592 ST918A-2125-3592 RST4059 (V77896)
60B00180-106	Remove Install Roller Swage	ST927C-11 or RKC7066 (V77896) ST918A-1375-2250 ST926C-1375-2250-2127 or RST2930 (V77896)
60B00180-107	Remove Install Roller Swage	ST927-4 ST918A-375-812 F80113-50, -64, ST926A-5, or RST1006 or RST3006 (V77896)
60B00180-12	Remove Install Roller Swage	ST927C-22 ST918A-1625-3400 ST926B-12 or ST926B-301B
60B00180-2	Remove Install Roller Swage	ST927C-9 ST918A-1125-2187 ST926B-2 or ST926B-401B
60B00180-20	Remove Roller Swage	ST927C-108 ST926E-136
60B00180-201	Remove	10ME65B02000
60B00180-202	Remove	10ME65B01900
60B00180-203	Remove Install Roller Swage	ST927C-21 ST918A-1876-3187 ST926E-97 or RST2506 (V77896)
60B00180-204	Remove Roller Swage	ST927C-15 F80113
60B00180-205	Remove Roller Swage	ST927C-1 ST926E-151
60B00180-206	Install Roller Swage	ST918A-500-1062 and ST919-1062 ST932-P-499 and ST932-C-235 ^{†[1]}
60B00180-207	Remove Roller Swage	ST918A-500-1218 and ST919-1218 ST932-P-499 and ST932-C-312 ^{†[1]}
60B00180-208	Remove Install Roller Swage	ST927C-18 ST918A-1750-2812 ST926E-77
60B00180-209	Install	ST918A-437-1312 and ST919-1312
60B00180-211	Install Sleeve Swage	ST918A-2500-3937 ST928B-1

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
60B00180-212	Remove Install Roller Swage	ST927B-10 ST918A-375-1154 and ST919-1154 ST926E-48 or RST4049 (V77896)
60B00180-217	Remove	10ME65B02000
60B00180-218	Remove	10ME65B01900
60B00180-219	Install	ST918A-1437-2844
60B00180-222	Install	ST918A-1000-2312
60B00180-224	Install	ST918A-2000-3187
60B00180-225	Install	ST918A-1125-3000
60B00180-226	Install	ST918A-1750-3070
60B00180-227	Remove Roller Swage	ST927C-15 F80113-34, -50, -64 or -105
60B00180-228	Remove Roller Swage	ST927C-15 F80113-37
60B00180-230	Install	ST918A-1500-2502
60B00180-231	Install	ST918A-1375-2856
60B00180-232	Install	ST918A-1312-2590
60B00180-233	Install	ST918A-1500-2582
60B00180-234	Install	ST918A-1625-2647
60B00180-235	Install	ST918A-1625-2964
60B00180-236	Install	ST918A-1500-2722
60B00180-237	Install	ST918A-1625-3182
60B00180-240	Install	ST918A-1750-2890
60B00180-241	Install	ST918A-1750-3339
60B00180-242	Install	ST918A-750-1750
60B00180-243	Install	ST918A-1000-2187
60B00180-244	Remove Roller Swage	A32091-2384 F80113-34, -50, -65 or ST932-1000-2255-1-2
60B00180-245	Install	ST918A-750-1750
60B00180-246	Remove Install Roller Swage	ST927C-82 ST918A-1250-2375 F80113-34,-50, -64 or -105, or ST926F-34
60B00180-247	Remove Roller Swage	A32091-2445 F80113-34, -50, -64 or -105
60B00180-249	Remove Install Roller Swage	ST927C-82 ST918A-1250-2375 F80113-34,-50, -64 or -105, or ST926F-34

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
60B00180-25	Remove Install Roller Swage	ST927C-19 ST918A-1750-3000 ST926E-84 or RST2048 (V77896)
60B00180-250	Remove Install Roller Swage	ST927C-22 ST918A-1625-3410 F80113-88
60B00180-251	Remove Install Roller Swage	ST927C-22 ST918A-1625-3410 ST926B-320B or F80113-88
60B00180-252	Remove Install Roller Swage	A32091-2466 ST918A-1375-2466 F80113-37
60B00180-253	Remove Install Roller Swage	A32091-2830 ST918A-1750-2830 TBD
60B00180-254	Remove Install Roller Swage	A32091-2466 ST918A-1375-2466 F80113-37
60B00180-255	Remove Install Roller Swage	A32091-2830 ST918A-1750-2830 TBD
60B00180-27	Remove Roller Swage	ST927C-21 ST926E-97 or F80113-70 or -88, or RST2506 (V77896)
60B00180-271	Roller Swage	F80113-70 or -88
60B00180-272	Roller Swage	F80113-70 or -88
60B00180-29	Remove Roller Swage	ST927C-21 ST926E-97 or F80113-70 or -88, or RST2506 (V77896)
60B00180-291	Roller Swage	F80113-70 or -88
60B00180-293	Roller Swage	F80113-70 or -88
60B00180-3	Remove Install Roller Swage	ST927C-16 ST918A-1250-2500 ST926B-3 or ST926B-201B
60B00180-300	Remove Roller Swage	ST927C-5 and ST918A-1250-2000 F80113-1 , -34, -50 , -64 or -105, or ST926E-162 or RST2453 (V77896)
60B00180-301	Remove Roller Swage	ST927C-11 F80113-34, -50, -64 or -105
60B00180-302	Remove Roller Swage Proof Load Test	2MIT65B90361 MIT65B90361 ST30-8783A-48 or ST8783F-TBD

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
60B00180-303	Remove Install Roller Swage	ST927B-4 ST918A-350-625 ST926E-18
60B00180-304	Remove Install Roller Swage	ST927B-1 ST918A-250-562 ST926E-1
60B00180-305	Remove Roller Swage Proof Load Test	2MIT65B90361 MIT65B90361 ST30-8783A-48 or ST8783F-TBD
60B00180-306	Proof Load Test	ST30-8783A-27 or ST8783F-TBD
60B00180-31	Sleeve Swage Sleeve Line Swage	ST929-1A-1250-2000 ST929-2A-1250-2000
60B00180-326	Remove Roller Swage	TBD TBD
60B00180-327	Remove Roller Swage	TBD TBD
60B00180-328	Remove Roller Swage	TBD TBD
60B00180-329	Remove Roller Swage	TBD TBD
60B00180-332	Remove Install Roller Swage	A32091-1437 ST918A-750-1437 F80113-1, -34, -50, -64 or -105, or ST926-3-3A-750
60B00180-333	Proof Load Test	ST30-8783A-27 or ST8783F-TBD
60B00180-351	Proof Load Test	ST30-8783A-28 or ST8783F-TBD
60B00180-36	Remove Roller Swage	B32066-4, -5, -7 B32066-3, -6, -8
60B00180-37	Proof Load Test	ST30-8783A-32 or ST8783F-TBD
60B00180-38	Remove Roller Swage Proof Load Test	A32091-3500 F80113-88 ST30-8783A-40 or ST8783F-3500-1
60B00180-39	Roller Swage	ST926B-601B or ST926E-172 or RST2544 (V77896)
60B00180-40	Roller Swage Proof Load Test	ST926A-28 or RST2374 (V77896) ST30-8783A-52 or ST8783F-TBD
60B00180-43	Remove Roller Swage	A32091-4110 and ST927C-131 F80113-44 or -61
60B00180-46	Install Roller Swage	ST918C-375-946 F80113-1, -34, -50, -64 or -105

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
60B00180-48	Remove Roller Swage	A32091-4125 and ST927C-131 F80113-44 or -61
60B00180-49	Remove Roller Swage	A32091-4145 and ST927C-131 F80113-44 or -61
60B00180-50	Remove Roller Swage	A32091-4165 and ST927C-131 F80113-44 or -61
60B00180-51	Remove Roller Swage	A32091-3985 F80113-44 or -61
60B00180-52	Remove Roller Swage	A32091-4015 F80113-44 or -61
60B00180-53	Remove Roller Swage	A32091-3530 TBD
60B00180-54	Remove Roller Swage	A32091-3560 TBD
60B00180-62 ^{*[4]}	Remove Install	A32091-1562 ST918A-750-1562
60B00180-68	Proof Load Test	ST30-8783A-61 or ST8783F-TBD
60B00180-70	Remove Roller Swage	A32091-3860 TBD
60B00180-71	Remove Roller Swage	A32091-3890 F80113-44 or -61
60B00180-72	Remove Roller Swage	A32091-3830 TBD
60B00180-73	Remove Roller Swage	A32091-3860 TBD
60B00180-74	Remove Roller Swage	A32091-3890 F80113-44 or -61
60B00180-75	Remove Roller Swage	A32091-4045 F80113-44 or -61
60B10024-6	Install Roller Swage	ST918C-875-1750 ST932-P-874 and ST932-C-078 ^{*[1]}
60B10024-7	Remove	ST927B-3
60B80067-1	Install Roller Swage	ST918A-562-1625 ST926C-562-1625-1550
60B80067-15	Install	ST918A-1500-2687
60B80067-17	Remove Install Roller Swage	ST927C-20 ST918A-1500-3125 ST926E-90 or ST926A-24

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
60B80067-2	Remove Install Roller Swage	ST927-10 ST918A-750-1437 ST926C-750-1437-1362
60B80067-3	Remove Install Roller Swage	ST927-11 ST918A-875-1562 ST926C-875-1562-1487 or RST1018 (V77896)
60B80067-4	Install Roller Swage	ST918A-1375-2375 ST926C-1375-2375-2301
60B80067-5	Install Roller Swage	ST918A-1125-2375 ST926C-1125-2375-2300
60B80067-7	Install	ST918A-1500-2687
60B80067-9	Install	ST918A-1250-2375
60B90021-1	Remove Install Roller Swage	ST927C-127 ST918A-1000-1625 ST926E-175
60B90143-1	Remove Install Roller Swage	ST927B-35 ST918A-315-656 ST926E-119 or RST2542 (V77896)
60B96203-1	Remove Install Roller Swage	ST927B-3 ST918A-250-625 ST926E-17
60B96213-1	Remove Install Roller Swage	ST927-6 ST918A-500-1000 ST926A-7 or F80113
60B96215-1	Remove Roller Swage	ST927B-5 ST926E-22
60B97202-1	Remove Roller Swage	ST927B-9 ST926E-43
60B97203-1	Remove Roller Swage	ST927B-6 ST926E-28
60B97204-1	Remove Roller Swage	ST927B-2 ST926E-8
60B97206-1	Remove Roller Swage	ST927B-3 ST926E-17 or MIT65B97208
60B97207-1	Remove Roller Swage	MIT65B97321 MIT65B97321
60B97208-1	Remove Roller Swage	MIT65B97321 MIT65B97321

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
60B98100-1	Remove	ST927B-1
	Install	ST918A-250-562
	Roller Swage	ST926E-1
60B98101-1	Remove	ST927B-4
	Install	ST918A-350-625
	Roller Swage	ST926E-18
65-44531-2	Install	ST918A-250-750
65-46150-25	Remove	A20011
	Swage	A20011
65-49529-5	Sleeve Swage	See mating bearing
65-54852-3	Install	ST918D-312-438-500
65-54855-12	Install	ST918D-562-689-250
65-54855-19	Install	ST918D-190-313-130
65-67747-4	Install	ST918D-312-438-500
65B07347-26	Remove	ST927B-5
	Anvil Swage	ST930C-437-750
65B07347-27	Remove	TBD
	Anvil Swage	ST930C-1250-1562
65B08377-4	Install	ST918D-66
65B08377-6	Install	ST918D-149F
65B1934-3	Sleeve Swage	See mating bearing
66-12688-1	Remove	TBD
	Swage	TBD
66-13255-1	Install	ST918D-1256-1432-590
66-16933-1	Stake	ST922C-3
66-25126	Install	ST918D-300-439-410
66-26136	Sleeve Swage	See mating bearing
69-35551-1	Roller Swage	ST932-1170-1580-2 ^{*[1]}
69-35552-1	Install	ST918D-1170-1430-526
	Roller Swage	ST932-1170-1580-2 ^{*[1]}
69-35553-1	Install	ST918D-1170-1430-526
	Roller Swage	ST932-1170-1580-2 ^{*[1]}
69-38919- ()	Sleeve Swage	See mating bearing
69-41384-3	Install	ST918D-39
69-45425-1	Install	ST918D-812-1125-665
69-56022-1	Install	ST918D-450-625-490

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
69-57619-1	Remove Install Roller Swage	ST927B-36 ST918A-375-750 ST926E-123
69-57622-1	Remove Install Roller Swage	ST927C-1 ST918A-625-1250 F80113-1, -34, -50, -64 or -105
69-57625-1	Remove Install Roller Swage	ST927C-80 ST918C -625-1461 F72865-1
69-57643-1	Remove Install Roller Swage	ST927-4 ST918A-375-812 ST926A-5
69-60125	Install	ST918D-75F
69-66801-3	Install Roller Swage	ST918A-1000-2250 F80113-34 or -50
69B00348-1,-2	Special Jig	MIT65B05338
69B00349-1,-2	Special Jig	MIT65B05336
69B00363-1, -2	Special jig	2MIT65B05370
69B01706- ()	Sleeve Swage	See mating bearing
69B13387-1	Sleeve Swage	G32019
69B13953-2	Remove Roller Swage	ST927A or ST927C-13 ST926B-20 or ST926B-501B
69B15036-1	Install Roller Swage	ST918A-375-812 and ST919-812 ST932-375-812 ^{*[1]}
69B15036-2	Install	ST918A-500-1000 and ST919-1000
69B15036-3	Install	ST918A-625-1187 and ST919-1187
69B16554-1	Anvil Swage	ST922-5
69B17663-1	Remove Roller Swage	ST927C-15 F80113
69B17663-2	Remove Roller Swage	ST927C-18 ST926E-77
69B80027-1	Sleeve Swage	ST929-2B-5000-3000
69B82080-2	Roller Swage	TBD
69B94365-1,-2	Roller Swage	ST926E-169
78245	Install Ball Stake Ball Stake Roller Swage	ST918A-250-625 and ST919-625 ST931-250-625 ST931D-250-625 ST932-P-249 and ST932-C-016 ^{*[1]}

20-50-03



STANDARD OVERHAUL PRACTICES MANUAL

Table 11: Bearing Replacement Tools (Continued)

BEARING PART NO.	OPERATION	TOOL PART NUMBER
78910-06-041	Remove	ST927B-49
	Ring Swage	ST930C-375-687
78910-09-072	Remove	ST927B-51
	Ring Swage	ST930C-562-875
814U6619-1	Remove	TBD
	Install	TBD
	Anvil Swage	TBD
	Roller Swage	TBD
814U6619-2	Remove	TBD
	Install	TBD
	Anvil Swage	TBD
	Roller Swage	TBD
814U6619-3	Remove	TBD
	Install	TBD
	Anvil Swage	TBD
	Roller Swage	TBD

*[1] The ST932-C and ST932-P tool codes are now obsolete. When you make an order for a tool, use the code ST932-WWW-XXX-Y-Z. The first two dash number elements (-WWW-XXX) are the same as for the ST918 tool; see Paragraph 10.B.(2) for the last two elements (-Y-Z) and more data.

*[2] These are BACB10B-series bearings with H code for E52100 steel. (There is no BACB10BH standard.)

*[3] This tool has two different dash number systems. See Table 6 for more data.

*[4] This bearing does not have a swaging groove.

20-50-03