Temporary Maintenance Instruction
TMI109-518 Rev. A

Inspection and Replacement of Damper Attachment Fitting Bearing

A109E / A109S / AW109SP / A119 / AW119MKII Helicopters

The technical content of this document is approved under the authority of DOA nr. EASA.21J.005.

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: July 26th, 2022.

2021-07-26

Introduction

The purpose of this TMI is to provide a new torque limit for the damper attachment fitting (P/N 109-0111-07) bearing torque check, and to align the damper attachment fitting bearing replacement procedure for all aircraft models.

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

DATA MODULE CODE	DATA MODULE TITLE	MODEL
MM 62-21-24 and 62-21-28	Maint Rotor Head	A119/AW119MKII
OM 62-21-07	Damper Attachment Fitting	A119/AW119MKII
MM 62-21-14A	Main Rotor Head	A109E
OM 62-21-07	Damper Attachment Fitting	A109E
AMP 0B-A-62-21-00-00A-283A-B	Main rotor head installation - Components – Special regular inspection	A109S/AW109SP
CR&OP 0B-A-62-21-02-02B-921A-C	Lag damper attachment fitting - Spherical bearing – Replacement (remove and install a new item)	A109S/AW109SP

The content of this TMI will be endorsed within the applicable Maintenance Manual and Component Repair & Overhaul Publication at the earliest opportunity.

Rev. A of this TMI is published in order to extend the expiration date.

Inspection and Replacement of Damper Attachment Fitting Bearing

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References

Table 1 References

Data Module	Data Module/Technical Publication
09-A-00-50-00-00A-013A-D	Material data information publication - Numeric index
0B-A-60-20-01-00A-351A-C(1)	Disassembled metal components – Test for surface cracks with dye penetrant
0B-A-GF-18-00-00A-066A-A(1)	Tool set, MR damper attachment fitting bearing replacement (GF-18-00) – Support equipment and tools data

(1) Applicable to A109S/AW109SP Helicopters. For the other helicopter models refer to the applicable Section or Data Module of the Maintenance Manual.

Preliminary requirements

Required conditions

Table 2 Required conditions

Condition	Data Module/Technical Publication
None	

Support equipment

Table 3 Support equipment

Nomenclature	Identification No.	Qty
Spherical Bearing Installation Tool Set(1)	895-3101-36-101	1
Spherical Bearing Staking Tool Set(1)	895-3101-37-109	1
Spherical Bearing Removal and Breakout Check Tool Set(1)	895-3101-38-101	1
Magnifying lens, 10 power	Local Supply	1

(1) Part of MR damper attachment fitting bearing replacement Tool Set, P/N 895-3101-35-107

Supplies

Table 4 Supplies

Nomenclature	Identification No.	Qty
Abrasive Pads	C015	AR
Corrosion Inhibitor	C003	AR
Cleaning Solvent	C010	AR
Aliphatic Naphtha	C059	AR
Retaining Compound	C227	AR
Lubricating Oil	C228	AR
Soft, lint-free Cloth	C011	AR

Chemical Conversion Coating	C206	AR
Conductive Paint	C198	AR
Polyurethane Lacquer	C138	AR
Masking Tape	C064	AR
Chemical Conversion Coating	C293	AR
Fine India Stone	C189	AR

Spares

Table 5 Spares

Nomenclature	Identification No.	Qty
Bearing	109-8101-49-1	AR
Bearing	109-8101-49-5	AR
Bearing	109-8101-49-109	AR

Safety conditions

WARNING

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 inhibitor (C003)
- Solvent, cleaning (C010)
- Aliphatic naphtha (C059)
- Retaining compound (C227)
- Lubricating oil (C228).
- Chemical conversion coating (C206)
- Paint, conductive (C198)
- Polyurethane Lacquer, polyurethane (C138)
- Chemical conversion coating (C293).

Procedure

Note

(1) Applicable to A109S/AW109SP Helicopters. For the other helicopter models refer to the applicable Section or Data Module of the Maintenance Manual.

1. **Inspect the damper attachment fitting bearing for freedom of movement.**

1.1. No binding of the ball is permitted.

1.2. In case of doubt about the rotational torque check, refer to step 2 of this instruction. The maximum rotational torque is 2 Nm.

1.3. If the rotational torque is out of limits, replace the bearing. Refer to step 2 of this instruction.

Note 1

Repair of the damper attachment fitting P/N 109-0111-07-101, -105, -109 and -113 is not permitted. permitted. Replace if you find rotational torque out of limits.

Note 2

The replacement procedure that follows is applicable to the damper attachment fitting P/N 109-0111-07-117 only.

2. Replace the damper attachment fitting bearing as follows:

2.1. Heat the lag damper attachment fitting in an oven to a temperature of 60° thru 70° C (140° thru 158° F).

2.2. Push out the unserviceable spherical bearing with the pusher and base tool P/N 895-3101-38-101. Refer to Fig 1. Be careful to prevent damage to the lag damper attachment fitting.

2.3. Clean the spherical bearing seat with a soft, lint-free Cloth (C011) and Cleaning Solvent (C010).

2.4. Examine the spherical bearing seat with a Magnifying lens, 10 power (Local supply) for scoring, seizure, corrosion and other damage.

2.5. Replace the lag damper attachment fitting if you find damage in the bearing seat.

Note

Light scratches and galling that you can remove with the Abrasive Pads (C015) are not cause of the part replacement.

2.6. Perform a dimensional check of the spherical bearing seat. The required dimension is 39.682 thru 39.695 mm (1.5623 thru 1.5628 in).

2.7. Perform a dye penetrant test for surface cracks on the lag damper attachment fitting. Refer to 0B-A-60-20-01-00A-351A-C(1).

2.8. If the lag damper attachment fitting has no defects continue with the steps that follow. Replace part if cracks are observed.

2.9. If necessary, apply Corrosion inhibitor (C003) to the aluminium alloy surfaces.

2.10. Check the bearing rotational torque (as illustrated in Fig 6), prior to the new spherical bearing installation, using a suitable tool or equivalent torquemeter; measured torque must be 1,0 Nm maximum.

CAUTION

Do not contaminate the liner of the spherical bearing with the Aliphatic Naphtha (C059).

2.11. Clean the outside diameter of the new spherical bearing with a soft, lint-free Cloth (C011) and Aliphatic Naphtha (C059).

2.12. Examine the external diameter of the spherical bearing for damage. Be careful with the edges for presence of burrs. If necessary, smooth off sharp edges of races with fine India Stone (C189).

CAUTION

Do not heat the lag damper attachment fitting more than the permitted temperature of 70° C (158° F).

2.13. Heat the lag damper attachment fitting to 60° thru 70° C (140° thru 158° F).

2.14. Apply a light layer of Retaining Compound (C227) on the external diameter of the spherical bearing and to its seat.

Note

You must push and stake the spherical bearing while the layer is wet.

2.15. Push the spherical bearing into its seat with the pusher and base tool P/N 895-3101-36-101 and an applicable press. Refer to Fig 2. Make sure that the bearing is centered equally from each side of the part.

2.16. Clean the squeeze-out layer from the spherical bearing and part surfaces with a soft, lint-free Cloth (C011) and Cleaning Solvent (C010).

2.17. Apply Lubricating Oil (C228) or equivalent to the pusher tip tool.

2.18. Stake one side of the spherical bearing with the anvil. To do this, you must apply a gradually increasing load to reach 11500 thru 14000 kg with the staking tool set, P/N 895-3101-37-109. Refer to Fig 3.

Note 1

If you put the spherical bearing manually into its seat, you must stake it to the high end of value

(14000 kg). If you put the spherical bearing into its seat with a press, you must stake it to the low end of the value (11500 kg).

Note 2

A load that is not sufficient prevents the correct formation of the countersunk lip. This effect impacts the breakout check.

Note 3

Too much load causes damage to the spherical bearing seat and to the bearing outer race. This effect causes an increase of the spherical bearing rotational torque to unsatisfactory values.

2.19. Perform a visual inspection of the spherical bearing for possible damage. No damages are allowed.

2.20. Perform a visual inspection of the lag damper attachment fitting for possible damage. No damages are allowed.

2.21. Stake the other side of the spherical bearing with an anvil as per Step 2.17 and Step 2.18. Refer to Fig 4.

2.22. Inspect the staked lip (Fig 5) as follows:

2.22.1. Inspect surface (A) for cracks and delaminations.

2.22.2. Measure the clearance between the seat and the countersunk lip along the full circumference with a feeler gauge of thickness 0.05 mm (0.002 in).

Note

It is not possible to put a feeler gauge of thickness 0.05 mm (0.002 in) in a correctly staked bearing but it permitted that the feeler gauge enters up to a maximum of 40% of the circumference.

2.22.3. Make sure that dimension B, the edge of the countersunk lip and the external edge of the seat, is flush within 0.25 mm (0.01 in), above and below.

2.23. Locally make a tool (Fig 6). Examine the spherical bearing rotational torque. Make sure that the uniball moves smoothly with a torque less than 2 Nm. Make sure that the external race of the spherical bearing does not move in part.

2.24. If the staking does not meet the above requirements of Step 2.22 and Step 2.23 do as follows:

2.24.1. Re-stake the spherical bearing on the two sides with an additional load of 500 kg.

Note

If you get another incorrect result, you must do the operation again. Add 500 kg each time until you obey the inspection rules. The total load must not be more than 14000 kg.

2.24.2. Inspect the staked lip again as per Step 2.22.

2.25. Clean the staked area with a soft, lint-free Cloth (C011) and Cleaning Solvent (C010).

2.26. After you have staked the area, seal the joint between the lag damper attachment fitting and the countersunk lip of the spherical bearing with Retaining Compound (C227).

Note

Leave the part for at least 24 hours at ambient temperature 21° thru 23° C (70° thru 74° F) before you do the breakout check.

2.27. Do a breakout check of the staked spherical bearing. To do this you must apply a load of 700 kg with the pusher and the base tool, P/N 895-3101-38-101. Refer to Fig 6. Make sure that the spherical bearing does not move in its seat. Replace the spherical bearing if you find staked lip yielding or distortion.

2.28. After you have staked the area, verify that you can turn the uniball of the spherical bearing with a torque of 2 Nm maximum.

2.29. Mark the staked area of the lag damper attachment fitting and the spherical bearing with the blue, yellow and green dots after the satisfactory results of the inspection (Step 2.22, Step 2.23 and Step 2.27).

2.30. Apply the protective finish as follows:

2.30.1. Apply Chemical Conversion Coating (C206) or (Chemical Conversion Coating (C293).

2.30.2. Put the Masking Tape (C064) on the surfaces where the paint is not necessary. Refer to NP symbol on Fig 7.

Note

Do not apply the paint on the mating surfaces, the attaching hardware holes and the bushing seats. In the area of electronic marking, use a transparent polyurethane lacquer.

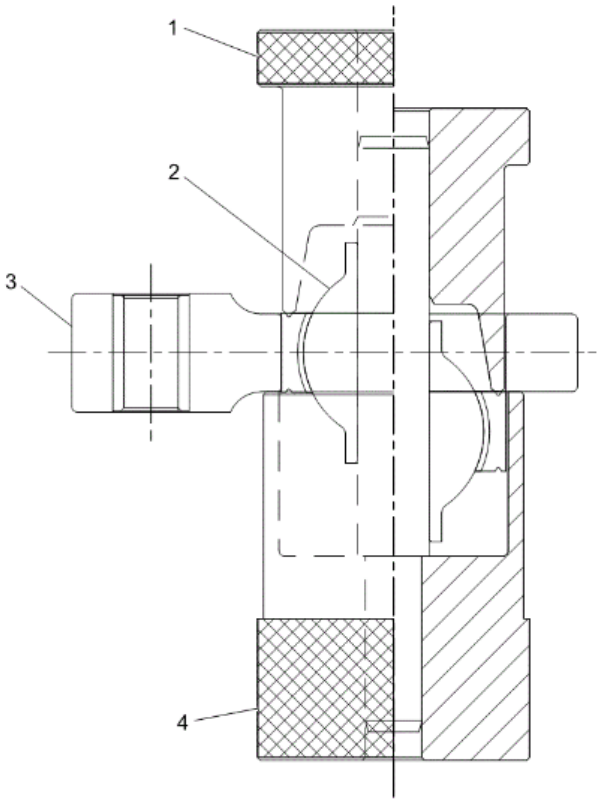
2.30.3. Apply one layer of Conductive Paint (C198).

2.30.4. Apply two layers of Polyurethane Lacquer (C138), colour No. 17178 Fed. Std. 595.

2.30.5. Remove the masking tape.

Requirements after job completion

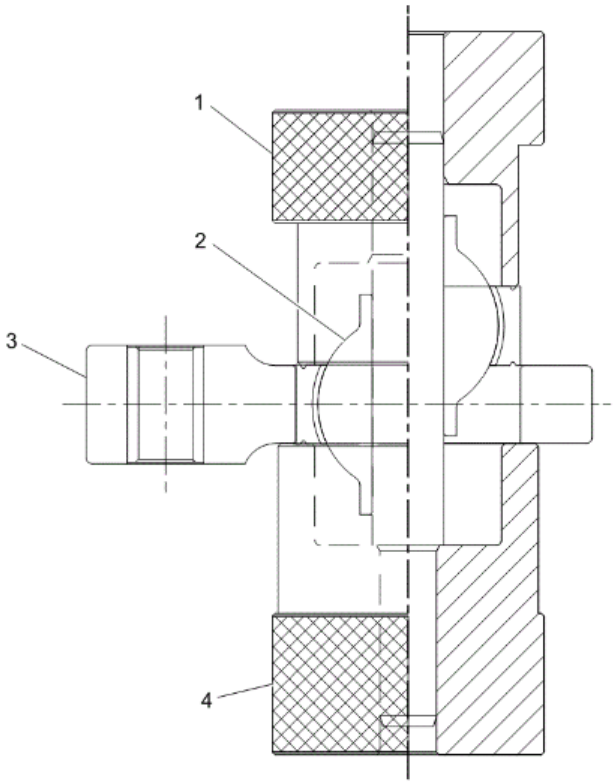
1. Remove all the tools and the other items from the work area. Make sure that the work area is clean.



1. Pusher P/N 895-3101-38-107 (*)
2. Spherical bearing
3. Damper attachment fitting CP
4. Base assy P/N 895-3101-38-103 (*)

(*) Part of tool set (P/N 895-3101-38-101).

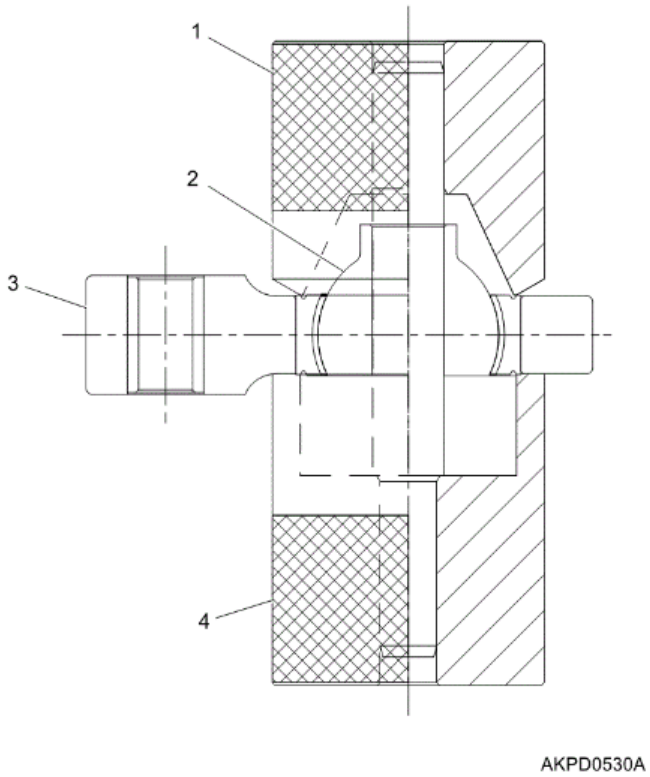
Figure 1 – Removal of the Spherical Bearing and Breakout Check.



1. Pusher P/N 895-3101-36-109 (*)
2. Spherical bearing
3. Damper attachment fitting CP
4. Base assy P/N 895-3101-36-103 (*)

(*) Part of tool set (P/N 895-3101-36-101).

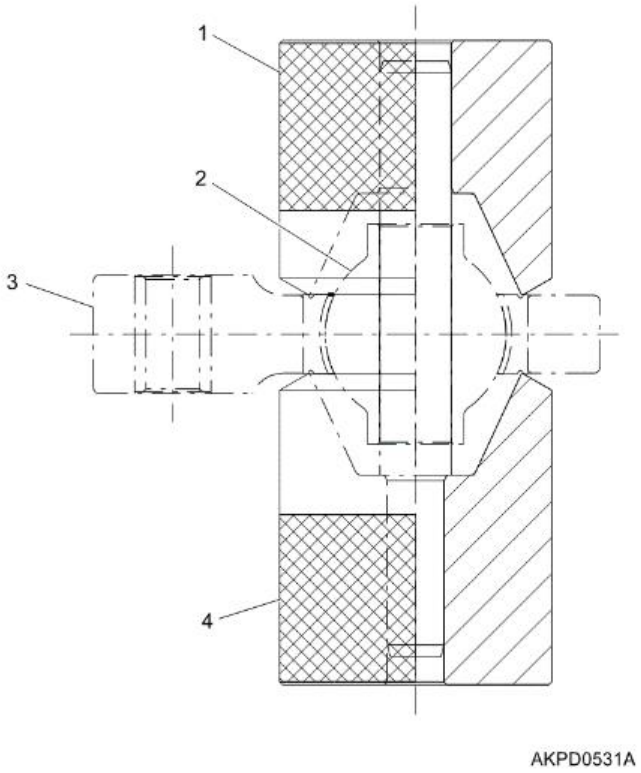
Figure 2 – Installation of the Spherical Bearing.



1. Pusher P/N 895-3101-37-115 (**)
2. Spherical bearing
3. Damper attachment fitting CP
4. Base assy P/N 895-3101-36-103 (*)

(*) Part of tool set (P/N 895-3101-36-101).
(**) Part of tool set (P/N 895-3101-37-109).

Figure 3 – Spherical Bearing Staking of First Side.



1. Pusher P/N 895-3101-37-115 (*)
2. Spherical bearing
3. Damper attachment fitting CP
4. Base assy P/N 895-3101-37-111 (*)

(*) Part of tool set (P/N 895-3101-37-109).

Figure 4 – Spherical Bearing Staking of Second Side.

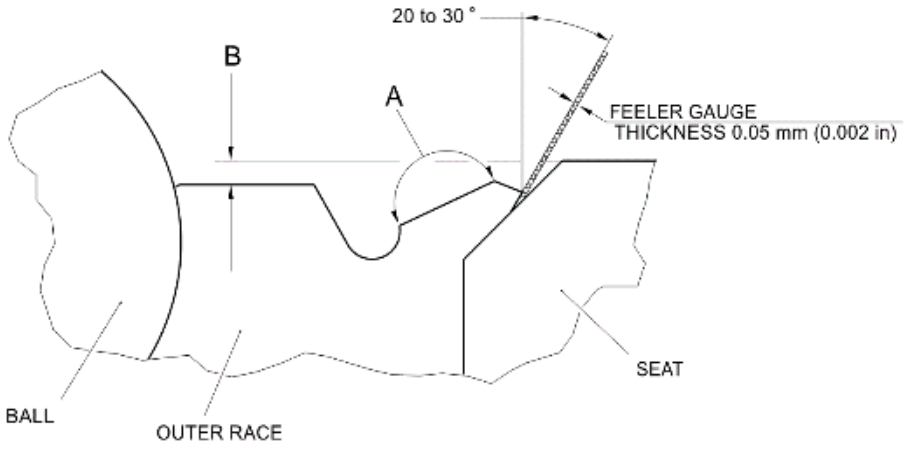


Figure 5 – Spherical Bearing Staked Lip Inspection.

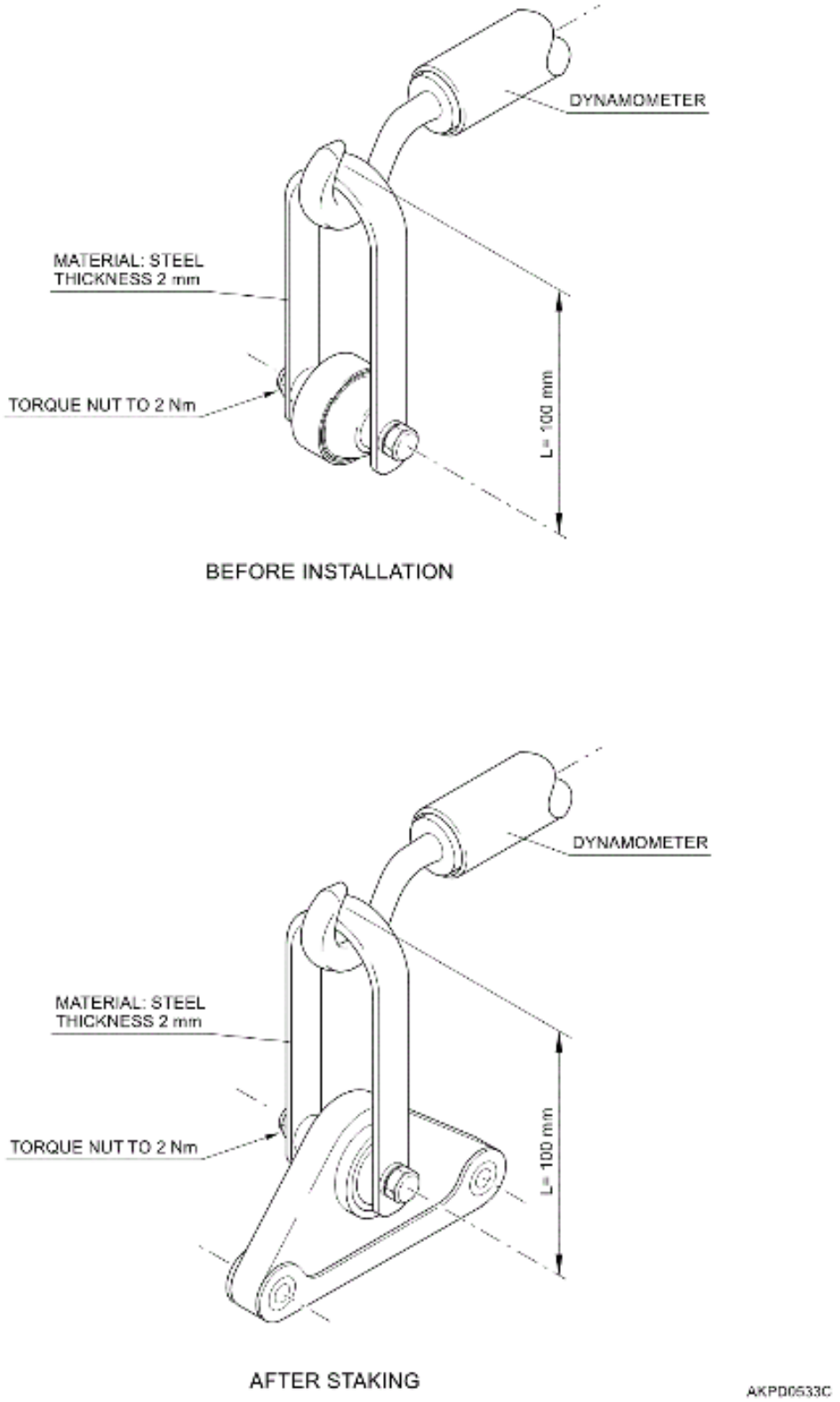


Figure 6 – Spherical Bearing Rotational Torque Check.

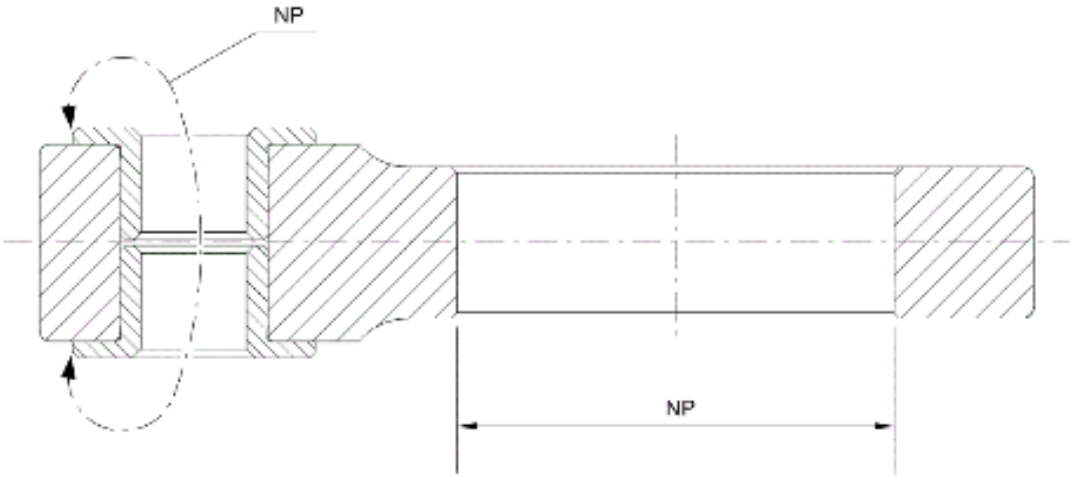


Figure 7 – No Paint Areas.