
A350 SLAT PCU ATA 27

RTW LINDENBERG 2022

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Liebherr-Aerospace Lindenberg

AGENDA

- Overview
- Component Description
- Investigation and Root Cause
- Way Forward
- Timeline
- PCU: VSBs and related PNs

A350 SLAT PCU ATA 27 – RTW
LINDENBERG 2022

OVERVIEW



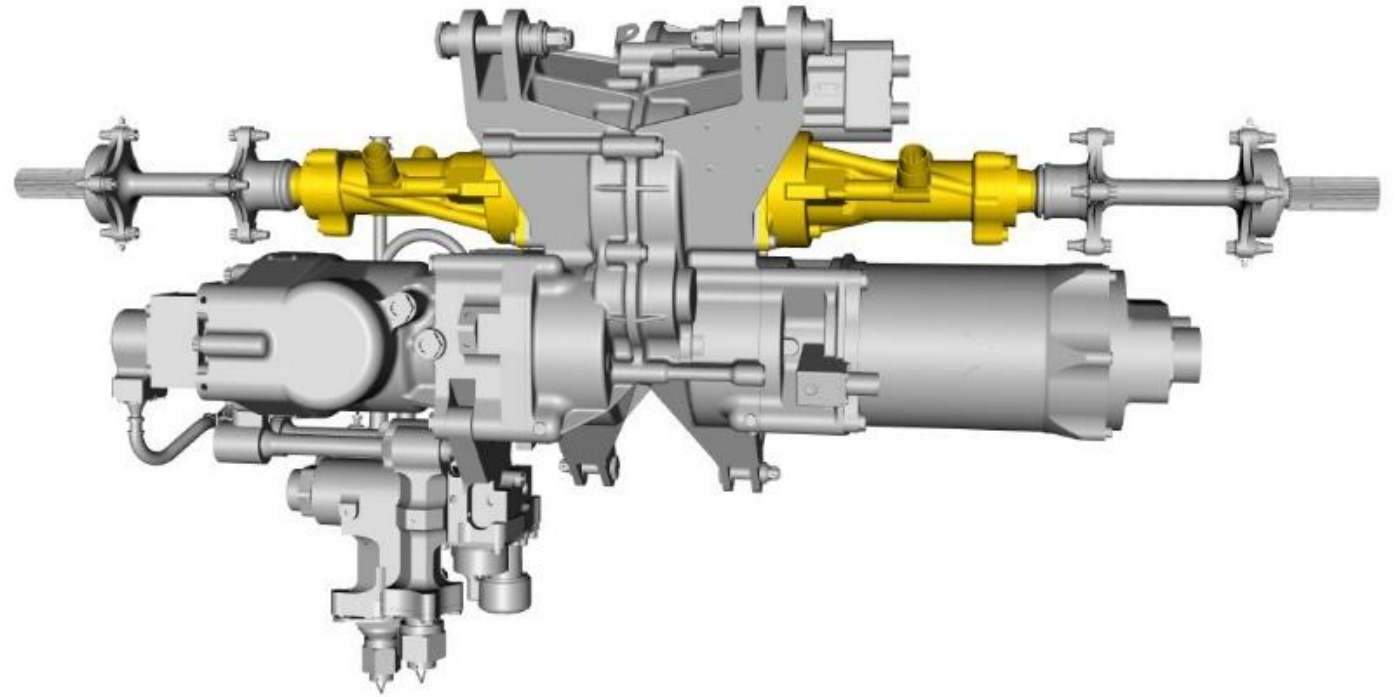
COMPONENT

A350 PCU
PN 4785A0000

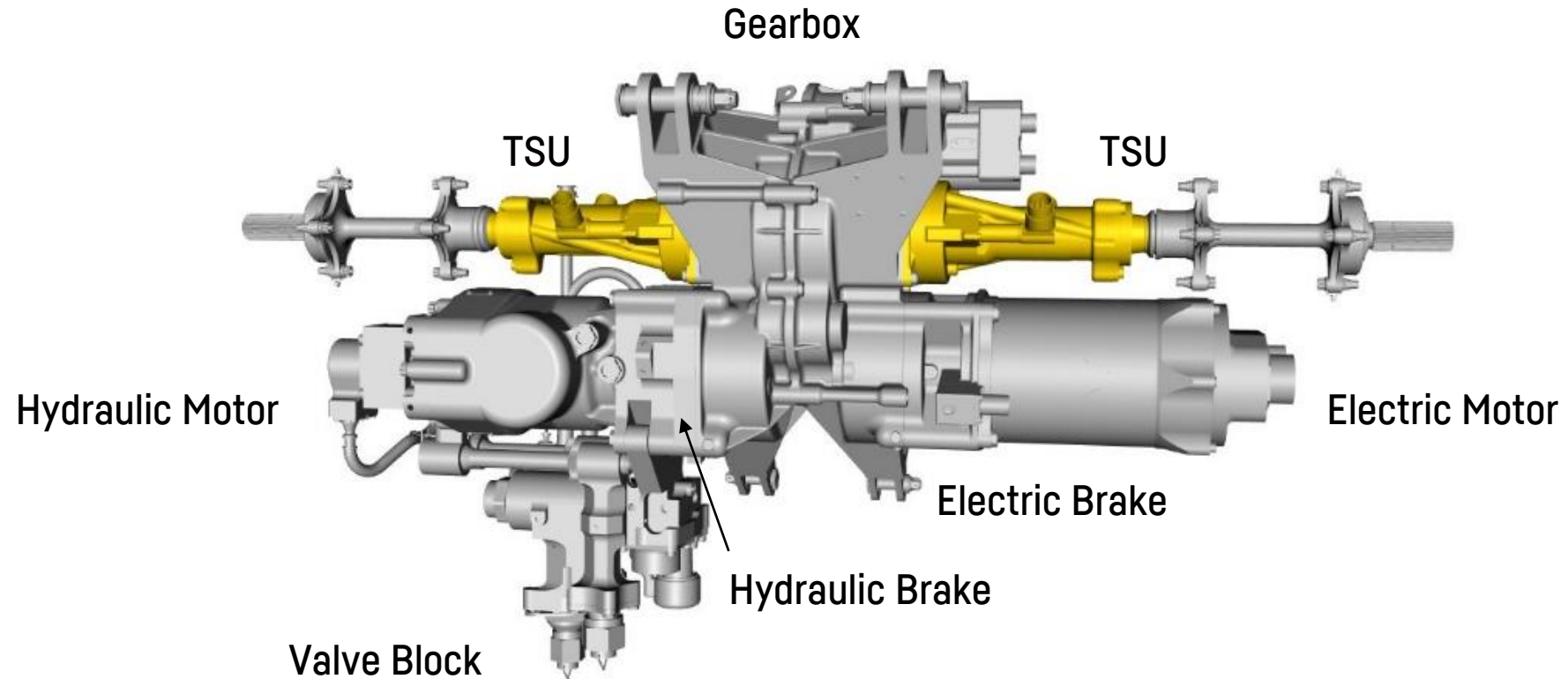
OVERVIEW

SLAT JAM

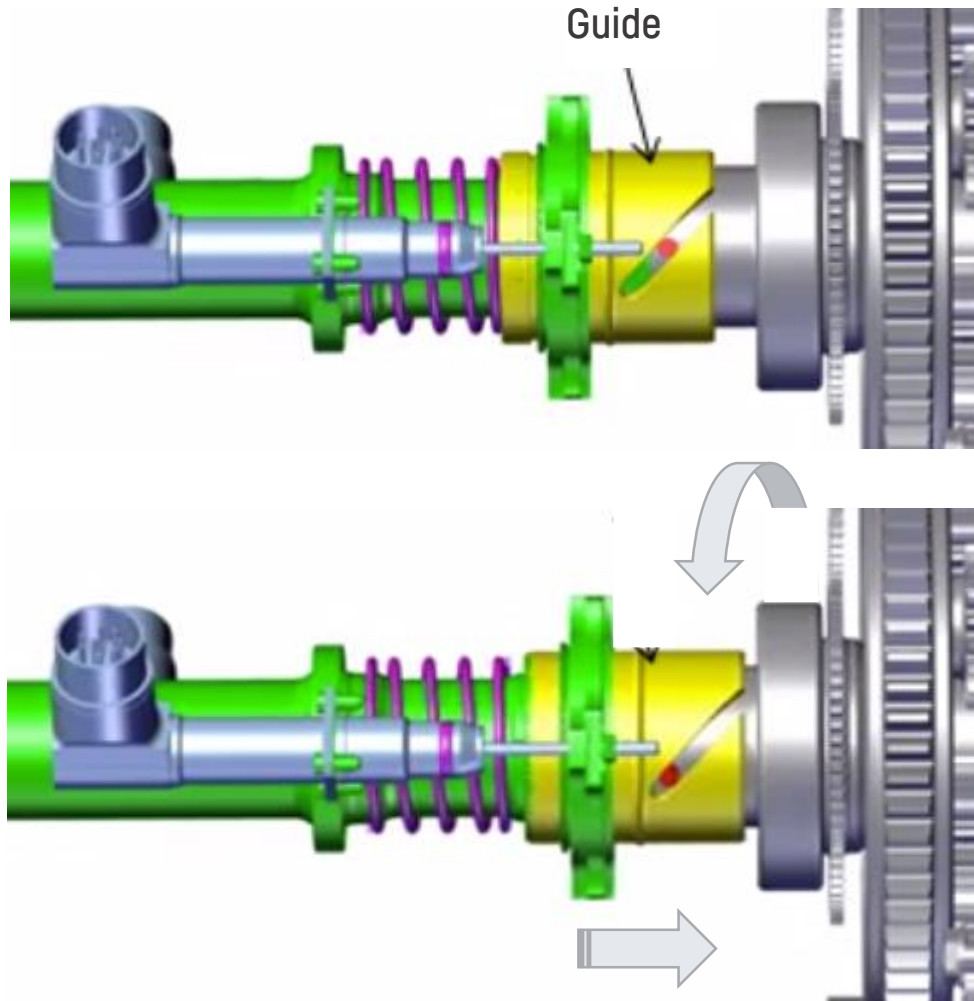
TORQUE SENSOR UNIT



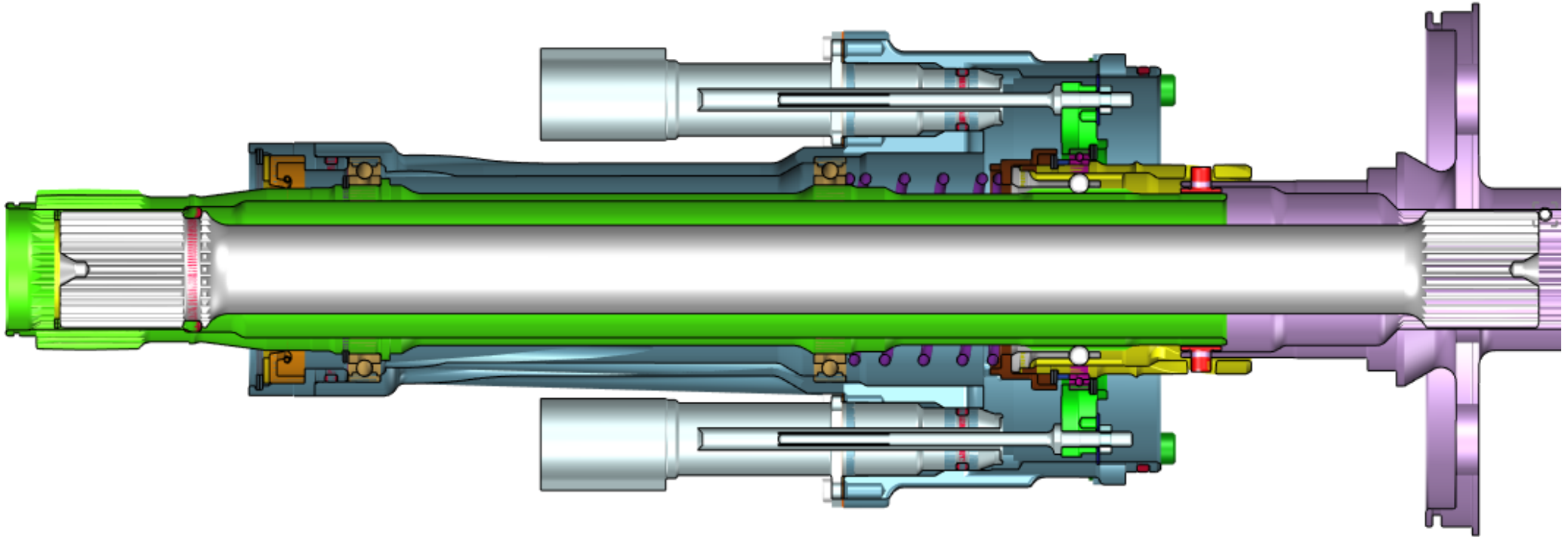
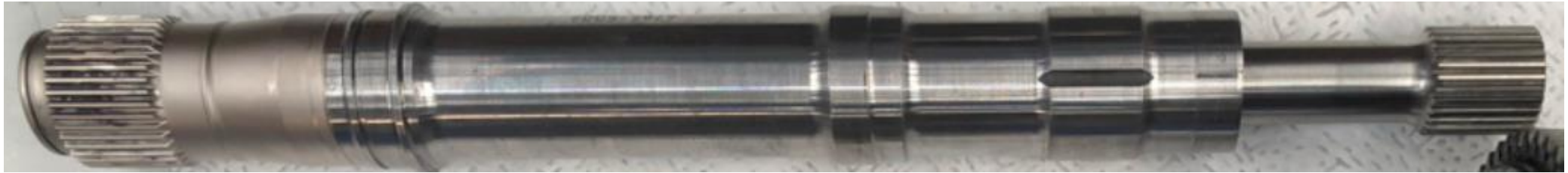
DESCRIPTION: A350 PCU



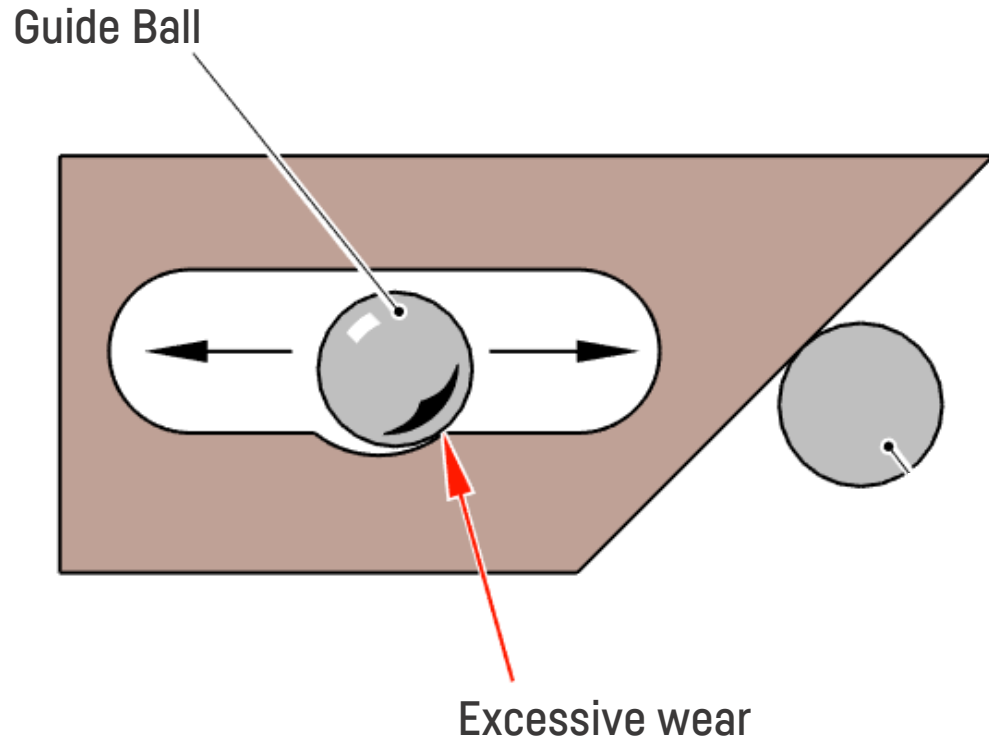
INVESTIGATIONS & ROOT CAUSE



INVESTIGATIONS & ROOT CAUSE



INVESTIGATIONS & ROOT CAUSE

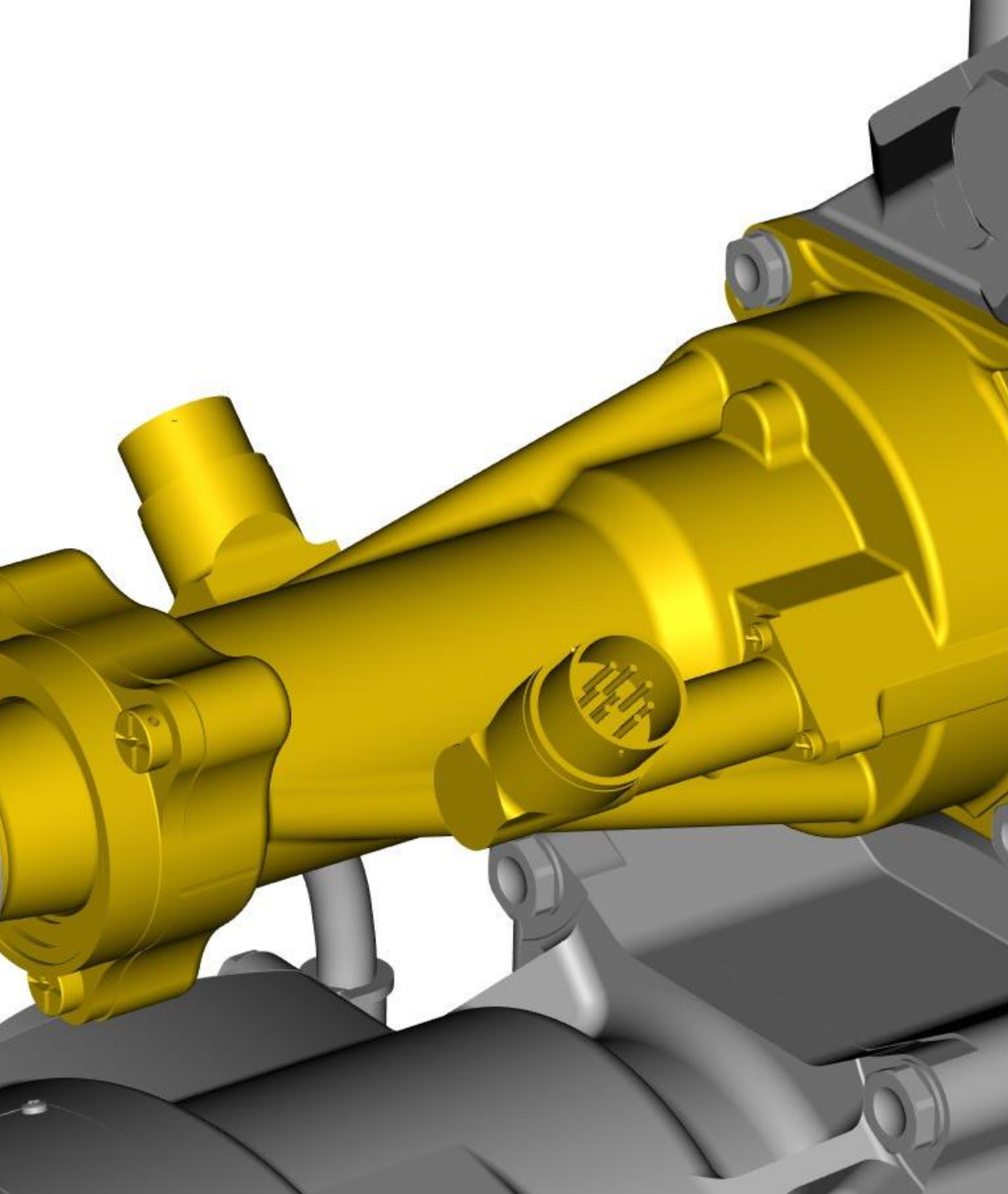


INVESTIGATIONS & ROOT CAUSE

Root Cause Analysis

- Wear was found in the drive shaft groove.
- TSU may not operate correctly when the wear has exceeded a critical limit.





A350 SLAT PCU ATA 27 – RTW LINDENBERG 2022

WAY-FORWARD

Solution

New PCU 4785A0000-06 improved with wear resistance

In-Service Strategy in accordance to Airbus AOT GSE (on-wing TSU health tester) used to monitor until implementation of the modification.

CUSTOMER SERVICES DIRECTORATE
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31700 BLAGNAC FRANCE
TELEPHONE + 33 (0)5 61 93 33 33

AIRBUS

ALERT OPERATORS TRANSMISSION - AOT

SUBJECT: ATA 27 – Prevention of Slat transmission shaft rupture

AIRCRAFT TYPE: A350

OUR REF.: A27P015-20 Rev 01 dated 03-SEP-2020

OUR PREVIOUS REF.: A27P015-20 Rev 00 dated 20th JULY 2020

0. REASON FOR REVISION

This AOT is revised in order to:

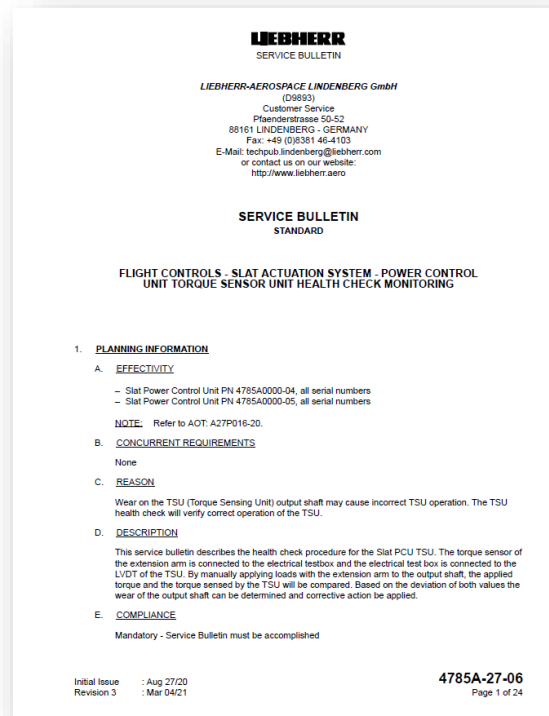
- align applicability with Airworthiness Directive (AD) 2020-0163R1
- introduce an alternate method for the Torque Sensing Unit (TSU) Health Check via use of Vendor (Liebherr) specific tool

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WAY-FORWARD: TSU Health Check Monitoring

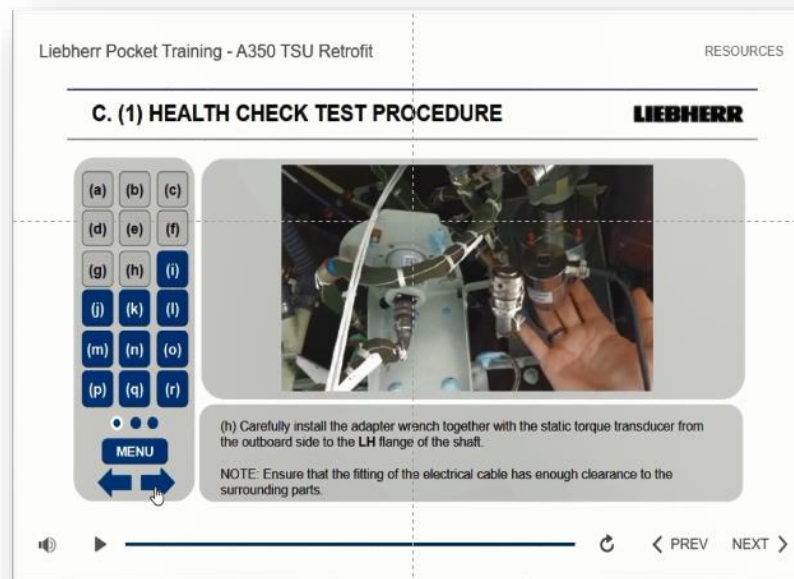
VSB for Health Check Monitoring

- Data recorded for evaluation
- Corrective actions can be applied

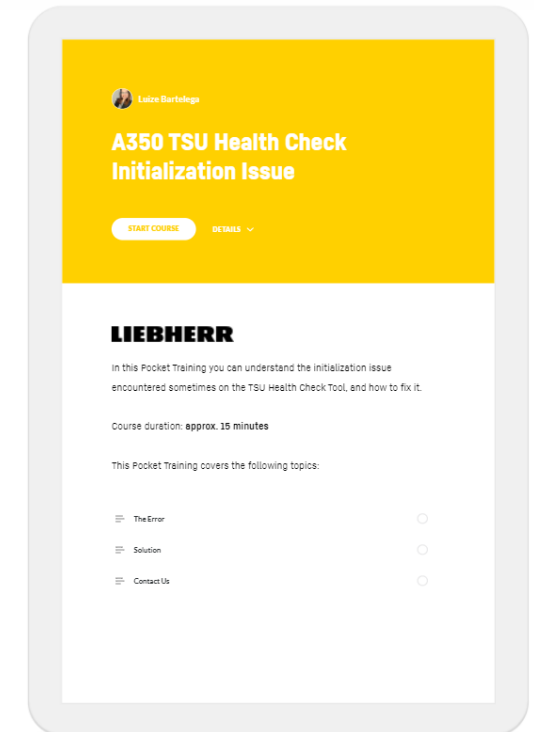


Pocket Training – VSB Health Check Monitoring

Videos and Pictures for each step of the VSB.

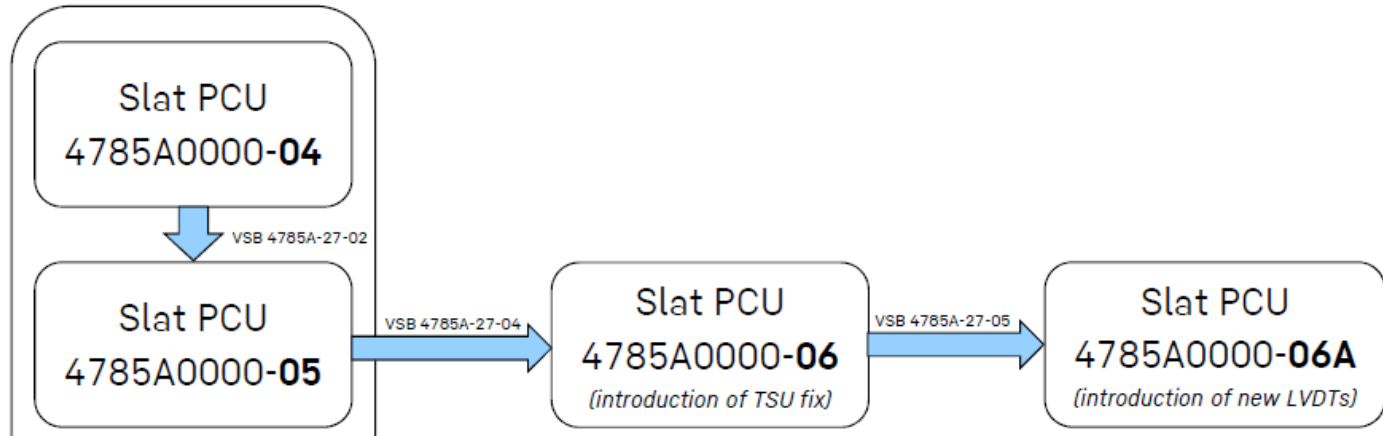
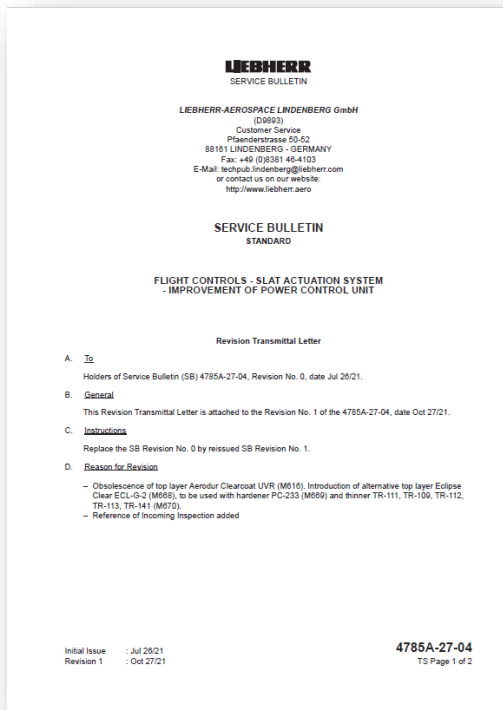


Pocket Training – TSU Health Check Initialization Issue



WAY-FORWARD: Retrofit

VSB 4785A-27-04 Improvement of PCU To PN 4785A0000-06

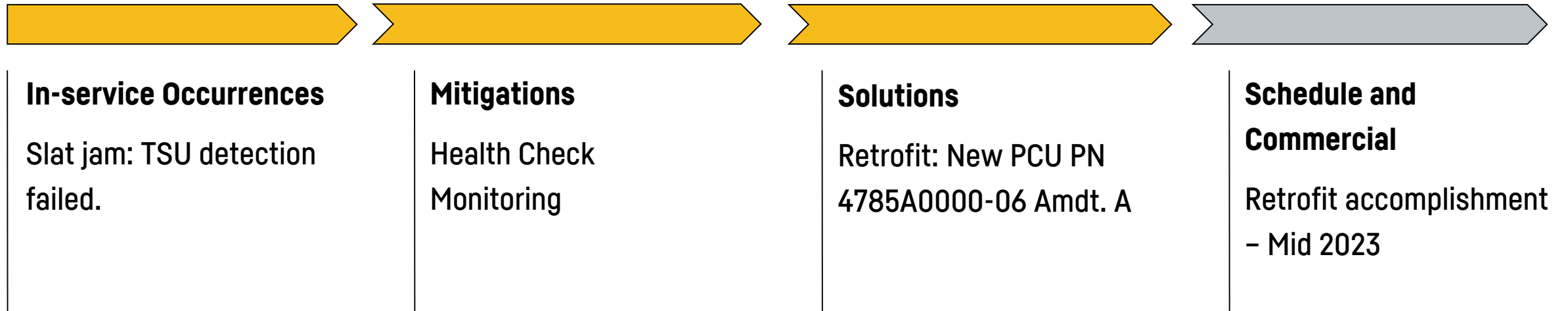


Status of Retrofit

PCUs Affected	PCUs Retrofitted	Retrofit Completion
433	231	52%

Modified to 4785A0000-06 Amdt A

TIMELINE



Update

Due to successfully completed Endurance Test, release for PNRs 4785A0000-06 Amdt. A increased to full life:

- 30.000 FC for A350XWB-800/-900 and A350XWB-1000
- 35.000 FC for A350XWB-900 Domestic

QUESTIONS AND COMMENTS

A350 MOVING DAMPER

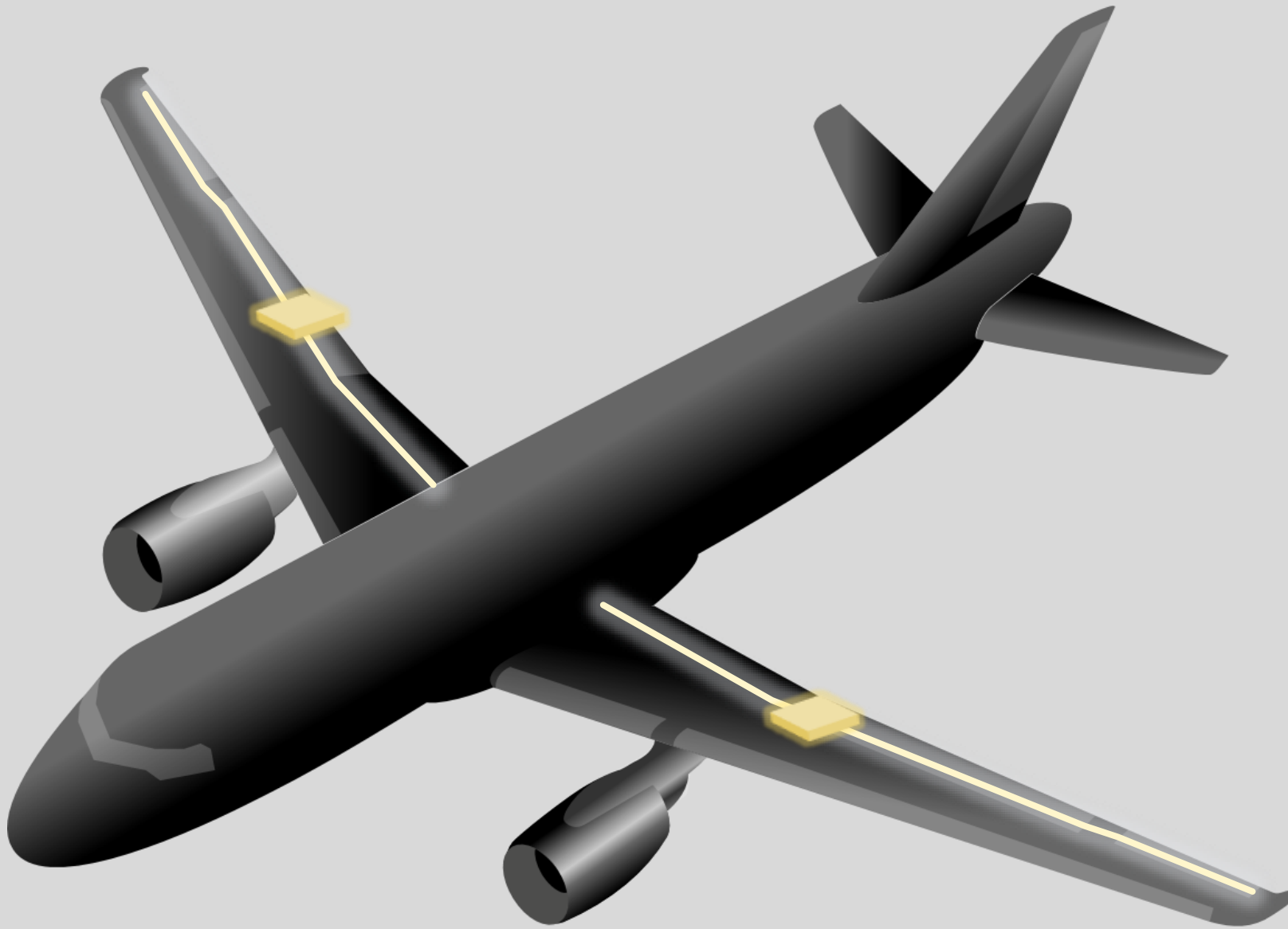
RTW 2022

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A350 MOVING DAMPER ATA 27 – RTW
LINDENBERG 2022

OVERVIEW



COMPONENT

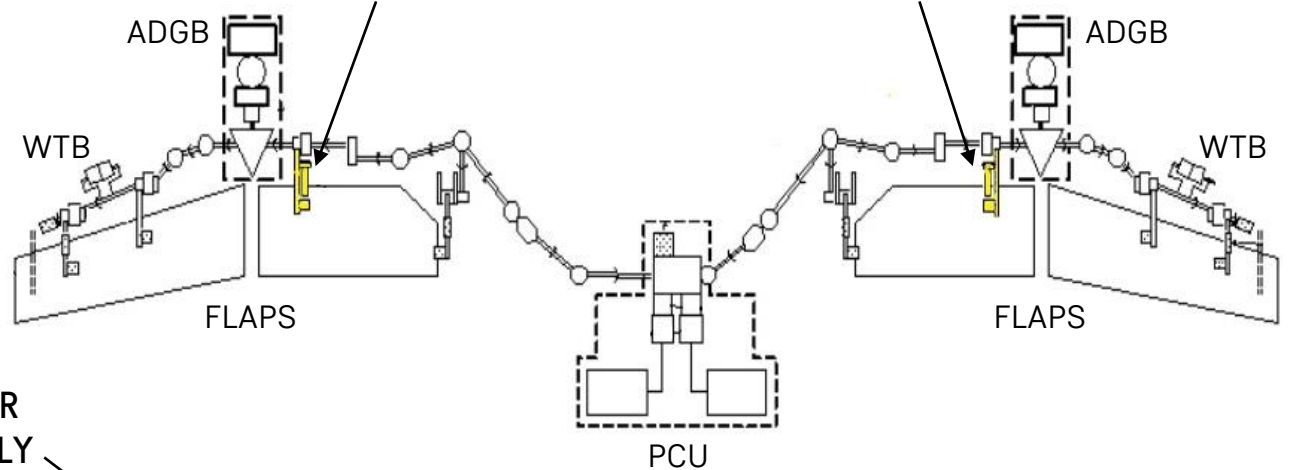
A350 MOVING DAMPER

DESCRIPTION: A350 MOVING DAMPER

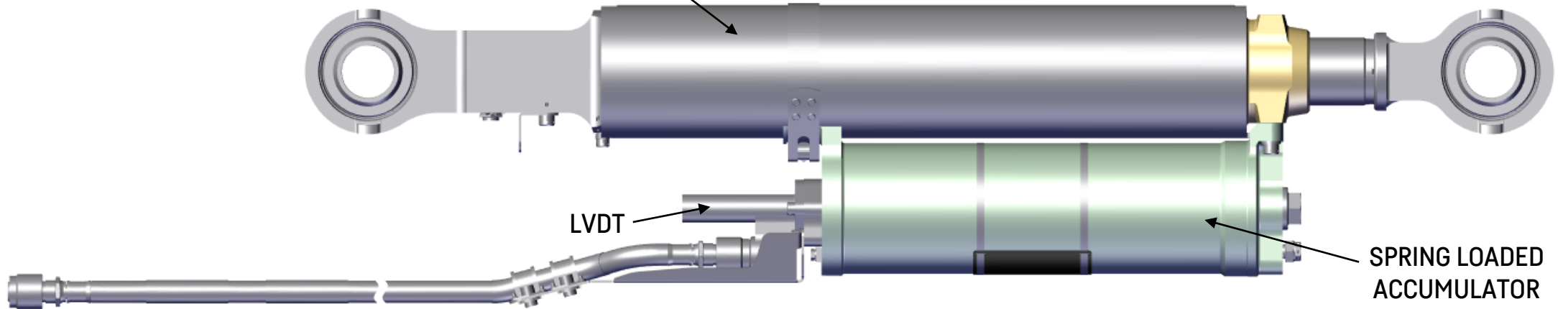
INSTALLATION IN A/C



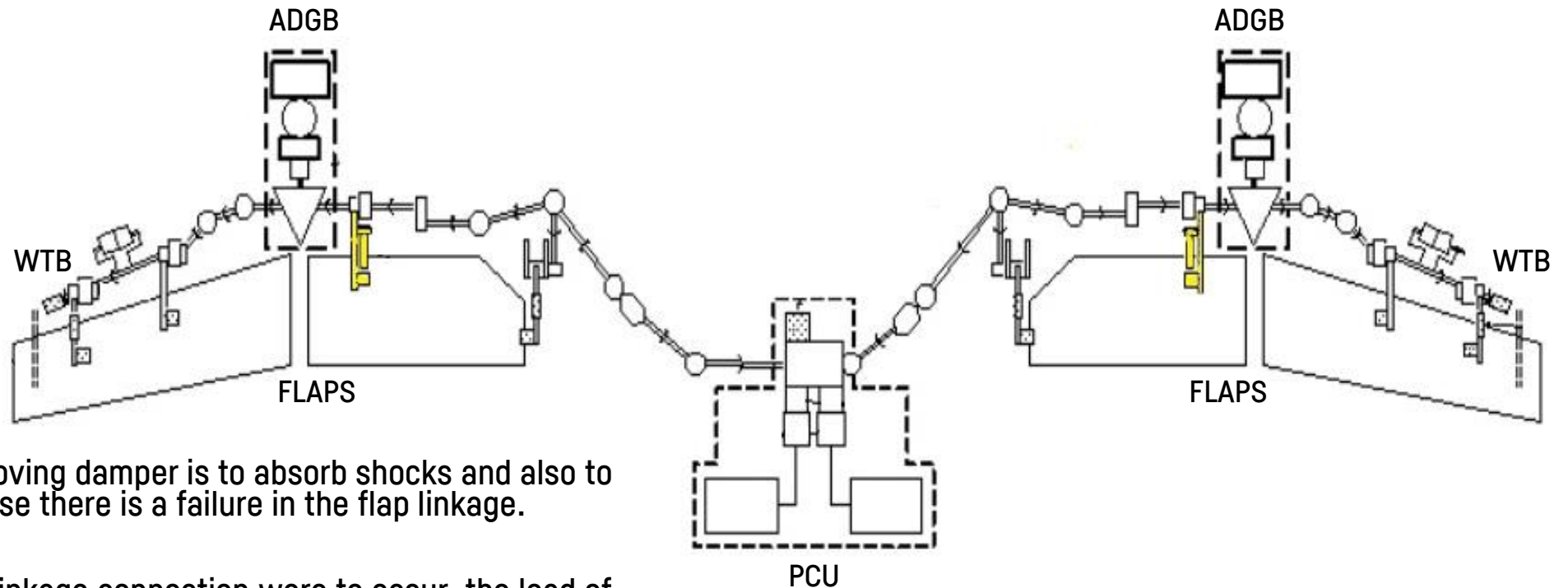
INSTALLATION POSITION OF THE MDs



CYLINDER ASSEMBLY

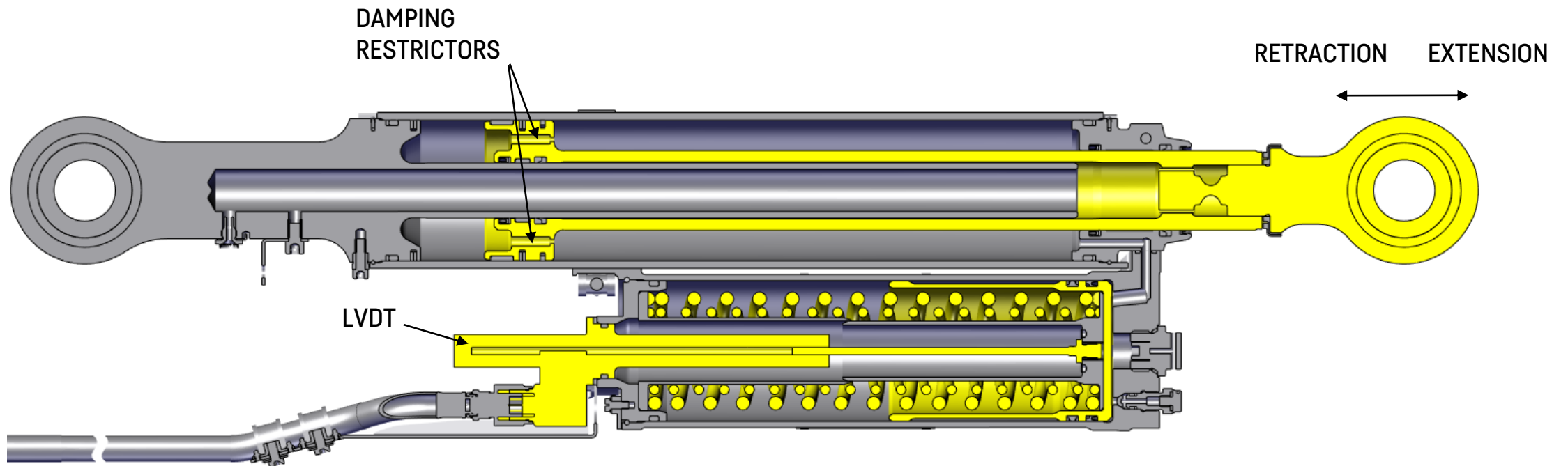


DESCRIPTION: A350 MOVING DAMPER

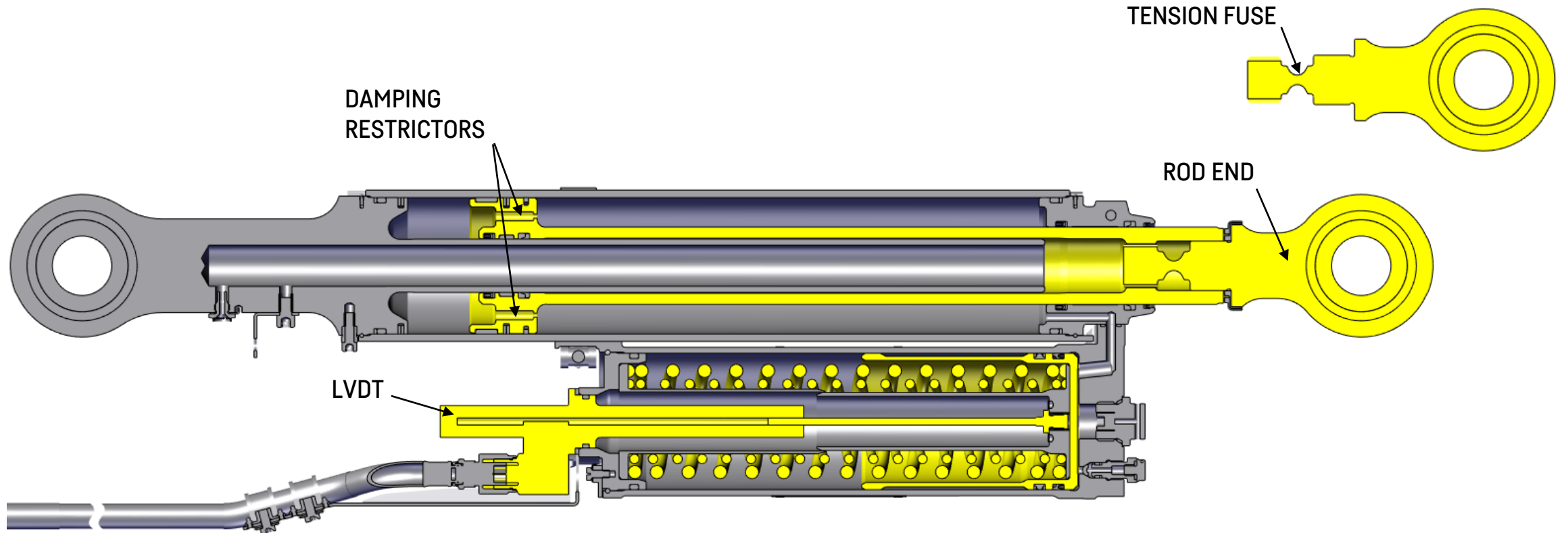


- The function of the moving damper is to absorb shocks and also to protect the flaps in case there is a failure in the flap linkage.
- If a failure in the flap linkage connection were to occur, the load of the flap would move the damper piston in the retract direction.
- This also prevents a twist in the inboard flap panel by decreasing the interface load.

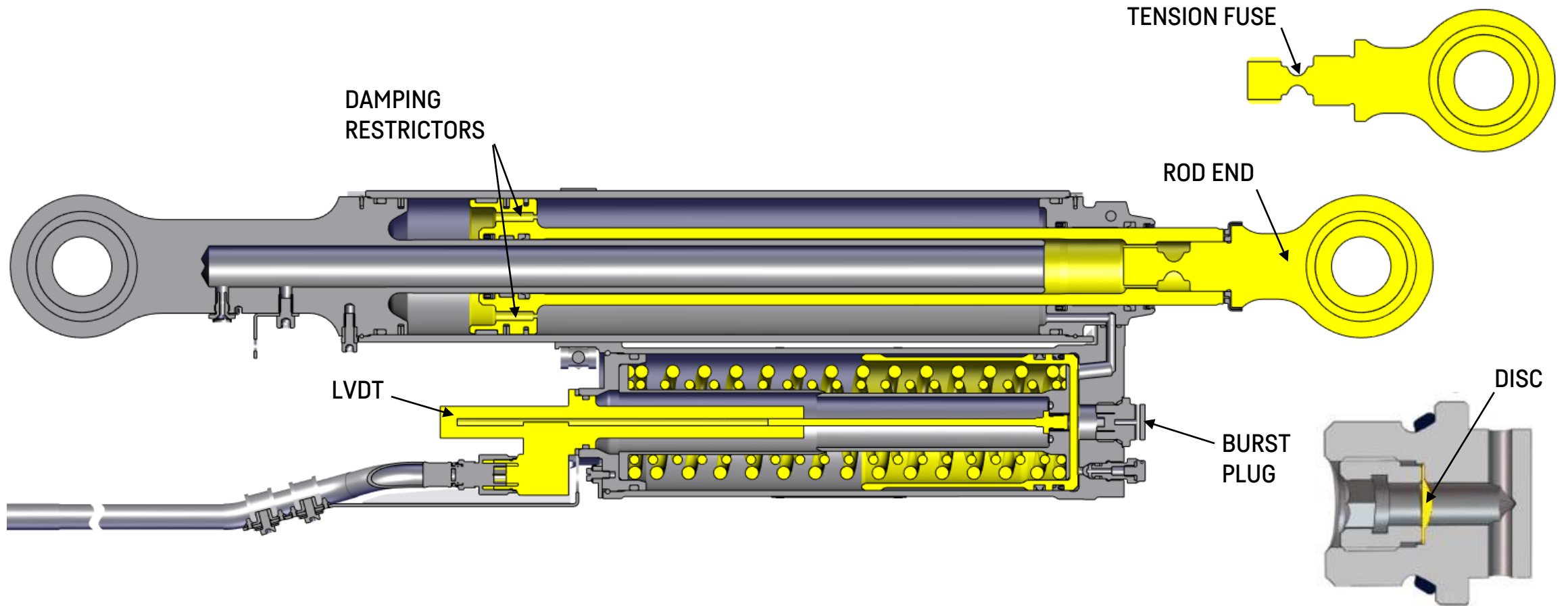
DESCRIPTION: A350 MOVING DAMPER



DESCRIPTION: A350 MOVING DAMPER



DESCRIPTION: A350 MOVING DAMPER



INVESTIGATIONS & ROOT CAUSE

Root cause analysis:

Two forms of leakage have been identified:

- Chronic leakage (time period of leakage: months to years)
- Sudden leakage (can degrade within 1 FC)

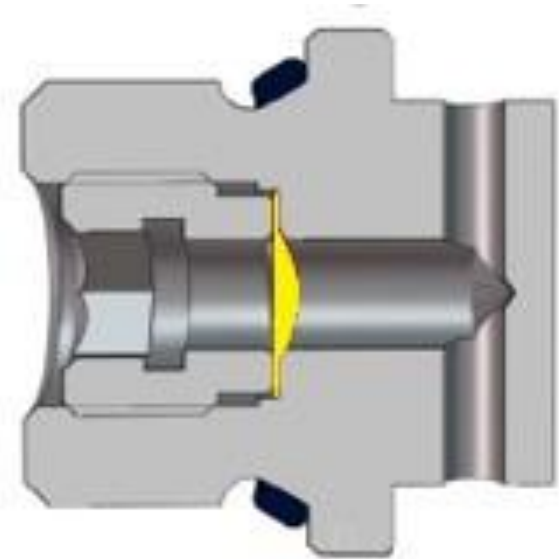
Conditions for leakage:

Extremely low temperatures in combination with dirt ingress.

Corrosion within the Burst Plug

Containment plan:

- Monitoring of in service units
- Introduction of Build Standard 02: accumulator oil filling level is increased
- Introduction of new seals to better withstand low temperatures (SN 1200 on)



WAY FORWARD

Development of Build Standard 03:

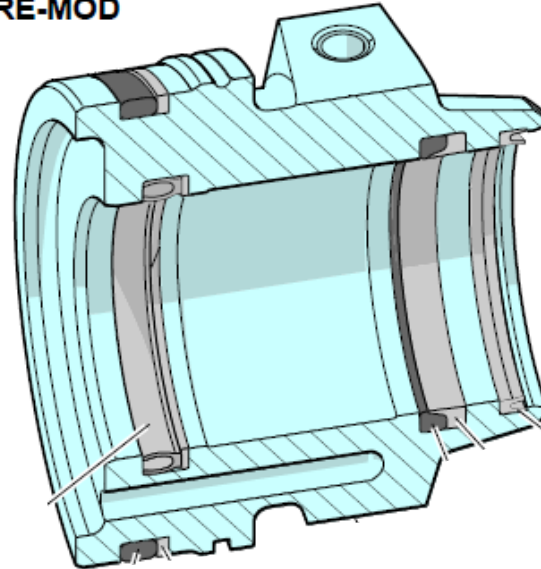
New Sealing Concept:

- Additional wiper in the accumulator
- Fluor silicone O-Rings
- Guide ring in the bushing
- Steel bushing instead of bronze
- Larger improved scraper
- Modified burst disc

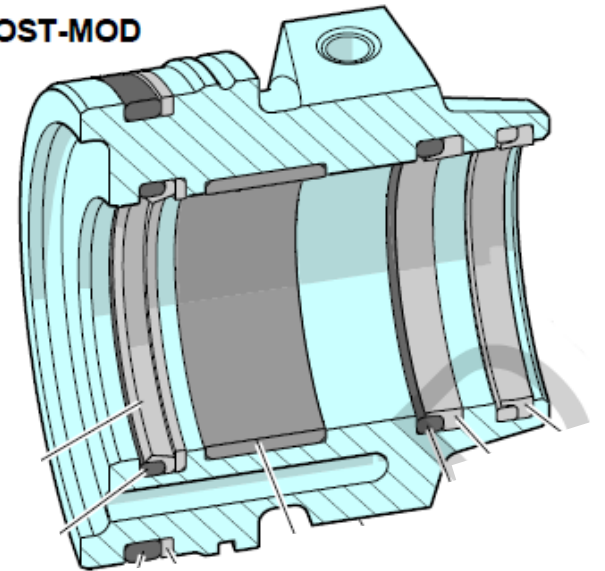


PRE-MOD
6343B0003-01
POST-MOD
6343B0003-02

PRE-MOD



POST-MOD



QUESTIONS AND COMMENTS

A350 NLG

SCOV Seepage

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AGENDA

- **IMPACT FOR OPERATORS**
- **AFFECTED COMPONENTS SUBJECT TO LEAKAGE**
- **INVESTIGATION AND ROOT CAUSE**
- **IN-SERVICE STRATEGY**
- **FINAL SOLUTION**
- **TIMELINE**

IMPACT FOR OPERATORS

- Impact may cause seepage when the system is not pressurized on the upper SCOV cap seal area.
- 45 Cases of A350 NLG seepage in the field reported
5% affected out of ~ 554 NLGs = 1108 SCOVs Total

SCOV PN: 4818A0000-06

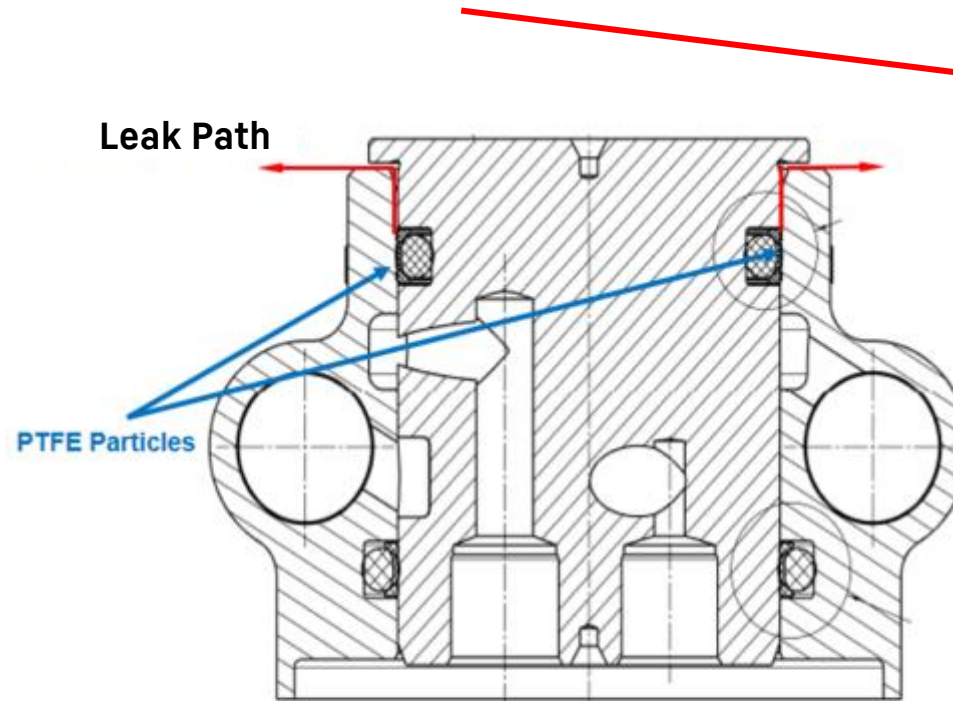


AFFECTED COMPONENTS SUBJECT TO LEAKAGE

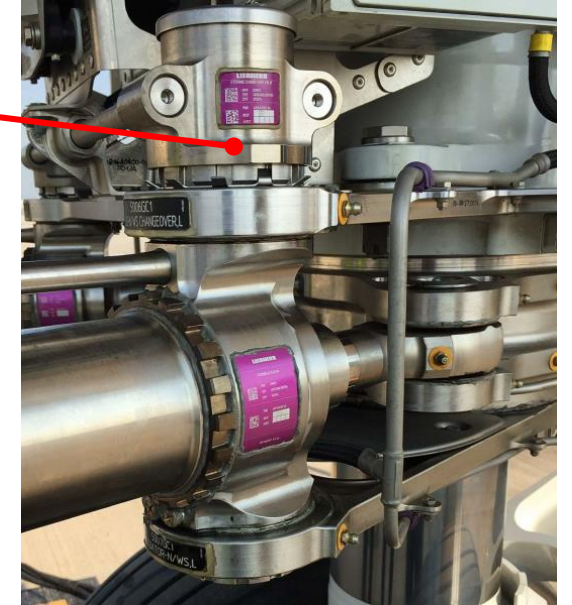
– SCOV PN 4818A000-06

Components in detail ref.:

Liebherr CMM 32-52-10

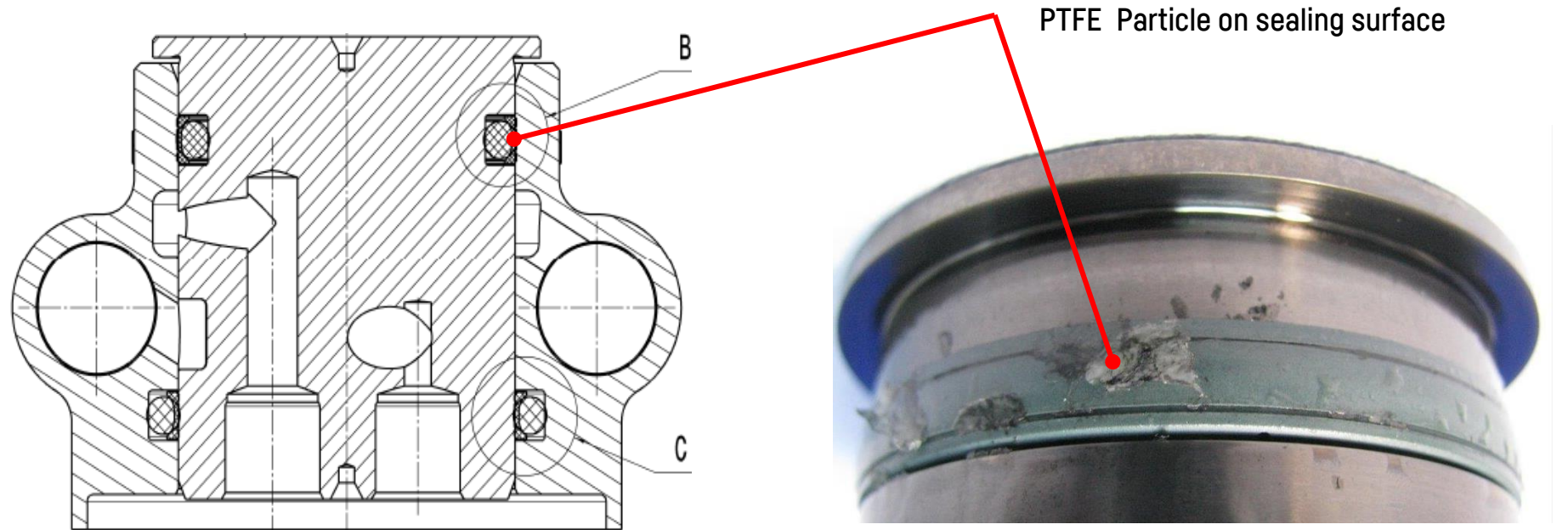


Seepage on SCOV upper area



INVESTIGATION AND ROOT CAUSE

- PTFE particles on upper cap seal area affecting the sealing condition
- PTFE particles cumulated during service



IN-SERVICE STRATEGY

New dispatch limits for SCOV available:

- 30 drops/min hydraulic system pressurized (theoretical limit)
- 4 drops/min hydraulic system is depressurized
- AMM Task No.: MP task A350-A-29-XX-XX-00002-360A-A Check of Hydraulic Components for External Leakage



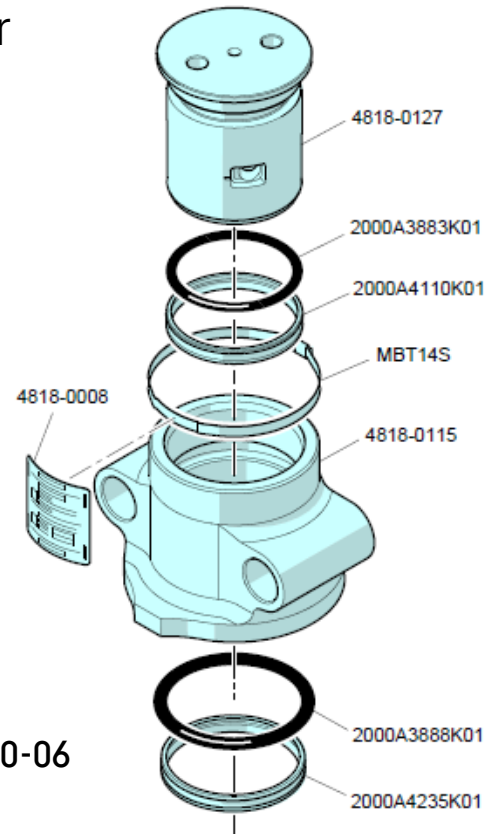
FINAL SOLUTION

Modification of SCOV sealing system resulting into:

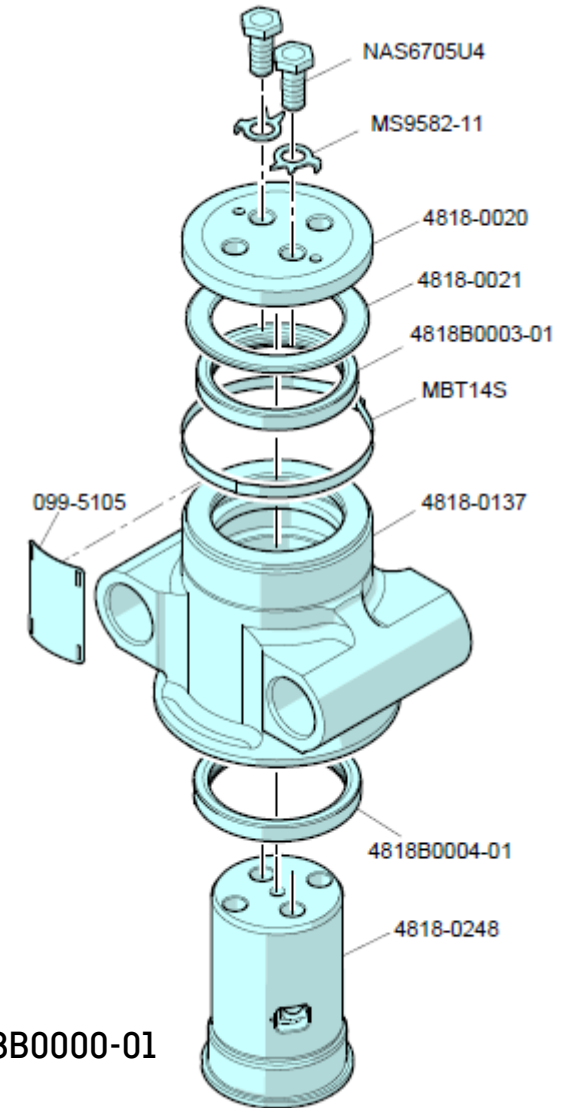
- New SCOV Housing with smaller diameter
- New spool with smaller diameter
- Different sealing system (PTFE-free)
- Changed radial load path

 **Post mod. SCOV on attrition only !**

PRE PN: 4818A0000-06



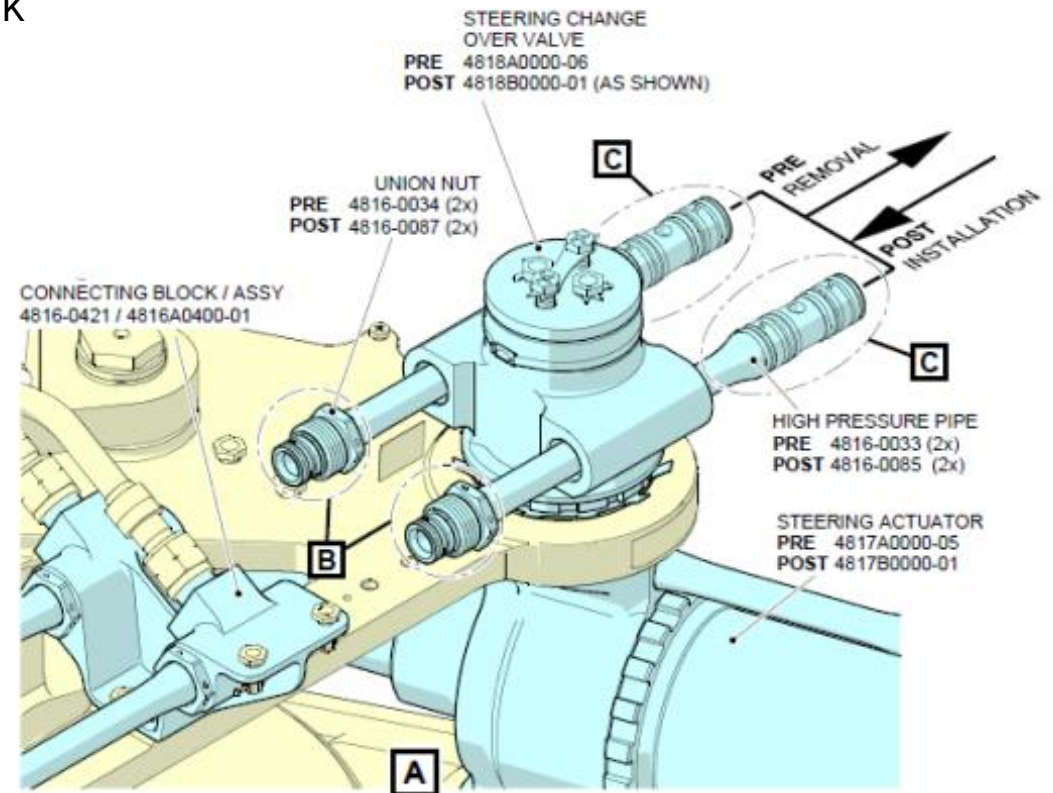
POST PN: 4818B0000-01



FINAL SOLUTION

Modification of SCOV additional parts:

- Transfer tubes with higher diameter to connecting block
- Transfer tubes with changed sealing system
- Two SCOVs per modification necessary
- Total modification time 12 hours



FINAL SOLUTION

First NLG with improved SCOV:

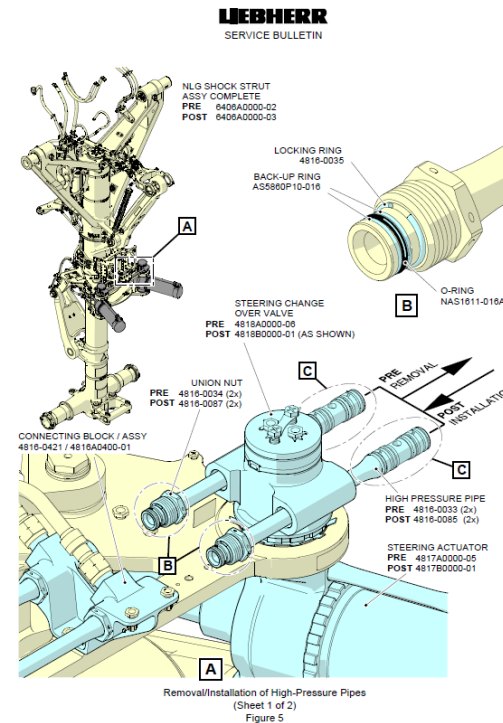
PN: 6406A0000-03 / SN: 6406A00LI000550

MFD: Sept. 2021

A/C > MSN 573 with post mod SCOVs

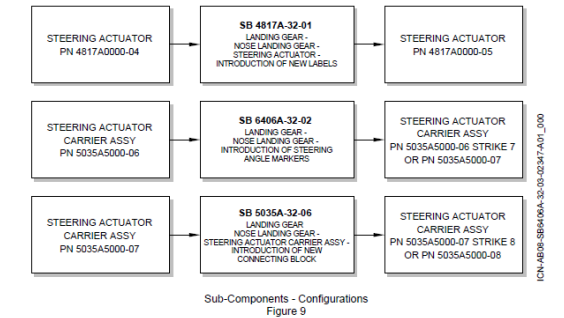
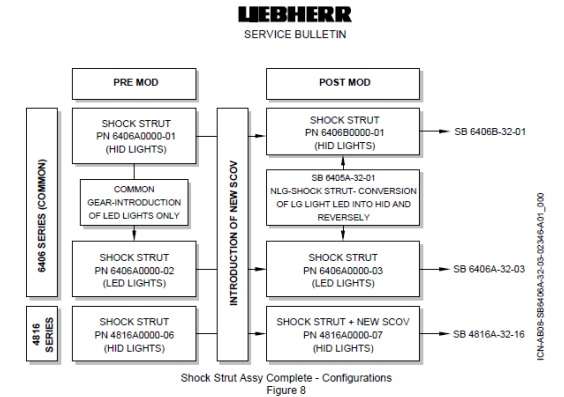
Reference Documents:

- Liebherr SB No.: 6406A-32-03
- Liebherr SB No.: 6406B-32-01
- Liebherr SB No.: 4816A-32-16
- Airbus SB No.: A350-32-P045



Initial Issue : Jan 19/22

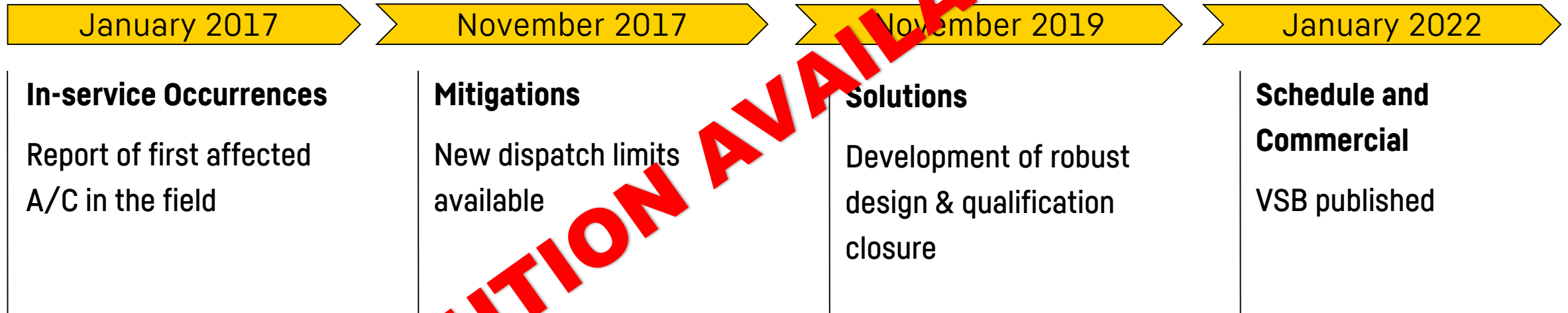
6406A-32-03
Page 24 of 28



Initial Issue : Jan 19/22

6406A-32-03
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TIMELINE



A350 NLG

Steering & Operating Noise

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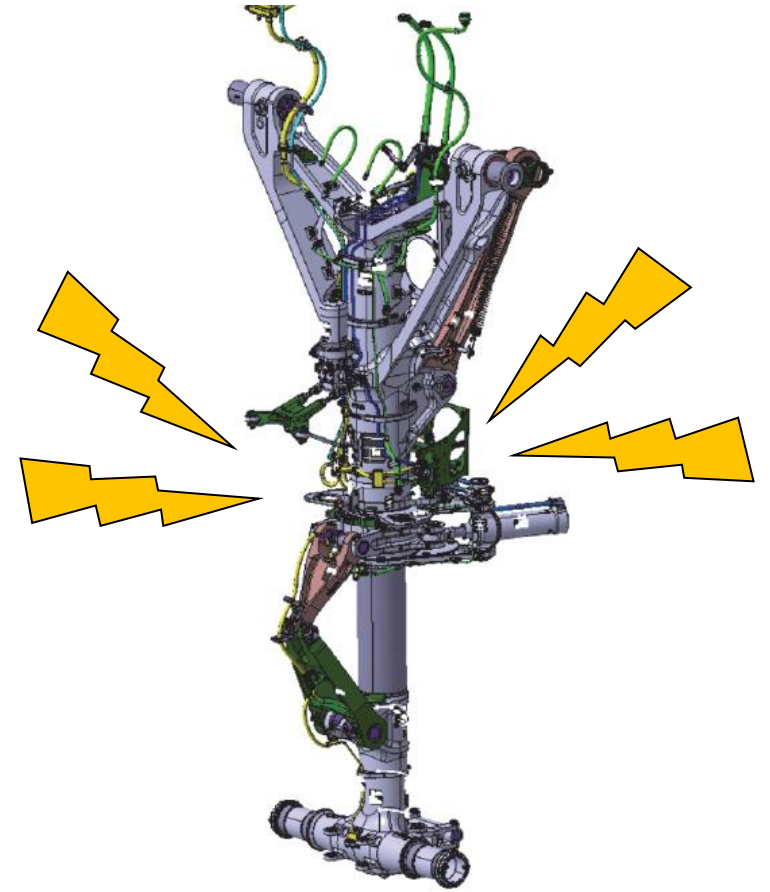


AGENDA

- **IMPACT FOR THE OPERATOR**
- **FIELD STATUS & OVERVIEW**
- **AFFECTED COMPONENTS**
- **INVESTIGATION AND ROOT CAUSE**
- **IN-SERVICE SOLUTION**
- **FINAL SOLUTION**
- **TIMELINE**

IMPACT FOR OPERATOR

- Comfort issue, passengers might affected by noise
- Immediate maintenance & trouble shooting



FIELD STATUS & OVERVIEW

- Approx. 25 suspect cases of A350 NLG Noise in the field reported (A/C delivered ~ 554 NLGs)
- Noise observed on PN: 6405 & PN: 5310 series (Common & EIS)
- Two NLGs returned for special investigation to LLI from In-service

A/C Type	TechRequest #	LLI Part Number	LLI Serial Number	First Occurrence Date	Current Seal Status (on Main or Spare)	First Flight	Cycles @ Occurrence Date	FH @ Occurrence Date	Status
-1000	80763271	6405A0000-01	LLI500105	February 2020	secondary	18/05/2018	1187	TBD	NLG REPLACED
-900	80807167	5310A0000-06	LLI000208	July 2020	primary	18/04/2017	1993	13829	NLG IN-SERVICE
-1000	80848929	6405A0000-01	LLI500156	September 2020	secondary	09/01/2019	1012	6972	NLG IN-SERVICE
- 1000	80856599	6405A0000-01	LLI500109	November 2020	secondary	03/05/2018	~ 1500	TBD	NLG REPLACED
-900	80849445	5310A0000-06	LLI000203	November 2020	secondary	10/04/2017	~ 2900	TBD	NLG IN-SERVICE
- 1000	80856593	6405A0000-01	LLI500177	December 2020	primary	15/02/2019	~ 1000	TBD	NLG IN-SERVICE
-900	N/A	5310A0000-06	LLI000229	January 2021	secondary	24/11/2017	TBD	TBD	NLG IN-SERVICE
- 900	80892257	6405A0000-02	LLI500313	March 2021	secondary	27/08/2019	TBD	TBD	NLG IN-SERVICE
- 900	80912134	TBD	TBD	April 2021	primary	12/12/2018	TBD	TBD	NLG IN-SERVICE
-1000	80927307	6406A0000-01	LLI500104	Juni 2021	secondary	16/02/2018	TBD	TBD	NLG IN-SERVICE
-1000	80932054	6405A0000-xx	TBD	Juni 2021	secondary	23/04/19	TBD	TBD	NLG IN-SERVICE
-900	N/A	4816A0000-06	TBD	Juni 2021	secondary	06/05/16	TBD	TBD	NLG IN-SERVICE
-900	N/A	4816A0000-06	4816A00LI000204	Juli 2021	TBD	11/05/17	TBD	TBD	NLG IN-SERVICE
-900	N/A	4816A0000-06	4816A00LI000226	April 2021	secondary	17/07/17	1919	17081	NLG IN-SERVICE
-900	80939048	TBD	TBD	July 2021	TBD	TBD	TBD	TBD	NLG IN-SERVICE
-900	80963144	TBD	TBD	TBD	TBD	TBD	TBD	TBD	NLG IN-SERVICE
-900	80965180	TBD	TBD	September 2021	TBD	TBD	TBD	TBD	NLG IN-SERVICE
-900	80970105	TBD	TBD	September 2021	TBD	TBD	TBD	TBD	NLG IN-SERVICE
-900	80984168	TBD	TBD	Oct 2021	TBD	TBD	TBD	TBD	NLG IN-SERVICE
-900	80991208	TBD	TBD	November 2021	TBD	TBD	TBD	TBD	NLG IN-SERVICE
-900	TBD	4816A0000-06	4816A00LI000208	Februar 2018	TBD	TBD	2347	15198	NLG IN-SERVICE

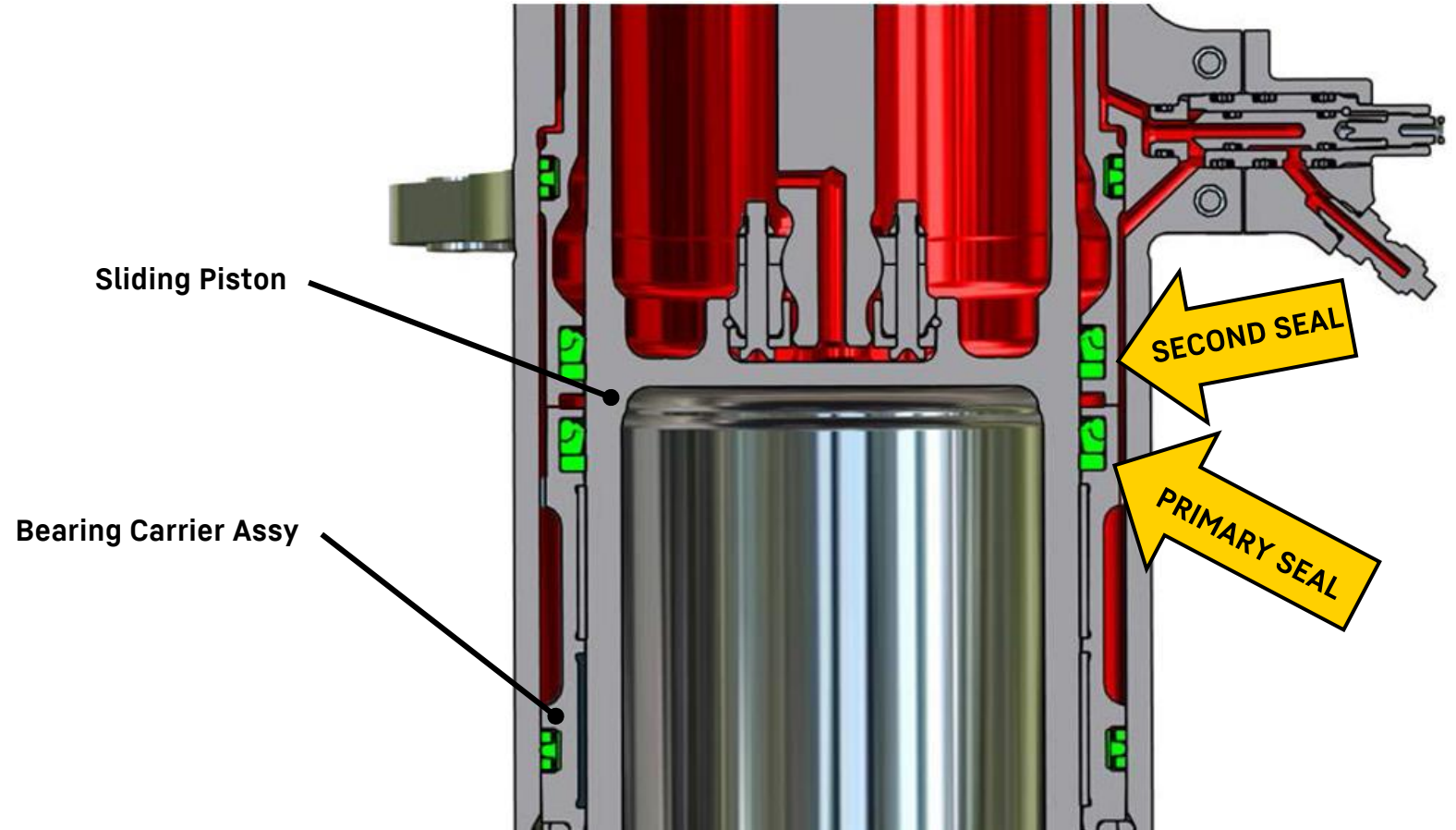
Steering Noise

AFFECTED COMPONENTS

Components in detail ref.:

Liebherr CMM 32-22-01

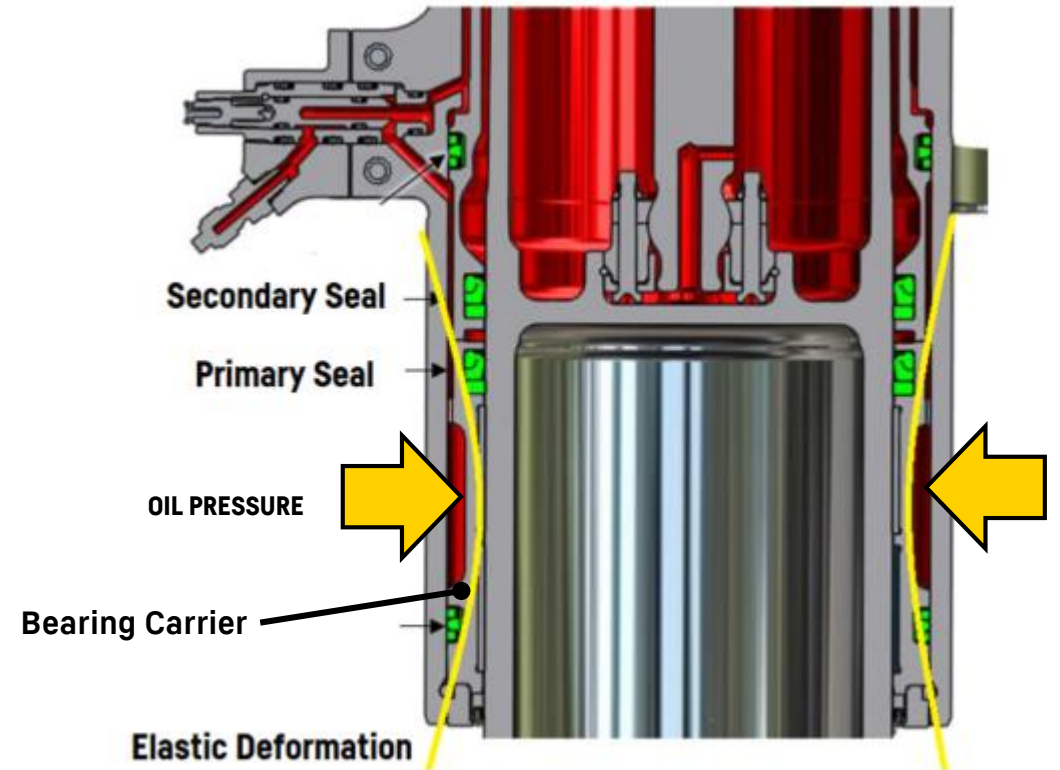
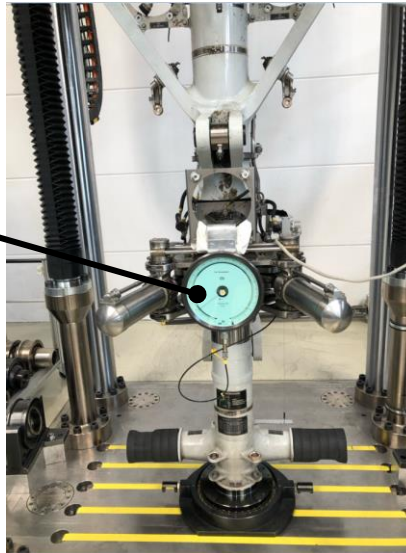
Liebherr CMM 32-21-01



INVESTIGATION AND ROOT CAUSE

- No noise / no elastic deformation on bearing carrier (A/C unloaded)
- Elastic deformation on bearing carrier with high oil pressure (A/C loaded)
- Noise confirmed for the investigated NLGs @ LLI Test Rig
- Noise confirmed for turning and/or damping movement

OIL PRESSURE MEASUREMENT



IN-SERVICE SOLUTION

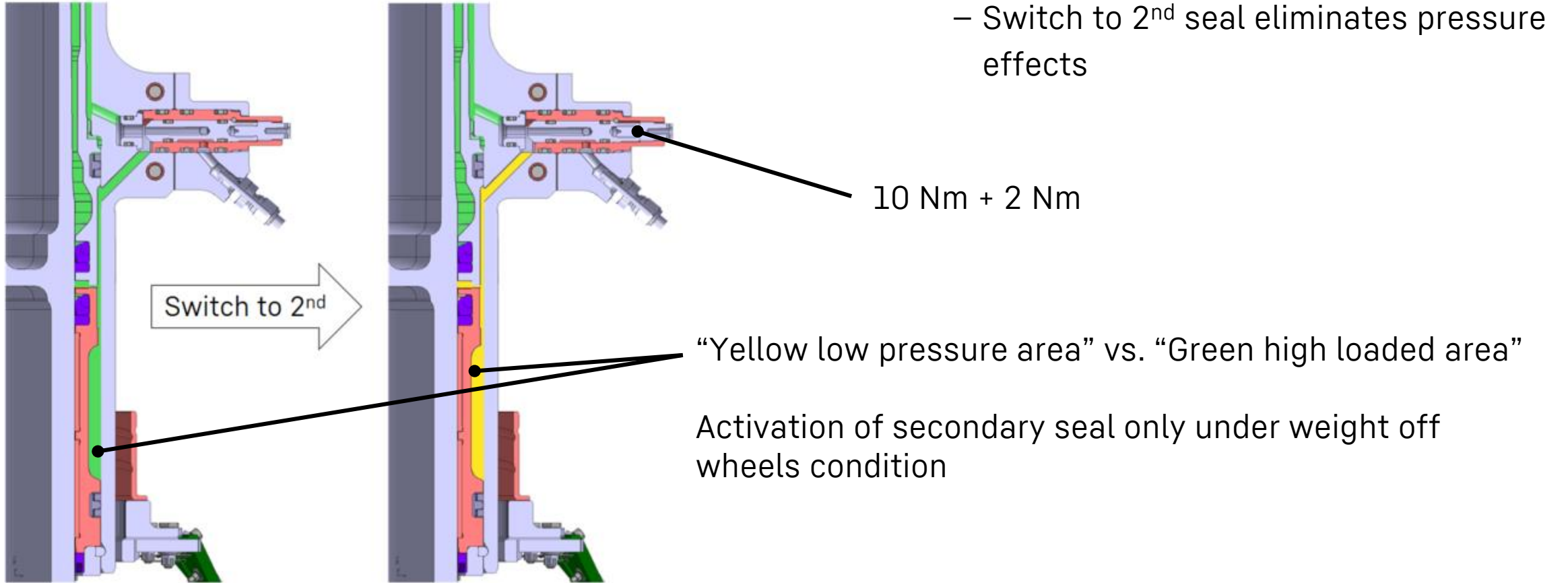
- Activation of secondary seal in weight off wheels conditions (on jacks) per AMM TASK A350-A-32-21-73-01001-132A-A, this restores nominal behavior.

IMPORTANT NOTES:

- Activation of secondary seal releases the pressure on carrier
- Activation of secondary seal only under weight off wheels condition
- Specific instructions & RDAF provided by Airbus via TechRequest
- No further maintenance action necessary if NLG is switched to second seal



IN-SERVICE SOLUTION

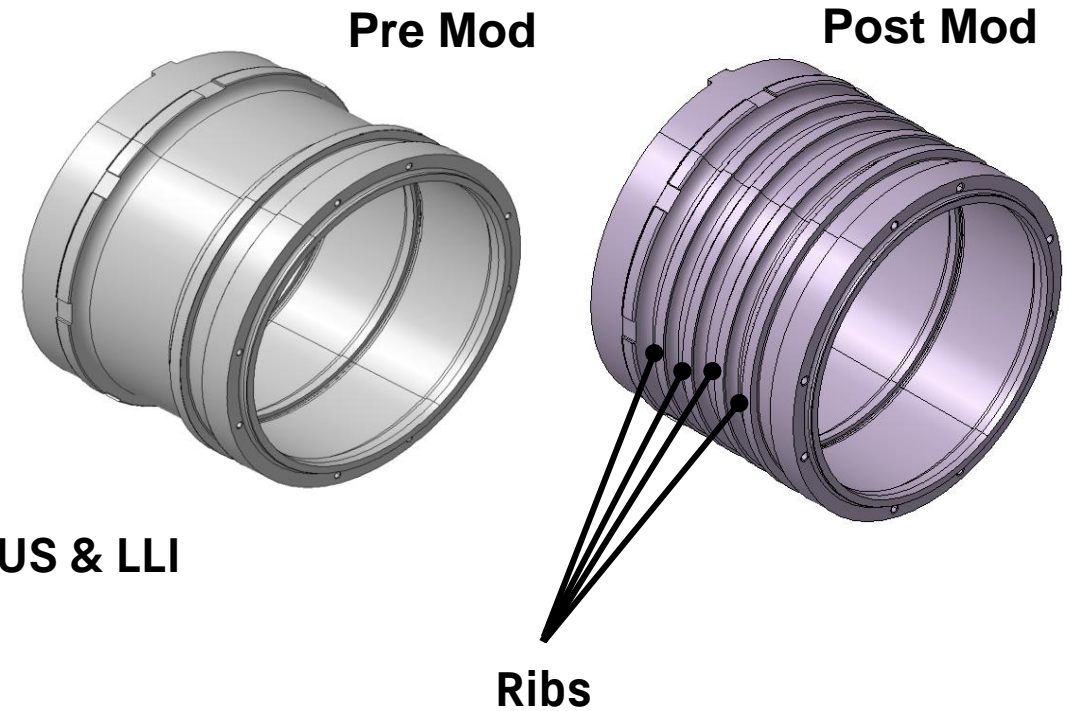


FINAL SOLUTION

Modification of bearing carrier to minimize the load effect at “high compressions” SATs

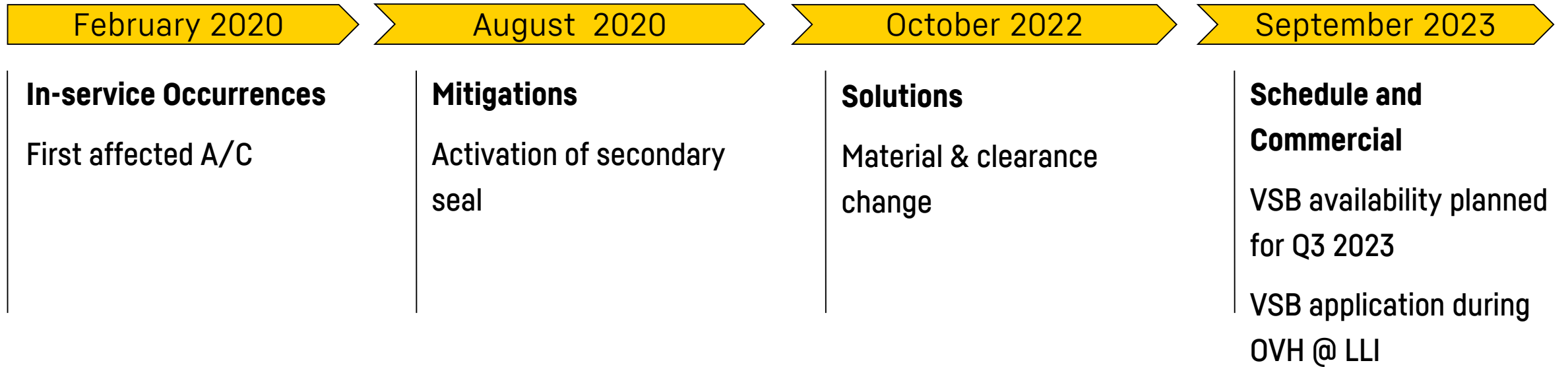
Currently the following design options are in discussion:

- Change of bearing clearance (higher gap)
- Stiffening of bearing carrier
 - Additional ribs
 - Material change for common gear



Modifications are currently under review between AIRBUS & LLI

TIMELINE



Airbus A350 NLG Tooling Catalogue

**A350 800/-900 NLG PN: 4816A0000-06
A350-1000 NLG PN: 6406A0000-01**

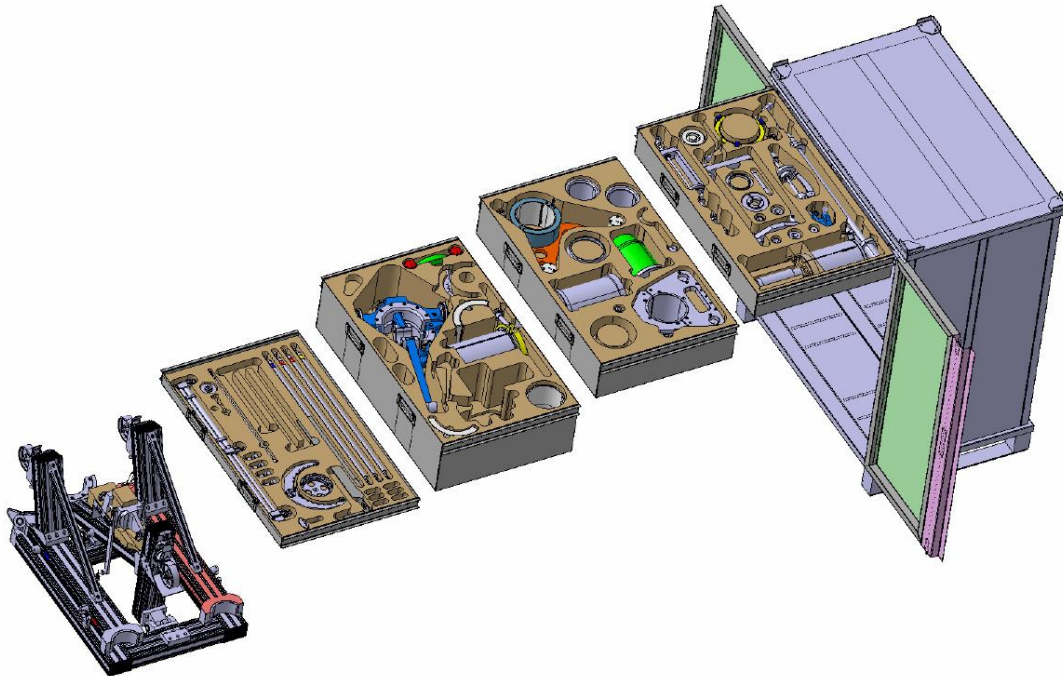
Technical Presentation

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Function: Special tools for specific tasks on A350 NLG

- NOTE: GSE PN: 6904A0000-01 valid for A350 NLG -800/-900/-1000, Procurable @ Liebherr Aerospace
- GSE PN: 6260A0000-01 valid for A350 NLG -800/-900 only (Non Procurable, replaced by PN: 6904A0000-01)



- BOX Dimensions : 1578mm x 1324mm x 836 mm
- Total Box Weight (including all tools) approx. : 360 Kg



4816A0000-06



6406A0000-01

Ref.: TEM 6904A0000-01
TEM 6904A0000-01 in Process
Ref.: TEM 6260A0000-01
TEM available

Parts List Tool Set A350 GSE -800 / -900 / -1000

✓	4816A0000-06
✓	6406A0000-01

Pos.	Part Number	Tool Name
1	6904A9700-01	TRANSPORT CASE
2	5035-0201W50	SLEEVE
3	5311A0000-01	GROUND LOCK PIN
4	6026-4101	PROTECTING COVER
5	6026-4102	PROTECTING COVER
6	6026A4400-01	CLAMPING FIXTURE
7	6260-0002	ASSEMBLY PUNCH
8	6260-0003	SOCKET WRENCH
9	6260-0005	SOCKET WRENCH
10	6260A0100-01	ASSEMBLY TOOL
11	6904A0100-01	ASSEMBLY TOOL
12	6260A0200-01	ASSEMBLY TOOL
13	6260A0300-01	ASSEMBLY TOOL
14	6260A0400-01	SOCKET WRENCH
15	6260A0500-01	GUIDE BOLT
16	6260A0600-01	GUIDE BOLT
17	6260A0700-01	PULLER
18	6260A0800-01	SOCKET WRENCH
19	6260B0900-01	REMOVING TOOL
20	6260A1000-01	PULLER EXTRACTING TOOL
21	6904A2000-01	ASSEMBLY TOOL
22	6260-0001	ASSEMBLY TOOL
23	6260A3000-01	PROTECTING COVER, ASSY
24	6260A4000-01	TOOL DRAWING TOOL

Pos.	Part Number	Tool Name
25	6260B5100-01	REMOVING TOOL
26	6904A1100-01	GUIDE BLOCK
27	6260A6500-01	INSTALLING TOOL
28	6260A6800-01	INSTALLATION JIG
29	6260A6600-01	REMOVING TOOL
30	6260A6000-01	INSTALLING TOOL
31	6260A7000-01	HOLDING TOOL
32	6260A8000-01	HOLDING FIXTURE
33	6260A9000-01	EXTRACTING TOOL
34	6260A6700-01	REMOVING TOOL
35	6904A5200-01	GUIDE BLOCK
36	5035-0020W01	MOUNTING SLEEVE
37	5035-0023W01	SEAL MOUNTING TOOL
38	5665A0000-01	MOUNTING DEVICE
39	5814A0000-01	SEAL MOUNTING TOOL
40	5677-0001	MOUNTING SLEEVE
41	5815A0000-01	MOUNTING DEVICE
42	5807A0000-01	MOUNTING DEVICE
43	5035-0043W01	INSTALLING TOOL
44	6260A6900-01	LIFTING GEAR
45	6904A9100-01	EXTENSION
46	6286A0000-01	SPECIAL SPANNER
47	6287A0000-01	SPECIAL SPANNER
48	6904A9000-01	PULLER EXTRACTING TOOL

Task and GSE tool allocation (overview 1 of 2)



4816A0000-06



6406A0000-01

Part Number	Tool Name	R/I Drag Stay
5311A0000-01	GROUND LOCK PIN	X
6026A4400-01	CLAMPING FIXTURE	X
6260A0100-01	ASSEMBLY TOOL	X
6260A0200-01	ASSEMBLY TOOL	X
6904A2000-01	ASSEMBLY TOOL	X
6260A8000-01	HOLDING FIXTURE	X

NOTE on
Page 5

Part Number	Tool Name	R/I Retraction Actuator
5311A0000-01	GROUND LOCK PIN	X
6260A0500-01	GUIDE BOLT	X
6260A0800-01	SOCKET WRENCH	X
6260B0900-01	REMOVING TOOL	X

Part Number	Tool Name	R/I Torque Links
5311A0000-01	GROUND LOCK PIN	X
6260-0002	ASSEMBLY PUNCH	X
6260A0300-01	ASSEMBLY TOOL	X
6260A1000-01	PULLER EXTRACTING	X
6904A2000-01	ASSEMBLY TOOL	X
6260-0001	ASSEMBLY TOOL	X
6260A8000-01	HOLDING FIXTURE	X

Part Number	Tool Name	R/I Steering Actuator
5311A0000-01	GROUND LOCK PIN	X
6260-0005	SOCKET WRENCH	X
6260A0400-01	SOCKET WRENCH	X
6260A0600-01	GUIDE BOLT	X
6260A0700-01	PULLER	X
6260A3000-01	PROTECTING COVER, A	X
5665A0000-01	MOUNTING DEVICE	X
6904A9000-01	PULLER EXTRACTING T	X

Part Number	Tool Name	R/I Shock Strut
5311A0000-01	GROUND LOCK PIN	X
6026-4101	PROTECTING COVER	X
6026-4102	PROTECTING COVER	X
6260A0400-01	SOCKET WRENCH	X
6260B5100-01	REMOVING TOOL	X
6260A6500-01	INSTALLING TOOL	X
6260A6800-01	INSTALLATION JIG	X
6260A6600-01	REMOVING TOOL	X
6260A6000-01	INSTALLING TOOL	X
6260A7000-01	HOLDING TOOL	X
6904A5200-01	GUIDE BLOCK	X
5035-0043W01	INSTALLING TOOL	X

Part Number	Tool Name	Strut Assembly
5035-0201W50	SLEEVE	X
5311A0000-01	GROUND LOCK PIN	X
6026-4101	PROTECTING COVER	X
6260A9000-01	EXTRACTING TOOL	X
6260A6700-01	REMOVING TOOL	X
5035-0020W01	MOUNTING SLEEVE	X
5035-0023W01	SEAL MOUNTING TOOL	X
5814A0000-01	SEAL MOUNTING TOOL	X
5677-0001	MOUNTING SLEEVE	X
5815A0000-01	MOUNTING DEVICE	X
5807A0000-01	MOUNTING DEVICE	X

Task and GSE tools allocation (overview 2 of 2)

✓	4816A0000-06
✓	6406A0000-01

Part Number	Tool Name	Wheel Change
5311A0000-01	GROUND LOCK PIN	X
6026-4102	PROTECTING COVER	X
6260-0003	SOCKET WRENCH	X
6904A9100-01	EXTENSION	X

Part Number	Tool Name	R/I Springs
5311A0000-01	GROUND LOCK PIN	X
6260A4000-01	TOOL DRAWING TOOL	X

Part Number	Tool Name	Servicing
5311A0000-01	GROUND LOCK PIN	X
6904A1100-01	GUIDE BLOCK	X

Part Number	Tool Name	R/I Uplock Roller
5311A0000-01	GROUND LOCK PIN	X
6286A0000-01	SPECIAL SPANNER	X

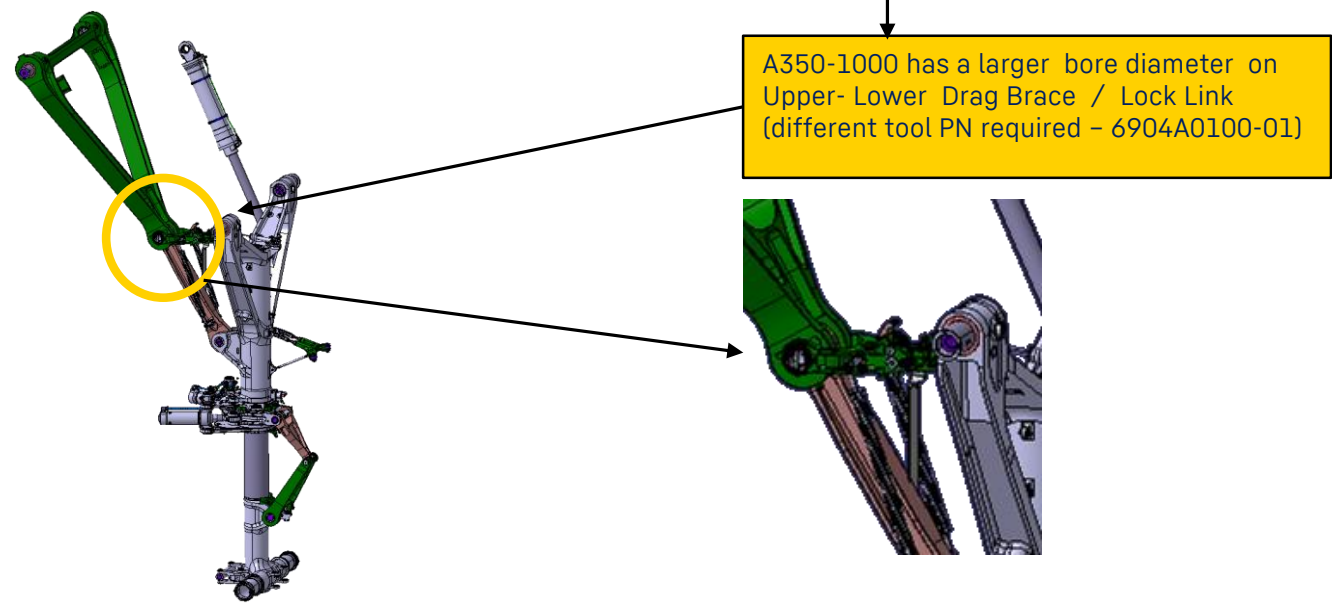
Part Number	Tool Name	Transport
6260A6900-01	LIFTING GEAR	X

Part Number	Tool Name	R/I SCOV
6904A9000-01	PULLER	X
5665A0000-01	MOUNTING DEVICE	X

Part Number	Tool Name	R/I Drag Stay
5311A0000-01	GROUND LOCK PIN	X
6026A4400-01	CLAMPING FIXTURE	X
6260A0100-01	ASSEMBLY TOOL	X
6260A0200-01	ASSEMBLY TOOL	X
6904A2000-01	ASSEMBLY TOOL	X
6260A8000-01	HOLDING FIXTURE	X

NOTE

NOTE:
 ASSEMBLY TOOL PN 6260A0100-01 for 800/900
 ASSEMBLY TOOL PN 6904A0100-01 for -1000



A350 NLG Liebherr Tooling Catalogue

A350 Case PN: 6904A9700-01

✓	4816A0000-06
✓	6406A0000-01

Ref.: -800/900 Case TEM 6904A9800-01 (for PRE 6260A0000-01)
Ref.: -1000 Case TEM 6904A9700-01 (for POST 6904A0000-01)
No specific CMM / CRM reference number

Function: Transport of GSE



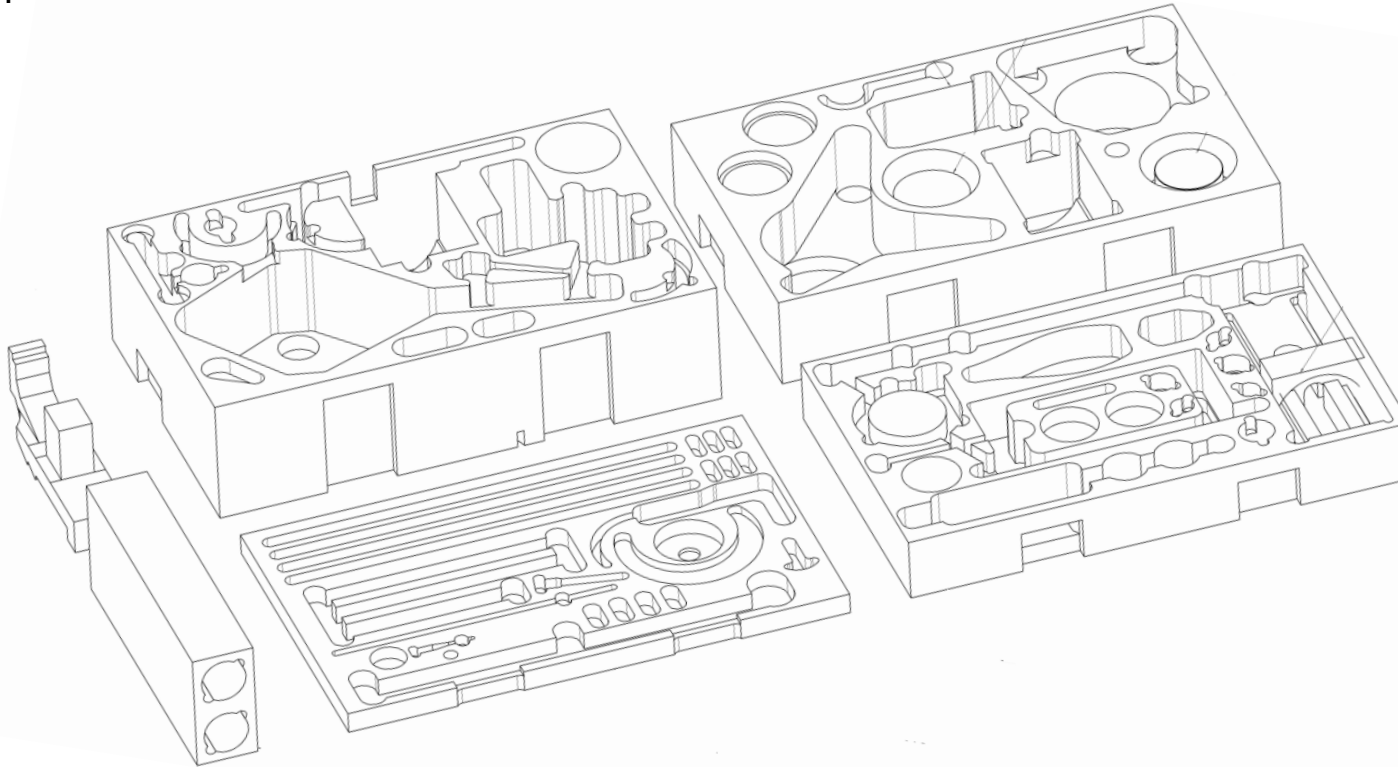
A350 Mould PN: 6904A9900-01

✗	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

*Ref.: TEM 6260A0000-01
No specific CMM / CRM reference number*

Function: To keep and protect GSEs in box

- Part of Transport Case PN: 6904A9800-01



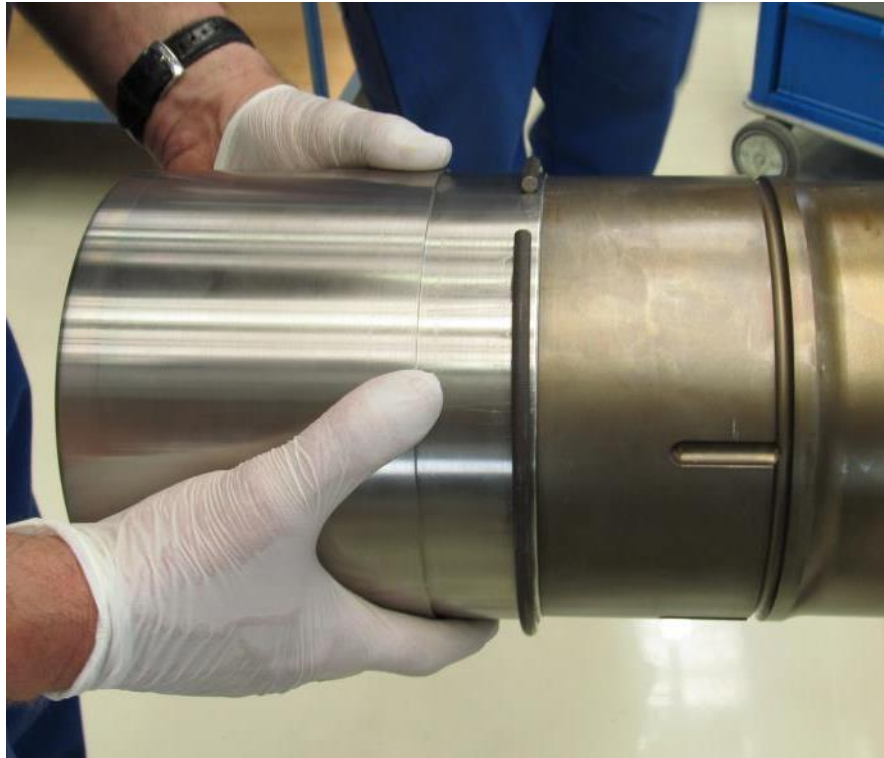
A350 NLG Liebherr Tooling Catalogue

Sleeve PN: 5035-0201W50

✗	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 5035-0201

Function: To install slotted ring on main fitting



A350 NLG Liebherr Tooling Catalogue

Ground Lock Pin PN: 5311A0000-01

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 5311A0000-01

Function: To lock NLG on ground



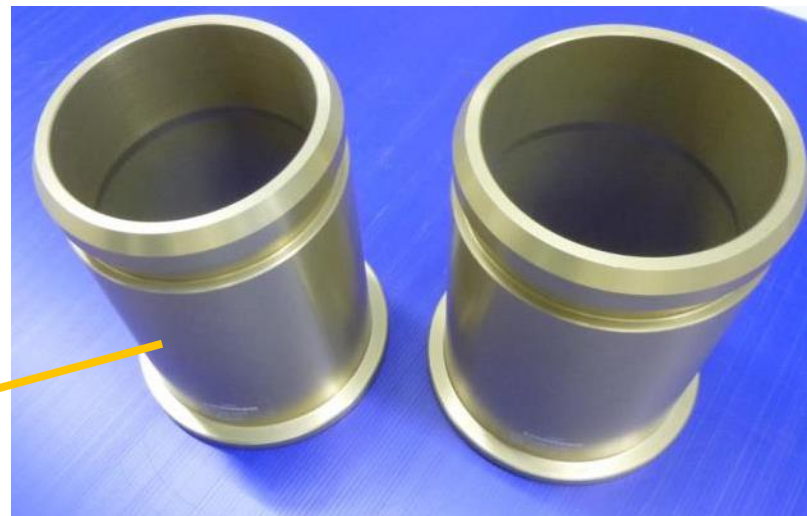
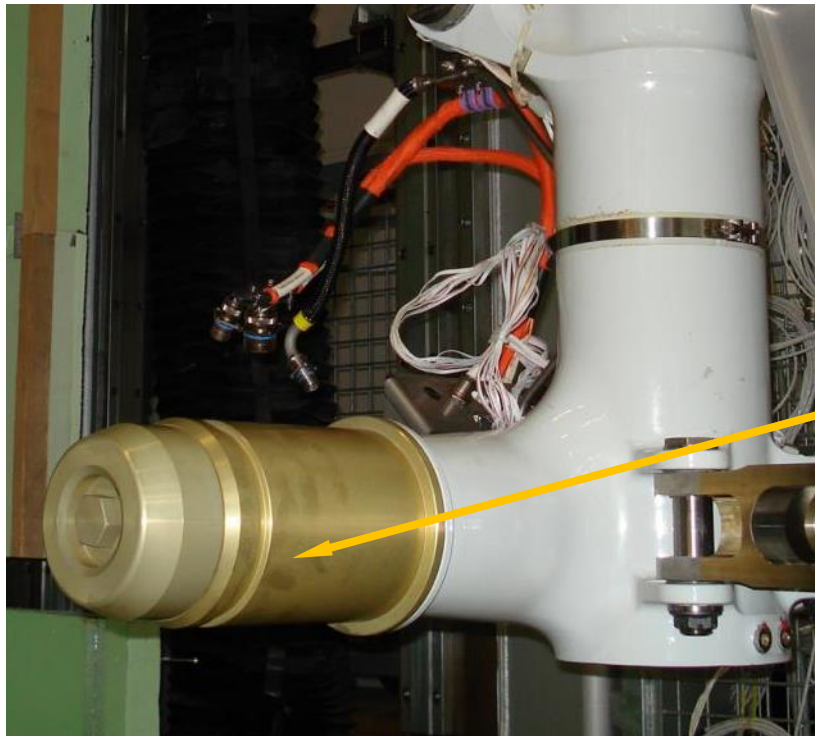
A350 NLG Liebherr Tooling Catalogue

Protecting Cover PN: 6026-4101

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6026-4101

Function: To protect wheel axle



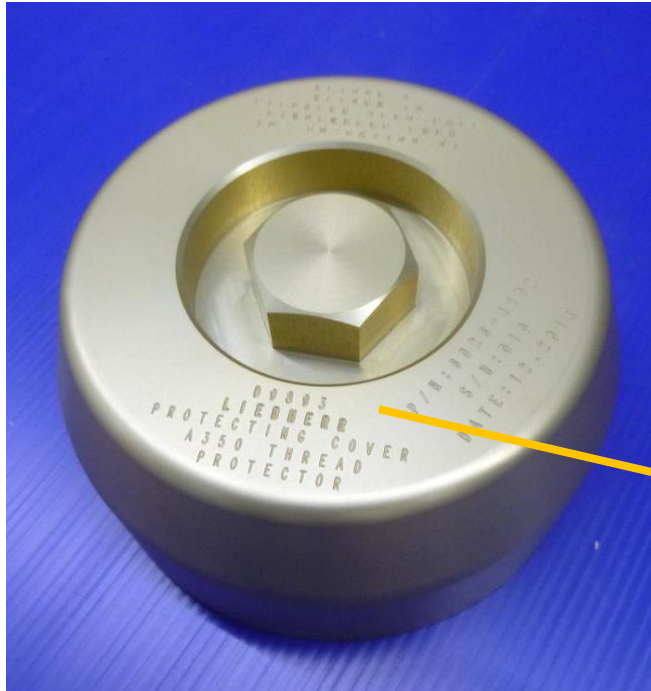
A350 NLG Liebherr Tooling Catalogue

Protecting Cover PN: 6026-4102

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6026-4102

Function: To protect axle thread



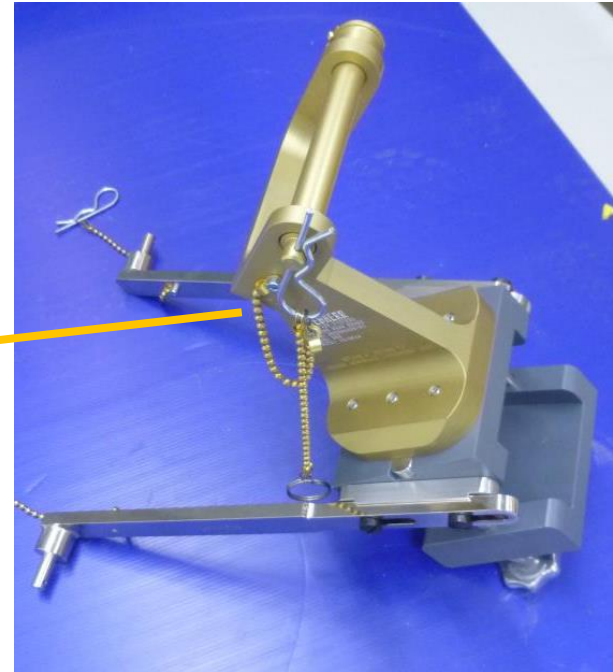
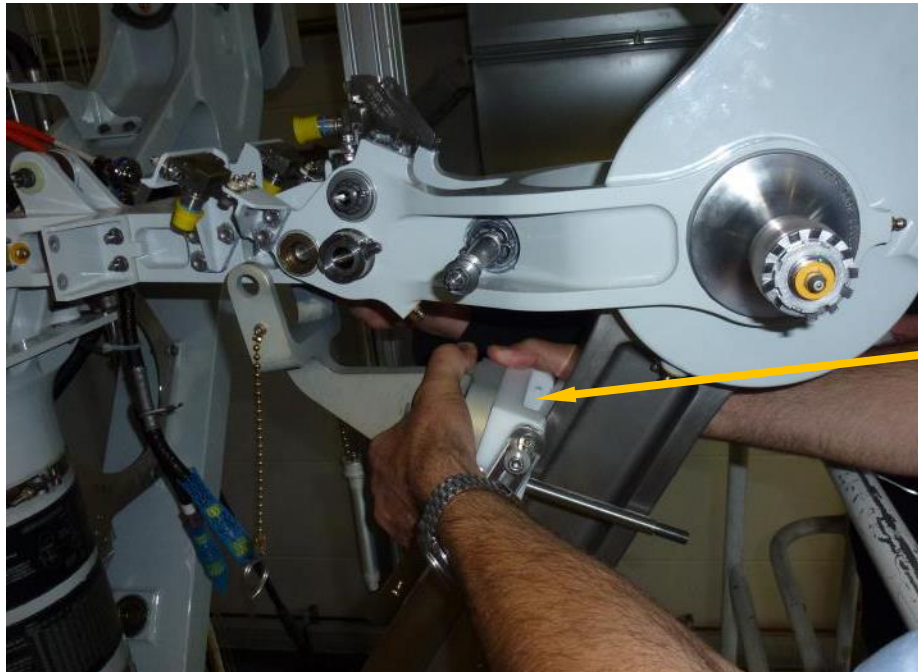
A350 NLG Liebherr Tooling Catalogue

Clamp Fixture PN: 6026A4400-01

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6026A4400-01

Function: To clamp the lower drag stay during installation



A350 NLG Liebherr Tooling Catalogue

Assembly Punch PN: 6260-0002

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260-0002

Function: To support torque link during removal and installation



A350 NLG Liebherr Tooling Catalogue

Socket Wrench PN: 6260-0005

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260-0005

Function: Removal and installation steering actuator



Tool necessary for LLI SB-4816A-32-16 & SB-6406A-32-03 & SB-6406B-32-01

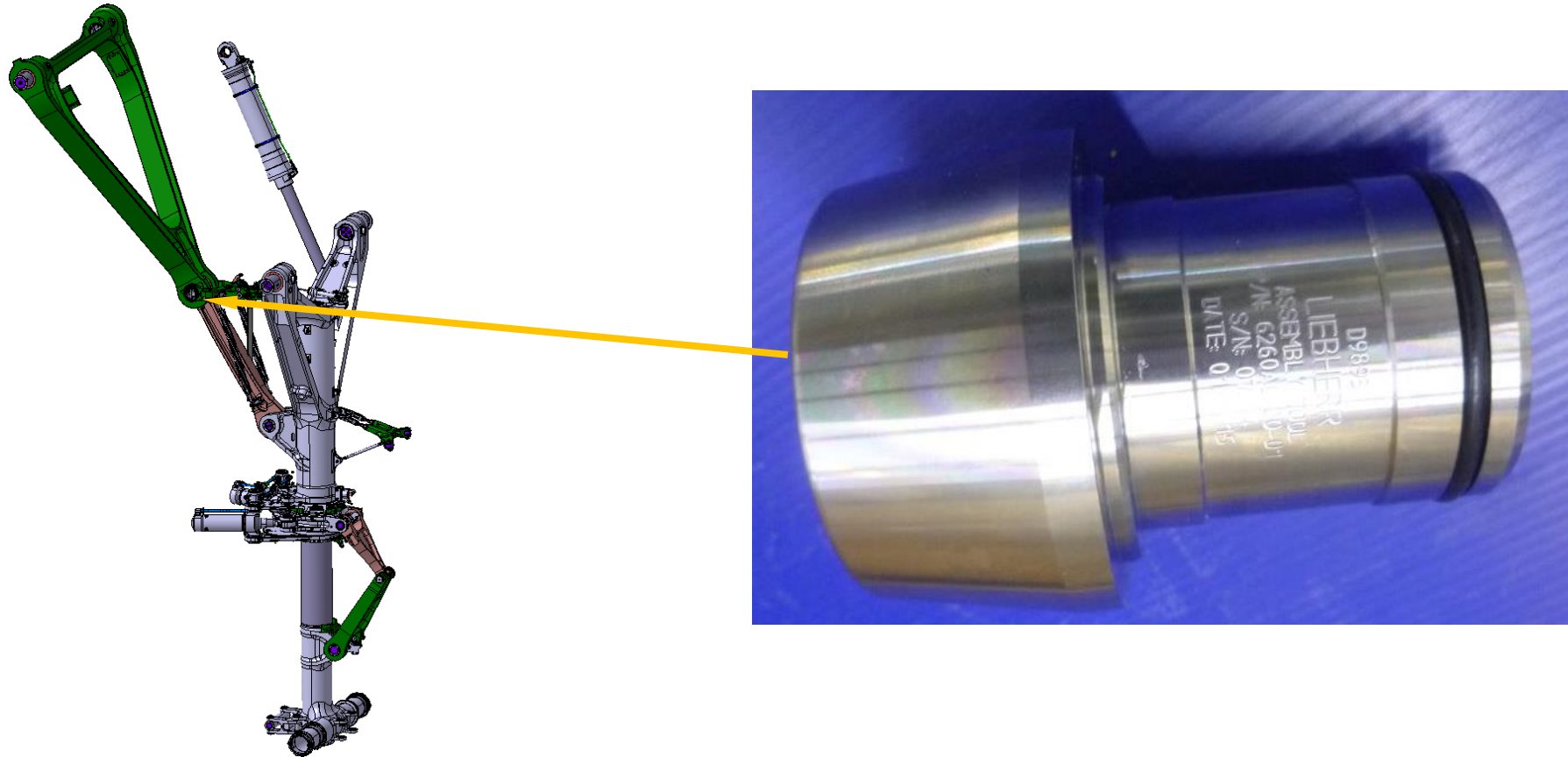
A350 NLG Liebherr Tooling Catalogue

Assembly Tool PN: 6260A0100-01

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✗	6406A0000-01

Ref.: TEM 6260A0100-01

Function: Guide cone for removal and installation of upper apex pin



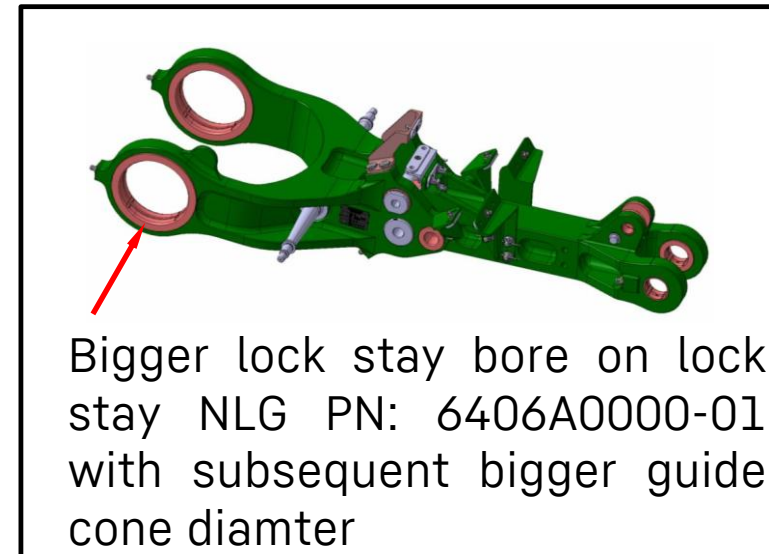
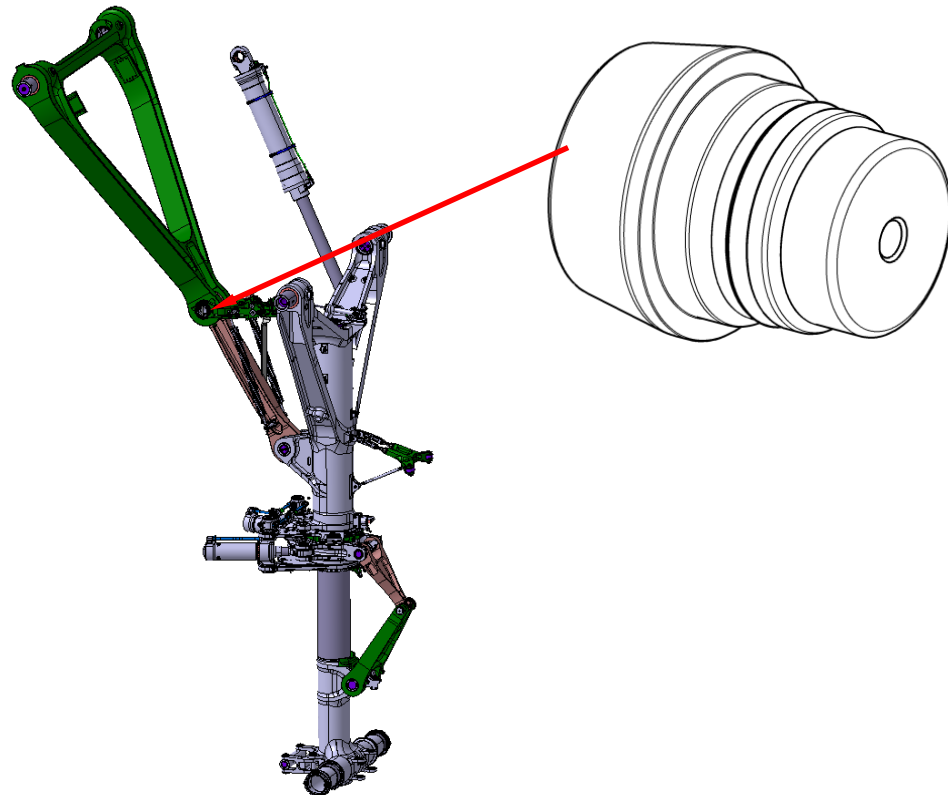
A350 NLG Liebherr Tooling Catalogue

Assembly Tool PN: 6904A0100-01

✓	Line Maintenance	✗	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6904A0100-01

Function: Guide cone for removal and installation upper apex pin



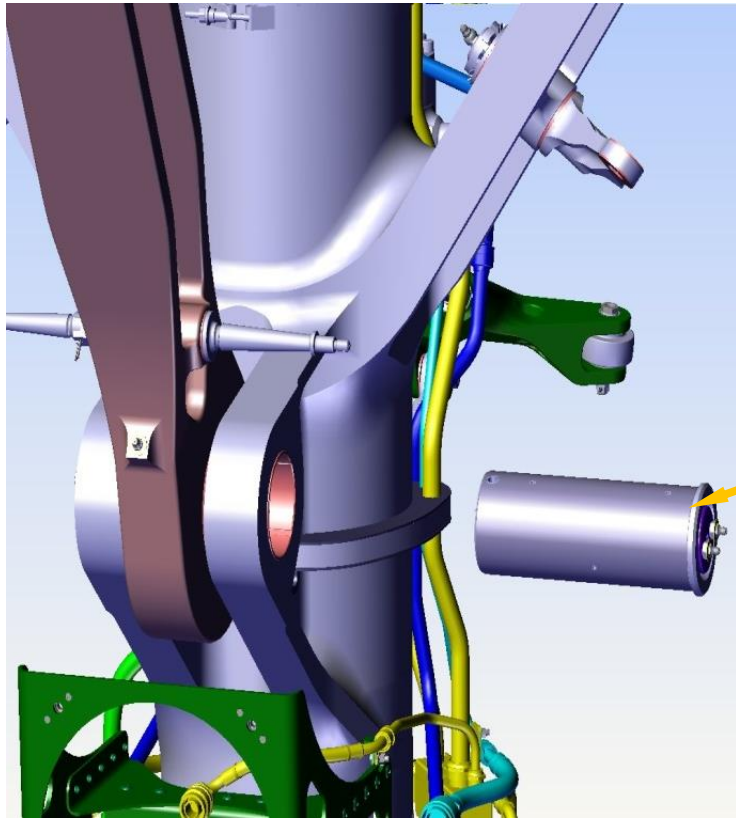
Drag stay apex pin bore diameter increased 10mm for A350 -1000

A350 NLG Liebherr Tooling Catalogue
Assembly Tool PN: 6260A0200-01

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A0200-01

Function: Guide cone for removal and installation lower apex pin



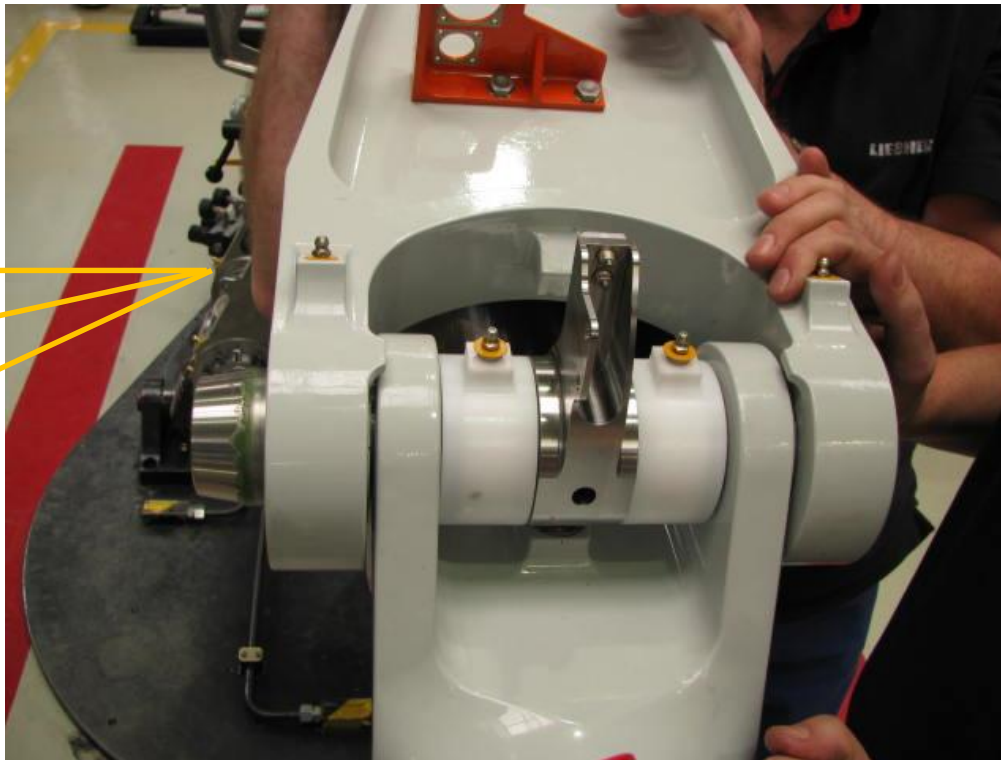
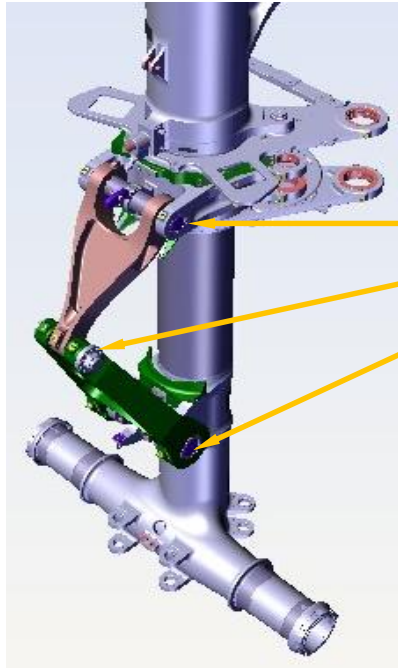
A350 NLG Liebherr Tooling Catalogue

Assembly Tool PN: 6260A0300-01

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A0300-01

Function: Guide cone for removal/installation of torque link bolts



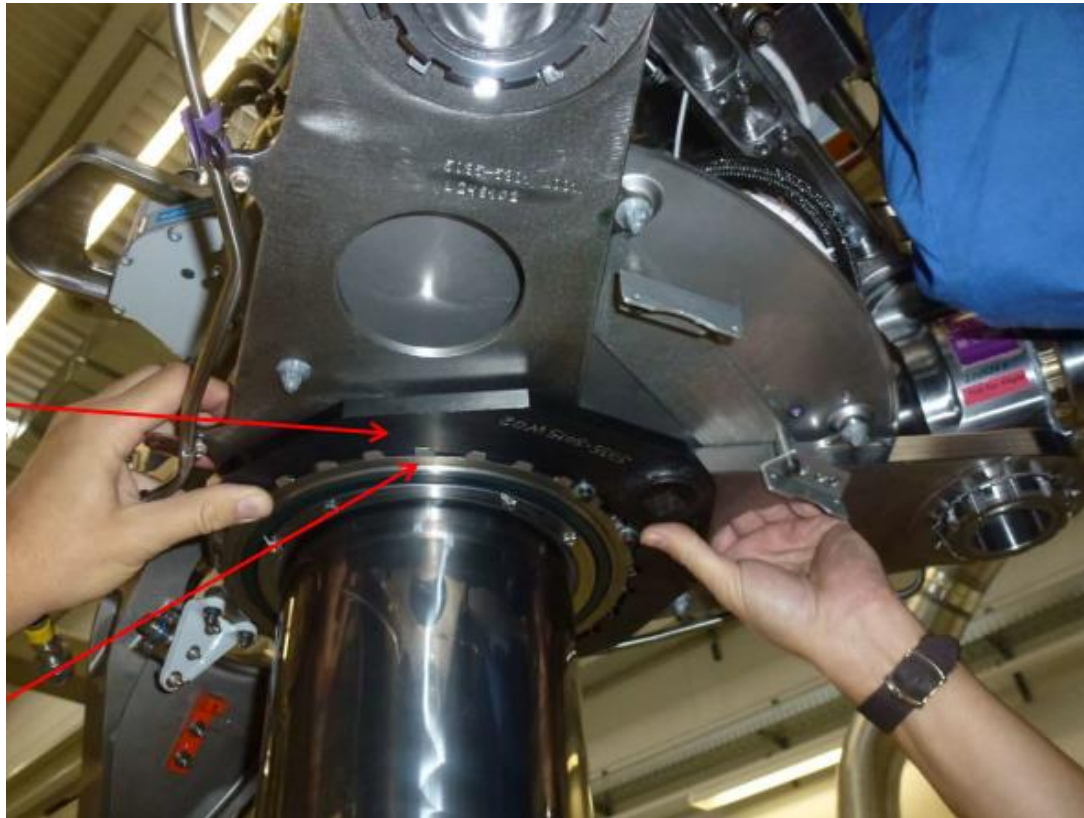
A350 NLG Liebherr Tooling Catalogue

Socket Wrench PN: 6260A0400-01

✓	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A0400-01

Function: To open main nut on shock strut assembly



A350 NLG Liebherr Tooling Catalogue

Guide Bolt PN: 6260A0500-01

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01
Ref.: TEM 6260A0500-01			

Function: Guide bolt for installation retraction actuator



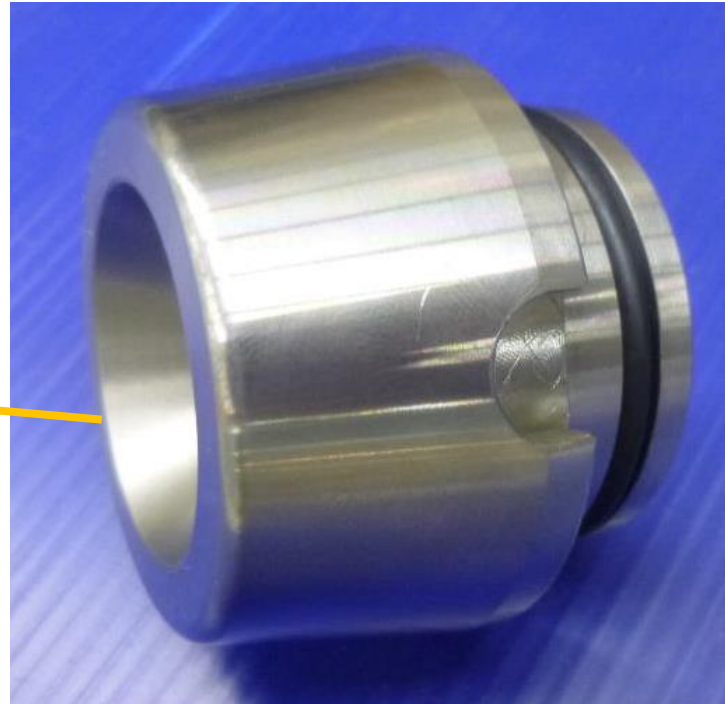
A350 NLG Liebherr Tooling Catalogue

Guide Bolt PN: 6260A0600-01

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A0600-01

Function: Guide bolt for removal and installation of steering actuator



A350 NLG Liebherr Tooling Catalogue

Puller PN: 6260A0700-01

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A0700-01

Function: Removal and installation of steering actuator bolt



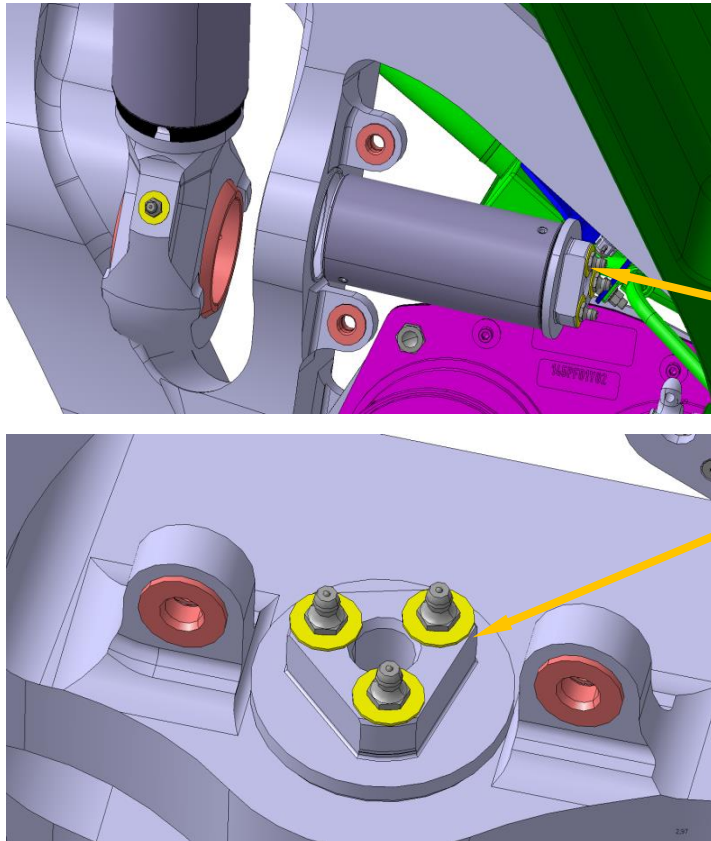
A350 NLG Liebherr Tooling Catalogue

Socket Wrench PN: 6260A0800-01

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A0800-01

Function: To break-free retraction actuator bolt before removal



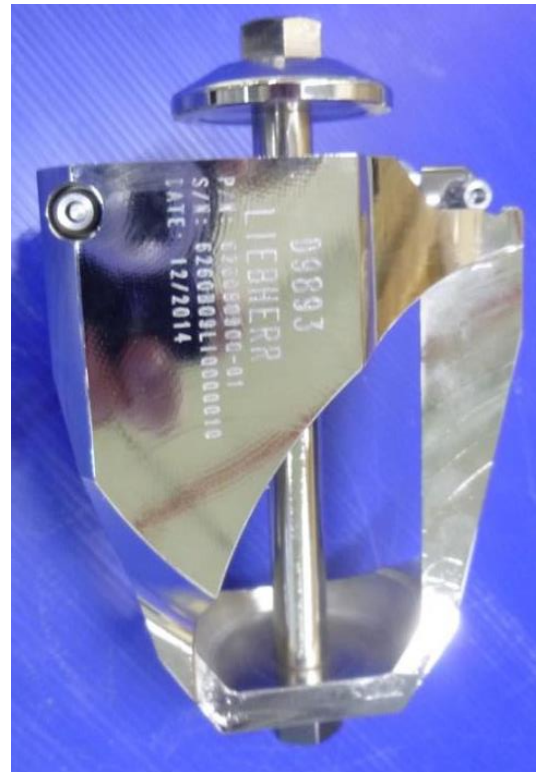
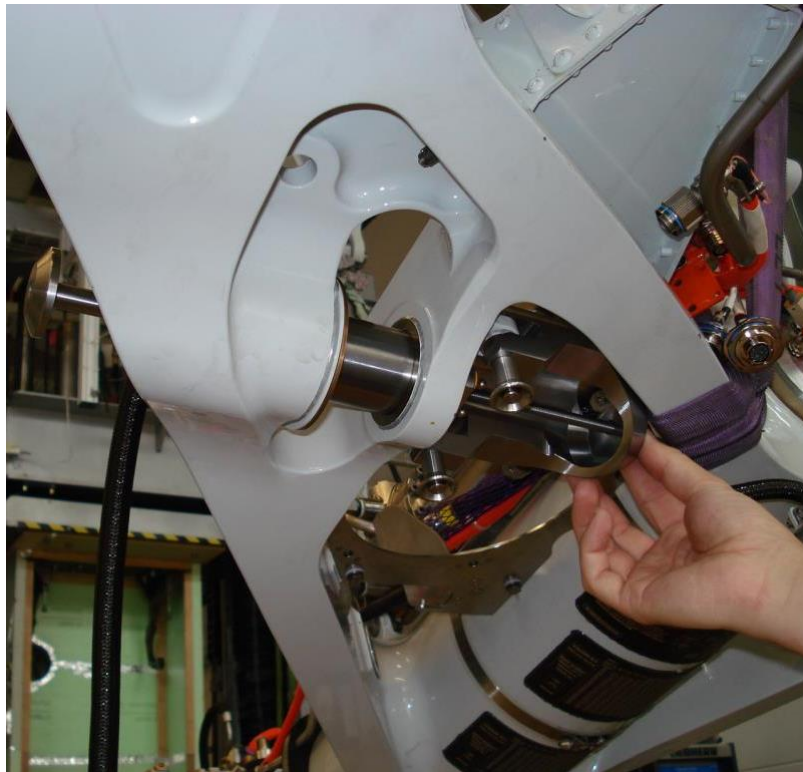
A350 NLG Liebherr Tooling Catalogue

Removing Tool PN: 6260B0900-01

Function: Removal of retraction actuator bolt

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260B0900-01



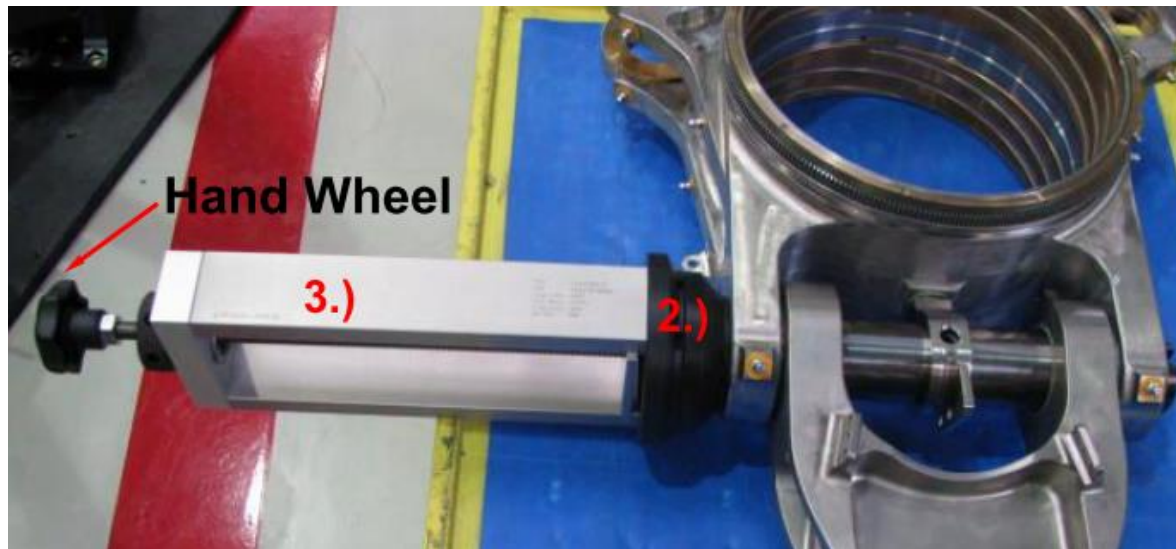
A350 NLG Liebherr Tooling Catalogue

Puller Extract PN: 6260A1000-01

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A1000-01

Function: Removal and installation torque link bolts

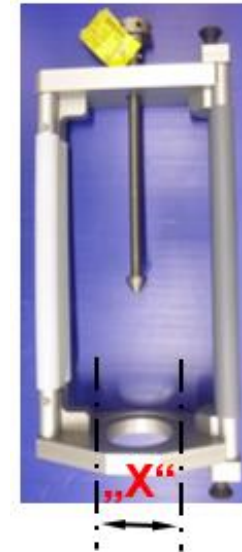
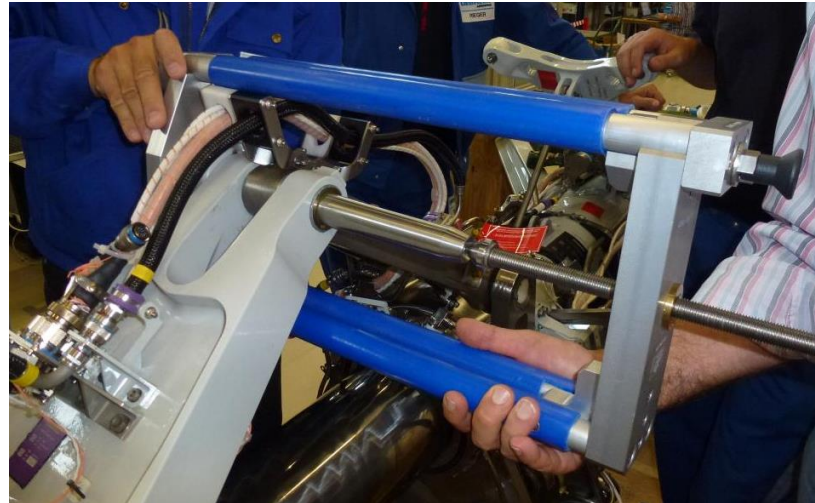
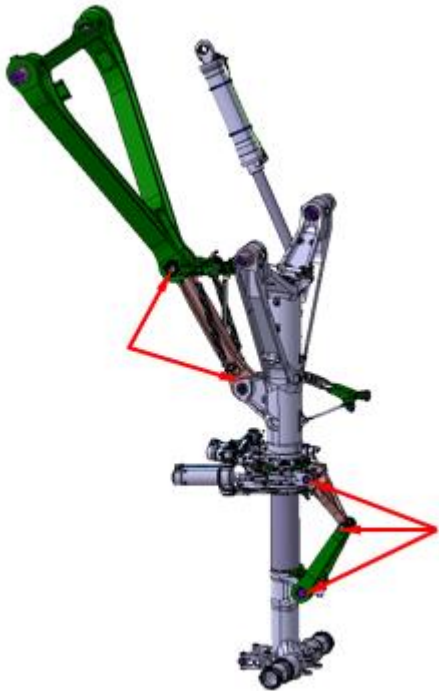


A350 NLG Liebherr Tooling Catalogue
Assembly Tool PN: 6260A2000-01

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✗	6406A0000-01

Ref.: TEM 6260A2000-01

Function: RI apex bolts and torque links



Bigger lock stay bore on lock stay NLG PN: 6406A0000-01 with subsequent bigger guide cone diameter

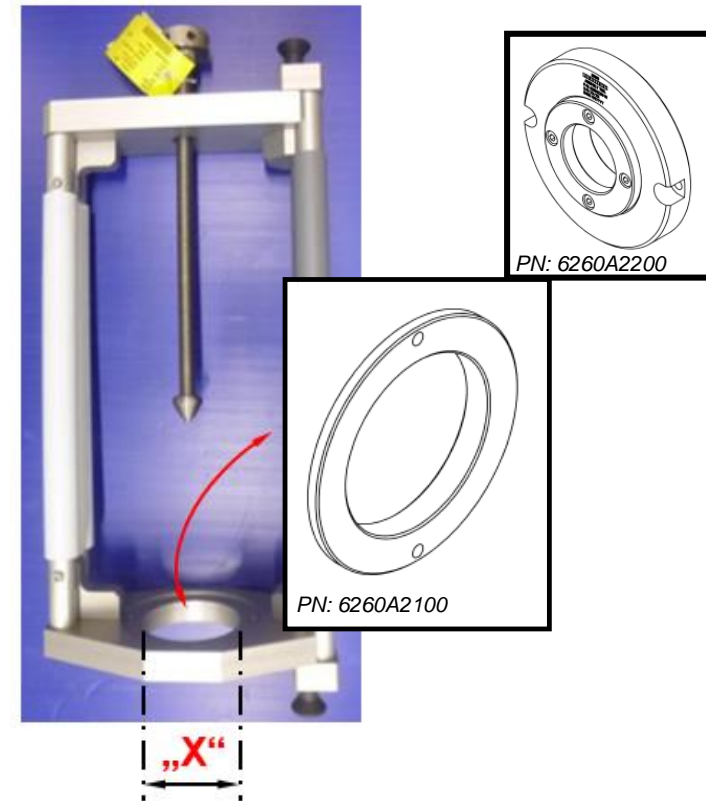
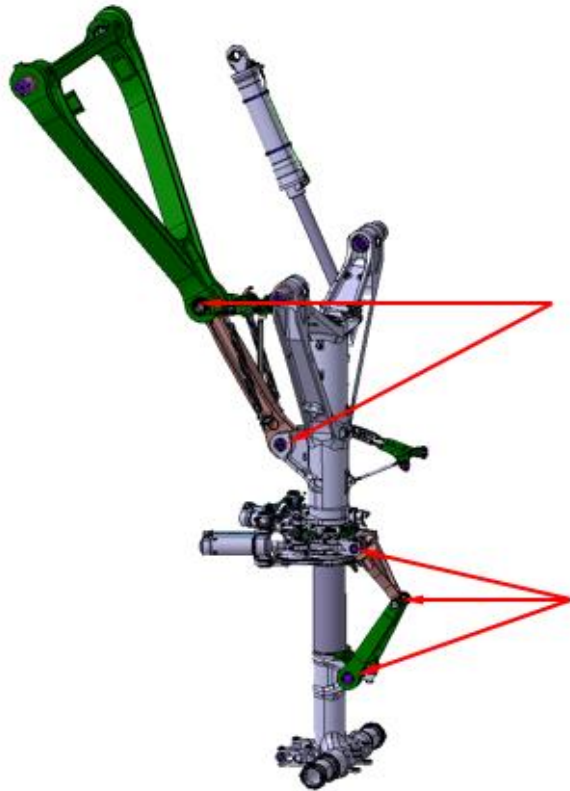
- Note: Part of GSE SET PN: 6260A0000-02
- Tool valid for -800/-900 only. No -1000 application

A350 NLG Liebherr Tooling Catalogue
Assembly Tool PN: 6904A2000-01

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A2000-01

Function: RI apex bolts and torque links



Increased dimension „X“ (bore diameter). Tool valid for -800/-900/-1000

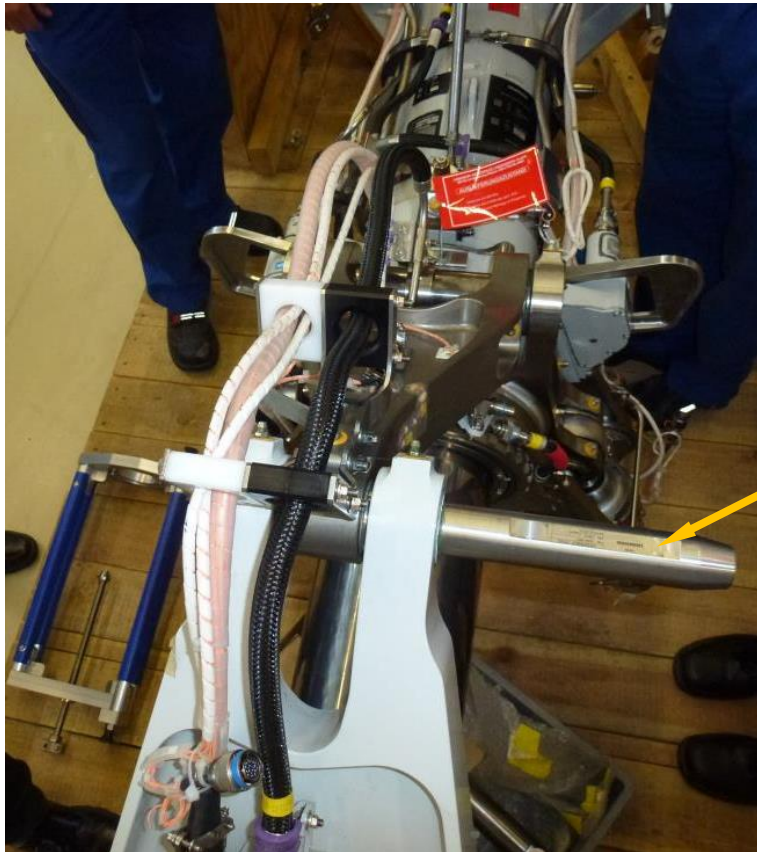
A350 NLG Liebherr Tooling Catalogue

Assembly Tool PN: 6260-0001

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260-0001

Function: Installation torque link apex pin

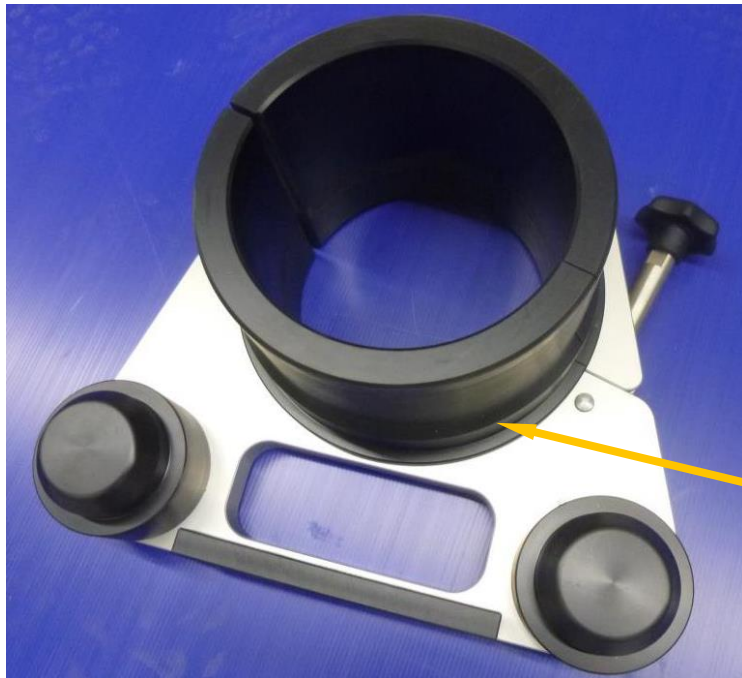


A350 NLG Liebherr Tooling Catalogue

Cover PN: 6260A3000-01

✓	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01
Ref.: TEM 6260A3000-01			

Function: To support lower steering plate during removal



Do not change the dimension „Y“ of plastic cover by yourself to prevent the shock strut from possible damage. A/C might be needs to be slightly lifted for tool installation.

A350 NLG Liebherr Tooling Catalogue

Drawing Tool PN: 6260A4000-01

Function: Spring removal and installation tool

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A4000-01



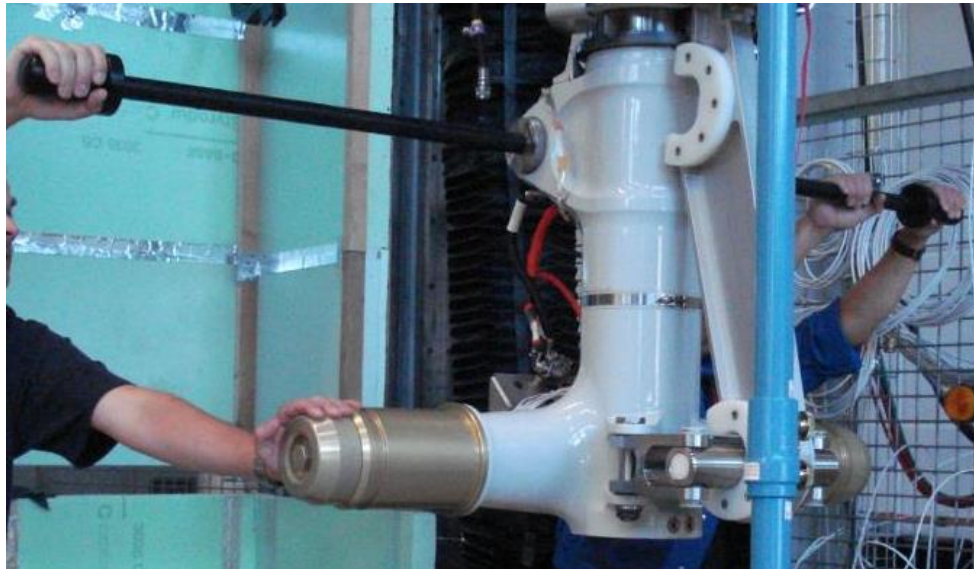
A350 NLG Liebherr Tooling Catalogue

Removing Tool PN: 6260B5100-01

✗	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

Update of TEM in Process

Function: To turn the slider during removal and installation



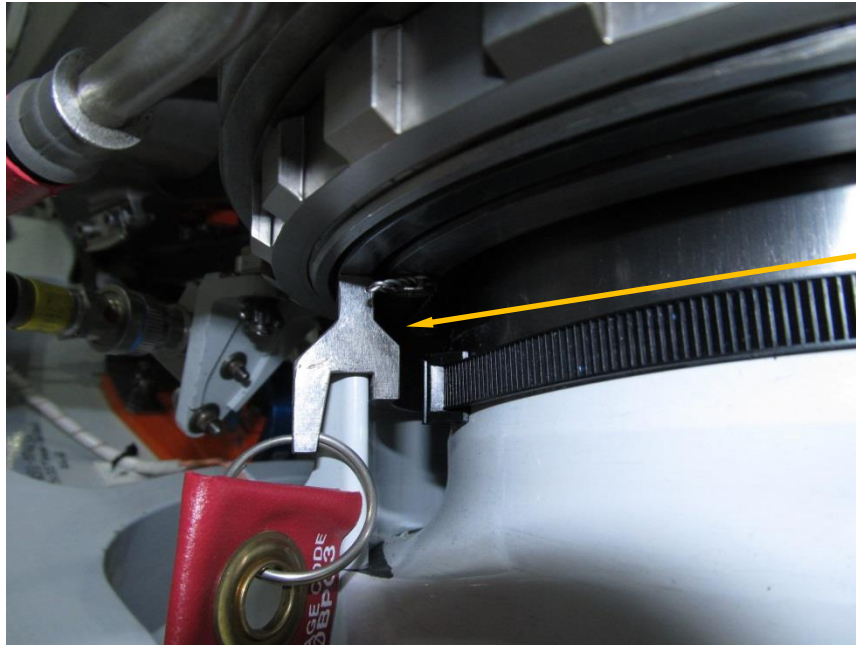
A350 NLG Liebherr Tooling Catalogue

Guide Block PN: 6904A1100-01

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6904A1100-01

Function: To apply correct amount of oil during servicing



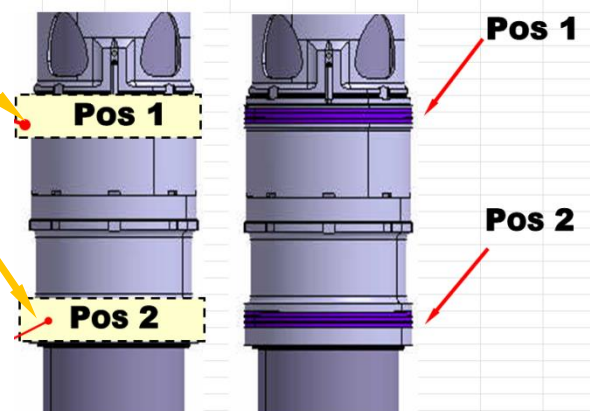
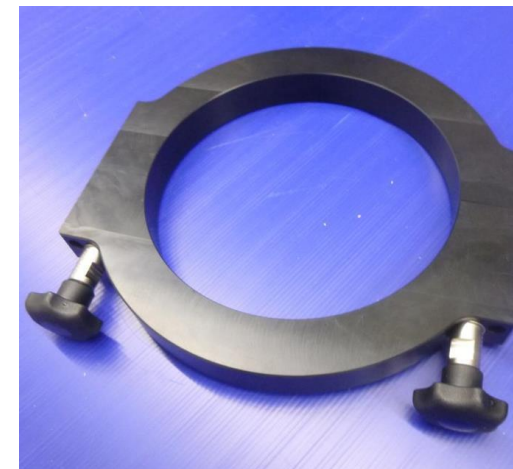
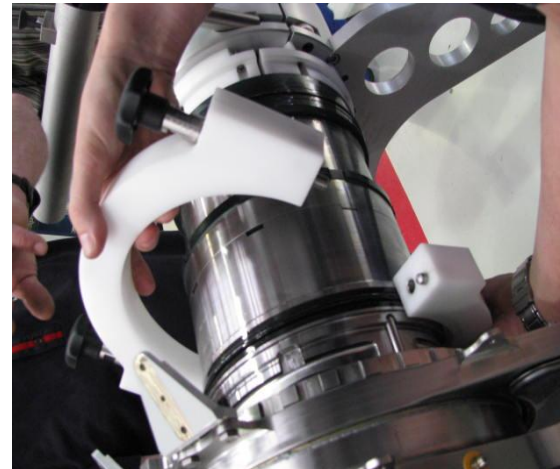
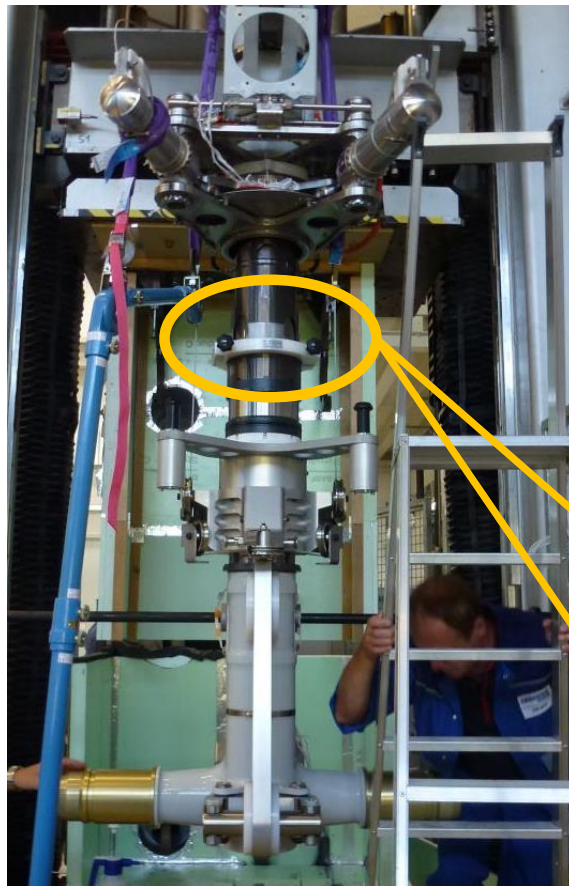
A350 NLG Liebherr Tooling Catalogue

Installation Tool PN: 6260A6500-01

✗	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A6500-01

Function: To avoid shearing of O-Ring during installation



In case tooling is not installed, seal will be sheared during pushing the slider back to main fitting.

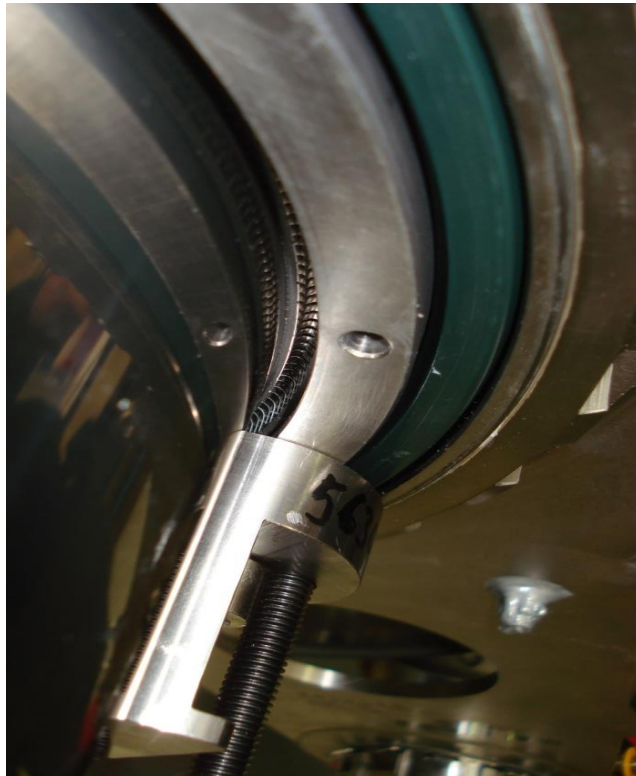
A350 NLG Liebherr Tooling Catalogue

Removing Tool PN: 6260A6600-01

Function: Ring removing tool

✗	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A6600-01



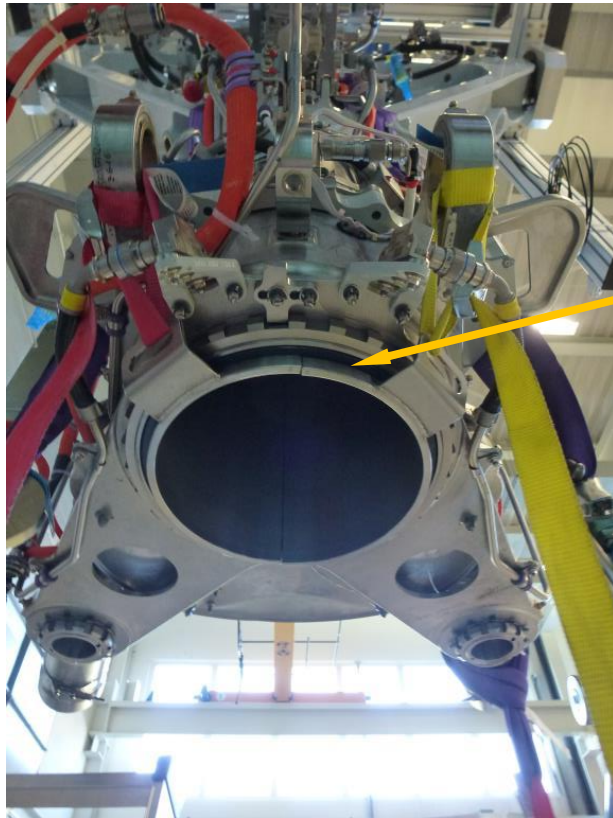
A350 NLG Liebherr Tooling Catalogue

Installation Jig PN: 6260A6800-01

✗	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A6800-01

Function: Protection sleeves to install slider into main fitting



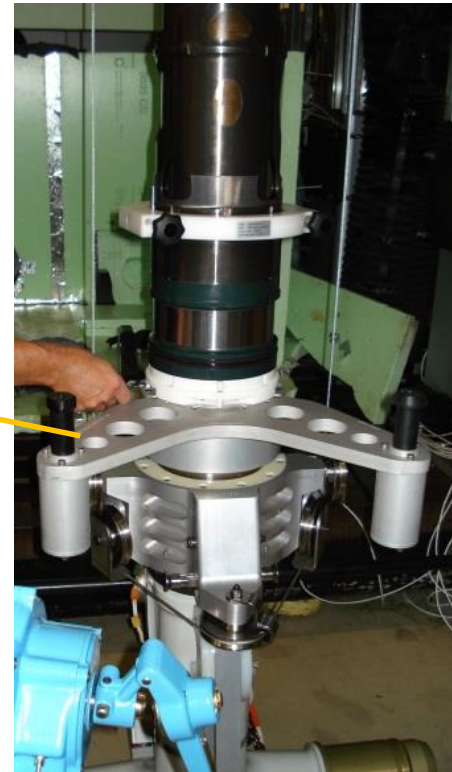
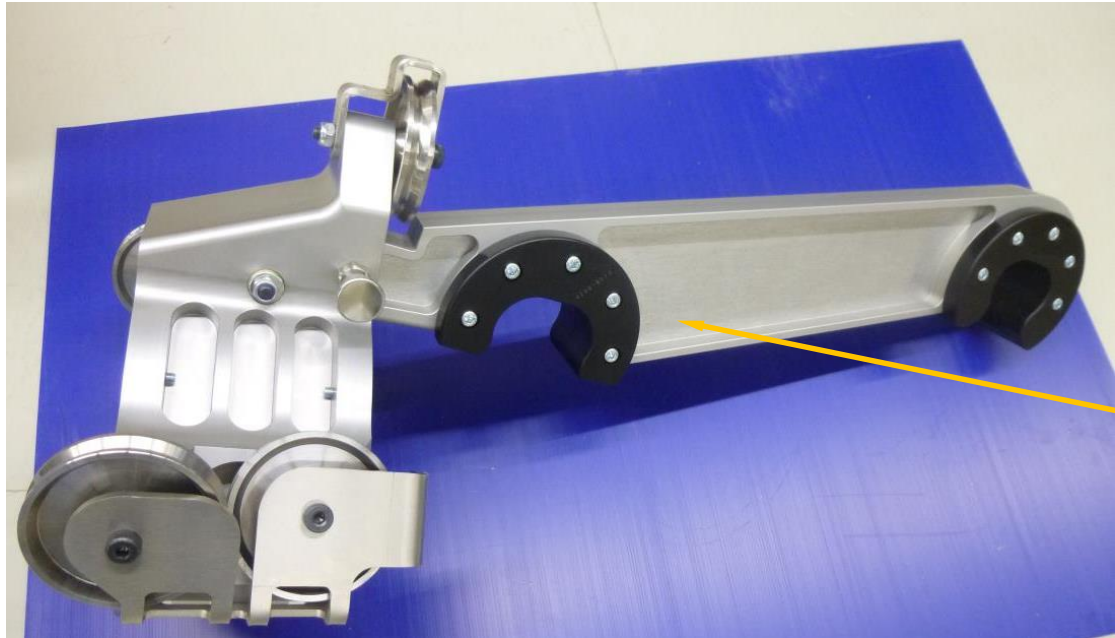
A350 NLG Liebherr Tooling Catalogue

Lifting Beam PN: 6260A6000-01

✗	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A6000-01

Function: Lifting of NLG sliding tube into main fitting



A350 NLG Liebherr Tooling Catalogue

Didsbury Hoist Kit (Not Included)

Function: To support lower steering plate during removal

AIRCRAFT APPLICATION SHEET FOR: 42/674

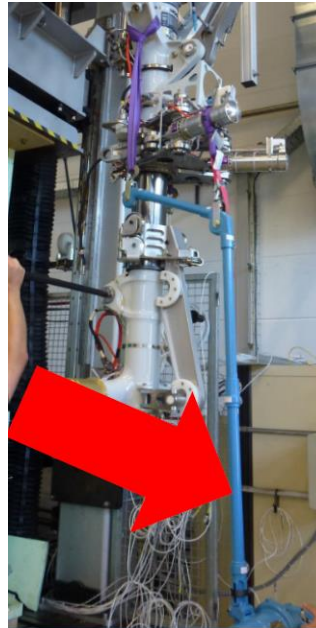
A350 NLG SLIDING TUBE R/I HOIST KIT

Revision 2. Includes 41/163

didsbury
World class fitting and handling solutions
Didsbury Engineering Co Ltd
Telephone: +44 (0)161 486 2200
Facsimile: +44 (0)161 486 2211
Email: sales@didsbury.com
Web: www.didsbury.com

ITEM NO.	PART No.	DESCRIPTION	QTY.
1	42/1	WINDING MECHANISM	1
2	41/100	610mm EXTENSION TUBE	2
3	41/104	457mm EXTENSION TUBE	1
4	41/110	TUBE COUPLING	1
5	42/672	ANGLE CHANGER	1
5	42/639	TOP SHEATH ASSEMBLY	1
7	42/494	HOOK	1
8	42/20	CABLE ASSEMBLY (FOR REFERENCE ONLY)	1
9	41/163	9" WINDING HANDLE	1

SWL: 254 Kg
WEIGHT: 18 Kg



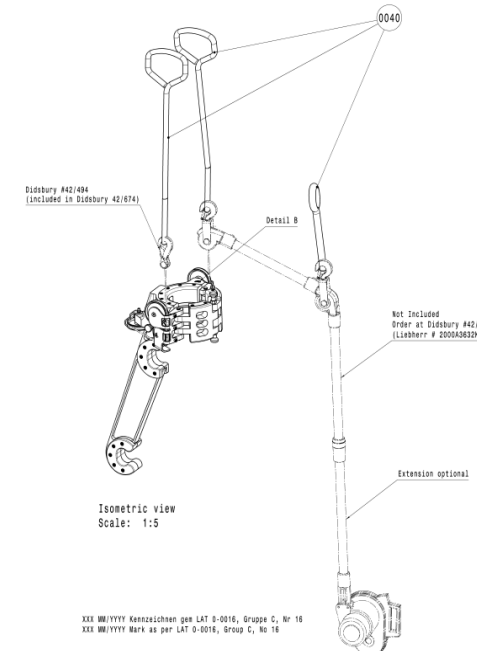
Didsbury Engineering Co Ltd

Telephone: +44 (0)161 486 2200
Facsimile: +44 (0)161 486 2211
Email: sales@didsbury.com
Web: www.didsbury.com

HOIST KIT TO BE ORDERD SEPERATLY
@ Didsbury directly. Liebherr
Reference Number is: 6260A6000M01

✗	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A3000-01



Minimum 800 mm clearance from ground to jacking dome is needed to remove sliding tube (total).

A350 NLG Liebherr Tooling Catalogue

Holding Tool PN: 6260A7000-01

✗	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A7000-01

Function: Jig to hold sliding tube



A350 NLG Liebherr Tooling Catalogue

Holding Fixture PN: 6260A8000-01

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A8000-01

Function: Shim installation tool



- Tooling was original designed to install the shims on A350-800/900 only with smaller bolt system and subsequent shim diameter.
- On A350 common NLG the shim does not fit exactly into the radius of the tooling, but tooling remains fully functional, positioning of shim into gap is possible as well.

A350 NLG Liebherr Tooling Catalogue

Extracting Tool PN: 6260A9000-01

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A9000-01

Function: Removal anti rotation pin



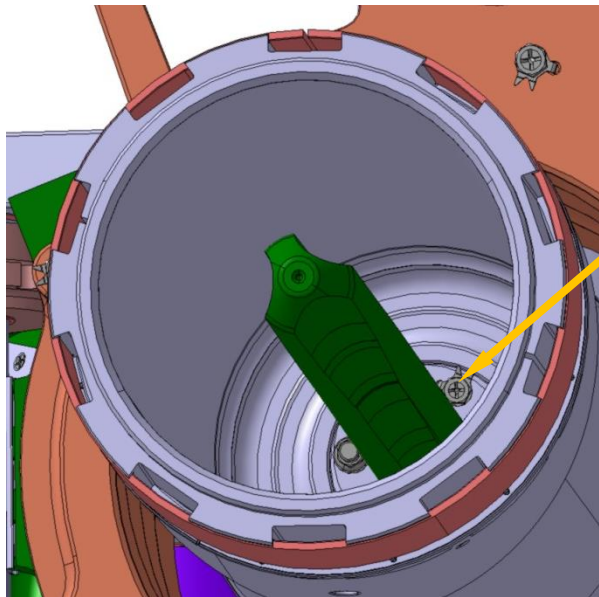
A350 NLG Liebherr Tooling Catalogue

Removing Tool PN: 6260A6700-01

✗	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A6700-01

Function: Metering pin screw installation



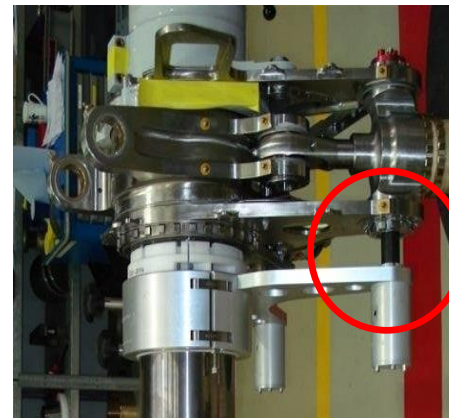
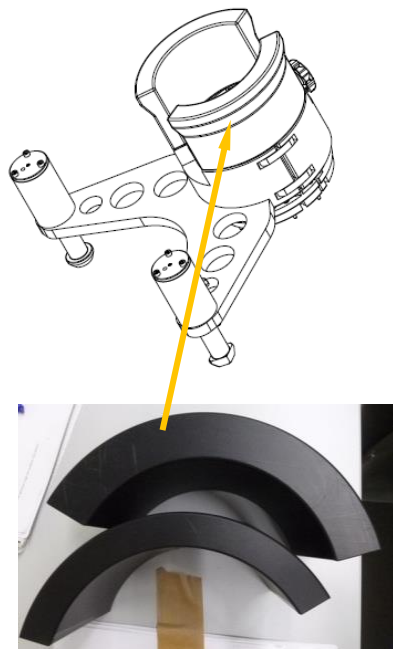
A350 NLG Liebherr Tooling Catalogue

Installation Tool PN: 6904A5200-01

✗	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A5200-01
Update of TEM to 6904A5200-01 in Process

Function: Positioning of slider during installation into main fitting



- Note: Tool modified from PRE PN: 6260A5200-01 (non procurable) into POST PN: 6904A5200-01 (Drilling pitch of attachment screws have changed) - PN: 6904A52000-01 validated and procurable
- Note: Spacer Piece PN: 6904-5212 is added to the tooling helping to ease installation of NLG

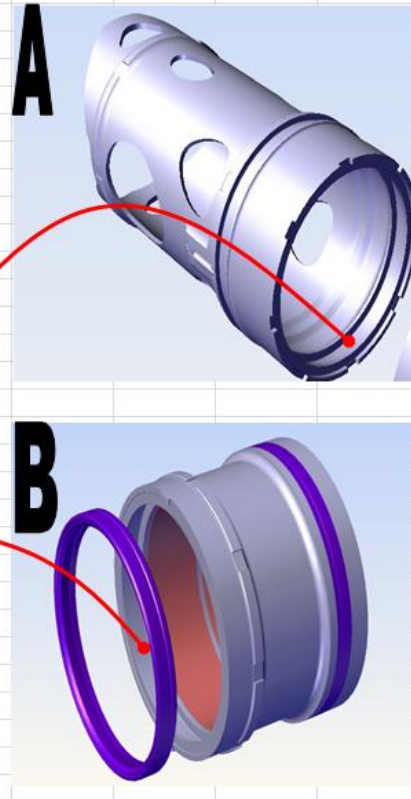
A350 NLG Liebherr Tooling Catalogue

Mounting Sleeve PN: 5035-0020W01

✗	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 5035-0020

Function: Calibration of cuff seals



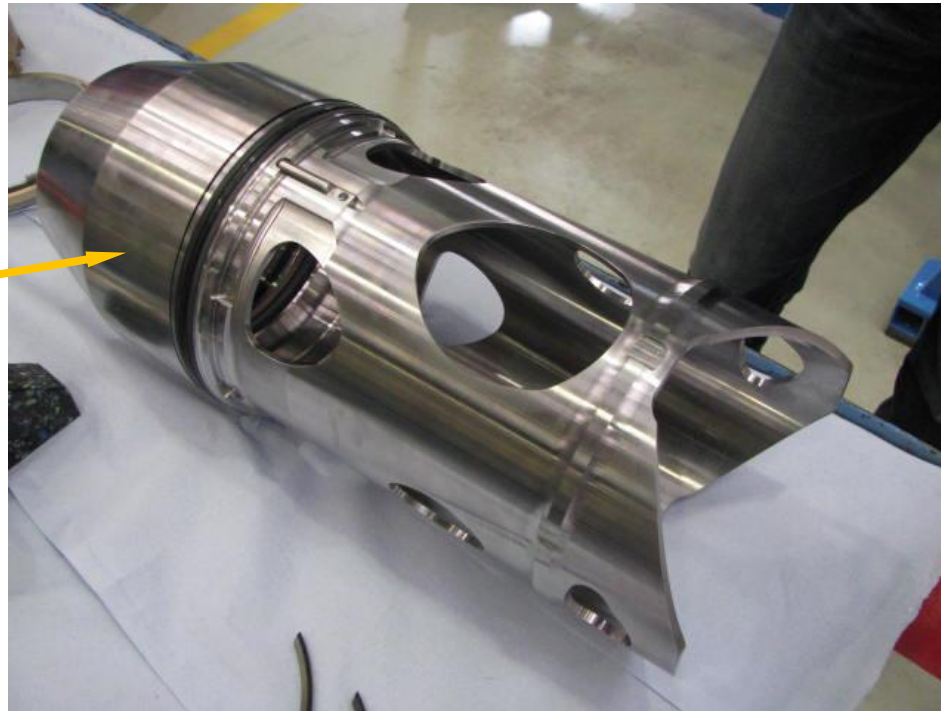
A350 NLG Liebherr Tooling Catalogue

Mounting Tool PN: 5035-0023W01

✗	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 5035-0023

Function: Steering cam seal installation



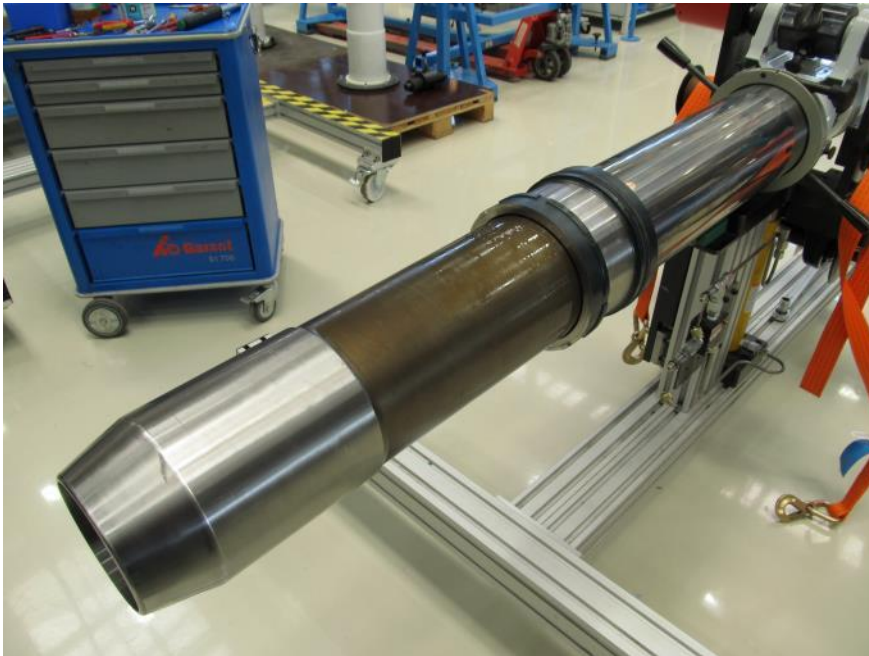
A350 NLG Liebherr Tooling Catalogue

Mounting Tool PN: 5814A0000-01

✗	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 5814A0000-01

Function: Seal installation slider

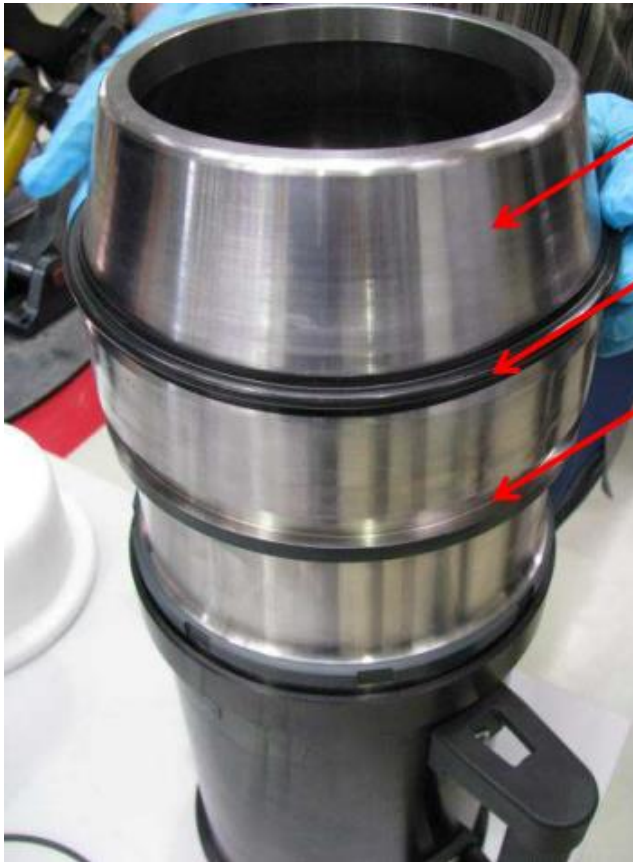


A350 NLG Liebherr Tooling Catalogue
Mounting Sleeve PN: 5677-0001

✗	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 5677A0000-01

Function: To install bearing on shock strut



A350 NLG Liebherr Tooling Catalogue

Mounting Device PN: 5815A0000-01

✗	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 5815A0000-01

Function: Scraper ring installation



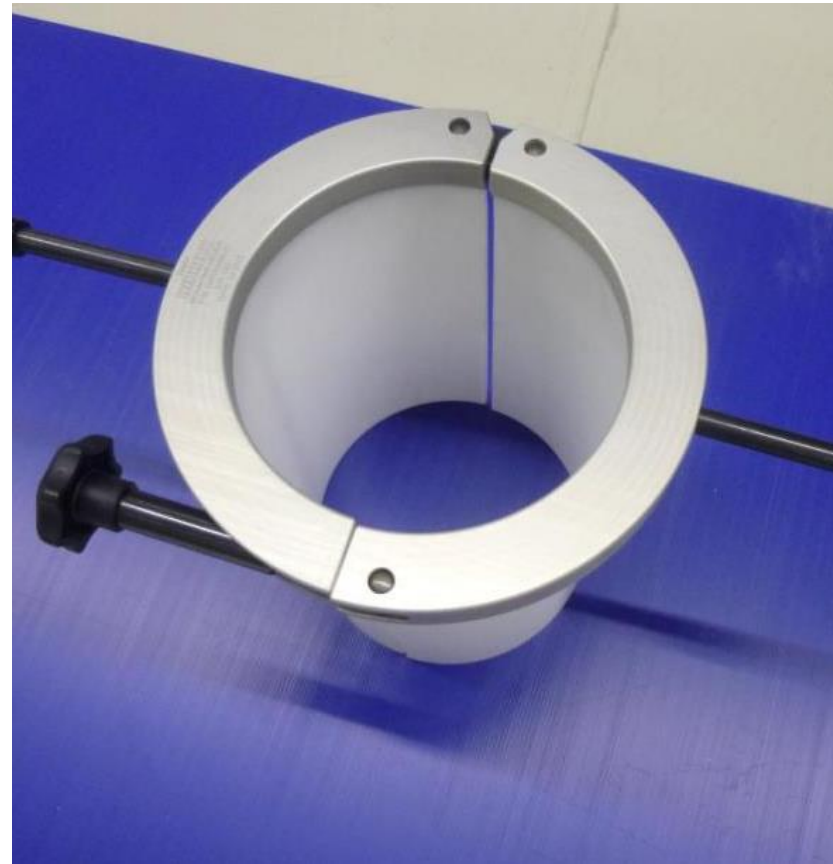
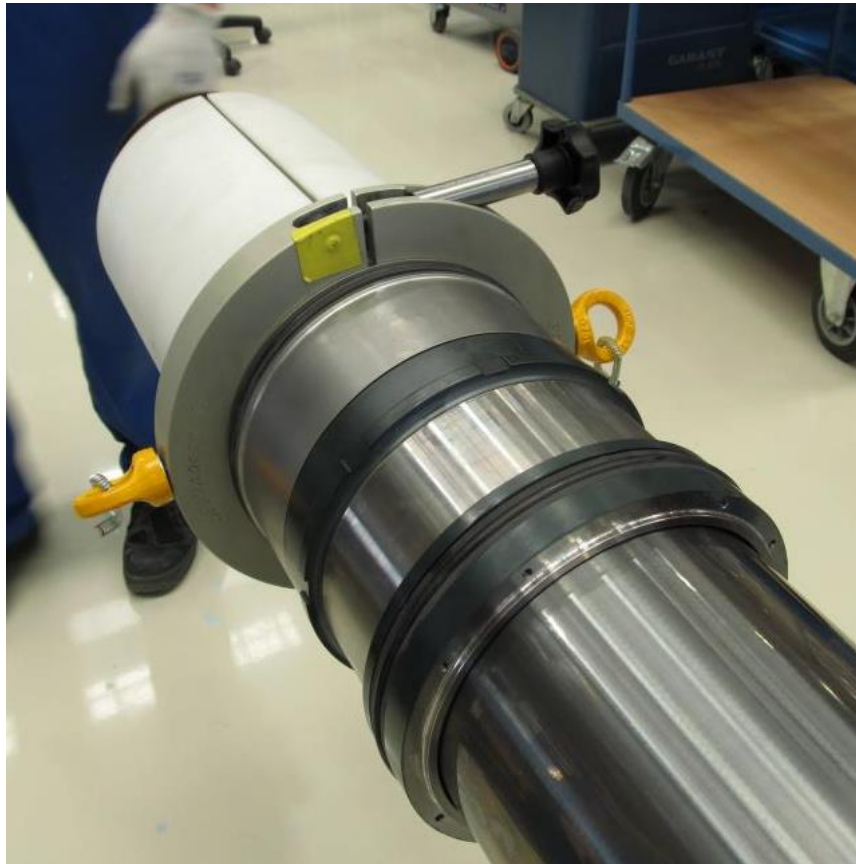
A350 NLG Liebherr Tooling Catalogue

Mounting Device PN: 5807A0000-01

✗	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 5807A0000-01

Function: Steering cuff installation



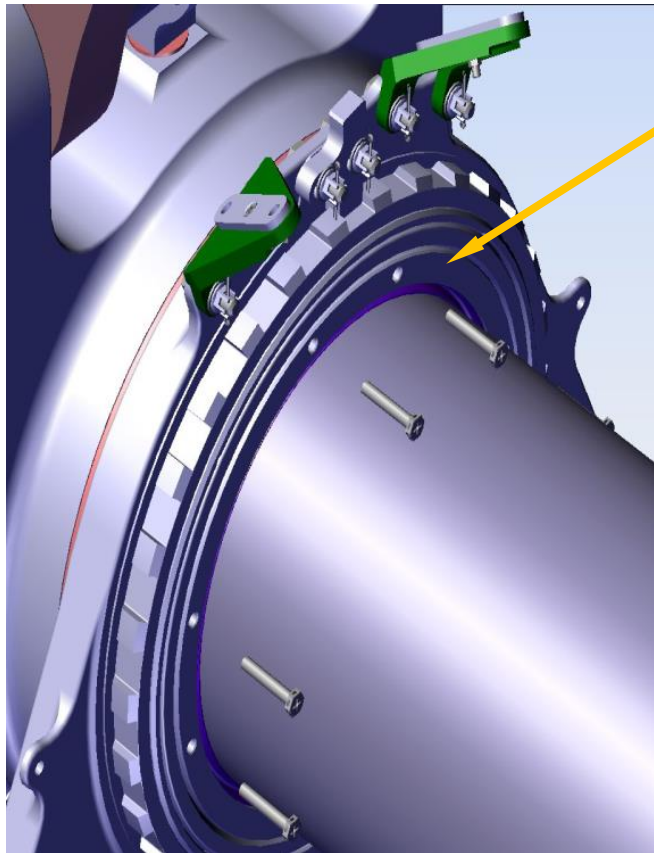
A350 NLG Liebherr Tooling Catalogue

Installation Tool PN: 5035-0043W01

✗	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 5035-0043

Function: Rotation of ring to find screw position



Ring



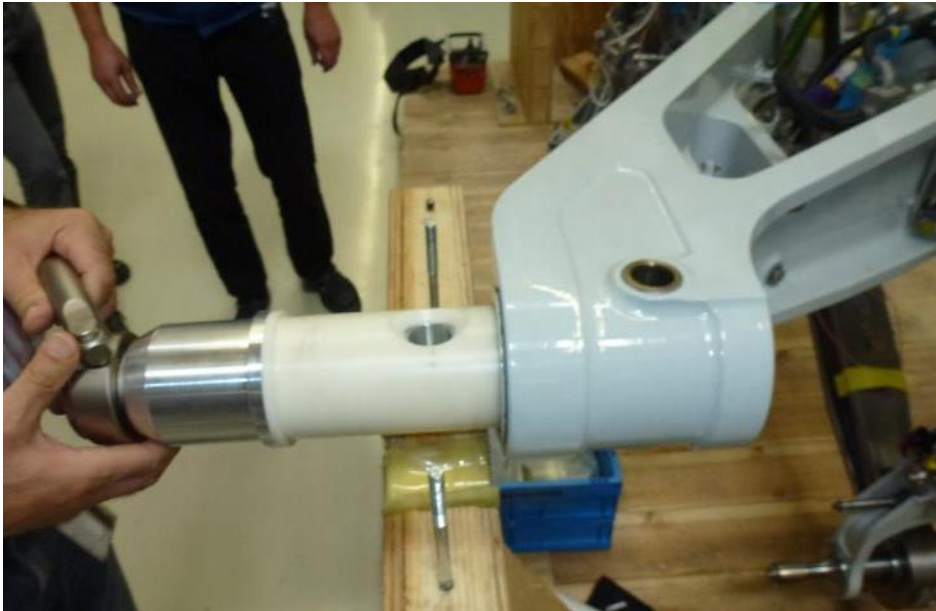
A350 NLG Liebherr Tooling Catalogue

Lifting Gear PN: 6260A6900-01

✗	Line Maintenance	✓	4816A0000-06
✓	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260A6900-01

Function: Lifting of NLG out of transport box



A350 NLG Liebherr Tooling Catalogue

Socket Wrench PN: 6260-0003

Function: Wheel nut removal and installation

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260-0003



A350 NLG Liebherr Tooling Catalogue

Extension PN: 6904A9100-01

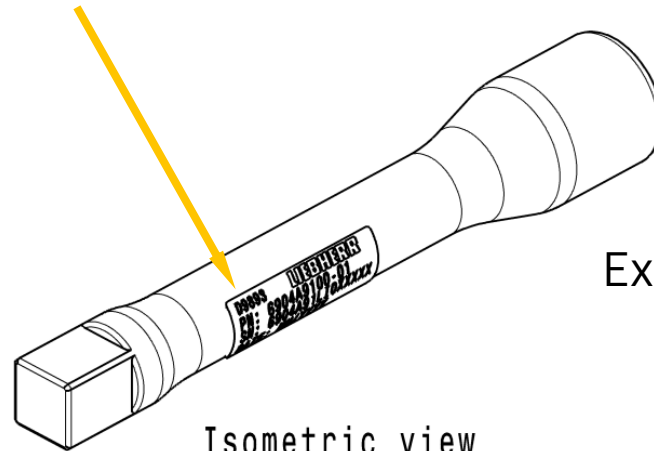
✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6260-0003

Function: Extension for Wheel nut (PN: 6260-0003)



WHEEL NUT PN (6260-0003)



Isometric view
Scale: 1:1

Extension PN: 6904A9100-01

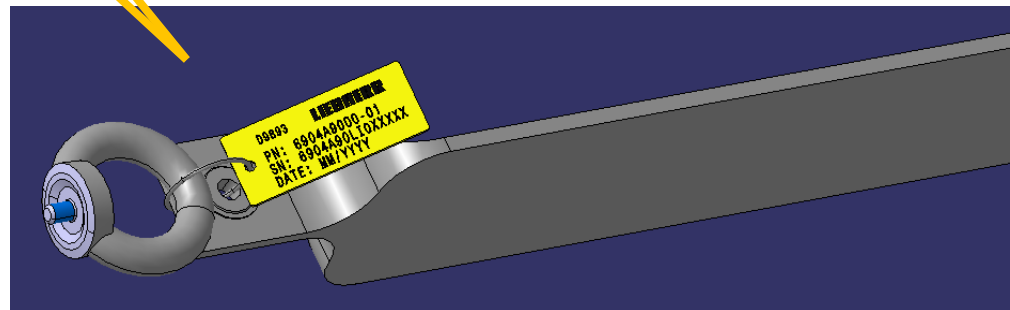
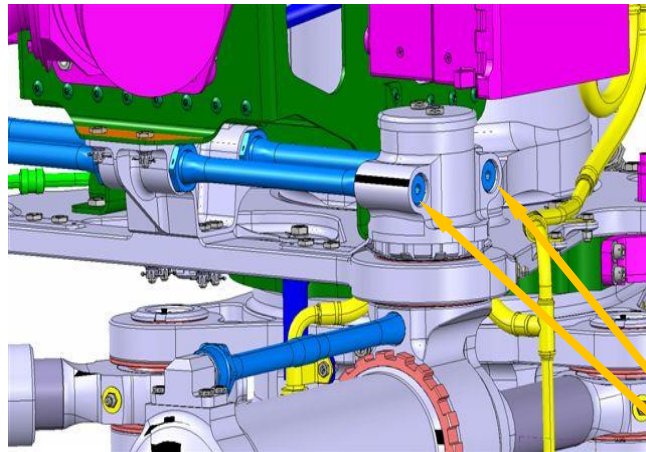
A350 NLG Liebherr Tooling Catalogue

Removal Tool PN: 6904A9000-01

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 6904A9000-01

Function: Removal of transfer tubes SCOV



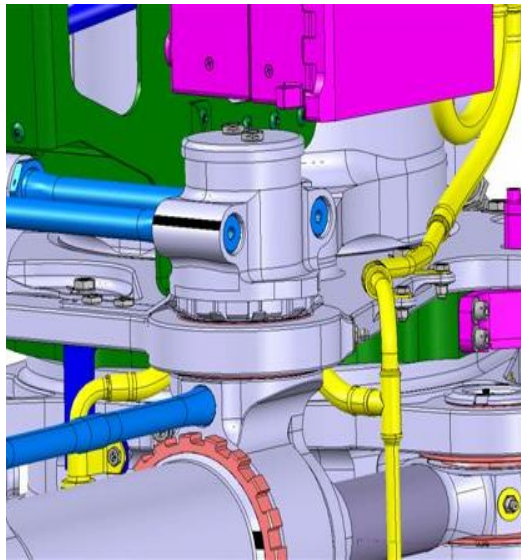
Tool necessary for LLI SB-4816A-32-16 & SB-6406A-32-03

Mounting Device PN: 5665A0000-01

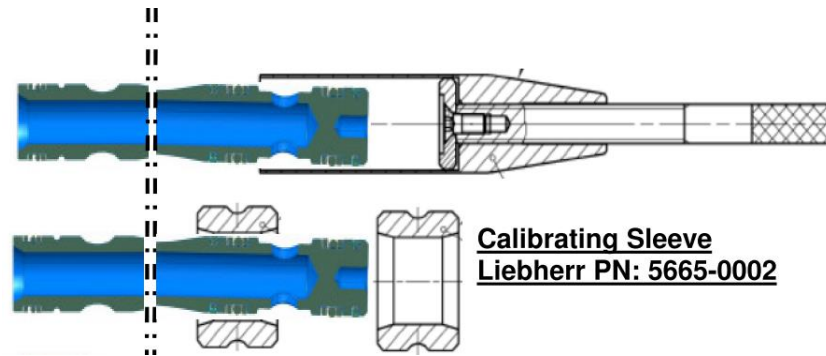
✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM 5665A0000-01

Function: SCOV PRE PN: 4818A0000-06 seal installation set transfer tube capable on both sides (SCOV SIDE & CONNECTING BLOCK SIDE)



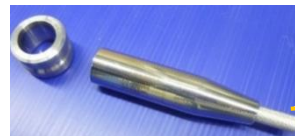
PRE: Transfer Tubes
PN: 4816-0033



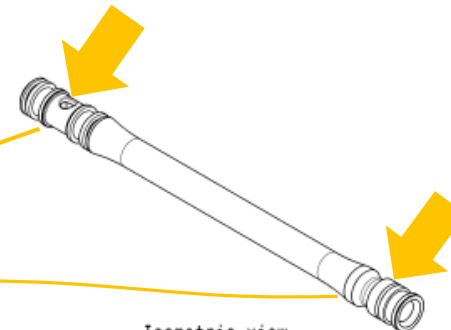
Adjustable seal Guide
Liebherr PN: 5665A0100-01

Calibrating Sleeve
Liebherr PN: 5665-0002

PRE-MOD: PNR 4818A0000-06



Tooling applicable for both sides



Isometric view
Scale: 1:1

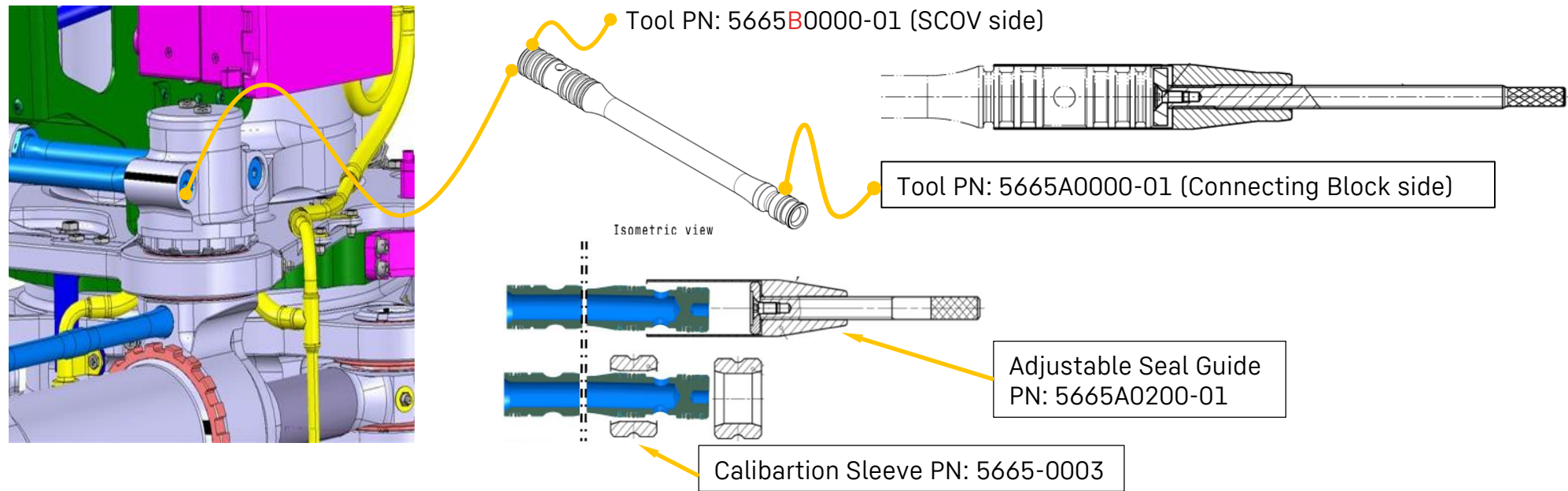
A350 NLG Liebherr Tooling Catalogue

Mounting Device PN: 5665B0000-01

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM No.: TBD

Function: SCOV POST PN: 4818B0000-01 seal installation set transfer tube Tool
 PN: 5665B0000-01 capable only on SCOV side



- NOTE: POST SCOV PN: 4818B0000-01 has a higher transfer tube diameter on SCOV side
For SCOV PN: 4818B0000-01 Tool Set PN: 5665A0000-01 AND PN: 566B0000-01 required
- Both tools necessary for LLI SB-4816A-32-16 & SB-6406A-32-03 (Modified SCOV PN: 4818B0000-01)

A350 NLG Liebherr Tooling Catalogue

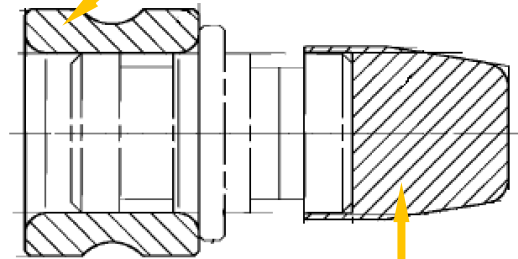
Mounting Device PN: 5662A0000-01

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

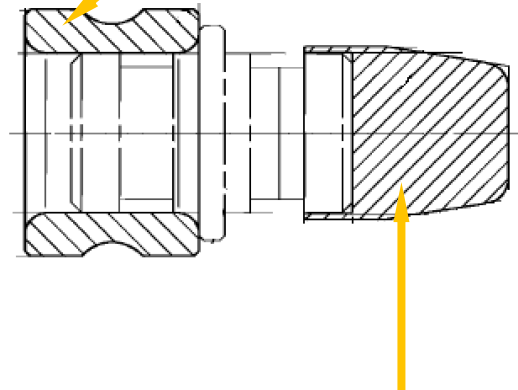
Ref.: TEM No.: TBD

Function: Coupling Plug seal installation Set (O-Ring & Back-up Ring)

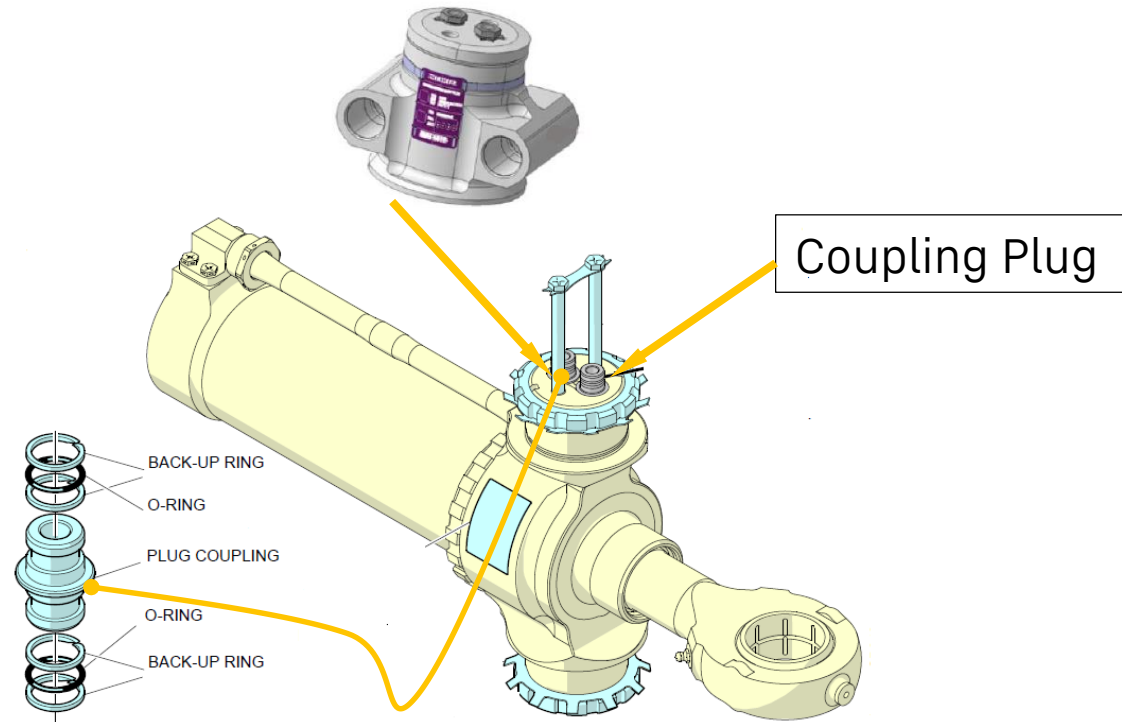
Tool PN: 5662-0002



Tool PN: 5662-0001



POST-MOD: PNR 4818B0000-01



Tool necessary for LLI SB-4816A-32-16 & SB-6406A-32-03

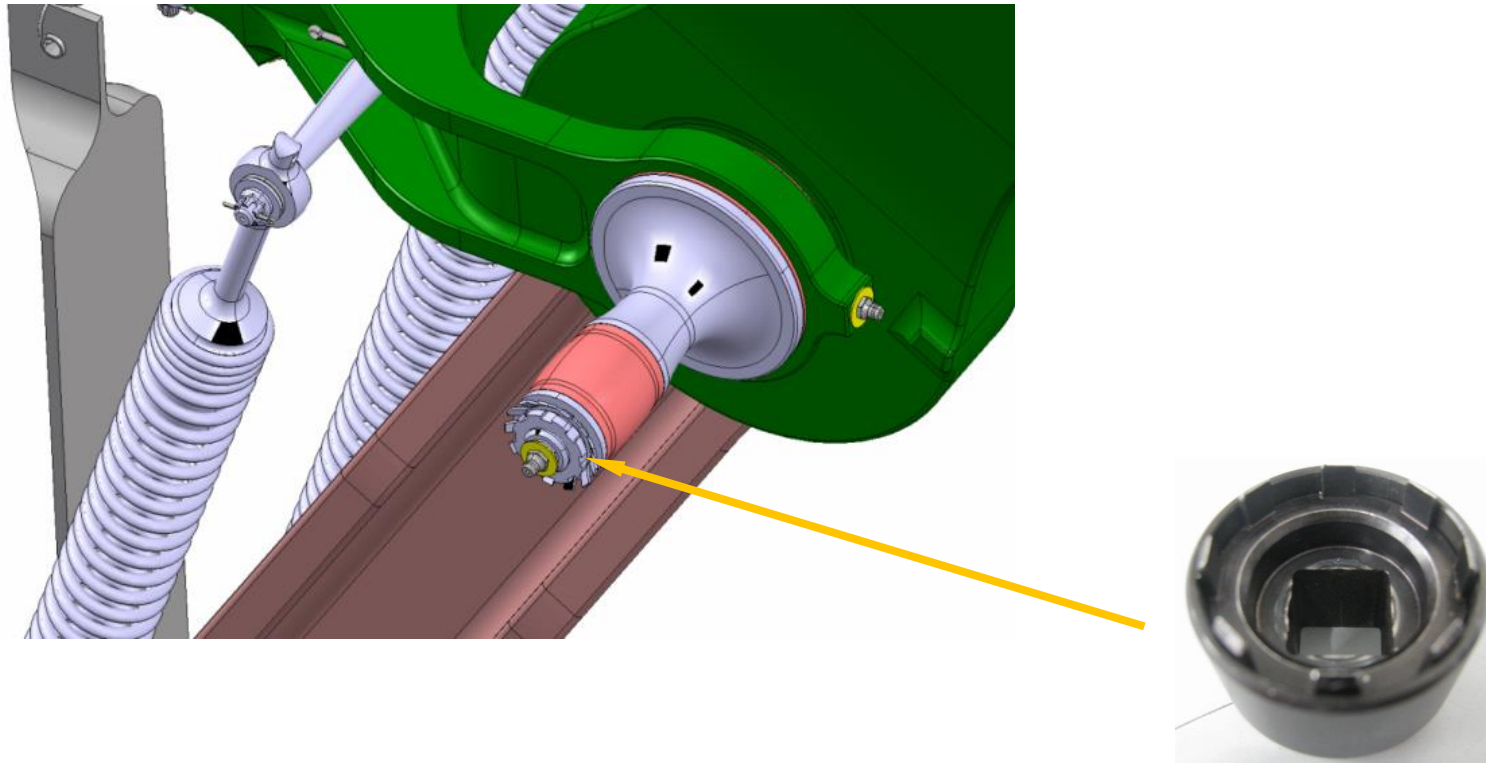
A350 NLG Liebherr Tooling Catalogue

6287A0000-01 Uplock Roller Nut

Function: Removal of Uplock Roller Nut

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM No.: TBD



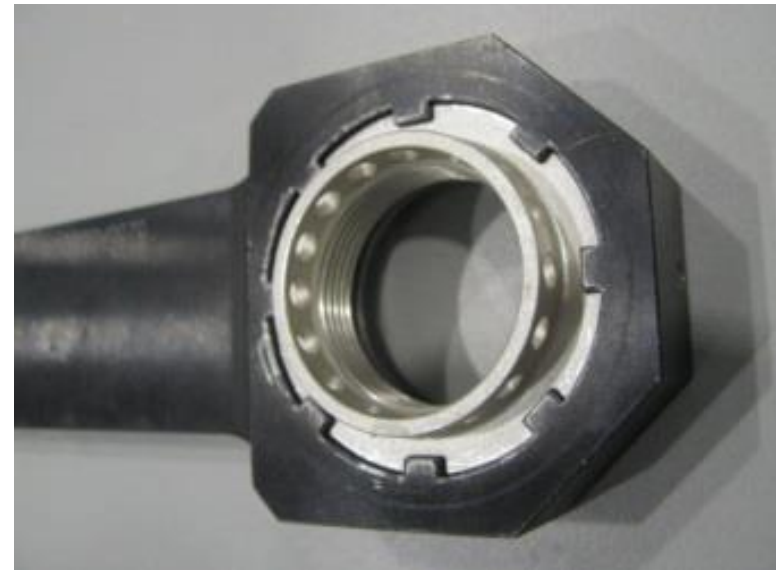
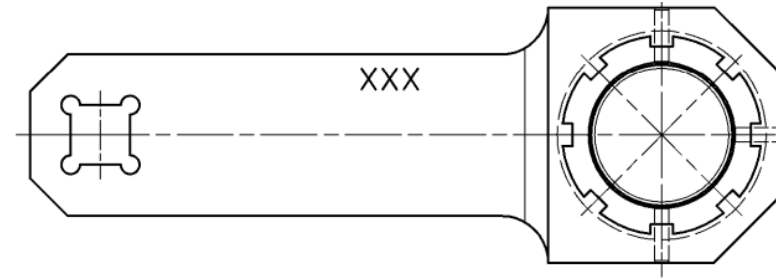
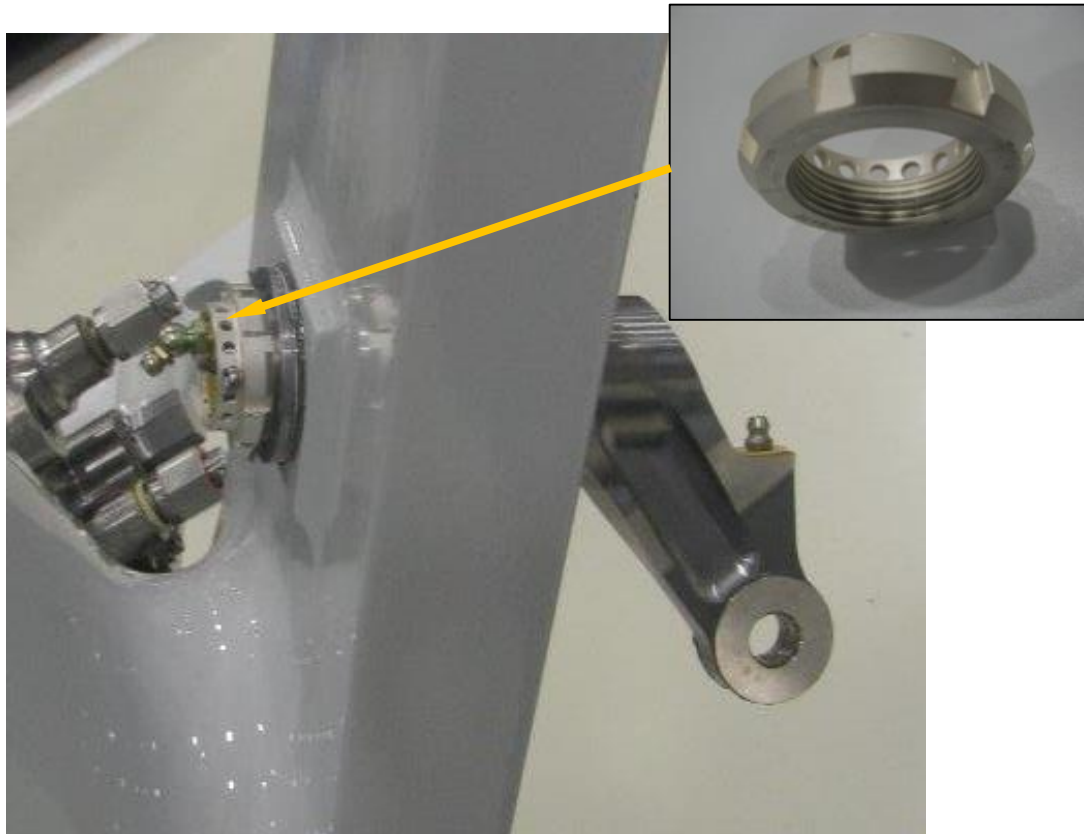
A350 NLG Liebherr Tooling Catalogue

6286A0000-01 Bolt Door Stop

✓	Line Maintenance	✓	4816A0000-06
✗	Heavy Maintenance	✓	6406A0000-01

Ref.: TEM No.: TBD

Function: Removal of Crank Bolt Door Stop



A350 NLG Liebherr Tooling Cataloge

REVISION RECORD

PAGE	DATE	CHANGE	REMARK
1	02.2018	PROCURABLE SET PN: 6904A0000-02 to 6904A0000-01	TYPO / REF. BOM
2	02.2018	PROCURABLE SET PN: 6904A0000-02 to 6904A0000-01	TYPO / REF. BOM
3	02.2018	PN: 6904A0000-02 to 6904A0000-01	TYPO / REF. BOM
6/17/27/53	02.2018	TEM ref. number added	TEM available
6	02.2018	PN: 6904A9800-01 and PN: 6904A9700-01 added	TEM available
27	10.2018	Insert PNs 6260A2100 & 2200 added	REF. BOM
37	10.2018	Didsbury Hoist Kit added	N.A
8-56	08.2019	A350 NLG PN & Maintenace Traffic Light added	N.A
55	05.03.2020	New Transfer Tube Seal Installation Tooling added	N.A
39	16.07.2021	Tool radius diffrence for A350 800/900 and Common NLG	N.A
56	08.10.2021	Coupling Plug Seal installation tool introduced	N.A
All	27.05.2022	Change to corporate identity	N.A

Thank you for your attention

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