Temporary Maintenance Instruction
TMI109-544

Tail Rotor Rotating Controls Half-Scissors Remove and Install Procedure

A109C / A109K2 / A109K2 from S/N 10001 to 10015, S/N 10027 / A109E / A109S / A109S with Trekker Kit/ AW109SP / AW109SP-REGA / A109LUH / A109LUHS / A109LUHNZ / A109LUHAG / A109LUHAP / A109LUHN / A109LOH / A109BAi Helicopters

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The present TMI will be evaluated for its introduction in the standard set of Technical Publication.
If no further notice is received, the present document expires on 08th,August 2025

2024-08-05

Introduction

The aim of this TMI is to provide instructions to remove and install the Tail Rotor Rotating Controls with a detail of the half-scissors group installation.

This TMI is composed by the following annexes:

- Annex 1 - Torque wrenches – Operation
- Annex 2 - Threaded fasteners – Tighten procedure
- Annex 3 – A109LUH - A109LUHS - A109LUHNZ - A109LUHAG - A109LUHAP - A109LUHN - A109LOH – Rotating controls – Remove procedure
- Annex 4 – A109LUH - A109LUHS - A109LUHNZ - A109LUHAG - A109LUHAP - A109LUHN - A109LOH Rotating controls – Install procedure
- Annex 5 – A109S/AW109SP- Scissors group – Remove Procedure
- Annex 6 – A109S/AW109SP- Scissors group – Install Procedure
- Annex 7 – A109S/AW109SP - Scissors group – Disassemble procedure
- Annex 8 – A109S/AW109SP - Scissors group – Assemble procedure
- Annex 9 – A109E - 64-31-6. Removal/installation (Sleeve assy P/N 109-0130-94)
- Annex 10 – A109E - 64-31-6C. Removal/installation (Sleeve assy P/N 109G6430A03)
- Annex 11 – A109K2 - 64-30-5. Removal/installation (Sleeve assy P/N 109-0130-94). [1]
- Annex 12 – A109K2 - 64-30-5A. Removal/installation (Sleeve assy P/N 109G6430A03) [1]
- Annex 13 – A109C - 64-30-3.Removal/installation
- Annex 14 – A109BAi – 2-4-12-6-3 Removal , 2-4-12-6-6 Installation

NOTES:

[1] The procedure is applicable also to A109K2 from S/N 10001 to 10015, S/N 10027

The aim of this TMI is to provide instructions to remove and install the Tail Rotor Rotating Controls with a detail of the half-scissors group installation.

All the information reported in the subsequent pages will be updated in the next IETP revision, Data Module:

DATA MODULE CODE	DATA MODULE TITLE	MODEL
CSPP-A-20-40-00-01A-100A-D	Torque wrenches - Operation	All
CSPP-A-20-40-00-02A-711A-D	Threaded fasteners - Tighten procedure	All
09-A-64-31-00-00A-520A-A	Rotating controls - Remove procedure	A109LUHS
09-A-64-31-00-00A-720A-A	Rotating controls - Install procedure	A109LUHS
09-A-64-31-00-00A-520A-A	Rotating controls - Remove procedure	A109LUHNZ
09-A-64-31-00-00A-720A-A	Rotating controls - Install procedure	A109LUHNZ
09-A-64-31-00-00A-520A-A	Rotating controls - Remove procedures	A109LUH
09-A-64-31-00-00A-720A-A	Rotating controls - Install procedures	A109LUH
09-A-64-31-00-00A-520A-A	Rotating controls - Remove procedure	A109LOH
09-A-64-31-00-00A-720A-A	Rotating controls - Install procedure	A109LOH
09-A-64-31-00-00A-520A-A	Rotating controls - Remove procedure	A109LUHAP
09-A-64-31-00-00A-720A-A	Rotating controls - Install procedure	A109LUHAP
09-G-64-31-00-00A-520A-A	Mécanisme de changement de pas - Procédure de dépose	A109LUHAG
09-G-64-31-00-00A-720A-A	Mécanisme de changement de pas - Procédure d'installation	A109LUHAG
0A-A-64-31-00-00A-520A-A	Rotating controls - Remove procedures	A109LUHN
0A-A-64-31-00-00A-720A-A	Rotating controls - Install procedures	A109LUHN
0B-A-64-31-02-00A-520A-A	Scissors group - Remove procedure	A109S/AW109SP
0B-A-64-31-02-00A-530A-B	Scissors group – Disassemble procedure	A109S/AW109SP
0B-A-64-31-02-00A-710A-B	Scissors group – Assemble procedure	A109S/AW109SP
0B-A-64-31-02-00A-720A-A	Scissors group – Install procedure	A109S/AW109SP
64-31-6	Removal/installation (Sleeve assy P/N 109-0130-94)	A109E
64-31-6C	Removal/installation (Sleeve assy P/N 109G6430A03)	A109E
64-30-5	Removal/installation (Sleeve assy P/N 109-0130-94)	A109K2
64-30-5C	Removal/installation (Sleeve assy P/N 109G6430A03)	A109K2
64-30-3	Removal/installation	A109C
2-4-12-6-3	Removal	A109BAi
2-4-12-6-6	Installation	A109BAi

The content of this TMI will be endorsed within the applicable Maintenance Manual at the earliest opportunity.

Annex 1

Torque wrenches – Operation

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References

Table 1 References

Data Module	Title
CSPP-A-20-40-00-02A-711A-D	Threaded fasteners – Tighten procedure

Description

1. Use of torque wrench to torque threaded fasteners

1.1. Torque wrench with concentric-type adapter

Refer to Fig 1.

1.2. Torque wrench with non-concentric-type adapter

Refer to Fig 2.

With a non-concentric-type adapter, the point of application of the force has effects on the torque applied to the fastener. Refer to Fig 3 for proper and improper application of the force and their effects.

2. Use of wrench-arc to torque threaded fasteners

2.1. Preliminary instructions

There are four basic procedures to tighten at different degrees: 15°, 30°, 60° and 120°, 90° and 180°. There is also an alternate procedure for the 15° wrench-arc position.

Before you tighten the nut, make sure that all the threads an all the sealing and mating surfaces are clean and free of nicks, burrs and scratches.

Before you start the torque procedure, make sure that the nut is seated tight and not torqued.

The procedures that follow are intended to be done with an open-end wrench with 15° offset angled heads. As alternative, you can use a torque angle gauges adapter to measure the arc.

The nut is tight when:

— You feel a great increase of resistance (more than the run-on torque)

— The parts are properly coupled

— There is no looseness between the mating parts.

2.2. 15° wrench-arc tighten procedure (preferred method)

Refer to Sheet 1 of Fig 4 (View A).

1. Tighten the nut with the open-end wrench.
2. Put the wrench on the nut and set a line of sight in relation to the handle of the wrench.
3. Turn the wrench until the flats of the nut (engaged by the wrench) align with the line of sight set in the Para 1.1.

2.3. 15° wrench-arc tighten procedure (alternate method)

Refer to Sheet 1 of Fig 4 (View B).

1. Tighten the nut with the open-end wrench.
2. Put the wrench on the nut and set a line of sight in relation to the flats of the nut engaged by the wrench.

3. Turn the wrench until the handle align with the line of sight set in the Para 1.1.

2.4. 30° wrench-arc tighten procedure

Refer to Sheet 2 of Fig 4 (View C).

1. Tighten the nut with the open-end wrench.
2. Put the wrench on the nut and set a line of sight in relation to the handle of the wrench.
3. Put the wrench in the opposite position on the same flats of the nut.
4. Turn the wrench until the handle align with the line of sight set in the Para 1.1.

2.5. 60° and 120° wrench-arc tighten procedure

Refer to Sheet 3 of Fig 4 (View D).

1. Tighten the coupling nut with the open-end wrench.
2. Use the corners of the coupling nut with reference to the flats of the union to set a reference point.
3. For 60° wrench-arc, turn the wrench until the first flat of the coupling nut aligns with the reference point.
4. For 120° wrench-arc, turn the wrench until the second flat of the coupling nut aligns with the reference point.

2.6. 90° and 180° wrench-arc tighten procedure

Refer to Sheet 4 of Fig 4 (View E and View F).

1. Tighten the coupling nut with the open-end wrench.
2. For 90° wrench-arc, turn the wrench until the handle is perpendicular to its starting position.
3. For 180° wrench-arc, turn the wrench until the handle points in the opposite direction.

3. Torque instructions

This procedure is applicable to all the fasteners with the locking, breakaway and seating torque values indicated.

If it is not differently specified, you must apply the torque to the nut.

“Self-locking” fasteners: set the torque wrench to the FINAL TORQUE value. The measured LOCKING TORQUE value must be between the given MAXIMUM LOCKING TORQUE and MINIMUM BREAKAWAY TORQUE values.

“Non self-locking” fasteners: set the torque wrench to the SEATING TORQUE value indicated.

3.1. Torque definitions

LOCKING TORQUE value: is the torque necessary to move the nut or bolt along its threaded length after it engages the related locking element, but before it is in contact with the parts that it must assemble.

BREAKAWAY TORQUE value: is the torque necessary to loosen the nut or bolt from its non-loaded position with the locking element engaged.

SEATING TORQUE value: is the torque that sets up the required tensile load in the bolt and locks the parts that must be assembled together.

FINAL TORQUE value: it is the sum of the measured LOCKING TORQUE value and the SEATING TORQUE value.

3.2. Torque procedure

After you assemble the fasteners, do the torque procedure as follows:

1. Make sure that:
   - All the threads of the nut or bolt engage with the related locking element
   - The fasteners are not fully in contact with the parts that you must assemble.

Note

Para 2 and Para 3 are applicable to "self-locking" fasteners. For "non self-locking fasteners skip to Para 4.

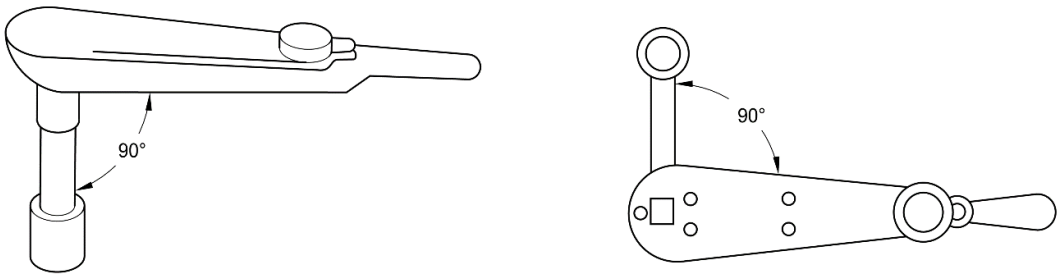
2. With the torque wrench, find and record the LOCKING TORQUE value at which you tightened the nut or bolt. Make sure that the measured value is less than the maximum applicable LOCKING TORQUE value, otherwise discard the nut or bolt.

3. With the torque wrench, loosen the nut or bolt to find the measured BREAKAWAY TORQUE value. Make sure that the measured value is more than the minimum applicable BREAKAWAY TORQUE value, otherwise discard the nut or bolt.

4. Calculate the SEATING TORQUE value as the torque that sets up the required tensile load in the bolt and locks the parts that must be assembled together. The SEATING TORQUE value is indicated in the maintenance procedures otherwise, if not specified, please refer to standard torque value written in CSPP-A-20-40-00-02A-711A-D (See Annex 2 of this TMI).

5. With the torque wrench, torque the nut or bolt to the FINAL TORQUE value. Calculate the FINAL TORQUE as the sum of the SEATING TORQUE plus the LOCKING TORQUE evaluated above. For standard (“non self-locking”) fasteners the FINAL TORQUE value is equal to the SEATING TORQUE value.

6. Safety the nut or bolt as indicated.



THE APPLIED AND INDICATED TORQUE VALUES ARE THE SAME.

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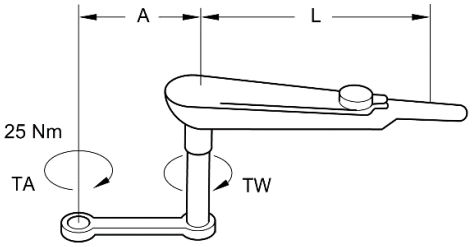
Figure 1 – Torque wrench with concentric-type adapter.

FORMULA TO OBTAIN CORRECT INDICATED TORQUE VALUE WITH NON CONCENTRIC ADAPTER

$$TW = \frac{(TA) \times (L)}{(L) \pm (A)}$$

TW = INDICATED TORQUE VALUE ON TORQUE WRENCH
TA = ACTUAL TORQUE VALUE APPLIED TO FASTENER
L = LEVER LENGTH
A = ADAPTER LENGTH

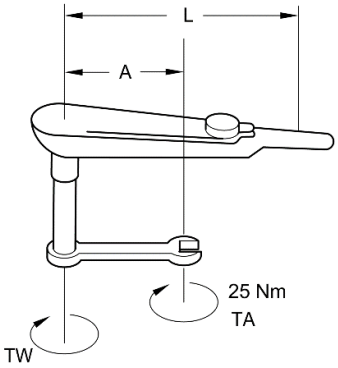
DIMENSIONS
A = 0.05 m
B = 0.04 m
L = 0.30 m



$$TW = \frac{25 \times 0.30}{0.30 + 0.05} = 21.4 \text{ Nm}$$

RESULTS : FASTENER TORQUED TO 25 Nm WHEN WRENCH INDICATES 21.4 Nm

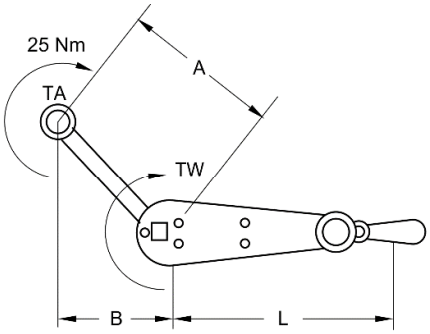
EXAMPLE 1



$$TW = \frac{25 \times 0.30}{0.30 - 0.05} = 30 \text{ Nm}$$

RESULTS : FASTENER TORQUED TO 25 Nm WHEN WRENCH INDICATES 30 Nm

EXAMPLE 2



$$TW = \frac{25 \times 0.30}{0.30 + 0.04} = 22 \text{ Nm}$$

RESULTS : FASTENER TORQUED TO 25 Nm WHEN WRENCH INDICATES 22 Nm

EXAMPLE 3

ICN-CSPP-A-204000-G-00001-00044-A-001-01

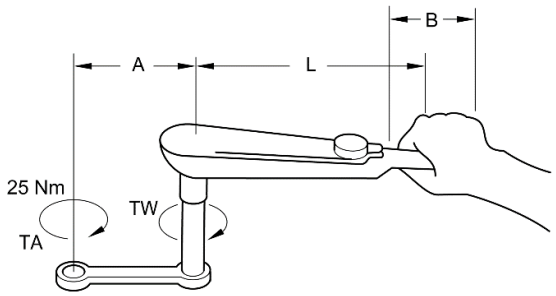
Figure 2 – Torque wrench with non-concentric-type adapter.

FORMULA TO OBTAIN CORRECT
INDICATED TORQUE VALUE WITH
NON CONCENTRIC ADAPTER

$$TW = \frac{(TA) \times (L)}{(L) \pm (A)}$$

TW = INDICATED TORQUE VALUE ON
TORQUE WRENCH
TA = ACTUAL TORQUE VALUE APPLIED
TO FASTENER
L = LEVER LENGTH
A = ADAPTER LENGTH

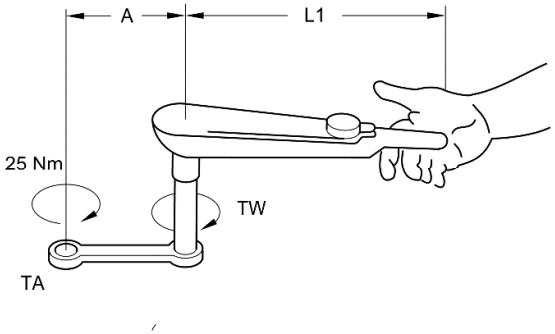
DIMENSIONS
A = 0.05 m
B = 0.10 m
L = 0.30 m
L1= 0.35 m
L2= 0.25 m



$$TW = \frac{25 \times 0.30}{0.30 + 0.05} = 21.4 \text{ Nm}$$

RESULTS : FASTENER TORQUED TO 25 Nm
WHEN WRENCH INDICATES 21.4 Nm

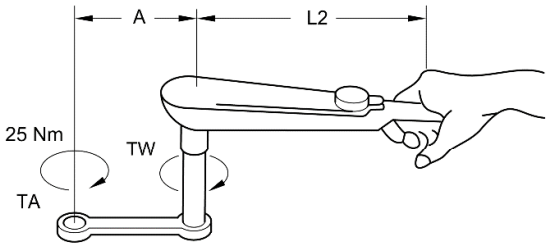
EXAMPLE 1
PROPER APPLICATION OF FORCE



$$TW = \frac{25 \times 0.35}{0.35 + 0.05} = 21.8 \text{ Nm}$$

RESULTS : FASTENER TORQUED TO 25 Nm
WHEN WRENCH INDICATES 21.8 Nm

EXAMPLE 2
IMPROPER APPLICATION OF FORCE



$$TW = \frac{25 \times 0.25}{0.25 + 0.05} = 20.8 \text{ Nm}$$

RESULTS : FASTENER TORQUED TO 25 Nm
WHEN WRENCH INDICATES 20.8 Nm

EXAMPLE 3
IMPROPER APPLICATION OF FORCE

ICN-CSPP-A-204000-G-00001-00045-A-001-01

Figure 3 – Torque wrench with non-concentric-type adapter — Effect of force application point.

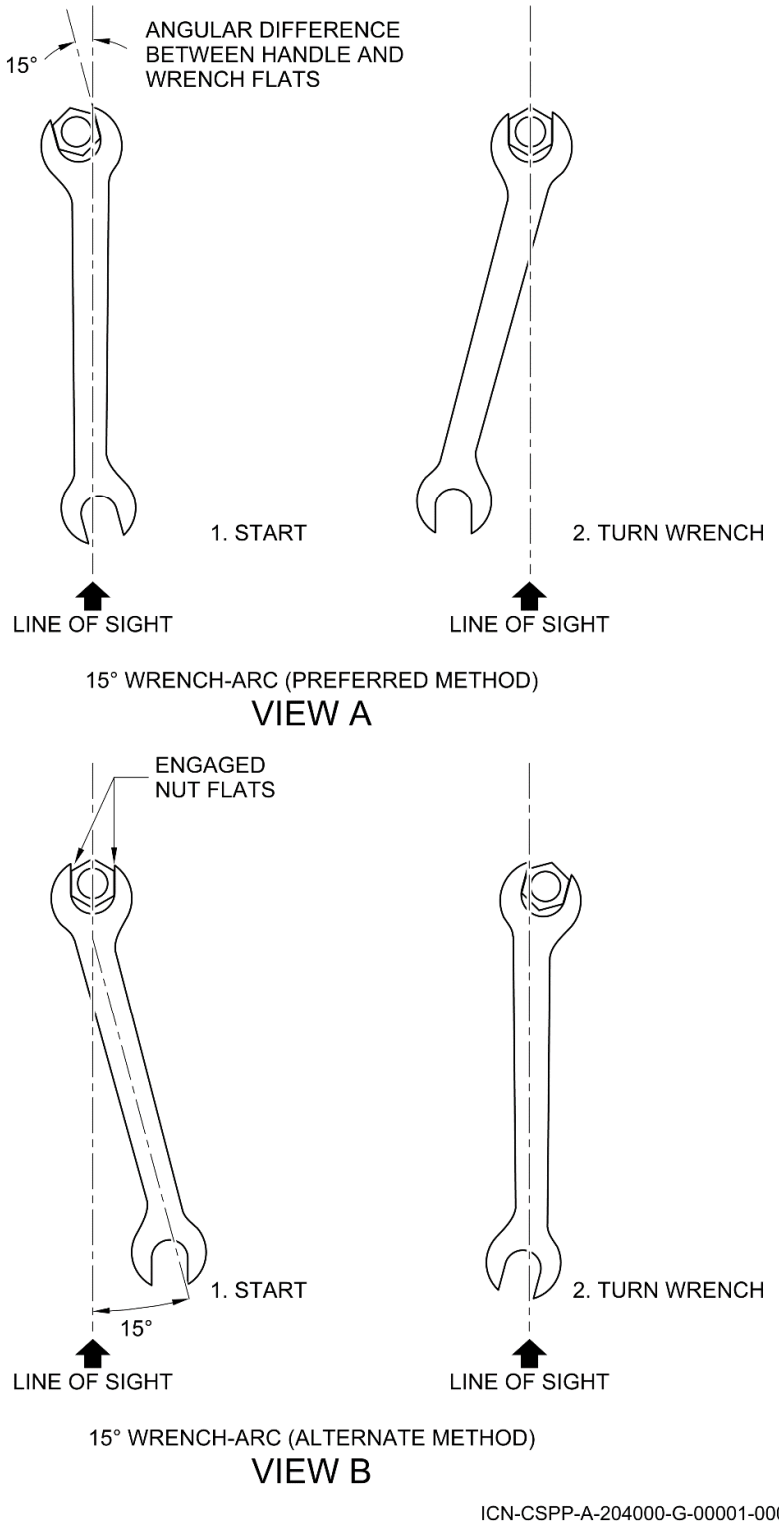


Figure 4 – Wrench-arc method (Sheet 1 of 4).

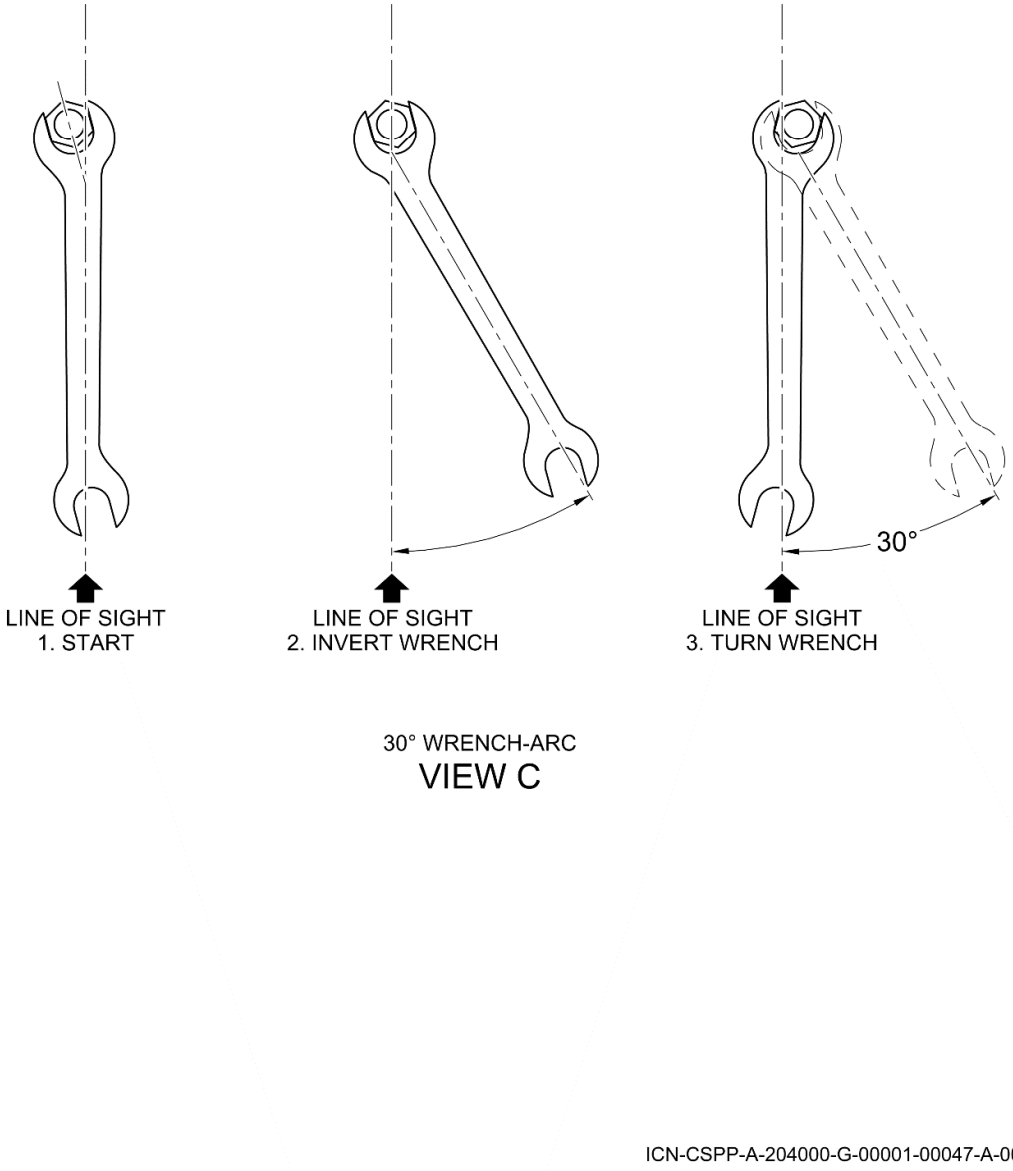


Figure 4 – Wrench-arc method (Sheet 2 of 4).

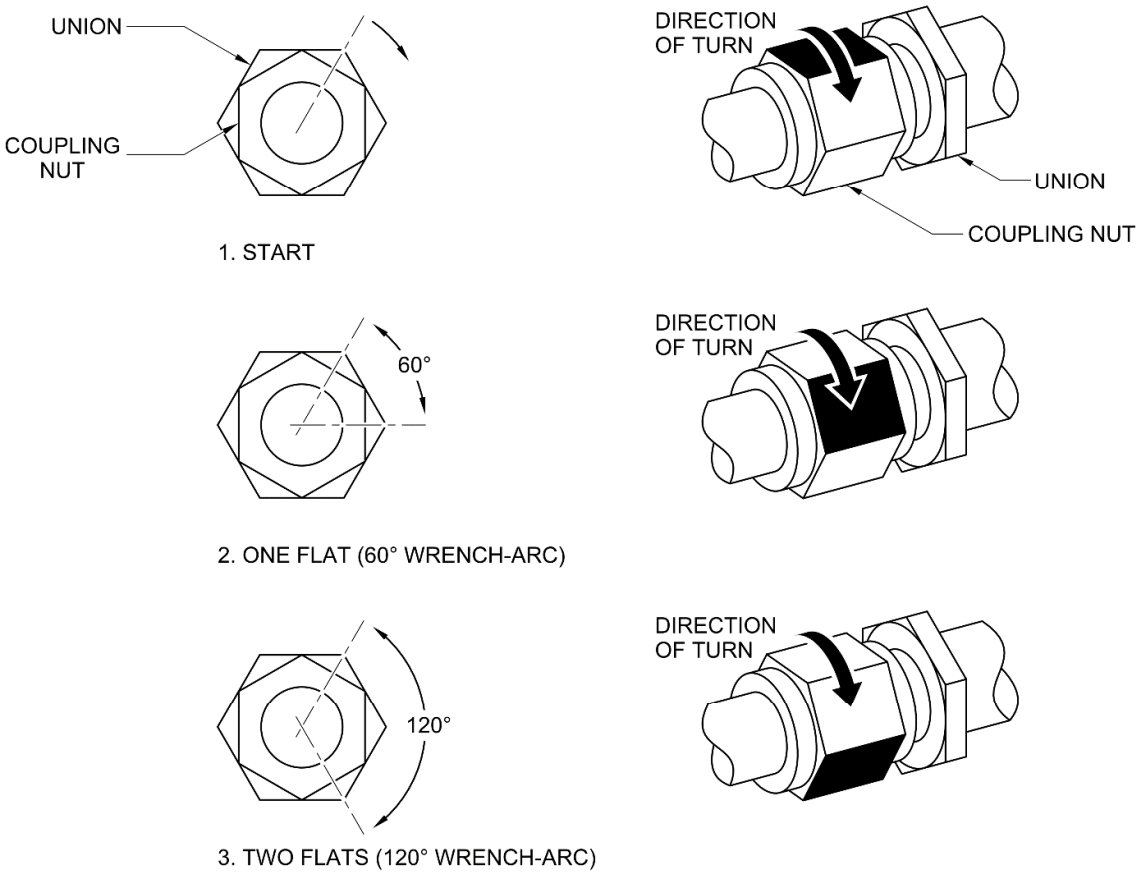
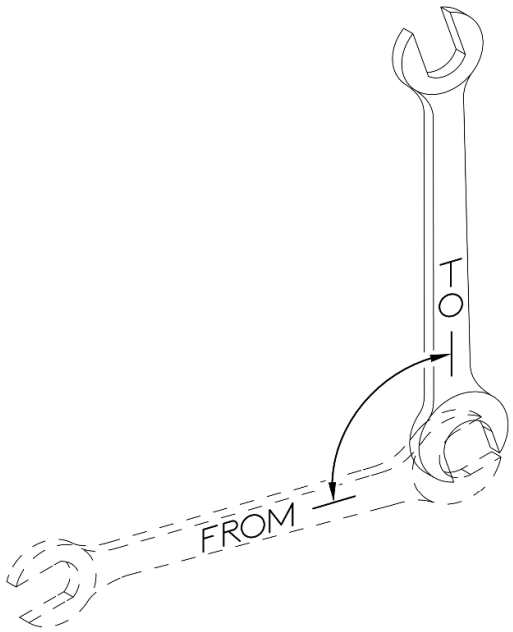
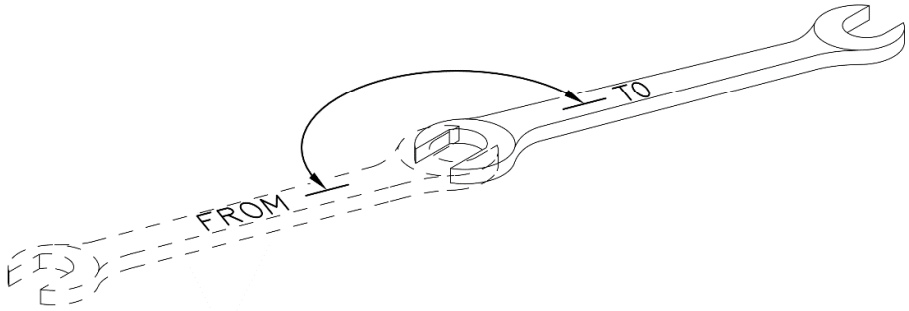


Figure 4 – Wrench-arc method (Sheet 3 of 4).



90° WRENCH-ARC
VIEW E



180° WRENCH-ARC
VIEW F

ICN-CSPP-A-204000-G-00001-00049-A-001-01

Figure 4 – Wrench-arc method (Sheet 4 of 4).

Annex 2

Threaded fasteners – Tighten procedure

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References

Table 1 References

Data Module	Title
CSPP-A-20-40-00-01A-100A-D	Torque wrenches – Operation
CSPP-A-20-40-00-05A-691A-D	Assembled parts (Slippage Marks) – Marking

Description

1. Tighten procedures

1.1. General torque informations

This data module supplies the instructions for tighten procedure of threaded fasteners. When a special or a standard torque is necessary for a threaded fastener, the torque value is specified in the applicable procedure. Use the standard torque you find in this data module, when the procedure does not show the torque value.

For the threaded fasteners of critical installations and of flight control system installation, the related procedure must indicate the Seating Torque or the Final Torque together with the Maximum Installation Torque and Minimum Breakaway Torque, if applicable. Refer to Table 2 for the torque definition.

Note

In the installation procedure, if not specified, the indicated torque is the Seating Torque. The Final Torque must be calculated as the sum of measured Installation Torque plus the Seating Torque indicated.

Table 2 Torque definition

Torque definition	Description
Seating Torque	The torque that creates the necessary tensile force in the threaded fastener and attaches the assembled parts.
Installation Torque (or Locking Torque,or Run Down Torque,or Frictional Lock,or Tare Torque)	The torque necessary to move the nut or bolt along a threaded length after the locking device is engaged and/or any residual torque, before you apply the Seating Torque.
Break Out Torque	The torque necessary to "unseat" or move a fastener, in the opposite direction to tightening, after that the Final Torque is applied.
Breakaway Torque	The minimum torque necessary to loosen the nut by a quarter turn from a non-torqued position with the locking device engaged.
Final Torque	The sum of the Installation Torque plus Seating Torque that gives the necessary attach force.
Maximum Final Torque	The Final Torque plus 5% (if not differently specified in the related installation procedure).
Minimum Final Torque	The Final Torque minus 5% (if not differently specified in the related installation procedure).

2. General assembly and maintenance information

2.1. General data

In the threaded connections, the nuts are usually tightened, not the bolt head. In some installations, not easily accessible or when the anchor or the barrel nuts are installed, it can be necessary to apply an increased final torque corresponding to the bolt shank friction torque. Bolt shank friction must be measured with a torque wrench fitted with an indicator (indicator type torque-wrench). The procedure indicates the tightening of the bolt-head, if the nuts cannot be tightened, refer to Para 2.1.1 for the related instructions.

When not specified differently in the related procedure the torque must be applied at increments in the sequence that follows:

— Torque to 70% Final Torque

— Loosen 1½ turns

— Torque to 100% Final Torque

— Torque again to 100% Final Torque until there are no more movement.

Before assembly, fastener threads shall be cleaned of any temporary protective treatment and tightened in a dry (non lubricated) or wet (lubricated) condition.

If not specified differently, dry assembly is chosen.

If applicable, any remaining sealant must be removed after final assembly.

For critical installations, when a threaded connection is part of a critical Assembly, the Vital Point (VP) is indicated in procedure in the torque-application step.

2.1.1. Tightening of bolts from heads

Bolts that have special torque values and are tightened on the head, must have the torque limit increased by the amount corresponding to the bolt shank friction torque.

Bolt shank friction must be measured with a torque wrench fitted with an indicator (indicator type torque-wrench).

2.2. Use of torque wrenches

Refer to data module CSPP-A-20-40-00-01A-100A-D (See Annex 1 of this TMI).

2.3. Nuts secured with cotter pin

When you tighten the nuts which are secured with a cotter pin, apply the necessary Final Torque in the limits indicated in the applicable torque-value table (when, in the procedure, the Seating Torque is indicated, the Final Torque must be calculated as the sum of the measured Installation Torque plus the Seating Torque):

— When you tighten the nuts, stop the torque load above the Minimum torque value and, if possible, install the cotter pin. If not possible, apply additional torque to get the next cotter-pin hole. Make sure that the torque value is not more than the Maximum torque value indicated.

— It is not permitted to install the cotter pin with the Final Torque more than the Maximum Final torque value, or over-tighten the nut and then loosen it.

— If the nut and cotter pin hole cannot be correctly positioned along the bolt axis by applying the required torque value, the nut shall be removed.

Note

For the flight control system installation, when the torque value is not indicated, refer to the torque values indicated in Para 3 or contact the Design Authority.

2.4. Self-locking nuts

It is not permitted to install self-locking nuts or special double lock-nuts more than one time without the measurement of the Maximum installation torque and Minimum breakaway torque indicated in the related procedure or the applicable torque-value tables. If the indicated torque values cannot be get, the nut must be discarded and replaced.

Self-locking nuts must be assembled without the application of jointing compound or lubrication (dry condition), if not specified differently in the applicable procedure.

2.5. Thread safety limits

After you get the torque value that is 70% final torque, remove the counter-acting wrench and continue to tighten the bolt. If the bolt turns together the nut, check that the bolt is out of the thread safety limits. If necessary, contact the Design Authority.

After the Final torque is applied correctly, the end of the bolt must be not less than the dimension of 1½ full thread pitches from the nut.

2.6. Grip length control

Note

The information given in the paragraphs that follow do not apply to the threaded fasteners of the components of a critical installation with a Vital Point (VP) where the torque check is indicated.

The information that follow apply to the threaded fasteners of all the components of the helicopter if not indicated differently.

2.6.1. General

Because of accumulated tolerance buildups between the structure and the fasteners, grip length adjustment of the bolt or screw is necessary where the grip lengths for standard bolts and screws are used. This adjustment must be done with change of the grip-length of the bolt or screw and/or with the use of flat washers, refer to the data that follow.

2.6.2. Bolts and screws

The standard grip length of bolts and screws can be increased or decreased of only one grip length and only for the reasons that follow:

— To prevent the threads in the structural bearing area. The shanks of structural fasteners must be seated with no threads in the structural bearing area. Do this when the sheet or the fitting adjacent to the nut has a thickness of 2.4 mm (0.094 in) or less. Where the sheet or the fitting adjacent to the nut has a thickness more than 2.4 mm (0.094 in), a maximum of one and half threads (including thread run out) is permitted. Make sure that these threads are not more than 25 % of the total thickness of the structural bearing area.

— To prevent nuts go to the bottom of the bolt or screw shank. The nut threads which engage on the first incomplete thread adjacent to the bolt shank (in a grip oriented fastener), are considered to be bottomed and are not permitted.

— To prevent wrong thread engagement. Full nut thread engagement is required and at least a full turn or chamfer plus a thread pitch of the bolt or screw shall extend from the nut. Bolts and screws with plain ends shall extend through the nut for a minimum length equivalent to two thread pitches.

Note

The grip length adjustment is not permitted where the thread protrusion cannot be seen (studs, fully threaded bolts, or bolts or screws used with inserts, nut plate or barrel nuts).

2.6.3. Washers

Additional washers (NAS1149) of the same alloy as those specified in the related engineering drawing can be used when necessary for the correct installation of nut and cotter pin. Not more than total three washers can be used, two under the nut (for the correct grip length adjustment) and one under the bolt or screw head (for the surface protection), if not specified differently in the related engineering drawing.

If the drawing does not specify the washers position, they can be installed under the item that turns (bolt or screw head or the nut) during tighten operation. The only exception is where one washer is required as material protection under the bolt or screw head.

Note

The replacement of washers (NAS1149) to joints where special washers are installed (chamfered, concave, dissimilar metal, keyed or lock washers) is not permitted.

2.7. V-band clamps installation

For the installation and tightening of V-band clamps refer to the instruction that follow:

— Install the clamp starting to match the v profile between clamp and flanges in the opposite sector of the clamp T-bolt

— Manually wrap the clamp on the flanges

— Measure the Breakaway Torque of the clamp nut

— Set the measured torque as the Installation torque and tighten the nut up to the surface of the clamp boss

— Tap all over the circumference of the clamp using a soft plastic hammer

— Torque again the nut with the same torque value

— Do again the operation until the clamp bolt no longer turns

— Set the wrench to the Final Torque and complete the tightening procedure

— Apply the slippage mark, refer to CSPP-A-20-40-00-05A-691A-D.

Note

The Final torque value is supplied by the clamp manufacturer.

2.8. Vital points

CAUTION

Fasteners of critical installations and flight control installation are flagged with VP (Vital Point).

For the check of the torque value of the threaded fasteners used in Vital Points (VP), these indications are given for the related procedure:

— The maximum Installation Torque and the minimum Breakaway Torque must be measured before the Final Torque is applied. If torque values indicated in procedure cannot be get, the nut or bolt must be replaced.

— To check that the Final Torque is correctly applied to all fasteners of the assembly, at the first application, the current Final Torque must be recorded in the Maintenance history record.

— A Dual inspection must be done. The dual inspection is done before the secondary locking is applied (safety wire, cotter pins, etch)

— The completion of dual inspection must be recorded in the Maintenance history record.

The Maintenance history record includes these data:

— The completion of torque tightening to the necessary torque values,

— The records of dual inspection

— The secondary locking

— The application of slippage marks.

Note

The Grip length control adjustment is not applicable on Vital points. If, in a Vital Point (VP), you find the one of the conditions described in Para 2.6, contact the Design Authority.

3. Torque values for threaded fasteners

3.1. General

The torque values for the threaded fasteners are given in the tables of Fig 1.

The torque values given in the tables are applicable to bolts and screws with different minimum ultimate tensile strengths. Refer to Para 3.2.

Fasteners listed in higher tensile strength categories (sheets 2 thru 5 of Fig 1) may be used in conjunction with fasteners listed in lower tensile strength categories. In those cases the lower category torque range applies, regardless of bolt tensile or nut strength relationship.

3.2. Recommended torque ranges

The torque ranges specified in sheet 1 of Fig 1 are recommended for the indicated nuts on bolts and screws with a minimum ultimate tensile strength of 860 MPa (125000 lbf/in^2).

The torque ranges specified in sheet 2 of Fig 1 are recommended for the indicated nuts on bolts, screws and ring-locked or interference studs with a minimum ultimate tensile strength of 860 MPa (125000 lbf/in^2).

The torque ranges specified in sheet 3 of Fig 1 are recommended for the indicated nuts on bolts and screws with a minimum ultimate tensile strength of 1100 MPa (160000 lbf/in^2).

The torque ranges specified in sheet 4 of Fig 1 are recommended for the indicated nuts on bolts and screws with a minimum ultimate tensile strength of 1240 MPa (180000 lbf/in^2).

The torque ranges specified in sheet 5 of Fig 1 are recommended for the indicated nuts on bolts and screws with a minimum ultimate tensile strength of 1515 MPa (220000 lbf/in^2).

The torque ranges specified in sheet 6 of Fig 1 are recommended for steel and corrosion resisting steel nuts on bolts and screws with a minimum ultimate tensile strength less than 860 MPa (1250000 lbf/in^2).

4. Torque values for studs

The recommended torque values for studs installed with interference are given in the table of Fig 2.

For the torque values of nuts on studs, refer to the table on sheet 2 of Fig 1.

5. Torque values for clamps

The recommended torque range for worm gear clamps on oil, fuel or coolant hose is 2.3 thru 3.3 N m (20 thru 30 lbf in).

The recommended torque range for .1900-32 thread size bolt or screw mounting loop clamps is 1.36 thru 1.69 N m (12 thru 15 lbf in).

6. Torque values for electrical connectors

The installation torque for the connection of mating threaded back accessories shall be obtained by tightening the coupling nut or accessory 1/8 turn past the point of finger tight.

7. Torque values for honeycomb panel inserts

For all bolts coupled with threaded inserts installed on honeycomb panels, refer to the table on Sheet 2 of Fig 1.

8. Torque values for coarse threads

The recommended torque values for coarse threads are given in the table of Fig 3.

9. Index of threaded fasteners

The Table 3 gives the index of the threaded fasteners.

The index lets you find a fasteners in the recommended torque value table when its part number is known.

Table 3 Index of threaded fasteners

Torque definition	Description
48FLW (SPS)	Fig. 1 (sheet 4 of 6)
A106A	Fig. 1 (sheet 1 of 6)
A135A (1)	Fig. 1 (sheet 4 of 6)

Torque definition	Description
A136A (1)	Fig. 1 (sheet 4 of 6)
A258A	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
A389A	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
A407A	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
A423A	Fig. 1 (sheet 2 of 6)
A427A	Fig. 1 (sheet 3 of 6)
A428A	Fig. 1 (sheet 2 of 6)
A436A	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
AN173 thru AN186	Fig. 1 (sheet 1 of 6)
AN173 thru AN186	Fig. 1 (sheet 2 of 6)
AN21 thru 27 (NAS M21 thru 27)	Fig. 1 (sheet 2 of 6)
AN21 thru AN37 (NAS M21 thru 37)	Fig. 1 (sheet 1 of 6)
AN256 (NAS M256)	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
AN3 thru AN20 (NAS M3 thru 20)	Fig. 1 (sheet 1 of 6) - Fig. 1 (sheet 2 of 6)
AN310 (NAS M310)	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
AN315 (NAS M315)	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
AN316 (NAS M316)	Fig. 1 (sheet 2 of 6)
AN320 (NAS M320)	Fig. 1 (sheet 2 of 6)
AN42 thru 49 (NAS M42 thru 49)	Fig. 1 (sheet 2 of 6)
AN42 thru AN49 (NAS M42 thru 49)	Fig. 1 (sheet 1 of 6)
AN502	Fig. 1 (sheet 1 of 6) - Fig. 1 (sheet 2 of 6)
AN525 (NAS M525)	Fig. 1 (sheet 1 of 6) - Fig. 1 (sheet 2 of 6)
EB (ESNA)	Fig. 1 (sheet 4 of 6)
FN22M (SPS)	Fig. 1 (sheet 5 of 6)
LH3393 (ESNA)	Fig. 1 (sheet 5 of 6)
LH3830 (ESNA)	Fig. 1 (sheet 4 of 6)
LH6422t (ESNA)	Fig. 1 (sheet 5 of 6)
LH6520	Fig. 1 (sheet 5 of 6)
LHEB220 (ESNA)	Fig. 1 (sheet 5 of 6)
M87714/1	Fig. 1 (sheet 3 of 6)
M87714/2	Fig. 1 (sheet 3 of 6)
M87714/3	Fig. 1 (sheet 3 of 6)
MA14182 (NAS M14182)	Fig. 1 (sheet 5 of 6)
MS14144 (NAS M14144)	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
MS14145 (NAS M14145)	Fig. 1 (sheet 2 of 6)

Torque definition	Description
MS14156 (NAS M14156)	Fig. 1 (sheet 4 of 6)
MS14157 (NAS M14157)	Fig. 1 (sheet 4 of 6)
MS14163	Fig. 1 (sheet 5 of 6)
MS14164 (NAS M14164)	Fig. 1 (sheet 5 of 6)
MS14181 (NAS M14181)	Fig. 1 (sheet 5 of 6)
MS17825	Fig. 1 (sheet 1 of 6)
MS17826	Fig. 1 (sheet 1 of 6)
MS20004 thru 24 (NAS M20004 thru 24)	Fig. 1 (sheet 3 of 6)
MS20033 thru 20046 (NAS M20033 thru 20046)	Fig. 1 (sheet 2 of 6)
MS20073 (NAS M20073)	Fig. 1 (sheet 1 of 6) - Fig. 1 (sheet 2 of 6)
MS20500	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
MS21025 (NAS M21025)	Fig. 1 (sheet 2 of 6)
MS21042 (NAS M21042)	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6) - Fig. 1 (sheet 4 of 6)
MS21043 (NAS M21043)	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
MS21044 (NAS M21044)	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
MS21047 thru 49 (NAS M21047 thru 49)	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
MS21051 thru 56 (NAS M21051 thru 56)	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
MS21058 thru 62 (NAS M21058 thru 62)	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
MS21069 thru 76 (NAS M21069 thru 76)	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
MS21080 (NAS M21080)	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
MS21083 (NAS M21083)	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
MS21084 (NAS M21084)	Fig. 1 (sheet 5 of 6)
MS21086 (NAS M21086)	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
MS21091	Fig. 1 (sheet 1 of 6) - Fig. 1 (sheet 2 of 6)
MS21133 (NAS M21133)	Fig. 1 (sheet 4 of 6)
MS21134 (NAS M21134)	Fig. 1 (sheet 4 of 6)
MS21225 (NAS M21225)	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
MS21250 (NAS M21250)	Fig. 1 (sheet 4 of 6)
MS21297 (NAS M21297)	Fig. 1 (sheet 5 of 6)
MS24694 (NAS M24694)	Fig. 1 (sheet 1 of 6) - Fig. 1 (sheet 2 of 6)
MS27039 (NAS M27039)	Fig. 1 (sheet 1 of 6) - Fig. 1 (sheet 2 of 6)
MS27576 (NAS M27576)	Fig. 1 (sheet 3 of 6)
MS9088	Fig. 1 (sheet 1 of 6) - Fig. 1 (sheet 2 of 6)
NAS1003 thru 10020	Fig. 1 (sheet 2 of 6)

Torque definition	Description
NAS1021	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
NAS1022	Fig. 1 (sheet 2 of 6)
NAS1023	Fig. 1 (sheet 2 of 6)
NAS1031	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
NAS1033	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
NAS1067	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
NAS1068	Fig. 1 (sheet 2 of 6)
NAS1101	Fig. 1 (sheet 3 of 6)
NAS1102	Fig. 1 (sheet 3 of 6)
NAS1103 thru 1120	Fig. 1 (sheet 3 of 6)
NAS1121 thru 1128	Fig. 1 (sheet 3 of 6)
NAS1131 thru 1138	Fig. 1 (sheet 3 of 6)
NAS1141 thru 1148	Fig. 1 (sheet 3 of 6)
NAS1151 thru 1158	Fig. 1 (sheet 3 of 6)
NAS1161 thru 1168	Fig. 1 (sheet 3 of 6)
NAS1171 thru 1178	Fig. 1 (sheet 3 of 6)
NAS1181 thru 1188	Fig. 1 (sheet 3 of 6)
NAS1189	Fig. 1 (sheet 3 of 6)
NAS1190	Fig. 1 (sheet 3 of 6)
NAS1191	Fig. 1 (sheet 3 of 6)
NAS1202 thru 1210	Fig. 1 (sheet 3 of 6)
NAS1218	Fig. 1 (sheet 3 of 6)
NAS1223 thru 1235	Fig. 1 (sheet 3 of 6)
NAS1266 thru 1270	Fig. 1 (sheet 3 of 6)
NAS1291	Fig. 1 (sheet 3 of 6) - Fig. 1 (sheet 4 of 6)
NAS1297	Fig. 1 (sheet 1 of 6) - Fig. 1 (sheet 2 of 6)
NAS1303 thru 1320	Fig. 1 (sheet 3 of 6)
NAS1351	Fig. 1 (sheet 3 of 6)
NAS1352	Fig. 1 (sheet 3 of 6)
NAS1402 thru 1406	Fig. 1 (sheet 3 of 6)
NAS144 thru 158	Fig. 1 (sheet 3 of 6)
NAS1473	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
NAS1474	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
NAS1580	Fig. 1 (sheet 3 of 6)
NAS1758	Fig. 1 (sheet 5 of 6)

Torque definition	Description
NAS1766	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
NAS1770	Fig. 1 (sheet 3 of 6)
NAS1771	Fig. 1 (sheet 3 of 6)
NAS1773	Fig. 1 (sheet 3 of 6)
NAS1778	Fig. 1 (sheet 3 of 6)
NAS1789	Fig. 1 (sheet 2 of 6)
NAS1791	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
NAS1792	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
NAS1793	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
NAS1801	Fig. 1 (sheet 3 of 6)
NAS1802	Fig. 1 (sheet 3 of 6)
NAS1804	Fig. 1 (sheet 4 of 6)
NAS1805	Fig. 1 (sheet 3 of 6) - Fig. 1 (sheet 4 of 6) - Fig. 1 (sheet 5 of 6)
NAS1870	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
NAS1972 thru 1980	Fig. 1 (sheet 4 of 6)
NAS2803 thru 2810	Fig. 1 (sheet 4 of 6)
NAS333 thru 340	Fig. 1 (sheet 3 of 6)
NAS428	Fig. 1 (sheet 1 of 6) - Fig. 1 (sheet 2 of 6)
NAS464	Fig. 1 (sheet 3 of 6)
NAS509	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
NAS517	Fig. 1 (sheet 3 of 6)
NAS577	Fig. 1 (sheet 3 of 6) - Fig. 1 (sheet 4 of 6)
NAS583 thru 590	Fig. 1 (sheet 3 of 6)
NAS6203 thru 6220	Fig. 1 (sheet 3 of 6)
NAS623	Fig. 1 (sheet 3 of 6)
NAS624 thru 644	Fig. 1 (sheet 4 of 6)
NAS6303 thru 6320	Fig. 1 (sheet 3 of 6)
NAS6402 thru 6420	Fig. 1 (sheet 3 of 6)
NAS6603 thru 6620	Fig. 1 (sheet 3 of 6)
NAS6703 thru 6720	Fig. 1 (sheet 3 of 6)
NAS673 thru 678	Fig. 1 (sheet 3 of 6)
NAS679	Fig. 1 (sheet 2 of 6) - Fig. 1 (sheet 3 of 6)
NAS6803 thru 6820	Fig. 1 (sheet 3 of 6)
NAS7103 thru 7116	Fig. 1 (sheet 3 of 6)

Torque definition	Description
NAS7203 thru 7216	Fig. 1 (sheet 3 of 6)
NAS7303 thru 7316	Fig. 1 (sheet 3 of 6)
NAS7500 thru 7516	Fig. 1 (sheet 3 of 6)
NAS8100 thru 8106	Fig. 1 (sheet 3 of 6)
NAS8200 thru 8206	Fig. 1 (sheet 3 of 6)
NAS8702 thru 8716	Fig. 1 (sheet 3 of 6)
NAS9101 thru 9106	Fig. 1 (sheet 3 of 6)
NAS9201 thru 9206	Fig. 1 (sheet 3 of 6)

	TORQUE RANGE - N m (lbf in - lbf ft *)	
	SHEAR	TENSION
	BOLTS AND SCREWS	
	AN173 thru AN186 MS9088 AN3 thru AN20 (NASM3 thru 20) AN42 thru AN49 (NASM42 thru 49) MS20073 (NASM20073) MS27039 (NASM27039) NAS1297	AN502 MS21091 AN21 thru AN37 (NASM21 thru 37) AN525 (NASM525) MS24694(NASM24694) NAS428
THREAD	NUTS	
	A106A MS17826	MS17825
.1900-32 (10-32)	0.79 - 1.36 (7 -12)	1.36 - 1.69 (12 -15)
.2500-28 (1/4-28)	2.8 - 3.9 (25 - 35)	3.4 - 4.5 (30 - 40)
.3125-24 (5/16-24)	5.6 - 7.9 (50 - 70)	6.8 - 9.6 (60 - 85)
.3750-24 (3/8-24)	7.9 - 10.2 (70 - 90)	10.7 - 12.4 (95 - 110)
.4375-20 (7/16-20)	12.4 - 17.0 (110 - 150)	30.5 - 33.9 (270 - 300)
.5000-20 (1/2-20)	17.0 - 22.6 (150 -200)	32.5 - 46.1 (24 - 34*)
.5625-18(9/16-18)	22.6 - 33.9 (200 - 300)	54 - 68 (40 - 50*)
.6250-18 (5/6-18)	33.9 - 47.5 (300 - 420)	75 - 88 (55 -65*)
.7500-16 (3/4-16)	61 - 84 (45 - 62*)	146 - 169 (108 - 125*)
.8750-14 (7/8-14)	107 - 130 (79 -96*)	169 - 203 (125 - 150*)
1.0000-12 (1-12)	169 - 203 (125 - 150*)	248 - 373 (183 - 275*)
1.1250-12 (1-1/8-18)	282 - 396 (208 -292*)	339 - 475 (250 - 350*)
1.2500-12 (1-1/4-12)	396 - 509 (292 - 375*)	610 - 746 (450 - 550*)

Refer to para. 2-1.

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Figure 1 – Torque values for threaded fasteners (Sheet 1 of 6).

THREAD	TORQUE RANGE - N m (lbf in - lbf ft *)	
	SHEAR	TENSION
	BOLTS, SCREWS AND ALL THREADED STUDS	
	A428 MS9088 AN21 thru 27 (NASM21 thru 37) MS20033 thru 20046 (NASM20033 thru 20046) MS27039 (NASM27039) NAS1297 AN173 thru AN186 MS21091 AN42 thru 49 (NASM42 thru 49) MS20073 (NASM20073) NAS428 AN502 AN3 thru 20 (NASM3 thru 20) AN525 (NASM525) MS24694 (NASM24694) NAS1003 thru 10020	
	NUTS	
	A423A AN316 (NASM316) AN320 (NASM320) MS141545 (NASM14125) MS21025 (NASM21025) MS21083 (NASM21083) NAS1022 NAS1068 NAS1789	A258A A407A MS20500 AN310 (NASM310 MS14144 (NASM14144) MS21043 (NASM21043) MS21047 thru 49 (NASM21047 thru 49) MS21058 thru 62 (NASM21058 thru 62) MS21080 (NASM21080) MS21086 (NASM21086) NAS509 NAS1021 NAS1031 NAS1067 NAS1474 NAS1791 NAS1793 A389A A436A AN256 (NASM256) AN315(NASM315) MS21042 (NASM21042) MS21044 (NASM21044) MS21051 thru 56 (NASM21051 thru 56) MS21069 thru 76 (NASM21069 thru 76) MS21083 (NASM21083) MS21225 (NASM21225) NAS679 NAS1023 NAS1033 NAS1473 NAS1766 NAS1792 NAS1870
.1900-32 (10-32)	1.35 - 1.69 (12 - 15)	2.3 - 2.8 (20 - 25)
.2500-28 (1/4-28)	3.4 - 4.5 (30 - 40)	5.6 - 7.9 (50 - 70)
.3125-24 (5/16-24)	6.8 - 9.6 (60 - 85)	11.3 - 15.8 (100 - 140)
.3750-24 (3/8-24)	10.7 - 12.4 (95 - 110)	18.1 - 21.5 (160 - 190)
.4375-20 (7/16-20)	30.5 - 33.9 (270 - 300)	50 - 57 (37 - 42*)
.5000-20 (1/2-20)	32.5 - 46.1 (24 - 34*)	54 - 79 (40 - 58*)
.5625-18 (9/16-18)	54 - 68 (40 - 50*)	89 - 112 (60 - 83*)
.6250-18 (5/8-18)	75 - 88 (55 - 65*)	123 - 146 (91 - 108*)
.7500-16 (3/4-16)	146 - 169 (108 -125*)	259 - 282 (191 - 208*)
.8750-14 (7/8-14)	169 - 203 (125 - 150*)	282 - 339 (208 - 250*)
1.0000-12 (1-12)	248 - 373 (183 - 275*)	418 - 621 (308 - 458*)
1.1250-12 (1-1/8-18)	339 - 475 (250 - 350*)	564 - 791 (416 - 583*)
1.2500-12 (1-1/4-12)	610 - 746 (450 - 550*)	1017 - 1242 (750 - 916*)

Refer to para. 2-1.

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Figure 1 – Torque values for threaded fasteners (Sheet 2 of 6).

THREAD	TORQUE RANGE - N m (lbf in - lbf ft *)	
	SHEAR	TENSION
	BOLTS, SCREWS AND ALL THREADED STUDS	
	A427A MS20004 thru 24 (NASM2004 thru 2024) NAS464 NAS673 thru 678 NAS1121 thru 1128 NAS1161 thru 1168 NAS1190 NAS1223 thru 1235 NAS1352 NAS1802 NAS6603 thru 6620 NAS7203 thru 7216 NAS8200 thru 8206 M87714/1 MS27576 (NASM27576) NAS517 NAS1101 NAS1131 thru 1138 NAS1171 thru 1178 NAS1191 NAS1266 thru 1270 NAS1402 thru 1406 NAS6203 thru 6220 NAS6703 thru 6720 NAS7303 thru 7316 NAS8702 thru 8716 M87714/2 NAS144 thru 158 NAS583 thru 590 NAS1102 NAS1141 thru 1148 NAS1181 thru 1188 NAS1202 thru 1210 NAS1303 thru 1320 NAS1580 NAS6303 thru 6320 NAS6803 thru 6820 NAS7500 thru 7516 NAS9101 thru 9106 M87714/3 NAS333 thru 340 NAS623 NAS1103 thru 1120 NAS1151 thru 1158 NAS1189 NAS1218 NAS1351 NAS1801 NAS6403 thru 6420 NAS7103 thru 7116 NAS8100 thru 8106 NAS9201 thru 9206	
	NUTS	
	A258A A436A AN310 NASM310) MS21043 (NASM21043) MS21051 thru 56 (NASM21051 thru 21056) MS21080 (NASM21080) MS21225 (NASM21225) NAS1021 NAS1067 NAS1766 NAS1793 A389A MS20500 AN315 (NASM315) MS21044 (NASM21044) MS21058 thru 62 (NASM21058 thru 21062) MS21083 (NASM21083) NAS509 NAS1031 NAS1473 NAS1791 NAS1870 A407A AN256 (NASM256) MS14144 (NASM14144) MS21047 thru 49 (NASM21047 thru 21049) MS21069 thru 76 (NASM21069 thru 21076) MS21086 (NASM21086) NAS679 NAS1033 NAS1474 NAS1792	MS21042 (NASM21042) NAS577 NAS1291 NAS1770 NAS1771 NAS1772 NAS1773 NAS1778 NAS1805
.1900-32 (10-32)	2.3 - 2.8 (20 - 25)	3.4 - 4.5 (30 - 40)
.2500-28 (1/4-28)	5.6 - 7.9 (50 - 70)	8.5 - 10.7 (75 - 95)
.3125-24 (5/16-24)	11.3 - 15.8 (100 - 140)	13.6 - 18.1 (120 - 160)
.3750-24 (3/8-24)	18.1 - 21.5 (160 - 190)	34 - 38 (25 - 28*)
.4375-20 (7/16-20)	50 - 57 (27 - 42*)	53 - 58 (39 - 43*)
.5000-20 (1/2-20)	54 - 79 (40 - 58*)	72 - 96 (53 - 71*)
.5625-18 (9/16-18)	89 - 112 (66 - 83*)	112 - 136 (83 - 100*)
.6250-18 (5/8-18)	123 - 146 (91 - 108*)	157 - 180 (16 - 133*)
.7500-16 (3/4-16)	259 - 282 (191 - 208*)	271 - 293 (200 - 216*)
.8750-14 (7/8-14)	282 - 339 (208 - 250*)	452 - 509 (333 - 375*)
1.0000-12 (1-12)	418 - 621 (307 - 458*)	587 - 791 (433 - 583*)
1.1250-12 (1-1/8-18)	564 - 791 (416 - 583*)	937 - 1164 (691 - 858*)
1.2500-12 (1-1/4-12)	1017 - 1242 (750 - 916*)	1955 - 2181 (1441 - 1608*)

Refer to para. 2-1.

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Figure 1 – Torque values for threaded fasteners (Sheet 3 of 6).

THREAD	TORQUE RANGE - N m (lbf in - lbf ft *)	
	SHEAR	TENSION
	BOLTS AND SCREWS	
	A136A[1] MS14157 (NASM14157) MS21250 (NASM21250) NAS1972 thru 1980	MS21134 (NASM21134) NAS624 thru 644 NAS2803 thru 2810
	NUTS	
	A135A[1] MS21042 (NASM21042) NAS577 NAS1291	MS14156 (NASM14156) MS21133 (NASM21133) NAS1804 NAS1805 EB (ESNA) LH3830 (ESNA) 48FLW (SPS)
.1900-32 (10-32)	2.5 - 3.2 (22 - 28)	3.8 - 5.1 (34 - 45)
.2500-28 (1/4-28)	6.3 - 8.9 (56 - 79)	9.5 - 12.1 (84 - 107)
.3125-24 (5/16-24)	12.6 - 17.8 (111 - 157)	15.2 - 20.3 (134 - 180)
.3750-24 (3/8-24)	20.3 - 24.2 (180 - 214)	38.0 - 43.4 (336 - 384*)
.4375-20 (7/16-20)	57 - 64 (505 - 566*)	60 - 65 (531 - 575*)
.5000-20 (1/2-20)	61 - 73 (45 - 54*)	81 - 108 (60 - 80*)
.5625-18 (9/16-18)	100 - 126 (74 - 93*)	126 - 152 (93 - 112*)
.6250-18 (5/8-18)	138 - 165 (102 - 122*)	176 - 203 (130 - 150*)
.7500-16 (3/4-16)	292 - 317 (215 - 234*)	305 - 330 (225 - 243*)
.8750-14 (7/8-14)	317 - 381 (234 - 281*)	509 - 572 (375 - 422*)
1.0000-12 (1-12)	496 - 698 (346 - 515*)	661 - 890 (487 - 656*)
1.1250-12 (1-1/8-18)	635 - 890 (468 - 656*)	1054 - 1309 (777 - 965*)
1.2500-12 (1-1/4-12)	1145 - 1397 (844 - 1030*)	2199 - 2454 (1621 - 1809*)

Refer to para. 2-1.
[1] Use A135A with A136A

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Figure 1 – Torque values for threaded fasteners (Sheet 4 of 6).

THREAD	TORQUE RANGE - N m (lbf in - lbf ft *)	
	SHEAR	TENSION
	BOLTS AND SCREWS	
	MS14163 MS14181 (NASM14181) MS21297 (NASM21297)	
	NUTS	
	LH6520 NAS1805	MS14164 (NASM14164) MS14182 (NASM14182) MS21084 (NASM21084) NAS1758 FN22 M (SPS) LH3393 (ESNA) LH6422 (ESNA) LHEB220 (ESNA)
.1900-32 (10-32)	3.2 -3.8 (28 - 34)	4.6 - 6.2 (41 - 55)
.2500-28 (1/4-28)	7.8 - 10.8 (69 - 95)	11.6 - 14.8 (103 - 131)
.3125-24 (5/16-24)	15.6 - 21.7 (138 - 192)	18.6 - 24.9 (165 - 220)
.3750-24 (3/8-24)	24.9 - 29.5 (220 - 261)	46.1 - 51.5 (408 - 456)
.4375-20 (7/16-20)	69 - 79 (51 - 58*)	73 - 80 (54 - 59*)
.5000-20 (1/2-20)	75 - 108 (55 - 80*)	99 - 132 (73 - 98*)
.5625-18 (9/16-18)	123 - 155 (91 - 114*)	155 - 187 (114 - 138*)
.6250-18 (5/8-18)	170 - 201 (125 - 148*)	217 - 248 (160 - 183*)
.7500-16 (3/4-16)	357 - 388 (263 - 285*)	373 - 403 (275 - 297*)
.8750-14 (7/8-14)	388 - 467 (286 - 344*)	621 - 700 (458 - 516*)
1.0000-12 (1-12)	575 - 854 (424 - 630*)	807 - 1088 (595 - 802*)
1.1250-12 (1-1/8-18)	776 - 1088 (572 - 802*)	1287 - 1601 (950 - 1181*)
1.2500-12 (1-1/4-12)	1398 - 1709 (1031 - 1260*)	2687 - 2999 (1962 - 2218*)

Refer to para. 2-1.

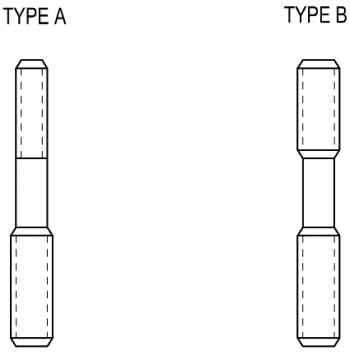
ICN-CSPP-A-204000-G-00001-00054-A-001-01

Figure 1 – Torque values for threaded fasteners (Sheet 5 of 6).

THREAD	TORQUE RANGE N m (lbf in)
.1900-32 (10-32)	0.45 - 0.68 (4.0 -6.0)
.2500-28 (1/4-28)	1.1 - 1.7 (10.0 - 15.0)
.3125-24 (5/16-24)	2.4 - 3.5 (21 - 31)
.3750-24 (3/8-24)	3.8 - 4.5 (34 - 40)
.4375-20 (7/16-20)	11.0 - 12.2 (97 - 108)
.5000-20 (1/2-20)	11.6 - 16.6 (103 -147)

ICN-CSPP-A-204000-G-00001-00056-A-001-01

Figure 1 – Torque values for threaded fasteners (Sheet 6 of 6).



THREAD		TORQUE RANGE - N m (lbf in - lbf ft *)	
NUT END [1]	STUD END	TYPE A	TYPE B
.1900-32 (10-32)	.1900-24 (10-24)	--------	3.4 - 4.5 (30.1 - 39.8)
	.2500-20 (1/4-20)	3.4 - 4.5 (30.1 - 39.8)	3.4 - 4.5 (30.1 - 39.8)
.2500-28 (1/4-28)	.2500-20 (1/4-20)	5.6 - 10.7 (50 - 95)	5.6 - 7.9 (50 - 70)
	.3125-18 (5/16-18)	5.6 - 12.4 (50 - 110)	5.6 - 9.0 (50 - 80)
.3125-24 (5/16-24)	.3125-18 (5/16-18)	11.3 - 25.4 (100 - 225)	11.3 - 14.7 (100 - 130)
	.3750-16 (3/8-16)	11.3 - 27.1 (100 - 240)	11.3 - 18.1 (100 - 160)
.3750-24 (3/8-24)	.3750-16 (3/8-16)	19.8 - 42.4 (175 - 375)	19.8 - 28.2 (175 - 250)
	.4375-14 (7/16-14)	19.8 - 53.7 (175 - 475)	19.8 - 36.7 (175 - 325)
.4375-20 (7/16-20)	.4375-14 (7/16-14)	27.1 -73.2 (240 - 648)	28.2 - 45.2 (249 - 400)
	.5000-13 (1/2-13)	27.1 - 81.4 (240 - 720)	28.2 - 59.3 (249 -525)
.5000-20 (1/2-20)	.5000-13 (1/2-13)	44.8 - 112.6 (33 - 83*)	44.8 - 78.7 (33 - 58*)
	.5625-12 (9/16-12)	44.8 - 128.9 (33 - 95*)	44.8 - 95.0 (33 - 70*)
.5625-18 (9/16-18)	.5625-12 (9/16-12)	67.8 - 162.8 (50 - 120*)	55.6 - 118.0 (41 - 87*)
	.6250-11 (5/8-11)	67.8 - 185.8 (50 - 137*)	67.8 - 128.9 (50 - 95*)
06250-18 (5/8-18)	.6250-11 (5/8-11)	101.7 - 225.2 (75 -166*)	78.7 - 157.3 (58 - 116*)
	.6875-11 (1-1/16-11)	101.7 - 271.3 (75 - 200*)	101.7 - 191.3 (75 - 141*)

[1] To torque the nuts see Fig. 1

ICN-CSPP-A-204000-G-00001-00055-A-001-01

Figure 2 – Torque values for studs.

THREAD	TORQUE RANGE - Nm (lbf in - lbf ft*)
.1900 - 24 (10 - 24)	1,36 - 1,69 (12.1 - 15.0)
.2500 - 20 (1/4 - 20)	2,9 - 3,3 (25 - 30)
.3125 - 18 (5/16 - 18)	5.5 - 6.2 (48 - 55)
.3750 - 16 (3/8 - 16)	10.8 - 12.4 (95 - 110)
.4375 - 14 (7/16 - 14)	15.9 - 17.5 (140 - 155)
.5000 - 13 (1/2 - 13)	27.2 - 32.7 (240 - 290)
.5625 - 12 (9/16- 12)	33.9 - 47.4 (300 - 420)
.6250 - 11 (5/8 - 11)	47.5 - 61 (420 - 540)
.7500 - 10 (3/4 - 10)	80 - 107 (58 - 79*)
.8750 - 9 (7/8 - 9)	147 - 203 (108 - 150*)
1.0000 - 8 (1 - 8)	249 - 338 (184 - 250*)
1.1250 - 7 (1 - 1/ 8 - 7)	337 - 451 (275 - 333*)
1.2500 - 7 (1 - 1/ 4 - 7)	452 - 564 (333 - 416*)
NUTS	All threaded nuts, inserts and tapped holes
BOLTS AND SCEWS	All

ICN-CSPP-A-204000-G-00001-00552-A-001-01

Figure 3 – Torque values for studs.

Annex 3

Rotating controls – Remove procedure

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References

Table 1 References

Data Module	Title
09-A-00-20-00-00A-120A-A	Helicopter safety – Pre-operation
09-A-06-41-00-00A-010A-A	Access doors and panels – General data
09-A-64-00-10-00A-520A-A ([1])	Tail rotor hub and blade assembly – Remove procedure
09-A-64-31-00-00A-251A-B	Rotating controls – Clean with chemical agent
09-A-64-31-00-00A-280A-B	Rotating controls – Inspection
09-A-64-31-00-00A-720A-A	Rotating controls – Install procedure

([1]) Applicable to A109LUHS Helicopters. For the other helicopter models refer to the applicable Data Module of the Maintenance Manual.

Preliminary requirements

Required conditions

Table 2 Required conditions

Condition	Data Module/Technical Publication
Make helicopter safe for maintenance	09-A-00-20-00-00A-120A-A
Panels P6 and P12 removed	09-A-06-41-00-00A-010A-A
Tail rotor hub and blade assembly removed	09-A-64-00-10-00A-520A-A (1)

(1) Applicable to A109LUHS Helicopters. For the other helicopter models refer to the applicable Data Module of the Maintenance Manual.

Support equipment

Table 3 Support equipment

Nomenclature	Identification No.	Qty
None		

Supplies

Table 4 Supplies

Nomenclature	Identification No.	Qty
None		

Spares

Table 5 Spares

Nomenclature	Identification No.	Qty
None		

Safety conditions

None.

Procedure

1. Remove the cotter pin (39, Fig 1), nut (38), bolt (35) and washers (36 and 37) then disconnect the tail-rotor pitch control tube (49) from the torque-shaft control lever (34). Discard the cotter pin.

2. Loosen the four nuts (51). Move outboard the torque shaft control levers (34 and 48) in order to have clearance for the removal of bolts (21).

3. Remove the cotter pin (47), nut (46), bolt (21) and washers (20 and 45). Discard the cotter pin.

4. Do the Step 3 again for the lower torque-shaft control lever (34).

5. Remove the attaching parts that follow from the link (32): the cotter pin (41), nut (40), bolt (44), washers (42 and 43), washers (33) and shim (33A) if installed. Discard the cotter pin.

6. Cut and remove the lock wire from the inboard boot (50).

7. Remove the rotating control assy from the 90-degree gear box output shaft.

8. Remove the attaching parts that follow from the FWD half-scissor (11): the cotter pins (8), nuts (9), bolts (13), washers (12 and 10) and if installed washers (10M). Discard the cotter pins.

9. Disconnect the FWD half-scissor (11) from the tail rotor sleeve (15) and AFT half-scissor (6).

10. Remove the attaching parts that follow from the AFT half-scissor (6): the cotter pin (5), nut (3), bolt (7), washers (4) and if installed washers (4M). Discard the cotter pin.

11. Disconnect the AFT half-scissor (6) from the pitch change slider (2).

12. Do the Step 8 thru Step 11 again for the other FWD half-scissor (11) and AFT half-scissor (6).

13. Cut and remove the lock wires from the two side of the outboard boot (14).

14. Remove the tail rotor sleeve (15) from the pitch change slider (2) together with the boot (14).

15. Remove the outboard boot (14) from the pitch change sleeve (15).

16. Remove the inboard boot (50) from the pitch change slider (2).

17. Remove the attaching parts that follow from the link (32): the cotter pin (25), nut (26), bolt (30) and washers (27 and 29). Discard the cotter pin.

18. Remove the link (32) together with the washers (31) and shim (31A) if installed.

19. Remove the attaching parts that follow from the link (22): the cotter pin (16), nut (17), bolt (23) and washers (18, 19, 24 and 18B) and washer (18A) if installed. Discard the cotter pin.

20. Remove the link (22) from the pitch control lever (28).

21. Do the Step 19 and Step 20 again for the lower link (22).

22. Remove the pitch control lever (28) from the duplex bearing housing (1).

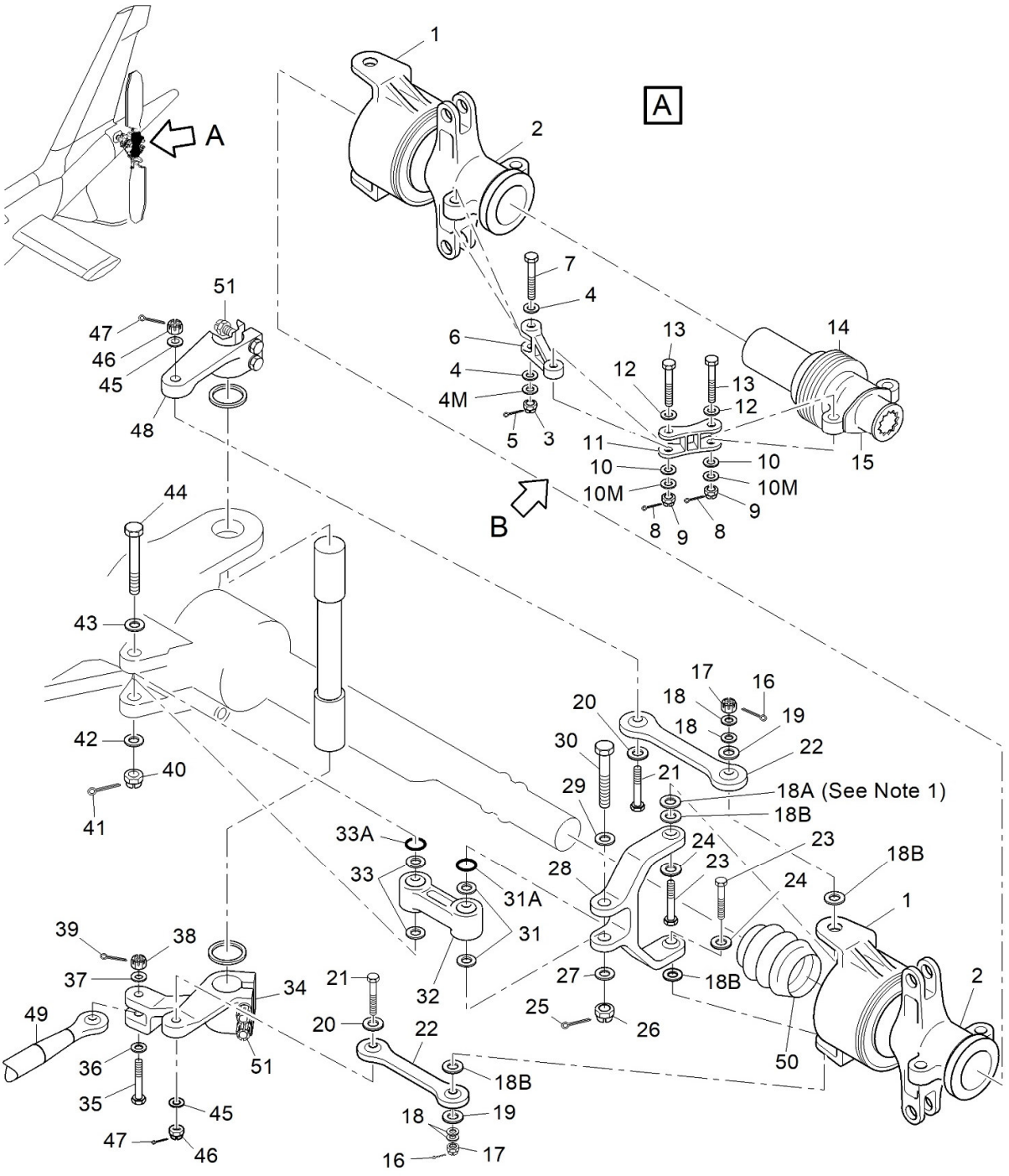
Requirements after job completion

1. Clean the rotating controls. Refer to 09-A-64-31-00-00A-251A-B.

2. Do an inspection of the rotating controls. Refer to 09-A-64-31-00-00A-280A-B.

3. Install the rotating controls. Refer to 09-A-64-31-00-00A-720A-A.

4. Remove loose items from the work area.



Note 1
Washer (18A) is shown in this location but, if necessary, can be installed on opposite bolt (23).

ICN-09-A-643100-G-00001-01030-A-003-01

Figure 1 – Rotating controls - Remove procedure (sheet 1 of 2).

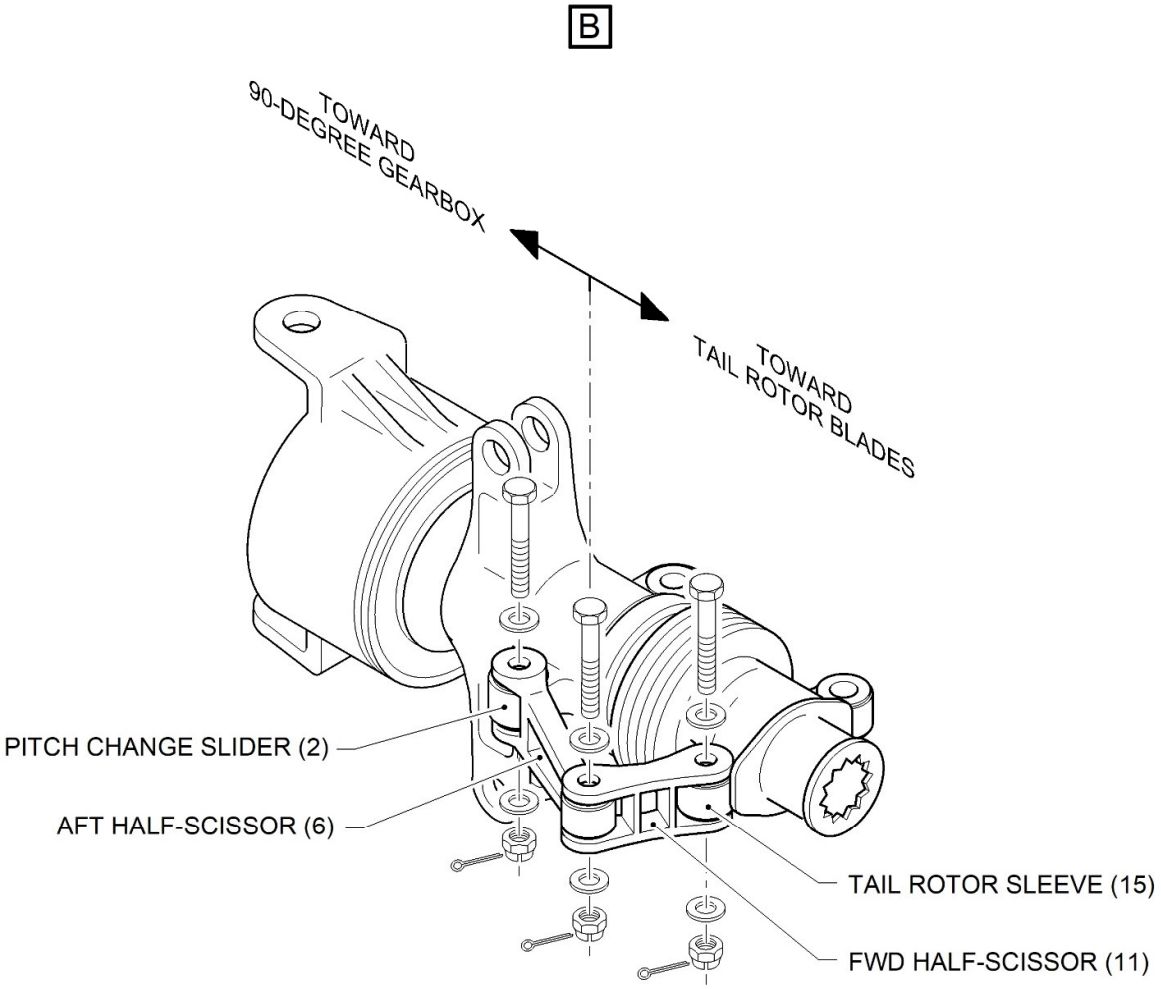


Figure 2 – Rotating controls - Remove procedure (sheet 2 of 2).

Annex 4

Rotating controls – Install procedure

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References

Table 1 References

Data Module	Title
09-A-00-20-00-00A-120A-A	Helicopter safety – Pre-operation
09-A-00-50-00-00A-013A-D	Material data information publication – Numeric index
09-A-06-41-00-00A-010A-A	Access doors and panels – General data
09-A-64-00-10-00A-720A-A ([1])	Tail rotor hub and blade assembly – Install procedure
09-A-64-31-10-00A-710A-B	Duplex bearing housing and pitch change slider – Assemble procedure
09-A-64-31-25-00A-720A-A	Torque shaft and torque shaft lever – Install procedure

([1]) Applicable to A109LUHS Helicopters. For the other helicopter models refer to the applicable Data Module of the Maintenance Manual.

Preliminary requirements

Required conditions

Table 2 Required conditions

Condition	Data Module/Technical Publication
Make helicopter safe for maintenance	09-A-00-20-00-00A-120A-A
Torque shaft and torque shaft levers installed	09-A-64-31-25-00A-720A-A
Duplex bearing housing and pitch change slider assembled	09-A-64-31-10-00A-710A-B

Support equipment

Table 3 Support equipment

Nomenclature	Identification No.	Qty
1. Wrench (torque)	Local supply	1 EA

Supplies

Table 4 Supplies

Nomenclature	Identification No.	Qty
1. Safety wire	C013 (2)	AR
2. Corrosion inhibiting compound	C505 (2)	AR
3. Corrosion preventive compound	C509 (2)	AR
4. Corrosion inhibiting compound	C587 (2)	AR

(2) Refer to 09-A-00-50-00-00A-013A-D of the Material Data Information Publication.

Spares

Table 5 Spares

Nomenclature	Identification No.	Qty
1. Shim	A864A0673E018M	AR
2. Bolt	AN174C17	1
3. Washer	NAS1149C0432R	AR
4. Washer	NAS1149D0416K	AR
5. Bolt	AN174-14	AR
6. Cotter pin	MS24665-155 MS24665-151 (Alternative)	AR
7. Nut	MS17825-4	AR
8. Washer	NAS1149F0416P	AR

Safety conditions

WARNING

- **The consumables that follow are dangerous materials:**
  - **Corrosion inhibiting compound (C505);**
  - **Corrosion preventive compound (C509);**
  - **Corrosion inhibiting compound (C587).**

  Before you use them, make sure you know the safety precautions and first aid instructions printed on:
  - **the label on the container material;**
  - **the material safety sheet;**
  - **the local safety regulations.**

  Make sure that the applicable first aid material is available.
- **This installation includes Vital Points (VP). During the procedure, you must obey the Local Regulations applicable to the Vital Points.**

CAUTION

Install the FWD half-scissor (11, Fig 1) and AFT half-scissor (6) in the correct Location and orientation as shown in Detail B of Fig 1.

Procedure

Note 1

Do an inspection of the two Bolt (Spare Ref. 5) (23), Bolt (44) and Bolt (30) (Spare Ref. 2) to make sure that there is no wear, fretting, dents and scratches. If you find damage, replace them.

Note 2

Install the larger washers (24) against the spherical bearing of the pitch control lever (28). Install the larger washers (19) against the spherical bearing of the link (22). Install the two smaller

washers (18) between the larger washer (19) and the nut (17). In order to get the correct position for the installation of the cotter pin (16), you can replace one of the washers (18) with the Washer (Spare Ref. 3). (**VP**)

Note 3

Before you install the inboard boot (50) in the housing and slider group (1 and 2), deform the boot metallic ring to an oval shape with a maximum diameter between 43 and 44 mm as shown in Detail C, Fig 1. This is to help a tighter fit in the seat.

Note 4

During the installation of the self-locking bolts or the self-locking nuts, when the locking is engaged, with the Wrench (torque) (Support equipment Ref. 1), make sure that the locking torque necessary to move the bolts or nuts, before contact with the washer, is between the minimum breakaway torque and the maximum locking torque. If you do not get this value, discard the bolts and / or nuts.

1. Install the inboard boot (50) in the slider (2).

2. Apply the Corrosion inhibiting compound (Supply Ref. 2) or Corrosion inhibiting compound (Supply Ref. 4) to the shank and under head of the bolt (23). (**VP**)

3. Attach the pitch control lever (28) and the two links (22) to the duplex bearing housing (1) with the bolts (23), washers (24), bumper washers (18B), washers (19 and 18) and nuts (17). Do not torque nuts.

Note 1

During the installation, if the total clearance between the pitch control lever (28) and the housing (1) is more than 0,3 mm, install one Washer (Spare Ref. 4) (18A) on one attachment point bolt (23). (**VP**)

Note 2

Before you torque nuts (17), make sure that the spherical bearings of the control lever (28) and link (22) touch the lug of the housing (1) and not the bumper washers (18B). (**VP**)

4. Install the housing and slider group (1 and 2) on the 90-degree gearbox output shaft.

Note

Turn the housing and slider group (1 and 2) during the installation in order to align it with the master dent present on the 90-degree gearbox output shaft.

5. Move outboard the torque shaft control levers (34 and 48) in order to have clearance for the installation of bolts (21).

6. Locally make an alignment tool with the characteristics that follow:

— Material: steel round bar;

— Length: approximately 200 mm;

— Diameter: between 6,317 and 6,329 mm.

7. Install the alignment tool in the levers (34 and 48) to align them. See Fig 3.

Note

If you use an existing alignment tool, make sure all leading particulars agree with Step 6.

8. Remove the alignment tool.

9. Apply the Corrosion inhibiting compound (Supply Ref. 2) or Corrosion inhibiting compound (Supply Ref. 4) to the shank and under head of the bolts (21, Fig 1). (**VP**)

Note

Install the larger washers (20) against the spherical bearing of the link (22) and the small washer (45) below the nut (46). (**VP**)

10. Connect the link (22) to the lever (48) with the bolt (21), washers (20 and 45) and the nut (46). Do not torque nuts.

11. Make sure that the bolt (21) can turn and move freely in its seat.

12. Do the Step 10 and Step 11 again for the other link (22) installed on the lever (34).

CAUTION

Make sure that the duplex bearing is not pre-loaded.

Note

Move the levers (48 and 34) in different positions. If the bolts (21) do not turn or move freely in their seats, do this operation until the bolts turn and move freely in their seats.

13. Apply the Corrosion inhibiting compound (Supply Ref. 2) or Corrosion inhibiting compound (Supply Ref. 4) to the shank and under head of the bolt (30). (**VP**)

14. Connect the link (32) to the pitch control lever (28) with the bolt (30), washers (29 and 27), washers (31) and nut (26). Do not torque nut.

Note

Install the washers (31) with tapered side against link (32).

15. Apply the Corrosion inhibiting compound (Supply Ref. 2) or Corrosion inhibiting compound (Supply Ref. 4) to the shank and under head of the bolt (44). (**VP**)

16. Connect the link (32) to the 90-degree gearbox with the bolt (44), washers (43 and 42) washers (33) and nut (40). Do not torque nut.

Note 1

Install the washers (33) with tapered side against link (32).

Note 2

Make sure that the bolts can turn and move freely in their seats, to get the perpendicularity between the link (32), pitch control lever (28) and 90-degree gearbox.

Put the link (32) against the 90-degree gearbox, if in this condition the clearance between the link (32) and the 90-degree gearbox is more than 0,05 mm, install the Shim (Spare Ref. 1) (33A) between the washer (33) and 90-degree gearbox.

In this condition do a check of the clearance between pitch control lever (28) and the link (32), if the clearance is more than 0,05 mm, install the Shim (Spare Ref. 1) (31A) between the washer (31) and pitch control lever (28).

17. Safety the inboard part of the inboard boot (50) with the Safety wire (Supply Ref. 1).

18. Install the outboard boot (14) on the sleeve (15).

19. Install the sleeve (15) on the 90-degree gearbox output shaft.

20. Make sure that the sleeve (15) is free to move inside the slider (2).

21. Make sure that the sleeve (15) moves freely along the 90-degree gearbox output shaft without binding and too much friction. If this is not the case, remove the sleeve and examine diameter and condition of the bushing Teflon lining.

22. Safety the inboard and outboard parts of the outboard boot (14) with the Safety wire (Supply Ref. 1).

23. Apply the Corrosion inhibiting compound (Supply Ref. 2) or Corrosion inhibiting compound (Supply Ref. 4) to the shank and under head of the bolts (13). (**VP**)

Note

Make sure that the head of the bolts (13) point in the direction of the rotation of the tail rotor.

24. Connect the FWD half-scissor (11) to the sleeve (15) with the bolt (13), washers (12 and 10) and nut (9). Fully tighten all components. Do not torque nut.

25. Manually determine the axial play between FWD half-scissor (11) and sleeve (15) along bolt axis in the way that follows:

25.1. Turn the FWD half-scissor (11) back and forth, from “a” to “b” as shown in Fig 2 Detail A, until you get the position of minimum play. Stop the FWD half-scissor in this position. (**VP**)

25.2. Torque the nut (9, Fig 1) until you get to the cotter pin hole on the bolt (13) with no axial play between components. FWD half-scissor must move freely with no binding. Slight friction is permitted. (**VP**)

25.3. If you find too much binding / friction, replace Nut (Spare Ref.15) (9) with a new one and do again Step 25.1 and Step 25.2. (**VP**)

25.4. If with the new nut (9) you still get too much binding / friction, add a washer, thickness 0,4 mm (P/N NAS1149F0416P) under nut and do again Step 25.1 and Step 25.2. (**VP**)

25.5. If you still get too much binding / friction, contact the TC holder.

26. Do the Step 24 and Step 25 again for the other FWD half-scissor (11).

27. Connect the AFT half-scissor (6) to the FWD half-scissor (11) with the bolt (13), washers (12 and 10) and nut (9). Fully tighten all components. Do not torque nut. (**VP**)

28. Manually determine the axial play between AFT half-scissor (6) and FWD half-scissor (11) along bolt axis in the way that follows:

28.1. Turn the AFT half-scissor (6) back and forth, from “a” to “b” as shown in Fig 2 Detail B, until you get the position of minimum play. Stop the AFT half-scissor in this position. (**VP**)

28.2. Torque the nut (9, Fig 1) until you get to the cotter pin hole on the bolt (13) with no axial play between components. AFT half-scissor (6) must move freely with no binding. Slight friction is permitted. (**VP**)

28.3. If you find too much binding / friction, replace Nut (Spare Ref. 7) (9) with a new one and do again Step 28.1 and Step 28.2. (**VP**)

28.4. If with the new nut (9) you still get too much binding / friction, add a Washer (Spare Ref. 8) (10M) under nut and do again Step 28.1 and Step 28.2. (**VP**)

28.5. If you still get too much binding / friction, contact the TC holder.

29. Do the Step 27 and Step 28 again for the other AFT half-scissor (6).

30. Apply the Corrosion inhibiting compound (Supply Ref. 2) or Corrosion inhibiting compound (Supply Ref. 4) to the shank and under head of the bolts (7). (**VP**)

Note

Make sure that the head of the bolts (7) point in the direction of the rotation of the tail rotor.

31. Connect the AFT half-scissor (6) to the slider (2) with the bolt (7), washers (4) and nut (3). Fully tighten all components. Do not torque nut.

32. Manually determine the axial play between AFT half-scissor (6) and slider (2) along bolt axis in the way that follows:

32.1. Move the sleeve (15) back and forth until you get the position of minimum play. Stop the sleeve in this position. (**VP**)

32.2. Torque the nut (3) until you get to the cotter pin hole on the bolt (7) with no axial play between components. (**VP**)

32.3. If you find too much binding / friction, replace Nut (Spare Ref. 7) (3) with a new one and do again Step 32.1 and Step 32.2. (**VP**)

32.4. If with the new nut (3) you still get too much binding / friction, add a Washer (Spare Ref. 8) (4M) under nut and do again Step 32.1 and Step 32.2. (**VP**)

32.5. If you still get too much binding / friction, contact the TC holder.

33. Do the Step 31 and Step 32 again for the other AFT half-scissor (6).

34. Move the lever (34) and / or lever (48) and make sure that the pitch change mechanism moves freely without binding.

35. Torque the nuts (17) to the final torque (locking torque + seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions: (**VP**)

— Locking torque: 3,39 N m maximum;

— Breakaway torque: 0,39 N m minimum;

— Seating torque: 3,40 thru 4,52 N m.

36. Install the new Cotter pin (Spare Ref. 6) (16).

37. Torque the nut (26) to the final torque (locking torque + seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions: (**VP**)

— Locking torque: 3,39 N m maximum;

— Breakaway torque: 0,39 N m minimum;

— Seating torque: 3,40 thru 4,52 N m.

38. Install the new Cotter pin (Spare Ref. 6) (25).

39. Torque the nut (46) to the final torque (locking torque + seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions: (**VP**)

— Locking torque: 3,39 N m maximum;

— Breakaway torque: 0,39 N m minimum;

— Seating torque: 3,40 thru 4,52 N m.

40. Install the new Cotter pin (Spare Ref. 6) (47).

41. Torque the nut (40) to the final torque (locking torque + seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions: (**VP**)

— Locking torque: 3,39 N m maximum;

— Breakaway torque: 0,39 N m minimum;

— Seating torque: 3,40 thru 4,52 N m.

42. Install the new Cotter pin (Spare Ref. 6) (41).

43. Install the new Cotter pin (Spare Ref. 6) (5 and 8).

44. Apply the Corrosion inhibiting compound (Supply Ref. 2) or Corrosion inhibiting compound (Supply Ref. 4) to the shank and under head of the bolt (35). (**VP**)

45. Connect the tail rotor pitch tube (49) to the torque shaft control lever (34) with the bolt (35), washers (36 and 37) and nut (38).

46. Torque the nut (38) to the final torque (locking torque + seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions: (**VP**)

— Locking torque: 3,39 N m maximum;

— Breakaway torque: 0,39 N m minimum;

— Seating torque: 3,40 thru 4,52 N m.

47. Install the new Cotter pin (Spare Ref. 6) (39).

48. Torque the four nuts (51) that attach the control levers (34 and 48) to the torque shaft to the final torque (locking torque + seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions: (**VP**)

— Locking torque: 3,39 N m maximum;

— Breakaway torque: 0,39 N m minimum;

— Seating torque: 5,65 thru 7,91 N m.

49. Move the tail rotor mechanism by acting with one hand on the lever (34) and with the other hand hold the sleeve (15) to prevent it from shaft disengagement. Make sure that the tail rotor mechanism moves without binding.

50. Apply the Corrosion preventive compound (Supply Ref. 3) to all the attaching hardware as follows:

— head of the bolts;

— washers;

— protruding thread of bolts;

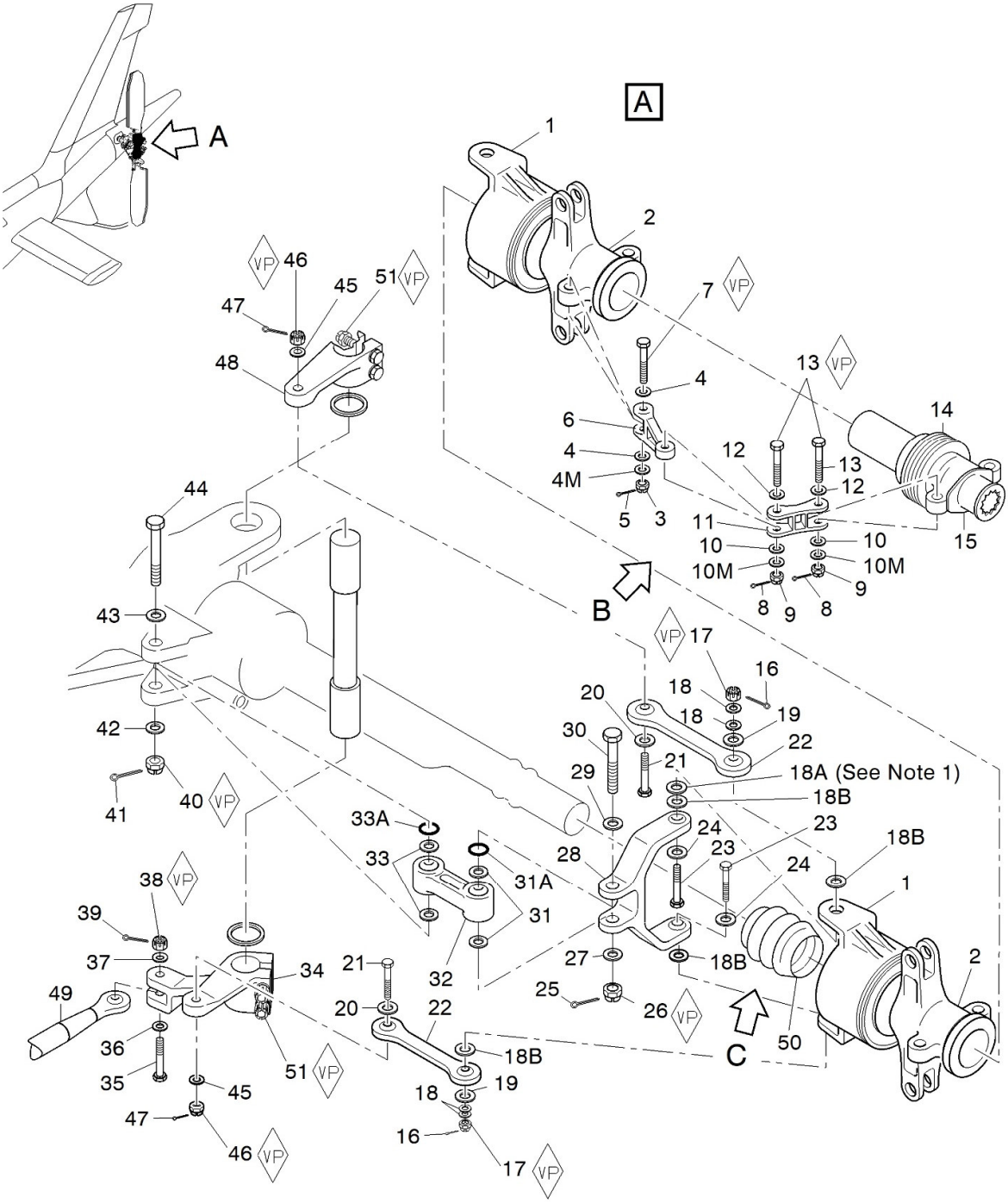
— cotter pin. (**VP**)

Requirements after job completion

51. Install the access panels P6 and P12. Refer to 09-A-06-41-00-00A-010A-A.

52. Install the tail rotor hub and blade assembly. Refer to 09-A-64-00-10-00A-720A-A ([1]).

53. Remove all the tools and the other items from the work area. Make sure that the work area is clean.



Note 1
Washer (18A) is shown in this location but, if necessary, can be installed on opposite bolt (23).

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Figure 1 – Rotating controls - Install procedure (Sheet 1 of 2).

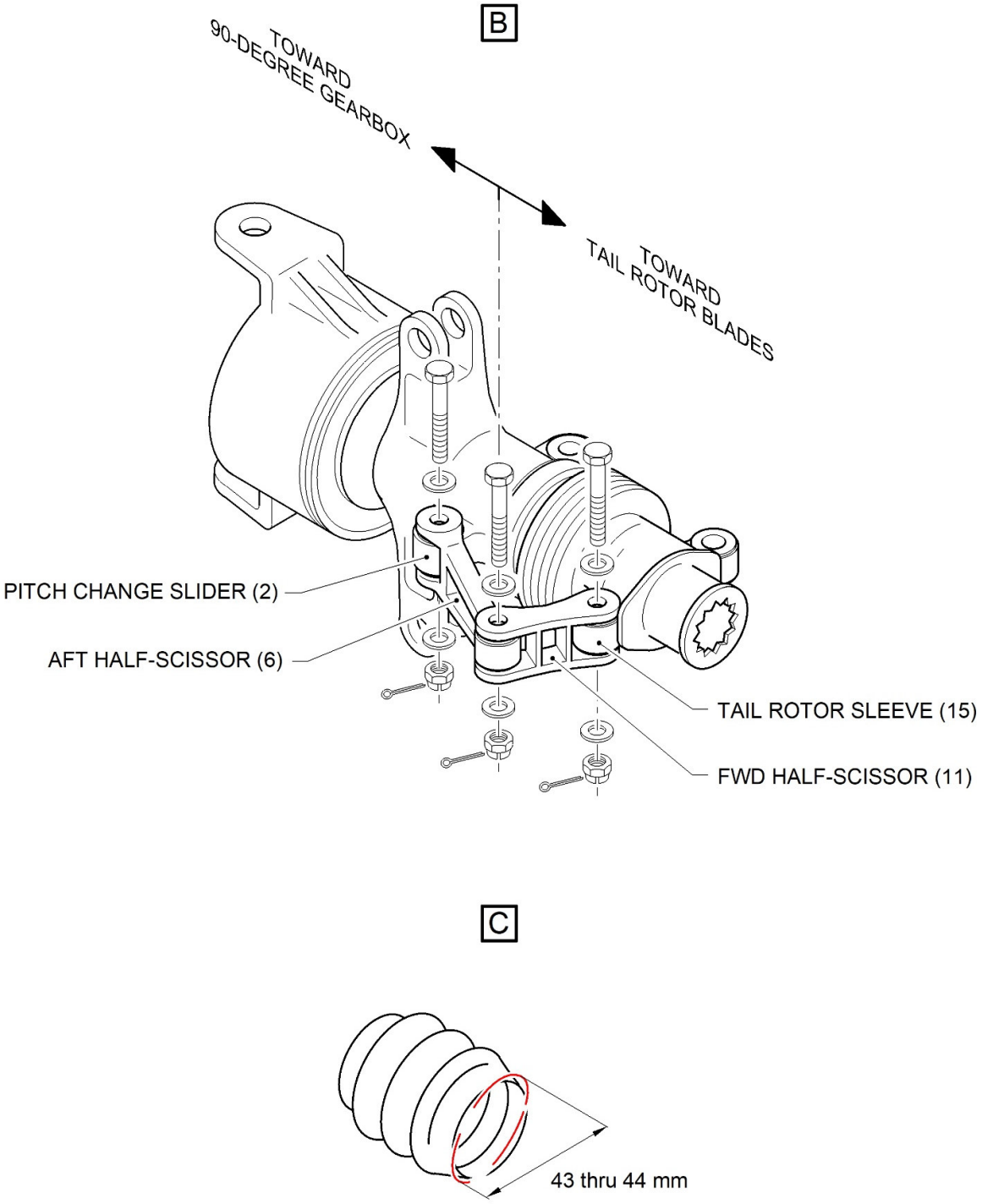

Figure 1 – Rotating controls - Install procedure (Sheet 2 of 2).

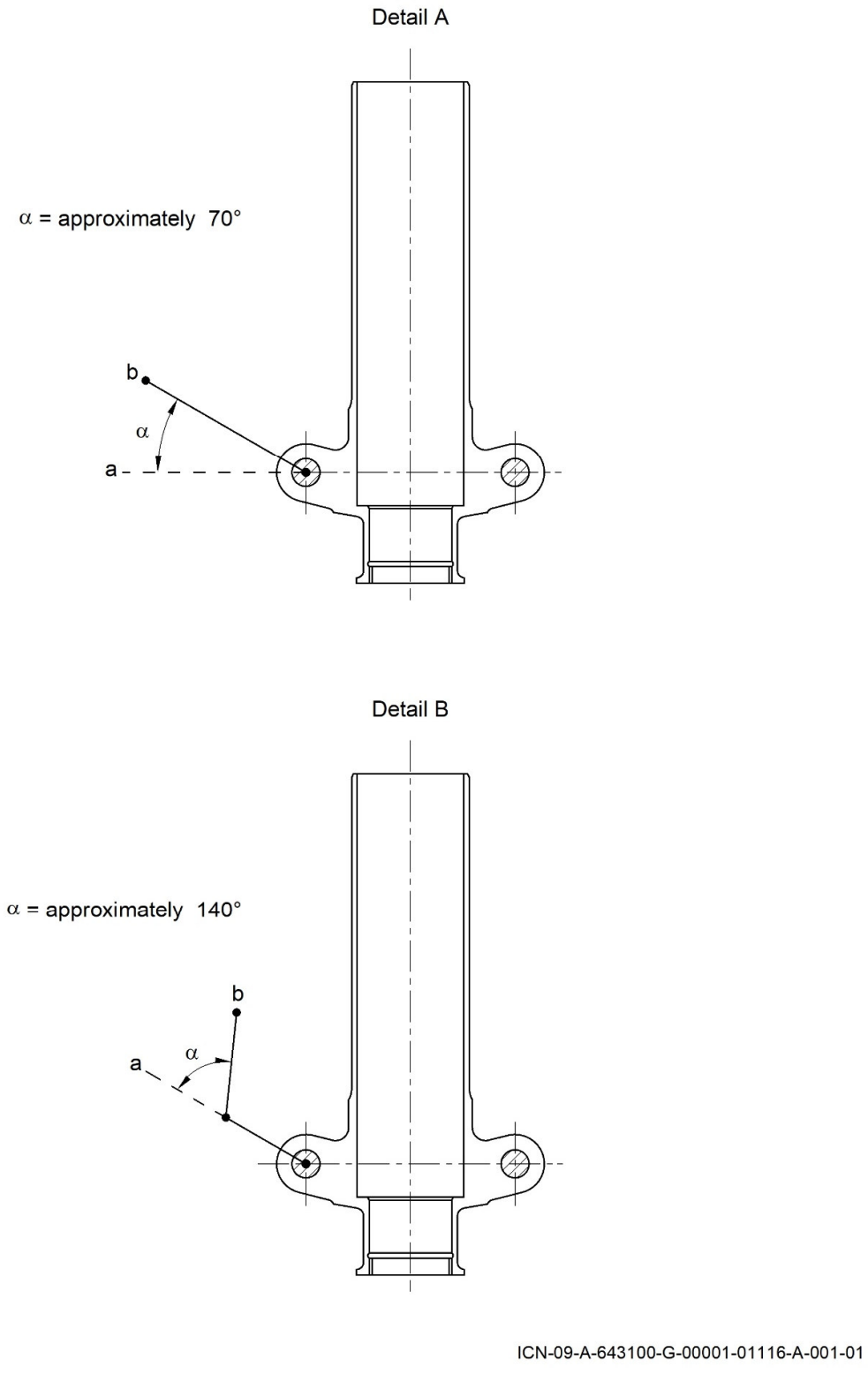

Figure 2 – Links play check.

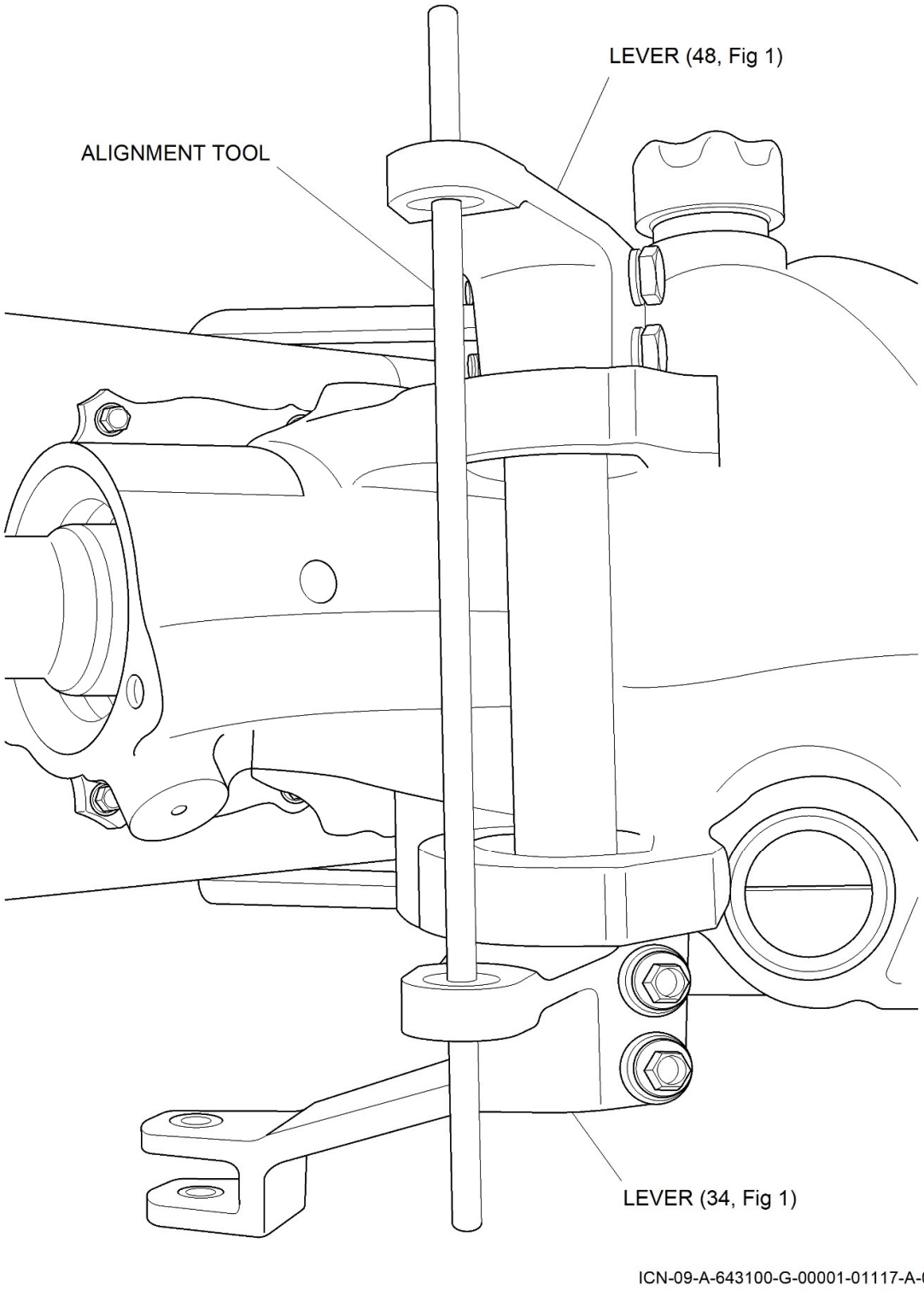

Figure 3 – Levers alignment.

Annex 5

Scissors group – Remove procedure

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Table 1 References

Data Module	Title
0B-A-00-20-00-00A-120A-A	Helicopter safety – Pre-operation
0B-A-00-60-00-00A-010A-A ([1])	Critical parts – General data
0B-A-64-31-02-00A-530A-B	Scissors group – Disassemble procedure
0B-A-64-31-02-00A-720A-A	Scissors group – Install procedure
09-A-64-31-00-00A-280A-B	Rotating controls – Inspection
09-A-64-31-00-00A-720A-A	Rotating controls – Install procedure

([1]) Applicable to A109S Helicopters. For the other helicopter models refer to the applicable Data Module of the Maintenance Manual.

Preliminary requirements

Required conditions

Table 2 Required conditions

Condition	Data Module/Technical Publication
The helicopter must be safe for maintenance	0B-A-00-20-00-00A-120A-A

Support equipment

Table 3 Support equipment

Nomenclature	Identification No.	Qty
None		

Supplies

Table 4 Supplies

Nomenclature	Identification No.	Qty
None		

Spares

Table 5 Spares

Nomenclature	Identification No.	Qty
None		

Safety conditions

CAUTION

This component includes critical parts. Be careful when you do work on this component after removal from the helicopter. A damage to the critical parts can occur if you are not careful. Refer to 0B-A-00-60-00-00A-010A-A ([1]).

Procedure

Note 1

The procedure that follows is applicable to the two scissors group (10, Fig 1) of the rotating controls.

Note 2

Before you remove the scissors group (10), identify and record its position on the slider assembly (4) and the sleeve (5), refer to Detail B of Fig 1. This is to put it again in its correct position at the installation.

1. Get access to the scissors group (10) that you must remove on the tail rotor.
2. Remove these parts that attach the scissors group (10) to the sleeve (5):
   - The cotter pin (8)
   - The nut (9)
   - The washer (7)
   - The washer (14), if installed
   - The bolt (3)
   - The washer (6).

   Discard the cotter pin (8).
3. Remove these parts that attach the scissors group (10) to the slider assembly (4):
   - The cotter pin (12)
   - The nut (11)
   - The washer (13)
   - The washer (16), if installed
   - The bolt (2)
   - The washer (1).

   Discard the cotter pin (12).
4. Remove the scissors group (10) from the slider assembly (4) and the sleeve (5).
5. If necessary, disassemble the scissors group. Refer to 0B-A-64-31-02-00A-530A-B.

Requirements after job completion

1. Install the scissors group. Refer to 0B-A-64-31-02-00A-720A-A.

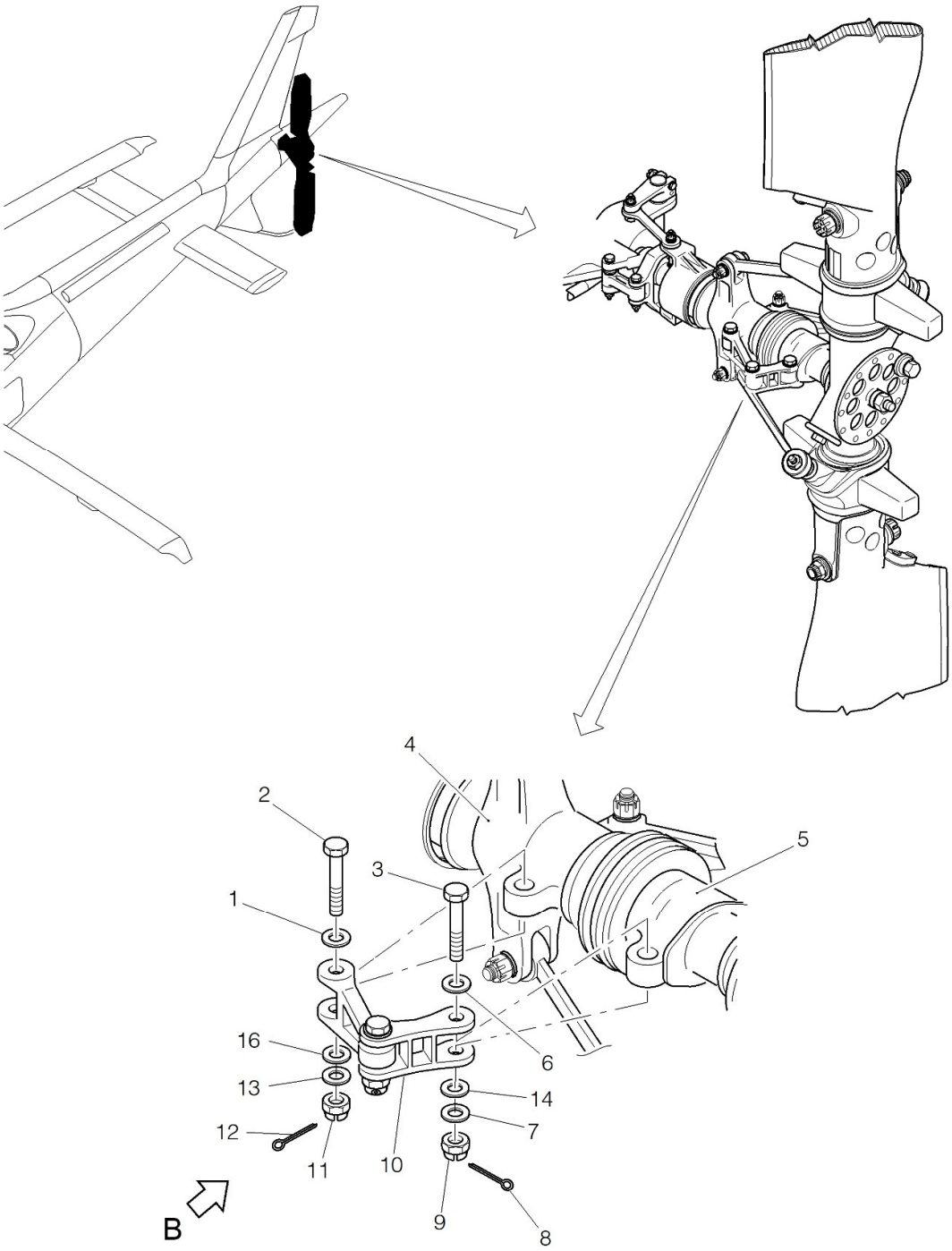

Figure 1 – Scissors group - Remove procedure (Sheet 1 of 2).

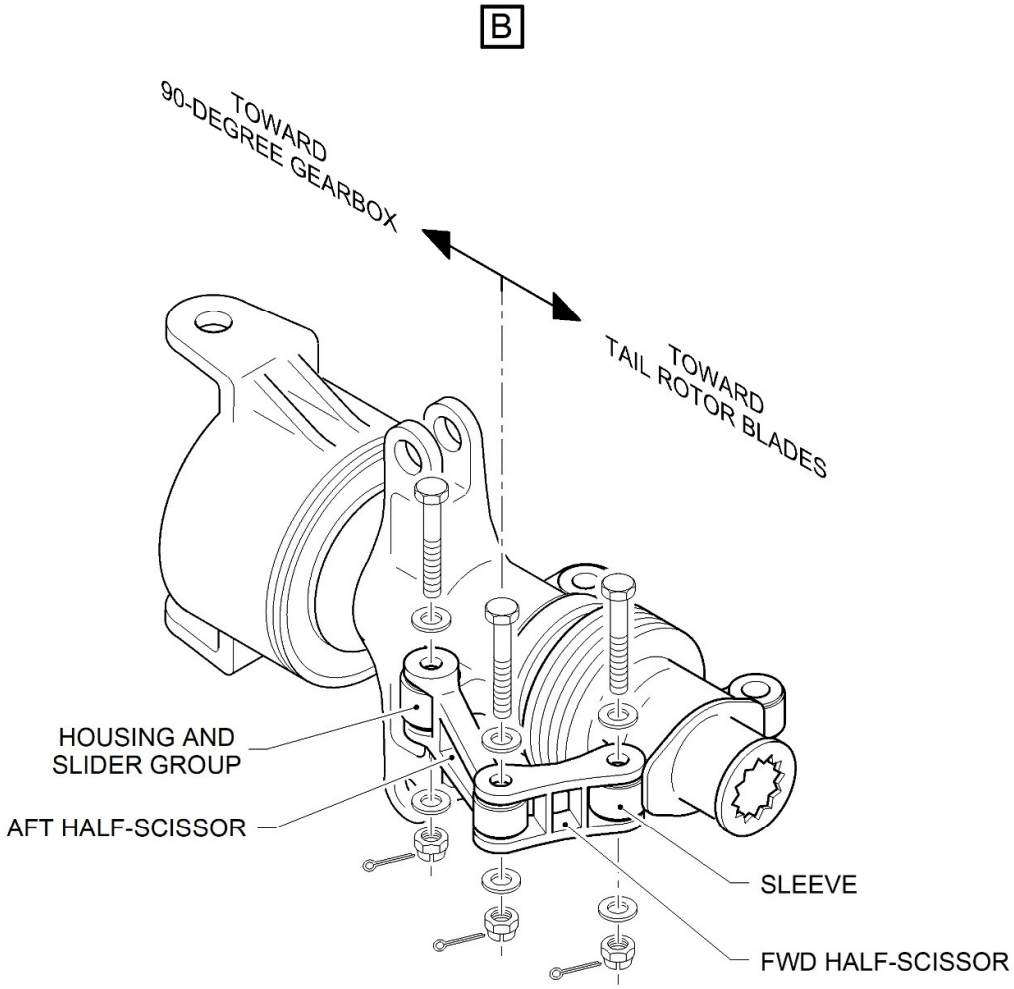

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Figure 1 – Scissors group - Remove procedure (Sheet 2 of 2).

Annex 6

Scissors group – Install procedure

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References

Table 1 References

Data Module	Title
09-A-00-50-00-00A-013A-D	Material data information publication – Numeric index
0B-A-00-20-00-00A-120A-A	Helicopter safety – Pre-operation
0B-A-00-60-00-00A-010A-A (1)	Critical parts – General data
0B-A-64-00-00-01A-311A-A	Tail rotor components – Visual check
0B-A-64-00-00-01A-311A-B	Tail rotor components – Visual check
0B-A-64-31-02-00A-710A-B	Scissors group – Assemble procedure

(1) Applicable to A109S Helicopters. For the other helicopter models refer to the applicable Data Module of the Maintenance Manual.

Preliminary requirements

Required conditions

Table 2 Required conditions

Condition	Data Module/Technical Publication
The helicopter must be safe for maintenance	0B-A-00-20-00-00A-120A-A

Support equipment

Table 3 Support equipment

Nomenclature	Identification No.	Qty
None		

Supplies

Table 4 Supplies

Nomenclature	Identification No.	Qty
1. Corrosion inhibiting compound	C505 (2)	AR
2. Corrosion preventive compound	C509 (2)	AR
3. Corrosion inhibiting compound	C587 (2)	AR

(2) Refer to 09-A-00-50-00-00A-013A-D of the Material Data Information Publication.

Spares

Table 5 Spares

Nomenclature	Identification No.	Qty
1. Cotter pin	MS24665-155 MS24665-151 (Alternative)	2 EA

Safety conditions

WARNINGS

- **The materials that follow are dangerous. Before you do this procedure, make sure that you know all the safety precautions and first aid instructions for these materials:**
  - **Corrosion inhibiting compound (C505)**
  - **Corrosion preventive compound (C509)**
  - **Corrosion inhibiting compound (C587).**

- **This installation includes Vital Points (VP). During the procedure, you must obey the Local Regulations applicable to the Vital Points.**

CAUTIONS

- **This component includes critical parts. Examine the component for signs of structural damage, before you install it on the helicopter. Refer to 0B-A-00-60-00-00A-010A-A ([1]).**
- **Install the FWD half-scissor (15, Fig 1) and AFT half-scissor (17) in the correct location and orientation as shown in Detail B of Fig 1.**

Procedure

CAUTIONS

- **Before you install the scissors group examine the components that follow:**
  - **The scissors group (10, Fig 1)**
  - **The bolts (2) and (3).**

  Refer to 0B-A-64-00-00-01A-311A-B.
- **After you installed the scissors group (10) examine it. Refer to 0B-A-64-00-00-01A-311A-A.**

Note

The procedure that follows is applicable to the two scissors group (10) of the rotating controls.

1. Apply the Corrosion inhibiting compound (Supply Ref. 1) or Corrosion inhibiting compound (Supply Ref. 3) to the shank of the bolt (3). (**VP**)

Note

Make sure that the head of the bolt (3) points in the direction of the rotation of the tail rotor. (**VP**)

2. Connect the FWD half-scissor (15) to the sleeve (5) with the bolt (3), washers (6 and 7) and nut (9). Fully tighten all components. Do not torque nut. (**VP**)

3. Manually determine the axial play between the FWD half-scissor (15) and the sleeve (5) along bolt axis in the way that follows:

3.1. Turn the FWD half-scissor (15) back and forth, from “a” to “b” as Shown in Fig 2 Detail A, until you get the position of minimum play. Stop the FWD half-scissor in this position. (**VP**)

3.2. Torque the nut (9, Fig 1) until you get to the cotter pin hole on the bolt (3) with no axial play between components. FWD half-scissor must move freely with no binding. Slight friction is permitted. (**VP**)

3.3. If you find too much binding / friction, replace the nut (9) with a new one and do again Step 3.1 and Step 3.2. (**VP**)

3.4. If with the new nut (9) you still get too much binding / friction, add a washer (14), thickness 0,4 mm under nut and do again Step 3.1 and Step 3.2. (**VP**)

3.5. If you still get too much binding / friction, contact the TC holder.

4. Connect the AFT half-scissor (17) to the FWD half-scissor (15). Refer to 0B-A-64-31-02-00A-710A-B.

5. Apply the Corrosion inhibiting compound (Supply Ref. 1) or Corrosion inhibiting compound (Supply Ref. 3) to the shank of the bolt (2). (**VP**)

Note

Make sure that the head of the bolt (2) points in the direction of the rotation of the tail rotor. (**VP**)

6. Connect the AFT half-scissor (17) to the slider (4) with the bolt (2), washers (1 and 13) and nut (11). Fully tighten all components. Do not torque nut. (**VP**)

7. Manually determine the axial play between the AFT half-scissor (17) and the slider (4) along bolt axis in the way that follows:

7.1. Move the sleeve (5) back and forth until you get the position of minimum play. Stop the sleeve in this position. (**VP**)

7.2. Torque the nut (11) until you get to the cotter pin hole on the bolt (2) with no axial play between components. (**VP**)

7.3. If you find too much binding / friction, replace the nut (11) with a new one and do again Step 7.1 and Step 7.2. (**VP**)

7.4. If with the new nut (11) you still get too much binding / friction, add a washer (16), thickness 0,4 mm under nut and do again Step 7.1 and Step 7.2. (**VP**)

7.5. If you still get too much binding / friction, contact the TC holder.

8. Install the new Cotter pin (Spare Ref. 1) (8) and (12).

9. Apply the Corrosion preventive compound (Supply Ref. 2) to the parts that follow:

— The heads of the bolts (2) and (3)

— The washers (7) and (13), the washers (14) and (16), if installed, the nuts (9) and (11) and the cotter pins (8) and (12). (**VP**)

Requirements after job completion

1. Remove all the tools and the other items from the work area. Make sure that the work area is clean.

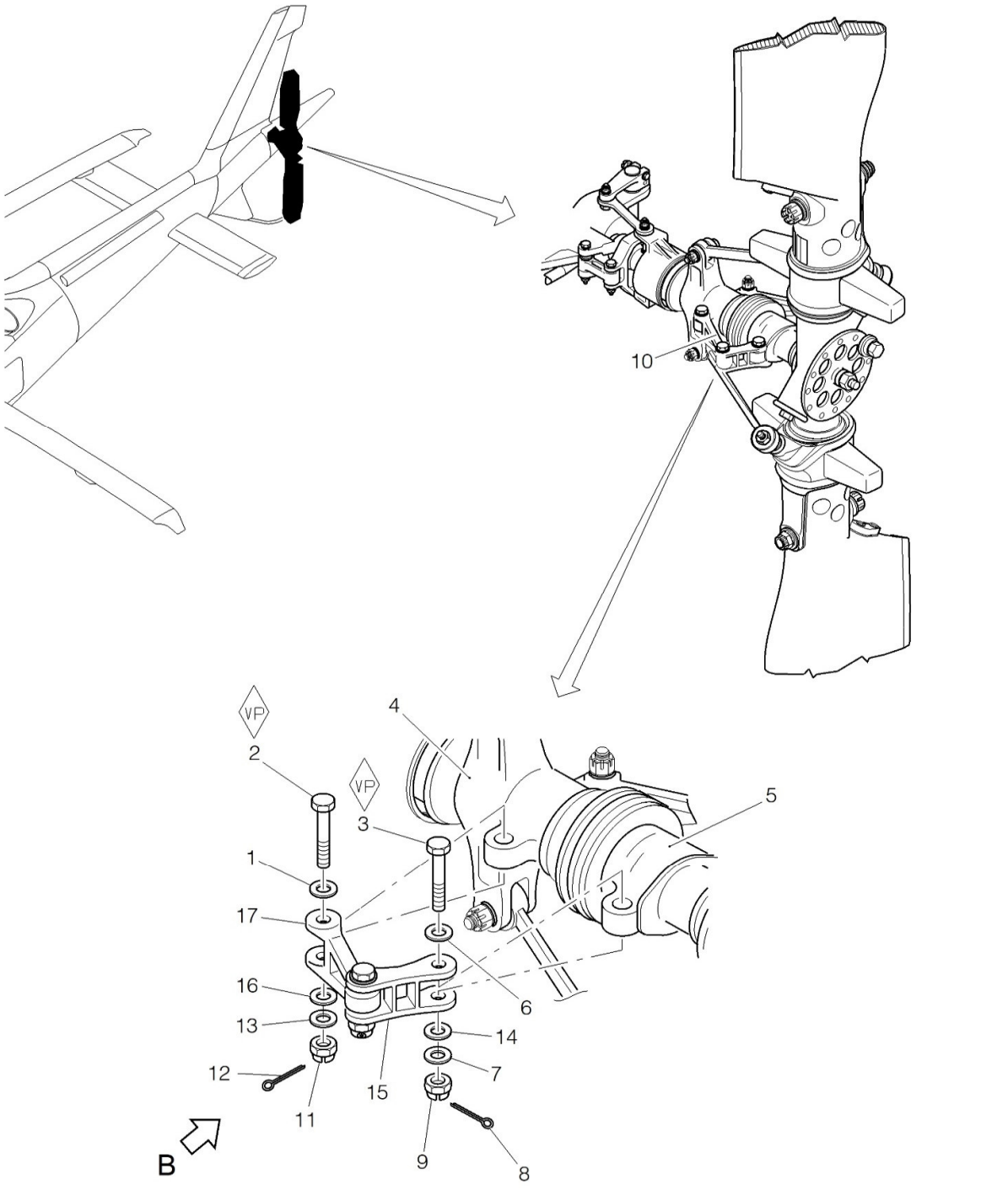

Figure 1 – Scissors group - Install procedure (Sheet 1 of 2).

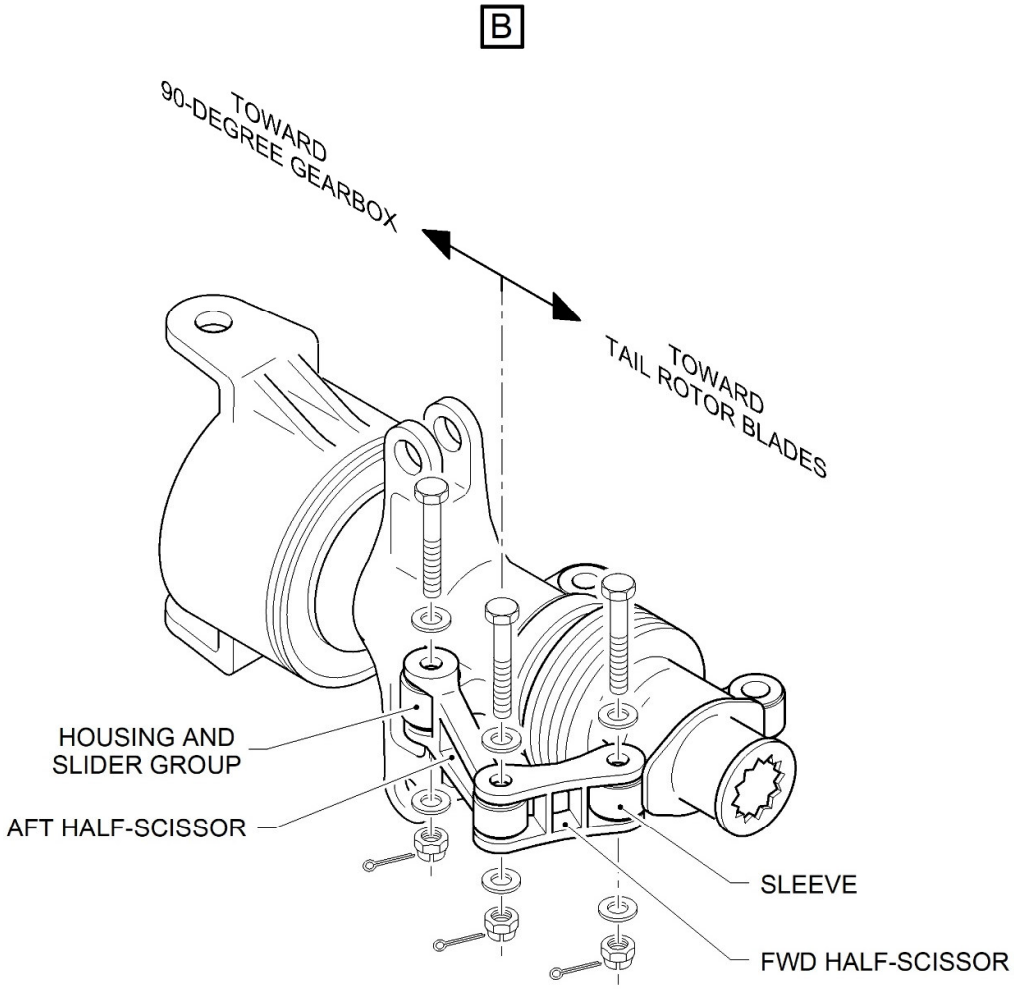

Figure 1 – Scissors group - Install procedure (Sheet 2 of 2).

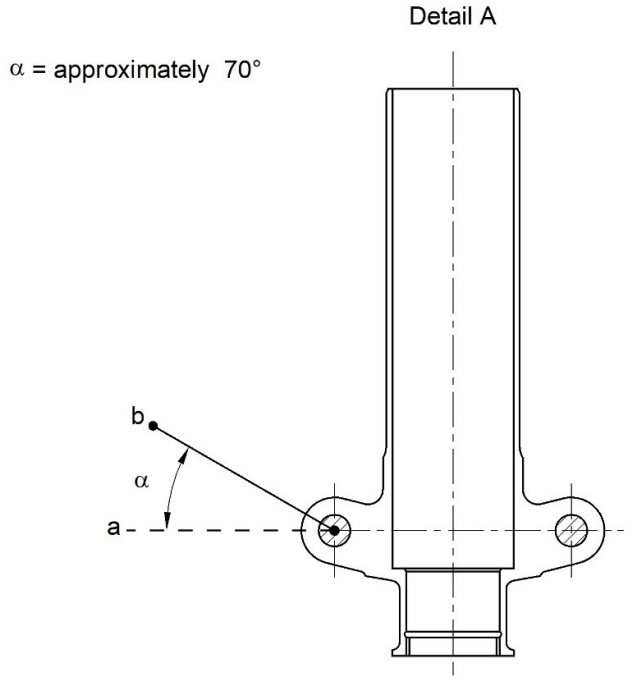

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Figure 2 - Links play check.

Annex 7

Scissors group – Disassemble procedure

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References

Table 1 References

Data Module	Title
0B-A-00-20-00-00A-120A-A	Helicopter safety – Pre-operation
0B-A-64-31-02-00A-520A-B	Scissors group – Remove procedure
0B-A-64-31-02-00A-710A-A	Scissors group – Assemble procedure

Preliminary requirements

Required conditions

Table 2 Required conditions

Condition	Data Module/Technical Publication
The helicopter must be safe for maintenance	0B-A-00-20-00-00A-120A-A
The scissors group must be removed	0B-A-64-31-02-00A-520A-A

Support equipment

Table 3 Support equipment

Nomenclature	Identification No.	Qty
None		

Supplies

Table 4 Supplies

Nomenclature	Identification No.	Qty
None		

Spares

Table 5 Spares

Nomenclature	Identification No.	Qty
None		

Safety conditions

None.

Procedure

1. Put the scissors group (Fig 1) on an applicable work table.
2. Remove these parts that attach the FWD half-scissors (3) to the AFT half-scissors (7):
   - The cotter pin (5)
   - The nut (5)
   - The washer (6)
   - The washer (8), if installed
   - The bolt (1)
   - The washer (2).

   Discard the cotter pin (4).
3. Disconnect the AFT half-scissors (7) from the FWD half-scissors (3).

Requirements after job completion

1. Assemble the scissors group. Refer to 0B-A-64-31-02-00A-710A-A.

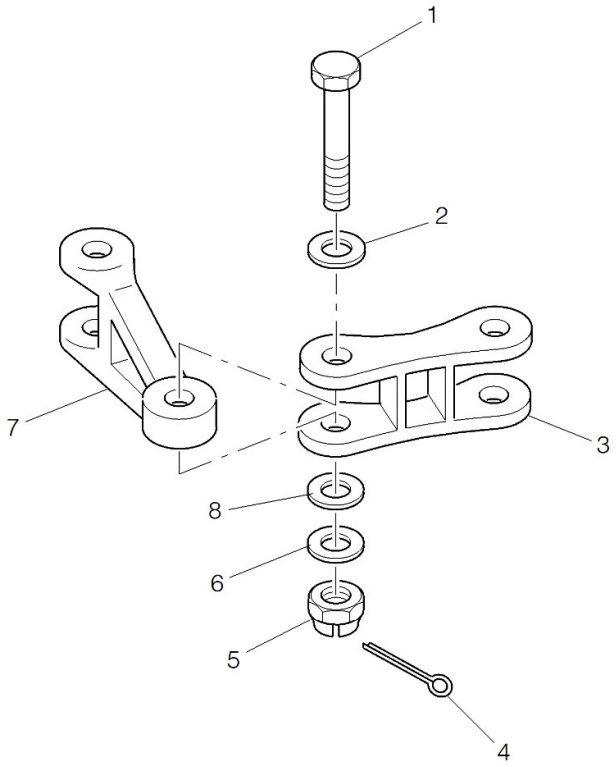

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Figure 1 – Scissors group - Disassemble procedure.

Annex 8

Scissors group – Assemble procedure

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References

Table 1 References

Data Module	Title
09-A-00-50-00-00A-013A-D	Material data information publication – Numeric index
0B-A-00-20-00-00A-120A-A	Helicopter safety – Pre-operation
0B-A-64-31-02-00A-720A-B	Scissors group – Install procedure

Preliminary requirements

Required conditions

Table 2 Required conditions

Condition	Data Module/Technical Publication
The helicopter must be safe for maintenance	0B-A-00-20-00-00A-120A-A

Support equipment

Table 3 Support equipment

Nomenclature	Identification No.	Qty
None		

Supplies

Table 4 Supplies

Nomenclature	Identification No.	Qty
1. Corrosion inhibiting compound	C505 (2)	AR
2. Corrosion preventive compound	C509 (2)	AR
3. Corrosion inhibiting compound	C587 (2)	AR

(2) Refer to 09-A-00-50-00-00A-013A-D of the Material Data Information Publication.

Spares

Table 5 Spares

Nomenclature	Identification No.	Qty
1. Cotter pin	MS24665-155 MS24665-151 (Alternative)	2 EA

Safety conditions

WARNINGS

- **The materials that follow are dangerous. Before you do this procedure, make sure that you know all the safety precautions and first aid instructions for these materials:**
  - **Corrosion inhibiting compound (C505)**
  - **Corrosion preventive compound (C509)**
  - **Corrosion inhibiting compound (C587).**
- **This installation includes Vital Points (VP). During the procedure, you must obey the Local Regulations applicable to the Vital Points.**

Procedure

1. Put the FWD half-scissors (3, Fig 1) and the AFT half-scissors (7) on an applicable work table.

2. Put the AFT half-scissors (7) in its position on the FWD half-scissors (3).

3. Apply the Corrosion inhibiting compound (Supply Ref. 1) or Corrosion inhibiting compound (Supply Ref. 3) to the shank of the bolt (1). (**VP**)

4. Connect the AFT half-scissors (7) to the FWD half-scissor (3) with the bolt (**1**), washers (2 and 6) and nut (5). Fully tighten all components. Do not torque nut. (**VP**)

5. Manually determine the axial play between AFT half-scissors (7) and FWD half-scissors (3) along bolt axis in the way that follows:

5.1. Turn the AFT half-scissors (7) back and forth, from “a” to “b” as shown in Fig 2 Detail A, until you get the position of minimum play. Stop the AFT half-scissors in this position. (**VP**)

5.2. Torque the nut (5, Fig 1) until you get to the cotter pin hole on the bolt (1) with no axial play between components. AFT half-scissors must move freely with no binding. Slight friction is permitted. (**VP**)

5.3. If you find too much binding / friction, replace the nut (5) with a new one and do again Step 5.1 and Step 5.2. (**VP**)

5.4. If with the new nut (5) you still get too much binding / friction, add a washer (8), thickness 0,4 mm under nut and do again Step 5.1 and Step 5.2. (**VP**)

5.5. If you still get too much binding / friction, contact the TC holder.

6. Install the new Cotter pin (Spare Ref. 1) (4).

7. Apply the Corrosion preventive compound (Supply Ref. 2) to the parts that follow:

- The head of the bolt (1)
- The washer (6), the washer (8), if installed, the nut (5) and the cotter pin (4). (**VP**)

Requirements after job completion

1. Install the scissors group. Refer to 0B-A-64-31-02-00A-720A-A.

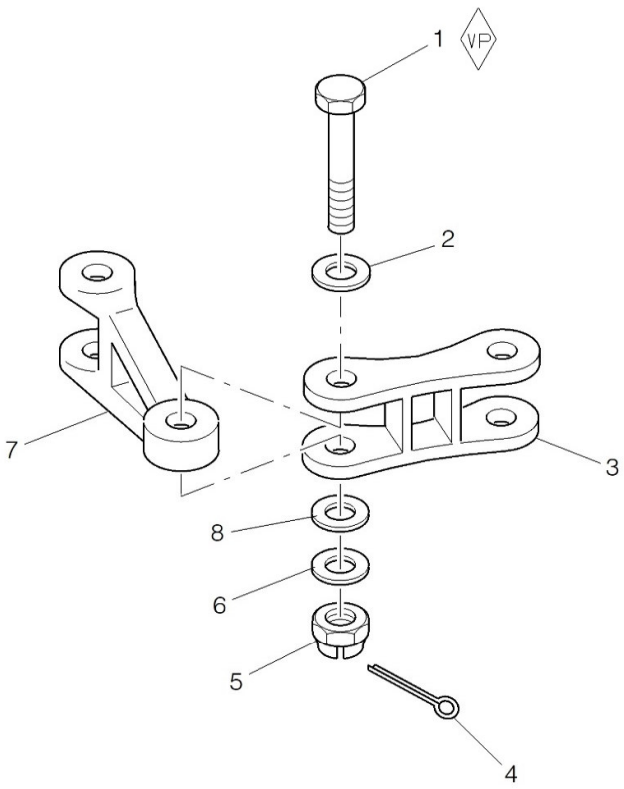

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Figure 1 – Scissors group - Assemble procedure.

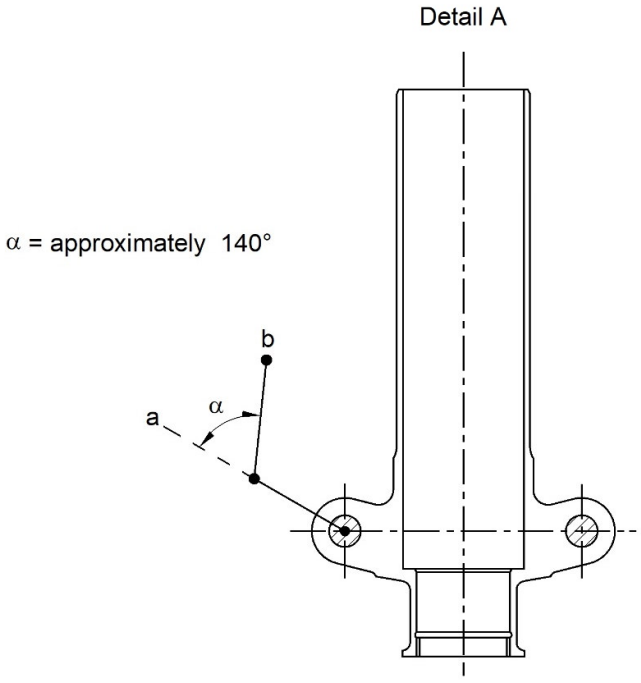

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Figure 2 – Link play check.

Annex 9

64-31-6. Removal/installation (Sleeve assy P/N 109-0130-94)
(Fig 64-29)

A. Input Conditions
(1) Required conditions:
- Helicopter safe for maintenance (Chap 00)
- Access panels P5 and P12 removed
- Tail rotor hub and blade assembly removed (Sect 64-00).

(2) Support equipment:
- Tool, T/R pitch change slider ring nut removal/installation (LSE NO 49)
- Tool, T/R pitch change housing ring nut removal/installation (LSE NO 130)
- Tool, T/R pitch change housing duplex bearing removal (LSE NO 131)
- Tool, T/R pitch change housing duplex bearing installation (LSE NO 132)
- Tool, T/R pitch change slider installation (LSE NO 133)
- Tool, T/R pitch change slider removal (LSE NO 101)
- Syringe (Local supply)
- Heating gun (Local supply)
- Feeler gage (Local supply)
- Depth micrometer gage (Local supply)
- Refrigerator (Local supply)

(3) Consumable materials:

WARNING: THE CONSUMABLE MATERIALS THE NOMENCLATURE OF WHICH IS PREFIXED BY “(D)” ARE DANGEROUS MATERIALS.BEFORE USE, MAKE SURE TO KNOW THE SAFETY PRECAUTIONS AND FIRST AID INSTRUCTIONS PRINTED ON:
- THE LABEL ON THE CONTAINER THE MATERIAL WAS SUPPLIED IN
- THE MATERIAL SAFETY DATA SHEET
- THE LOCAL SAFETY REGULATIONS.
ALSO MAKE SURE THAT THE APPLICABLE FIRST AID MATERIALS ARE AVAILABLE.

- (D) Sealing compound (C029)
- Safety wire (C014)
- (D) Primer (C446)
- Safety wire (C013)
- (D) Grease (C594)
- Cloth, soft lint-free (C011)
- (D) Solvent, cleaning (C023)
- (D) Oil (C139)
- (D) Primer (C237)
- (D) Corrosion preventive compound (C509)
- (D) Corrosion inhibiting compound (C505)
- (D) Corrosion preventive compound (C587)

(4) Other recommendations: None.

WARNING: THIS INSTALLATION INCLUDES VITAL POINTS (**VP**). DURING THE PROCEDURE, YOU MUST OBEY THE LOCAL REGULATIONS APPLICABLE TO THE VITAL POINTS.

CAUTION: MAKE SURE THAT YOU DO NOT MIX GREASES OF DIFFERENT BRANDS ALTHOUGH THE SPECIFICATIONS ARE THE SAME. REFER TO THE HELICOPTER LOG BOOK TO PREVENT MIXTURE OF UNWANTED GREASES.

CAUTION: THIS COMPONENT INCLUDES CRITICAL PARTS. EXAMINE THE COMPONENT FOR SIGNS OF STRUCTURAL DAMAGE, BEFORE YOU INSTALL IT ON THE HELICOPTER. REFER TO SECT 20-40.

B. Removal Procedure.

(1) Disconnect tail rotor pitch control tube (59) from torque shaft control lever (49) by removing attaching hardware. Discard cotter pin.

(2) Disconnect FWD half scissor (30) from sleeve (25) and AFT half scissor (35) from slider (23) by removing attaching parts. Discard cotter pins.

(3) Detach AFT half scissor (35) from FWD half scissor (30) by removing attaching parts. Discard cotter pin.

(4) Cut lockwire from forward boot (26) and withdraw sleeve (25) from gearbox shaft. Remove forward boot (26) from sleeve (25).
Valid for sleeve assy P/N 109-0130-90-121: if loose remove bushing (27). Ref. to Para 64-31-6B.
Valid for sleeve assy P/N 109-0130-90-129: if loose bushing (27) contact TC holder or an Authorized repair center.

NOTE: Mark position of pitch control links (20) to reconnect in same position during reassembly of slider.

CAUTION: REMOVE THE PITCH CONTROL LINK (20) IN THE SEQUENCE AS FOLLOWS FOR NOT DAMAGE THE LINK.

(5) Remove pitch control link (20) from slider arm (23), by removing parts; the bolt (21), the washer (22), damper washer (60), the other washer (22), the nut (38) and discard the cotter pin (38A) remove pitch control link (20).

(6) Remove and discard cotter pin (70), remove the nut (66), the flat surface cup washer (67), the spacer (68) (if installed), the washer (69) and disconnect the pitch control link (20) from the blade (71).

(7) Remove links (10) by removing attaching parts. Discard cotter pins.

(8) Cut lockwire from aft boot (39).

(9) Withdraw housing (15), together with assembled parts, from gearbox shaft.

(10) Disassemble housing (15) and slider assembly (23) as follows:

NOTE: Items 10, 11 and 12 (Fig 64-30) are part of tool (LSE NO 49).

(a) Lock the support (10) on an applicable bench vice.

(b) Put the duplex bearing housing (3) and the pitch change slider assembly (9) on the support (10).

NOTE: In order to avoid damage to the bushings (7) of the pitch change slider (9) during the removal of the ring nut (2), put the pitch change slider (9) on the support (10) with the two pitch change slider arm (6) that touch the two cylindrical fittings (11) as shown in Detail A of 64-30.

(c) Open the two clawed tabs on the lock ring (1), then remove it from the ring nut (2).

(d) Remove the ring nut (2) from the pitch change slider (9) with the wrench (12).

(e) Put the pitch change slider (3, Fig 64-31) and the duplex bearing housing (2) on the support (4) part of the tool (LSE NO 101).

CAUTION: MAKE SURE THAT THE TOOL IS PERFECTLY ALIGNED WITH THE DUPLEX BEARING WHEN YOU PRESS IT OUT IN ORDER TO PREVENT DUPLEX BEARING DAMAGE.

(f) Put the adapter (1) part of the tool (LSE NO 101) on the pitch change slider (3) then, with an applicable press, remove the pitch change slider from the duplex bearing housing (2).

(g) Lock the support (4, Fig 64-32) part of the tool (LSE NO 130) on an applicable bench vice.

(h) Put the duplex bearing housing (1) on the support (4), part of the tool (LSE NO 130), then lock with the two bolts (3 and 5) part of the tool (LSE NO 130).

NOTE: The ring nut (5, Fig 64-30) is installed with retaining compound. To remove it a high torque will be necessary. Use an applicable lever to remove it.

(i) Cut the lock wire, in two places, then, with the wrench (2, Fig 64-32) part of the tool (LSE NO 130), remove the ring nut (5, Fig 64-30).

NOTE: Items 1, 3 and 4 of Fig 64-33 are part of the tool (LSE NO 131).

(j) Put the duplex bearing housing (2) on the support (1).

NOTE: To help remove the duplex bearing (4, Fig 64-30) from the duplex bearing housing (3) a light heating of the external part of the duplex bearing housing with a heating gun is permitted. The temperature must not be more than 90° C. To prevent damage to the duplex bearing do not apply hot air directly on the duplex bearing boots.

(k) Put the two adapters (3 and 4, Fig 64-33) on the duplex bearing housing (2) then with an applicable press remove the duplex bearing (4, Fig 64-30) from the duplex bearing housing (3).

(11) Remove boot (39, Fig 64-29).

(12) Remove attaching parts of levers (5 and 49), then remove levers and shims (8) and extract pivot (9) from lugs on gearbox.

(13) Disconnect pitch control lever (40) from link (46) by removing attaching parts. Remove lever (40). Discard cotter pin.

(14) Disconnect link (46) from lugs on gearbox by removing attaching parts. Remove link (46). Discard cotter pin.

C. Installation Procedure.

CAUTION: INSTALL THE FWD HALF-SCISSOR (30, FIG 64-29) AND AFT HALF-SCISSOR (35, FIG 64-29) IN THE CORRECT LOCATION AND ORIENTATION AS SHOWN IN DETAIL C1 OF FIG 64-29.

NOTE: During the installation of the self-locking bolts or the self-locking nuts, when the locking is engaged, with the torque wrench (Local supply), make sure that the locking torque necessary to move the bolts or nuts, before contact with the washer, is between the minimum breakaway torque and the maximum locking torque. If you do not get his value, discard the bolts and/or nuts.

(1) Position torque shaft (9, Fig 64-29) in 90-degree gearbox lugs.

(2) Install laminated shims (8) and levers (5 and 49) on torque shaft (9). Do not torque attaching parts.

NOTE: If any of the following items: 90-degree gearbox case, torque shaft (9) levers (5 and 49) laminated shims (8) have been replaced, proceed as follows:

(a) Position torque shaft (9) in 90-degree gearbox lugs.

(b) Position levers (5 and 49) on torque shaft (9) without shims and secure temporarily in position.

(c) Measure the total gap between one lever and the adjacent lug with a feeler gauge. Half of the gap is dimension of each laminated shim (8).

(d) Remove levers (5 and 49) from torque shaft (9).

(e) Fit laminated shims (8) on torque shaft (9) then reinstall levers (5 and 49) and secure. Do not torque nuts (3 and 51) at this time.

(f) Check for free rotation of pivot. If shim thickness is unsatisfactory, modify the shims the same amount on either side to obtain an axial play between 0,03 and 0,08 mm between 90° gearbox lugs bearings and levers (5 and 49) when installed.

NOTE: Before installing the boot in the housing and slider group deform the boot metallic rim to an oval shape with a maximum diameter of 43 thru 44 mm (1.693 thru 1.732 in) as shown in DETAIL D of figure 64-29. This is to help a tighter fit in the seat. Put the inboard boot in its position in the housing and slider group.

(3) Position aft boot (39) on gearbox shaft.
(4) Reassemble housing (15) and slider assembly (23) as follows:

CAUTION: BEFORE YOU ASSEMBLE THE HOUSING AND SLIDER GROUP (1, FIG. 64-34), PUT THE COMPONENT THAT FOLLOW AND THE RELATED ATTACHING PARTS ON AN APPLICABLE WORK TABLE.
CAREFULLY EXAMINE THE COMPONENT AND THE RELATED ATTACHING PARTS FOR CORROSION, NICKS AND DAMAGE, WEAR AND FRETTING. IF YOU FIND THAT THE COMPONENT IS DAMAGED, REPLACE IT.
- THE DUPLEX BEARING (4)
- THE HOUSING (5).

(a) Divide the two parts of the duplex bearing (4).

NOTE: Do Step C.(4)(b) thru Step C.(4)(d) only for removed bearings. New bearings are supplied already lubricated and must not be filled with grease.

(b) Fill the Syringe (Local supply) with the Grease (C594).
(c) Before you install the bearing (8), fill it with 3.5 cc (0.21 in3) of grease with the syringe from the side opposite to the boot. Refer to Detail A of Fig. 64-34.
(d) Do Step C.(4)(c) again on the bearing (9).
(e) Put the bearing (8) against the bearing (9) with the boot sides externally and the internal and external V-marks aligned to show an arrow. See Detail A, Fig. 64-34.
(f) Install the duplex bearing (4) into the housing (5) in the way that follows:
1. Apply a thin layer of Primer (C446) on the mating surfaces between the duplex bearing (4) and housing (5).
2. Put the housing (5) on the Base (10), part of the tool (LSE NO 132).

WARNING: BE CAREFUL WHEN YOU USE HEAT. HOT PARTS CAN CAUSE INJURY TO THE PERSONS. ALWAYS USE APPLICABLE PROTECTIVE CLOTHING.

3. Heat the housing (5) to a temperature between 60 and 70 °C with the Heating gun (Local supply). This will help you to install the duplex bearing (4) into the housing. Make sure that the temperature is not more than 90 °C (heating gun set to a temperature of 90 °C).

NOTE: As an alternative to heating the housing (5); you can cool down the duplex bearing (4) with the Refrigerator (Local supply) to a temperature between -18 and -40 °C for 30 minutes. Do not touch the cold slider with bare hands to prevent injury.

4. Push the duplex bearing (4) into the housing (5). To do this, use the Pin (11), part of the tool (LSE NO 132) and an applicable arbor press.
5. Make sure there is no clearance between the two bearings (8 and 9) and between the outer ring of duplex bearing (4) and the shoulder of the housing (5). To do this, use the applicable Feeler gage (Local supply).
6. Remove the housing-bearing assembly (12) from the base (10).

NOTE: Before you continue, make sure that all the components are at ambient temperature.

(g) Install the ring nut (3) into the housing-bearing assembly (12). Obey the instructions that follow:
1. Clean the threads of the ring nut (3) and the housing (5) with the Cloth, soft lint-free (C011) and the Solvent, cleaning (C023). (**VP**)
2. Dry the threads of the ring nut (3) and the housing (5) with a clean Cloth, soft lint-free (C011). (**VP**)
3. Apply a layer of Primer (C237) on the threads of the ring nut (3).
4. Apply a layer of Primer (C237) on the threads of the housing (5).

5. Apply four drops of Sealing compound (C029) on the threads of the ring nut (3). Put them in four equally spaced positions (90 degrees apart). (**VP**)
6. Lock the Base (14), part of the tool (LSE NO 130) in an applicable vice.
7. Put the housing-bearing assembly (12) on the base (14), then lock it with the two Bolts (13), part of the tool (LSE NO 130).
8. Install the ring nut (3) in the housing-bearing assembly (12) with the Wrench (15), part of the tool (LSE NO 130).
9. Torque the ring nut (3) to 117,7 thru 127,5 Nm (86,8 thru 94 lbf ft). (**VP**)
10. Make sure that the duplex bearing (4) turns freely. (**VP**)
11. Refer to Detail B of Fig. 64-34.
    (a) Measure and record the dimension L.
    (b) Make sure that the dimension you find is between 23.75 to 24.0 mm (0.935 to 0.945 in).
    (c) If you find that the dimension is not in the given limits, remove the duplex bearing (4). Then, do Step C.(4)(f) and Step C.(4)(g) again.
12. Refer to Detail C of Fig. 64-34.
    (a) Measure and record the dimension M.
    (b) Calculate and record the dimension N with this formula: N = M - L.
13. Remove the housing group (16) from the base (14).

NOTE: The safety wire must be installed with the double-twist method and put in tension. Example of an acceptable safety wire installation is shown in Detail B1 of Fig. 64-34. As a general approach, an “a” angle between 60° and 120° is adviseable.

14. Safety the ring nut (3) to the housing (5) with the new Safety wire (C014) in two places as shown in Detail B1 of Fig. 64-34. Refer also to Section 20-10. (**VP**)

(h) Apply a thin layer of Oil (C139) on the internal surface of the duplex bearing (4).
(i) Put the Bushing (18), part of the tool (LSE NO 133) in its position on the Pin (19), part of the tool (LSE NO 133).
(j) Put the housing group (16) on the pin (19) above the bushing (18).
(k) Put the slider (2) on the pin (19).

NOTE: To help you install the slider (2), heat the housing group (16) in an oven preheated to a temperature of 50 °C for 15 to 30 minutes.
As an alternative to heating the housing group (16); you can cool down the slider (2) with the Refrigerator (Local supply) to a temperature between -18 and -40 °C for 30 minutes. Do not touch the cold slider with bare hands to prevent injury.

(l) Push the slider (2) into the housing group (16). To do this, use the Barrel (17), part of the tool (LSE NO 133) and an applicable arbor.
(m) Remove the housing-slider assembly (20) from the pin (19).

NOTE: Before you continue, make sure that all the components are at ambient temperature.

(n) Make sure there is no clearance between the inner rings of the two bearings (8 and 9) and the shoulder of the slider (2). To do this, use the applicable Feeler gage (Local supply).
(o) Refer to Detail D of Fig. 64-34:
    1. Measure and record the dimension N. To do this, use an applicable Depth micrometer gage (Local supply).
    2. Make sure that the dimension N measured agrees with the dimension calculated at Step C.(4)(g)12.b.
    3. If you find that the dimension N does not agree, remove the duplex bearing (4). Then, do Step C.(4)(f) and Step C.(4)(o) again.
(p) Lock the Base (22), part of the tool (LSE NO 49) in an applicable vice.
(q) Put the housing-slider assembly (20) on the base (22).

(r) Move the braces (23) of the slider against the pins (24) of the base (22). Refer to Detail E of Fig. 64-34.
(s) Clean the threads of the ring nut (6) and the slider (2) with the Cloth, soft lint-free (C011) and the Solvent, cleaning (C023). (**VP**)
(t) Dry the threads of the ring nut (6) with a clean Cloth, soft lint-free (C011). (**VP**)
(u) Apply a layer of Primer (C237) on the threads of the ring nut (6).
(v) Apply a layer of Primer (C237) on the threads of the slider (2).
(w) Apply four drops of Sealing compound (C029) on the threads of the ring nut (6). Put them in four equally spaced positions (90 degrees apart). (**VP**)
(x) Install the ring nut (6) with the Wrench (21), part of the tool (LSE NO 49).
(y) Torque the ring nut (6) to 49,04 thru 58,84 Nm (36,1 thru 43,4 lbf ft). (**VP**)
(z) Remove the housing and slider group (1) from the base (22).
(aa) Install the new Lock ring (7).
(bb) Bend the clawed tabs of the lock ring (7) on the ring nut (6). Make sure that the two clawed tabs of the lock ring (7) are correctly engaged.

(5) Connect pitch control lever (40) and links (10) to housing (15).
(6) Torque the bolt (14) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(7) Install the cotter pin.
(8) Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank and under head of the bolt (14).

NOTE 1: It is possible to install the bumper washers (40A) between housing (15) and links (10) between lever (40) and housing (15). Before you torque nuts (11), make sure that the spherical bearings of the control lever (40) and link (10) touch the lug of the housing (15) and not the bumper washers (40A).

NOTE 2: Install the two larger washers (13 and 15A) against spherical bearing of pitch control lever (40) and link (10). Install the two small washers (12) between the larger one (15A) and the nut (11). To obtain proper torque, replacement of one smaller washer AN960C416 with an AN960C416L washer is permitted.

NOTE 3: During the installation, if the total clearance between the pitch control lever (40) and the housing (15) is more than 0,3 mm, install one washer (65) P/N AN960PD416L (superseded by P/N NAS1149D0416K) on one attachment point bolt (14).

(9) Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) on the shank of the bolt (21).
(10) Connect pitch control links (20) to slider (23) following markings made at removal. Install between links and slider damper washers (60) with bolt (21), washers (22) and nut (38).
(11) Torque the bolt (21) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(12) Install the cotter pin.
(13) Apply the Corrosion preventive compound (C509) to the nut (38), protruding thread of bolt (21) and cotter pin (38A).
(14) Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) on the shank of the blade pin.
(15) Put the connecting link (46) in position on the lever (40) and the fitting (61).
(16) Put the four washers (46A) and the two shims (46B) in their position between the connecting link (46), the lever (40) and the fitting (61).

(17) Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank and under head of the bolt (58). Secure the connecting link to fitting (61) using the bolt (58), washers (57, 56) and nut t (55)
(18) Measure clearance between the link (46) and the fitting (61); if the clearance is more than 0.05 mm (0.002 in), adjust thickness of shim (46B).

NOTE: Shims (46B) can be installed on the top side or either on the bottom side of link (46).

(19) Torque the bolt (58) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(20) Install the cotter pin.
(21) Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank and under head of the bolt (44), then secure the connecting link to lever (40) using the bolt (44), washers (42, 43) and nut (41);
(22) Measure clearance between the link (46) and the lever (40); if the clearance is more than 0.05 mm (0.002 in), adjust thickness of shim (46B).
(23) Torque the bolt (44) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(24) Install the cotter pin.
(25) Install the assembly on 90-degree gearbox output shaft. Lockwire boot aft (39) with safety wire (C013).
(26) Connect links (10) to levers (5 and 49). Verify that bolts can turn and slide freely in seats, otherwise reposition lever (49) and/or lever (5) until this requirement is satisfied.
(27) Torque the bolts (45) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(28) Install the cotter pin.

NOTE: Install larger washer under bolt head and small washer under nut.

(29) Torque the bolt (7 and 47) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 5.65 thru 7.91 N m (50 thru 70 lbf in)

(30) Install the cotter pin.
(31) Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank and under head of the bolt (45).

CAUTION: CHECK THAT LEVERS (5 AND 49) ARE ALIGNED TO EACH OTHER, AND THAT BEARING (18) IS NOT PRELOADED.

(32) Connect the free arm of torque shaft control lever (49) to tail rotor control tube (59) with the bolt (52), the washer (53) and the nut (54).
(33) Torque the bolt (52) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):

- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(34) Install the cotter pin.
(35) Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank and under head of the bolts (52).
(36) Valid only for sleeve (25) P/N 109-0130-90-121: if removed, install bushing (27) into sleeve (25). Ref. to Para 64-31-6B.
Valid only for sleeve (25) P/N 109-0130-90-129: if it is necessary to install bushing (27) into sleeve (25), contact TC holder or an Authorized repair center.
(37) Install forward boot (26) on sleeve (25).
(38) Install sleeve (25) on gearbox shaft. Lockwire forward boot (26) as required using safety wire (C014).
(39) Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank of the bolts (32).

NOTE: Make sure that the head of the bolt (32) points in the direction of the rotation of the tail rotor.

(40) Connect the FWD half-scissor (30) to the sleeve (26) with the bolt (32), washers (29 and 31) and nut (28). Fully tighten all components. Do not torque nut.
(41) Manually determine the axial play between FWD half-scissor (30) and sleeve (26) along bolt axis in the way that follows:
(a) Turn the FWD half-scissor (30) back and forth, from “a” to “b” as Shown in Fig 64-29B Detail A, until you get the position of minimum play. Stop the FWD half-scissor (30) in this position. (**VP**)
(b) Torque the nut (28) until you get to the cotter pin hole on the bolt (32) with no axial play between components. FWD half-scissor must move freely with no binding. Slight friction is permitted. (**VP**)
(c) If you find too much binding / friction, replace the nut (32) with a new one and do again Step C.(36)(a) and Step C.(36)(b). (**VP**)
(d) If with the new nut (28) you still get too much binding / friction, add a washer (31A) P/N NAS1149F0416P under nut and do again Step C.(36)(a) and Step C.(36)(b). (**VP**)
(e) If you still get too much binding / friction, contact the TC holder.
(42) Connect the AFT half-scissor (35) to the FWD half-scissor (30) with the bolt (72), washers (73 and 74) and nut (75). Fully tighten all components. Do not torque nut. (**VP**)
(a) Before install the bolt (72) that connect the FWD half-scissor and AFT half-scissor apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587).
(43) Manually determine the axial play between AFT half-scissors (35) and FWD half-scissors (30) along bolt axis in the way that follows:
(a) Turn the AFT half-scissors (35) back and forth, from “a” to “b” as Shown in Fig 64-29B Detail B, until you get the position of minimum play. Stop the AFT half-scissors (35) in this position. (**VP**)
(b) Torque the nut (75) until you get to the cotter pin hole on the bolt (72) with no axial play between components. AFT half-scissor must move freely with no binding. Slight friction is permitted. (**VP**)
(c) If you find too much binding / friction, replace the nut (75) with a new one and do again Step C.(38)(a) and Step C.(38)(b). (**VP**)
(d) If with the new nut (75) you still get too much binding / friction, add a washer (74A) P/N NAS1149F0416P under nut and do again Step C.(38)(a) and Step C.(38)(b). (**VP**)
(e) If you still get too much binding / friction, contact the TC holder.
(44) Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank of the bolts (72).

NOTE: Make sure that the head of the bolt (37) points in the direction of the rotation of the tail rotor.

(45) Connect the AFT half-scissor (35) to the slider (23) with the bolt (37), washers (36 and 34) and nut (33). Fully tighten all components. Do not torque nut.
(46) Manually determine the axial play between AFT half-scissor (35) and the slider (23) along bolt axis in the way that follows:
  (a) Move the slider (23) back and forth until you get the position of minimum play. Stop the sleeve in this position. (**VP**)
  (b) Torque the nut (33) until you get to the cotter pin hole on the bolt (37) with no axial play between components. (**VP**)
  (c) If you find too much binding / friction, replace the nut (33) with a new one and do again Step C.(41)(a) and Step C.(41)(b). (**VP**)
  (d) If with the new nut (33) you still get too much binding / friction, add a washer (34A) P/N NAS1149F0416P under nut and do again Step C.(41)(a) and Step C.(41)(b). (**VP**)
  (e) If you still get too much binding / friction, contact the TC holder.
(47) Install the new Cotter pins on nuts (28, 33 and 75).
(48) Apply the Corrosion preventive compound (C509) to the parts that follow:
  (a) The heads of the bolts (32 and 37).
  (b) The washers (31) and (34), the nuts (28) and (33) and the cotter pins.
(49) Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank and under head of the bolts (32) and (37).

NOTE: Ensure that bolt (32 and 37) heads are facing tail rotor sense of rotation.

(50) On the blade side, install the washer (69) with the countersunk side against the base of the blade pin as shown in detail F of Fig. 64-29.

NOTE: If before removed install spacer (68) as shown in figure.

(51) Put the outboard end of the pitch change control link (20) on the blade pin.
(52) Install the flat surface of cup washer (67) against the pitch change control link (20).
(53) Torque the nut (66) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
  - Locking torque: 9.04 N m (80 lbf in) maximum
  - Breakaway torque: 1.07 N m (9.47 lbf in) minimum
  - Seating torque: 7.91 thru 10.17 N m (70 thru 90 lbf in)
(54) Install the new cotter pin (70).
(55) Apply the Corrosion preventive compound (C509) to the nut (66), protruding thread of the blade pin and cotter pin (70).

D. Follow-On Maintenance Required:
- Install tail rotor hub and blade assembly (Sect 64-00)
- Install access panels P5 and P12.

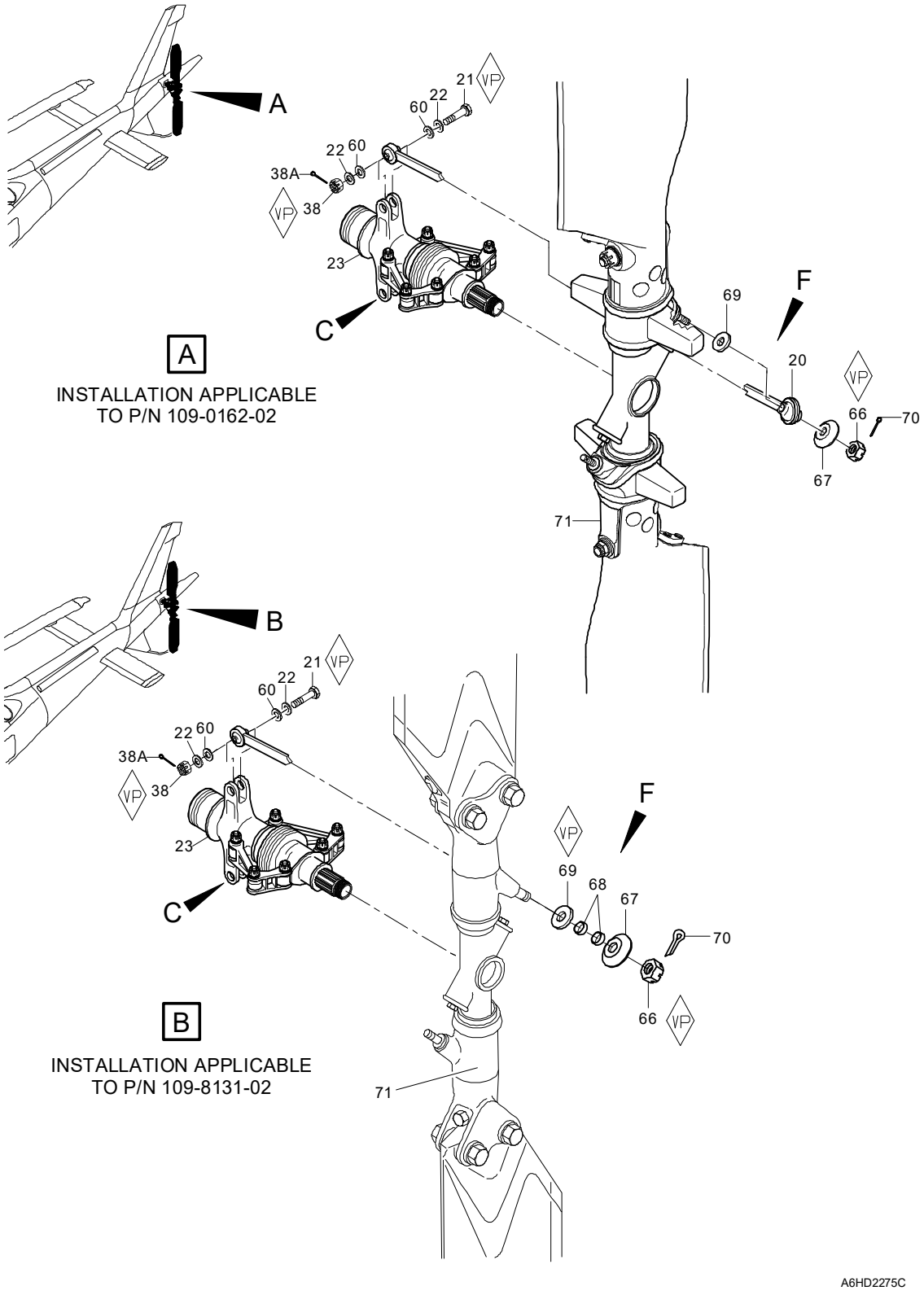


Figure 64-29 (sheet 1 of 5). Pitch change mechanism (Sleeve assy P/N 109-0130-94)

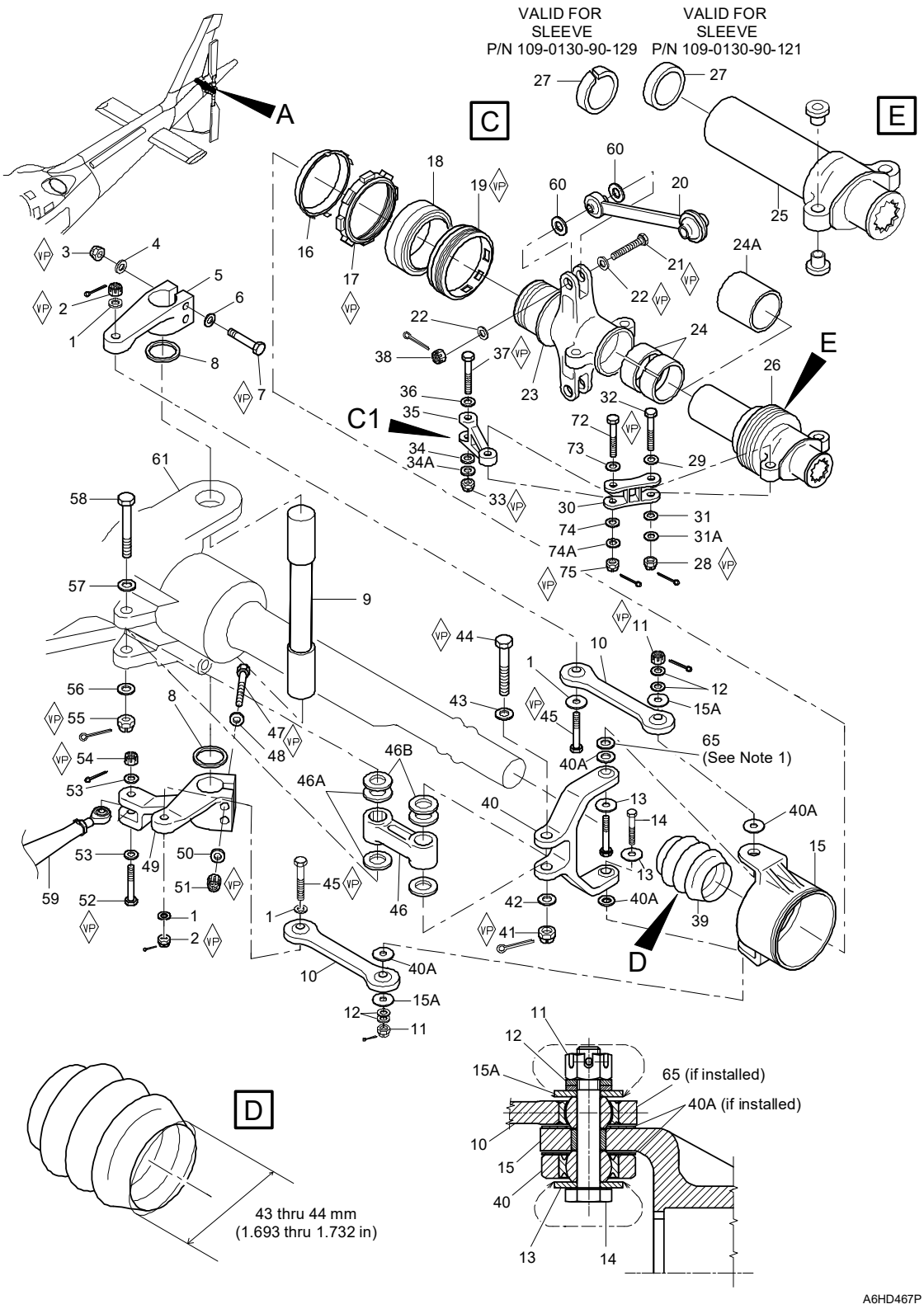


Figure 64-29 (sheet 2 of 5). Pitch change mechanism (Sleeve assy P/N 109-0130-94)

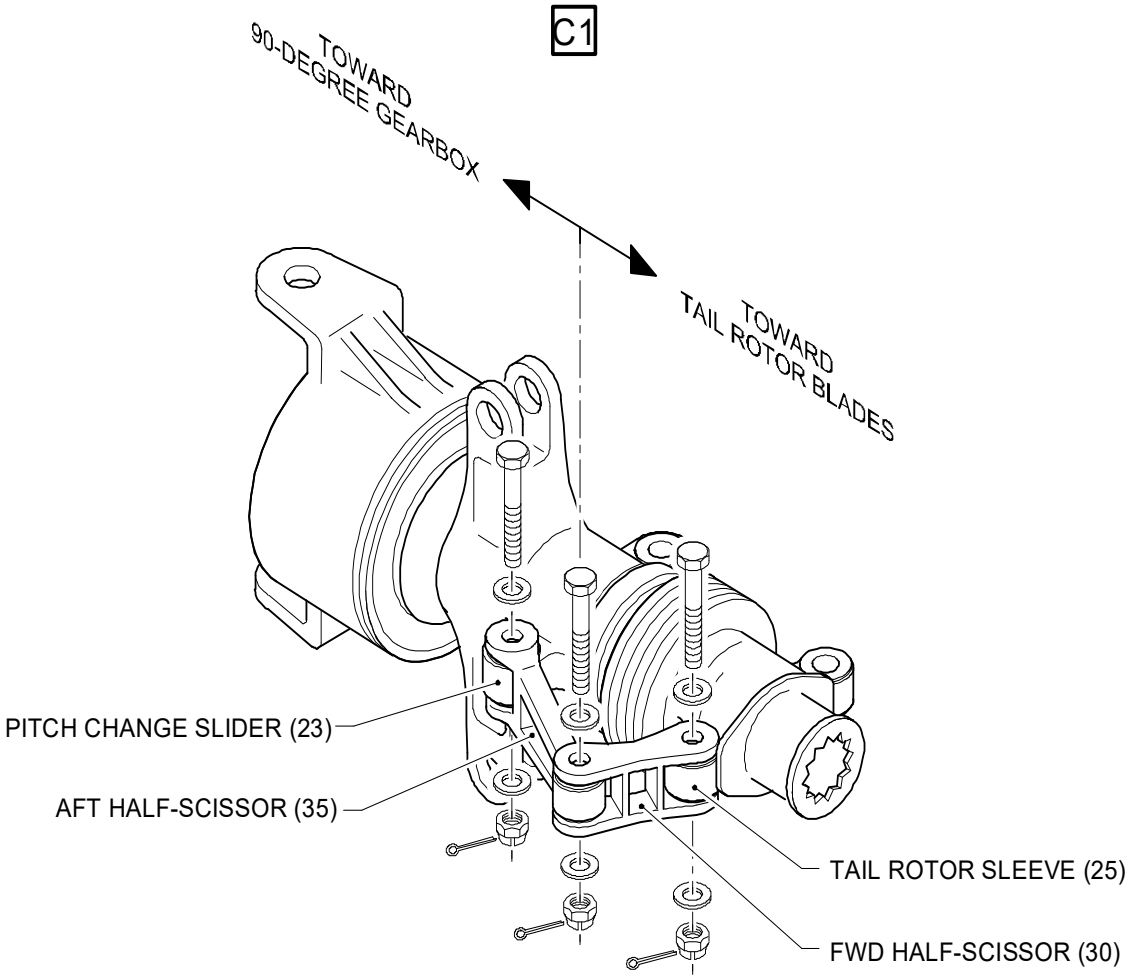


Figure 64-29 (sheet 3 of 5). Pitch change mechanism (Sleeve assy P/N 109-0130-94)

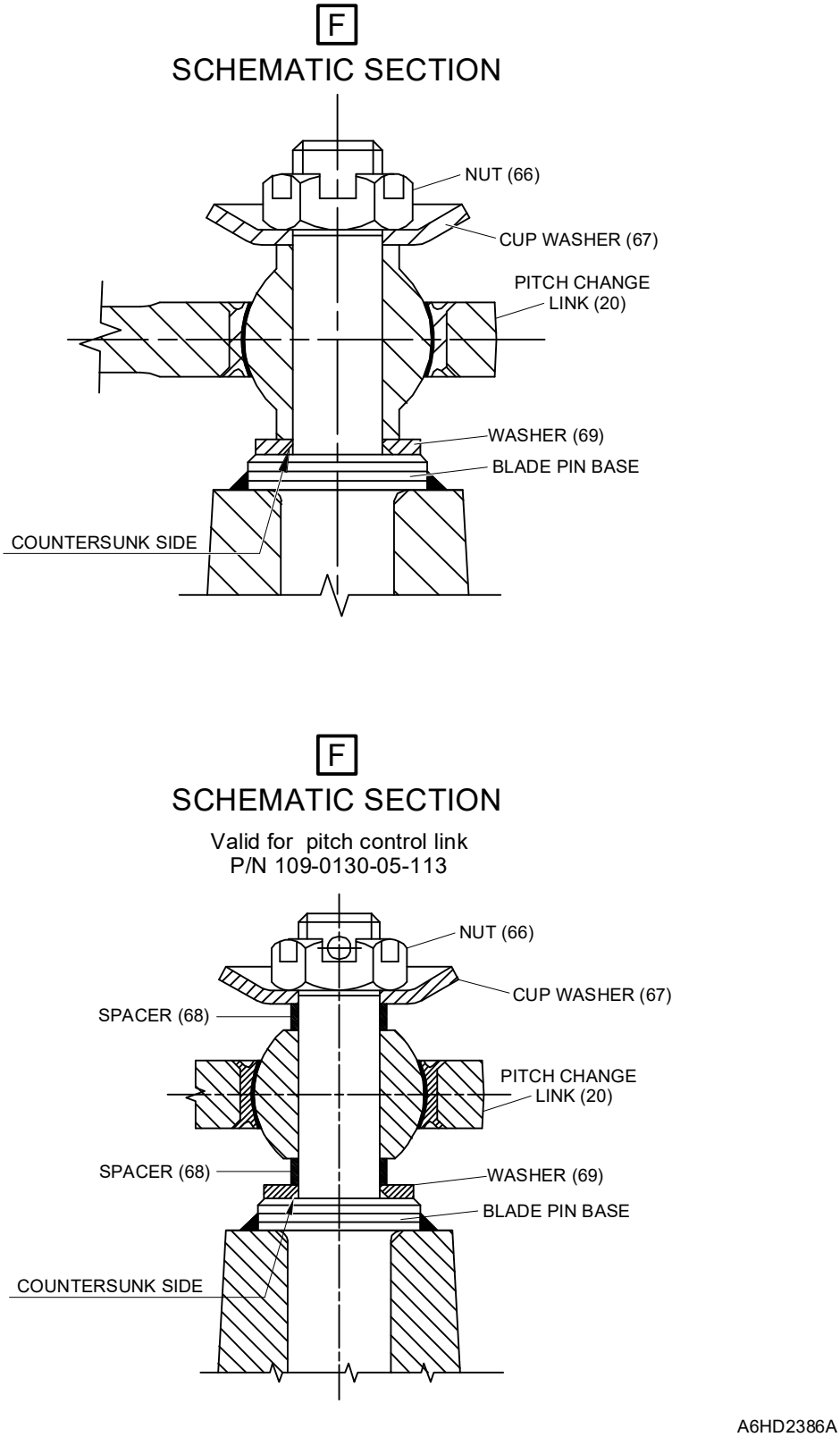


Figure 64-29 (sheet 4 of 5). Pitch change mechanism (Sleeve assy P/N 109-0130-94)

1. Washer
2. Nut
3. Nut
4. Washer
5. Lever
6. Washer
7. Bolt
8. Shim
9. Torque shaft
10. Link
11. Nut
12. Washer
13. Spacer
14. Bolt
15. Housing
15A. Shim
16. Lock ring
17. Ring nut
18. Duplex bearing
19. Ring nut
20. Pitch control link
21. Bolt
22. Washer
23. Slider
24. Bushing (*)
24A. Bushing
25. Sleeve
26. Forward boot
27. Bushing
28. Nut
29. Washer
30. FWD half scissor
31. Washer
31A. Washer (select on fit)
32. Bolt (*)
33. Nut
34. Washer
34A. Washer (select on fit)
35. AFT half scissor
36. Washer
37. Bolt (*)
38. Nut
38A. Cotter pin
39. AFT boot
40. Lever
40A. Bumper washer
41. Nut
42. Washer
43. Washer
44. Bolt
45. Bolt
46. Link
46A. Washer
46B. Washer
47. Bolt
48. Washer
49. Torque shaft control lever
50. Washer
51. Nut
52. Bolt
53. Washer
54. Nut
55. Nut
56. Washer
57. Washer
58. Bolt
59. Tail rotor pitch control tube (ref)
60. Washer, damper
61. T/R gearbox fitting
62. Shim
63. Bushing (**)
64. Shim
65. Washer
66. Nut
67. Flat surface cup washer
68. Spacer (if installed)
69. Washer
70. Cotter pin
71. Hub and blade assy
72. Bolt
73. Washer
74. Washer
74A. Washer (select on fit)
75. Nut

(*) Used with slider P/N 109-0130-91-105.

(**) Used with slider P/N 109-0130-91-117/-119.

NOTE 1:

Washer (65) is shown in this location but, if necessary, can be installed on opposite bolt (14).

Figure 64-29 (sheet 5 of 5). Pitch change mechanism (Sleeve assy P/N 109-0130-94)

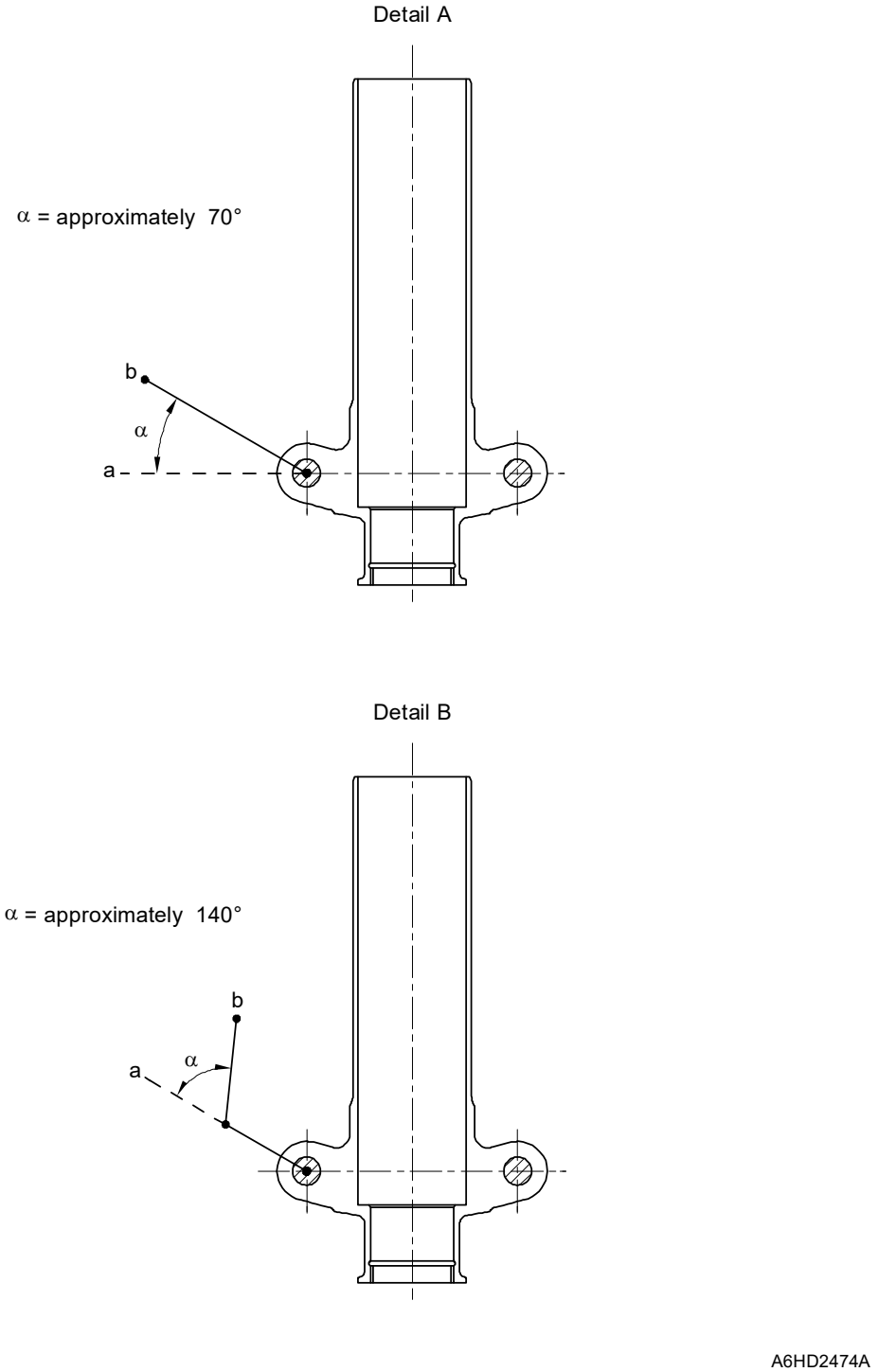
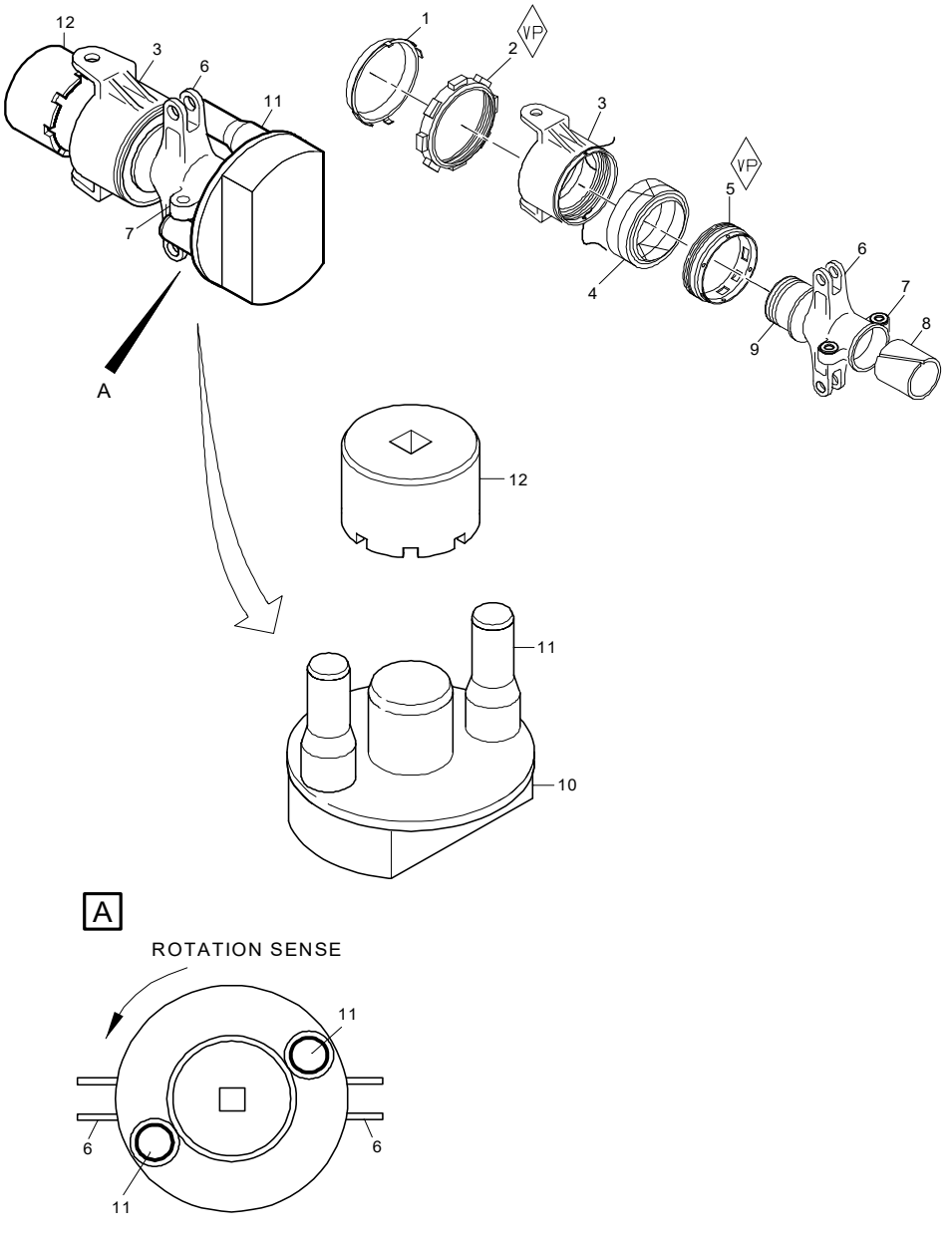
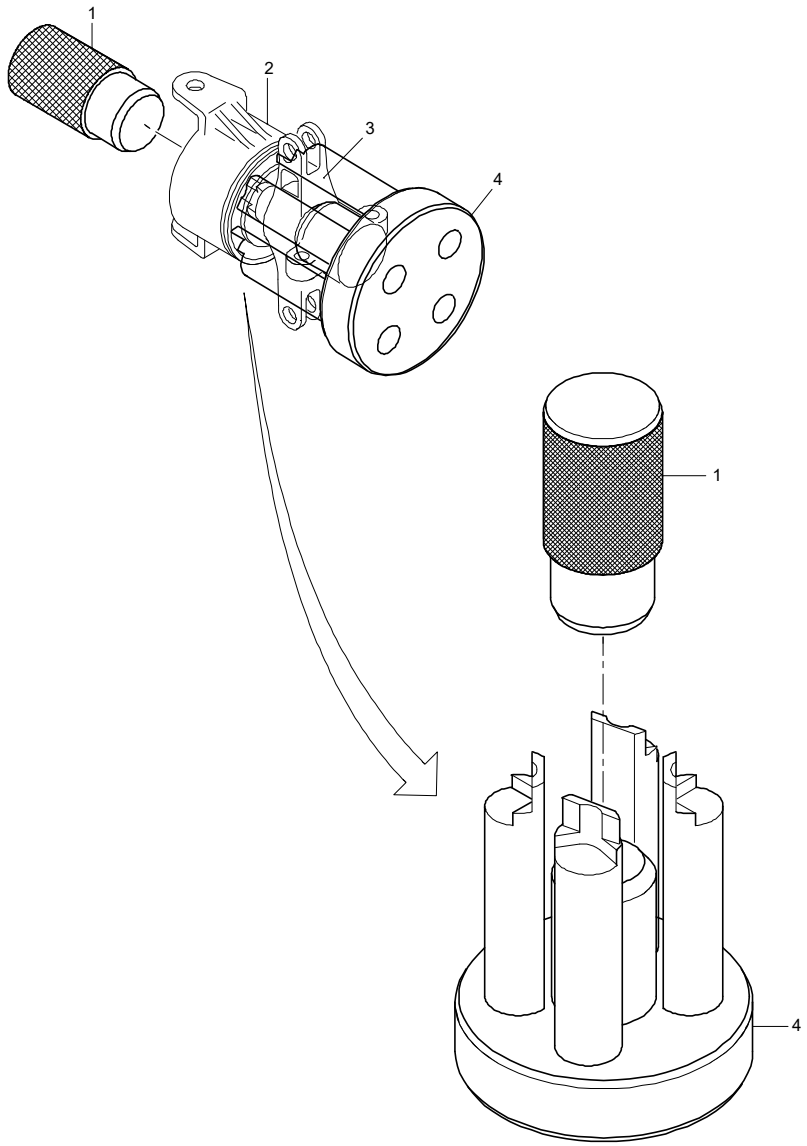


Figure 64-29B. Half scissors play check



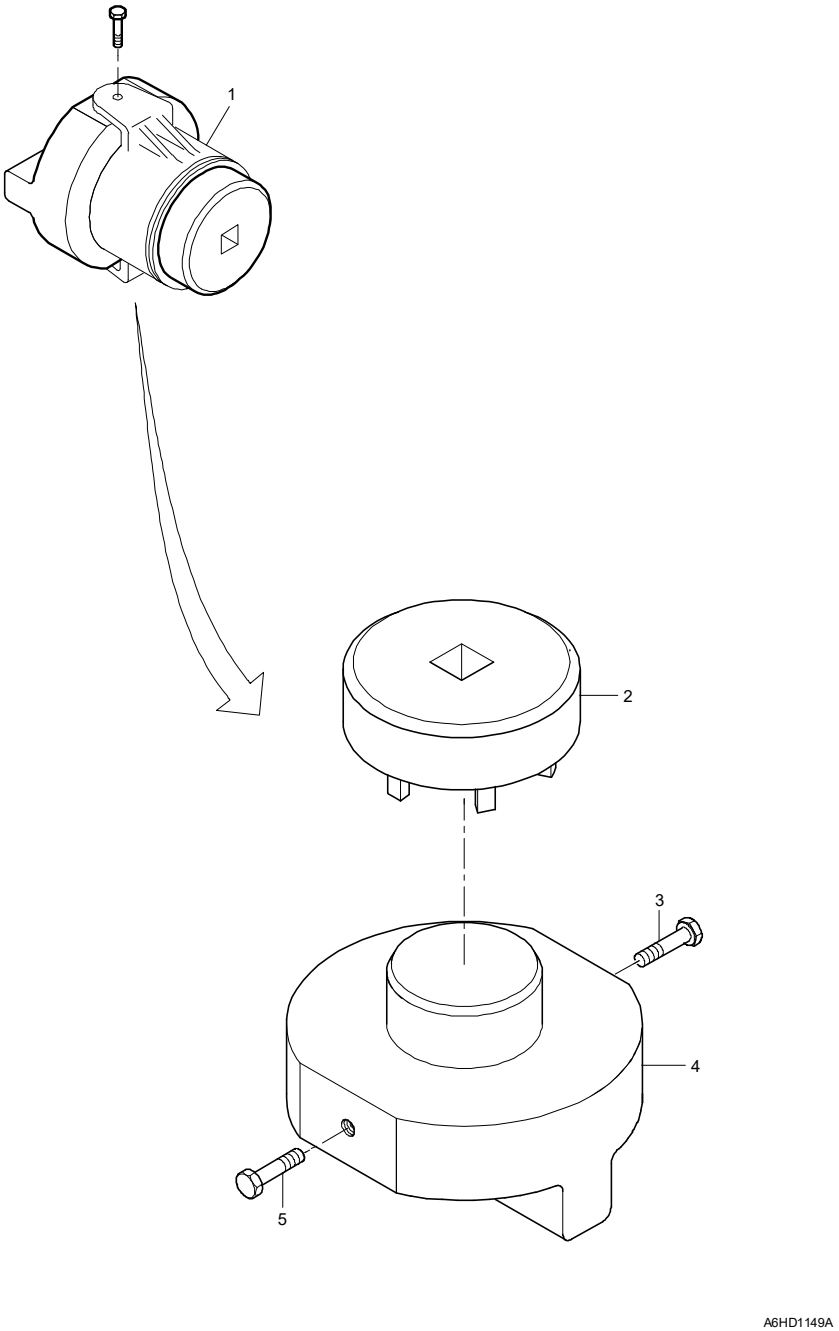
1. Lock ring
2. Ring nut
3. Duplex bearing housing
4. Duplex bearing
5. Ring nut
6. Pitch change slider arm
7. Bushing
8. Bushing
9. Pitch change slider assembly
10. Support
11. Cylindrical fitting
12. Wrench

Figure 64-30. Pitch change slider ring nut removal (Sleeve assy P/N 109-0130-94)



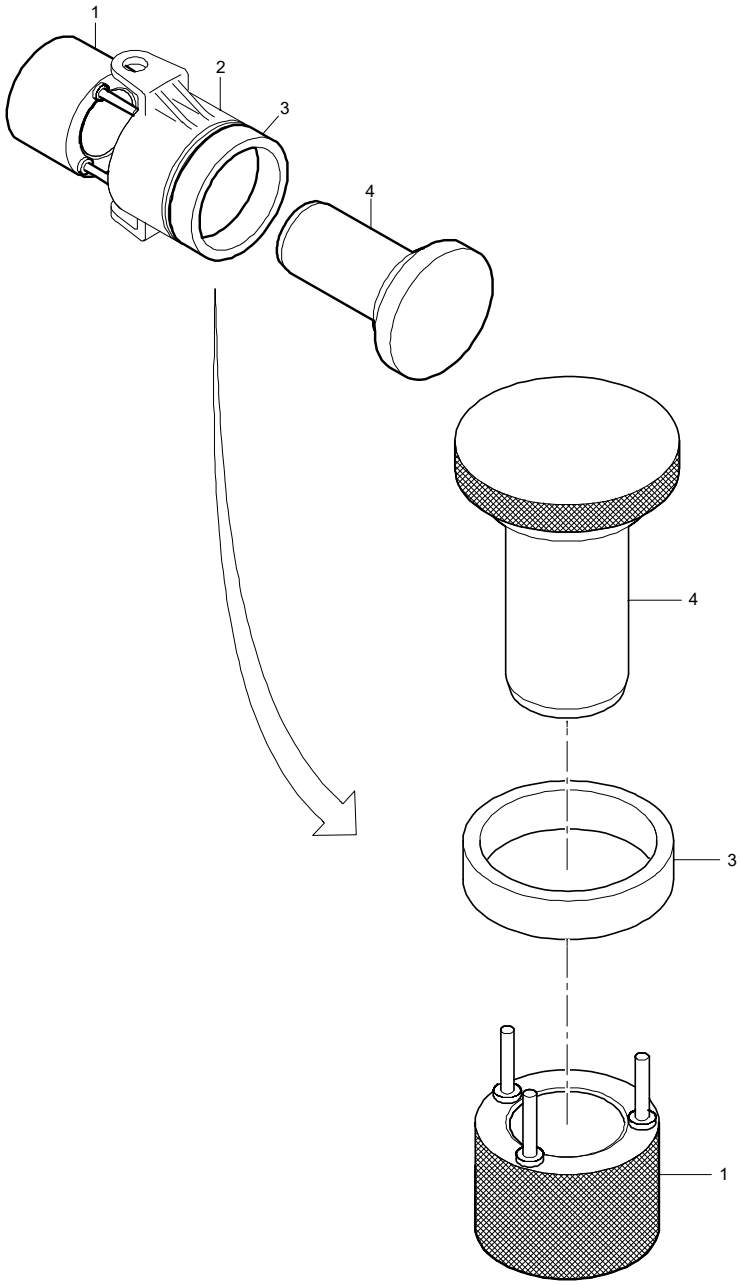
1. Adapter
2. Duplex bearing housing
3. Pitch change slider
4. Support

Figure 64-31. T/R Pitch change slider removal (Sleeve assy P/N 109-0130-94)



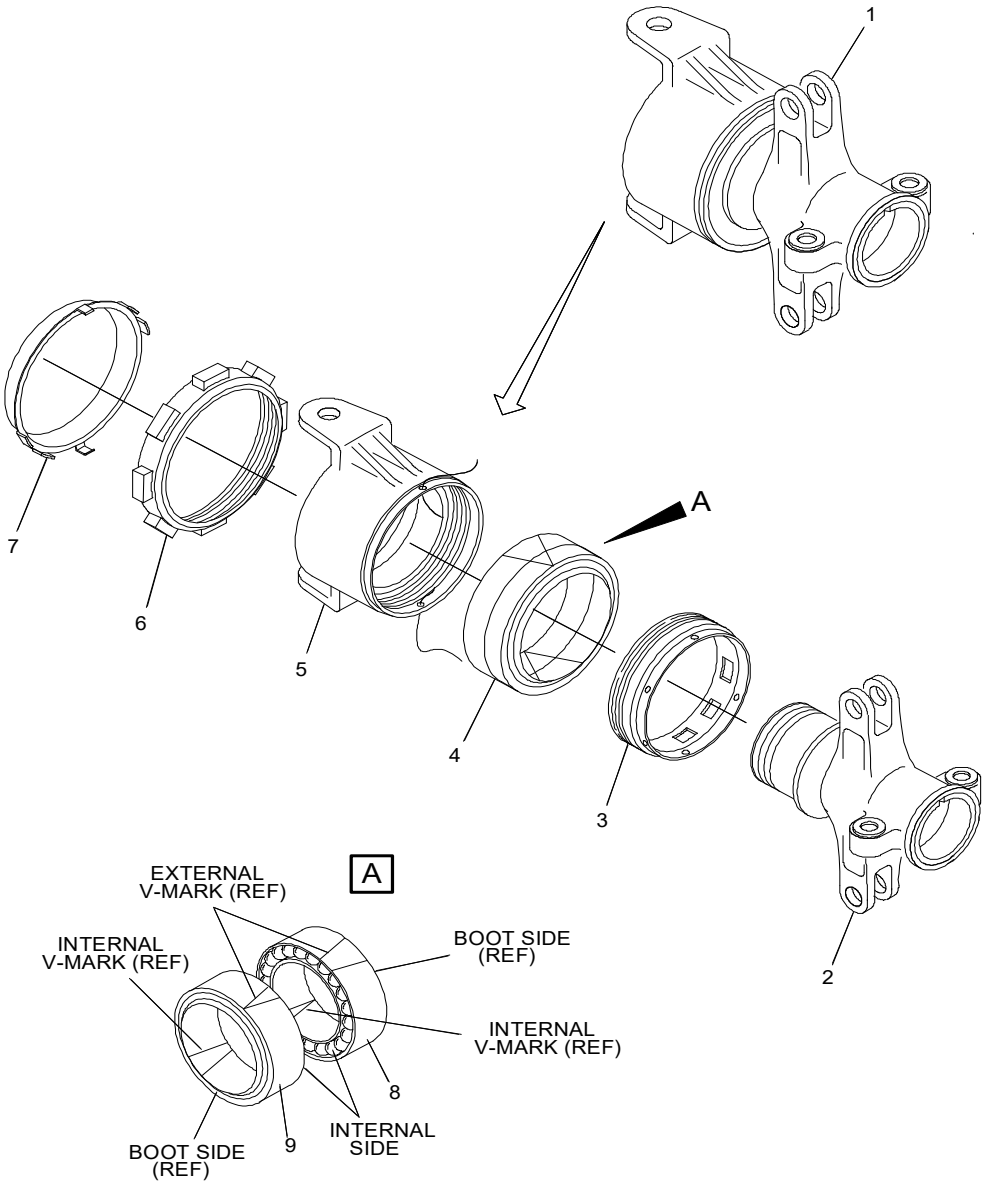
1. Duplex bearing housing
2. Wrench
3. Bolt
4. Support
5. Bolt

Figure 64-32. T/R Pitch change housing ring nut removal (Sleeve assy P/N 109-0130-94)



1. Support
2. Duplex bearing housing
3. Adapter
4. Adapter

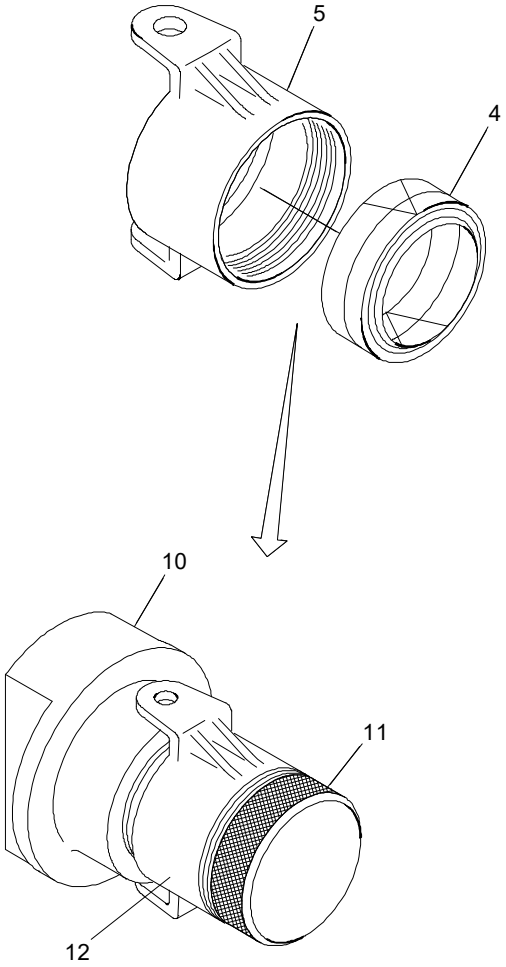
Figure 64-33. T/R Pitch change housing duplex bearing removal (Sleeve assy P/N 109-0130-94)



A6HD1151B

1. Housing and slider group
2. Slider
3. Ring nut
4. Douplex bearing
5. Housing
6. Nut
7. Lock ring
8. Bearing
9. Bearing
10. Base (Part of LSE NO 132)
11. Pin (Part of LSE NO 132)
12. Housing-bearing assembly
13. Bolt (Part of LSE NO 130)
14. Base (Part of LSE NO 130)
15. Wrench (Part of LSE NO 130)
16. Housing group
17. Barrel (Part of the LSE NO 133)
18. Bushing (Part of LSE NO 133)
19. Pin (Part of LSE NO 133)
20. Housing-slider assembly
21. Wrench (Part of LSE NO 49)
22. Base (Part of LSE NO 49)
23. Brace
24. Pin

Figure 64-34 (sheet 1 of 5). Housing and slider group (Sleeve assy P/N 109-0130-94)



A6HD1152C

Figure 64-34 (sheet 2 of 5). Housing and slider group (Sleeve assy P/N 109-0130-94)

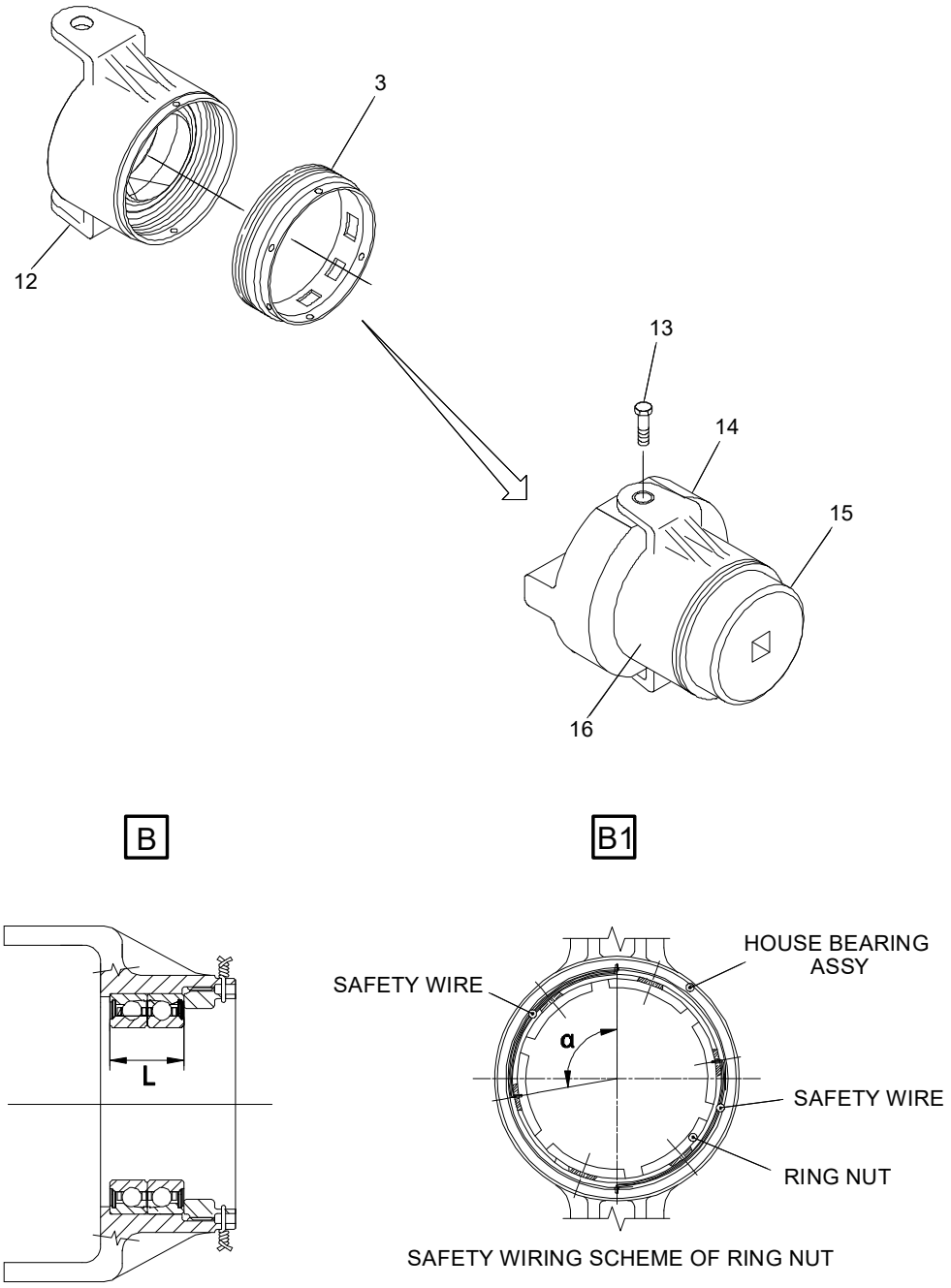


Figure 64-34 (sheet 3 of 5). Housing and slider group (Sleeve assy P/N 109-0130-94)

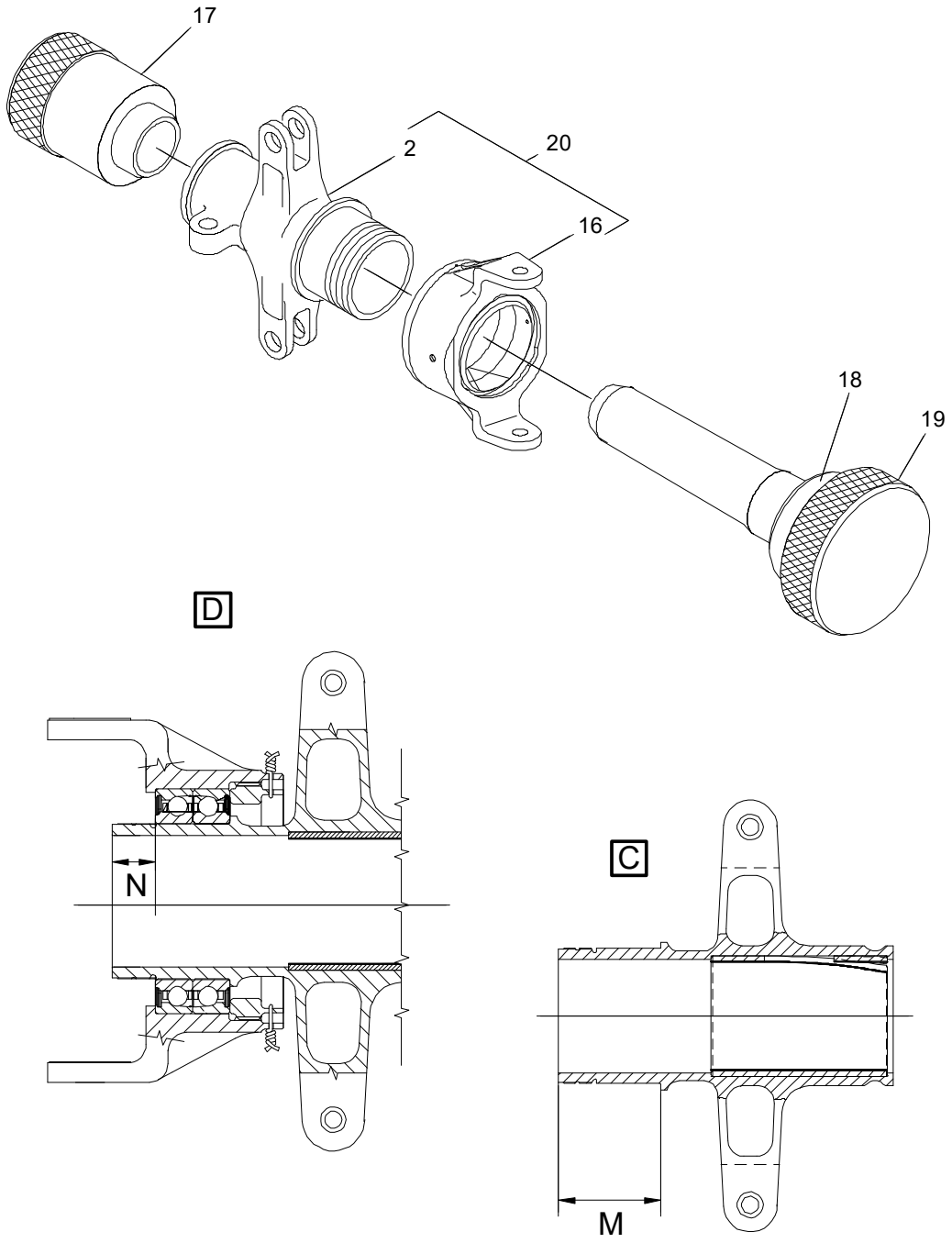


Figure 64-34 (sheet 4 of 5). Housing and slider group (Sleeve assy P/N 109-0130-94)

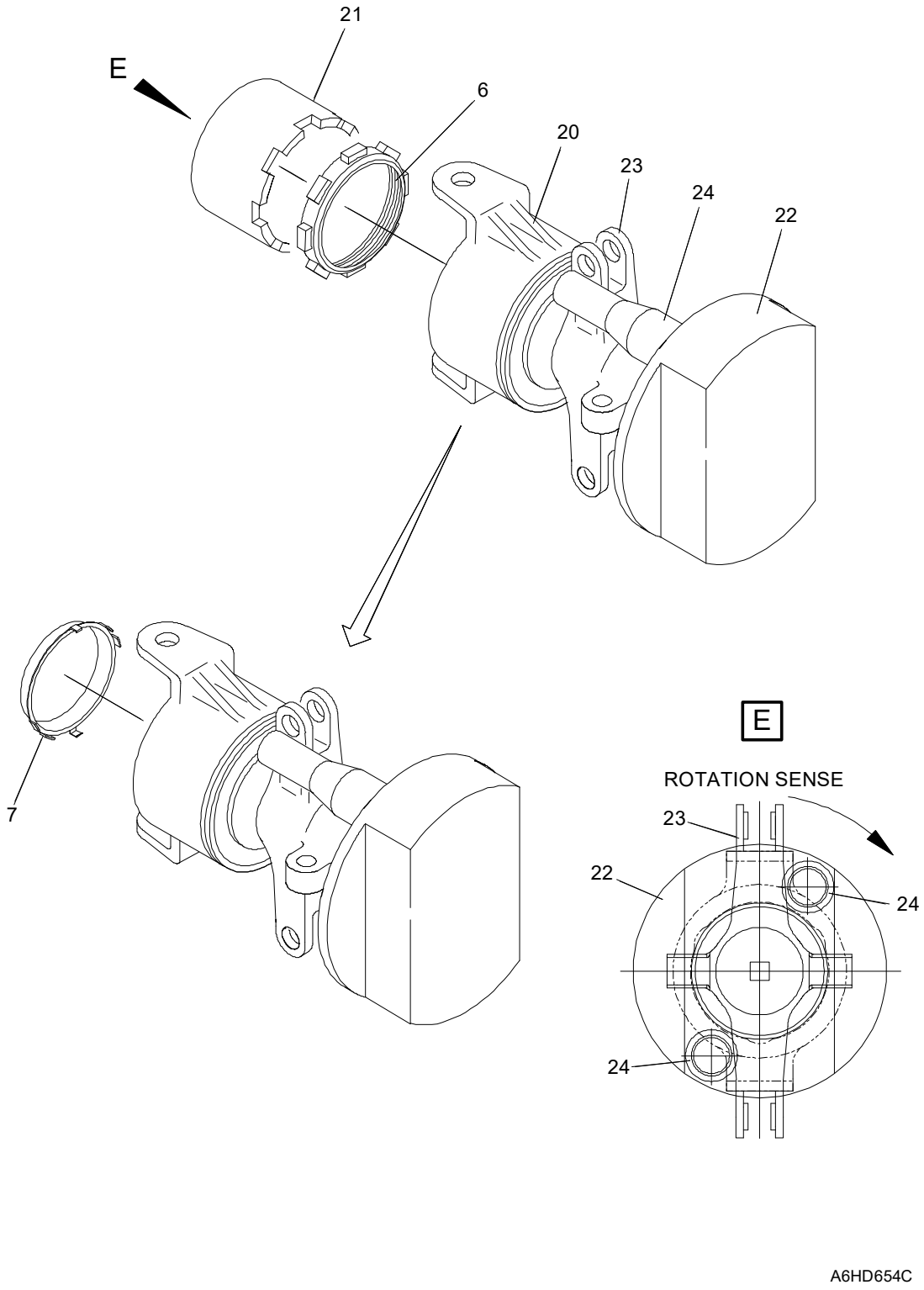


Figure 64-34 (sheet 5 of 5). Housing and slider group (Sleeve assy P/N 109-0130-94)

Annex 10

64-31-6C. Removal/installation (Sleeve assy P/N 109G6430A03)
(Fig 64-35)

A. Input Conditions
(1) Required conditions:
- Helicopter safe for maintenance (Chap 00)
- Access panels P5 and P12 removed
- Tail rotor hub and blade assembly removed (Sect 64-00).

(2) Support equipment:
- Tool, T/R pitch change slider ring nut removal/installation (LSE NO 49)
- Tool, T/R pitch change housing ring nut removal/installation (LSE NO 130)
- Tool, T/R pitch change housing duplex bearing removal (LSE NO 131)
- Tool, T/R pitch change housing duplex bearing installation (LSE NO 132)
- Tool, T/R pitch change slider installation (LSE NO 133)
- Tool, T/R pitch change slider removal (LSE NO 101)
- Syringe (Local supply)
- Heating gun (Local supply)
- Feeler gage (Local supply)
- Depth micrometer gage (Local supply)
- Refrigerator (Local supply)
- Plastic scraper (Local supply)

(3) Consumable materials:

WARNING: THE CONSUMABLE MATERIALS THE NOMENCLATURE OF WHICH IS PREFIXED BY “(D)” ARE DANGEROUS MATERIALS.
BEFORE USE, MAKE SURE TO KNOW THE SAFETY PRECAUTIONS AND FIRST AID INSTRUCTIONS PRINTED ON:
- THE LABEL ON THE CONTAINER THE MATERIAL WAS SUPPLIED IN
- THE MATERIAL SAFETY DATA SHEET
- THE LOCAL SAFETY REGULATIONS.

ALSO MAKE SURE THAT THE APPLICABLE FIRST AID MATERIALS ARE AVAILABLE.

- Abrasive paper (C055)
- (D) Sealing compound (C029)
- Safety wire (C014)
- (D) Primer (C446)
- Safety wire (C013)
- (D) Grease (C594)
- Cloth, soft lint-free (C011)
- (D) Solvent, cleaning (C023)
- (D) Oil (C139)
- (D) Primer (C237)
- Sealant (C501)
- (D) Corrosion preventive compound (C509)
- (D) Corrosion inhibiting compound (C505)
- (D) Corrosion preventive compound (C587)
- (D) Cleaning solvent (C287)
- (D) Corrosion inhibitor (C288)

(4) Other recommendations:

WARNING: THIS INSTALLATION INCLUDES VITAL POINTS (VP). DURING THE PROCEDURE, YOU MUST OBEY THE LOCAL REGULATIONS APPLICABLE TO THE VITAL POINTS.

CAUTION: MAKE SURE THAT YOU DO NOT MIX GREASES OF DIFFERENT BRANDS ALTHOUGH THE SPECIFICATIONS ARE THE SAME. REFER TO THE HELICOPTER LOG BOOK TO PREVENT MIXTURE OF UNWANTED GREASES.

CAUTION: THIS COMPONENT INCLUDES CRITICAL PARTS. EXAMINE THE COMPONENT FOR SIGNS OF STRUCTURAL DAMAGE, BEFORE YOU INSTALL IT ON THE HELICOPTER. REFER TO SECT 20-40.

B. Removal Procedure.

(1) Disconnect tail rotor pitch control tube (59) from torque shaft control lever (49) by removing attaching hardware. Discard cotter pin.
(2) Disconnect FWD half scissor (30) from sleeve (25) and AFT half scissor (35) from slider (23) by removing attaching parts. Discard cotter pins.
(3) Detach AFT half scissor (35) from FWD half scissor (30) by removing attaching parts. Discard cotter pin.
(4) Cut lockwire from forward boot (26) and withdraw sleeve (25) from gearbox shaft. Remove forward boot (26) from sleeve (25).

NOTE: Mark position of pitch control links (20) to reconnect in same position during reassembly of slider.

CAUTION: REMOVE THE PITCH CONTROL LINK (20) IN THE SEQUENCE AS FOLLOWS FOR NOT DAMAGE THE LINK.

(5) Remove pitch control link (20) from slider arm (23), by removing parts; the bolt (21), the washer (22), damper washer (60), the other washer (22), the nut (38) and discard the cotter pin (38A) remove pitch control link (20).
(6) Remove and discard cotter pin (70), remove the nut (66), the flat surface cup washer (67), the spacer (68) (if installed), the washer (69) and disconnect the pitch control link (20) from the blade (71).
(7) Remove links (10) by removing attaching parts. Discard cotter pins.
(8) Cut lockwire from aft boot (39).
(9) Withdraw housing (15), together with assembled parts, from gearbox shaft.
(10) Disassemble housing (15) and slider assembly (23) as follows:
  (a) Put the housing and slider group (1, Figure 64-36) on an applicable work table.
  (b) Lock the Base (Part of LSE NO 49) (2) in an applicable vice.
  (c) Put the housing and slider group (1) on the base (2).
  (d) Move the braces (3) of the slider against the pins (4) of the base (2).
  (e) Open the two clawed tabs on the lock ring (5). Then remove it from the housing and slider group (1).
  (f) Remove the ring nut (7) with the Wrench (Part of LSE NO 49) (6).
  (g) Remove the housing-slider assembly (8) from the base (2).
  (h) Put the housing-slider assembly (8) on the Support (Part of LSE 101) (9).

CAUTION: WHEN YOU DO THE STEP B.(10)(I) THAT FOLLOWS, MAKE SURE THAT THE PIN (12) AND THE DUPLEX BEARING (22) ARE CORRECTLY ALIGNED. THIS IS TO PREVENT DUPLEX BEARING DAMAGE.

  (i) Push the slider group (10) out of the housing group (11). To do this, use the Pin (Part of LSE NO 101) (12) and an applicable arbor press.
  (j) Remove the slider group (10) from the support (9).
  (k) Remove the sealant from the housing group (11), between the housing-bearing assembly (18) and the flange (14) with the Plastic scraper (Local supply) (See Detail A).

(l) Cut the safety wire from the six bolts (15).
(m) Remove these parts that attach the flange (14) with the peeling shim (13) to the housing-bearing assembly (18):
- The six bolts (15)
- The six countersunk washers (16)
- The six washers (17).
(n) Remove the flange (14) with the peeling shim (13) from the housing-bearing assembly (18).
(o) Put the Bushing (Part of LSE NO 131) (20) in its position on the Pin (Part of LSE NO 131) (21).
(p) Put the housing-bearing assembly (18) on the pin (21) above the bushing (20).

WARNING: BE CAREFUL WHEN YOU USE HEAT. HOT PARTS CAN CAUSE INJURY TO THE PERSONS. ALWAYS USE APPLICABLE PROTECTIVE CLOTHING.

(q) Lightly increase the temperature of the external surface of the housing-bearing assembly (18) with the Heating gun (Local supply). This will help you to remove the duplex bearing (22) from the bearing support sleeve (23). Make sure that the temperature must not be more than 90 °C.
(r) Push the duplex bearing (22) out of the bearing support sleeve (23). To do this, use the Barrel (Part of LSE NO 131) (19) and an applicable arbor press.
(11) Remove boot (39, Fig 64-35).
(12) Remove attaching parts of levers (5 and 49), then remove levers and shims (8) and extract pivot (9) from lugs on gearbox.
(13) Disconnect pitch control lever (40) from link (46) by removing attaching parts. Remove lever (40). Discard cotter pin.
(14) Disconnect link (46) from lugs on gearbox by removing attaching parts. Remove link (46). Discard cotter pin.

C. Installation Procedure.

CAUTION: INSTALL THE FWD HALF-SCISSOR (30, FIG 64-35) AND AFT HALF-SCISSOR (35, FIG 64-35) IN THE CORRECT LOCATION AND ORIENTATION AS SHOWN IN DETAIL C1 OF FIG 64-35.

NOTE: During the installation of the self-locking bolts or the self-locking nuts, when the locking is engaged, with the torque wrench (Local supply), make sure that the locking torque necessary to move the bolts or nuts, before contact with the washer, is between the minimum breakaway torque and the maximum locking torque. If you do not get his value, discard the bolts and/or nuts.

(1) Position torque shaft (9, Fig 64-35) in 90-degree gearbox lugs.
(2) Install laminated shims (8) and levers (5 and 49) on torque shaft (9). Do not torque attaching parts.

NOTE: If any of the following items: 90-degree gearbox case, torque shaft (9) levers (5 and 49) laminated shims (8) have been replaced, proceed as follows:

(a) Position torque shaft (9) in 90-degree gearbox lugs.
(b) Position levers (5 and 49) on torque shaft (9) without shims and secure temporarily in position.
(c) Measure the total gap between one lever and the adjacent lug with a feeler gauge. Half of the gap is dimension of each laminated shim (8).
(d) Remove levers (5 and 49) from torque shaft (9).
(e) Fit laminated shims (8) on torque shaft (9) then reinstall levers (5 and 49) and secure. Do not torque nuts (3 and 51) at this time.
(f) Check for free rotation of pivot. If shim thickness is unsatisfactory, modify the shims the same amount on either side to obtain an axial play between 0,03 and 0,08 mm between 90° gearbox lugs bearings and levers (5 and 49) when installed.

NOTE: Before installing the boot in the housing and slider group deform the boot metallic rim to an oval shape with a maximum diameter of 43 thru 44 mm (1.693 thru 1.732 in) as shown in DETAIL D of figure 64-35. This is to help a tighter fit in the seat. Put the inboard boot in its position in the housing and slider group.

(3) Position aft boot (39) on gearbox shaft.
(4) Reassemble housing (15) and slider assembly (23) as follows:

CAUTION: BEFORE YOU ASSEMBLE THE HOUSING AND SLIDER GROUP (1, FIG. 64-37) PUT THE COMPONENT THAT FOLLOW AND THE RELATED ATTACHING PARTS ON AN APPLICABLE WORK TABLE.
CAREFULLY EXAMINE THE COMPONENT AND THE RELATED ATTACHING PARTS FOR CORROSION, NICKS AND DAMAGE, WEAR AND FRETTING. IF YOU FIND THAT THE COMPONENT IS DAMAGED, REPLACE IT:
- THE DUPLEX BEARING (11)
- THE BEARING SUPPORT SLEEVE (8).

(a) Divide the two parts of the duplex bearing (11).

NOTE: Do step C.(4)(b) thru step C.(4)(d) only for removed bearings. New bearings are supplied already lubricated and must not be filled with grease.

(b) Fill the Syringe (Local supply) with the Grease (C594).
(c) Before you install the bearing (12), fill it with 3.5 cc (0.21 in3) of grease with the syringe from the side opposite to the boot. Refer to Detail A of Fig. 64-37.
(d) Do step C.(4)(c) again on the bearing (13).
(e) Put the bearing (12) against the bearing (13) with the boot sides externally and the internal and external V-marks aligned to show an arrow. See Detail A, Fig. 64-37.
(f) Install the duplex bearing (11) into the bearing support sleeve (8) in the way that follows:
1. Apply a thin layer of Primer (C446) on the mating surfaces between the duplex bearing (11) and bearing support sleeve (8).
2. Put the bearing support sleeve (8) on the Base (Part of LSE NO 132) (14).

WARNING: BE CAREFUL WHEN YOU USE HEAT. HOT PARTS CAN CAUSE INJURY TO THE PERSONS. ALWAYS USE APPLICABLE PROTECTIVE CLOTHING.

3. Heat the bearing support sleeve (8) to a temperature between 60 and 70 °C with the Heating gun (Local supply) . This will help you to install the duplex bearing (11) into the bearing support sleeve. Make sure that the temperature is not more than 90 °C (heating gun set to a temperature of 90 °C).

NOTE: As an alternative to heating the bearing support sleeve (8); you can cool down the duplex bearing (11) with the Refrigerator (Local supply) to a temperature between -18 and -40 °C for 30 minutes. Do not touch the cold duplex bearing with bare hands to prevent injury.

4. Push the duplex bearing (11) into the bearing support sleeve (8). To do this, use the Pin (Part of LSE NO 132) (15) and an applicable arbor press.
5. Make sure there is no clearance between the two bearings (12 and 13) and between the outer ring of duplex bearing (11) and the shoulder of the bearing support sleeve (8). To do this, use the applicable Feeler gage (Local supply).
6. Remove the housing-bearing assembly (16) from the base (14).

NOTE: Before you continue, make sure that all the components are at ambient temperature.

(g) Install the flange (6) with the peeling shim (7) into the housing-bearing assembly (16). Obey the instructions that follow:

1. Clean the flange (6), the mating surfaces of the housing-bearing assembly (16) and the six bolts (3) with the Cloth, soft lint-free (C011) and the Solvent, cleaning (C023).
2. Dry the parts that you cleaned with a clean Cloth, soft lint-free (C011).
3. Temporarily put the flange (6) in its correct position on the housing-bearing assembly (16) against the duplex bearing (11). Do not apply pressure on the bearing.
4. Measure the gap between the flange (6) and the housing-bearing assembly (16) in the six tabs. Refer to Detail B of Fig. 64-37. Calculate the average value (dimension S) and then record it. (**VP**)
5. Adjust the thickness "S7" of the peeling shim (7) with this formula: (**VP**) S7 = S - 0,17 thu 0,22 mm (0.007 thru 0.009 in).
6. Install the peeling shim (7) and the flange (6) in the housing-bearing assembly (16).

CAUTION: MAKE SURE THAT THERE ARE NO BURRS DURING PEELING SHIMS INSTALLATION (7) ADJUSTMENT. IF YOU FIND BURRS REMOVE WITH ABRASIVE PAPER (C055).

NOTE: Make sure that the six countersunk washers are correctly installed as shown in Detail B of Fig. 64-37. **(VP)**

7. Install these parts that attach the flange (6) with the peeling shim (7) to the bearing support sleeve (8): (**VP**)
   - The six washers (5)
   - The six countersunk washers (4)
   - The six bolts (3).

NOTE 1: During the installation of the six bolts (3) in the insert of the bearing support sleeve (8), when the locking is engaged, with the torque wrench (Local supply), make sure that the locking torque necessary to move the bolts, before contact with the washers (4) and (5), is between 0.22 Nm (1.95 lbf in) and 2.03 Nm (17.97 lbf in). if you do not get this value, discard the bolts and / or inserts. (**VP**)

NOTE 2: In case you have to replace the inserts, contact the TC holder.

8. Torque the bolts (3) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
   - Locking torque: 2.03 N m (17.97 lbf in) maximum
   - Breakaway torque: 0.22 N m (1.95 lbf in) minimum
   - Seating torque: 4.30 thru 4.52 N m (38.05 thru 40 lbf in)
9. Remove the housing-bearing assembly (16) from the base (14).
10. Make sure that the duplex bearing (11) turns freely. (**VP**)
11. Refer to Detail B of Fig. 64-37:
    (a) Measure and record the dimension L.
    (b) Make sure that the dimension you find is between 23.75 to 24.0 mm (0.935 to 0.945 in).
    (c) If you find that the dimension is not in the given limits, remove the duplex bearing (11). Then, do step C.(4)(f) and step C.(4)(g) again.
12. Refer to Detail C of Fig. 64-37:
    (a) Measure and record the dimension M.
    (b) Calculate and record the dimension N with this formula: N = M - L.
13. Safety the six bolts (3) with the new Wire, safety (C014) . Refer also to CSPP-A-20-40-00-03A-712AD. (**VP**)

(h) Apply a thin layer of Oil (C139) on the internal surface of the duplex bearing (11).
(i) Put the Bushing (Part of LSE NO 133) (18) in its position on the Pin (Part of LSE NO 133) (19).
(j) Put the housing group (16) on the pin (19) above the bushing (18).
(k) Put the slider (2) on the pin (19).

NOTE 1: To help you install the slider (2), heat the housing group (16) in an oven preheated to a temperature of 50 °C for 15 to 30 minutes.

NOTE 2: As an alternative to heating the housing group (16); you can cool down the slider (2) with the Refrigerator (Local supply) to a temperature between -18 and -40 °C for 30 minutes. Do not touch the cold slider with bare hands to prevent injury.

(l) Push the slider (2) into the housing group (16). To do this, use the Barrel (Part of LSE NO 133) (17) and an applicable arbor.
(m) Remove the housing-slider assembly (20) from the pin (19).

NOTE: Before you continue, make sure that all the components are at ambient temperature.

(n) Make sure there is no clearance between the inner rings of the two bearings (12 and 13) and the shoulder of the slider (2). To do this, use the applicable Feeler gage (Local supply).
(o) Refer to Detail D of Fig. 64-37:
1. Measure and record the dimension N. To do this, use an applicable Depth micrometer gage (Local supply).
2. Make sure that the dimension N measured agrees with the dimension calculated at step C.(4)(g)(11)b.
3. If you find that the dimension N does not agree, remove the duplex bearing (11). Then, do step C.(4)(f) thru step C.(4)(o) again.
(p) Lock the Base (Part of LSE NO 49) (22) in an applicable vice.
(q) Put the housing-slider assembly (20) on the base (22).
(r) Move the braces (23) of the slider against the pins (24) of the base (22). Refer to Detail E of Fig. 64-37.
(s) Clean the threads of the ring nut (9) and the slider (2) with the Cloth, soft lint-free (C011) and the Solvent, cleaning (C023) . (**VP**)
(t) Dry the threads of the ring nut (9) and slider (2) with a clean Cloth, soft lint-free (C011) . (**VP**)
(u) Apply a layer of Primer (C237) on the threads of the ring nut (9).
(v) Apply a layer of Primer (C237) on the threads of the slider (2).
(w) Apply four drops of Adhesive (C029) on the threads of the ring nut (9). Put them in four equally spaced positions (90 degrees apart). (**VP**)
(x) Install the ring nut (9) with the Wrench (Part of LSE NO 49) (21).
(y) Torque the ring nut (9) to 49 thru 59 N m (36 thru 43 lbf ft). (**VP**)
(z) Remove the housing and slider group (1) from the base (22).
(aa) Install the new Lock ring (10).
(bb) Bend the clawed tabs of the lock ring (10) on the ring nut (9). Make sure that the two clawed tabs of the lock ring (10) are correctly engaged.
(cc) Seal the gap between the flange (6) and the housing-bearing assembly (16) with Sealant (C501) as shown in Detail B of Fig. 64-37.
(dd) Let the sealing compound cure. For sealing compound cure cycle, refer to 09-A-00-50-00-85A-074C-D.
(ee) Clean the head of the six bolts (3) with a soft Lint-free cloth (C011) and the Cleaning solvent (C287).
(ff) Apply the Corrosion inhibitor (C288) to the head of the six bolts (3).
(gg) Paint a slippage mark between the head of the six bolts (3) and flange (6), refer to CSPP-A-20-40-00-05A-691A-D.

(5) Connect pitch control lever (40, Fig. 64-35) and links (10) to housing (15).
(6) Torque the bolts (14) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(7) Install cotter pins and apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank and under head of the bolt (14).

NOTE 1: It is possible to install the bumper washers (40A) between housing (15) and links (10) between lever (40) and housing (15). Before you torque nuts (11), make sure that the spherical bearings of the control lever (40) and link (10) touch the lug of the housing (15) and not the bumper washers (40A). (**VP**)

NOTE 2: Install the two spacers (13 and 15A) against spherical bearing of pitch control lever (40) and link (10). Install the two small washers (12) between the larger one (15A) and the nut (11). To obtain proper torque, replacement of one smaller washer AN960C416 with an AN960C416L washer is permitted. (**VP**)

NOTE 3: During the installation, if the total clearance between the pitch control lever (40) and the housing (15) is more than 0,3 mm, install one washer (65) P/N AN960PD416L (superseded by P/N NAS1149D0416K) on one attachment point bolt (14).

(8) Deleted.
(9) Deleted.
(10) Deleted.
(11) Deleted.
(12) Deleted.

NOTE: Deleted.

(13) Deleted.
(14) Deleted.
(15) Deleted.
(16) Deleted.
(17) Deleted.
(18) Put the connecting link (46) in position on the lever (40) and the fitting (61).
(19) Put the four washers (46A) and the two shims (46B) in their position between the connecting link (46), the lever (40) and the fitting (61).
(20) Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank and under head of the bolt (58). Secure the connecting link to fitting (61) using the bolt (58), washers (57, 56) and nut (55).
(21) Measure clearance between the link (46) and the fitting (61); if the clearance is more than 0.05 mm (0.002 in), adjust thickness of shim (46B).

NOTE: Shims (46B) can be installed on the top side or either on the bottom side of link (46).

(22) Torque the bolt (58) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(23) Install the cotter pin.
(24) Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank and under head of the bolt (44), then secure the connecting link to lever (40) using the bolt (44), washers (42, 43) and nut (41).
(25) Measure clearance between the link (46) and the lever (40); if the clearance is more than 0.05 mm (0.002 in), adjust thickness of shim (46B).
(26) Torque the bolt (44) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum

- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(27)Install the cotter pin.

(28)Install the assembly on 90-degree gearbox output shaft. Lockwire boot aft (39) with safety wire (C013).

(29)Connect links (10) to levers (5 and 49). Verify that bolts can turn and slide freely in seats, otherwise reposition lever (49) and/or lever (5) until this requirement is satisfied.

(30)Torque the bolt (45) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):

- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(31)Install the cotter pin.

NOTE: Install larger washer under bolt head and small washer under nut.

(32)Torque the bolts (7 and 47) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):

- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 5.65 thru 7.91 N m (50 thru 70 lbf in)

(33)Install the cotter pin.

(34)Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank and under head of the bolt (45).

CAUTION: CHECK THAT LEVERS (5 AND 49) ARE ALIGNED TO EACH OTHER, AND THAT BEARING (18) IS NOT PRELOADED.

(35)Connect the free arm of torque shaft control lever (49) to tail rotor control tube (59) with the bolt (52), the washer (53) and the nut (54).

(36)Torque the bolt (52) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):

- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(37)Install the cotter pin.

(38)Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank and under head of the bolts (52).

(39)Connect pitch control links (20) to slider (23) following markings made at removal. Install between links and slider damper washers (60) with bolt (21), washers (22) and nut (38).

(40)Torque the bolt (21) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):

- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(41)Install the cotter pin.

(42)Install forward boot (26) on sleeve (25).

(43)Install sleeve (25) on gearbox shaft. Lockwire forward boot (26) as required using Safety wire (C014).

(44)Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank of the bolts (32).

NOTE: Make sure that the head of the bolt (32) points in the direction of the rotation of the tail rotor.

(45)Connect the FWD half-scissor (30) to the sleeve (26) with the bolt (32), washers (29 and 31) and nut (28). Fully tighten all components. Do not torque nut.

(46)Manually determine the axial play between FWD half-scissor (30) and sleeve (26) along bolt axis in the way that follows:

(a) Turn the FWD half-scissor (30) back and forth, from “a” to “b” as Shown in Fig 64-29B Detail A, until you get the position of minimum play. Stop the FWD half-scissor (30, Fig. 64-35) in this position. (**VP**):

(b) Torque the nut (28) until you get to the cotter pin hole on the bolt (32) with no axial play between components. FWD half-scissor must move freely with no binding. Slight friction is permitted. (**VP**):

(c) If you find too much binding / friction, replace the nut (32) with a new one and do again Step C.(36)(a) and Step C.(36)(b). (**VP**):

(d) If with the new nut (32) you still get too much binding / friction, add a washer (31A) P/N NAS1149F0416P under nut and do again Step C.(36)(a) and Step C.(36)(b). (**VP**):

(e) If you still get too much binding / friction, contact the TC holder.

(47)Connect the AFT half-scissor (35) to the FWD half-scissor (30) with the bolt (76), washers (77 and 78) and nut (79). Fully tighten all components. Do not torque nut. (**VP**):

(a) Before install the bolt (76) that connect the FWD half-scissor and AFT half-scissor apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587).

(48)Manually determine the axial play between AFT half-scissors (35) and FWD half-scissors (30) along bolt axis in the way that follows:

(a) Turn the AFT half-scissors (35) back and forth, from “a” to “b” as Shown in Fig 64-29B Detail B, until you get the position of minimum play. Stop the AFT half-scissors (35) in this position. (**VP**):

(b) Torque the nut (79) until you get to the cotter pin hole on the bolt (76) with no axial play between components. AFT half-scissor must move freely with no binding. Slight friction is permitted. (**VP**):

(c) If you find too much binding / friction, replace the nut (79) with a new one and do again Step C.(38)(a) and Step C.(38)(b). (**VP**):

(d) If with the new nut (79) you still get too much binding / friction, add a washer (78A) P/N NAS1149F0416P under nut and do again Step C.(38)(a) and Step C.(38)(b). (**VP**):

(e) If you still get too much binding / friction, contact the TC holder.

(49)Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank of the bolts (76).

NOTE: Make sure that the head of the bolt (37) points in the direction of the rotation of the tail rotor.

(50)Connect the AFT half-scissor (35) to the slider (23) with the bolt (37), washers (36 and 34) and nut (33). Fully tighten all components. Do not torque nut.

(51)Manually determine the axial play between AFT half-scissor (35) and the slider (23) along bolt axis in the way that follows:

(a) Move the slider (23) back and forth until you get the position of minimum play. Stop the sleeve in this position. (**VP**):

(b) Torque the nut (33) until you get to the cotter pin hole on the bolt (37) with no axial play between components. (**VP**):

(c) If you find too much binding / friction, replace the nut (33) with a new one and do again Step 41(a) and Step 41(b). (**VP**):

(d) If with the new nut (33) you still get too much binding / friction, add a washer (34A) P/N NAS1149F0416P under nut and do again Step C.(41)(a) and Step C.(41)(b). (**VP**):

(e) If you still get too much binding / friction, contact the TC holder.

(52)Install the new Cotter pins on nuts (28, 33 and 79).

(53)Apply the Corrosion preventive compound (C509) to the parts that follow:

(a) The heads of the bolts (32 and 37)

(b) The washers (31) and (34), the nuts (28) and (33) and the cotter pins.

(54) Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank and under head of the bolts (32) and (37).

(55) Connect the pitch control link (20) to the blade (71) with the washer (69), the spacer (68) (if installed), the flat surface cup washer (67) and the nut (66).

(56) Torque the nut (66) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):

- Locking torque: 9.04 N m (80 lbf in) maximum
- Breakaway torque: 1.07 N m (9.47 lbf in) minimum
- Seating torque: 7.91 thru 10.17 N m (70 thru 90 lbf in)

(57) Install the cotter pin.

NOTE: Ensure that bolt (32 and 37) heads are facing tail rotor sense of rotation.

D. Follow-On Maintenance Required:

- Install tail rotor hub and blade assembly (Sect 64-00)
- Install access panels P5 and P12.

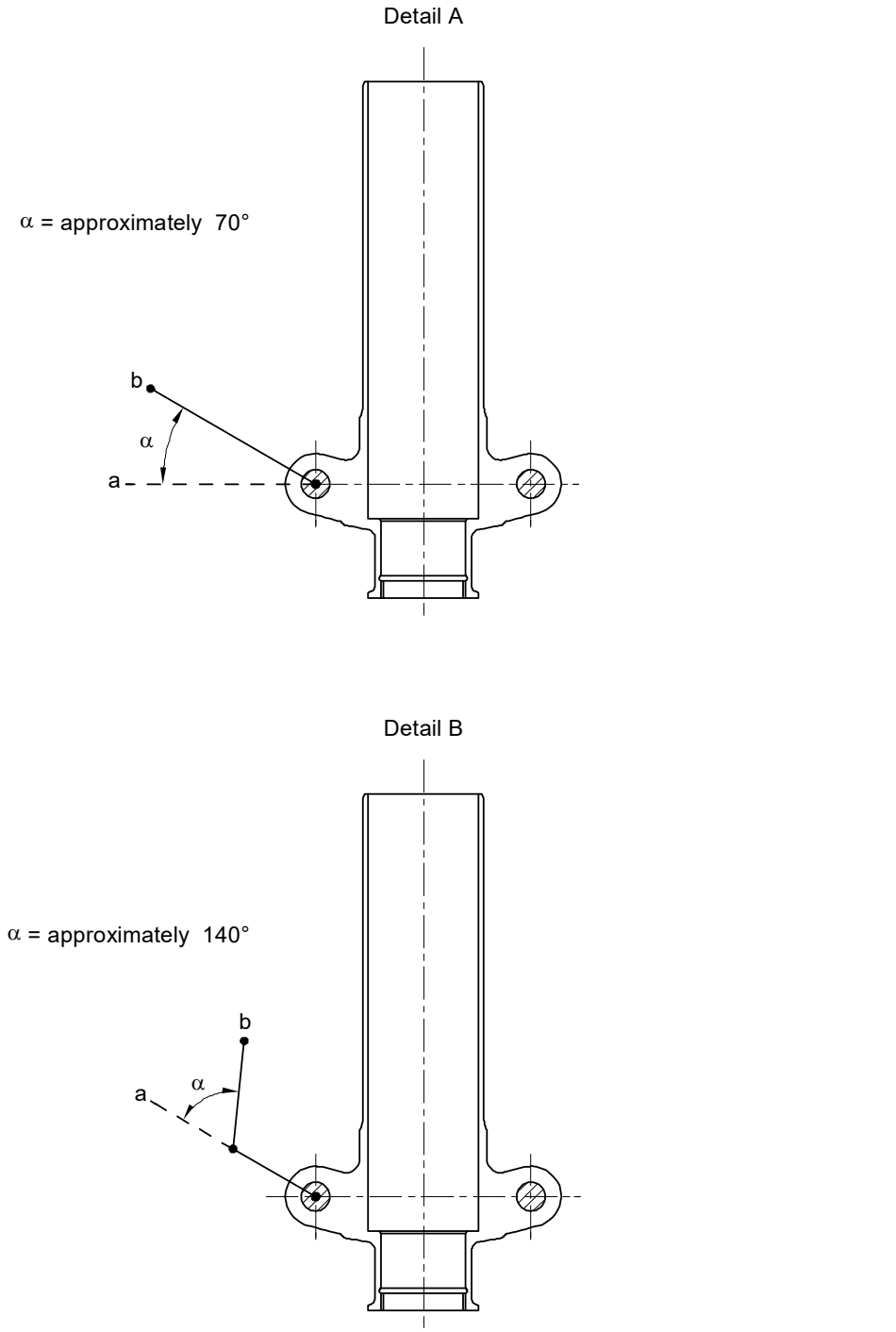


Figure 64-29B. Half scissors play check

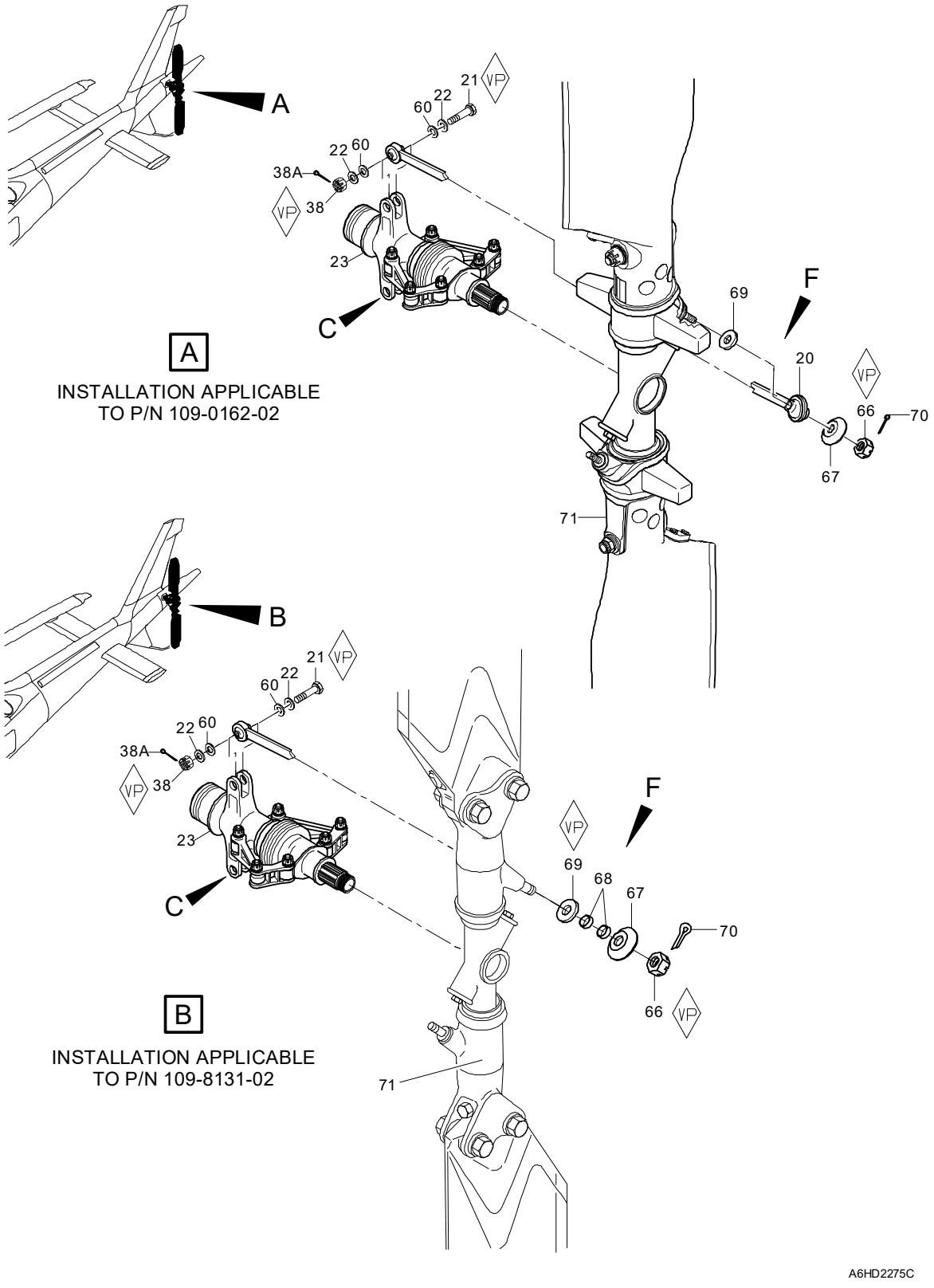


Figure 64-35 (sheet 1 of 5). Pitch change mechanism (Sleeve assy P/N 109G6430A03)

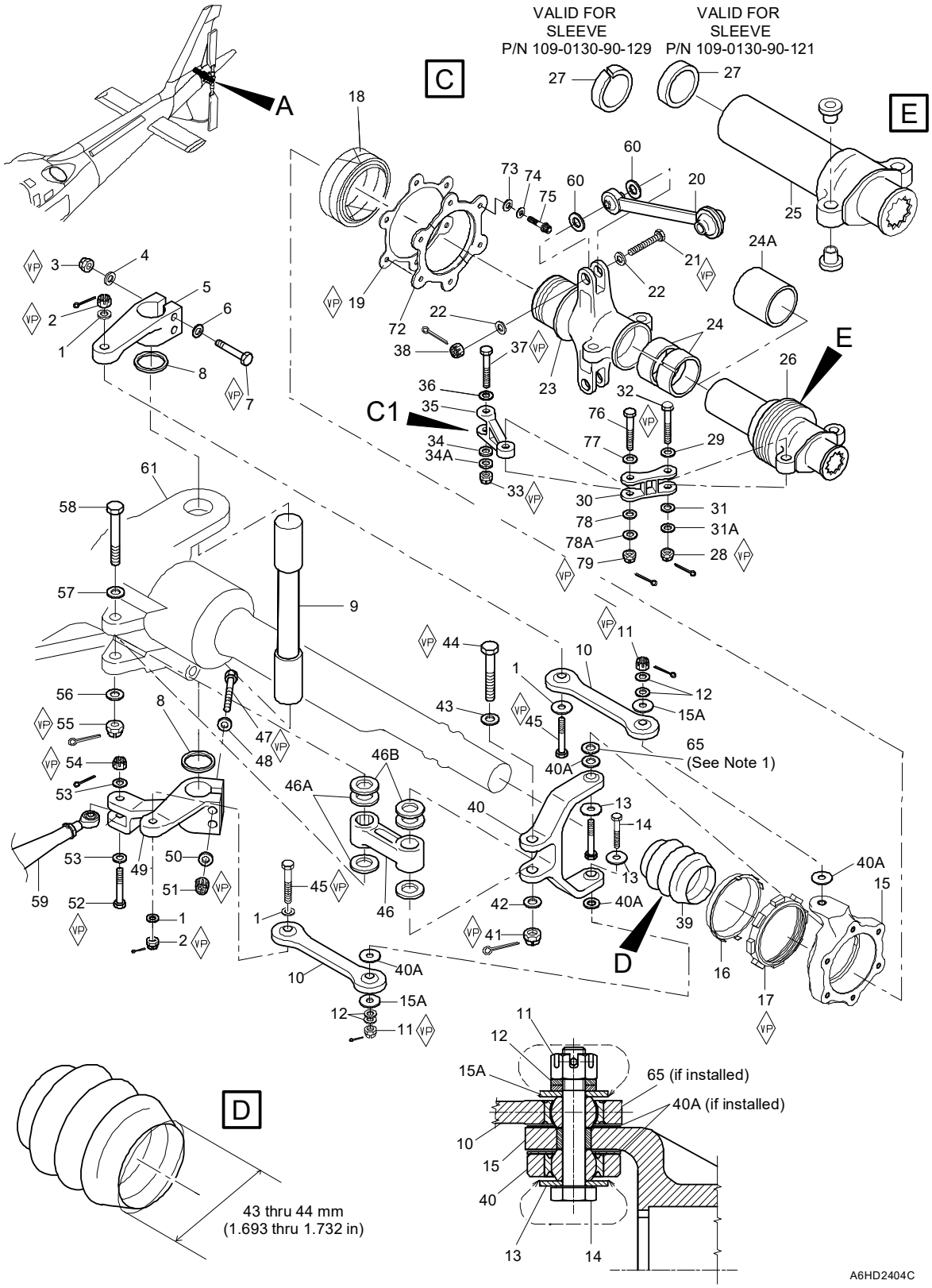


Figure 64-35 (sheet 2 of 5). Pitch change mechanism (Sleeve assy P/N 109G6430A03)

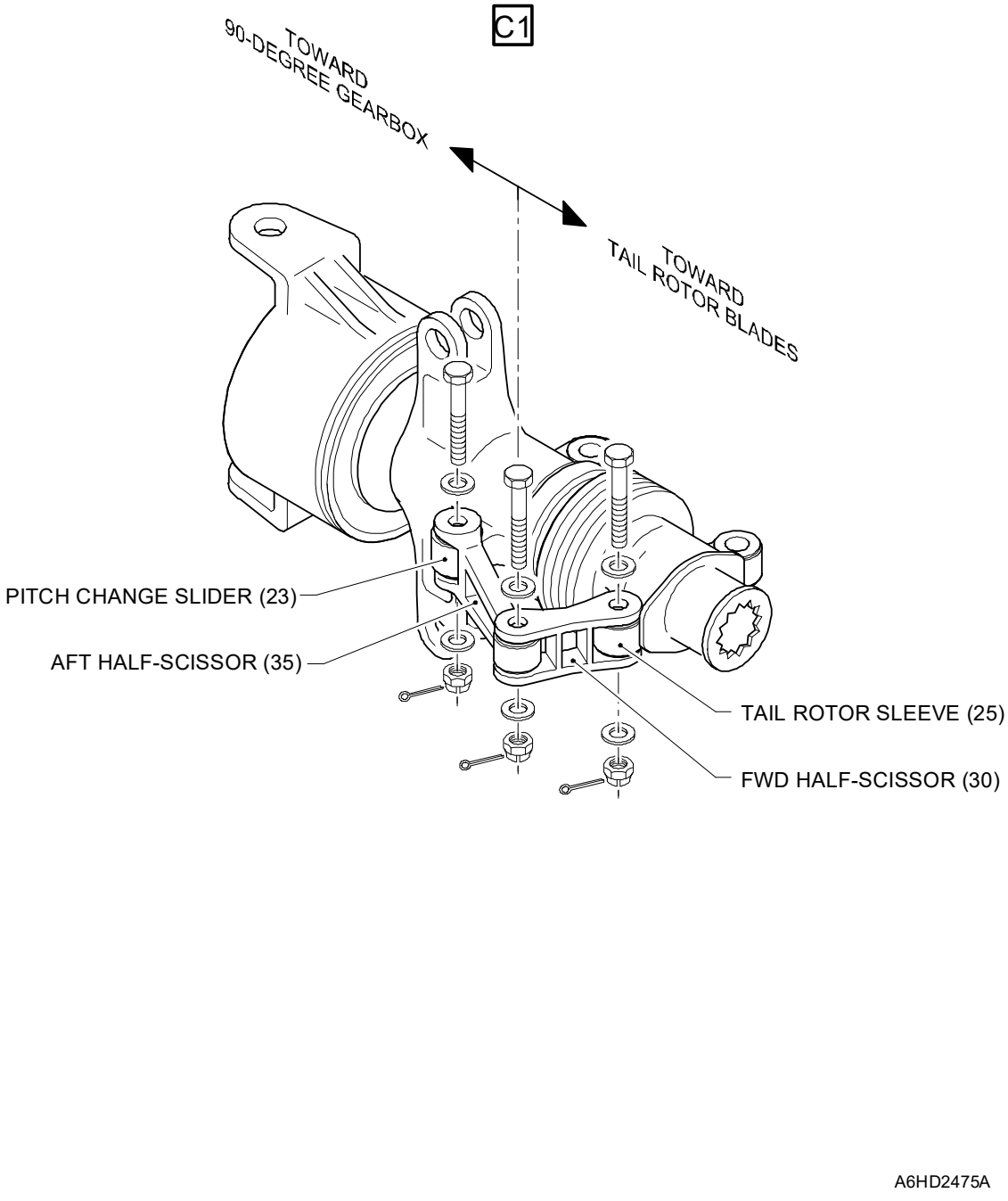
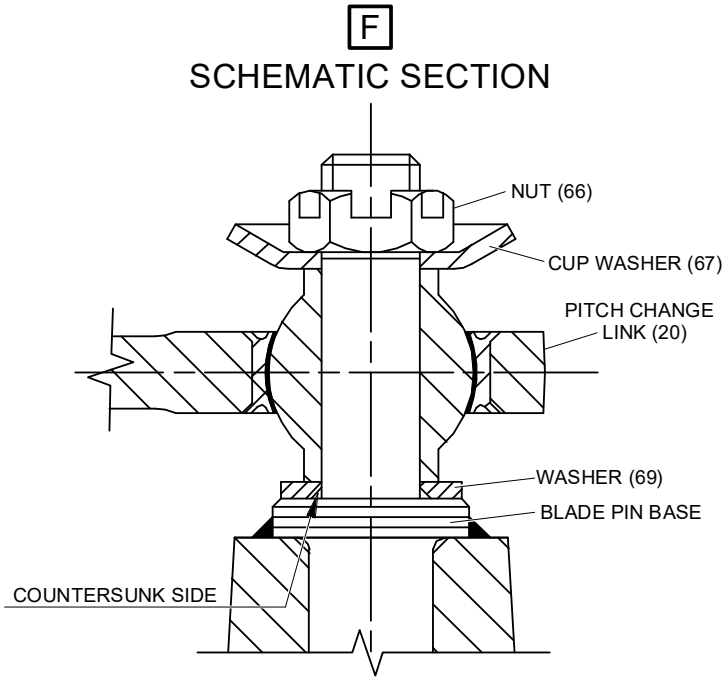


Figure 64-35 (sheet 3 of 5). Pitch change mechanism (Sleeve assy P/N 109G6430A03)



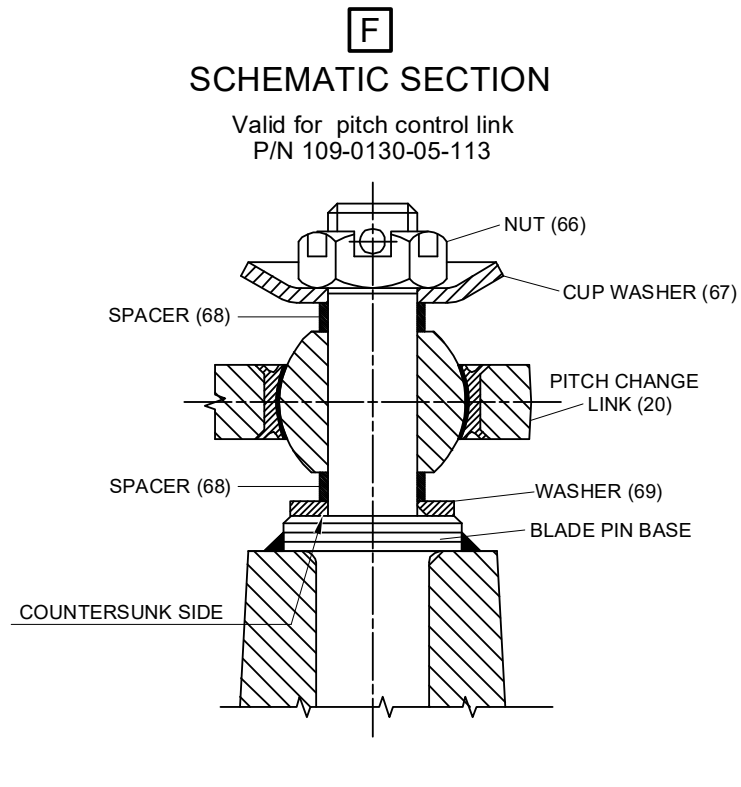


Figure 64-35 (sheet 4 of 5). Pitch change mechanism (Sleeve assy P/N 109G6430A03)

1. Washer
2. Nut
3. Nut
4. Washer
5. Lever
6. Washer
7. Bolt
8. Shim
9. Torque shaft
10. Link
11. Nut
12. Washer
13. Spacer
14. Bolt
15. Housing
15A. Spacer
16. Lock ring
17. Ring nut
18. Duplex bearing
19. Ring nut
20. Pitch control link
21. Bolt
22. Washer
23. Slider
24. Bushing (*)
24A. Bushing (**)
25. Sleeve
26. Forward boot
27. Bushing
28. Nut
29. Washer
30. FWD half scissor
31. Washer
31A. Washer (select on fit)
32. Bolt (*)
33. Nut
34. Washer
34A. Washer (select on fit)
35. AFT half scissor
36. Washer
37. Bolt (*)
38. Nut
38A. Cotter pin
39. AFT boot
40. Lever
40A. Bumper washer
41. Nut
42. Washer
43. Washer
44. Bolt
45. Bolt
46. Link
46A. Washer
46B. Shim
47. Bolt
48. Washer
49. Torque shaft control lever
50. Washer
51. Nut
52. Bolt
53. Washer
54. Nut
55. Nut
56. Washer
57. Washer
58. Bolt
59. Tail rotor pitch control tube (ref)
60. Washer, damper
61. T/R gearbox fitting
62. Shim
63. Bushing (**)
64. Shim
65. Washer
66. Nut
67. Flat surface cup washer
68. Spacer (if installed)
69. Washer
70. Cotter pin
71. Hub and blade assy
72. Flange
73. Washer
74. Washer
75. Bolt
76. Bolt
77. Washer
78. Washer
78A. Washer (select on fit)
79. Nut

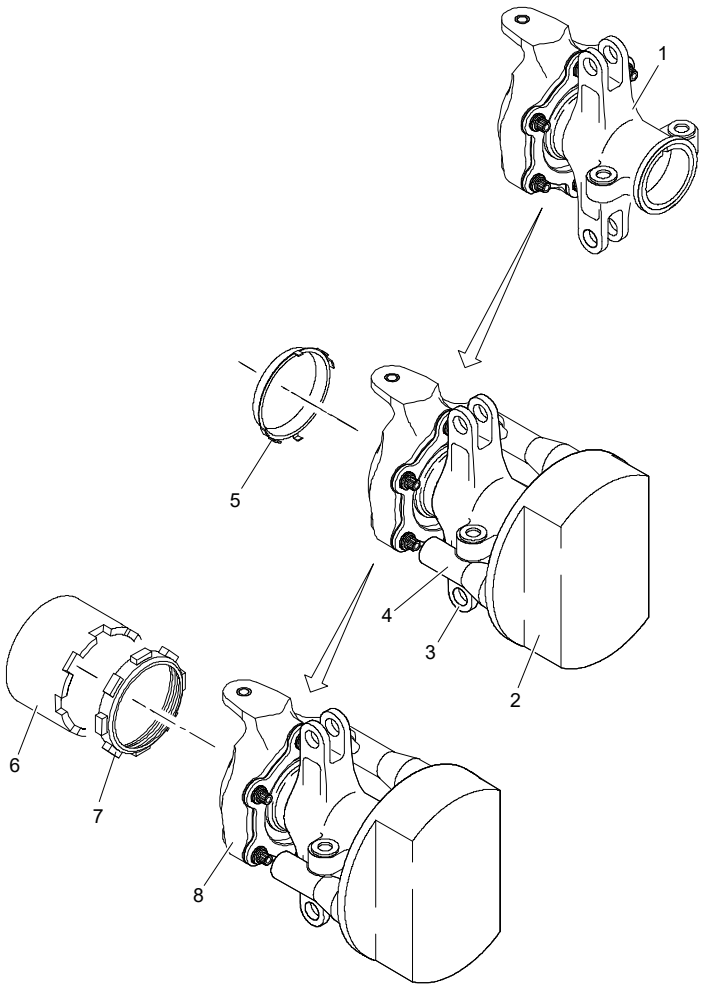
(*) Used with slider P/N 109-0130-91-105.

(**) Used with slider P/N 109-0130-91-117/-119.

NOTE 1:

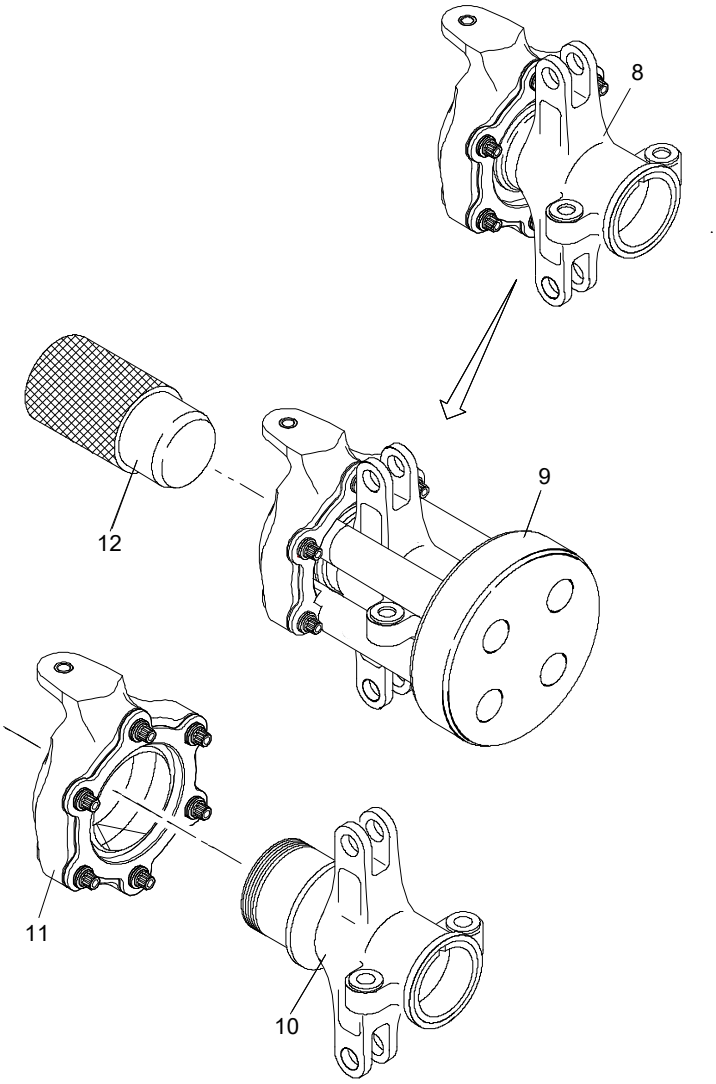
Washer (65) is shown in this location but, if necessary, can be installed on opposite bolt (14).

Figure 64-35 (sheet 5 of 5). Pitch change mechanism (Sleeve assy P/N 109G6430A03)



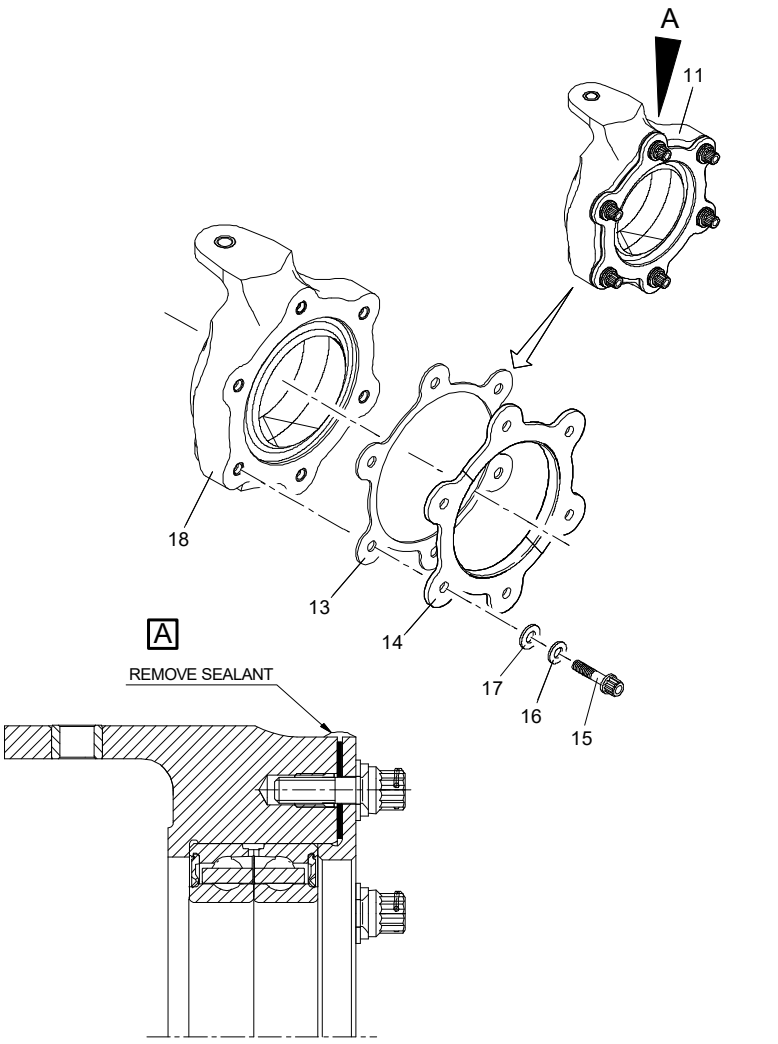
1. Slider group
2. Base
3. Brace
4. Pin
5. Lock ring
6. Wrench
7. Ring nut
8. Housing-slider assembly
9. Support

Figure 64-36 (sheet 1 of 4). Housing and slider group - Disassemble procedure (Sleeve assy P/N 109G6430A03)



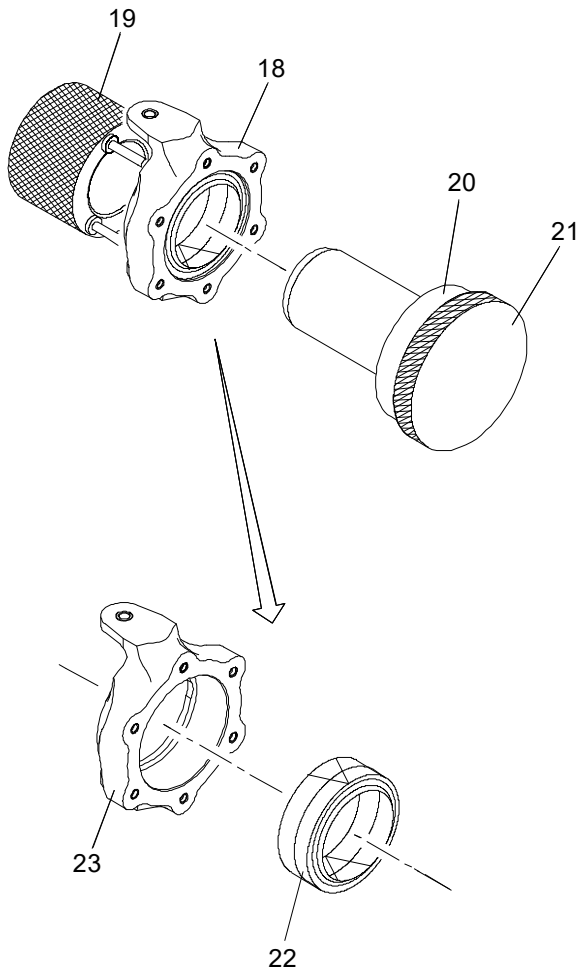
8. Housing-slider assembly
9. Support
10. Slider group
11. Housing group
12. Pin

Figure 64-36 (sheet 2 of 4). Housing and slider group - Disassemble procedure (Sleeve assy P/N 109G6430A03)



11. Housing group
12. Pin
13. Peeling shim
14. Flange
15. Bolt
16. Washer
17. Washer
18. Housing-bearing assembly

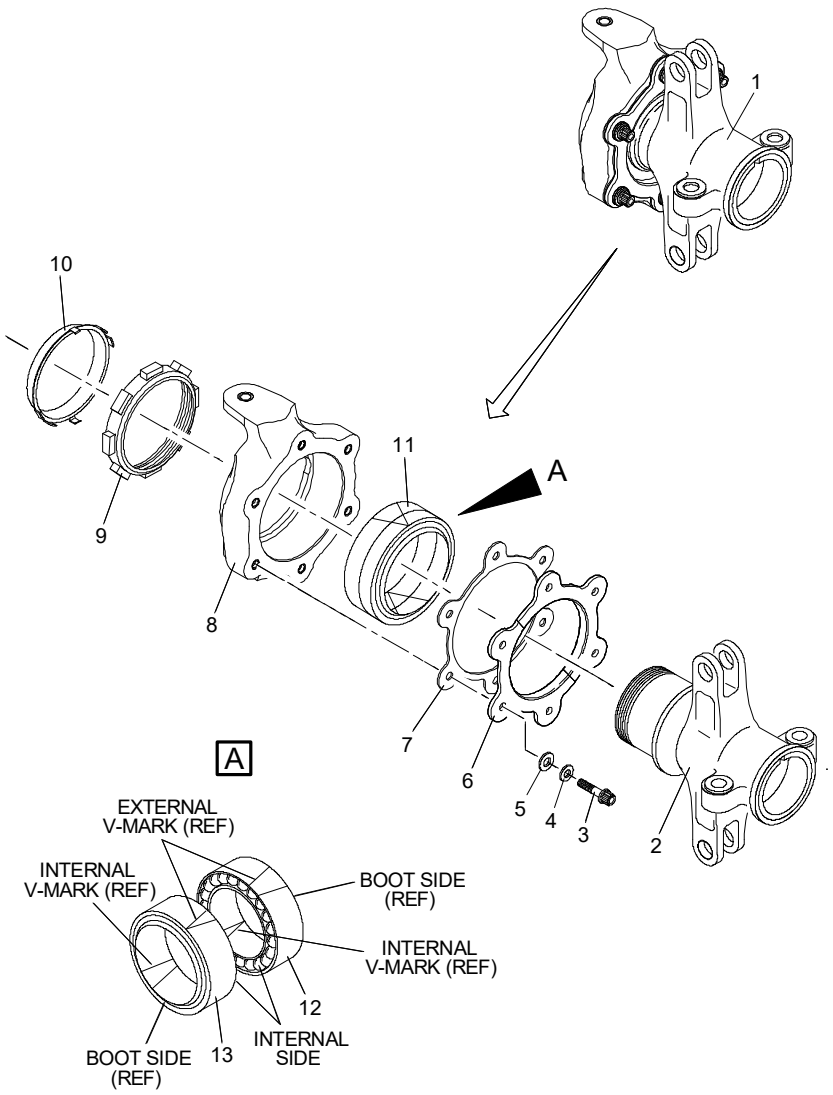
Figure 64-36 (sheet 3 of 4). Housing and slider group - Disassemble procedure (Sleeve assy P/N 109G6430A03)



A6HD2411A

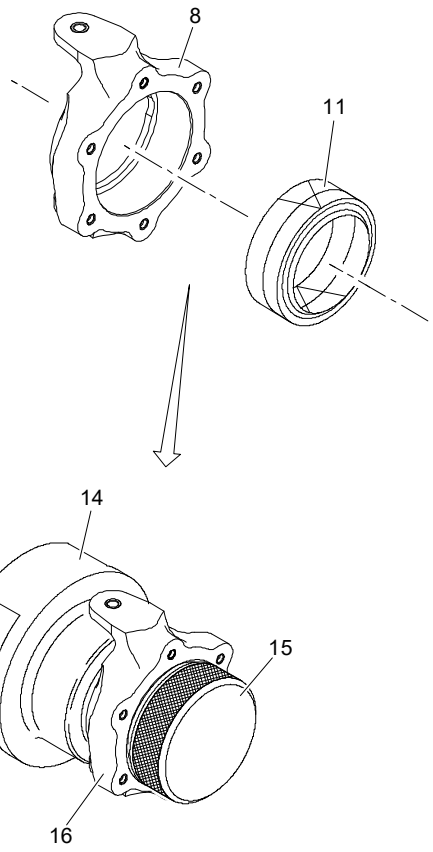
18. Housing-bearing assembly
19. Barrel
20. Bushing
21. Pin
22. Duplex bearing
23. Bearing support sleeve

Figure 64-36 (sheet 4 of 4). Housing and slider group - Disassemble procedure (Sleeve assy P/N 109G6430A03)



1. Slider group
2. Slider
3. Bolt
4. Countersunk washer
5. Washer
6. Flange
7. Peeling shim
8. Bearing support sleeve
9. Ring nut
10. Lock ring
11. Duplex bearing
12. Bearing
13. Bearing

Figure 64-37 (sheet 1 of 5). Housing and slider group - Assemble procedure (Sleeve assy P/N 109G6430A03)



14. Base
15. Pin
16. Housing-bearing assembly

Figure 64-37 (sheet 2 of 5). Housing and slider group - Assemble procedure (Sleeve assy P/N 109G6430A03)

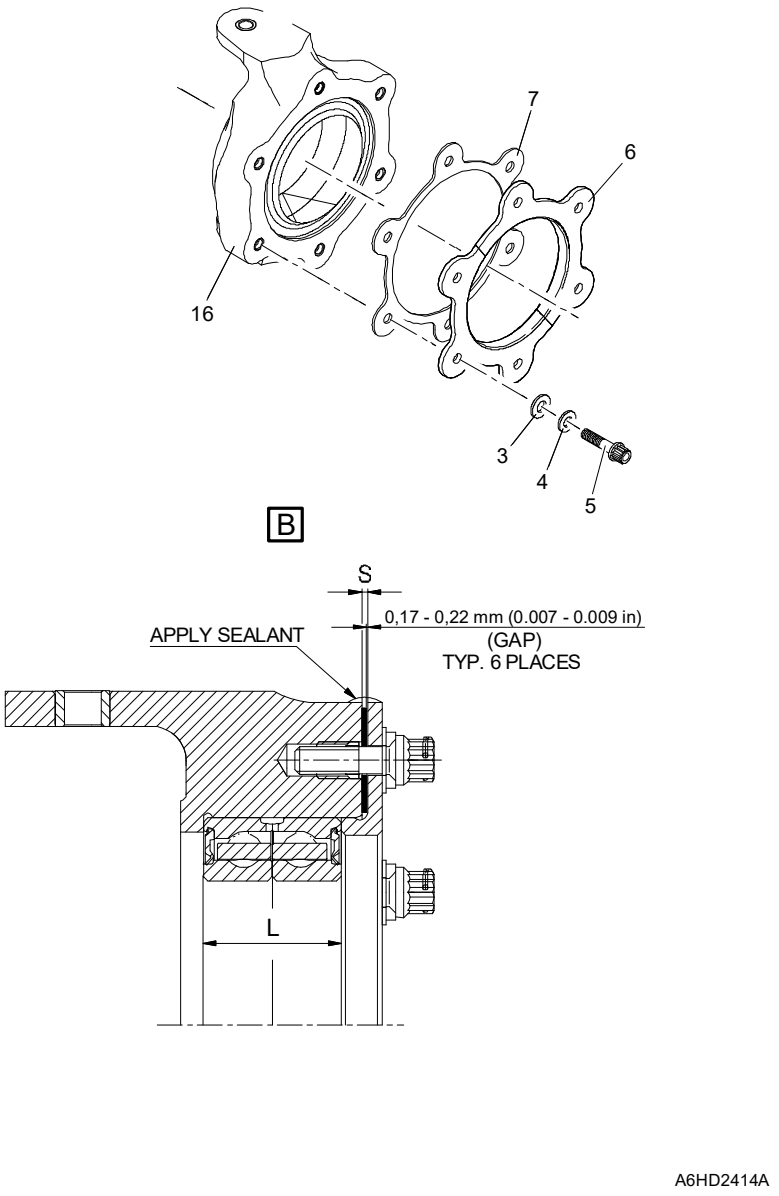
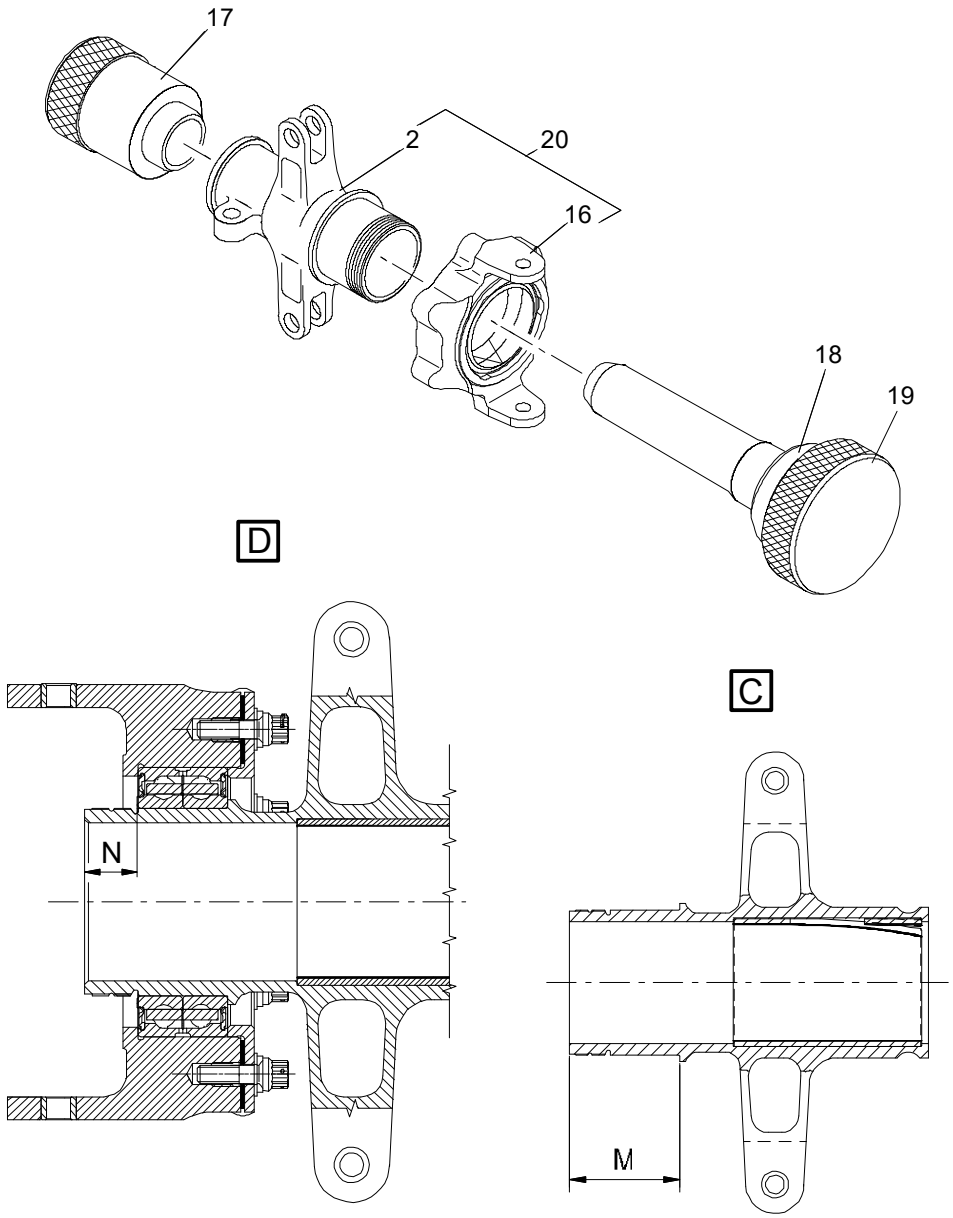


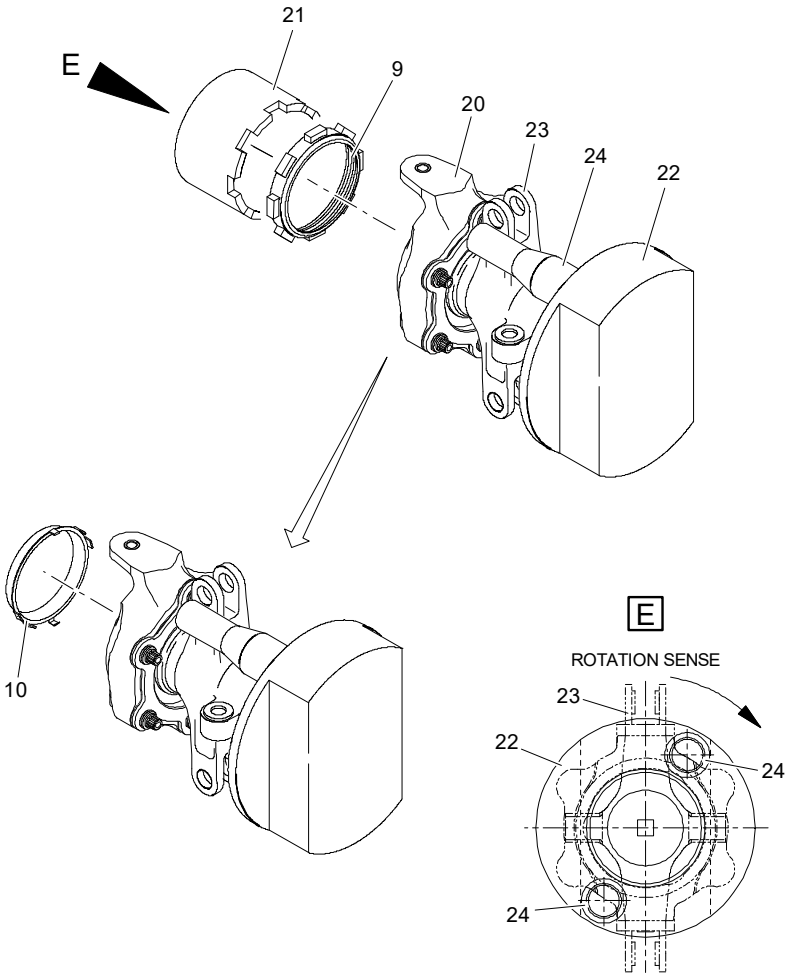
Figure 64-37 (sheet 3 of 5). Housing and slider group - Assemble procedure (Sleeve assy P/N 109G6430A03)



A6HD2415A

17. Barrel
18. Bushing
19. Pin
20. Housing-slider assembly

Figure 64-37 (sheet 4 of 5). Housing and slider group - Assemble procedure (Sleeve assy P/N 109G6430A03)



A6HD2416A

20. Housing-slider assembly
21. Wrench
22. Base
23. Brace
24. Pin

Figure 64-37 (sheet 5 of 5). Housing and slider group - Assemble procedure (Sleeve assy P/N 109G6430A03)

Annex 11

64-30-5. Removal/installation (sleeve assy P/N 109-0130-94)
(Fig 64-19)

A. Input Conditions
(1) Required conditions:
- Helicopter safe for maintenance (Chap 00).
- Access panels 11 and 60 removed (Sect 06-40, fig 06-4).
- Tail rotor hub and blade assembly removed (Sect 64-00).

(2) Support equipment:
- Tool, T/R pitch change slider ring nut removal/installation (LSE NO 10).
- Tool, T/R pitch change housing ring nut removal/installation (LSE NO 11).
- Tool, T/R pitch change housing duplex bearing removal (LSE NO 12).
- Tool, T/R pitch change housing duplex bearing installation (LSE NO 13).
- Tool, T/R pitch change slider removal (LSE NO 14).
- Deleted.
- Tool, T/R pitch change slider removal (LSE NO 19) .
- Syringe (Local supply).
- Heating gun (Local supply).
- Feeler gage (Local supply).
- Depth micrometer gage (Local supply).
- Refrigerator (Local supply).

(3) Consumable materials:

WARNING: THE CONSUMABLE MATERIALS THE NOMENCLATURE OF WHICH IS PREFIXED BY “(D)” ARE DANGEROUS MATERIALS.BEFORE USE, MAKE SURE TO KNOW THE SAFETY PRECAUTIONS AND FIRST AID INSTRUCTIONS PRINTED ON:
- THE LABEL ON THE CONTAINER THE MATERIAL WAS SUPPLIED IN
- THE MATERIAL SAFETY DATA SHEET
- THE LOCAL SAFETY REGULATIONS.
ALSO MAKE SURE THAT THE APPLICABLE FIRST AID MATERIALS ARE AVAILABLE.

- (D) MEK (C005).
- (D) Sealing compound (C029).
- Safety wire (C014).
- (D) Primer (C446).
- (D) Grease (C594).
- Soft lint-free cloth (C011).
- (D) Solvent, cleaning (C023).
- (D) Oil (C139).
- (D) Primer (C237).

(4) Other recommendations:

WARNING: THIS INSTALLATION INCLUDES VITAL POINTS (VP). DURING THE PROCEDURE, YOU MUST OBEY THE LOCAL REGULATIONS APPLICABLE TO THE VITAL POINTS.

CAUTION: MAKE SURE THAT YOU DO NOT MIX GREASES OF DIFFERENT BRANDS ALTHOUGH THE SPECIFICATIONS ARE THE SAME. REFER TO THE HELICOPTER LOG BOOK TO PREVENT MIXTURE OF UNWANTED GREASES.

CAUTION: THIS COMPONENT INCLUDES CRITICAL PARTS. EXAMINE THE COMPONENT FOR SIGNS OF STRUCTURAL DAMAGE, BEFORE YOU INSTALL IT ON THE HELICOPTER.

B. Removal Procedure.

(1) Disconnect tail rotor pitch control tube (59) from lever (49) by removing attaching hardware. Discard cotter pin.

(2) Disconnect FWD half scissor (30) from sleeve (27) and AFT half scissor (35) from slider (23) by removing attaching parts. Discard cotter pins.

(3) Detach AFT half scissor (35) from FWD half scissor (30) by removing attaching parts. Discard cotter pin.

(4) Cut lockwire from forward boot (26) and withdraw sleeve (25) from gearbox shaft. Remove forward boot (26) from sleeve (25). If loose remove bushing (27) ref to para 64-30-11.

NOTE: Mark position of pitch control links (20) to reconnect in same position during reassembly of slider.

(5) Disconnect link (20) from slider (23) by removing parts; remove link (20). Discard cotter pin.

(6) Remove links (10) by removing attaching parts. Discard cotter pins.

(7) Cut lockwire from boot (39).

(8) Withdraw housing (15), together with assembled parts, from gearbox shaft.

(9) Disassemble housing and slider assembly as follows:

(a) Open the two clawed tabs on the lock ring (16) then remove it from the ring nut (17).

CAUTION: MAKE SURE THAT THE TOOL IS PERFECTLY ALIGNED WITH THE DUPLEX BEARING WHEN YOU PRESS IT OUT IN ORDER TO PREVENT DUPLEX BEARING DAMAGE.

(b) Unscrew ring nut (17) from slider (23) using tool (LSE NO 10).

(c) Withdraw slider (23) from housing (15) using tool (LSE NO 19).

(d) Cut the safety wire and unscrew ring nut (19) from housing (15) using tool (LSE NO 11).

(e) Remove duplex bearing (18) from housing (15) using tool (LSE NO 12).

(f) Deleted.

(10) Remove boot (39).

(11) Remove attaching parts of levers (5 and 49), then remove levers and shims (8) and extract pivot (9) from lugs on gearbox.

(12) Disconnect lever (40) from link (46) by removing attaching parts, remove lever (40). Discard cotter pin.

(13) Disconnect link (46) from lugs on gearbox by removing attaching parts; remove washers and shims remove link (46). Discard cotter pin.

C. Installation Procedure.

CAUTION: INSTALL THE FWD HALF-SCISSOR (30, FIG 64-19) AND AFT HALF-SCISSOR (35, FIG 64-19) IN THE CORRECT LOCATION AND ORIENTATION AS SHOWN IN DETAIL C1 OF FIG 64-19.

NOTE: During the installation of the self-locking bolts or the self-locking nuts, when the locking is engaged, with the torque wrench (Local supply), make sure that the locking torque necessary to move the bolts or nuts, before contact with the washer, is between the minimum breakaway torque and the maximum locking torque. If you do not get his value, discard the bolts and/or nuts.

(1) Position pivot (9, fig 64-19) in 90° gearbox lugs.

(2) Install laminated shims (8) and levers (5 and 49) on pivot (9). Do not torque attaching parts.

NOTE: If any of the following items: 90° gearbox case, pivot (9) levers (5 and 49) laminated shims (8) have been replaced, proceed as follows:

(a) Position pivot (9) in 90° gearbox lugs.

(b) Position levers (5 and 49) on pivot (9) without shims and secure temporarily in position.

(c) Measure the total gap between one lever and the adjacent lug with a feeler gauge. Half of the gap is dimen- sion of each laminated shim (8).

(d) Remove levers (5 and 49) from pivot (9).

(e) Fit laminated shims (8) on pivot (9) then reinstall levers (5 and 49) and secure. Do not torque nuts (3 and 51) at this time.
(f) Check for free rotation of pivot. If shim thickness is unsatisfactory, modify the shims the same amount on either side to obtain an axial play between 0,03 to 0,08 mm between 90° gearbox lugs bearings and levers (5 and 49) when installed.

NOTE: Before installing the boot in the housing and slider group deform the boot metallic rim to an oval shape with a maximum diameter of 43 thru 44 mm (1.693 thru 1.732 in) as shown in figure 64-19. This is to help a tighter fit in the seat. Put the inboard boot in its position in the housing and slider group.

(3) Position boot (39) on gearbox shaft.
(4) Reassembly housing and slider assembly as follows:

CAUTION: BEFORE YOU ASSEMBLE THE HOUSING AND SLIDER GROUP (1, FIG. 64-23), PUT THE COMPONENT THAT FOLLOW AND THE RELATED ATTACHING PARTS ON AN APPLICABLE WORK TABLE.
CAREFULLY EXAMINE THE COMPONENT AND THE RELATED ATTACHING PARTS FOR CORROSION, NICKS AND DAMAGE, WEAR AND FRETTING. IF YOU FIND THAT THE COMPONENT IS DAMAGED, REPLACE IT.
- THE DUPLEX BEARING (4)
- THE HOUSING (5).

(a) Divide the two parts of the duplex bearing (4).

NOTE: Do Step C.(4)(b) thru Step C.(4)(d) only for removed bearings. New bearings are supplied already lubricated and must not be filled with grease.

(b) Fill the Syringe (Local supply) with the Grease (C594).
(c) Before you install the bearing (8), fill it with 3.5 cc (0.21 in3) of grease with the syringe from the side opposite to the boot. Refer to Detail A of Fig. 64-23.
(d) Do Step C.(4)(c) again on the bearing (9).
(e) Put the bearing (8) against the bearing (9) with the boot sides externally and the internal and external V- marks aligned to show an arrow. See Detail A, Fig. 64-23.
(f) Install the duplex bearing (4) into the housing (5) in the way that follows:
1. Apply a thin layer of Primer (C446) on the mating surfaces between the duplex bearing (4) and housing (5).
2. Put the housing (5) on the Base (10), part of the tool (LSE NO 12).

WARNING: BE CAREFUL WHEN YOU USE HEAT. HOT PARTS CAN CAUSE INJURY TO THE PERSONS.
ALWAYS USE APPLICABLE PROTECTIVE CLOTHING.

3. Heat the housing (5) to a temperature between 60 and 70 °C with the Heating gun (Local supply). This will help you to install the duplex bearing (4) into the housing. Make sure that the temperature is not more than 90 °C (heating gun set to a temperature of 90 °C).

NOTE: As an alternative to heating the housing (5); you can cool down the duplex bearing (4) with the Refrigerator (Local supply) to a temperature between -18 and -40 °C for 30 minutes. Do not touch the cold duplex bearing with bare hands to prevent injury.

4. Push the duplex bearing (4) into the housing (5). To do this, use the Pin (11), part of the tool (LSE NO 13) and an applicable arbor press.
5. Make sure there is no clearance between the two bearings (8 and 9) and between the outer ring of duplex bearing (4) and the shoulder of the housing (5). To do this, use the applicable Feeler gage (Local supply).
6. Remove the housing-bearing assembly (12) from the base (10).

NOTE: Before you continue, make sure that all the components are at ambient temperature.

(g) Install the ring nut (3) into the housing-bearing assembly (12). Obey the instructions that follow:

1. Clean the threads of the ring nut (3) and the housing (5) with the Cloth, soft lint-free (C011) and the Solvent, cleaning (C023). (VP)
2. Dry the threads of the ring nut (3) and the housing (5) with a clean Cloth, soft lint-free (C011). (VP)
3. Apply a layer of Primer (C237) on the threads of the ring nut (3).
4. Apply a layer of Primer (C237) on the threads of the housing (5).
5. Apply four drops of Sealing compound (C029) on the threads of the ring nut (3). Put them in four equally spaced positions (90 degrees apart). (VP)
6. Lock the Base (14), part of the tool (LSE NO 11) in an applicable vice.
7. Put the housing-bearing assembly (12) on the base (14), then lock it with the two Bolts (13), part of the tool (LSE NO 11).
8. Install the ring nut (3) in the housing-bearing assembly (12) with the Wrench (15), part of the tool (LSE NO 11).
9. Torque the ring nut (3) to 117,7 thru 127,5 Nm (86,8 thru 94 lbf ft). (**VP**)
10. Make sure that the duplex bearing (4) turns freely. (VP)
11. Refer to Detail B of Fig. 64-23.
    (a) Measure and record the dimension L.
    (b) Make sure that the dimension you find is between 23.75 to 24.0 mm (0.935 to 0.945 in).
    (c) If you find that the dimension is not in the given limits, remove the duplex bearing (4). Then, do Step C.(4)(f) and Step C.(4)(g) again.
12. Refer to Detail C of Fig. 64-23.
    (a) Measure and record the dimension M.
    (b) Calculate and record the dimension N with this formula: N = M - L.
13. Remove the housing group (16) from the base (14).

NOTE: The safety wire must be installed with the double-twist method and put in tension. Example of an acceptable safety wire installation is shown in Detail B1 of Fig. 64-23. As a general approach, an “a” angle between 60° and 120° is adviseable.

14. Safety the ring nut (3) to the housing (5) with the new Safety wire (C014) in two places as shown in Detail B1 of Fig. 64-23. Refer also to Section 20-10. (VP)

(h) Apply a thin layer of Oil (C139) on the internal surface of the duplex bearing (4).
(i) Put the Bushing (18), part of the tool (LSE NO 14) in its position on the Pin (19), part of the tool (LSE NO 14).
(j) Put the housing group (16) on the pin (19) above the bushing (18).
(k) Put the slider (2) on the pin (19).

NOTE: To help you install the slider (2), heat the housing group (16) in an oven preheated to a temperature of 50 °C for 15 to 30 minutes.
As an alternative to heating the housing group (16); you can cool down the slider (2) with the Refrigerator (Local supply) to a temperature between -18 and -40 °C for 30 minutes. Do not touch the cold slider with bare hands to prevent injury.

(l) Push the slider (2) into the housing group (16). To do this, use the Barrel (17), part of the tool (LSE NO 14) and an applicable arbor.
(m) Remove the housing-slider assembly (20) from the pin (19).

NOTE: Before you continue, make sure that all the components are at ambient temperature.

(n) Make sure there is no clearance between the inner rings of the two bearings (8 and 9) and the shoulder of the slider (2). To do this, use the applicable Feeler gage (Local supply).
(o) Refer to Detail D of Fig. 64-23:
1. Measure and record the dimension N. To do this, use an applicable Depth micrometer gage (Local supply).
2. Make sure that the dimension N measured agrees with the dimension calculated at Step C.(4)(g)12.b.
3. If you find that the dimension N does not agree, remove the duplex bearing (4). Then, do Step C.(4)(f) and Step C.(4)(o) again.
(p) Lock the Base (22), part of the tool (LSE NO 10) in an applicable vice.
(q) Put the housing-slider assembly (20) on the base (22).
(r) Move the braces (23) of the slider against the pins (24) of the base (22). Refer to Detail E of Fig. 64-23.
(s) Clean the threads of the ring nut (6) and the slider (2) with the Cloth, soft lint-free (C011) and the Solvent, cleaning (C023). (VP)
(t) Dry the threads of the ring nut (6) with a clean Cloth, soft lint-free (C011). (VP)
(u) Apply a layer of Primer (C237) on the threads of the ring nut (6).
(v) Apply a layer of Primer (C237) on the threads of the slider (2).
(w) Apply four drops of Sealing compound (C029) on the threads of the ring nut (6). Put them in four equally spaced positions (90 degrees apart). (VP)
(x) Install the ring nut (6) with the Wrench (21), part of the tool (LSE NO 10).
(y) Torque the ring nut (6) to 49,04 thru 58,84 Nm (36,1 thru 43,4 lbf ft). (**VP**)
(z) Remove the housing and slider group (1) from the base (22).
(aa) Install the new Lock ring (7).
(bb) Bend the clawed tabs of the lock ring (7) on the ring nut (6). Make sure that the two clawed tabs of the lock ring (7) are correctly engaged.

(5) Connect lever (40) and links (10) to housing (15).
(6) Torque the bolt (14) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(7) Install the cotter pin.

NOTE 1: It is possible to install the shims (15A) between housing (15) and links (10) and shims (40A) between lever (40) and housing (15). The washers must have the following dimensions: internal diameter 12 mm, external diameter 24 mm, thickness 0,5 -0,6 mm.

NOTE 2: Install the two larger washers against spherical bearing of lever (40) and link (10). Install the two smaller washers between the larger one and the nut. To obtain proper torque replacement of one smaller washer AN960C416 with an AN960C416L washer is permitted.

NOTE 3: If during installation the gap between lever (40) and sleeve (15) is more than 0,3 mm, install an AN960C416L washer.

(8) Connect pitch control links (20) to slider (23) following markings made at removal. Install between links and slider damper washers (60) with bolt (21), washers (22) and nut (38).
(9) Torque the bolt (21) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(10) Install the cotter pin.
(11) Apply the Corrosion preventive compound (C509) to the nut (38), protruding thread of bolt (21) and cotter pin (38A).

(12)Put the connecting link (46) in position on the lever (40) and the fitting (61).
(13)Put the four washers (46A) and the two shims (46B) in their position between the connecting link (46), the lever (40) and the fitting (61).
(14)Apply anti seize compound (C179) to the stem of bolt (58), then secure the connecting link to fitting (61) using the bolt (58), washers (57, 59) and nut (58A).
(15)Measure clearance between the link (46) and the fitting (61); if the clearance is more than 0.05 mm (0.002 in), adjust thickness of shim (46B).
(16)Torque the bolt (58) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(17)Install the cotter pin.
(18)Apply anti seize compound (C179) to the stem of bolt (44), then secure the connecting link to lever (40) using the bolt (44), washers (42, 43) and nut (41);
(19)Measure clearance between the link (46) and the lever (40); if the clearance is more than 0.05 mm (0.002 in), adjust thickness of shim (46B).
(20)Torque the bolt (44) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(21)Install the cotter pin.

NOTE: Shims (46B) can be installed on the top side or either on the bottom side of link (46).

(22)Install the group on 90° gearbox output shaft. Lockwire boot (39) with safety wire (C014).
(23)Connect links (10) to levers (5 and 49). Verify that bolts can turn and slide freely in seats, otherwise reposition lever (49) and/or lever (5) until this requirement is satisfied.
(24)Torque the bolts (45) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(25)Install the cotter pin.

NOTE: Install larger washer under bolt head and smaller washer under nut.

(26)Torque the bolt (7 and 47) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 5.65 thru 7.91 N m (50 thru 70 lbf in)

(27)Install the cotter pin.

CAUTION: CHECK THAT LEVERS (5 AND 49) ARE ALIGNED TO EACH OTHER, AND THAT BEARING (18) IS NOT PRELOADED.

(28)Connect the free arm of lever (49) to tail rotor pitch change control tube (59) with the bolt (52), the washer (53) and the nut (54)
(29)Torque the bolt (52) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum

- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(30)Install the cotter pin.

(31)Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank and under head of the bolts (52).

(32)(Helicopters equipped with sleeve P/N 109-0130-90-117)
If removed, install bushing (27) into sleeve (25) ref to para 64-30-11.

(33)Install boot (26) on sleeve (27).

(34)Install sleeve (27) on gearbox shaft. Lockwire boot (26) as required using safety wire.

(35)Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank of the bolt (32).

NOTE: Make sure that the head of the bolt (32) points in the direction of the rotation of the tail rotor.

(36)Connect the FWD half-scissor (30) to the sleeve (27) with the bolt (32), washers (29 and 31) and nut (28). Fully tighten all components. Do not torque nut.

(37)Manually determine the axial play between FWD half-scissor (30) and sleeve (27) along bolt axis in the way that follows:

(f) Turn the FWD half-scissor (30) back and forth, from “a” to “b” as Shown in Fig 64-19B Detail A, until you get the position of minimum play. Stop the FWD half-scissor (30) in this position. (**VP**)

(g) Torque the nut (28) until you get to the cotter pin hole on the bolt (32) with no axial play between components. FWD half-scissor must move freely with no binding. Slight friction is permitted. (**VP**)

(h) If you find too much binding / friction, replace the nut (32) with a new one and do again Step C.(25)(a) and Step C.(25)(b). (**VP**)

(i) If with the new nut (28) you still get too much binding / friction, add a washer (29A) P/N NAS1149F0416P under nut and do again Step C.(25)(a) and Step C.(25)(b). (**VP**)

(j) If you still get too much binding / friction, contact the TC holder.

(38)Connect the AFT half-scissor (35) to the FWD half-scissor (30) with the bolt (63), washers (64 and 65) and nut (66). Fully tighten all components. Do not torque nut. (**VP**)

(b) Before install the bolt (63) that connect the FWD half-scissor and AFT half-scissor apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587).

(39)Manually determine the axial play between AFT half-scissors (35) and FWD half-scissors (30) along bolt axis in the way that follows:

(f) Turn the AFT half-scissors (35) back and forth, from “a” to “b” as Shown in Fig 64-19B Detail B, until you get the position of minimum play. Stop the AFT half-scissors (35) in this position. (**VP**)

(g) Torque the nut (66) until you get to the cotter pin hole on the bolt (63) with no axial play between components. AFT half-scissor must move freely with no binding. Slight friction is permitted. (**VP**)

(h) If you find too much binding / friction, replace the nut (66) with a new one and do again Step C.(27)(a) and Step C.(27)(b). (**VP**)

(i) If with the new nut (66) you still get too much binding / friction, add a washer (65A) P/N NAS1149F0416P under nut and do again Step C.(27)(a) and Step C.(27)(b). (**VP**)

(j) If you still get too much binding / friction, contact the TC holder.

(40)Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank of the bolt (63).

NOTE: Make sure that the head of the bolt (37) points in the direction of the rotation of the tail rotor.

(41)Connect the AFT half-scissor (35) to the slider (23) with the bolt (37), washers (36 and 34) and nut (33). Fully tighten all components. Do not torque nut.

(42)Manually determine the axial play between AFT half-scissor (35) and the slider (23) along bolt axis in the way that follows:

(f) Move the sleeve (23) back and forth until you get the position of minimum play. Stop the sleeve in this position. (**VP**)

(g) Torque the nut (33) until you get to the cotter pin hole on the bolt (37) with no axial play between components. (**VP**)

(h) If you find too much binding / friction, replace the nut (33) with a new one and do again Step C.(30)(a) and Step C.(30)(b). (**VP**)

(i) If with the new nut (33) you still get too much binding / friction, add a washer (34A) P/N NAS1149F0416P under nut and do again Step C.(30)(a) and Step C.(30)(b). (**VP**)

(j) If you still get too much binding / friction, contact the TC holder.

(43)Install the new Cotter pins on nuts (28, 33 and 66).

(44)Apply the Corrosion preventive compound (C509) to the parts that follow:

(c) The heads of the bolts (32 and 37)

(d) The washers (29) and (34), the nuts (28) and (33) and the cotter pins.

NOTE: Ensure that attaching hardware (32 and 37) bolt heads are facing tail rotor sense of rotation.

(e) On the blade side, install the washer (69) with the countersunk side against the base of the blade pin as shown in detail F of Fig. 64-29.

NOTE: If before removed install spacer (68) as shown in figure.

(45)Put the outboard end of the pitch change control link (20) on the blade pin.

(46)Install the flat surface of cup washer (67) against the pitch change control link (20).

(47)Torque the nut (66) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):

- Locking torque: 9.04 N m (80 lbf in) maximum
- Breakaway torque: 1.07 N m (9.47 lbf in) minimum
- Seating torque: 7.91 thru 10.17 N m (70 thru 90 lbf in)

(48)Install the new cotter pin (70).

(49)Apply the Corrosion preventive compound (C509) to the nut (66), protruding thread of the blade pin and cotter pin (70).

D. Follow-On Maintenance Required:

- Install tail rotor hub and blade assembly (Sect 64-00).
- Install access panels 11 and 60.

NOTE: If links (10) P/N 109-0133-04-101 have been replaced with -105 or vice versa, perform tail rotor control system adjustment (para 67-00-30).

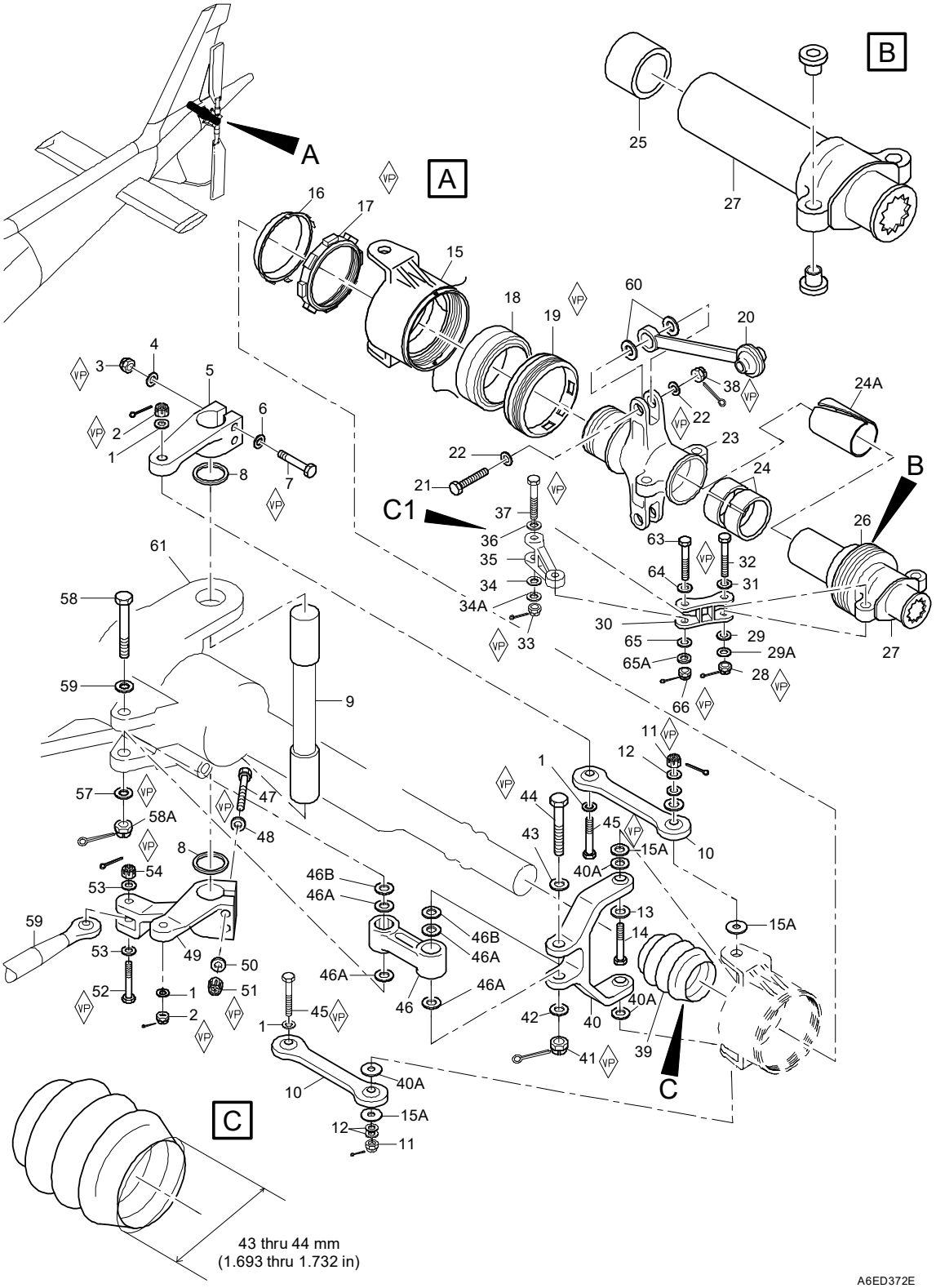


Figure 64-19 (sheet 1 of 4). Pitch change mechanism (Sleeve assy P/N 109-0130-94)

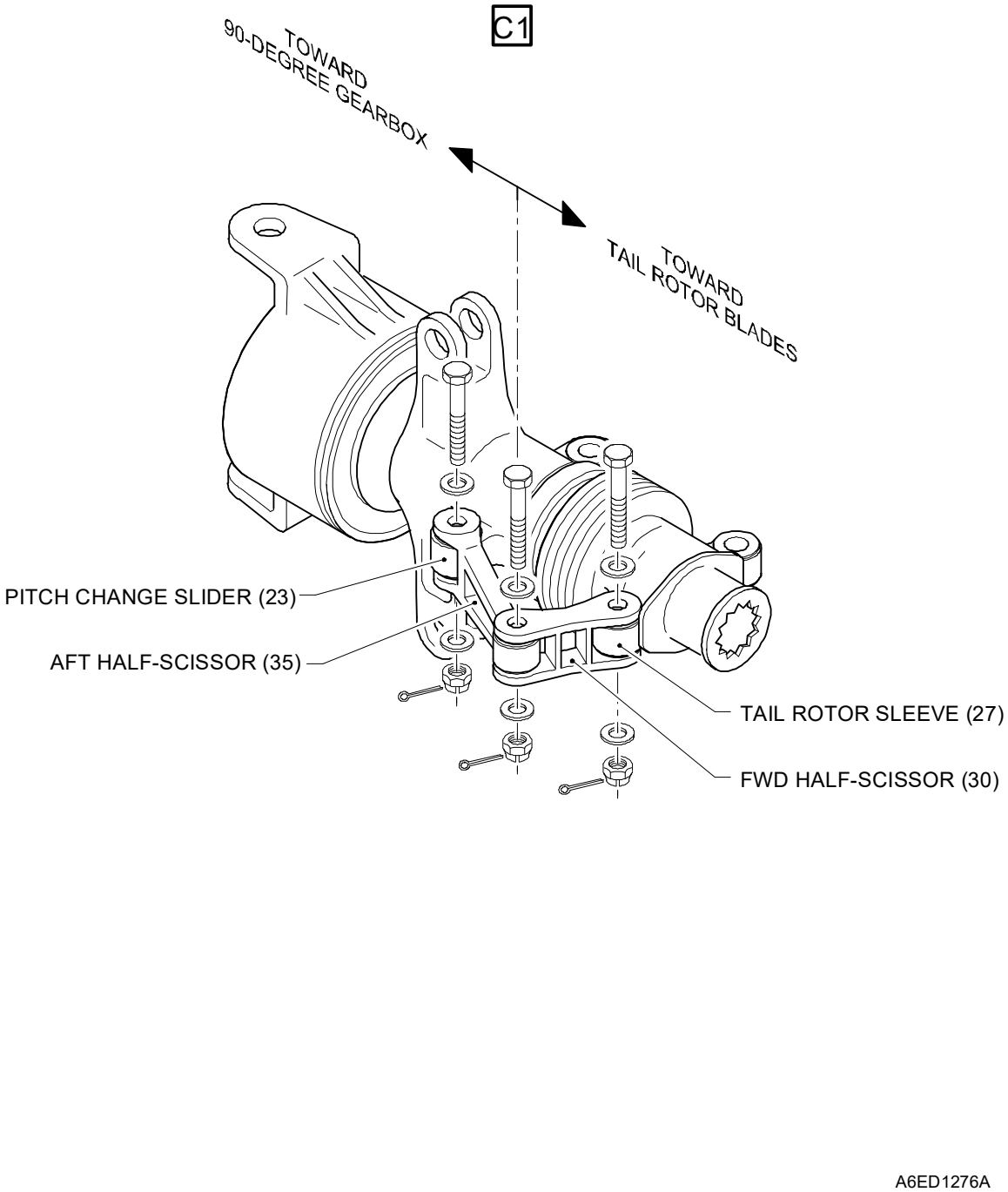


Figure 64-19 (sheet 3 of 5). Pitch change mechanism (Sleeve assy P/N 109-0130-94)

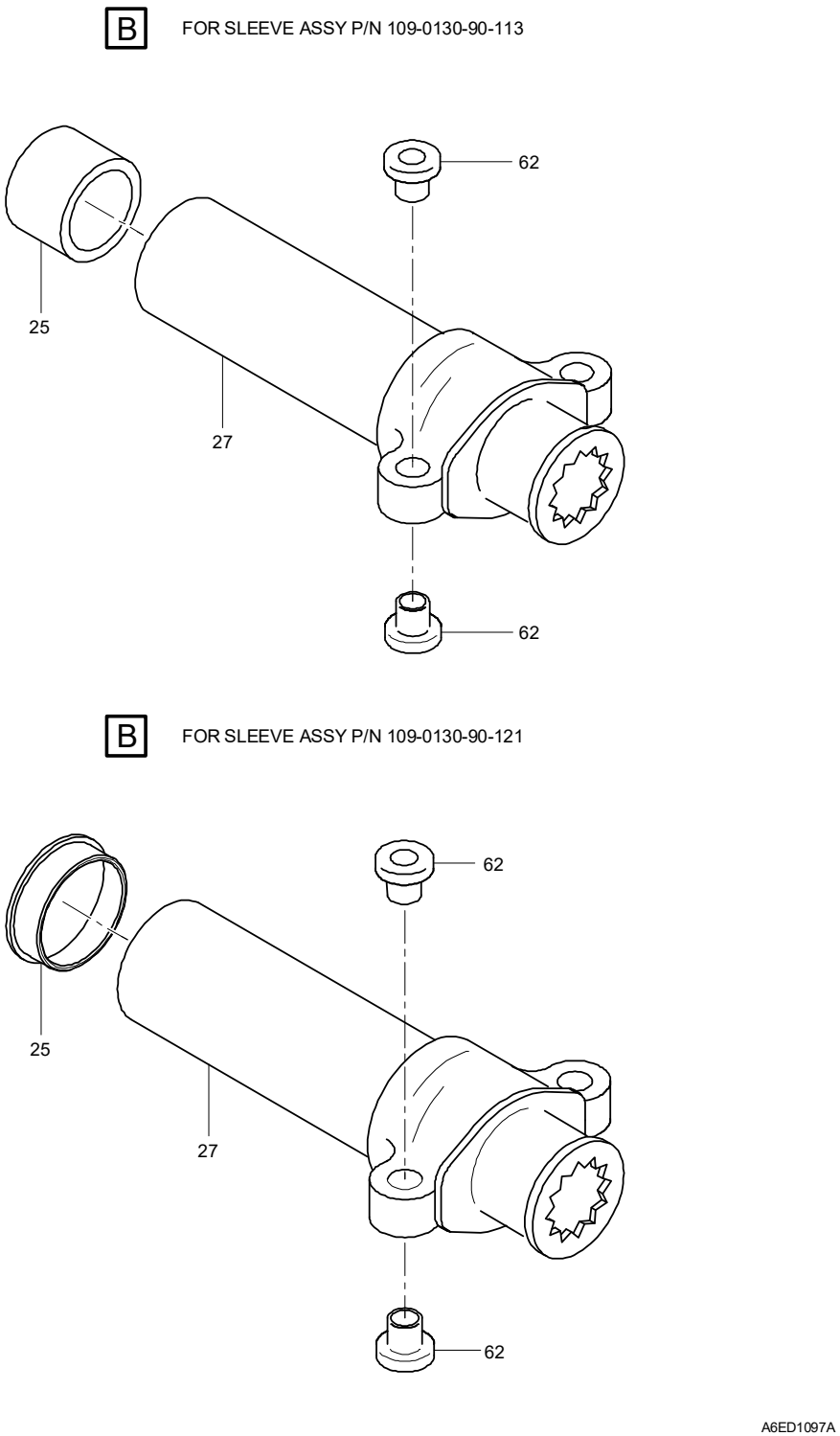


Figure 64-19 (sheet 3 of 4). Pitch change mechanism (Sleeve assy P/N 109-0130-94)

1. Washer
2. Nut
3. Nut
4. Washer
5. Lever
6. Washer
7. Bolt
8. Shim
9. Pivot
10. Link
11. Nut
12. Washer
13. Spacer
14. Bolt (*)
15. Housing
15A.Shim
16. Lock ring
17. Ring nut
18. Duplex bearing
19. Ring nut
20. Link
21. Bolt (*)
22. Washer
23. Slider
24. Bushings (**)
24A.Bushings (***)
25. Bushings (***)
26. Boot
27. Sleeve
28. Nut
29. Washer
29A. Washer (select on fit)
30. FWD half scissor
31. Washer
32. Bolt (*)
33. Nut
34. Washer
34A. Washer (select on fit)
35. AFT half scissor
36. Washer
37. Bolt (*)
38. Nut
39. Boot
40. Lever
40A.Bumper washer
41. Nut
42. Washer
43. Washer
44. Bolt (*)
45. Bolt (*)
46. Link
46A.Washer
46B.Shim
47. Bolt
48. Washer
49. Lever
50. Washer
51. Nut
52. Bolt (*)
53. Washer
54. Nut
55. Deleted
56. Deleted
57. Washer
58. Bolt (*)
58A.Nut
59. Tail rotor pitch control tube (ref)
60. Washers
61. Fitting, T/R gearbox
62. Bushings
63. Bolt
64. Washer
65. Washer
65A. Washer (select on fit)
66. Nut

(*) These bolts are provided with cotter pins which are not illustrated for clarity of representation.

(**) Used with slider P/N 109-0130-91-105.

(***) Used with slider P/N 109-0130-91-117/-119.

Figure 64-29 (sheet 4 of 4). Pitch change mechanism (Sleeve assy P/N 109-0130-94)

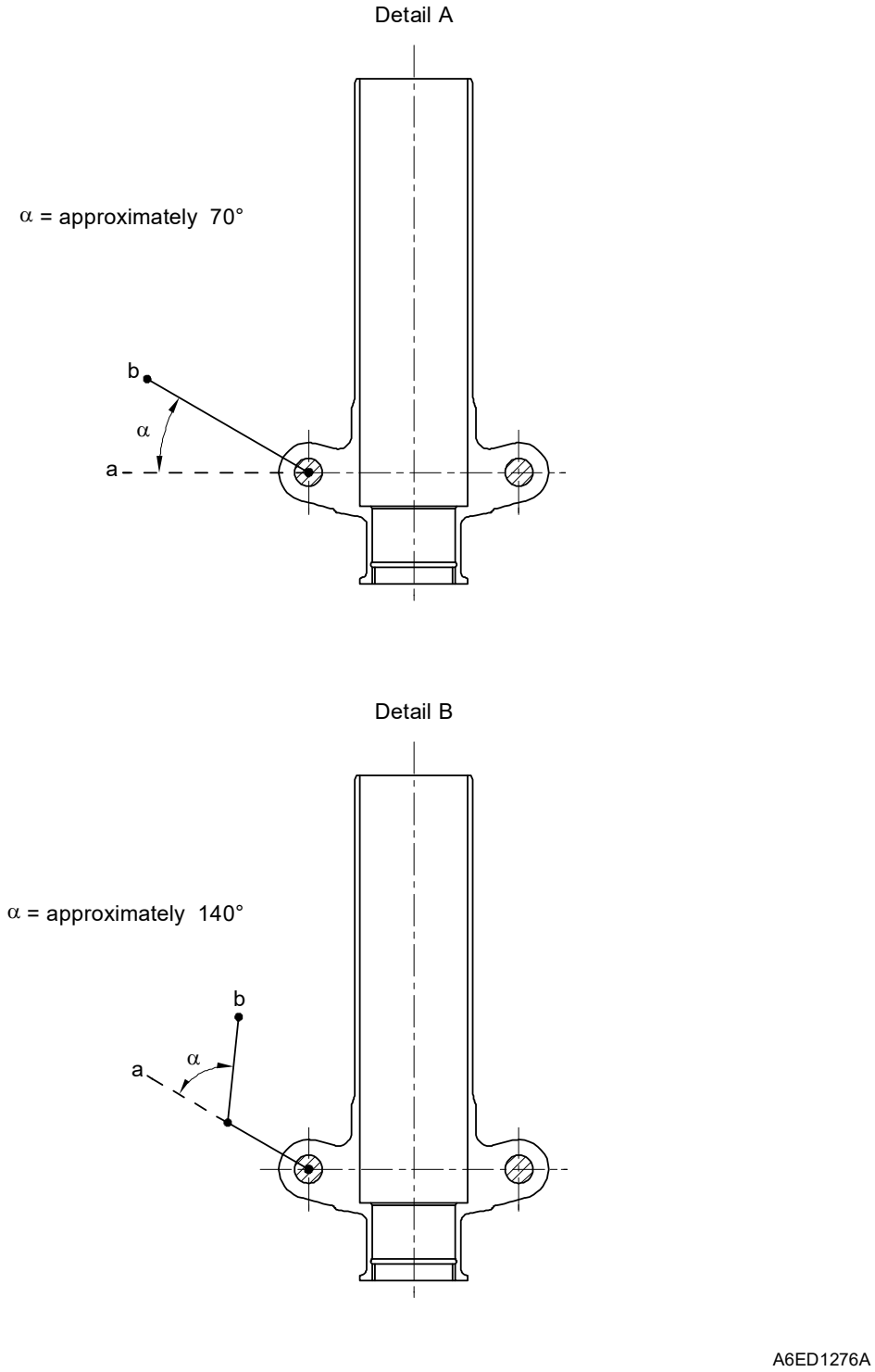


Figure 64-19B. Half scissors play check

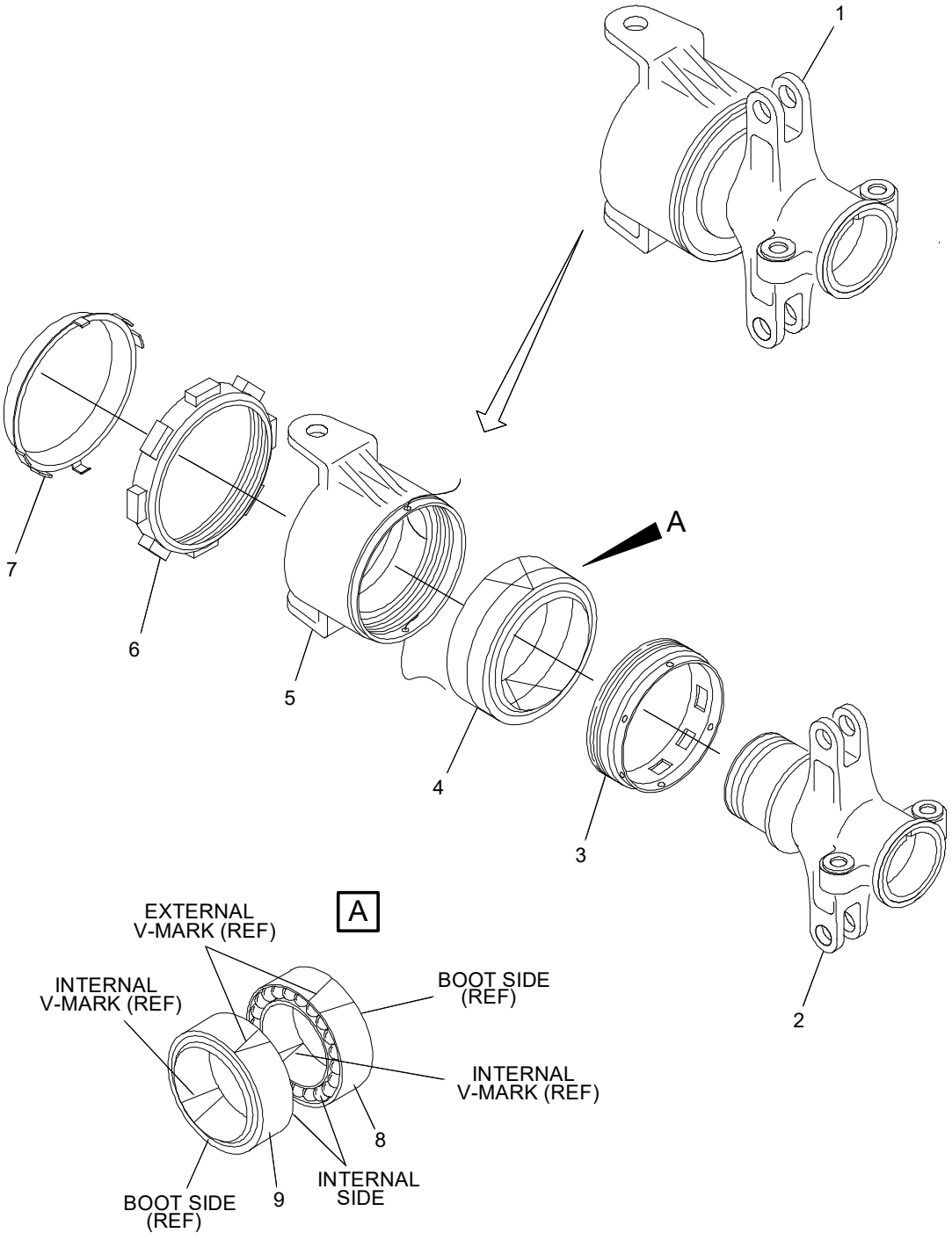


Figure 64-23 (sheet 1 of 5). Housing and slider assembly (sleeve assy P/N 109-0130-94)

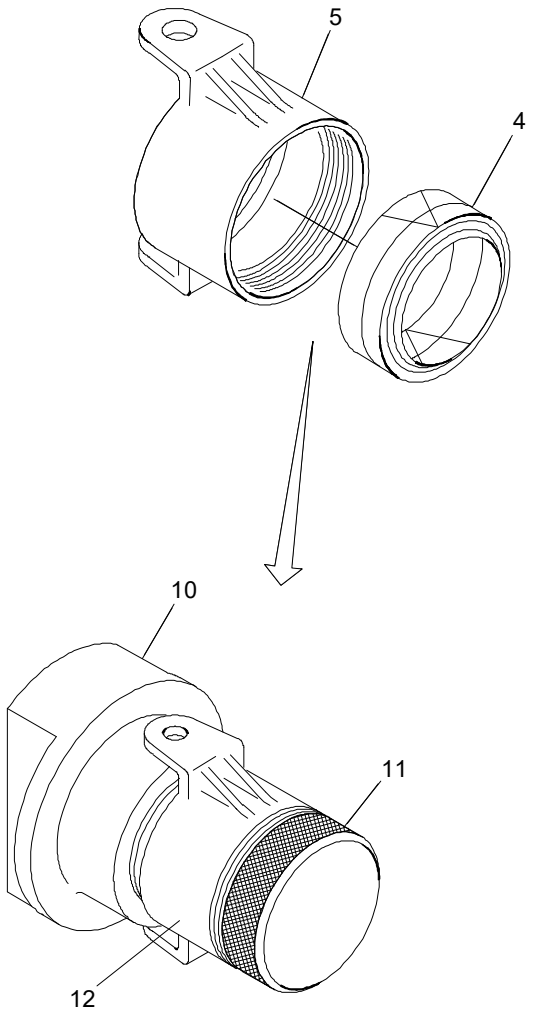


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Figure 64-23 (sheet 2 of 5). Housing and slider assembly (sleeve assy P/N 109-0130-94)

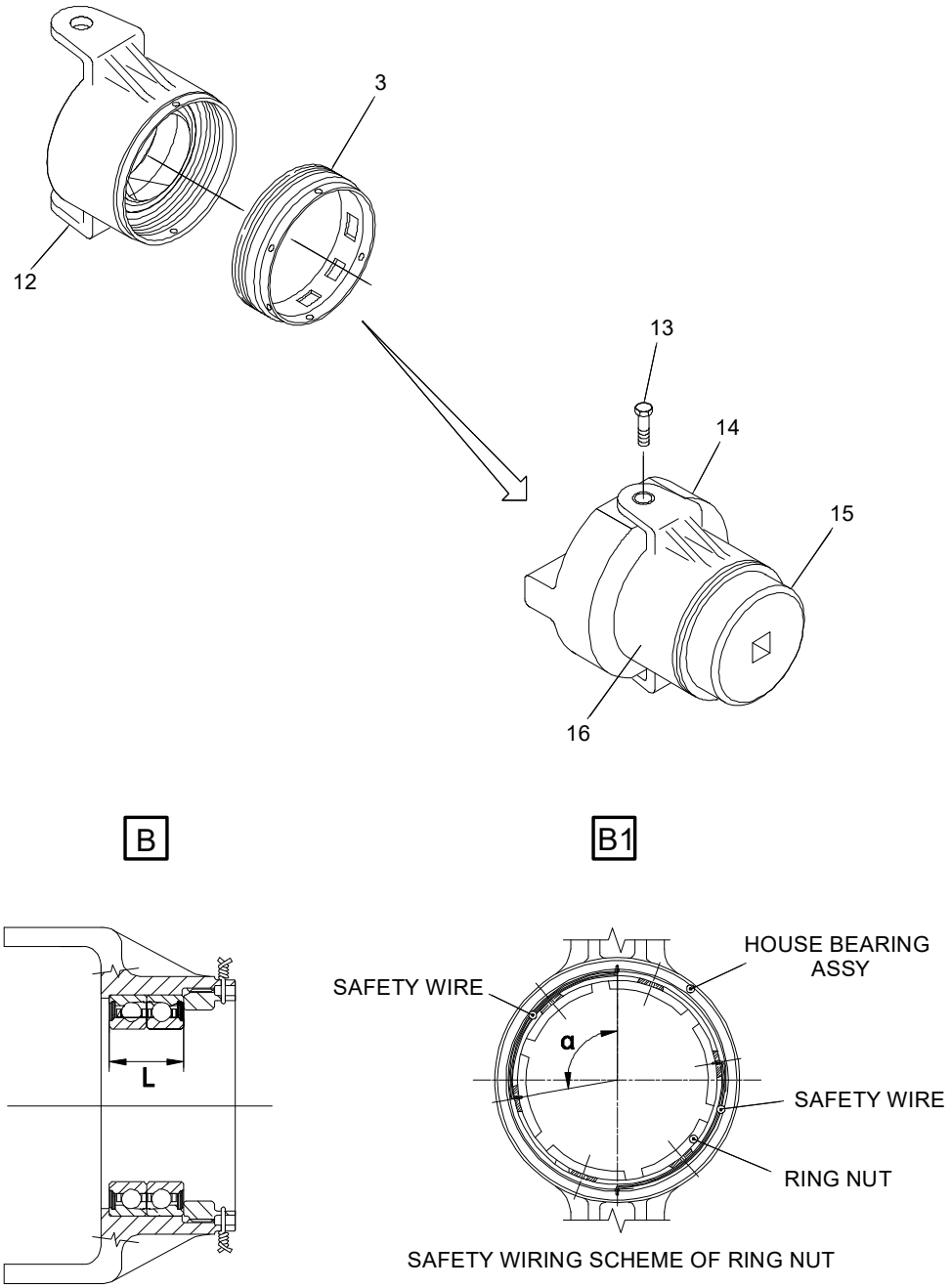


Figure 64-23 (sheet 3 of 5). Housing and slider assembly (sleeve assy P/N 109-0130-94)

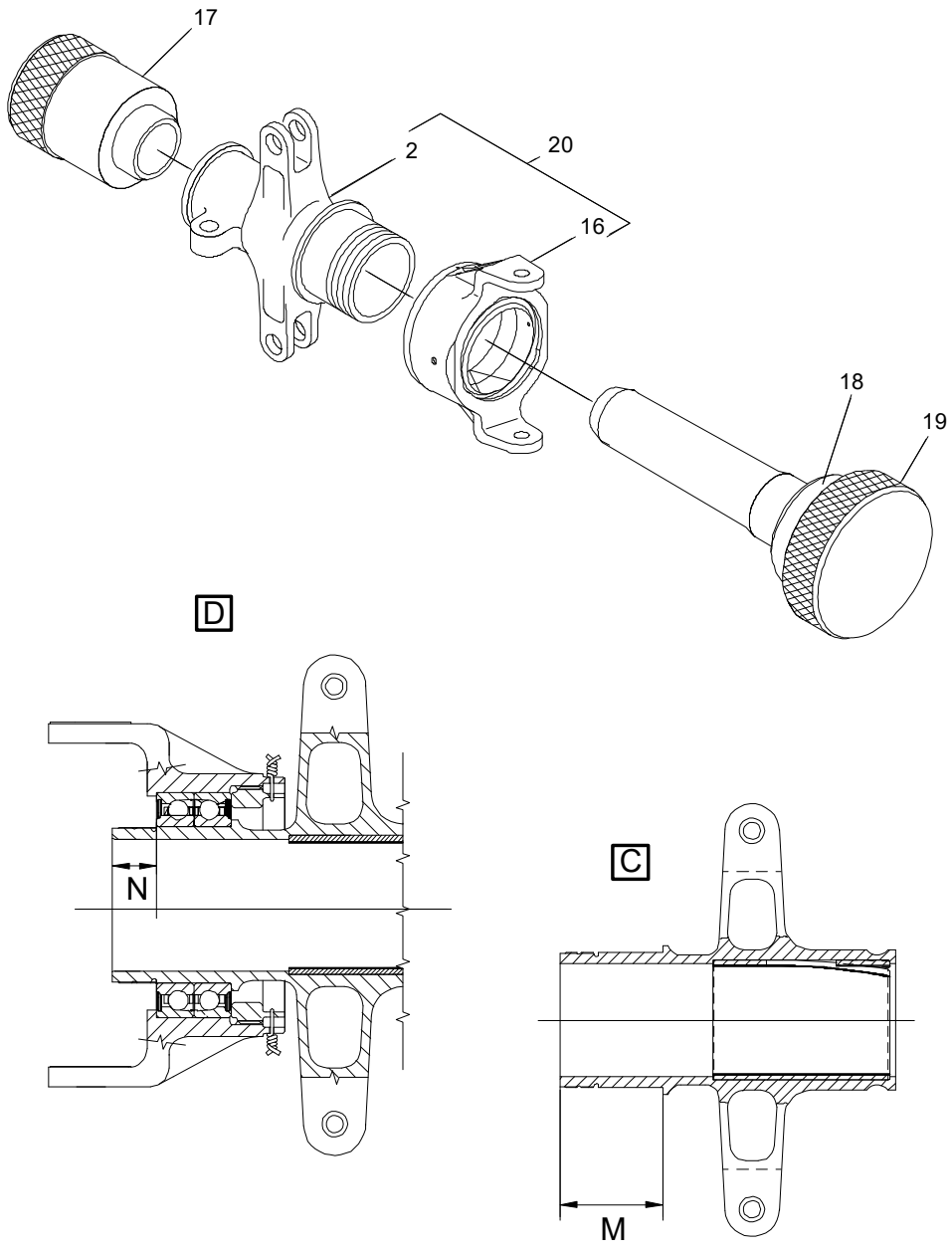


Figure 64-23 (sheet 4 of 5). Housing and slider assembly (sleeve assy P/N 109-0130-94)

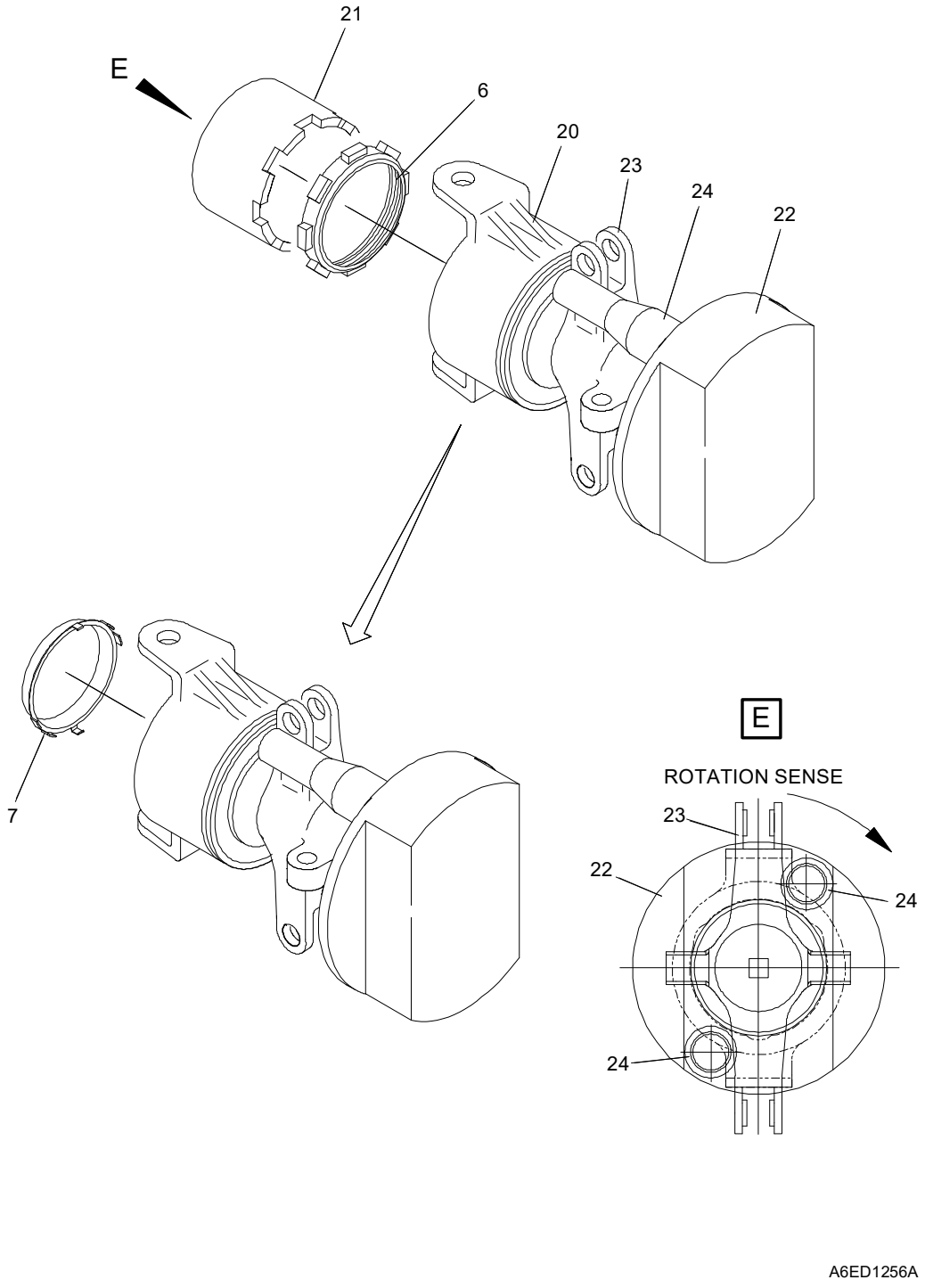


Figure 64-23 (sheet 5 of 5). Housing and slider assembly (sleeve assy P/N 109-0130-94)

Annex 12

64-30-5A. Removal/installation (Sleeve assy P/N 109G6430A03)
(Fig 64-20)

A. Input Conditions

(1) Required conditions:
- Helicopter safe for maintenance (Chap 00)
- Access panels 11 and 60 removed (Sect 06-40, fig 06-4)
- Tail rotor hub and blade assembly removed (Sect 64-00).

(2) Support equipment:
- Tool, T/R pitch change slider ring nut removal/installation (LSE NO 10)
- Tool, T/R pitch change housing duplex bearing removal (LSE NO 12)
- Tool, T/R pitch change housing duplex bearing installation (LSE NO 13)
- Tool, T/R pitch change slider removal (LSE NO 14)
- Tool, T/R pitch change slider removal (LSE NO 19)
- Syringe (Local supply)
- Heating gun (Local supply)
- Feeler gage (Local supply)
- Depth micrometer gage (Local supply)
- Refrigerator (Local supply)
- Plastic scraper (Local supply)

(3) Consumable materials:

WARNING: THE CONSUMABLE MATERIALS THE NOMENCLATURE OF WHICH IS PREFIXED BY “(D)” ARE DANGEROUS MATERIALS.BEFORE USE, MAKE SURE TO KNOW THE SAFETY PRECAUTIONS AND FIRST AID INSTRUCTIONS PRINTED ON:
- THE LABEL ON THE CONTAINER THE MATERIAL WAS SUPPLIED IN
- THE MATERIAL SAFETY DATA SHEET
- THE LOCAL SAFETY REGULATIONS.

ALSO MAKE SURE THAT THE APPLICABLE FIRST AID MATERIALS ARE AVAILABLE.

- Abrasive paper (C055)
- (D) Sealing compound (C029)
- Safety wire (C014)
- (D) Primer (C446)
- Safety wire (C013)
- (D) Grease (C594)
- Cloth, soft lint-free (C011)
- (D) Solvent, cleaning (C023)
- (D) Oil (C139)
- (D) Primer (C237)
- Sealant (C501)
- (D) Corrosion inhibiting compound (C505)
- (D) Corrosion preventive compound (C587)
- (D) Cleaning solvent (C287)
- (D) Corrosion inhibitor (C288)

(4) Other recommendations:

WARNING: THIS INSTALLATION INCLUDES VITAL POINTS (**VP**). DURING THE PROCEDURE, YOU MUST OBEY THE LOCAL REGULATIONS APPLICABLE TO THE VITAL POINTS.

CAUTION: MAKE SURE THAT YOU DO NOT MIX GREASES OF DIFFERENT BRANDS ALTHOUGH THE SPECIFICATIONS ARE THE SAME. REFER TO THE HELICOPTER LOG BOOK TO PREVENT MIXTURE OF UNWANTED GREASES.

CAUTION: THIS COMPONENT INCLUDES CRITICAL PARTS. EXAMINE THE COMPONENT FOR SIGNS OF STRUCTURAL DAMAGE, BEFORE YOU INSTALL IT ON THE HELICOPTER. REFER TO SECT 20-40.

B. Removal Procedure.

(1) Disconnect tail rotor pitch control tube (59) from torque shaft control lever (49) by removing attaching hardware. Discard cotter pin.
(2) Disconnect FWD half scissor (30) from sleeve (25) and AFT half scissor (35) from slider (23) by removing attaching parts. Discard cotter pins.
(3) Detach AFT half scissor (35) from FWD half scissor (30) by removing attaching parts. Discard cotter pin
(4) Cut lockwire from forward boot (26) and withdraw sleeve (25) from gearbox shaft. Remove forward boot (26) from sleeve (25). If loose remove bushing (27).

NOTE: Mark position of pitch control links (20) to reconnect in same position during reassembly of slider.

CAUTION: REMOVE THE PITCH CONTROL LINK (20) IN THE SEQUENCE AS FOLLOWS FOR NOT DAMAGE THE LINK.

(5) Remove pitch control link (20) from slider arm (23), by removing parts; the bolt (21), the washer (22), damper washer (60), the other washer (22), the nut (38) and discard the cotter pin (38A) remove pitch control link (20).
(6) Remove links (10) by removing attaching parts. Discard cotter pins.
(7) Cut lockwire from aft boot (39).
(8) Withdraw housing (15), together with assembled parts, from gearbox shaft.
(9) Disassemble housing (15) and slider assembly (23) as follows:
  (a) Put the housing and slider group (1, Figure 64-21) on an applicable work table.
  (b) Lock the Base (Part of LSE NO 10) (2) in an applicable vice.
  (c) Put the housing and slider group (1) on the base (2).
  (d) Move the braces (3) of the slider against the pins (4) of the base (2).
  (e) Open the two clawed tabs on the lock ring (5). Then remove it from the housing and slider group (1).
  (f) Remove the ring nut (7) with the Wrench (Part of LSE NO 10) (6).
  (g) Remove the housing-slider assembly (8) from the base (2).
  (h) Put the housing-slider assembly (8) on the Support (Part of LSE 19) (9).

CAUTION: WHEN YOU DO THE STEP B.(9)(I) THAT FOLLOWS, MAKE SURE THAT THE PIN (12) AND THE DUPLEX BEARING (22) ARE CORRECTLY ALIGNED. THIS IS TO PREVENT DUPLEX BEARING DAMAGE.

  (i) Push the slider group (10) out of the housing group (11). To do this, use the Pin (Part of LSE NO 19) (12) and an applicable arbor press.
  (j) Remove the slider group (10) from the support (9).
  (k) Remove the sealant from the housing group (11), between the housing-bearing assembly (18) and the flange (14) with the Plastic scraper (Local supply) (See Detail A).
  (l) Cut the safety wire from the six bolts (15).
  (m) Remove these parts that attach the flange (14) with the peeling shim (13) to the housing-bearing assembly (18):
    - The six bolts (15)
    - The six countersunk washers (16)
    - The six washers (17).

(n) Remove the flange (14) with the peeling shim (13) from the housing-bearing assembly (18).
(o) Put the Bushing (Part of LSE NO 12) (20) in its position on the Pin (Part of LSE NO 12) (21).
(p) Put the housing-bearing assembly (18) on the pin (21) above the bushing (20).

WARNING: BE CAREFUL WHEN YOU USE HEAT. HOT PARTS CAN CAUSE INJURY TO THE PERSONS. ALWAYS USE APPLICABLE PROTECTIVE CLOTHING.

(q) Lightly increase the temperature of the external surface of the housing-bearing assembly (18) with the Heating gun (Local supply). This will help you to remove the duplex bearing (22) from the bearing support sleeve (23). Make sure that the temperature must not be more than 90 °C.
(r) Push the duplex bearing (22) out of the bearing support sleeve (23). To do this, use the Barrel (Part of LSE NO 12) (19) and an applicable arbor press.

(10) Remove boot (39, Fig 64-20).
(11) Remove attaching parts of levers (5 and 49), then remove levers and shims (8) and extract pivot (9) from lugs on gearbox.
(12) Disconnect pitch control lever (40) from link (46) by removing attaching parts. Remove lever (40). Discard cotter pin.
(13) Disconnect link (46) from lugs on gearbox by removing attaching parts. Remove link (46). Discard cotter pin.

C. Installation Procedure.

CAUTION: INSTALL THE FWD HALF-SCISSOR (30, FIG 64-20) AND AFT HALF-SCISSOR (35, FIG 64-20) IN THE CORRECT LOCATION AND ORIENTATION AS SHOWN IN DETAIL C1 OF FIG 64-20.

NOTE: During the installation of the self-locking bolts or the self-locking nuts, when the locking is engaged, with the torque wrench (Local supply), make sure that the locking torque necessary to move the bolts or nuts, before contact with the washer, is between the minimum breakaway torque and the maximum locking torque. If you do not get his value, discard the bolts and/or nuts.

(1) Position torque shaft (9, Fig 64-20) in 90-degree gearbox lugs.
(2) Install laminated shims (8) and levers (5 and 49) on torque shaft (9). Do not torque attaching parts.

NOTE: If any of the following items: 90-degree gearbox case, torque shaft (9) levers (5 and 49) laminated shims (8) have been replaced, proceed as follows:

(a) Position torque shaft (9) in 90-degree gearbox lugs.
(b) Position levers (5 and 49) on torque shaft (9) without shims and secure temporarily in position.
(c) Measure the total gap between one lever and the adjacent lug with a feeler gauge. Half of the gap is dimension of each laminated shim (8).
(d) Remove levers (5 and 49) from torque shaft (9).
(e) Fit laminated shims (8) on torque shaft (9) then reinstall levers (5 and 49) and secure. Do not torque nuts (3 and 51) at this time.
(f) Check for free rotation of pivot. If shim thickness is unsatisfactory, modify the shims the same amount on either side to obtain an axial play between 0,03 and 0,08 mm between 90° gearbox lugs bearings and levers (5 and 49) when installed.

NOTE: Before installing the boot in the housing and slider group deform the boot metallic rim to an oval shape with a maximum diameter of 43 thru 44 mm (1.693 thru 1.732 in) as shown in DETAIL D of figure 64-20. This is to help a tighter fit in the seat. Put the inboard boot in its position in the housing and slider group.

(3) Position aft boot (39) on gearbox shaft.
(4) Reassemble housing (15) and slider assembly (23) as follows:

CAUTION: BEFORE YOU ASSEMBLE THE HOUSING AND SLIDER GROUP (1, FIG. 64-22) PUT THE COMPONENT THAT FOLLOW AND THE RELATED ATTACHING PARTS ON AN

APPLICABLE WORK TABLE.
CAREFULLY EXAMINE THE COMPONENT AND THE RELATED ATTACHING PARTS FOR CORROSION, NICKS AND DAMAGE, WEAR AND FRETTING. IF YOU FIND THAT THE COMPONENT IS DAMAGED, REPLACE IT:
- THE DUPLEX BEARING (11)
- THE BEARING SUPPORT SLEEVE (8).

(a) Divide the two parts of the duplex bearing (11).

NOTE: Do step C.(4)(b) thru step C.(4)(d) only for removed bearings. New bearings are supplied already lubricated and must not be filled with grease.

(b) Fill the Syringe (Local supply) with the Grease (C594).
(c) Before you install the bearing (12), fill it with 3.5 cc (0.21 in3) of grease with the syringe from the side opposite to the boot. Refer to Detail A of Fig. 64-22.
(d) Do step C.(4)(c) again on the bearing (13).
(e) Put the bearing (12) against the bearing (13) with the boot sides externally and the internal and external V-marks aligned to show an arrow. See Detail A, Fig. 64-22.
(f) Install the duplex bearing (11) into the bearing support sleeve (8) in the way that follows:
1. Apply a thin layer of Primer (C446) on the mating surfaces between the duplex bearing (11) and bearing support sleeve (8).
2. Put the bearing support sleeve (8) on the Base (Part of LSE NO 13) (14).

WARNING: BE CAREFUL WHEN YOU USE HEAT. HOT PARTS CAN CAUSE INJURY TO THE PERSONS. ALWAYS USE APPLICABLE PROTECTIVE CLOTHING.

3. Heat the bearing support sleeve (8) to a temperature between 60 and 70 °C with the Heating gun (Local supply) . This will help you to install the duplex bearing (11) into the bearing support sleeve. Make sure that the temperature is not more than 90 °C (heating gun set to a temperature of 90 °C).

NOTE: As an alternative to heating the bearing support sleeve (8); you can cool down the duplex bearing (11) with the Refrigerator (Local supply) to a temperature between -18 and -40 °C for 30 minutes. Do not touch the cold duplex bearing with bare hands to prevent injury.

4. Push the duplex bearing (11) into the bearing support sleeve (8). To do this, use the Pin (Part of LSE NO 13) (15) and an applicable arbor press.
5. Make sure there is no clearance between the two bearings (12 and 13) and between the outer ring of duplex bearing (11) and the shoulder of the bearing support sleeve (8). To do this, use the applicable Feeler gage (Local supply).
6. Remove the housing-bearing assembly (16) from the base (14).

NOTE: Before you continue, make sure that all the components are at ambient temperature.

(g) Install the flange (6) with the peeling shim (7) into the housing-bearing assembly (16). Obey the instructions that follow:
1. Clean the flange (6), the mating surfaces of the housing-bearing assembly (16) and the six bolts (3) with the Cloth, soft lint-free (C011) and the Solvent, cleaning (C023).
2. Dry the parts that you cleaned with a clean Cloth, soft lint-free (C011).
3. Temporarily put the flange (6) in its correct position on the housing-bearing assembly (16) against the duplex bearing (11). Do not apply pressure on the bearing.
4. Measure the gap between the flange (6) and the housing-bearing assembly (16) in the six tabs. Refer to Detail B of Fig. 64-22. Calculate the average value (dimension S) and then record it. (**VP**)
5. Adjust the thickness “S7” of the peeling shim (7) with this formula: (**VP**) S7 = S - 0,17 thu 0,22 mm (0.007 thru 0.009 in).

6. Install the peeling shim (7) and the flange (6) in the housing-bearing assembly (16).

CAUTION: MAKE SURE THAT THERE ARE NO BURRS DURING PEELING SHIMS INSTALLATION (7) ADJUSTMENT. IF YOU FIND BURRS REMOVE WITH ABRASIVE PAPER (C055).

NOTE: Make sure that the six countersunk washers are correctly installed as shown in Detail B of Fig. 64-22. **(VP)**

7. Install these parts that attach the flange (6) with the peeling shim (7) to the bearing support sleeve (8): (**VP**)
   - The six washers (5)
   - The six countersunk washers (4)
   - The six bolts (3).

NOTE 1: During the installation of the six bolts (3) in the insert of the bearing support sleeve (8), when the locking is engaged, with the torque wrench (Local supply), make sure that the locking torque necessary to move the bolts, before contact with the washers (4) and (5), is between 0.22 Nm (1.95 lbf in) and 2.03 Nm (17.97 lbf in). if you do not get this value, discard the bolts and / or inserts. (**VP**)

NOTE 2: In case you have to replace the inserts, contact the TC holder.

8. Torque the bolts (3) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
   - Locking torque: 2.03 N m (17.97 lbf in) maximum
   - Breakaway torque: 0.22 N m (1.95 lbf in) minimum
   - Seating torque: 4.30 thru 4.52 N m (38.05 thru 40 lbf in)
9. Remove the housing-bearing assembly (16) from the base (14).
10. Make sure that the duplex bearing (11) turns freely. (**VP**)
11. Refer to Detail B of Fig. 64-22:
    a. Measure and record the dimension L.
    b. Make sure that the dimension you find is between 23.75 to 24.0 mm (0.935 to 0.945 in).
    c. If you find that the dimension is not in the given limits, remove the duplex bearing (11). Then, do step C.(4)(f) and step C.(4)(g) again.
12. Refer to Detail C of Fig. 64-22:
    a. Measure and record the dimension M.
    b. Calculate and record the dimension N with this formula: N = M - L.
13. Safety the six bolts (3) with the new Wire, safety (C014) . Refer also to CSPP-A-20-40-00-03A-712AD. (**VP**)

(h) Apply a thin layer of Oil (C139) on the internal surface of the duplex bearing (11).
(i) Put the Bushing (Part of LSE NO 14) (18) in its position on the Pin (Part of LSE NO 19) (19).
(j) Put the housing group (16) on the pin (19) above the bushing (18).
(k) Put the slider (2) on the pin (19).

NOTE 1: To help you install the slider (2), heat the housing group (16) in an oven preheated to a temperature of 50 °C for 15 to 30 minutes.

NOTE 2: As an alternative to heating the housing group (16); you can cool down the slider (2) with the Refrigerator (Local supply) to a temperature between -18 and -40 °C for 30 minutes. Do not touch the cold slider with bare hands to prevent injury.

(l) Push the slider (2) into the housing group (16). To do this, use the Barrel (Part of LSE NO 14) (17) and an applicable arbor.
(m) Remove the housing-slider assembly (20) from the pin (19).

NOTE : Before you continue, make sure that all the components are at ambient temperature.

(n) Make sure there is no clearance between the inner rings of the two bearings (12 and 13) and the shoulder of the slider (2). To do this, use the applicable Feeler gage (Local supply).
(o) Refer to Detail D of Fig. 64-22:
1. Measure and record the dimension N. To do this, use an applicable Depth micrometer gage (Local supply).
2. Make sure that the dimension N measured agrees with the dimension calculated at step C.(4)(g)(11)b.
3. If you find that the dimension N does not agree, remove the duplex bearing (11). Then, do step C.(4)(f) thru step C.(4)(o) again.
(p) Lock the Base (Part of LSE NO 10) (22) in an applicable vice.
(q) Put the housing-slider assembly (20) on the base (22).
(r) Move the braces (23) of the slider against the pins (24) of the base (22). Refer to Detail E of Fig. 64-22.
(s) Clean the threads of the ring nut (9) and the slider (2) with the Cloth, soft lint-free (C011) and the Solvent, cleaning (C023) . (**VP**)
(t) Dry the threads of the ring nut (9) and slider (2) with a clean Cloth, soft lint-free (C011) . (**VP**)
(u) Apply a layer of Primer (C237) on the threads of the ring nut (9).
(v) Apply a layer of Primer (C237) on the threads of the slider (2).
(w) Apply four drops of Adhesive (C029) on the threads of the ring nut (9). Put them in four equally spaced positions (90 degrees apart). (**VP**)
(x) Install the ring nut (9) with the Wrench (Part of LSE NO 10) (21).
(y) Torque the ring nut (9) to 49 thru 59 N m (36 thru 43 lbf ft). (**VP**)
(z) Remove the housing and slider group (1) from the base (22).
(aa) Install the new Lock ring (10).
(bb) Bend the clawed tabs of the lock ring (10) on the ring nut (9). Make sure that the two clawed tabs of the lock ring (10) are correctly engaged.
(cc) Seal the gap between the flange (6) and the housing-bearing assembly (16) with Sealant (C501) as shown in Detail B of Fig. 64-22.
(dd) Let the sealing compound cure. For sealing compound cure cycle, refer to 09-A-00-50-00-85A-074C-D.
(ee) Clean the head of the six bolts (3) with a soft Lint-free cloth (C011) and the Cleaning solvent (C287).
(ff) Apply the Corrosion inhibitor (C288) to the head of the six bolts (3).
(gg) Paint a slippage mark between the head of thesix bolts (3) and flange (6), refer to CSPP-A-20-40-00-05A-691A-D.

(5) Connect pitch control lever (40, Fig. 64-20) and links (10) to housing (15).
(6) Torque the bolts (14) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(7) Install cotter pins and apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank and under head of the bolt (14).

NOTE 1: It is possible to install the bumper washers (40A) between housing (15) and links (10) between lever (40) and housing (15). Before you torque nuts (11), make sure that the spherical bearings of the control lever (40) and link (10) touch the lug of the housing (15) and not the bumper washers (40A). (**VP**)

NOTE 2: Install the two spacers (13 and 15A) against spherical bearing of pitch control lever (40) and link (10). Install the two small washers (12) between the larger one (15A) and the nut (11). To obtain proper torque, replacement of one smaller washer AN960C416 with an AN960C416L washer is permitted. (**VP**)

NOTE 3: During the installation, if the total clearance between the pitch control lever (40) and the housing (15) is more than 0,3 mm, install one washer (65) P/N AN960PD416L (superseded by P/N NAS1149D0416K) on one attachment point bolt (14).

(8) Put the connecting link (46) in position on the lever (40) and the fitting (61).
(9) Put the four washers (46A) and the two shims (46B) in their position between the connecting link (46), the lever (40) and the fitting (61).
(10) Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank and under head of the bolt (58). Secure the connecting link to fitting (61) using the bolt (58), washers (57, 56) and nut (55).
(11) Measure clearance between the link (46) and the fitting (61); if the clearance is more than 0.05 mm (0.002 in), adjust thickness of shim (46B).

NOTE: Shims (46B) can be installed on the top side or either on the bottom side of link (46).

(12) Torque the bolt (58) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(13) Install the cotter pin.
(14) Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank and under head of the bolt (44), then secure the connecting link to lever (40) using the bolt (44), washers (42, 43) and nut (41).
(15) Measure clearance between the link (46) and the lever (40); if the clearance is more than 0.05 mm (0.002 in), adjust thickness of shim (46B).
(16) Torque the bolt (44) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(17) Install the cotter pin.
(18) Install the assembly on 90-degree gearbox output shaft. Lockwire boot aft (39) with safety wire (C013).
(19) Connect links (10) to levers (5 and 49). Verify that bolts can turn and slide freely in seats, otherwise reposition lever (49) and/or lever (5) until this requirement is satisfied.
(20) Torque the bolt (45) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(21) Install the cotter pin.

NOTE: Install larger washer under bolt head and small washer under nut.

(22) Torque the bolt (7 and 47) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 5.65 thru 7.91 N m (50 thru 70 lbf in)

(23) Install the cotter pin.
(24) Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank and under head of the bolt (45).

CAUTION: CHECK THAT LEVERS (5 AND 49) ARE ALIGNED TO EACH OTHER, AND THAT BEARING (18) IS NOT PRELOADED.

(25)Connect the free arm of torque shaft control lever (49) to tail rotor control tube (59) with the bolt (52), the washer (53) and the nut (54).
(26)Torque the bolt (52) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(27)Install the cotter pin.
(28)Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank and under head of the bolts (52).
(29)Connect pitch control links (20) to slider (23) following markings made at removal. Install between links and slider damper washers (60) with bolt (21), washers (22) and nut (38).
(30)Torque the bolt (21) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(31)Install the cotter pin.
(32)If removed, install bushing (27) into sleeve (25).
(33)Install forward boot (26) on sleeve (25).
(34)Install sleeve (25) on gearbox shaft. Lockwire forward boot (26) as required using Safety wire (C014).
(35)Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank of the bolt (32).

NOTE: Make sure that the head of the bolt (32) points in the direction of the rotation of the tail rotor.

(36)Connect the FWD half-scissor (30) to the sleeve (25) with the bolt (32), washers (29 and 31) and nut (28). Fully tighten all components. Do not torque nut.
(37)Manually determine the axial play between FWD half-scissor (30) and sleeve (25) along bolt axis in the way that follows:
(a) Turn the FWD half-scissor (30) back and forth, from “a” to “b” as Shown in Fig 64-19B Detail A, until you get the position of minimum play. Stop the FWD half-scissor (30) in this position. (**VP**)
(b) Torque the nut (28, Fig. 64-20) until you get to the cotter pin hole on the bolt (32) with no axial play between components. FWD half-scissor must move freely with no binding. Slight friction is permitted. (**VP**)
(c) If you find too much binding / friction, replace the nut (32) with a new one and do again Step C.(35)(a) and Step C.(35)(b). (**VP**)
(d) If with the new nut (28) you still get too much binding / friction, add a washer (31A) P/N NAS1149F0416P under nut and do again Step C.(35)(a) and Step C.(35)(b). (**VP**)
(e) If you still get too much binding / friction, contact the TC holder.
(38)Connect the AFT half-scissor (35) to the FWD half-scissor (30) with the bolt (76), washers (77 and 78) and nut (79). Fully tighten all components. Do not torque nut. (**VP**)
(a) Before install the bolt (76) that connect the FWD half-scissor and AFT half-scissor apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587).
(39)Manually determine the axial play between AFT half-scissors (35) and FWD half-scissors (30) along bolt axis in the way that follows:
(a) Turn the AFT half-scissors (35) back and forth, from “a” to “b” as Shown in Fig 64-19B Detail B, until you get the position of minimum play. Stop the AFT half-scissors (35, Fig 64-20) in this position. (**VP**)
(b) Torque the nut (79) until you get to the cotter pin hole on the bolt (76) with no axial play between components. AFT half-scissor must move freely with no binding. Slight friction is permitted. (**VP**)
(c) If you find too much binding / friction, replace the nut (79) with a new one and do again Step C.(37)(a) and Step C.(37)(b). (**VP**)

(d) If with the new nut (79) you still get too much binding / friction, add a washer (78A) P/N NAS1149F0416P under nut and do again Step C.(37)(a) and Step C.(37)(b). (**VP**)

(40) Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank of the bolts (37).

NOTE: Make sure that the head of the bolt (37) points in the direction of the rotation of the tail rotor.

(41) Connect the AFT half-scissor (35) to the slider (23) with the bolt (37), washers (36 and 34) and nut (33). Fully tighten all components. Do not torque nut.

(42) Manually determine the axial play between AFT half-scissor (35) and the slider (23) along bolt axis in the way that follows:

(a) Move the slider (23) back and forth until you get the position of minimum play. Stop the sleeve in this position. (**VP**)

(b) Torque the nut (33) until you get to the cotter pin hole on the bolt (37) with no axial play between components. (**VP**)

(c) If you find too much binding / friction, replace the nut (33) with a new one and do again Step C.(40)(a) and Step C.(40)(b). (**VP**)

(d) If with the new nut (33) you still get too much binding / friction, add a washer (34A) P/N NAS1149F0416P under nut and do again Step C.(30)(a) and Step C.(30)(b). (**VP**)

(e) If you still get too much binding / friction, contact the TC holder.

(43) Install the new Cotter pins on nuts (28, 33 and 79).

(44) Apply the Corrosion preventive compound (C509) to the parts that follow:

(a) The heads of the bolts (32 and 37)

(b) The washers (31) and (34), the nuts (28) and (33) and the cotter pins.

(45) Apply the Corrosion inhibiting compound (C505) or Corrosion inhibiting compound (C587) to the shank and under head of the bolts (32) and (37).

NOTE: Ensure that bolt (32 and 37) heads are facing tail rotor sense of rotation.

D. Follow-On Maintenance Required:

- Install tail rotor hub and blade assembly (Sect 64-00)
- Install access panels 11 and 60.

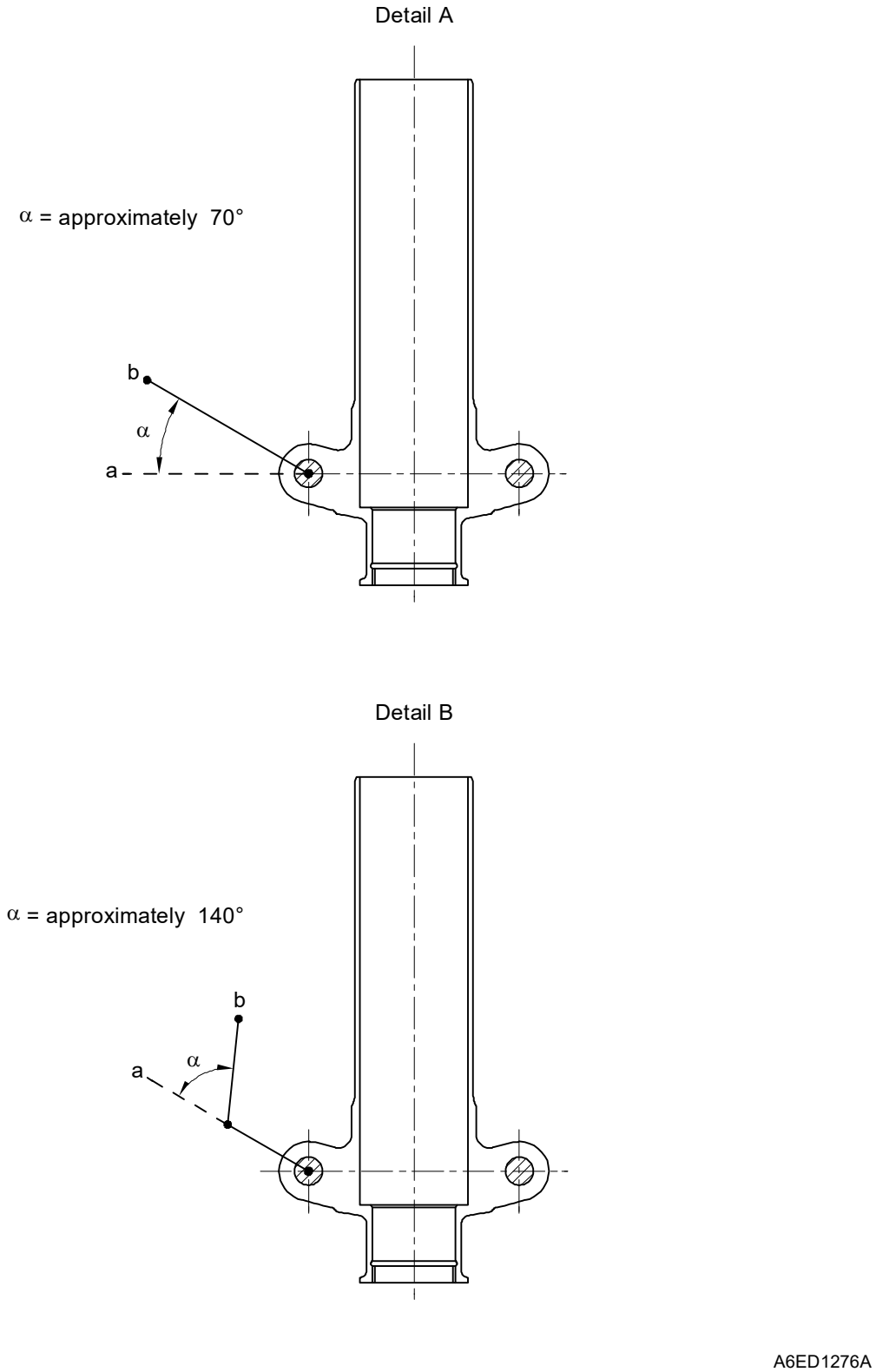


Figure 64-19B. Half scissors play check

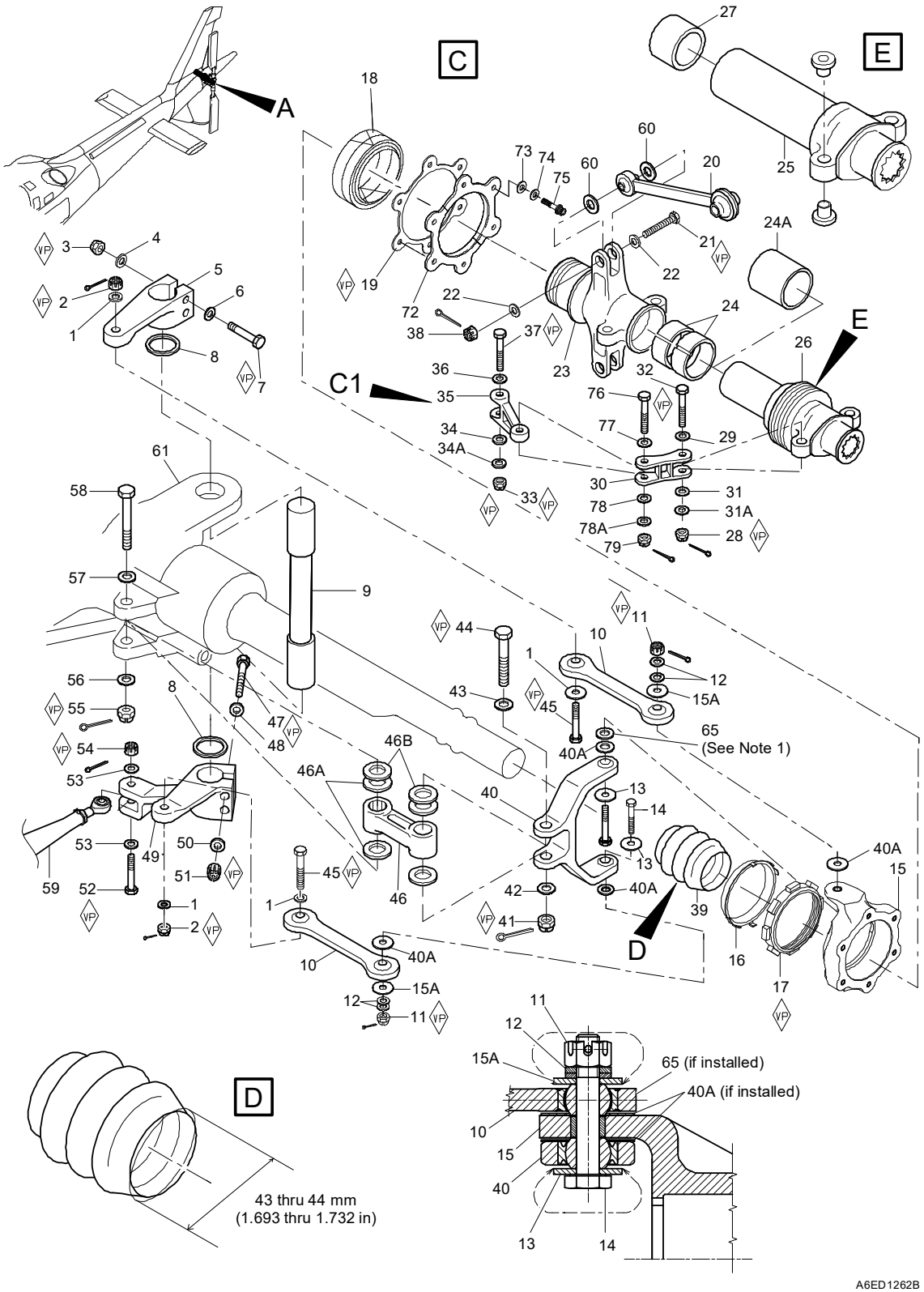


Figure 64-20 (sheet 1 of 3). Pitch change mechanism (Sleeve assy P/N 109G6430A03)

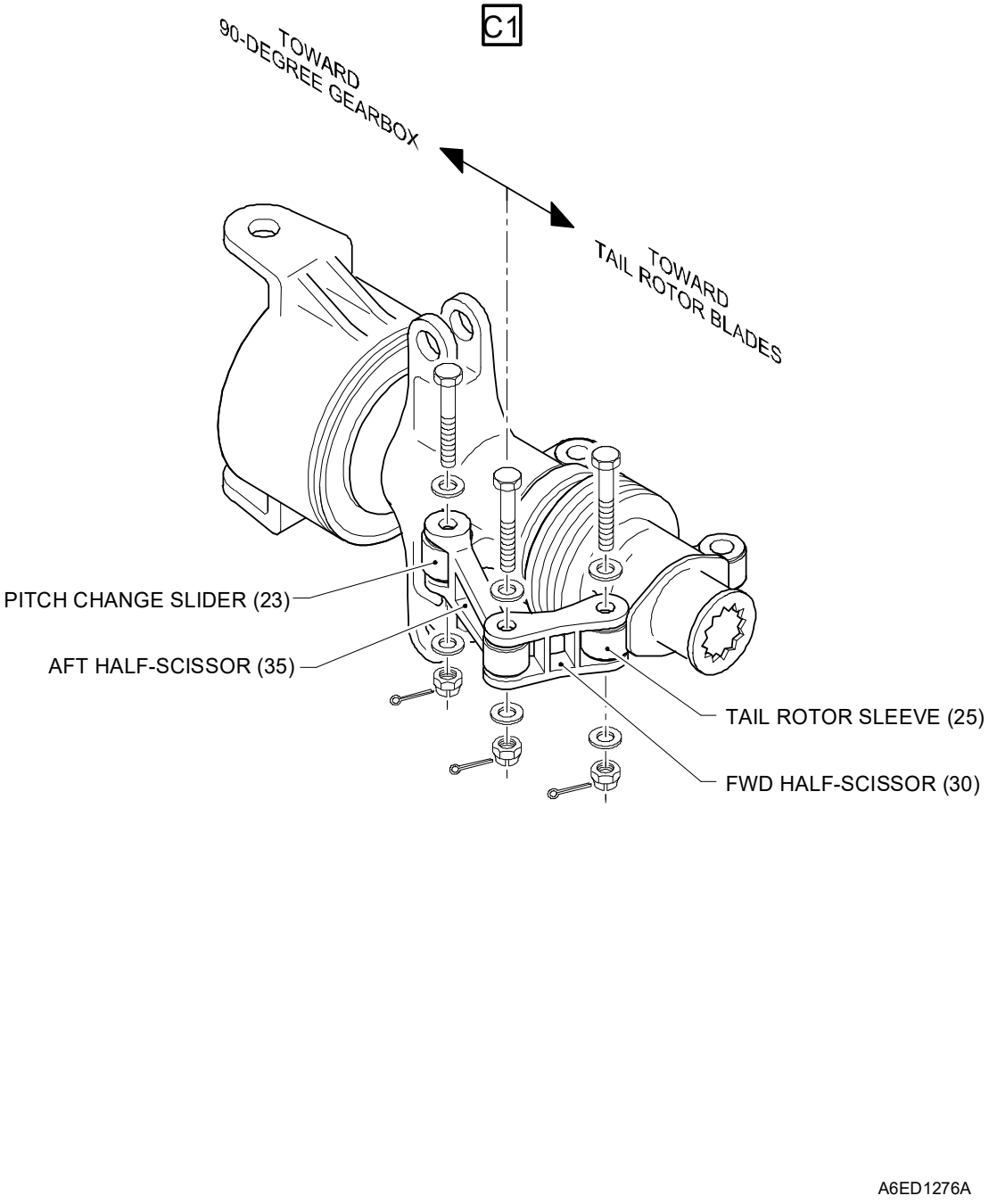


Figure 64-20 (sheet 2 of 3). Pitch change mechanism (Sleeve assy P/N 109G6430A03)

1. Washer
2. Nut
3. Nut
4. Washer
5. Lever
6. Washer
7. Bolt
8. Shim
9. Torque shaft
10. Link
11. Nut
12. Washer
13. Spacer
14. Bolt
15. Housing
15A. Spacer
16. Lock ring
17. Ring nut
18. Duplex bearing
19. Ring nut
20. Pitch control link
21. Bolt
22. Washer
23. Slider
24. Bushing (*)
25. Sleeve
26. Forward boot
27. Bushing
28. Nut
29. Washer
30. FWD half scissor
31. Washer
31A. Washer (select on fit)
32. Bolt (*)
33. Nut
34. Washer
34A. Washer (select on fit)
35. AFT half scissor
36. Washer
37. Bolt (*)
38. Nut
38A. Cotter pin
39. AFT boot
40. Lever
40A. Bumper washer
41. Nut
42. Washer
43. Washer
44. Bolt
45. Bolt
46. Link
46A. Washer
46B. Shim
47. Bolt
48. Washer
49. Torque shaft control lever
50. Washer
51. Nut
52. Bolt
53. Washer
54. Nut
55. Nut
56. Washer
57. Washer
58. Bolt
59. Tail rotor pitch control tube (ref)
60. Washer, damper
61. T/R gearbox fitting
62. Shim
63. Bushing (**)
64. Shim
65. Washer
66. Nut
67. Flat surface cup washer
68. Spacer (if installed)
69. Washer
70. Cotter pin
71. Hub and blade assy
72. Flange
73. Washer
74. Washer
75. Bolt
76. Bolt
77. Washer
78. Washer
78A. Washer (select on fit)
79. Nut

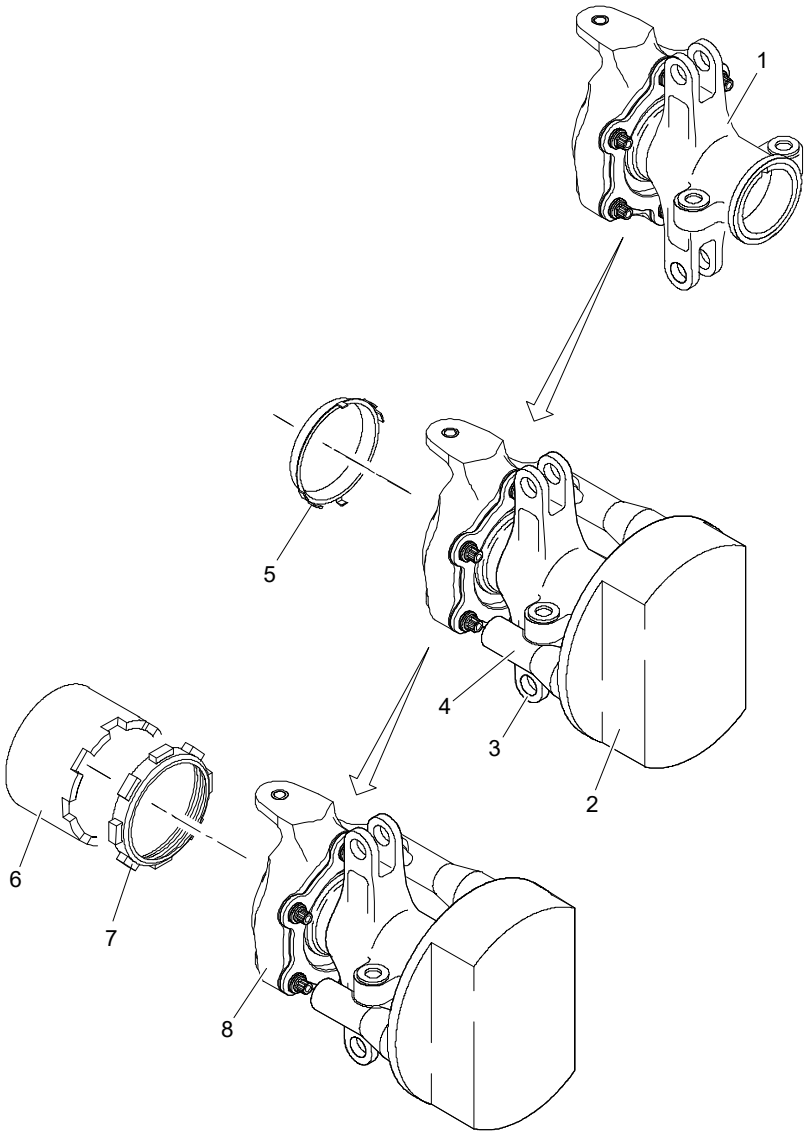
(*) Used with slider P/N 109-0130-91-105.

(**) Used with slider P/N 109-0130-91-117/-119.

NOTE 1:

Washer (65) is shown in this location but, if necessary, can be installed on opposite bolt (14).

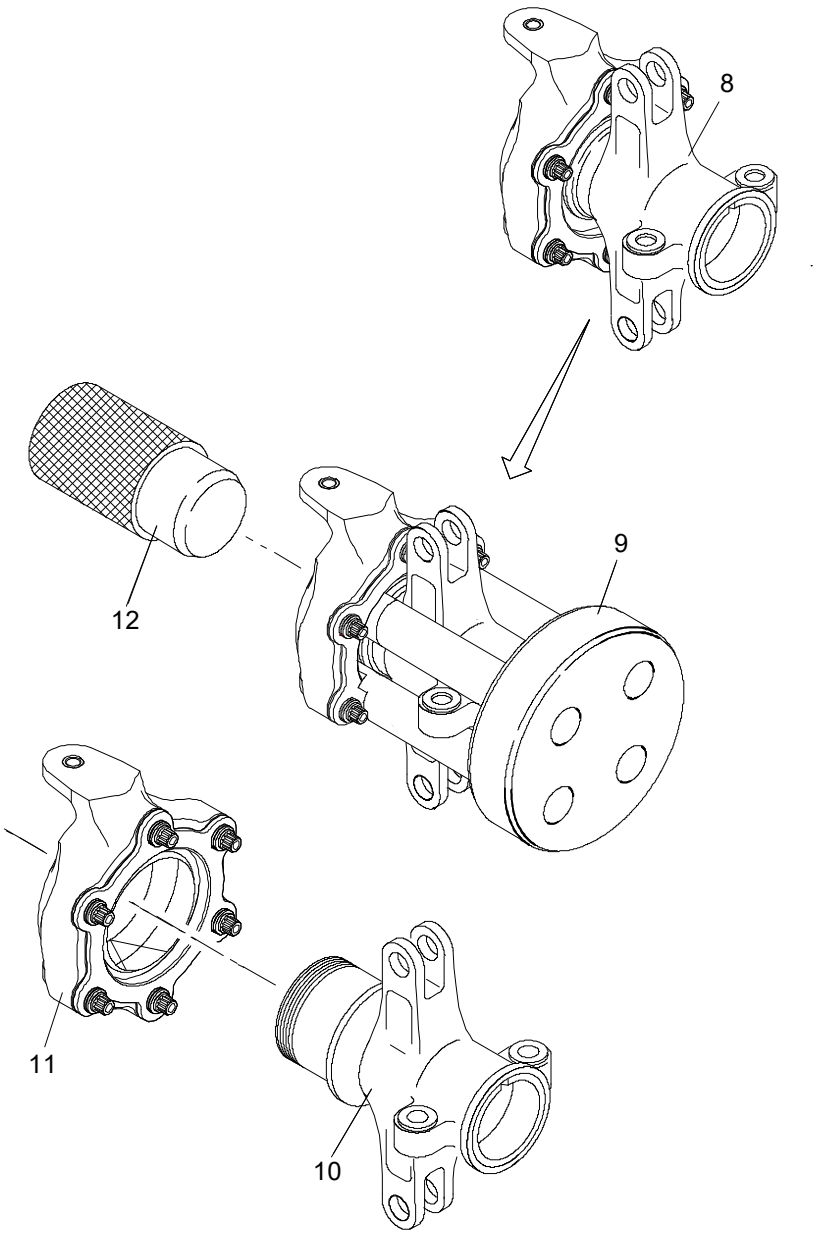
Figure 64-20 (sheet 3 of 3). Pitch change mechanism (Sleeve assy P/N 109G6430A03)



A6ED1265A

1. Slider group
2. Base
3. Brace
4. Pin
5. Lock ring
6. Wrench
7. Ring nut
8. Housing-slider assembly
9. Support

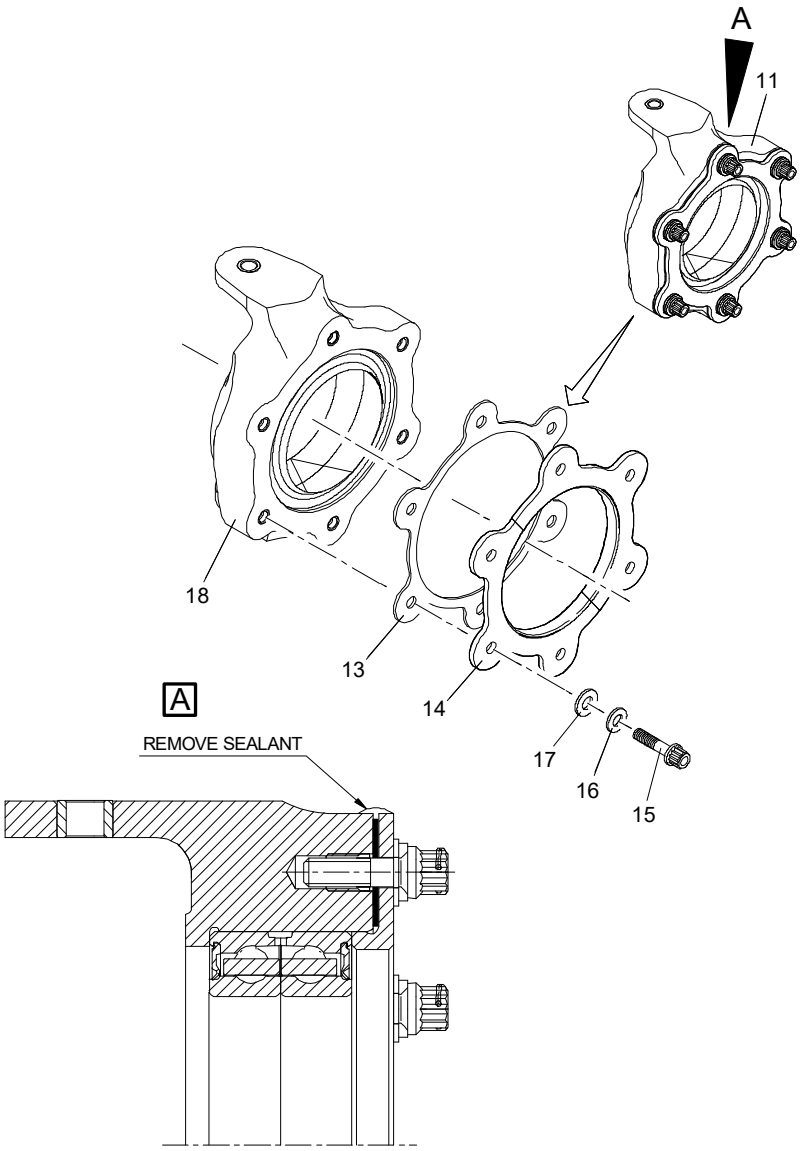
Figure 64-21 (sheet 1 of 4). Housing and slider group - Disassemble procedure (Sleeve assy P/N 109G6430A03)



A6ED1266A

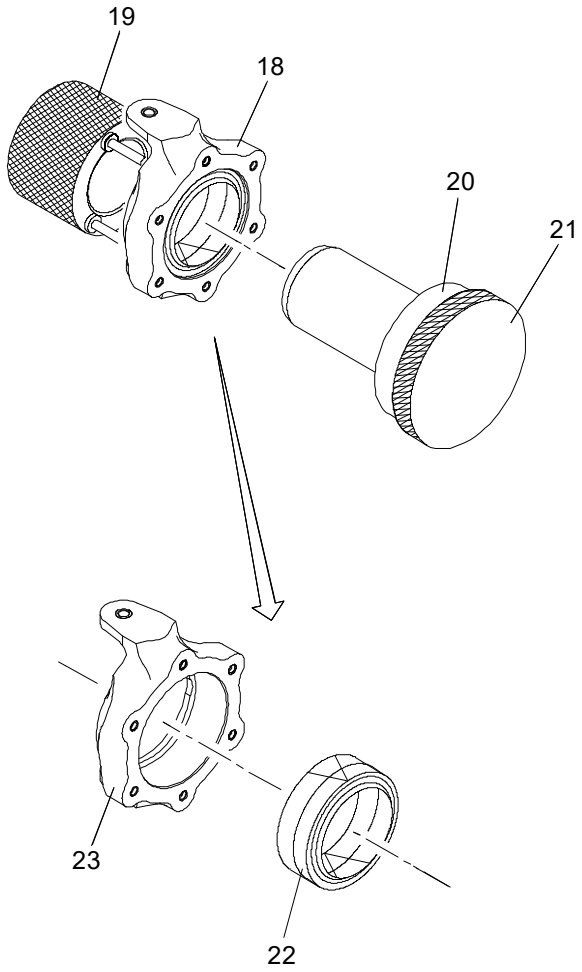
8. Housing-slider assembly
9. Support
10. Slider group
11. Housing group
12. Pin

Figure 64-21 (sheet 2 of 4). Housing and slider group - Disassemble procedure (Sleeve assy P/N 109G6430A03)



11. Housing group
12. Pin
13. Peeling shim
14. Flange
15. Bolt
16. Washer
17. Washer
18. Housing-bearing assembly

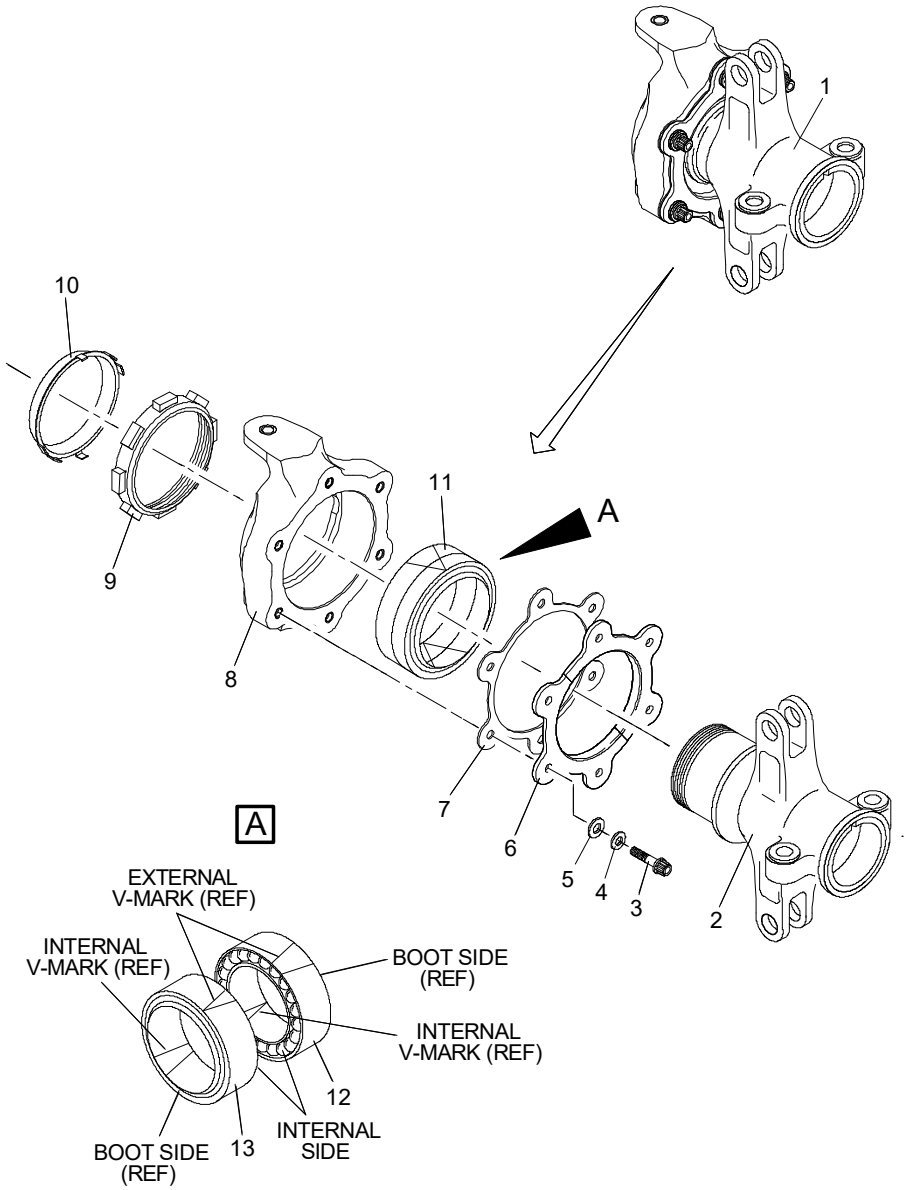
Figure 64-21 (sheet 3 of 4). Housing and slider group - Disassemble procedure (Sleeve assy P/N 109G6430A03)



A6ED1268A

18. Housing-bearing assembly
19. Barrel
20. Bushing
21. Pin
22. Duplex bearing
23. Bearing support sleeve

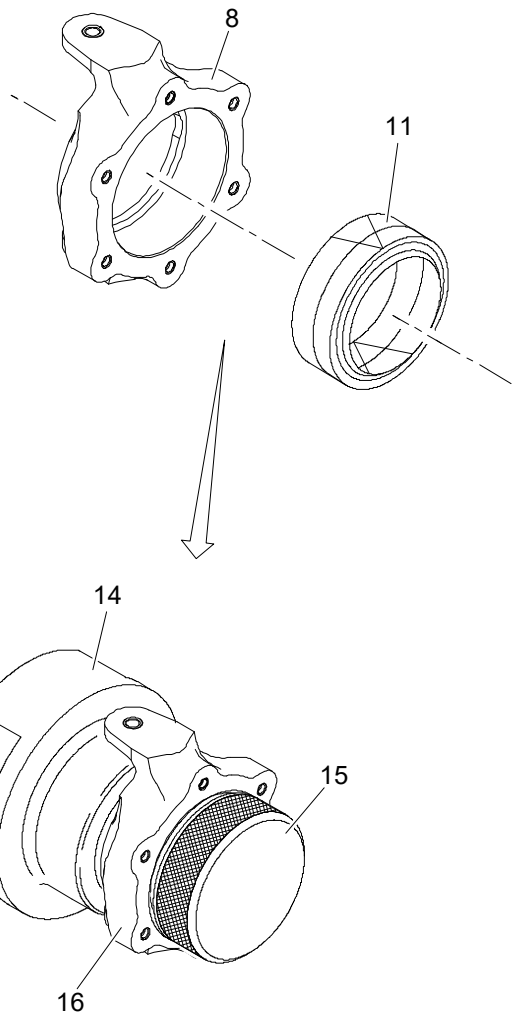
Figure 64-21 (sheet 4 of 4). Housing and slider group - Disassemble procedure (Sleeve assy P/N 109G6430A03)



A6ED1269A

1. Slider group
2. Slider
3. Bolt
4. Countersunk washer
5. Washer
6. Flange
7. Peeling shim
8. Bearing support sleeve
9. Ring nut
10. Lock ring
11. Duplex bearing
12. Bearing
13. Bearing

Figure 64-22 (sheet 1 of 5). Housing and slider group - Assemble procedure (Sleeve assy P/N 109G6430A03)



A6ED1270A

14. Base
15. Pin
16. Housing-bearing assembly

Figure 64-22 (sheet 2 of 5). Housing and slider group - Assemble procedure (Sleeve assy P/N 109G6430A03)

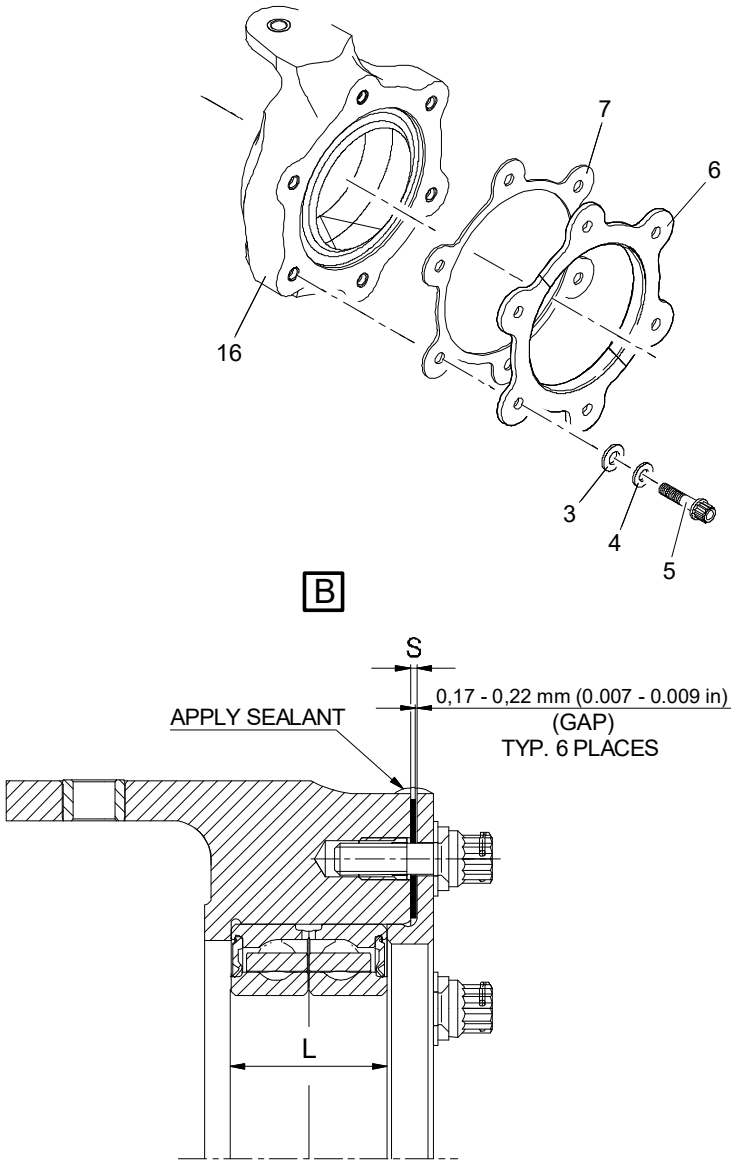
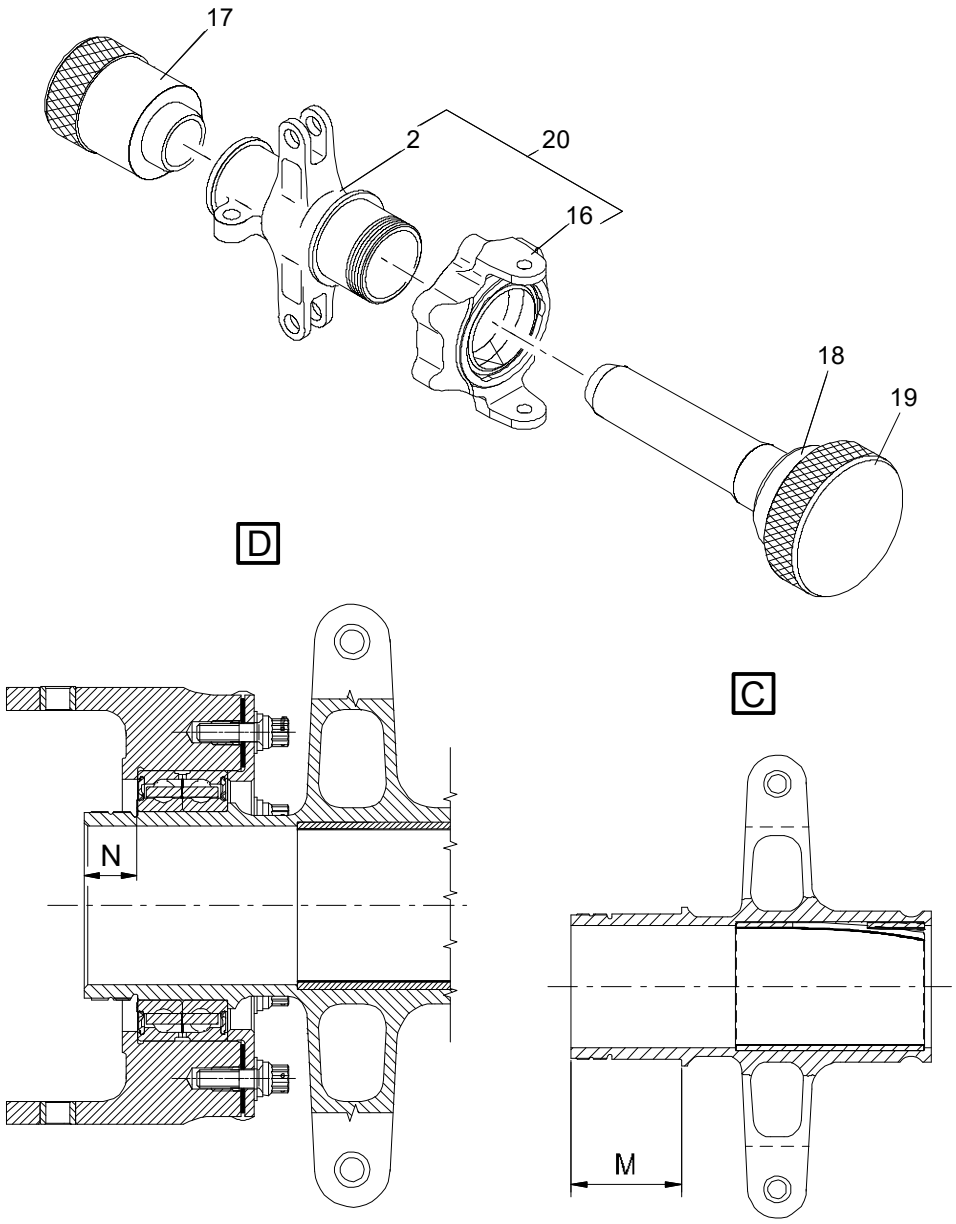


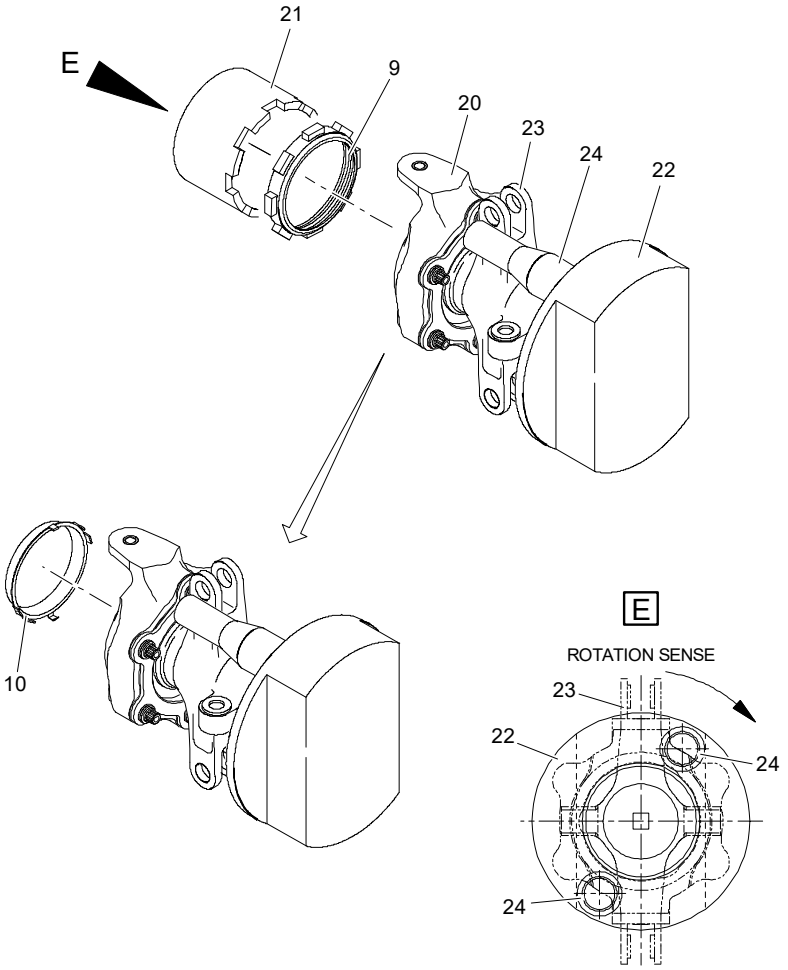
Figure 64-22 (sheet 3 of 5). Housing and slider group - Assemble procedure (Sleeve assy P/N 109G6430A03)



A6ED1272A

17. Barrel
18. Bushing
19. Pin
20. Housing-slider assembly

Figure 64-22 (sheet 4 of 5). Housing and slider group - Assemble procedure (Sleeve assy P/N 109G6430A03)



21. Wrench
22. Base
23. Brace
24. Pin

Figure 64-22 (sheet 5 of 5). Housing and slider group - Assemble procedure (Sleeve assy P/N 109G6430A03)

Annex 13

64-30-3. Removal/installation
(Fig 64-17)

E. Input Conditions

(5) Required conditions:

- Helicopter safe for maintenance (Chap 00).
- Access panels P6 and P12 removed (Sect 06-40).
- Tail rotor hub and blade assembly removed (Sect 64-00).

(6) Support equipment:

- Tool, T/R pitch change slider ring nut removal/installation (LSE NO 9).
- Tool, T/R pitch change housing ring nut removal/installation (LSE NO 10).
- Tool, T/R pitch change housing duplex bearing removal (LSE NO 11).
- Tool, T/R pitch change housing duplex bearing installation (LSE NO 12).
- Tool, T/R pitch change slider installation (LSE NO 13).
- Tool, T/R duplex bearing removal (LSE NO 17).
- Syringe (Local supply).
- Heating gun (Local supply).
- Feeler gage (Local supply)
- Depth micrometer gage (Local supply).
- Refrigerator (Local supply).

(7) Consumable materials:

WARNING: THE CONSUMABLE MATERIALS THE NOMENCLATURE OF WHICH IS PREFIXED BY “(D)” ARE DANGEROUS MATERIALS.BEFORE USE, MAKE SURE TO KNOW THE SAFETY PRECAUTIONS AND FIRST AID INSTRUCTIONS PRINTED ON:
- THE LABEL ON THE CONTAINER THE MATERIAL WAS SUPPLIED IN
- THE MATERIAL SAFETY DATA SHEET
- THE LOCAL SAFETY REGULATIONS.
ALSO MAKE SURE THAT THE APPLICABLE FIRST AID MATERIALS ARE AVAILABLE.

- Abrasive paper No 300 or 400 (LCM NO 6).
- (D) MEK (Methyl-ethyl-ketone) (LCM NO 9).
- (D) Retaining compound (LCM NO 19).
- (D) Grease (LCM NO 22).
- (D) Primer (LCM NO 23).
- Safety wire (LCM NO 24).
- (D) Lubricating oil (LCM NO 25).
- (D) Adhesive (LCM NO 29).
- (D) Corrosion inhibiting compound (LCM NO 40).
- (D) Corrosion inhibiting compound (LCM NO 41).
- (D) Primer (LCM NO 34).
- Safety wire (LCM NO 36).
- (D) Solvent, cleaning (LCM NO 37).
- Soft lint-free cloth (Local supply).

(8) Other recommendations: None.

WARNING: THIS INSTALLATION INCLUDES VITAL POINTS (VP). DURING THE PROCEDURE, YOU MUST OBEY THE LOCAL REGULATIONS APPLICABLE TO THE VITAL POINTS.

CAUTION: MAKE SURE THAT YOU DO NOT MIX GREASES OF DIFFERENT BRANDS ALTHOUGH THE SPECIFICATIONS ARE THE SAME. REFER TO THE HELICOPTER LOG BOOK TO PREVENT MIXTURE OF UNWANTED GREASES.

CAUTION: THIS COMPONENT INCLUDES CRITICAL PARTS. EXAMINE THE COMPONENT FOR SIGNS OF STRUCTURAL DAMAGE, BEFORE YOU INSTALL IT ON THE HELICOPTER. REFER TO SECT 20-60.

F. Removal Procedure.

(1) Disconnect tail rotor pitch control tube (59) from lever (49) by removing attaching hardware. Discard cotter pin.

(2) Disconnect FWD half scissor (30) from sleeve (25) and AFT half scissor (35) from slider (23) by removing attaching parts. Discard cotter pins.

(3) Detach AFT half scissor (35) from FWD half scissor (30) by removing attaching parts. Discard cotter pin.

(4) Cut lockwire from boot (26) and withdraw sleeve (27) from gearbox shaft. Remove boot (26) from sleeve (27). If loose remove bushing (25).

NOTE: For helicopter equipped with sleeve assy P/N 109-0130-90-113 remove spacer P/N 109-0130-89-1.

NOTE: Mark position of links (20) to reconnect in same position during reassembly on slider.

(5) Disconnect links (20) from slider (23) by removing parts; remove links (20). Discard cotter pins.

(6) Remove links (10) by removing attaching parts. Discard cotter pins.

(7) Cut lockwire from boot (39).

(8) Withdraw housing (15), together with assembled parts, from gearbox shaft.

(9) Disassemble housing (15) and slider assembly (23) as follows:

NOTE: Items 10, 11 and 12 (figure 64-17A) are part of tool (LSE NO 9).

(a) Lock the support (10) on an applicable bench vice.

(b) Put the duplex bearing housing (3) and the pitch change slider assembly (9) on the support (10).

NOTE: In order to avoid damage to the bushings (7) of the pitch change slider (9) during the removal of the ring nut (2), put the pitch change slider (9) on the support (10) with the two pitch change slider arm (6) that touch the two cylindrical fittings (11) as shown in Detail A of figure 64-17A.

(c) Open the two clawed tabs on the lock ring (1), then remove it from the ring nut (2).

(d) Remove the ring nut (2) from the pitch change slider (9) with the wrench (12).

(e) Put the pitch change slider (3, figure 64-17B) and the duplex bearing housing (2) on the support (4) part of the tool (LSE NO 21).

CAUTION: MAKE SURE THAT THE TOOL IS PERFECTLY ALIGNED WITH THE DUPLEX BEARING WHEN YOU PRESS IT OUT IN ORDER TO PREVENT DUPLEX BEARING DAMAGE.

(f) Put the adapter (1) part of the tool (LSE NO 21) on the pitch change slider (3) then, with an applicable press, remove the pitch change slider from the duplex bearing housing (2).

(g) Lock the support (4, figure 64-17C) part of the tool (LSE NO 10) on an applicable bench vice.

(h) Put the duplex bearing housing (1) on the support (4), part of the tool (LSE NO 10), then lock with the two bolts (3 and 5) part of the tool (LSE NO 10).

NOTE: The ring nut (5, figure 64-17A) is installed with retaining compound. To remove it a high torque will be necessary. Use an applicable lever to remove it.

(i) Cut the lock wire, in two places, then, with the wrench (2, figure 64-17C) part of the tool (LSE NO 10), remove the ring nut (5, figure 64-17A).

NOTE: Items 1, 3 and 4 of figure 64-17D are part of the tool (LSE NO 17).

(j) Put the duplex bearing housing (2) on the support (1).

NOTE: To help remove the duplex bearing (4, figure 64-17A) from the duplex bearing housing (3) a light heating of the external part of the duplex bearing housing with a heating gun is permitted. The temperature must not be more than 90° C. To prevent damage to the duplex bearing do not apply hot air directly on the duplex bearing boots.

(k) Put the two adapters (3 and 4, figure 64-17D) on the duplex bearing housing (2) then with an applicable press remove the duplex bearing (4, figure 64-17A) from the duplex bearing housing (3).

(10) Remove boot (39).

(11) Remove attaching parts of levers (5 and 49), then remove levers and shims (8) and extract pivot (9) from lugs on gearbox.

(12) Disconnect lever (40) from link (46) by removing attaching parts, remove lever (40). Discard cotter pin.

(13) Disconnect link (46) from lugs on gearbox by removing attaching parts; remove link (46). Discard cotter pin.

G. Installation Procedure.

CAUTION: INSTALL THE FWD HALF-SCISSOR (30, FIG 64-17) AND AFT HALF-SCISSOR (35, FIG 64-17) IN THE CORRECT LOCATION AND ORIENTATION AS SHOWN IN DETAIL C1 OF FIG 64-17.

NOTE: During the installation of the self-locking bolts or the self-locking nuts, when the locking is engaged, with the torque wrench (Local supply), make sure that the locking torque necessary to move the bolts or nuts, before contact with the washer, is between the minimum breakaway torque and the maximum locking torque. If you do not get his value, discard the bolts and/or nuts.

(1) Position pivot (9, fig 64-17) in 90° gearbox lugs.

(2) Install laminated shims (8) and levers (5 and 49) on pivot (9). Do not torque attaching parts.

NOTE: If any of the following items: 90° gearbox case, pivot (8) levers (5 and 49) laminated shims (8) have been replaced, proceed as follows:

(a) Position pivot (9) in 90° gearbox lugs.

(b) Position levers (5 and 49) on pivot (9) without shims and secure temporarily in position.

(c) Measure the total gap between one lever and the adjacent lug with a feeler gauge. Half of the gap is the dimension of each laminated shim (8).

(d) Remove levers (5 and 49) from pivot (9).

(e) Fit laminated shims (8) on pivot (9) then reinstall levers (5 and 49) and secure. Do not torque nuts (3 and 51) at this time.

(f) Check for free rotation of pivot. If shim thickness is unsatisfactory, modify the shims the same amount on either side to obtain an axial play between 0.03 to 0.08 mm between 90° gearbox lugs bearings and levers (5 and 49) when installed.

NOTE: Before installing the boot in the housing and slider group deform the boot metallic rim to an oval shape with a maximum diameter of 43 thru 44 mm (1.693 thru 1.732 in) as shown in DETAIL C of Fig 64-17. This is to help a tighter fit in the seat. Put the inboard boot in its position in the housing and slider group.

(3) Position boot (39) on gearbox shaft.

(4) Reassemble housing (15) and slider assembly (23) as follows:

CAUTION: BEFORE YOU ASSEMBLE THE HOUSING AND SLIDER GROUP (1, FIG. 64-17E), PUT THE COMPONENT THAT FOLLOW AND THE RELATED ATTACHING PARTS ON AN APPLICABLE WORK TABLE.
CAREFULLY EXAMINE THE COMPONENT AND THE RELATED ATTACHING PARTS FOR

CORROSION, NICKS AND DAMAGE, WEAR AND FRETTING. IF YOU FIND THAT THE COMPONENT IS DAMAGED, REPLACE IT.
- THE DUPLEX BEARING (4)
- THE HOUSING (5).

(a) Divide the two parts of the duplex bearing (4).

NOTE: Do Step C.(4)(b) thru Step C.(4)(d) only for removed bearings. New bearings are supplied already lubricated and must not be filled with grease.

(b) Fill the Syringe (Local supply) with the Grease (LCM NO 22).
(c) Before you install the bearing (8), fill it with 3.5 cc (0.21 in3) of grease with the syringe from the side opposite to the boot. Refer to Detail A of Fig. 64-17E.
(d) Do Step C.(4)(c) again on the bearing (9).
(e) Put the bearing (8) against the bearing (9) with the boot sides externally and the internal and external V-marks aligned to show an arrow. See Detail A, Fig. 64-17E.
(f) Install the duplex bearing (4) into the housing (5) in the way that follows:
7. Apply a thin layer of Primer (LCM NO 23) on the mating surfaces between the duplex bearing (4) and housing (5).
8. Put the housing (5) on the Base (10), part of the tool (LSE NO 12).

WARNING: BE CAREFUL WHEN YOU USE HEAT. HOT PARTS CAN CAUSE INJURY TO THE PERSONS. ALWAYS USE APPLICABLE PROTECTIVE CLOTHING.

9. Heat the housing (5) to a temperature between 60 and 70 °C with the Heating gun (Local supply). This will help you to install the duplex bearing (4) into the housing. Make sure that the temperature is not more than 90 °C (heating gun set to a temperature of 90 °C).

NOTE: As an alternative to heating the housing (5); you can cool down the duplex bearing (4) with the Refrigerator (Local supply) to a temperature between -18 and -40 °C for 30 minutes. Do not touch the cold duplex bearing with bare hands to prevent injury.

10. Push the duplex bearing (4) into the housing (5). To do this, use the Pin (11), part of the tool (LSE NO 12) and an applicable arbor press.
11. Make sure there is no clearance between the two bearings (8 and 9) and between the outer ring of duplex bearing (4) and the shoulder of the housing (5). To do this, use the applicable Feeler gage (Local supply).
12. Remove the housing-bearing assembly (12) from the base (10).

NOTE: Before you continue, make sure that all the components are at ambient temperature.

(g) Install the ring nut (3) into the housing-bearing assembly (12). Obey the instructions that follow:
1. Clean the threads of the ring nut (3) and the housing (5) with the Cloth, soft lint-free (Local supply) and the Solvent, cleaning (LCM NO 37). (VP)
2. Dry the threads of the ring nut (3) and the housing (5) with a clean Cloth, soft lint-free (Local supply). (VP)
3. Apply a layer of Primer (LCM NO 34) on the threads of the ring nut (3).
4. Apply a layer of Primer (LCM NO 34) on the threads of the housing (5).
5. Apply four drops of Sealing compound (LCM NO 19) on the threads of the ring nut (3). Put them in four equally spaced positions (90 degrees apart). (VP)
6. Lock the Base (14), part of the tool (LSE NO 10) in an applicable vice.
7. Put the housing-bearing assembly (12) on the base (14), then lock it with the two Bolts (13), part of the tool (LSE NO 10).
8. Install the ring nut (3) in the housing-bearing assembly (12) with the Wrench (15), part of the tool (LSE NO 10).

9. Torque the ring nut (3) to 117,7 thru 127,5 Nm (86,8 thru 94 lbf ft). (**VP**)
10. Make sure that the duplex bearing (4) turns freely. (VP)
11. Refer to Detail B of Fig. 64-17E.
    (a) Measure and record the dimension L.
    (b) Make sure that the dimension you find is between 23.75 to 24.0 mm (0.935 to 0.945 in).
    (c) If you find that the dimension is not in the given limits, remove the duplex bearing (4). Then, do Step C.(4)(f) and Step C.(4)(g) again.
12. Refer to Detail C of Fig. 64-17E.
    (a) Measure and record the dimension M.
    (b) Calculate and record the dimension N with this formula: N = M - L.
13. Remove the housing group (16) from the base (14).

NOTE: The safety wire must be installed with the double-twist method and put in tension. Example of an acceptable safety wire installation is shown in Detail B1 of Fig. 64-17E. As a general approach, an “a” angle between 60° and 120° is adviseable.

14. Safety the ring nut (3) to the housing (5) with the new Safety wire (LCM NO 36) in two places as shown in Detail B1 of Fig. 64-17E. Refer also to Section 20-10. (VP)

(h) Apply a thin layer of Oil (LCM NO 25) on the internal surface of the duplex bearing (4).
(i) Put the Bushing (18), part of the tool (LSE NO 13) in its position on the Pin (19), part of the tool (LSE NO 13).
(j) Put the housing group (16) on the pin (19) above the bushing (18).
(k) Put the slider (2) on the pin (19).

NOTE: To help you install the slider (2), heat the housing group (16) in an oven preheated to a temperature of 50 °C for 15 to 30 minutes.
As an alternative to heating the housing group (16); you can cool down the slider (2) with the Refrigerator (Local supply) to a temperature between -18 and -40 °C for 30 minutes. Do not touch the cold slider with bare hands to prevent injury.

(l) Push the slider (2) into the housing group (16). To do this, use the Barrel (17), part of the tool (LSE NO 13) and an applicable arbor.
(m) Remove the housing-slider assembly (20) from the pin (19).

NOTE: Before you continue, make sure that all the components are at ambient temperature.

(n) Make sure there is no clearance between the inner rings of the two bearings (8 and 9) and the shoulder of the slider (2). To do this, use the applicable Feeler gage (Local supply).
(o) Refer to Detail D of Fig. 64-17E:
    1. Measure and record the dimension N. To do this, use an applicable Depth micrometer gage (Local supply).
    2. Make sure that the dimension N measured agrees with the dimension calculated at Step C.(4)(g)12.b.
    3. If you find that the dimension N does not agree, remove the duplex bearing (4). Then, do Step C.(4)(f) and Step C.(4)(o) again.
(p) Lock the Base (22), part of the tool (LSE NO 9) in an applicable vice.
(q) Put the housing-slider assembly (20) on the base (22).
(r) Move the braces (23) of the slider against the pins (24) of the base (22). Refer to Detail E of Fig. 64-17E.
(s) Clean the threads of the ring nut (6) and the slider (2) with the Cloth, soft lint-free (Local supply) and the Solvent, cleaning (LCM NO 37). (VP)
(t) Dry the threads of the ring nut (6) with a clean Cloth, soft lint-free (Local supply). (VP)
(u) Apply a layer of Primer (LCM NO 34) on the threads of the ring nut (6).
(v) Apply a layer of Primer (LCM NO 34) on the threads of the slider (2).

(w) Apply four drops of Sealing compound (LCM NO 19) on the threads of the ring nut (6). Put them in four equally spaced positions (90 degrees apart). (VP)
(x) Install the ring nut (6) with the Wrench (21), part of the tool (LSE NO 9).
(y) Torque the ring nut (6) to 49,04 thru 58,84 Nm (36,1 thru 43,4 lbf ft). (**VP**)
(z) Remove the housing and slider group (1) from the base (22).
(aa) Install the new Lock ring (7).
(bb) Bend the clawed tabs of the lock ring (7) on the ring nut (6). Make sure that the two clawed tabs of the lock ring (7) are correctly engaged.

(5) Connect lever (40) and links (10) to housing (15).
(6) Torque the bolts (14) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(7) Install the cotter pins.

NOTE 1: Install the two larger washers against spherical bearing of lever (40) and link (10). Install the two small washers between the larger one and the nut. To obtain proper torque replacement of one smaller washer AN960C416 with an AN960C416L washer is permitted.

NOTE 2: If during installation the gap between lever (40) and sleeve (15) is more than 0.3 mm, install an AN960C416L washer.

(8) Connect pitch control links (20) to slider (23) following markings made at removal. Install between links and slider damper washers (60) with bolt (21), washers (22) and nut (38).
(9) Torque the bolt (21) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(10) Install the cotter pin.
(11) Put the connecting link (46) in position on the lever (40) and the fitting (61).
(12) Put the four washers (46A) and the two shims (46B) in their position between the connecting link (46), the lever (40) and the fitting (61).
(13) Apply corrosion inhibiting compound (LCM NO 40) or corrosion inhibiting compound (LCM NO 41) to the stem of bolt (58), then secure the connecting link to fitting (61) using the bolt (58), washers (57, 59) and nut (58A).
(14) Measure clearance between the link (46) and the fitting (61); if the clearance is more than 0.05 mm (0.002 in), adjust thickness of shim (46B).
(15) Torque the bolt (58) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(16) Install the cotter pin.
(17) Apply corrosion inhibiting compound (LCM NO 40) or corrosion inhibiting compound (LCM NO 41) to the stem of bolt (44), then secure the connecting link to lever (40) using the bolt (44), washers (42, 43) and nut (41).
(18) Measure clearance between the link (46) and the lever (40); if the clearance is more than 0.05 mm (0.002 in), adjust thickness of shim (46B).
(19) Torque the bolt (44) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):
- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum

- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(20)Install the cotter pin.

(21)Install the group on 90o gearbox output shaft. Lockwire boot with safety wire (LCM NO 24).

(22)Connect links (10) to levers (5 and 49). Verify that bolts can turn and slide freely in seats, otherwise reposition lever (49) and/or lever (5) until this requirement is satisfied.

(23)Torque the bolt (45) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):

- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(24)Install the cotter pin.

NOTE: Install larger washer under bolt head and small washer under nut.

(25)Torque the bolts (7 and 47) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):

- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 5.65 thru 7.91 N m (50 thru 70 lbf in)

(26)Install the cotter pins.

CAUTION: CHECK THAT LEVERS (5 AND 49) ARE ALIGNED TO EACH OTHER, AND THAT BEARING (18) IS NOT PRELOADED.

(27)Connect the free arm of lever (49) to tail rotor pitch change control tube (59) with the bolt (52), the washer (53) and the nut (54).

(28)Torque the bolt (52) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):

- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

(29)Install the cotter pin.

(30)(Helicopters equipped with sleeve P/N 109-0130-90-113). (Refer to figure 64-17 sheet 2). Install bushing (25), sleeve (27) as follows:

(a) Prepare surface to be bonded of bushing seat in sleeve by sandblasting or by using abrasive paper No 180-240 (LCM NO 6).

(b) Clean surface to be bonded with MEK (LCM NO 9).

(c) Apply a light coat of adhesive (LCM NO 29) on bushing (25) and relative seat in sleeve (27).

(d) Install bushing (25) in sleeve (27). Wipe off adhesive in excess.

NOTE: Ensure bushing is perfectly centered in sleeve.

(e) Leave adhesive to cure at room temperature (22° - 26 °C) for at least 24 hours or at a temperature of 80° - 88 °C for 1 hour.

(f) Ream the bushing (25) internal diameter up to 31.42 ÷ 31.44 mm.

(31)Install boot (26) on sleeve (27).

NOTE: For helicopter equipped with sleeve assy P/N 109-0130-90-113 remove spacer P/N 109-0130-89-1.

(32)Install sleeve (27) on gearbox shaft. Lockwire boot (26) as required using safety wire.

(33) Apply the Corrosion inhibiting compound (LCM NO 40) or Corrosion inhibiting compound (LCM NO 41) to the shank of the bolts (32).

NOTE: Make sure that the head of the bolt (32) points in the direction of the rotation of the tail rotor.

(34)Connect the FWD half-scissor (30) to the sleeve (27) with the bolt (32), washers (29 and 31) and nut (28). Fully tighten all components. Do not torque nut.

(35)Manually determine the axial play between FWD half-scissor (30) and sleeve (27) along bolt axis in the way that follows:

(k) Turn the FWD half-scissor (30) back and forth, from “a” to “b” as Shown in Fig 64-17F Detail A, until you get the position of minimum play. Stop the FWD half-scissor (30) in this position. (**VP**)

(l) Torque the nut (28) until you get to the cotter pin hole on the bolt (32) with no axial play between components. FWD half-scissor must move freely with no binding. Slight friction is permitted. (**VP**)

(m) If you find too much binding / friction, replace the nut (32) with a new one and do again Step C.(25)(a) and Step C.(25)(b). (**VP**)

(n) If with the new nut (28) you still get too much binding / friction, add a washer (29A) P/N NAS1149F0416P under nut and do again Step C.(25)(a) and Step C.(25)(b). (**VP**)

(o) If you still get too much binding / friction, contact the TC holder.

(36)Connect the AFT half-scissor (35) to the FWD half-scissor (30) with the bolt (63), washers (64 and 65) and nut (66). Fully tighten all components. Do not torque nut. (**VP**)

(c) Before install the bolt (63) that connect the FWD half-scissor and AFT half-scissor apply the Corrosion inhibiting compound (LCM NO 40) or Corrosion inhibiting compound (LCM NO 41).

(37)Manually determine the axial play between AFT half-scissors (35) and FWD half-scissors (30) along bolt axis in the way that follows:

(k) Turn the AFT half-scissors (35) back and forth, from “a” to “b” as Shown in Fig 64-17F Detail B, until you get the position of minimum play. Stop the AFT half-scissors (35) in this position. (**VP**)

(l) Torque the nut (66) until you get to the cotter pin hole on the bolt (63) with no axial play between components. AFT half-scissor must move freely with no binding. Slight friction is permitted. (**VP**)

(m) If you find too much binding / friction, replace the nut (66) with a new one and do again Step C.(27)(a) and Step C.(27)(b). (**VP**)

(n) If with the new nut (66) you still get too much binding / friction, add a washer (65A) P/N NAS1149F0416P under nut and do again Step C.(27)(a) and Step C.(27)(b). (**VP**)

(o) If you still get too much binding / friction, contact the TC holder.

(38)Apply the Corrosion inhibiting compound (LCM NO 40) or Corrosion inhibiting compound (LCM NO 41) to the shank of the bolts (63).

NOTE: Make sure that the head of the bolt (37) points in the direction of the rotation of the tail rotor.

(39)Connect the AFT half-scissor (35) to the slider (23) with the bolt (37), washers (36 and 34) and nut (33). Fully tighten all components. Do not torque nut.

(40)Manually determine the axial play between AFT half-scissor (35) and the slider (23) along bolt axis in the way that follows:

(k) Move the sleeve (23) back and forth until you get the position of minimum play. Stop the sleeve in this position. (**VP**)

(l) Torque the nut (33) until you get to the cotter pin hole on the bolt (37) with no axial play between components. (**VP**)

(m) If you find too much binding / friction, replace the nut (33) with a new one and do again Step C.(30)(a) and Step C.(30)(b). (**VP**)

(n) If with the new nut (33) you still get too much binding / friction, add a washer (34A) P/N NAS1149F0416P under nut and do again Step C.(30)(a) and Step C.(30)(b). (**VP**)

(o) If you still get too much binding / friction, contact the TC holder.

(41)Install the new Cotter pins on nuts (28, 33 and 66).

(42)Apply the Corrosion preventive compound (LCM NO 2) to the parts that follow:

(f) The heads of the bolts (32 and 37).

(g) The washers (29) and (34), the nuts (28) and (33) and the cotter pins.

NOTE: Ensure that attaching hardware (32 and 37) bolt heads are facing tail rotor sense of rotation.

H. Follow-On Maintenance Required:
- Install tail rotor hub and blade assembly (Sect 64-00)
- Install access panels P6 and P12 (Sect 64-00).

NOTE: If links (10) P/N 109-0133-04-011 have been replaced with -105 or viceversa, perform tail rotor control system adjustment (para 67-00-29).

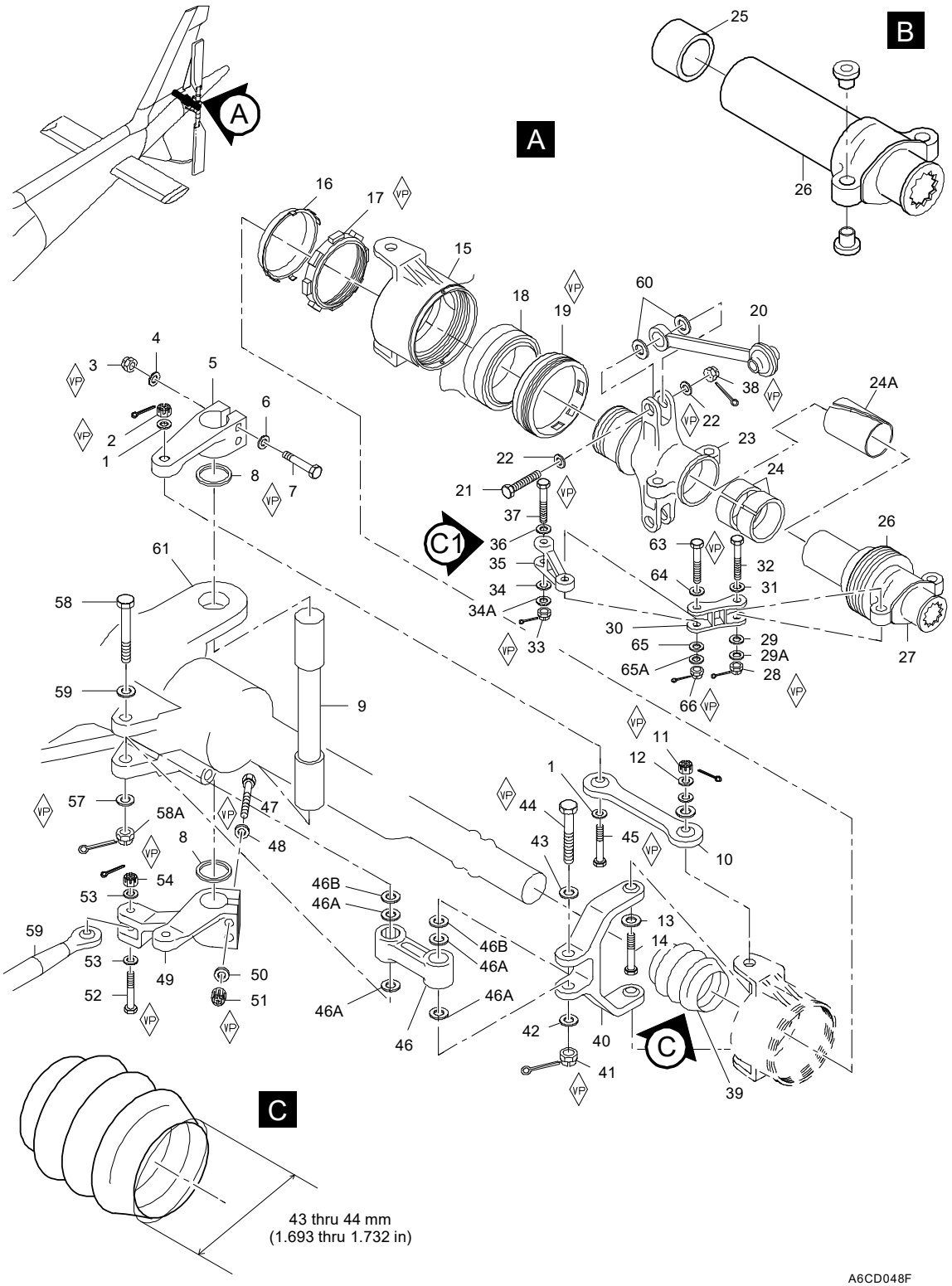


Figure 64-17 (sheet 1 of 4). Pitch change mechanism

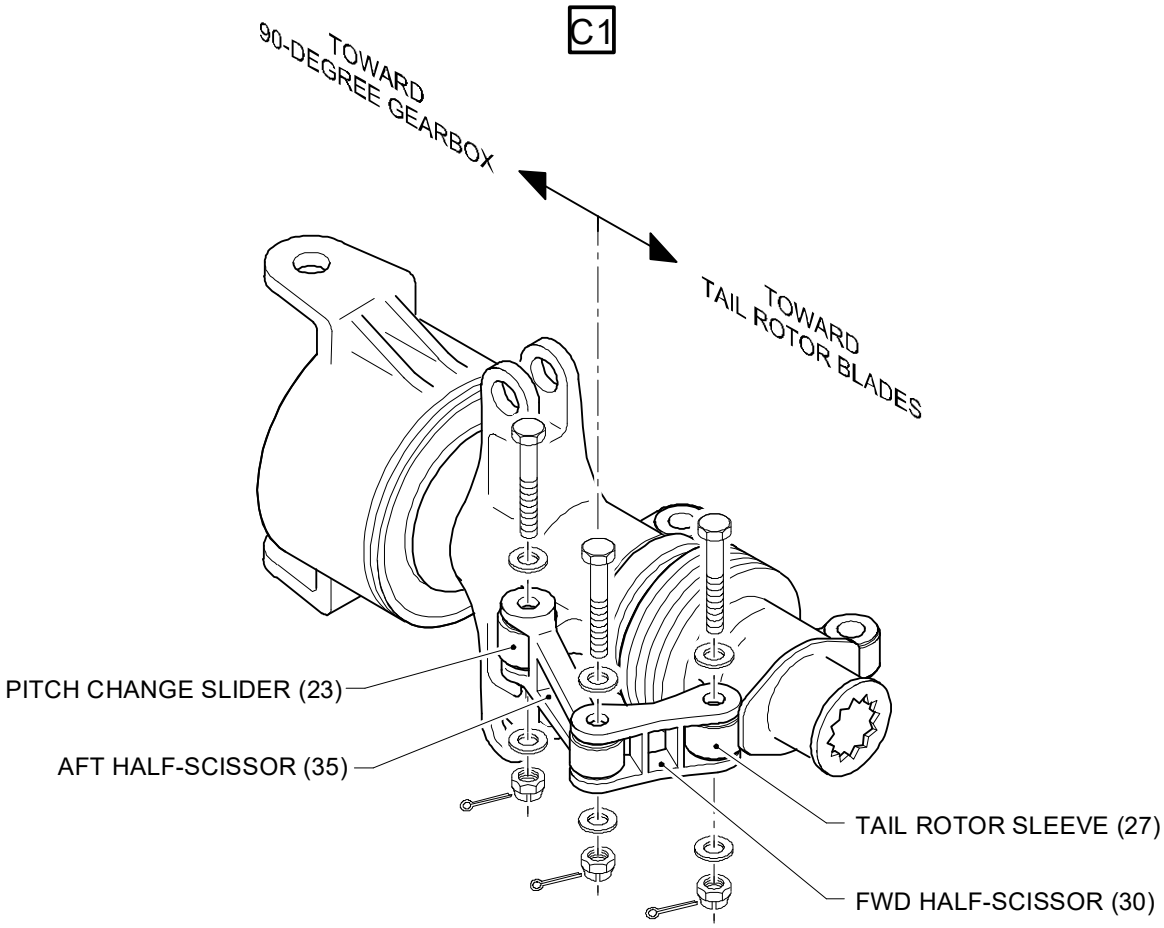


Figure 64-17 (sheet 2 of 4). Pitch change mechanism

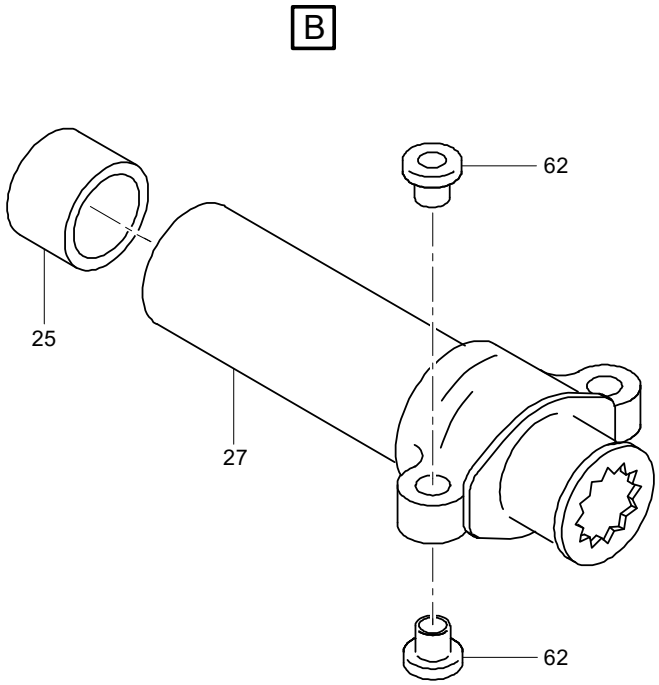


Figure 64-17 (sheet 3 of 4). Pitch change mechanism

1. Washer
2. Nut
3. Nut
4. Washer
5. Lever
6. Washer
7. Bolt
8. Shim
9. Pivot
10. Link
11. Nut
12. Washer
13. Spacer
14. Bolt (*)
15. Housing
16. Lock ring
17. Ring nut
18. Duplex bearing
19. Ring nut
20. Link
21. Bolt (*)
22. Washer
23. Slider
24. Bushings (**)
24A. Bushings (***)
25. Bushings (***)
26. Boot
27. Sleeve
28. Nut
29. Washer
29A. Washer (on fit)
30. FWD half scissor
31. Washer
32. Bolt (*)
33. Nut
34. Washer
34A. Washer (on fit)
35. AFT half scissor
36. Washer
37. Bolt (*)
38. Nut
39. Boot
40. Lever
41. Nut
42. Washer
43. Washer
44. Bolt (*)
45. Bolt (*)
46. Link
46A. Washer
46B. Shim
47. Bolt
48. Washer
49. Lever
50. Washer
51. Nut
52. Bolt (*)
53. Washer
54. Nut
55. Nut
56. Washer
57. Washer
58. Bolt (*)
58A. Nut
59. Tail rotor pitch control tube (ref)
60. Washers
61. Fitting, T/R gearbox
62. Bushings
63. Bolt
64. Washer
65. Washer
65A. Washer (on fit)
66. Nut

(*) These bolts are provided with cotter pins which are not illustrated for clarity of representation.
(**) Used with slider P/N 109-0130-91-105.
(***) Used with slider P/N 109-0130-91-117/-119

Figure 64-17 (sheet 4 of 4). Pitch change mechanism

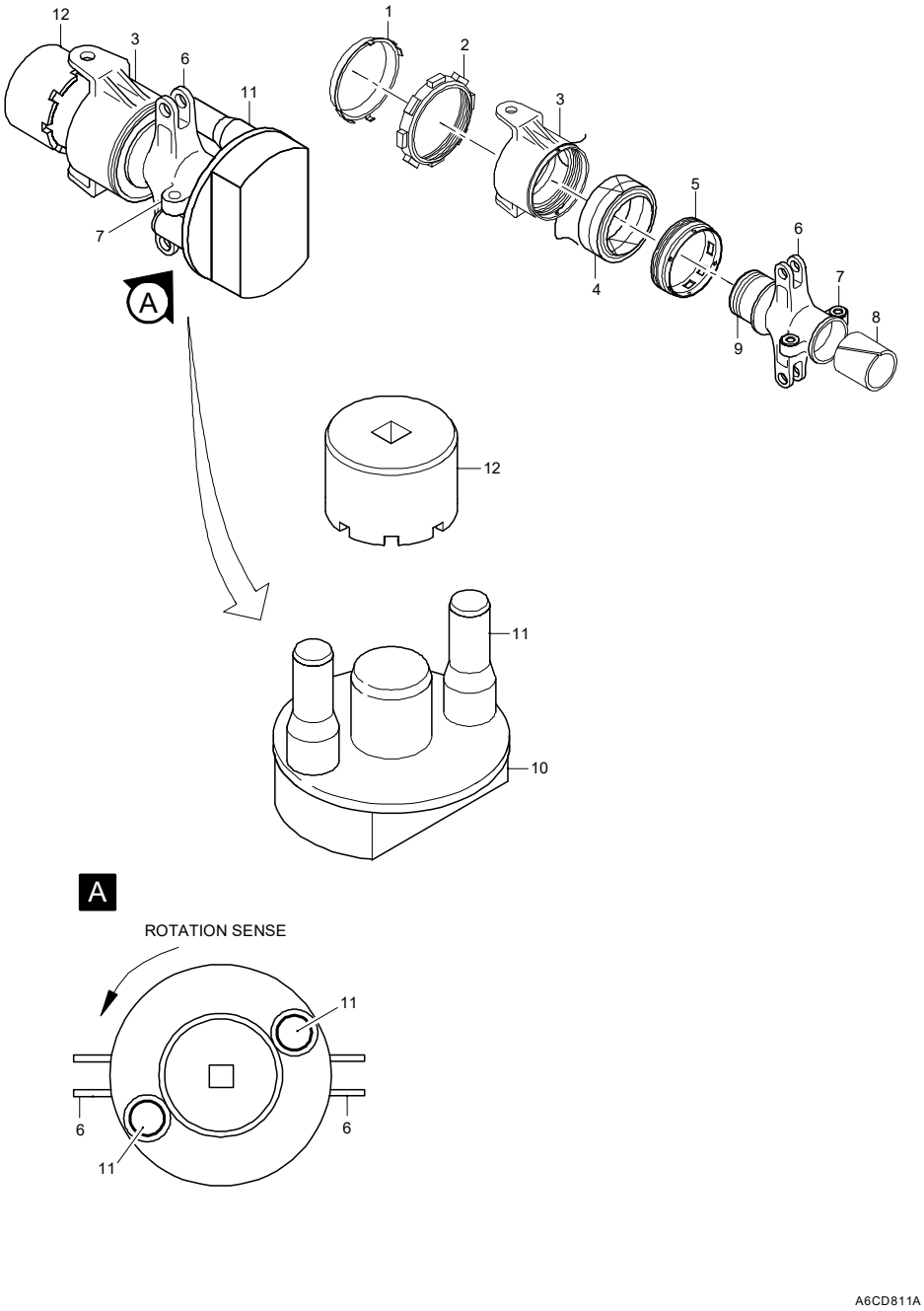


Figure 64-17A. Pitch change slider ring nut removal

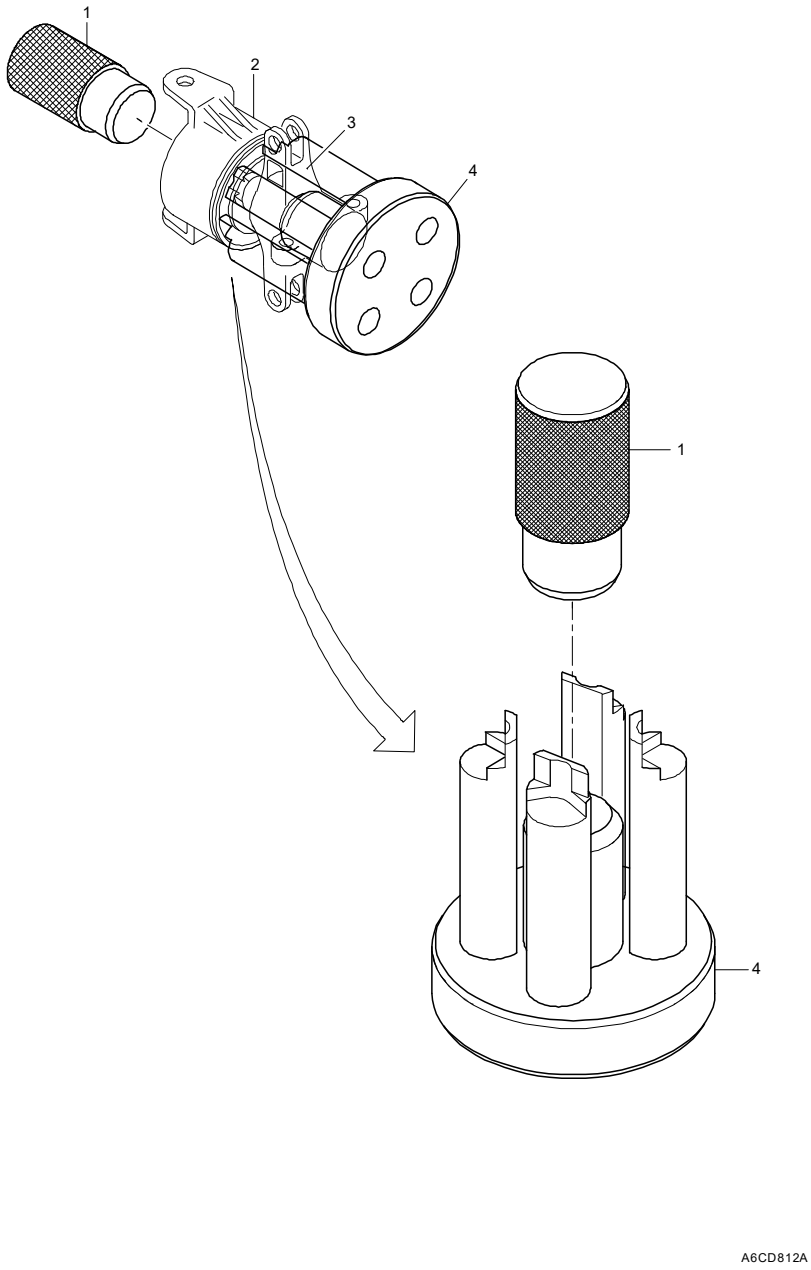


Figure 64-17B. T/R Pitch change slider removal

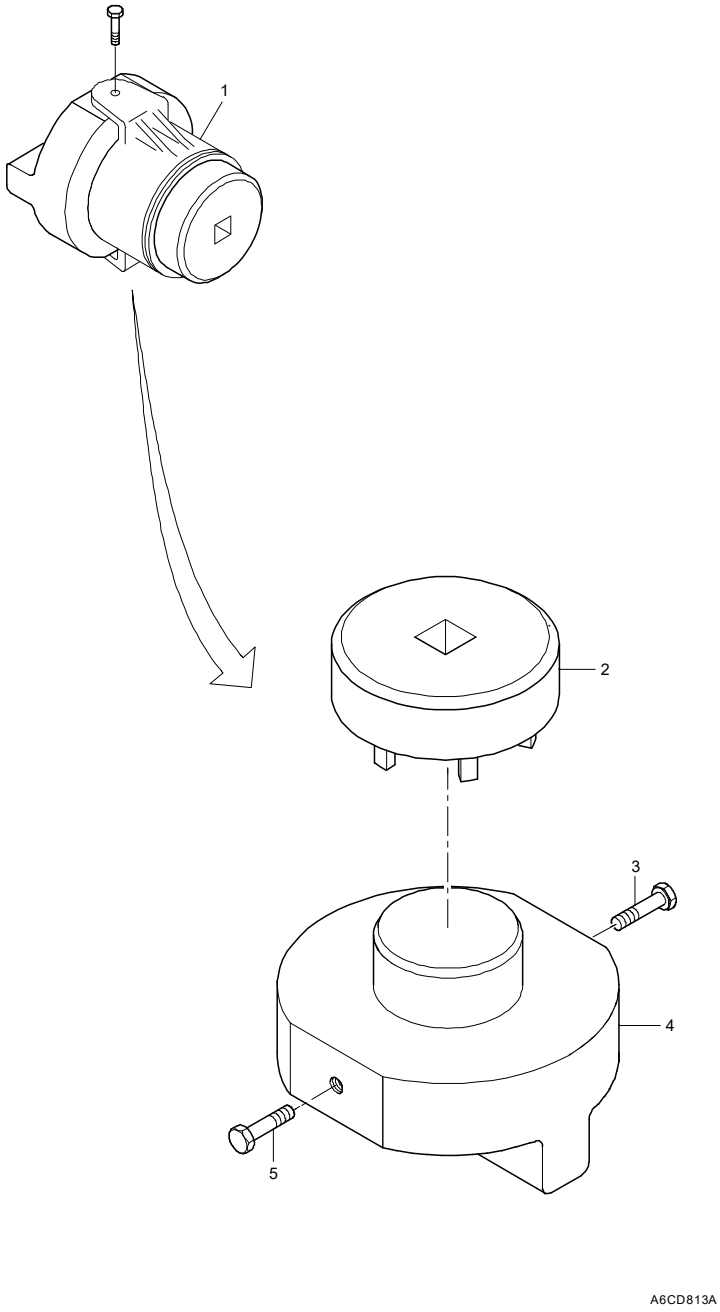


Figure 64-17C. T/R Pitch change housing ring nut removal

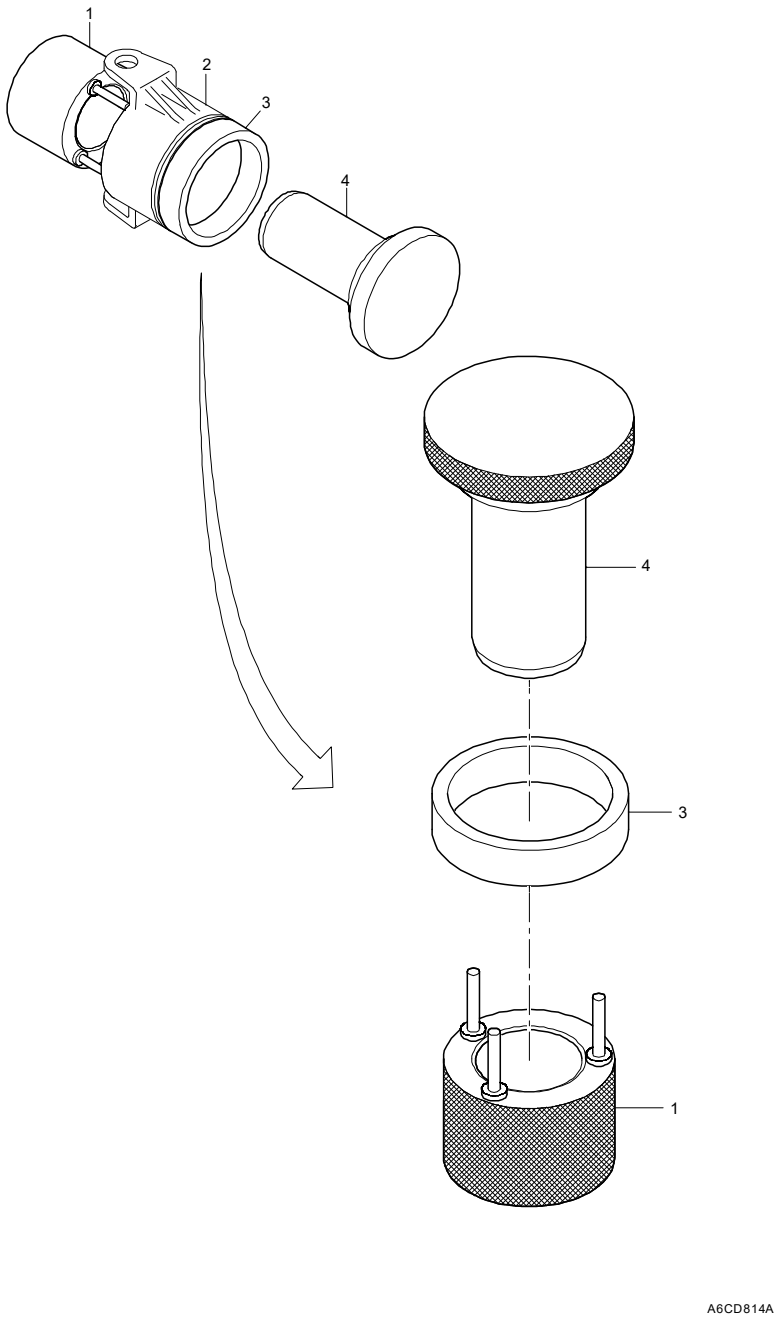


Figure 64-17D. T/R Pitch change housing duplex bearing removal

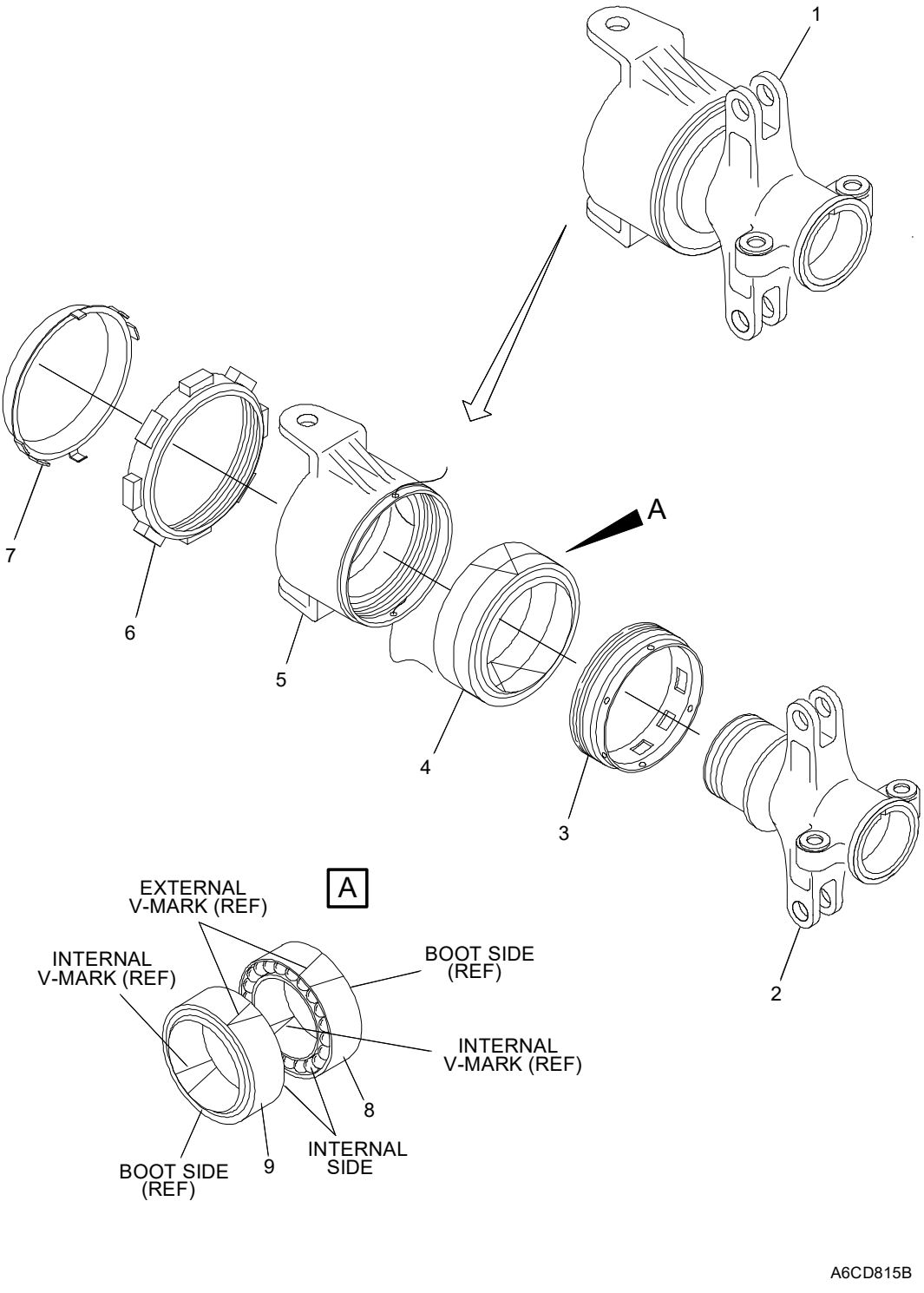


Figure 64-17E (sheet 1 of 5). Housing and slider group

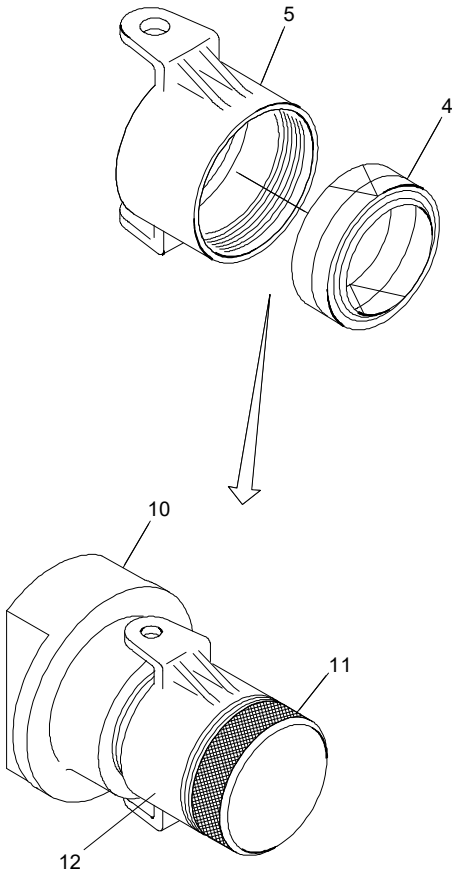


Figure 64-17E (sheet 2 of 5). Housing and slider group

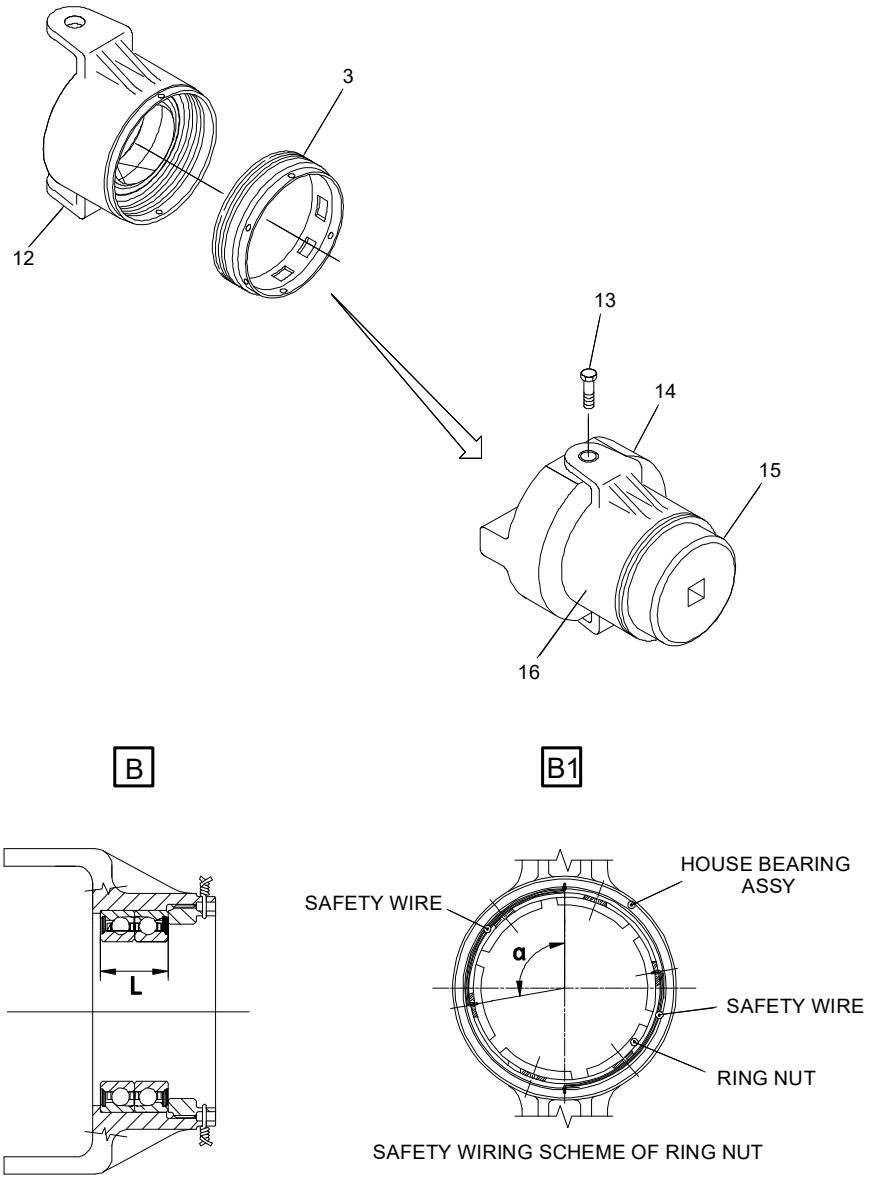


Figure 64-17E (sheet 3 of 5). Housing and slider group

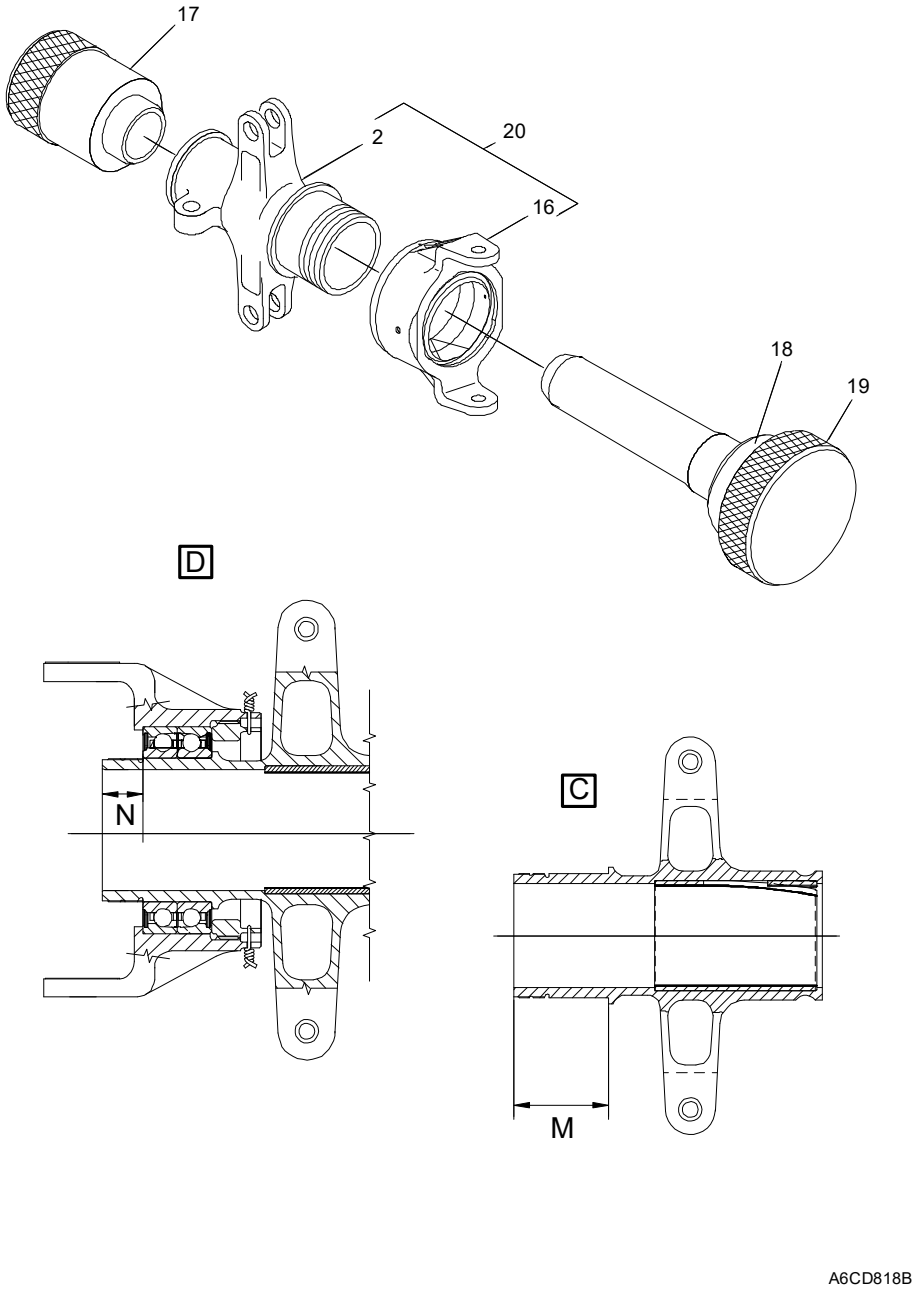


Figure 64-17E (sheet 4 of 5). Housing and slider group

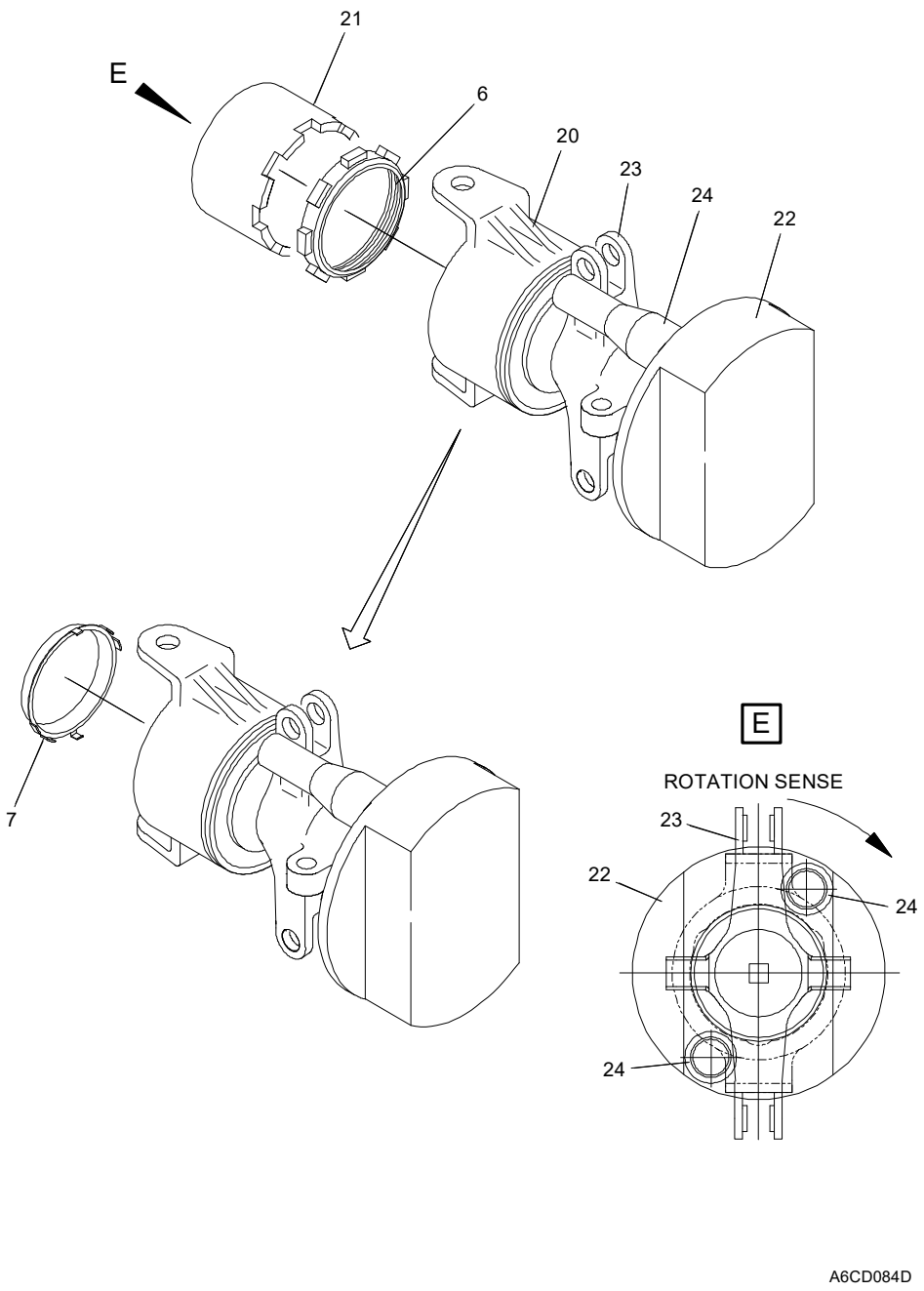


Figure 64-17E (sheet 5 of 5). Housing and slider group

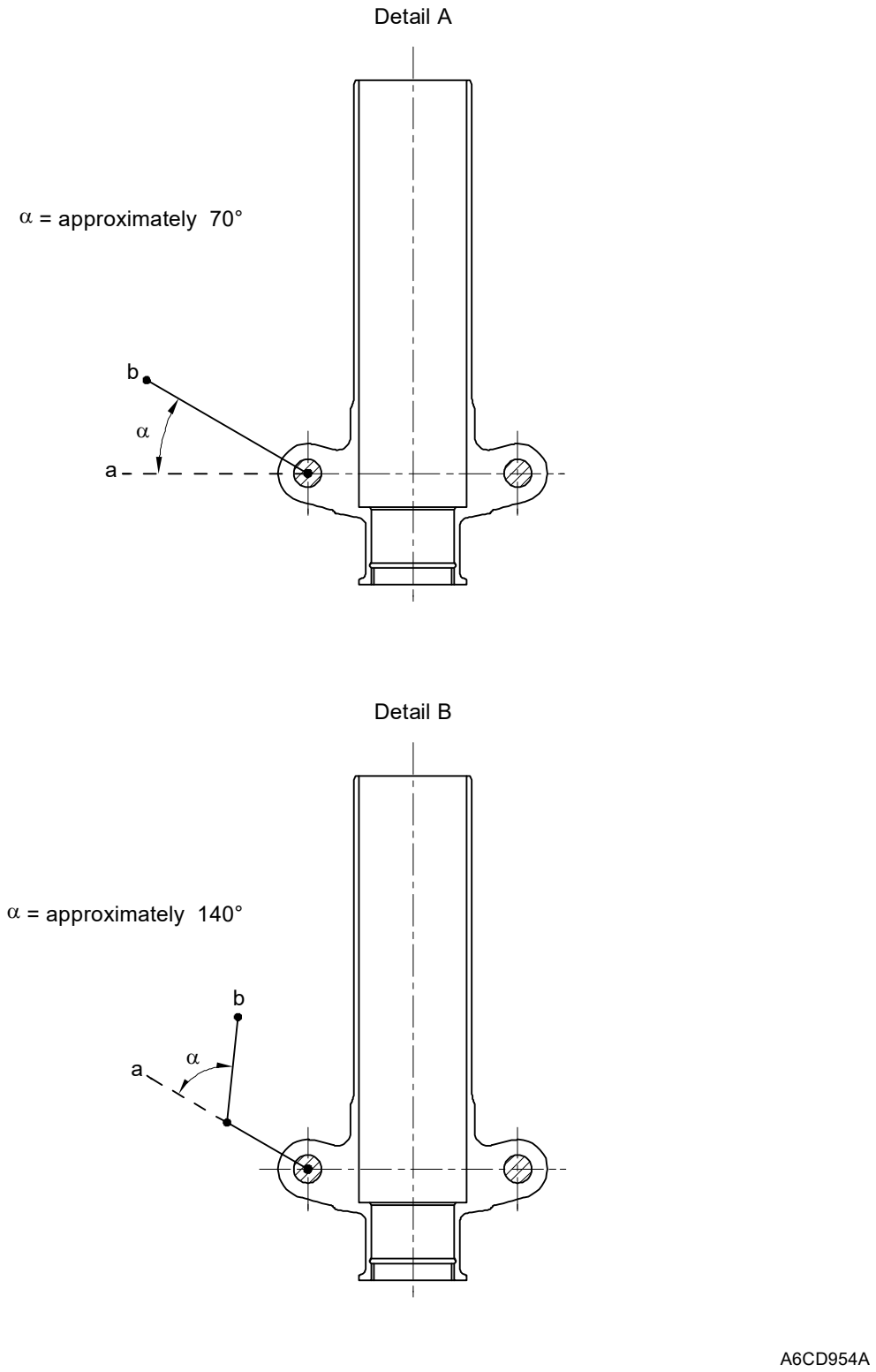


Figure 64-17F. Half scissors play ch

Annex 14

2-4-12-6-3. Removal

a. Remove 90° gearbox covers to gain access to the work area.
b. Remove the tail rotor hub and blade assembly as described in Section VI.
c. Disconnect FWD half-scissor (27, fig 2-96) from sleeve (20).
d. Disconnect AFT half-scissor (28) from slider (29).
d1. Detach FWD half-scissor (27) from AFT half-scissor (28) by removing associated attaching hardware (26).
e. Cut lockwire from boot (23) and withdraw sleeve (20) from gearbox shaft.

NOTE: Mark position of links (24) to reconnect in same position during reassembly on slider (29).

f. Disconnect links (24) from slider (29).
g. Remove links (45) by removing attaching hardware.

NOTE: Remove washers (40A) and bumper washers (40B) if installed.

h. Cut lockwire or ty-rap from boot (49).
i. Disconnect and remove link (48) together with washers (67) and laminated shims (68) if installed withdraw housing and slider assembly (32, 29) from gearbox shaft.
j. Disassemble housing and slider assembly (32, 29) as follows:
   1. Open the two clawed tabs on the lock ring (38) then remove it from the ring nut (37).
   2. Unscrew ring nut (37) from slider (29) using tool (135 or 107, table A4-3).
   3. Withdraw slider (29) from housing (32) using tool (136, table A4-3).

CAUTION: MAKE SURE THAT THE TOOL IS PERFECTLY ALIGNED WITH THE DUPLEX BEARING WHEN YOU PRESS IT OUT IN ORDER TO PREVENT DUPLEX BEARING DAMAGE.

   4. Cut lockwire, in two places, then unscrew ring nut (35) using tool (137 and 138, table A4-3) from housing (32). Remove bearing (36) using tool (139, table A4-3).
   5. Replace bushing(s) (34), if necessary, refer to E-A109-BA-250-3 manual, Para 9-1-5.
k. Remove boot (49).
l. Disconnect control tube from lever (52), remove levers (52, 53) and shims (54), extract pivot (55) from lugs on gearbox.
m. Remove lever (43).

2-4-12-6-6. Installation

WARNING: THIS INSTALLATION INCLUDES VITAL POINTS (**VP**). DURING THE PROCEDURE, YOU MUST OBEY THE LOCAL REGULATIONS APPLICABLE TO THE VITAL POINTS.

CAUTION 1: MAKE SURE THAT YOU DO NOT MIX GREASES OF DIFFERENT BRANDS ALTHOUGH THE SPECIFICATIONS ARE THE SAME. REFER TO THE HELICOPTER LOG BOOK TO PREVENT MIXTURE OF UNWANTED GREASES.

CAUTION 2: THIS COMPONENT INCLUDES CRITICAL PARTS. EXAMINE THE COMPONENT FOR SIGNS OF STRUCTURAL DAMAGE, BEFORE YOU INSTALL IT ON THE HELICOPTER.

NOTE: During the installation of the self-locking bolts or the self-locking nuts, when the locking is engaged, with the torque wrench (Local supply), make sure that the locking torque necessary to move the bolts or nuts, before contact with the washer, is between the minimum breakaway torque and the maximum locking torque. If you do not get his value, discard the bolts and/or nuts.

a. Position pivot (55) in 90° gearbox lugs.
b. Install laminated shims (54) and levers (52, 53) on pivot (55). Do not torque attaching hardware (51).

NOTE: if any of the following items: 90° gearbox case, pivot (55), levers (52, 53), laminated shims (54) have been replaced, proceed as follows:

1. Position pivot (55) in 90° gearbox lugs.
2. Position levers (52, 53) on pivot (55) without shims and secure temporarily in position.
3. Measure the total gap between one lever and the adjacent lug with a feeler gauge. Half of the gap is the dimension of each laminated shim (54).
4. Remove lever (52, 53) from pivot (55).
5. Fit laminated shims (54) on pivot (55) then reinstall levers (52, 53) and secure. Do not torque hardware (51).
6. Check pivot for freedom of rotation. If shim thickness is unsatisfactory, modify the shims the same amount on either side to obtain axial play from 0.03 to 0.08 mm between 90° gearbox lugs bearings and levers (52, 53) when installed.

c. Position boot (49) on gearbox shaft.
d. Reassemble housing and slider assembly (32, 29) as follows (see figure 2-96A):

CAUTION: BEFORE YOU ASSEMBLE THE HOUSING AND SLIDER GROUP (1, FIGURE 2-96A), PUT THE COMPONENTS THAT FOLLOW AND THE RELATED ATTACHING PARTS ON AN APPLICABLE WORK TABLE:
- THE DUPLEX BEARING (4);
- THE HOUSING (5).
CAREFULLY EXAMINE THE COMPONENTS AND THE RELATED ATTACHING PARTS FOR CORROSION, NICKS AND DAMAGE, WEAR AND FRETTING. IF YOU FIND THAT THE COMPONENT IS DAMAGED, REPLACE IT.

1. Divide the two parts of the duplex bearing (4).

NOTE: Do Step d.2. thru Step d.4. only for removed bearings. New bearings are supplied already lubricated and must not be filled with grease.

2. Fill the syringe (Local supply) with the grease (LCM No 162).
3. Before you install the bearing (8), fill it with 3.5 cc of grease with the syringe from the side opposite to the boot. Refer to Detail A of figure 2-96A.
4. Do Step d.3. again on the bearing (9).
5. Put the bearing (8) against the bearing (9) with the boot sides externally and the internal and external V-marks aligned to show an arrow. See Detail A, figure 2-96A.
6. Install the duplex bearing (4) into the housing (5) in the way that follows:
   (a) Apply a thin layer of primer (LCM No 39) on the mating surfaces between the duplex bearing (4) and housing (5).
   (b) Put the housing (5) on the base (10), part of the tool (LSE No 109).

WARNING: BE CAREFUL WHEN YOU USE HEAT. HOT PARTS CAN CAUSE INJURY TO THE PERSONS. ALWAYS USE APPLICABLE PROTECTIVE CLOTHING.

   (c) Heat the housing (5) to a temperature between 60 and 70 °C with the heating gun (Local supply). This will help you to install the duplex bearing (4) into the housing. Make sure that the temperature is not more than 90 °C (heating gun set to a temperature of 90 °C).

NOTE: As an alternative to heating the housing (5); you can cool down the duplex bearing (4) with the refrigerator (Local supply) to a temperature between -18 and -40 °C for 30 minutes. Do not touch the cold duplex bearing with bare hands to prevent injury.

(d) Push the duplex bearing (4) into the housing (5). To do this, use the pin (11), part of the tool (LSE NO 109) and an applicable arbor press.
(e) Make sure there is no clearance between the two bearings (8 and 9) and between the outer ring of duplex bearing (4) and the shoulder of the housing (5). To do this, use the applicable feeler gage (Local supply).
(f) Remove the housing-bearing assembly (12) from the base (10).

NOTE: Before you continue, make sure that all the components are at ambient temperature.

7. Install the ring nut (3) into the housing-bearing assembly (12). Obey the instructions that follow:
   (a) Clean the threads of the ring nut (3) and the housing (5) with the cloth, soft lint-free (Local supply) and the solvent, cleaning (LCM No 165). (**VP**)
   (b) Dry the threads of the ring nut (3) and the housing (5) with a clean cloth, soft lint-free (Local supply). (**VP**)
   (c) Apply a layer of primer (LCM No 134) on the threads of the ring nut (3).
   (d) Apply a layer of primer (LCM No 134) on the threads of the housing (5).
   (e) Apply four drops of sealing compound (LCM No 60) on the threads of the ring nut (3). Put them in four equally spaced positions (90 degrees apart). (**VP**)
   (f) Lock the base (14), part of the tool (LSE No 108) in an applicable vice.
   (g) Put the housing-bearing assembly (12) on the base (14), then lock it with the two bolts (13), part of the tool (LSE No 108).
   (h) Install the ring nut (3) in the housing-bearing assembly (12) with the wrench (15), part of the tool (LSE No 108).
   (i) Torque the ring nut (3) 118 thru 127 Nm. (**VP**)
   (j) Make sure that the duplex bearing (4) turns freely. (**VP**)
   (k) Refer to Detail B of figure 2-96A.
      1. Measure and record the dimension L.
      2. Make sure that the dimension you find is between 23.75 to 24.0 mm.
      3. If you find that the dimension is not in the given limits, remove the duplex bearing. (4). Then, do Step d.6. and Step d.7. again.
   (l) Refer to Detail C of figure 2-96A.
      1. Measure and record the dimension M.
      2. Calculate and record the dimension N with this formula: N = M - L.
   (m) Remove the housing group (16) from the base (14).

NOTE: The safety wire must be installed with the double-twist method and put in tension. Example of an acceptable safety wire installation is shown in Detail B1 of figure 2-96A. As a general approach, an “a” angle between 60° and 120° is adviseable.

   (n) Safety the ring nut (3) to the housing (5) with the new safety wire (LCM No 53) in two places as shown in Detail B1 of figure 2-96A. Refer also to Appendix 1. (**VP**)
8. Apply a thin layer of oil (LCM No 59) on the internal surface of the duplex bearing (4).
9. Put the bushing (18), part of the tool (LSE No 111) in its position on the pin (19), part of the tool (LSE No 111).
10. Put the housing group (16) on the pin (19) above the bushing (18).
11. Put the slider (2) on the pin (19).

NOTE: To help you install the slider (2), heat the housing group (16) in an oven preheated to a temperature of 50 °C for 15 to 30 minutes.
As an alternative to heating the housing group (16); you can cool down the slider (2) with the refrigerator (Local supply) to a temperature between -18 and -40 °C for 30 minutes. Do not touch the cold slider with bare hands to prevent injury.

12. Push the slider (2) into the housing group (16). To do this, use the barrel (17), part of the tool (LSE No 111) and an applicable arbor.

13. Remove the housing-slider assembly (20) from the pin (19).

NOTE: Before you continue, make sure that all the components are at ambient temperature.

14. Make sure there is no clearance between the inner rings of the two bearings (8 and 9) and the shoulder of the slider (2). To do this, use the applicable feeler gage (Local supply).
15. Refer to Detail D of figure 2-96A:
    (a) Measure and record the dimension N. To do this, use an applicable depth micrometer gage (Local supply).
    (b) Make sure that the dimension N measured agrees with the dimension calculated at Step d.7.(l)2.
    (c) If you find that the dimension N does not agree, remove the duplex bearing (4). Then, do Step d.6. and Step d.15. again.
16. Lock the base (22), part of the tool (LSE No 107) in an applicable vice.
17. Put the housing-slider assembly (20) on the base (22).
18. Move the braces (23) of the slider against the pins (24) of the base (22). Refer to Detail E of figure 2-96A.
19. Clean the threads of the ring nut (6) and the slider (2) with the cloth, soft lint-free (Local supply) and the solvent, cleaning (LCM No 133). (**VP**)
20. Dry the threads of the ring nut (6) with a clean cloth, soft lint-free (Local supply). (**VP**)
21. Apply a layer of primer (LCM No 134) on the threads of the ring nut (6).
22. Apply a layer of primer (LCM No 134) on the threads of the slider (2).
23. Apply four drops of sealing compound (LCM No 60) on the threads of the ring nut (6). Put them in four equally spaced positions (90 degrees apart). (**VP**)
24. Install the ring nut (6) with the wrench (21), part of the tool (LSE No 107).
25. Torque the ring nut (6) to 49 thru 59 Nm. (**VP**)
26. Remove the housing and slider group (1) from the base (22).
27. Install the new lock ring (7).
28. Bend the clawed tabs of the lock ring (7) on the ring nut (6). Make sure that the two clawed tabs of the lock ring (7) are correctly engaged.

e. Connect lever (43, fig. 2-96) and links (45) to sleeve (32).

NOTE 1: Install the two larger washers (41) against spherical bearing of lever (43) and link (45). Install the two smaller washers (40) between the larger one (41) and the nut (39).
To obtain proper torque, replacement of one smaller washer (40) AN960C416 with an AN960C416L washer is permitted.

NOTE 2: To prevent sleeve (32) wear, you can install the bumper washers (40B) between the lever (43) and sleeve (32) and between the sleeve (32) and link (45).

NOTE 3: If during installation the gap between lever (43) and sleeve (32) is more than 0.3 mm, install the washer (40A) AN960PD416L.

NOTE 4: Two types of links (45) exist: P/N 109-0133-04-101 and -105. Check that the two links (45) to install are of the same type. This means the same length. Do not mix different types. Proceed with tail rotor rigging after installation of links of a different type.

e1. Torque the bolts (42) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):

- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

e2. Install the cotter pins.

NOTE 1: (Applicable if bumper washers (40B) are installed) Before you torque nuts (39), make sure that the spherical bearings of the lever (43) and link (45) touch the bushing (33) of the sleeve (32) and not the bumper washers (40B).

NOTE 2: As an alternative it is possible to install cotter pins MS24665-151 in place of cotter pins MS24665-153 or MS24665-155.

f. Install link (48), washers (67) and laminated shim (68), if previously installed, on lever (43) using relative attaching hardware. Do not torque attaching hardware.

NOTE: If any of the following items: link (48), lever (43), laminated shims (68) have been replaced, proceed as follows:

- position link (48), two washers (67) and laminated shim (68) (if installed) on lever (43). Secure temporarily in position using relative attaching hardware.
- measure the gap between link (48) and lever (43) with a feeler gauge. If the gap is more than 0.05 mm (0.0002 inch) install or adjust the thickness of the laminated shim (68).
- fit laminated shim (68).

f1. Torque the bolt (47) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):

- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

f2. Install the cotter pin.

f3. Install boot (23) on sleeve (20). Insert sleeve (20) on 90° gearbox output shaft and in slider (29). Install boot (23) on slider (29) and safety with lock wire both sides are required.

NOTE: Before installing the boot (49) in the housing and slider group deform the boot metallic rim to an oval shape with a maximum diameter between 43 and 44 mm as shown in Detail A1. This is to help a tighter fit in the seat. Put the inboard boot in its position in the housing and slider group.

g. Install the group on 90° gearbox output shaft. Lockwire boot (23) as required. Safety the boot (49) with a ty-rap (NSN 5975-01-034-2706).

CAUTION: CHECK THAT LEVERS (52, 53) ARE ALIGNED TO EACH OTHER, AND THAT DUPLEX BEARING (36) IS NOT PRELOADED.

h. Connect links (45) to levers (52, 53). Verify that bolts (46) can turn and slide freely in seats, otherwise reposition lever (52) and/or lever (53) until this requirement is satisfied.

h1. Torque the bolts (46) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):

- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

h2 Install the cotter pins.

NOTE: Install larger washer under bolt head and smaller washer under nut.

i. Torque the bolts (51) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):

- Locking torque: 3.39 N m (30 lbf in) maximum

- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 5.65 thru 7.91 N m (50 thru 70 lbf in)

i1. Install the cotter pins.

j. Install link (48), washers (67) and laminated shim (68), if previously installed, on 90° gearbox lugs using relative attaching hardware. Do not torque attaching hardware.

NOTE: If any of the following items: 90° gearbox case, link (48), laminated shims (68) have been replaced, proceed as follows:

- position link (48), two washers (67) and laminated shim (68) (if installed) on 90° gearbox lugs. Secure temporarily in position using relative attaching hardware.
- measure the gap between link (48) and adjacent lug with a feeler gauge. If the gap is more than 0.05 mm (0.0002 inch) install or adjust the thickness of the laminated shim (68).
- fit laminated shim (68).

j1. Torque the bolt (47) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):

- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

j2. Install the cotter pin.

k. Connect the free arm of lever (52) to tail rotor pitch change control tube.

k1. Torque the bolt (50) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):

- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

k2. Install the cotter pin.

l. Connect pitch links (24) to slider (29) following markings made at removal.

m. Torque the bolt (25) to the Final torque (Locking torque + Seating torque). Refer to the torque values that follow and to Annex 1 for the torque instructions. (**VP**):

- Locking torque: 3.39 N m (30 lbf in) maximum
- Breakaway torque: 0.39 N m (3.45 lbf in) minimum
- Seating torque: 3.40 thru 4.52 N m (30 thru 40 lbf in)

n. Install the cotter pin.

NOTE 1: Final check for freedom of movement.
Tail rotor pitch change mechanism should move by hand while pulling or pushing on pivot (55) with push-rod removed on tail rotor servo actuator. If hard to move check freedom of movement slider (29) on sleeve (20). Cause for hard movement could be teflon bushings or tail rotor scissors.

NOTE 2: Install the FWD half-scissor (27) and AFT half-scissor (28) in the correct location and orientation as shown in Detail C of figure 2-96.

o. Apply the corrosion inhibiting compound (LCM NO 166) or corrosion inhibiting compound (LCM NO 167) to the shank of the bolts (26).

NOTE: Make sure that the head of the bolt (26) points in the direction of the rotation of the tail rotor.

p. Connect the FWD half-scissor (27) to the sleeve (20) with the bolt, washers and nut (26). Fully tighten all components. Do not torque nut.
q. Manually determine the axial play between FWD half-scissor (27) and sleeve (20) along bolt axis in the way that follows:
   1. Turn the FWD half-scissor (27) back and forth, from “a” to “b” as Shown in Fig 2-96B Detail A, until you get the position of minimum play. Stop the FWD half-scissor (27, fig 2-96) in this position. (**VP**)
   2. Torque the nut (26) until you get to the cotter pin hole on the bolt with no axial play between components. FWD half-scissor must move freely with no binding. Slight friction is permitted. (**VP**)
   3. If you find too much binding / friction, replace the nut with a new one and do again Step o.1. and Step o.2. (**VP**)
   4. If with the new nut (26) you still get too much binding / friction, add a washer (26H) P/N NAS1149F0416P under nut and do again Step o.1. and Step o.2. (**VP**)
   5. If you still get too much binding / friction, contact the TC holder.
r. Connect the AFT half-scissor (28) to the FWD half-scissor (27) with the bolt, washers and nut (26). Fully tighten all components. Do not torque nut. (**VP**)
   1. Before you install the bolt that connects the FWD half-scissor and AFT half-scissor apply the corrosion inhibiting compound (LCM NO 166) or corrosion inhibiting compound (LCM NO 167).
s. Manually determine the axial play between AFT half-scissor (28) and FWD half-scissor (27) along bolt axis in the way that follows:
   1. Turn the AFT half-scissor (28) back and forth, from “a” to “b” as Shown in Fig 2-96B Detail B, until you get the position of minimum play. Stop the AFT half-scissor (28, fig 2-96) in this position. (**VP**)
   2. Torque the nut (26) until you get to the cotter pin hole on the bolt with no axial play between components. AFT half-scissor must move freely with no binding. Slight friction is permitted. (**VP**)
   3. If you find too much binding / friction, replace the nut with a new one and do again Step q.1. and Step q.2. (**VP**)
   4. If with the new nut you still get too much binding / friction, add a washer (26H) P/N NAS1149F0416P under nut and do again Step q.1. and Step q.2. (**VP**)
   5. If you still get too much binding / friction, contact the TC holder.
t. Apply the corrosion inhibiting compound (LCM NO 166) or corrosion inhibiting compound (LCM NO 167) to the shank of the bolts (26).

NOTE: Make sure that the head of the bolt (26) points in the direction of the rotation of the tail rotor.

u. Connect the AFT half-scissor (28) to the slider (29) with the bolt, washers and nut (26). Fully tighten all components. Do not torque nut.
v. Manually determine the axial play between AFT half-scissor (28) and the slider (29) along bolt axis in the way that follows:
   1. Move the sleeve (20) back and forth until you get the position of minimum play. Stop the sleeve in this position. (**VP**)
   2. Torque the nut (26) until you get to the cotter pin hole on the bolt with no axial play between components. (**VP**)
   3. If you find too much binding / friction, replace the nut with a new one and do again Step t.1. and Step t.2. (**VP**)
   4. If with the new nut you still get too much binding / friction, add a washer (26S) P/N NAS1149F0416P under nut and do again Step t.1. and Step t.2. (**VP**)
   5. If you still get too much binding / friction, contact the TC holder.
w. Install the new cotter pins on nuts.
x. Apply the corrosion preventive compound (LCM NO 145) to the parts that follow:
   1. The heads of the bolts, washers and nuts (26) and cotter pin that attach the FWD half-scissor (27) to tail rotor sleeve (20).
   2. The heads of the bolts, washers and nuts (26) and cotter pin that attach the AFT half-scissor (28) to pitch change slider (29).
y. Install tail rotor as described in Section VI.

z. Install 90° gearbox covers.

NOTE: If links (45) P/N 109-0133-04-101 have been replaced with -105 or vice versa, perform tail rotor control system adjustment (para 2-4-8-7).

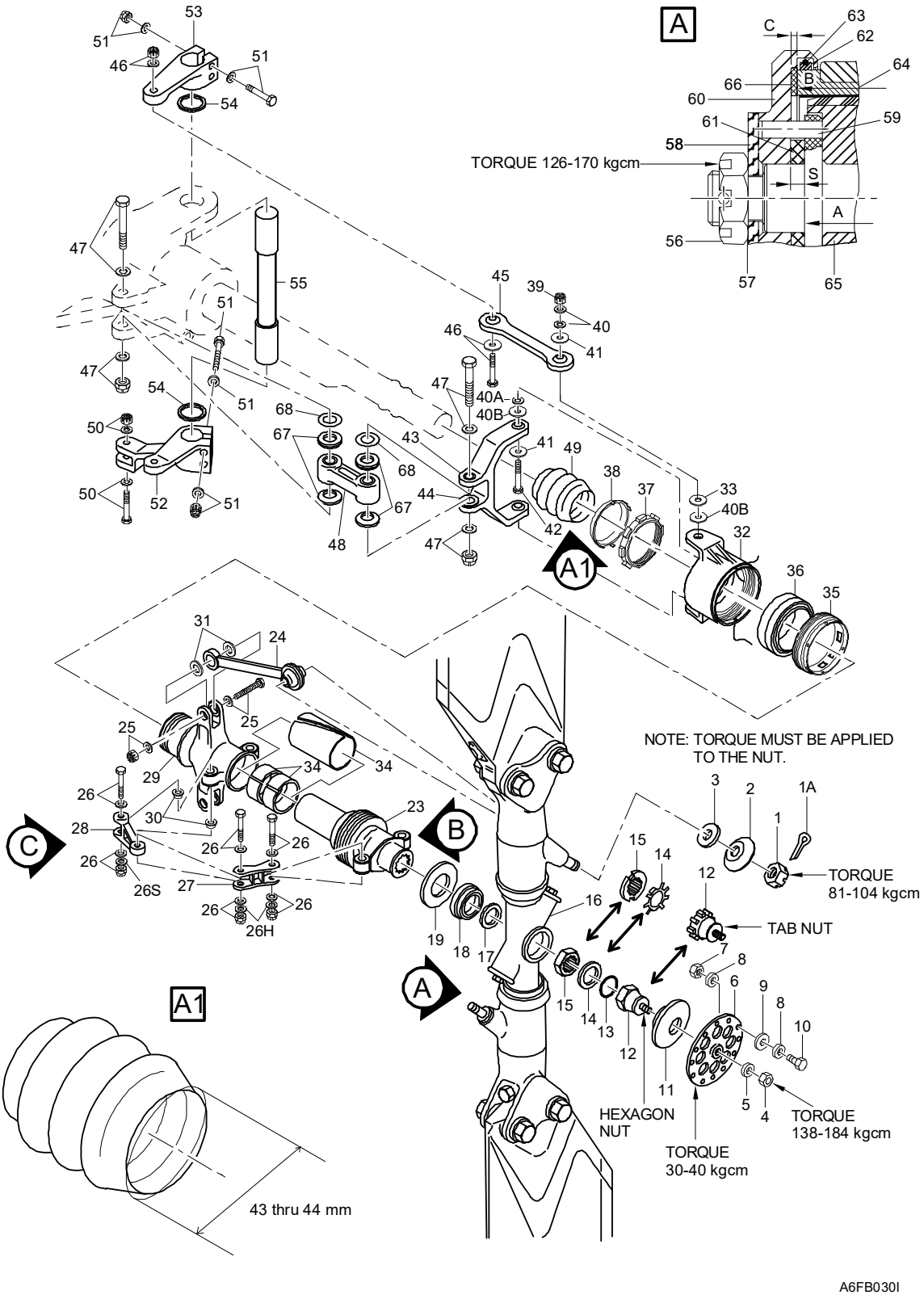


Figure 2-96 (sheet 1 of 3). Tail rotor installation

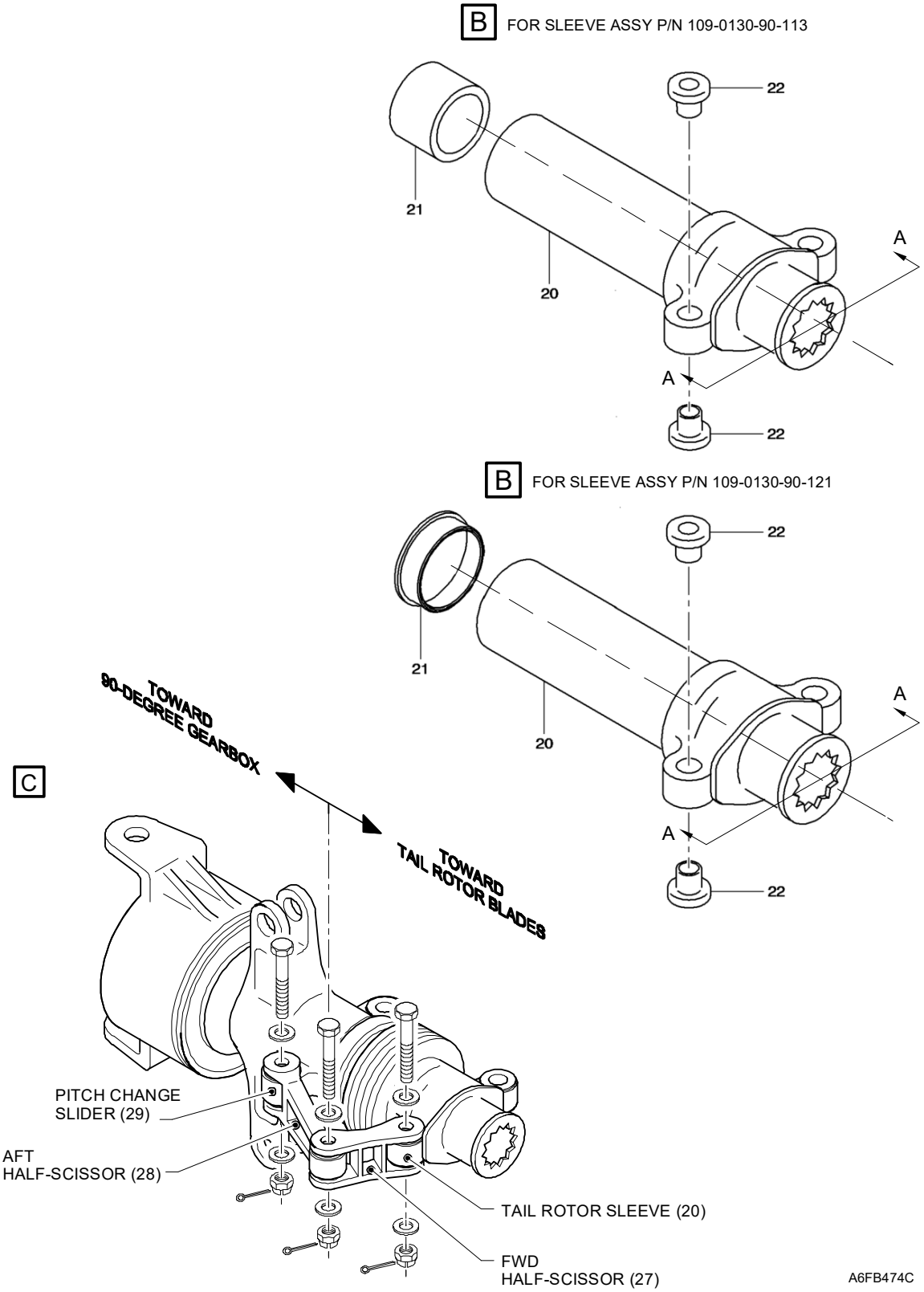
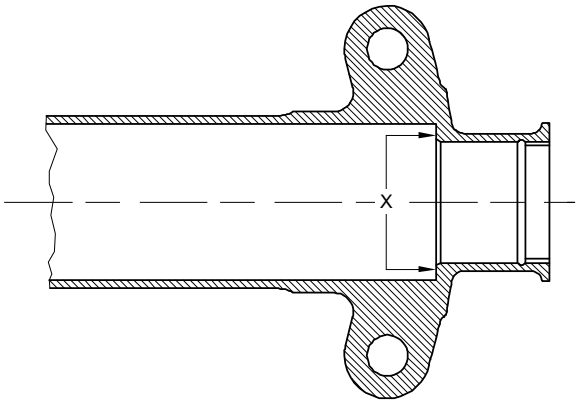


Figure 2-96 (sheet 2 of 3). Tail rotor installation

SECTION A-A



1. Nut
1A. Cotter pin
2. Washer
3. Washer
4. Nut
5. Washer
6. Balancing flange
7. Nut
8. Washer
9. Washer
10. Bolt
11. Boot
12. Nut
13. O-ring
14. Washer
15. Spacer
16. Hub and blades
17. Spacer
18. Boot
19. Bumper
20. Sleeve
21. Bushing
22. Bushing
23. Boot
24. Link
25. Attaching hardware
26. Attaching hardware
27. Scissors, driving, fwd
28. Scissors, driving, aft
29. Slider
30. Bushing
31. Washer, damper
31A. Washer
32. Housing
33. Bushing
34. Bushing
35. Ring nut
36. Bearing
37. Ring nut
38. Lock ring
39. Nut
40. Washer
40A Washer
40B Bumper washer
41. Washer
42. Bolt
43. Lever
44. Bushing
45. Link
46. Attaching hardware
47. Attaching hardware
48. Link
49. Boot
50. Attaching hardware
51. Attaching hardware
52. Lever
53. Lever
54. Shim
55. Pivot
56. Nut
57. Washer, balancing
58. Washer, balancing
59. Pin
60. Cover
61. Shim
62. Packing
63. Bushing
64. Bushing
65. Trunnion
66. Washer, bonded
67. Washer
68. Shim, laminated

Figure 2-96 (sheet 3 of 3). Tail rotor installation

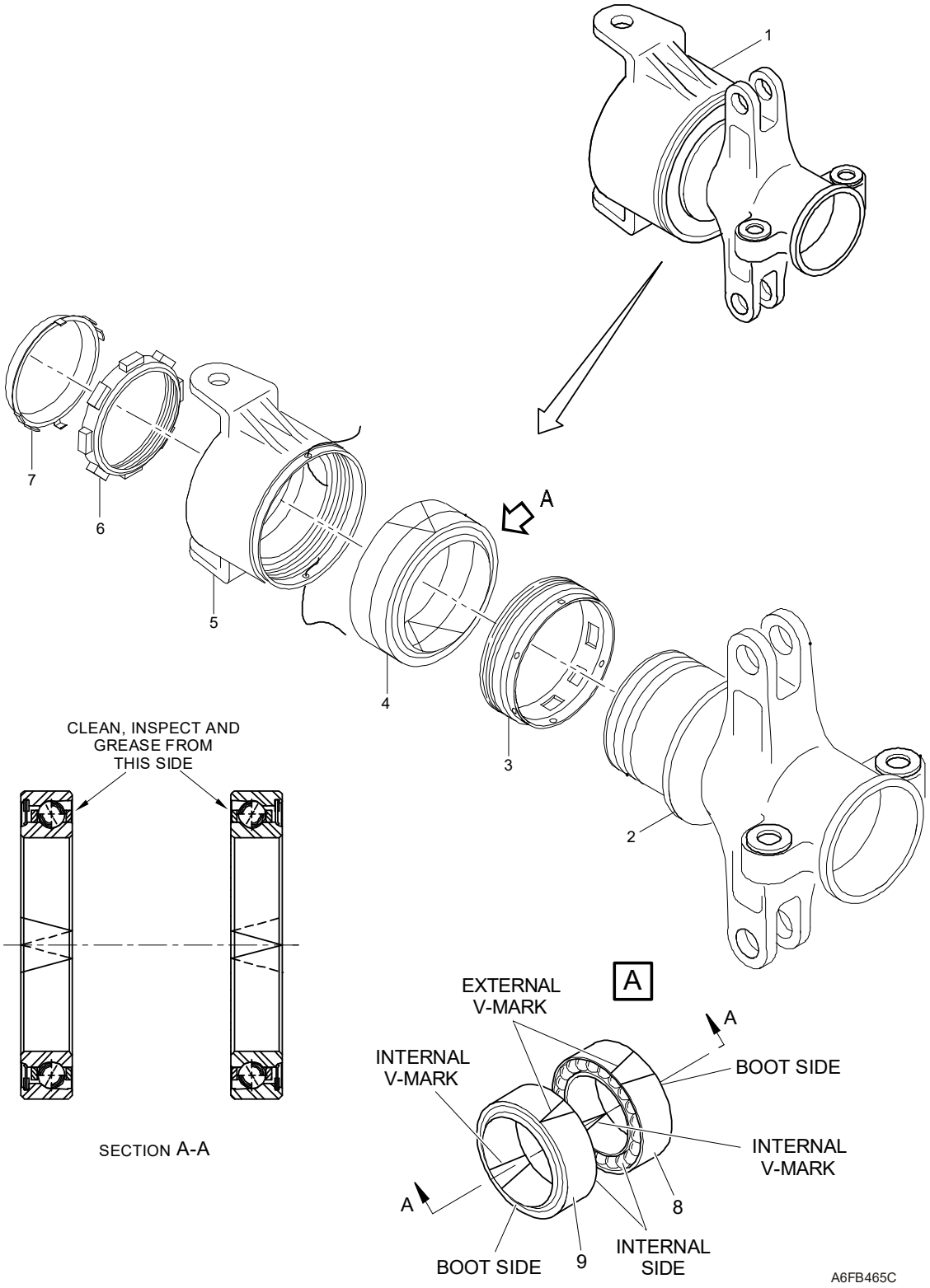
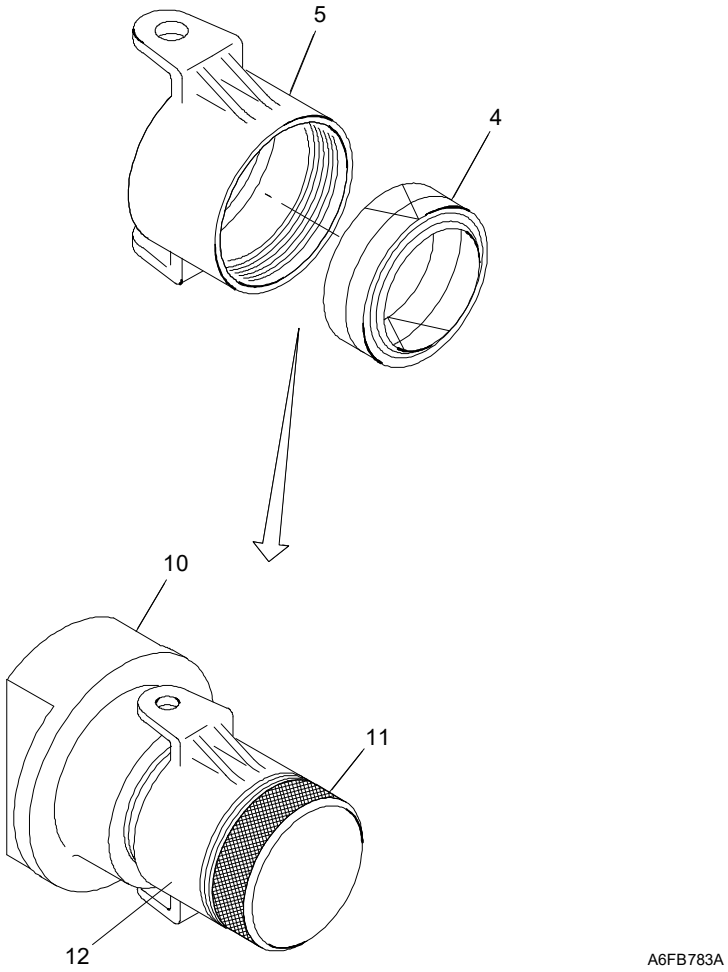


Figure 2-96A (sheet 1 of 5). Housing, duplex bearing and slider assembly



1. Housing and slider assembly
2. Slider assy
3. Ring nut
4. Duplex bearing
5. Housing
6. Ring nut
7. Lock ring
8. Bearing
9. Bearing
10. Base (Part of LSE No 109)
11. Pin (Part of LSE No 109)
12. Housing-bearing assembly
13. Bolt (Part of LSE No 108)
14. Base (Part of LSE No 108)
15. Wrench (Part of LSE No 108)
16. Housing group
17. Barrel (Part of the LSE No 111)
18. Bushing (Part of LSE No 111)
19. Pin (Part of LSE No 111)
20. Housing-slider assembly
21. Wrench (Part of LSE No 107)
22. Base (Part of LSE No 107)
23. Brace
24. Pin

Figure 2-96A (sheet 2 of 5). Housing, duplex bearing and slider assembly

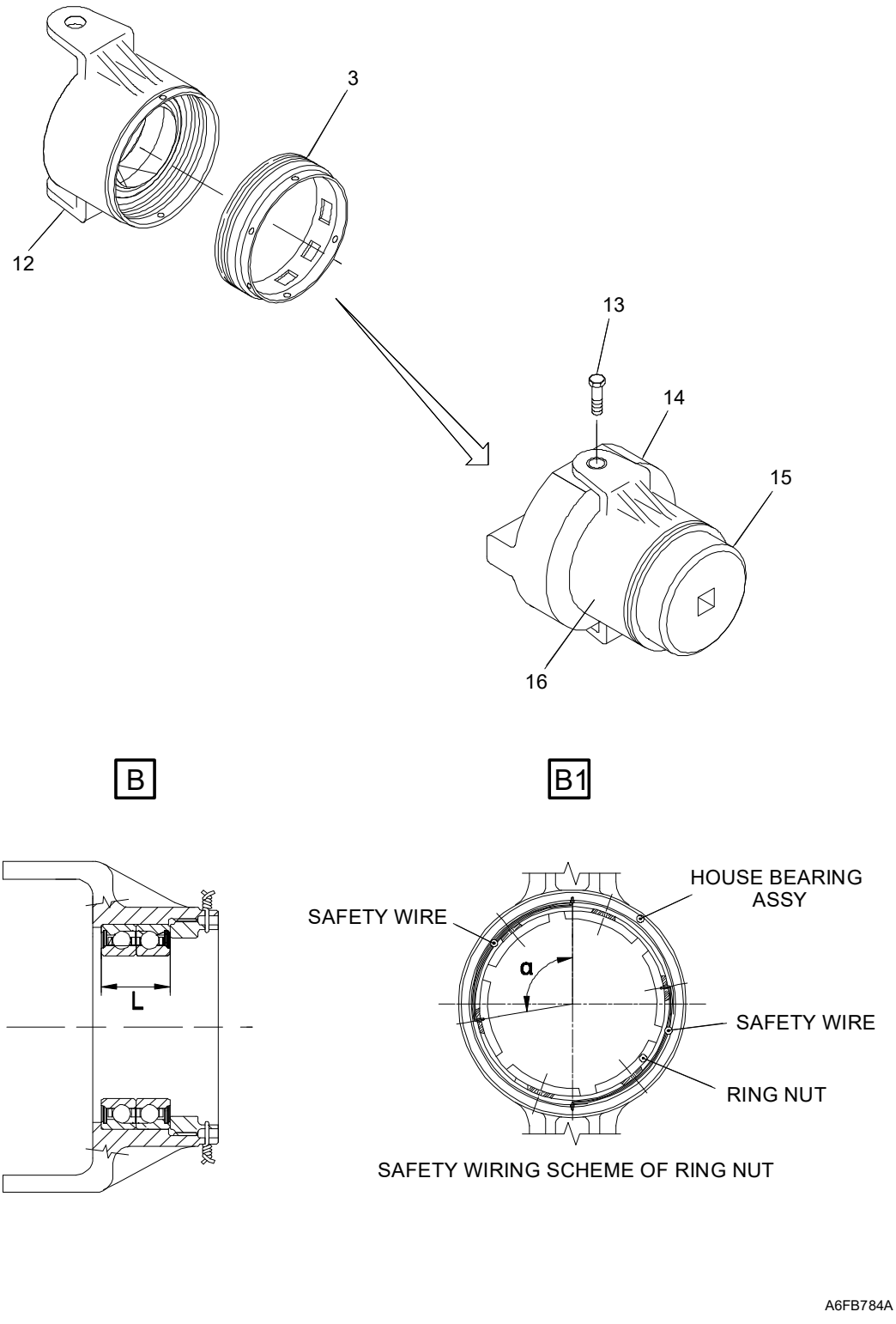


Figure 2-96A (sheet 3 of 5). Housing, duplex bearing and slider assembly

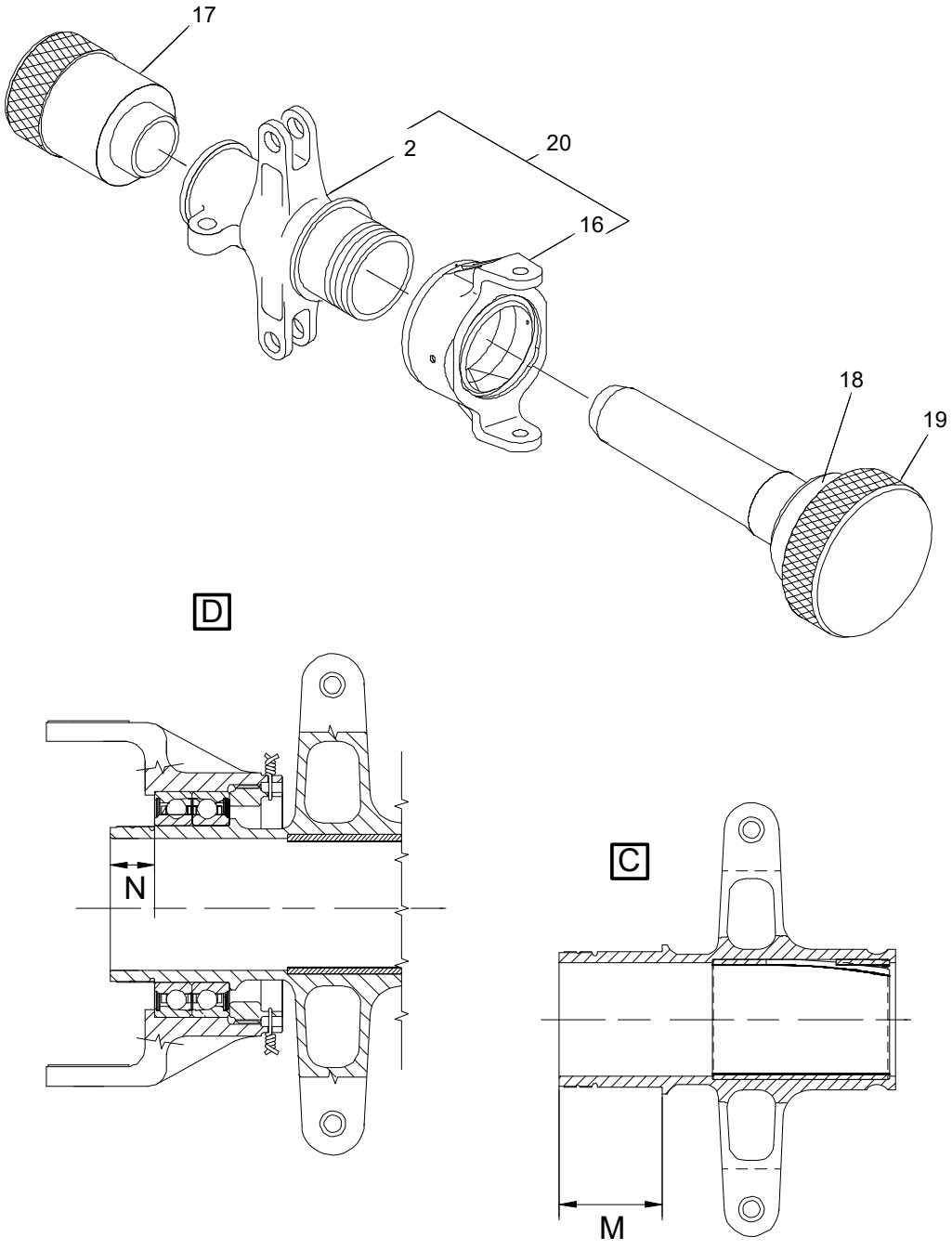


Figure 2-96A (sheet 4 of 5). Housing, duplex bearing and slider assembly

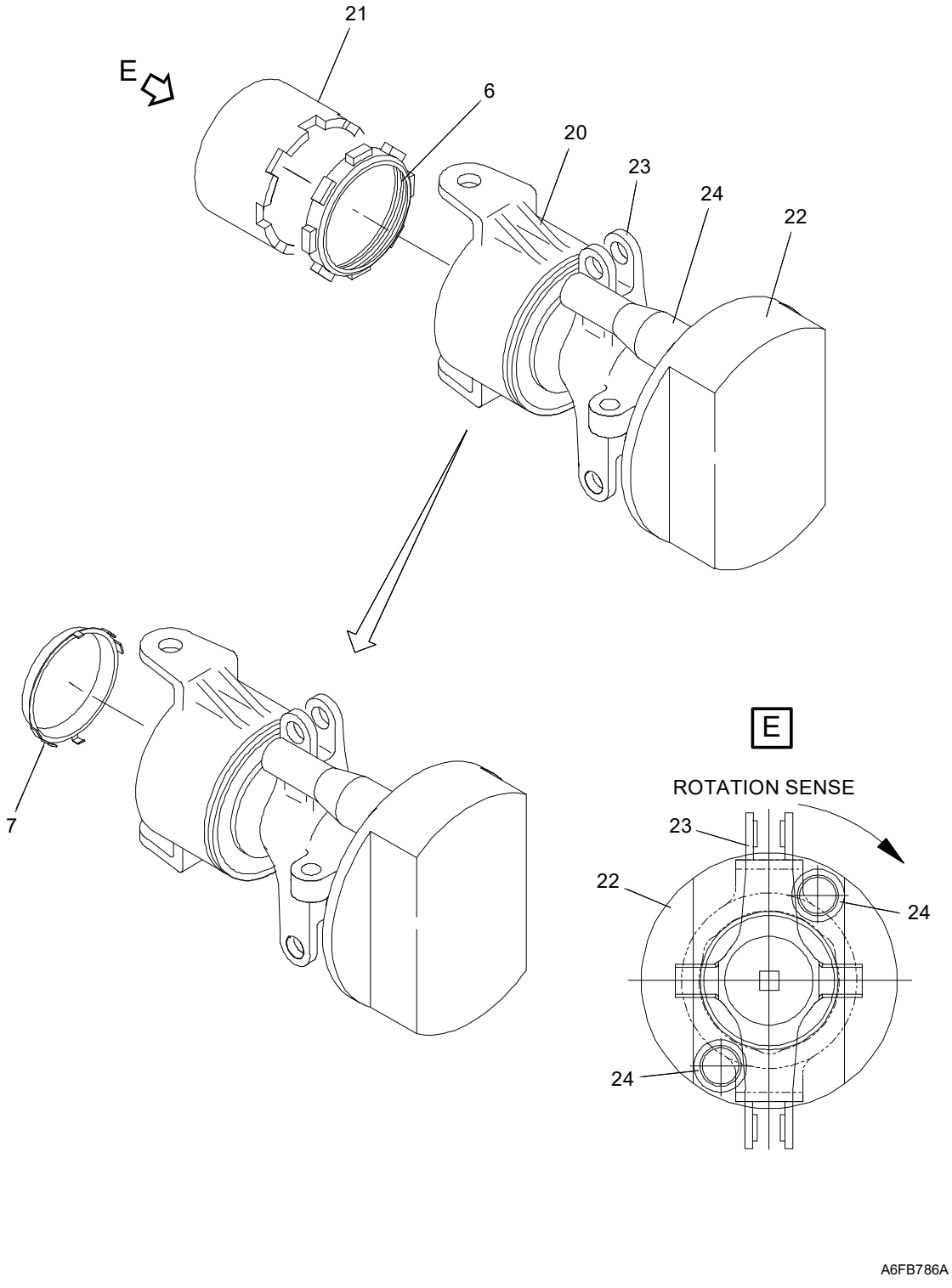


Figure 2-96A (sheet 5 of 5). Housing, duplex bearing and slider assembly

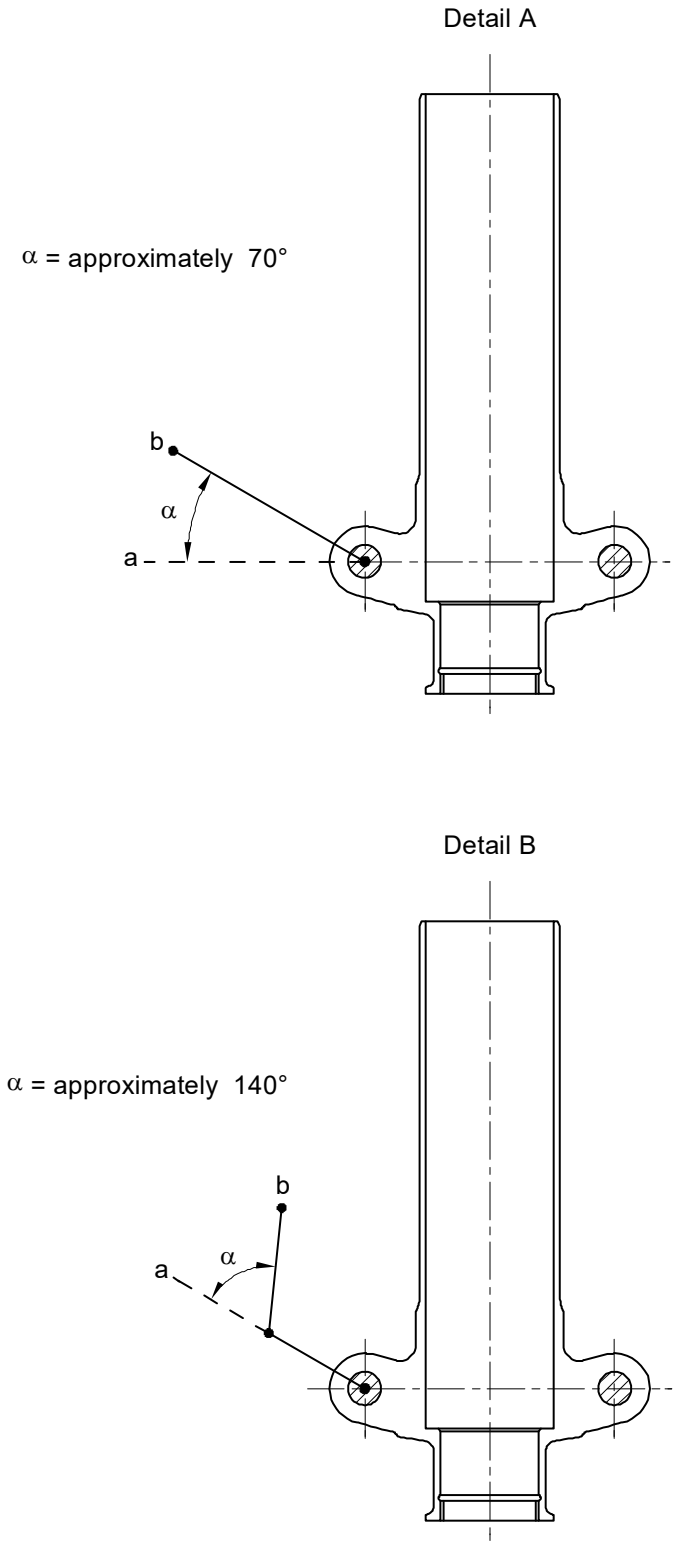


Figure 2-96B. Half-scissors play check