
RTW 2022

Airbus

SA Family

GERMANY, EUROPE
19 September 2022

LIEBHERR

Liebherr-Aerospace Toulouse



Airbus SAceo

ATA 36

LIEBHERR

Liebherr-Aerospace



Agenda

- 1 Introduction and presentation
- 2 SAceo - Fleet Performance - Airbus data
- 3 SAceo - ATA36 - Available solutions and mitigations
- 4 SA - ATA21 - AIR PACK REGUL FAULT
- 5 SAneo - ATA36 - High Pressure Valve
- 6 SAneo - ATA36 - Fan Air Valve Body
- 7 Liebherr Initiatives and Digital Services

Your Liebherr Aerospace Toulouse Technical Support Team – Airbus fleet



Damien Pinet / Commercial Aircraft Team Leader

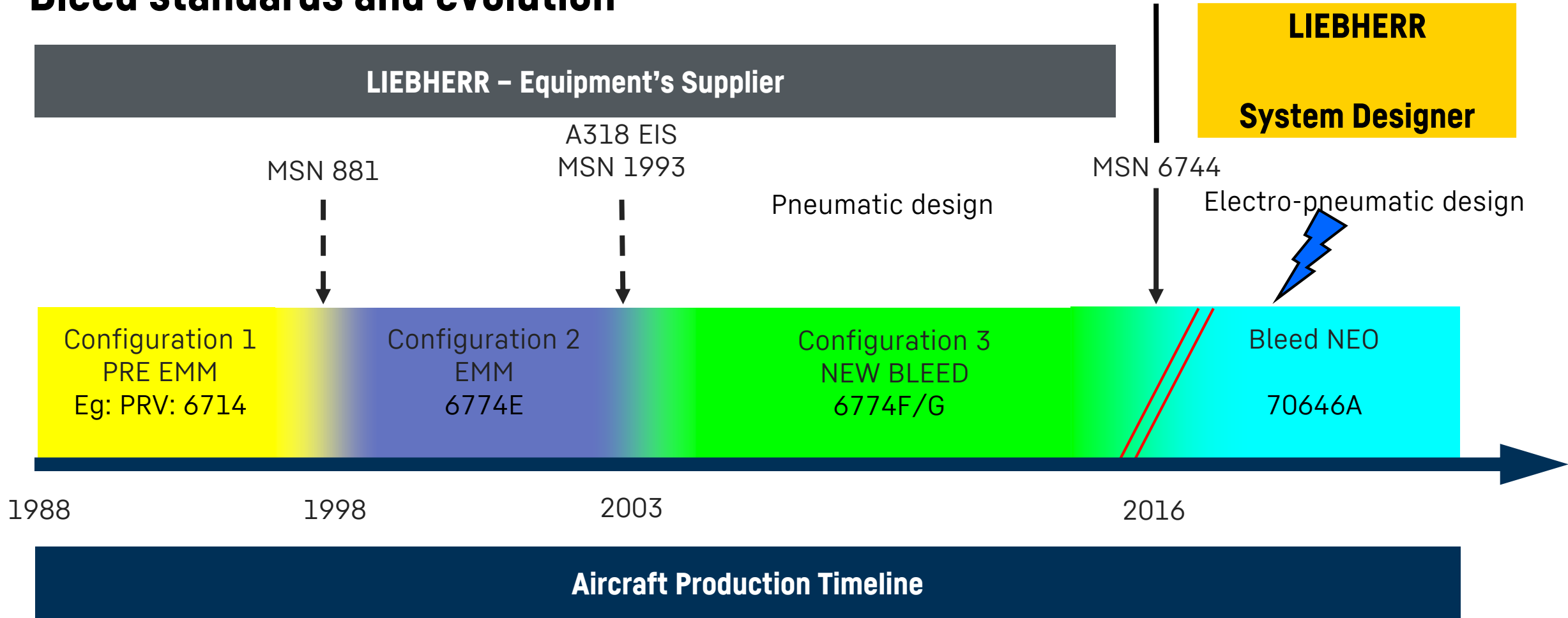
Nicolas Perles / SAneo ATA36 focal

Elisabeth Dahan / SAceo ATA6 focal
BTS & GSE Focal

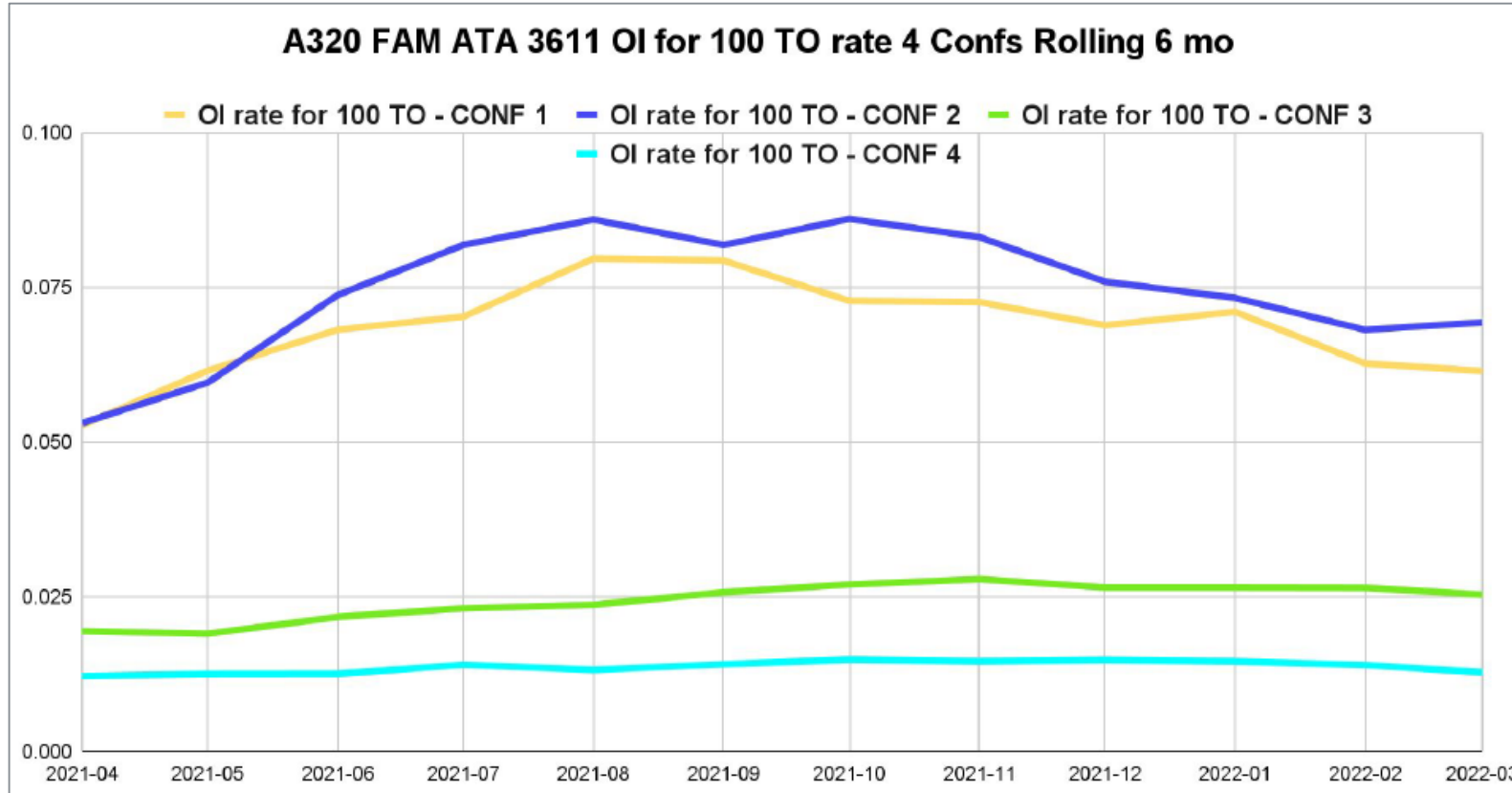
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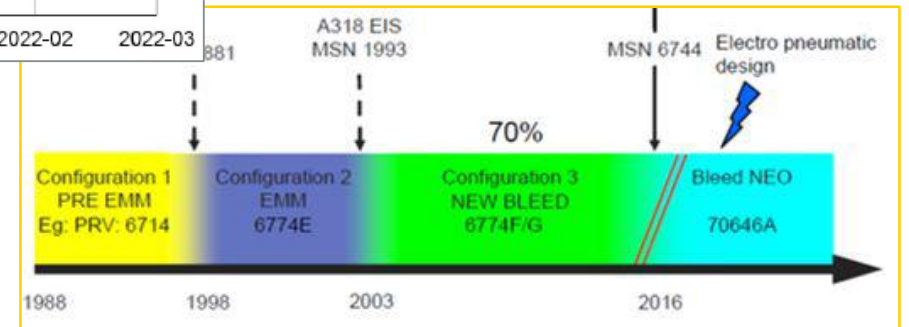
Bleed standards and evolution



A320ceo ATA36-11 – WW Fleet OI rate trend vs Bleed configurations



*Airbus data as of March 2022



Targeted solutions to optimize aircraft operation

		AIR ENG HP VALVE FAULT	AIR ENG BLEED NOT CLSD - PRV	TLT Misbehavior - 34D01*, 341E*, 341F01	Bleed Low Temperature - TCT	Bleed Overpressure at Take-Off	AIR ENG BLEED ABNORM PR - OPV 6740F01* & 6740G01*	AIR ENG BLEED FAULT - Over Temperature	AIR ENG BLEED FAULT - OTHERS	AIR ENG BLEED ABNORM PR - OTHERS
Mitigation/ solution	BMC STD12 + OPV G + Wiring	●	●	●		●				
	BMC STD12		●		●	●				
	TLT PN 341F020000			●						
	TCT PN 342B050000				●			●		
	FAV PN 6730F010000							●		
	EEC SCN 22					●				
	AMM/TSM improvement	●		●	●	●	●	●		
AIRBUS complementary solutions	AIRBUS bleed health check	●	●		●	●		●	●	●
	Skywise predictive maintenance	●	●	●	●			●	●	●
LIEBHERR complementary solutions	LIEBHERR bleed health check	●	●		●	●		●	●	●
	Data Driven Engineering Solutions (DDES)	●	●		●	●				
	Pack off/take-off SP	●	●	●		●				
	Bleed pressure regulation SP					●	●			
	Bleed temperature regulation SP				●			●		
	Overhaul solutions SP	●	●	●	●			●		
	Modernisation	●	●	●				●		

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Take-Off / Packs OFF - Solution and Mitigations

Take-Off / Packs OFF System

Overview



Liebherr

Take-off pack off

Preventive maintenance based on scheduled and recommended removals of the key involved equipment.



Airbus

ISI 36.11.00109

BMC STD12
BMC Full Kit

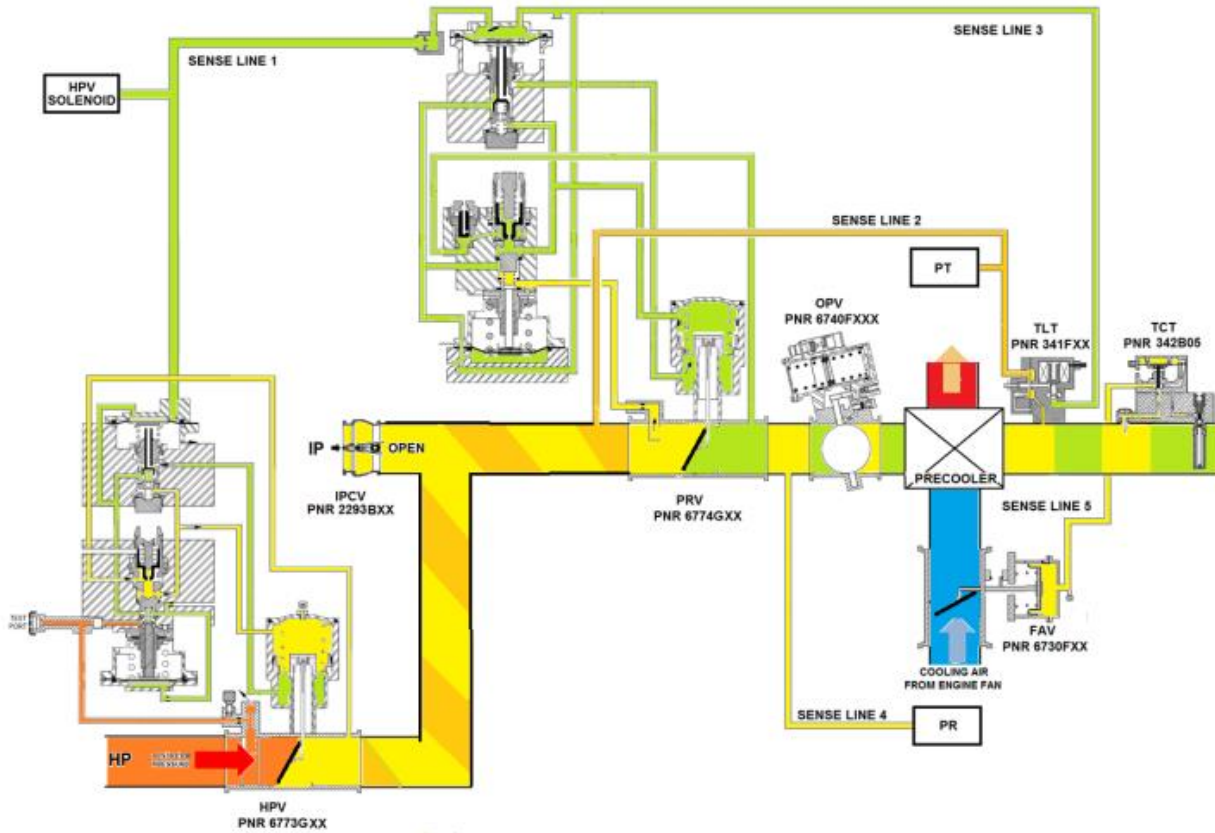


Airbus and Liebherr solutions act as complementary means to maximize system performance over time

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Engine Bleed Abnormal Press – Support Solutions & Maintenance



Liebherr

System performance

Addressing the key system performance drivers to prevent and avoid the in-service occurrences due to Abnormal press. 

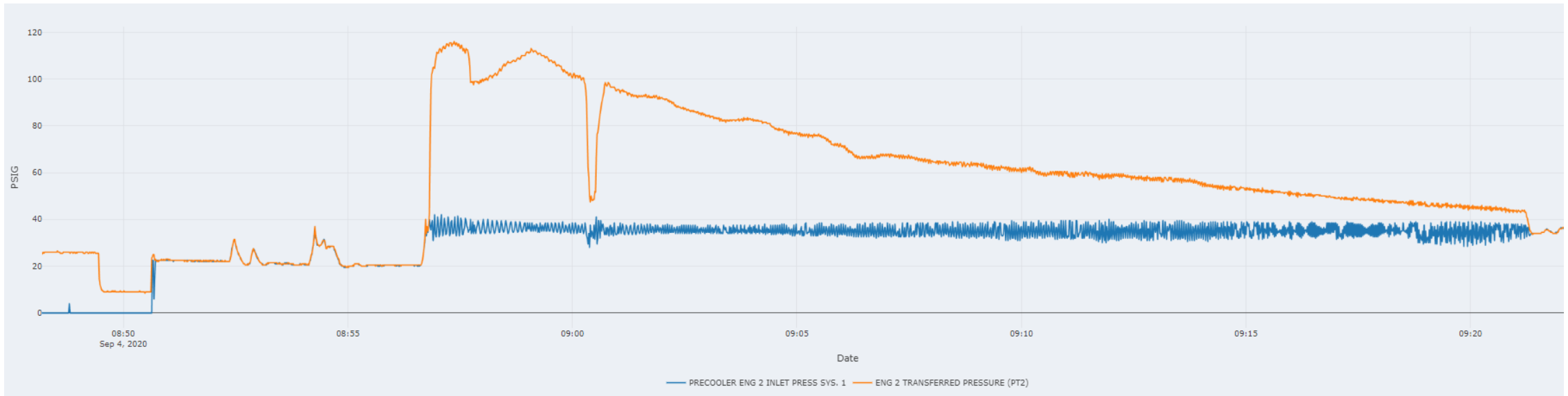
Abnorm_Press



Liebherr Support Package to mitigate ABNORMAL PRESS + OVPRESS Faults in Take-Off with Packs ON

Engine Bleed Abnormal Press – PRV Functional Test

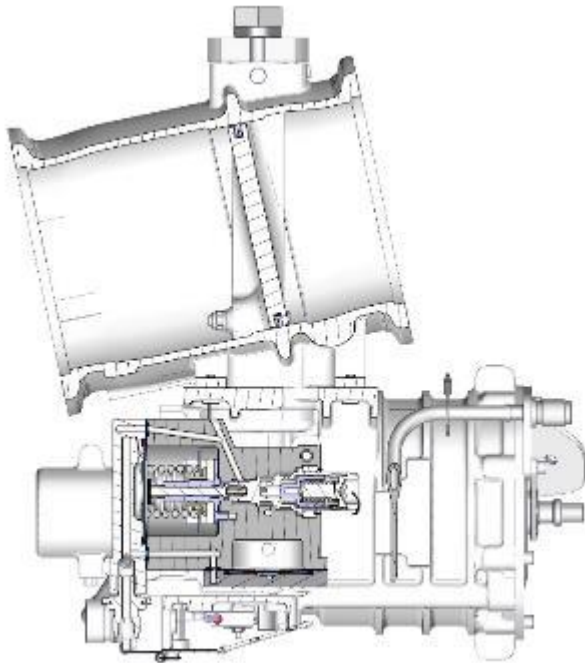
- Liebherr identified a correlation between Aircraft extended storage and increase of ENG BLEED FAULT + ABNORMAL PRESS FAULT during Take-Off, shortly after A/C Return To Service.



In addition, refer to Airbus **OIT 999.0037/20** for Return To Service maintenance recommendations

Engine Bleed Abnormal Press – PRV functional test

The test can be performed using **Liebherr BTS PNR 99127B03** or **99127B04** and **kit 99127-231**, with no additional tools necessary.



This test procedure is available through SIL **LS6774-36-01** since November 2020

FAQ on storage recommendations & Return to Service

- Liebherr FAQ page still available and updated to provide a list of Q&A about our ATA21, 36, 27 & 32 products in regards to storage/parking conditions and provide you with recommendations proposed with AIB for RTS.

<https://www.liebherr.com/en/deu/specials/aer-webforms/webform-fleet-support-for-takeoff-2020/faq.html>

- ▼ Airbus A320 ATA21 | Effect of heat and humidity on Liebherr components
- ▼ Airbus A320neo ATA36 | PRV Manual Operation
- ▼ Airbus A320neo ATA36 | HPV Faults
- ▼ Airbus A320neo ATA36 | DPS Faults
- ▼ Airbus A320neo ATA36 | PRV stuck in closed position
- ▼ Airbus A320neo ATA36 | FAV actuator water ingestion
- ▼ Airbus A320ceo ATA36 | Bleed Faults
- ▼ Airbus A330neo ATA36 | HPV faults
- ▼ Airbus A330ceo ATA36 | PRV Reliability
- ▼ Airbus A330ceo ATA36 | PRV Engine Bleed Not Closed
- ▼ Airbus A350 ATA27 | Slat GRA
- ▼ Airbus A350 ATA27 | Slat GRA
- ▼ Airbus A350 ATA27 | Flap Moving Damper
- ▼ Airbus A380 ATA27 | EBHA
- ▼ Airbus A380 ATA36 | Bleed Fault
- ▼ COMAC ARJ21 ATA32 | Sealant
- ▼ COMAC ARJ21 ATA32 | Electronics Packaging
- ▼ Embraer E190 ATA32 | Sliding Tube
- ▼ MHI CRJ700/900/1000 ATA21/ATA36 | Environmental Control System / Bleed Valves



Liebherr still continues to analyse removals of equipment's after storage/parking period

Engine Bleed Abnormal Press – Sense-lines leak check

A rigorous periodic inspection and maintenance of the sense-lines on the SA CEO Bleed pneumatic system is key to ensure an optimal system performance.

E.g.: AMM TASK 36-11-00-720-008-A: Functional Test of the Sense Line Connected between the HP Bleed Valve and the Bleed-Pressure Regulator Valve with the Bleed Test Set

5. On the test set: - Do a check of the pressure value shown on the LCD (5).	On the test set: - The pressure is more or equal to 5.8 psi (0.40 bar).
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Scenario 1: no leak in HPV/PRV sense-line



Scenario 2: leak in HPV/PRV sense-line

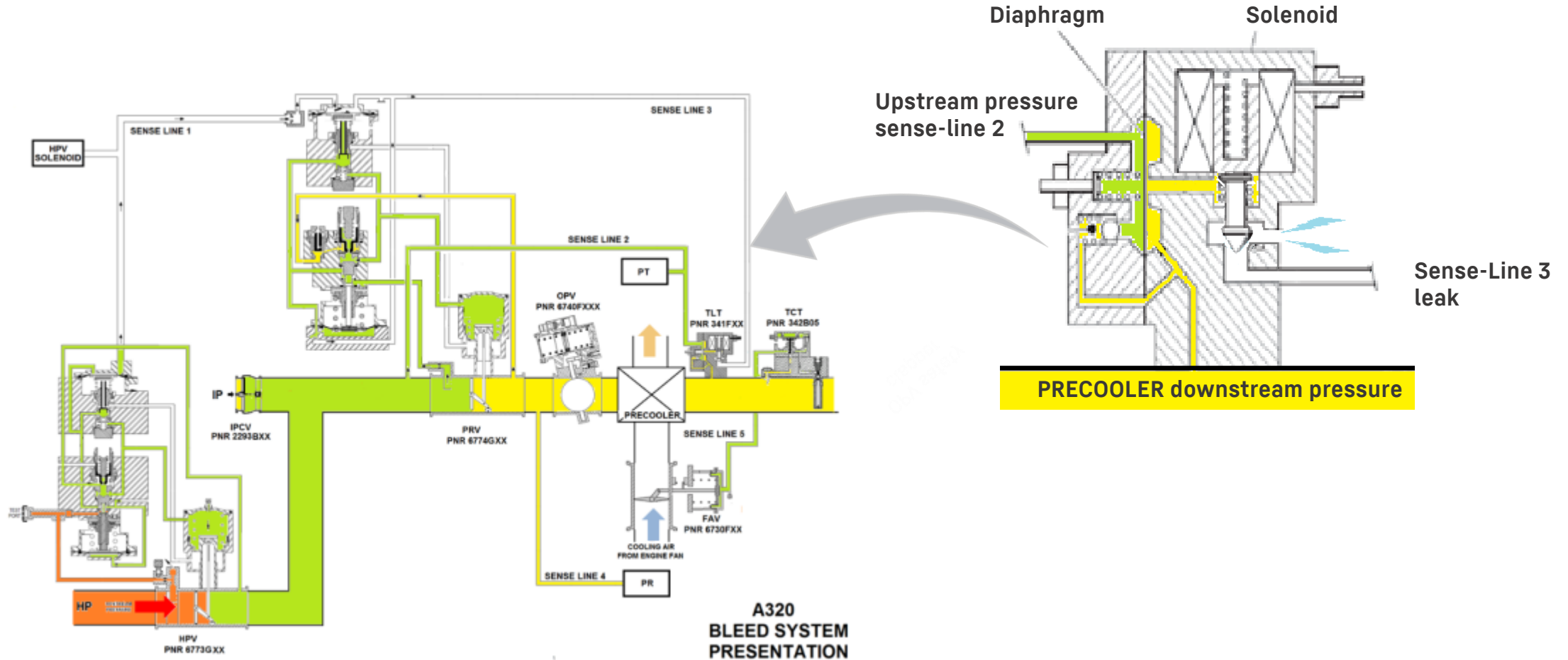


Sense-Line Tester kit SBE2213 applicable with Liebherr and Airbus Bleed Test Set

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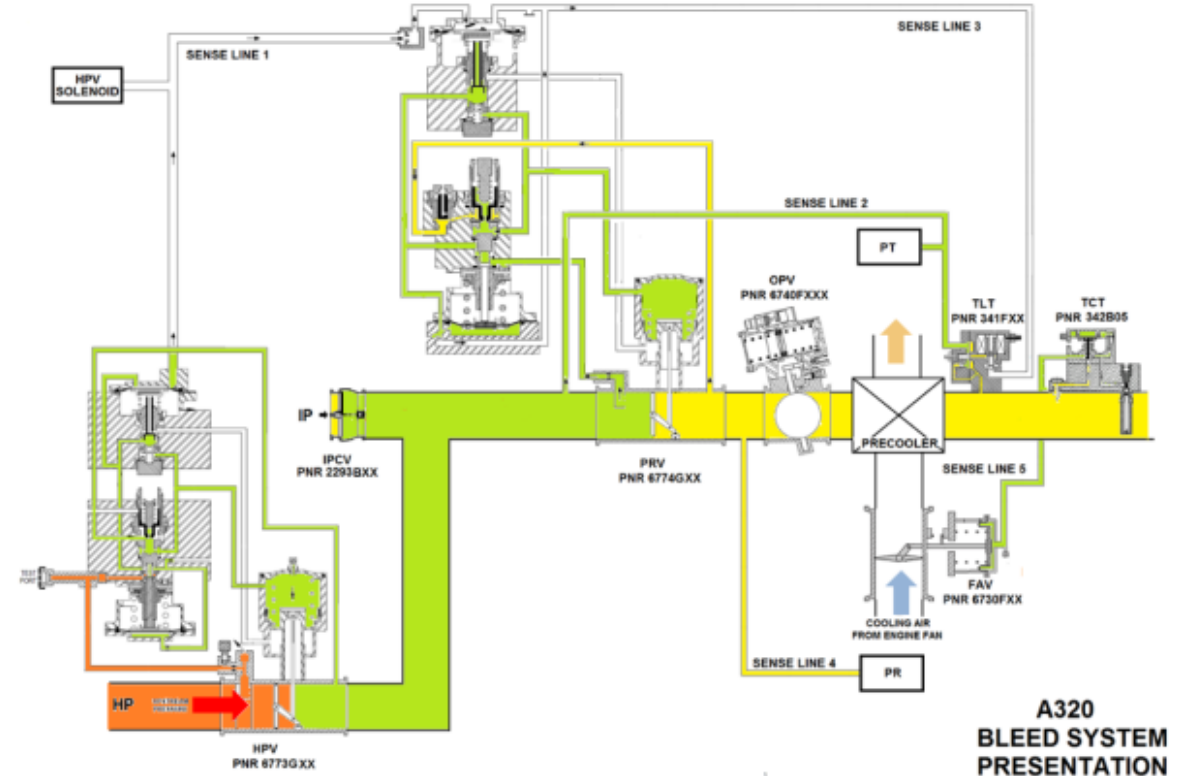
Engine Reverse Flow at start sequence – TLT function



Behaviour of the TLT Non-Return function

Engine Reverse Flow at start sequence – TLT function

- Only during Engine starting sequence using APU Bleed, both Bleeds are still interconnected for a 10s time period
- The TLT Non-Return Function is alone to protect the engine
- In this particular 10s timeframe, the failure of TLT reverse flow protection may lead to engine stall.

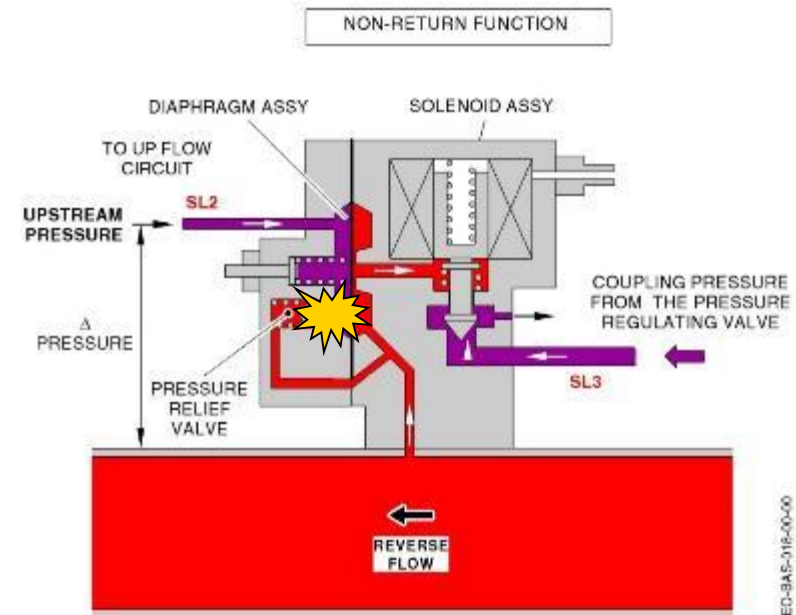
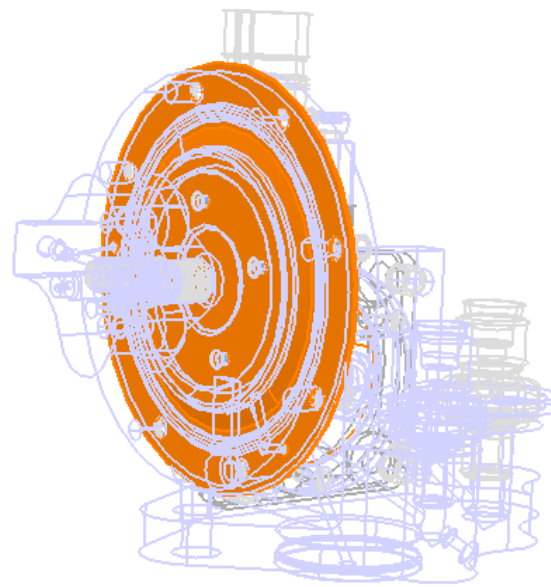
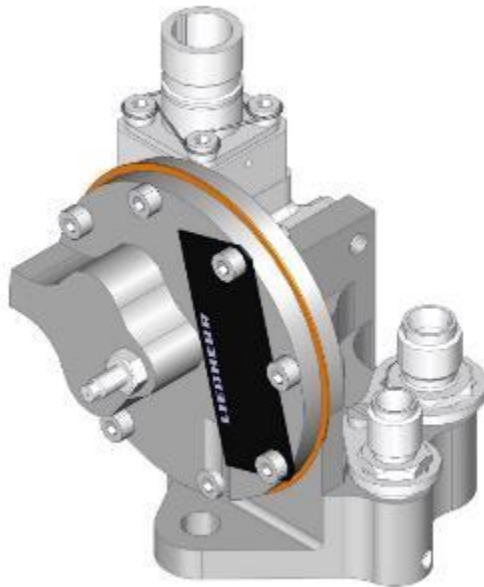


Complete failure of TLT reverse flow function just after the engine start sequence with APU Bleed (10s) may lead to engine stall.

Engine Reverse Flow - TLT 341F010000 manufacturing evolution

After engine stall events, some TLT (341F010000) were investigated and found with pollution in the Non-return function and the solenoid.

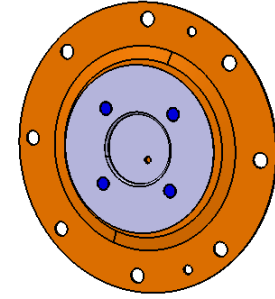
After analysis, some RTV was found as part of the pollution and RTV is used in the manufacturing of TLT diaphragm



A320NEC CED-8AS-018-00-00

Engine Reverse Flow - TLT 341F01 manufacturing evolution

The modification will consist in removing RTV during diaphragm manufacturing only.



VSB 341F-36-01 to be applied on attrition basis. At opportunity of a Major repair, systematic embodiment at no additional costs.

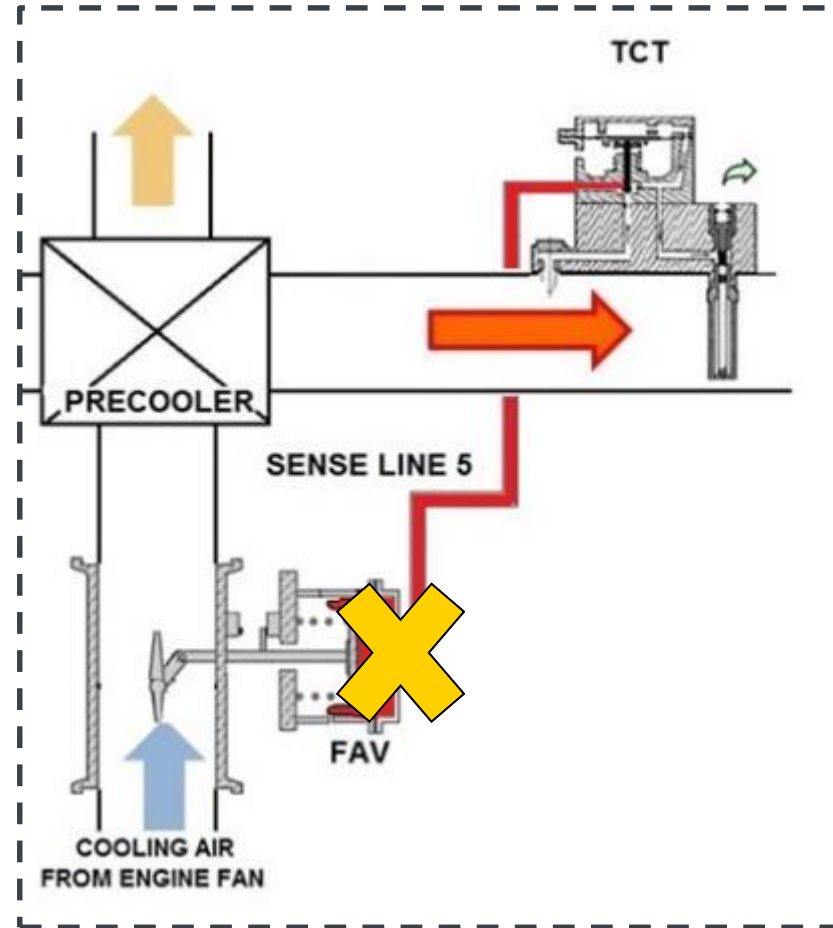
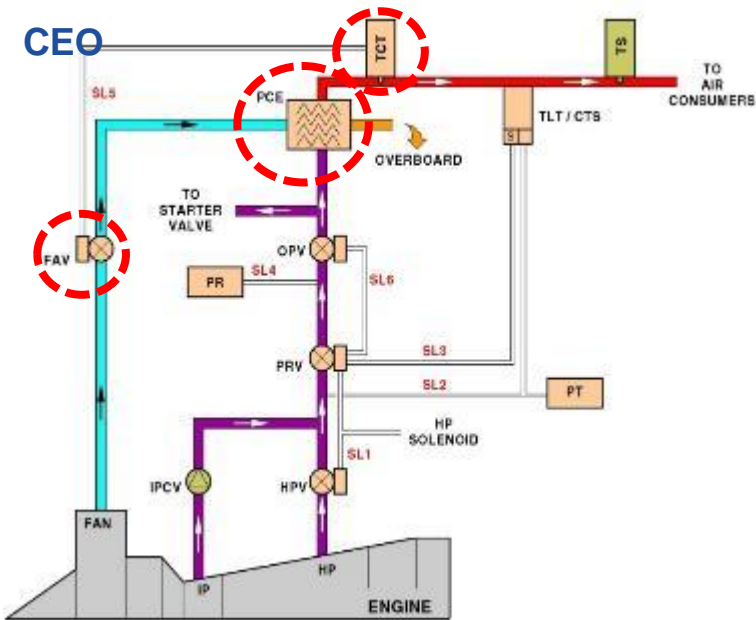


VSB 341F-36-01 available since July 2022

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Engine Bleed Low Temp



Bleed Low Temp is detected when Precooler Outlet temperature drops below 150°C for more than 5secs

Engine Bleed Low Temp – Support Solutions & Maintenance

A periodic cleaning of the FAV banjo hole can efficiently prevent the majority of low temp events

Refer to Airbus AMM TASK 36-11-00-720-012-A

(applicable on FAV 6730F010000 only)



Liebherr

System performance

Addressing the key system performance drivers to prevent and avoid the in-service occurrences due to temperature regulation.



Airbus SA

ATA 21

LIEBHERR

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AIR PACK REGUL FAULT E/W ORPHAN INVESTIGATION

– Previous investigations:

➤ 2014 : AIR PACK REGUL FAULT E/W without associated FM

✓ **Solution 1 : Correction of « AIR PACK X REGUL FAULT » logic in Software 1803B0000-03**

➤ 2017 : CDS high removal rate investigation

✓ **Solution 2 : CDS disparity monitoring change logic in new hardware & software 71103A010001**




– 2020 : AIR PACK REGUL FAULT E/W ORPHAN new investigation

Investigation results :

- One CDS intermittent failure leading to Orphan E/W → reporting logic correction is planned for next software batch [expected target date not before 2023]
- TSM 21-61-810-820/821-A called by Orphan E/W AIR PACK X REGUL FAULT has been reviewed.
- New troubleshooting tips in case of E/W Orphan → AIRBUS PRESENTATION

– Investigation progress 

AIR PACK REGUL FAULT E/W ORPHAN INVESTIGATION

 **Applicability**
 **Interchangeability**
 One way
  **Two ways**

		ceo	neo		features
			P&W	CFM	
	1803B0000-02				CEO features
VSB 1803B-21-02 Issued Apr. 2016		 			
	1803B0000-03				NEO P&W requirements + Correction of « AIR PACK X REGUL FAULT » logic
VSB 1803B-21-03 Issued Dec. 2016		 	 		
	1803B0000-04				NEO CFM requirements + Correction of « AIR PACK X REGUL FAULT » logic
VSB 1803B-21-04 Issued Aug. 2018		 	 	 	
	1803B0000-05				NEO CFM Enhanced Engine Support Function + Correction of « AIR PACK X REGUL FAULT » logic
NO VSB EIS Oct 2020		 	 	 	
	71103A010101				Same as 1803B0000-05 + CDS disparity monitoring change + HW ready for ventilation & CSAS control

NEW HARDWARE

SOLUTION 1

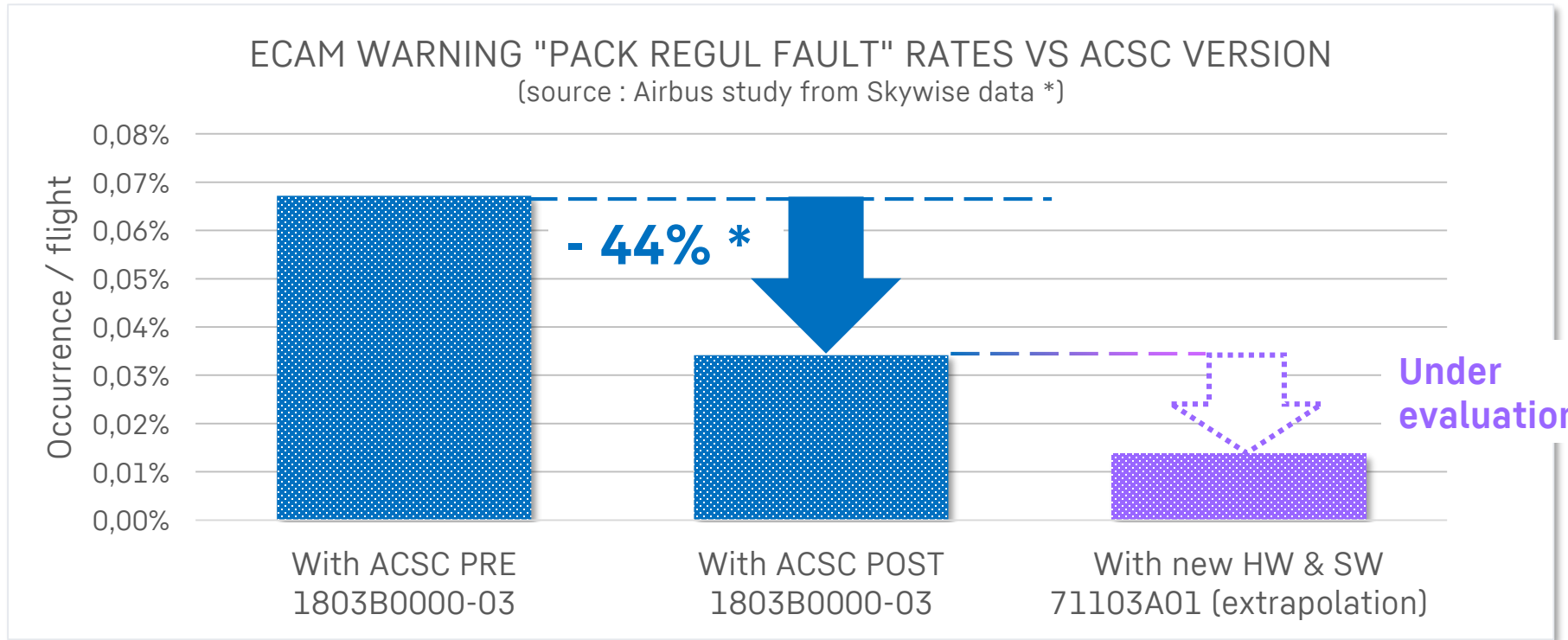
SOLUTION 2

/// Software modification of 1803 hardware not available, pending on 71103 results

AIR PACK REGUL FAULT E/W ORPHAN INVESTIGATION

– ACSC software modification improvement measure

In June 2021, Airbus performed a comparative study in ECAMs “AIR PACK# REGUL FAULT” occurrence rate per flight between pre and post mod 1803B0000-03 software. The result is very positive, with a reduction of :



(*) : Based on A319-A320-A321 aircraft delivered from 2010 to 2019, on a total of nearly 3,500,000 flights.



Operator encouraged to install post 1803B0000-03 standard to ease T/S of this E/W

Agenda

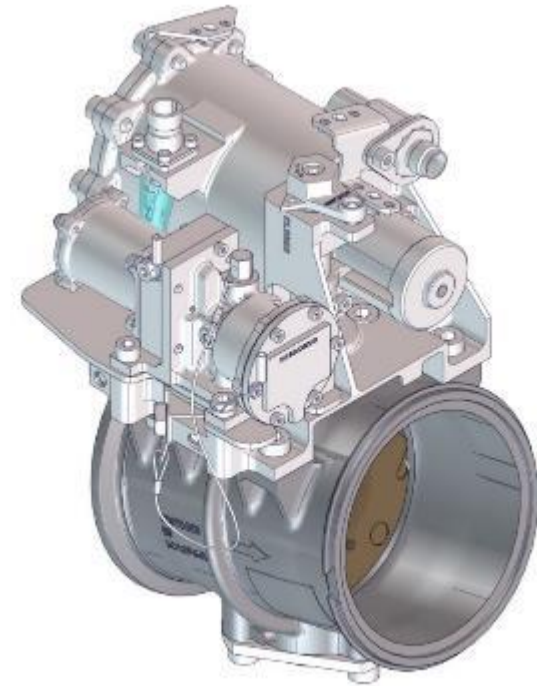
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HPV In-service occurrences

High Pressure Valve (HPV) 70645A020001

- HPV Failed Closed
 - RCP-Saneo-36-0339
 - TFU 36.11.00115

- HPV Failed Open
 - RCP-Saneo-36-0380
 - TFU 36.11.00106



HPV Fault - Failed closed (FC) system effect

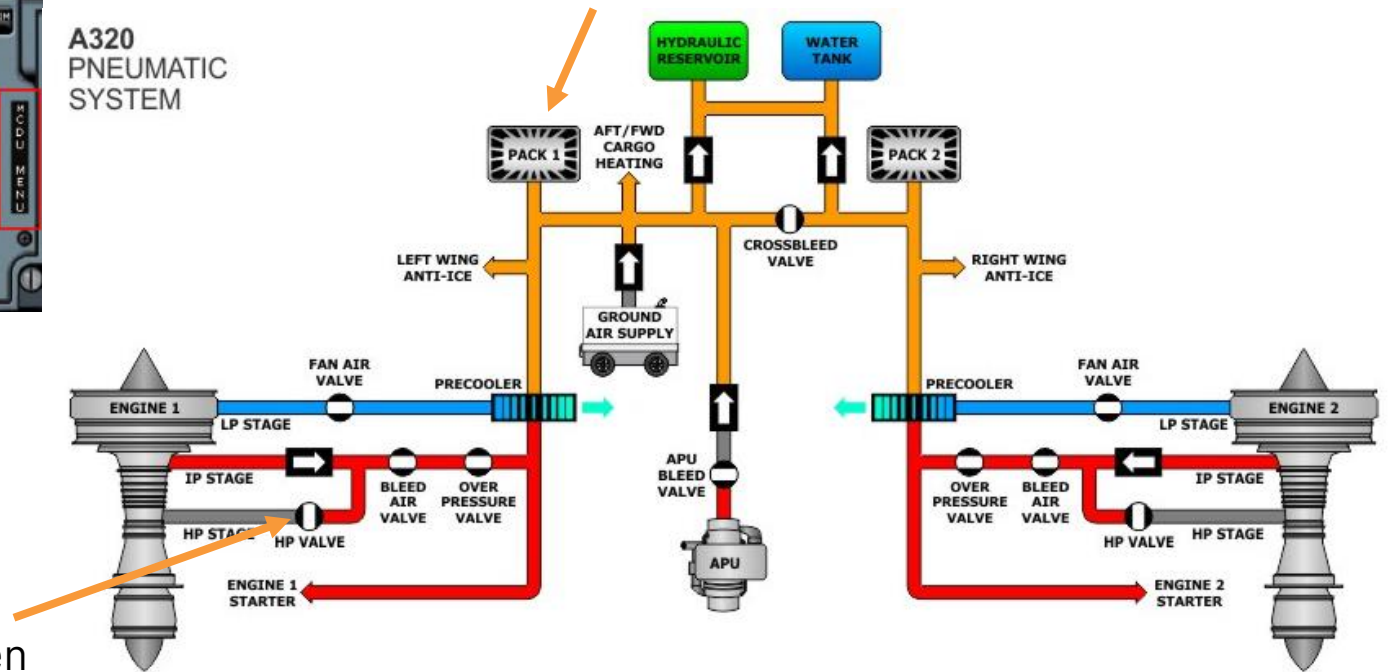


Context

Cruise, bleed on Intermediate Pressure port
 Top of descent leads to engine thrust reduction

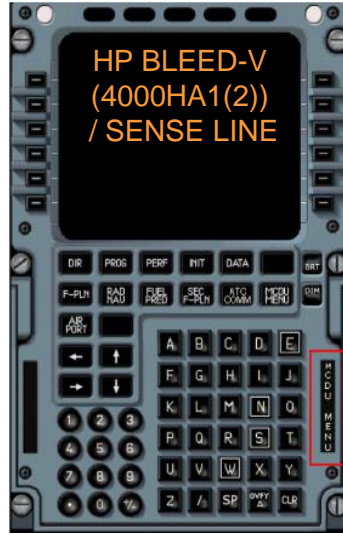
Pack Inlet Pressure is detected below 18 psig

A320 PNEUMATIC SYSTEM



HPV is detected closed while commanded to open

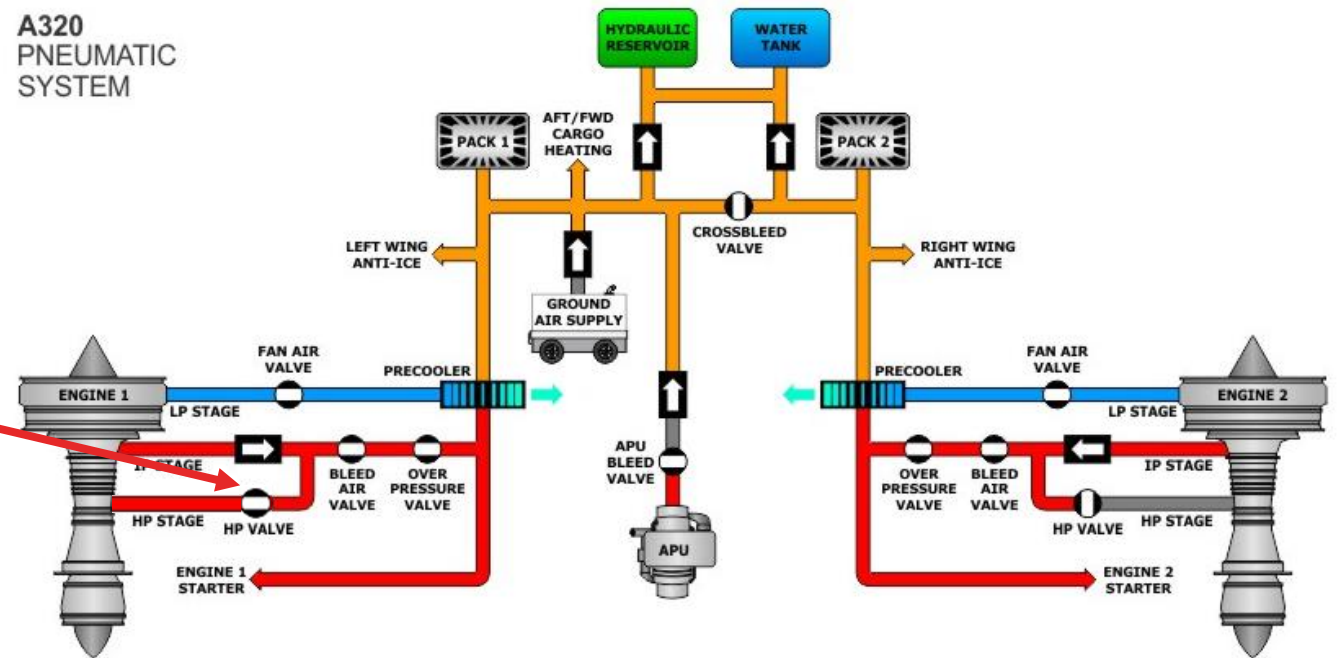
HPV Fault - Failed open (FO) system effect



In-service occurrence
 Most cases occur on ground at Take-off during engine thrust increase to Take-off level

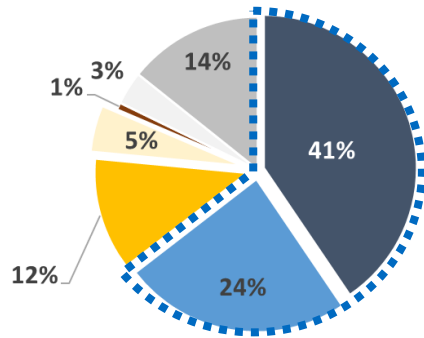
BMC detects HPV is open also
 it is commanded to close
BMC isolates the bleed and
closes corresponding PRV

A320 PNEUMATIC SYSTEM

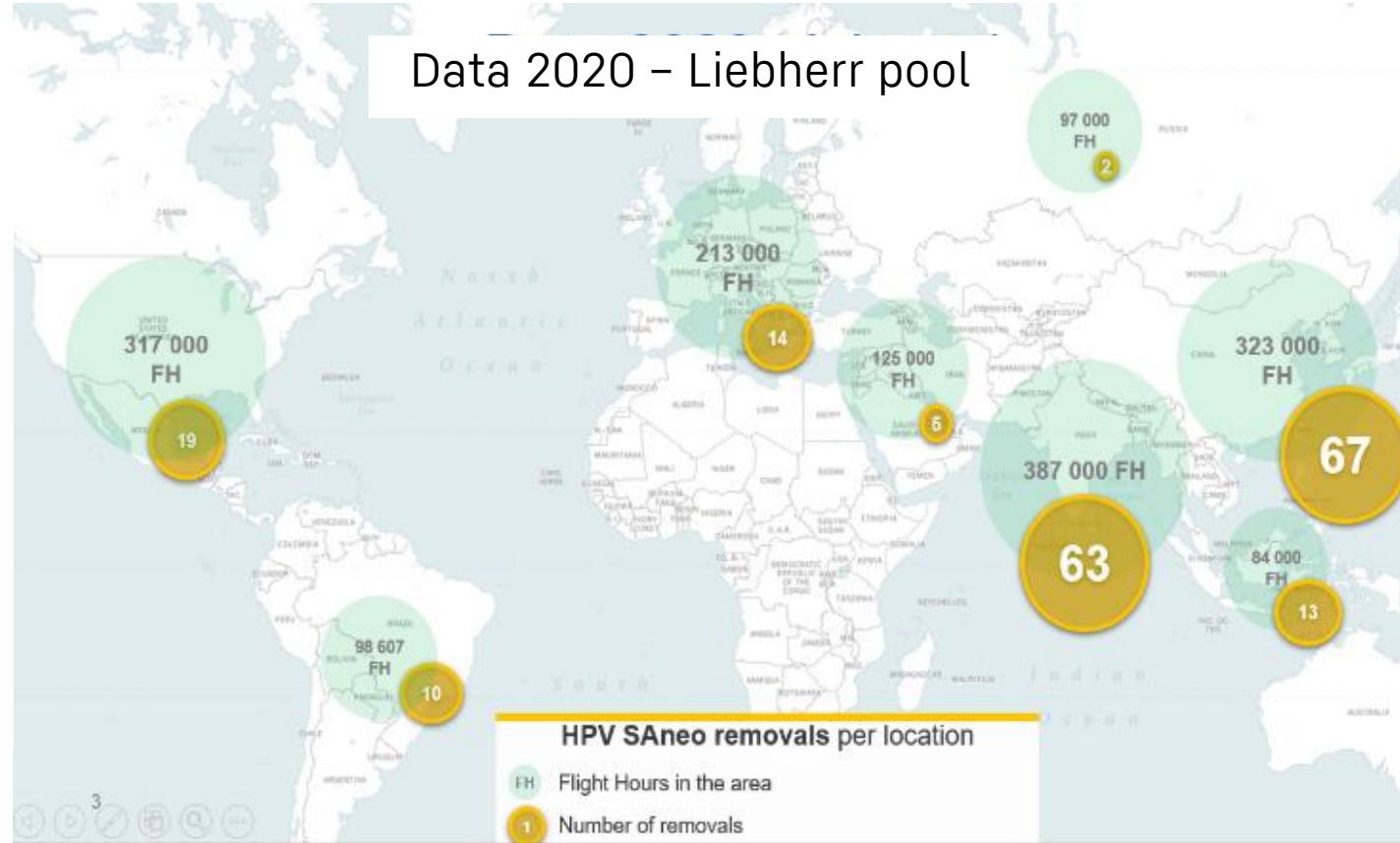


HPV Faults in-service findings

Major finding HPV 70645
Study period [Jan 2018-Oct 2021]



- ACTUATOR S/A ALUMINUM PHOSPHATE CONTAMINATION
- REGULATOR S/A ALUMINUM PHOSPHATE CONTAMINATION
- SOLENOID S/A failed
- CLIP RUPTURE
- BEARINGS WORN
- INDUCED
- NFF

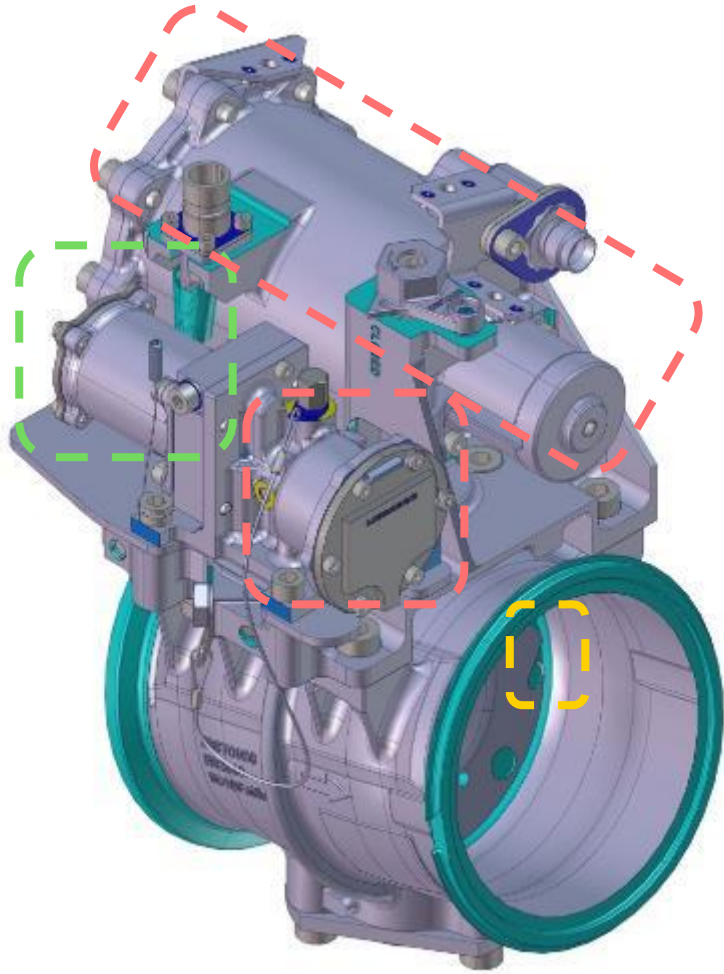


*NFF rate drastically reduced starting from CMM update



Asia more affected than the rest of the world

HPV Faults in-service findings



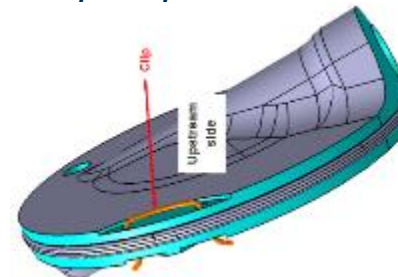
- ✓ *Aluminium phosphate exudation from JPXX32 graphite on actuator seals and regulation clapper*



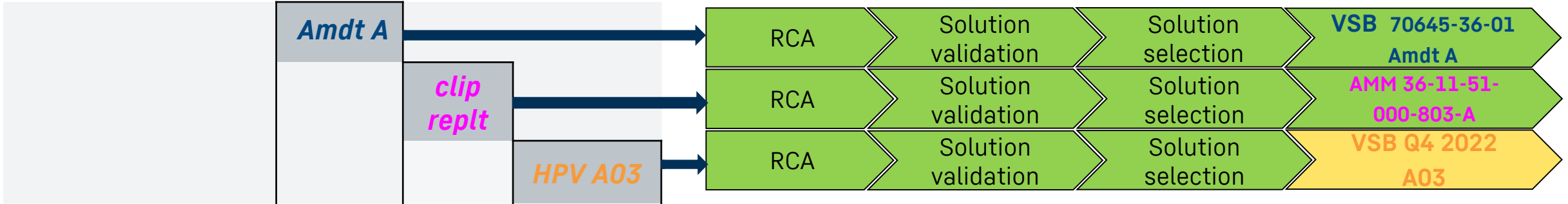
- ✓ *Solenoid winding weakness*



- ✓ *Butterfly clip rupture*

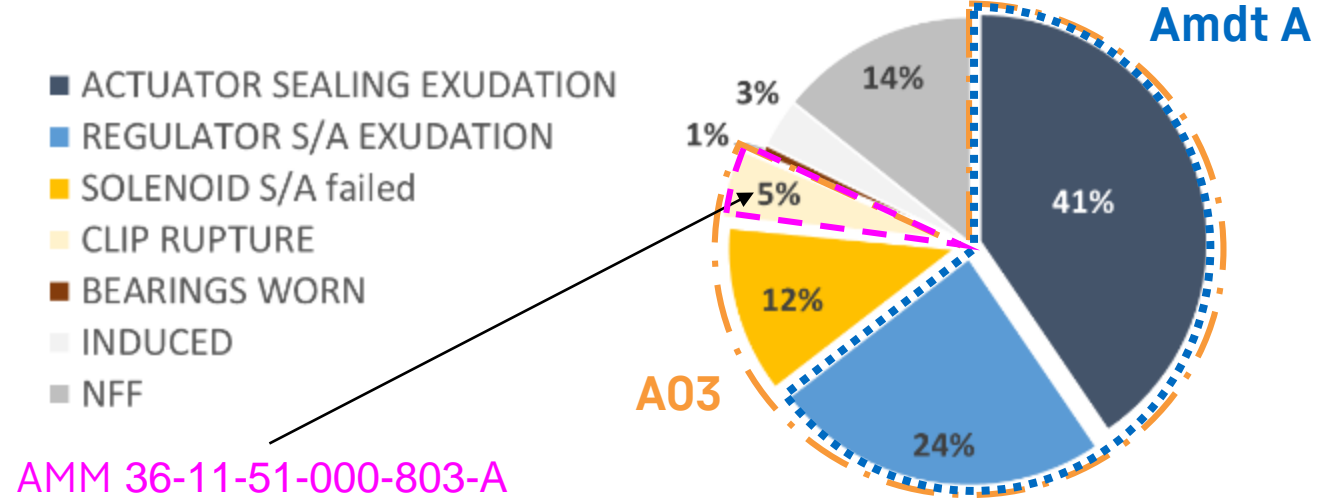


HPV faults & solution+mitigation generalization timeline



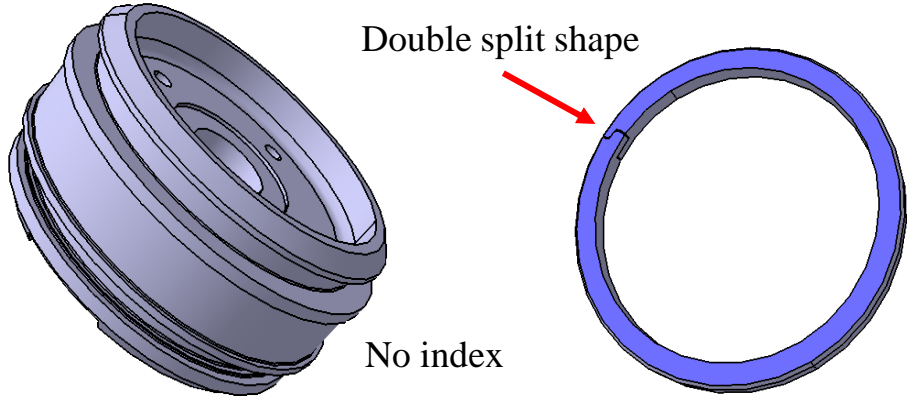
Design solutions	Failure Mode		Amdt A	clip replt	HPV A03
	FC	FO			
Graphite piston seals	X	X	✓		✓
Graphite regul. clapper	X		✓		✓
Butterfly clip		X		✓	✓
Solenoid sleeve	X				✓

Major finding HPV 70645
Study period [Jan 2018-Oct 2021]

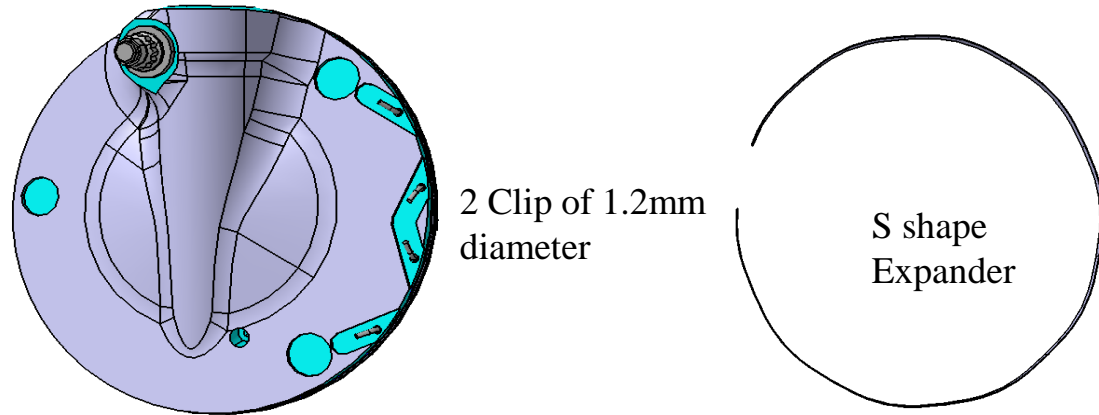


HPV A03 modifications

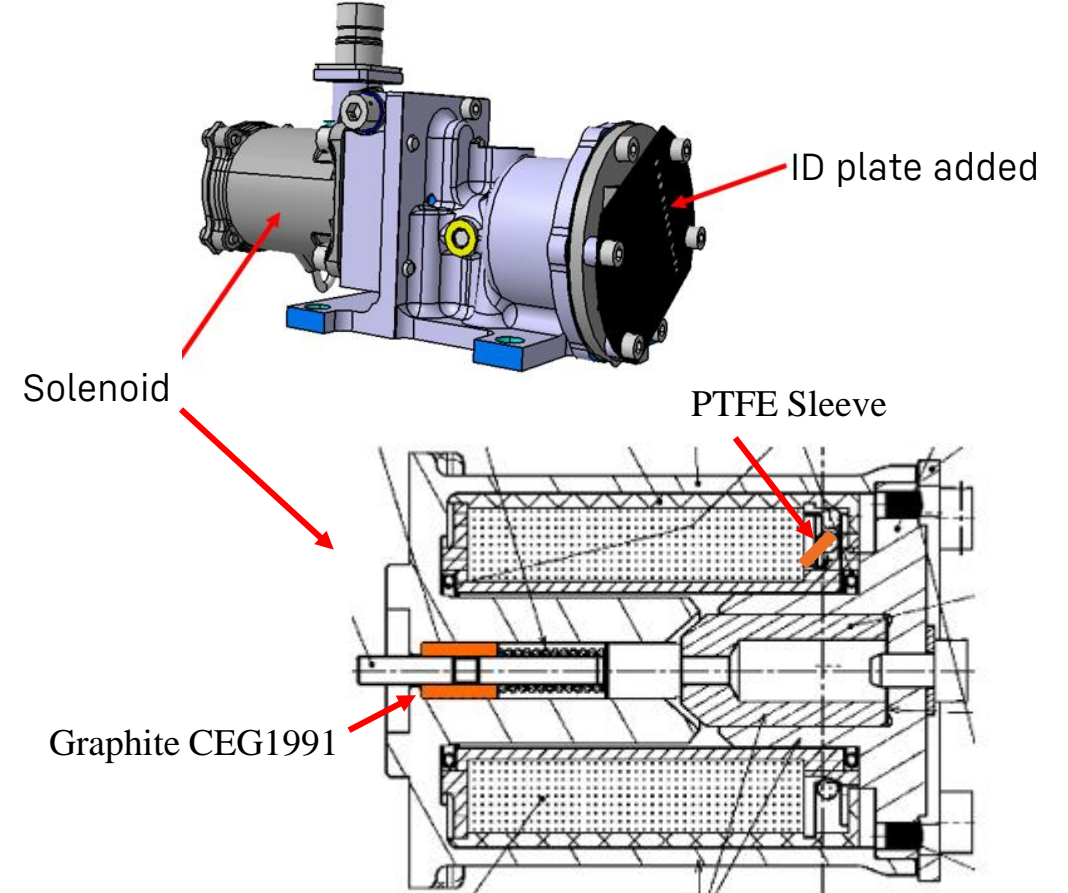
✓ Actuator



Butterfly



✓ Solenoid & ID plate



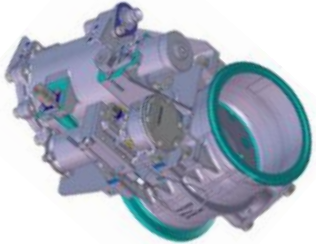
HPV Faults - In-service mitigation

- After investigation of the different events, Airbus and Liebherr confirm the troubleshooting is very efficient to detect the HPV faults on wing. In the majority of cases, a HPV faults is linked to a **hard failure of the valve**.
- Pending HPV 70645A030001 introduction, Airbus and Liebherr recommend to strictly follow Airbus TSM and remove HPV when an HPV Maintenance Message (CMS) is triggered.



Recommendation: per TSM, replace the HPV when a HPV Maintenance Message is posted

HPV/PRV – Liebherr Support Solutions



HPV 70645A020001		
VSB 70645-36-01 (Amdt A) Jul2022	Butterfly clip Preventive Replacement in Airbus AMM May 2022	Butterfly clip and Solenoid fix 70645A03 Q1 2023

PRV 70646A010001	
Preventive Maintenance Support Package	Design benefits from HPV Q1 2023



/// Continuous embodiment and proven efficiency of VSB 70645-36-01 on HPV
Butterfly clip replacement applied by several major airlines with success

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FAV In-service occurrences

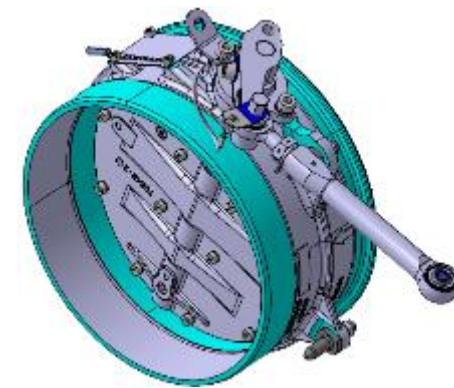
Fan Air Valve (FAV)
70649A01000x (body)
70654A0x0001 (actuator)

- FAV Investigation
 - RCP-Saneo-36-0318
 - TFU 54.51.00.0104 (CFM)
 - TFU 54.51.00.018 (PW)



FAV body

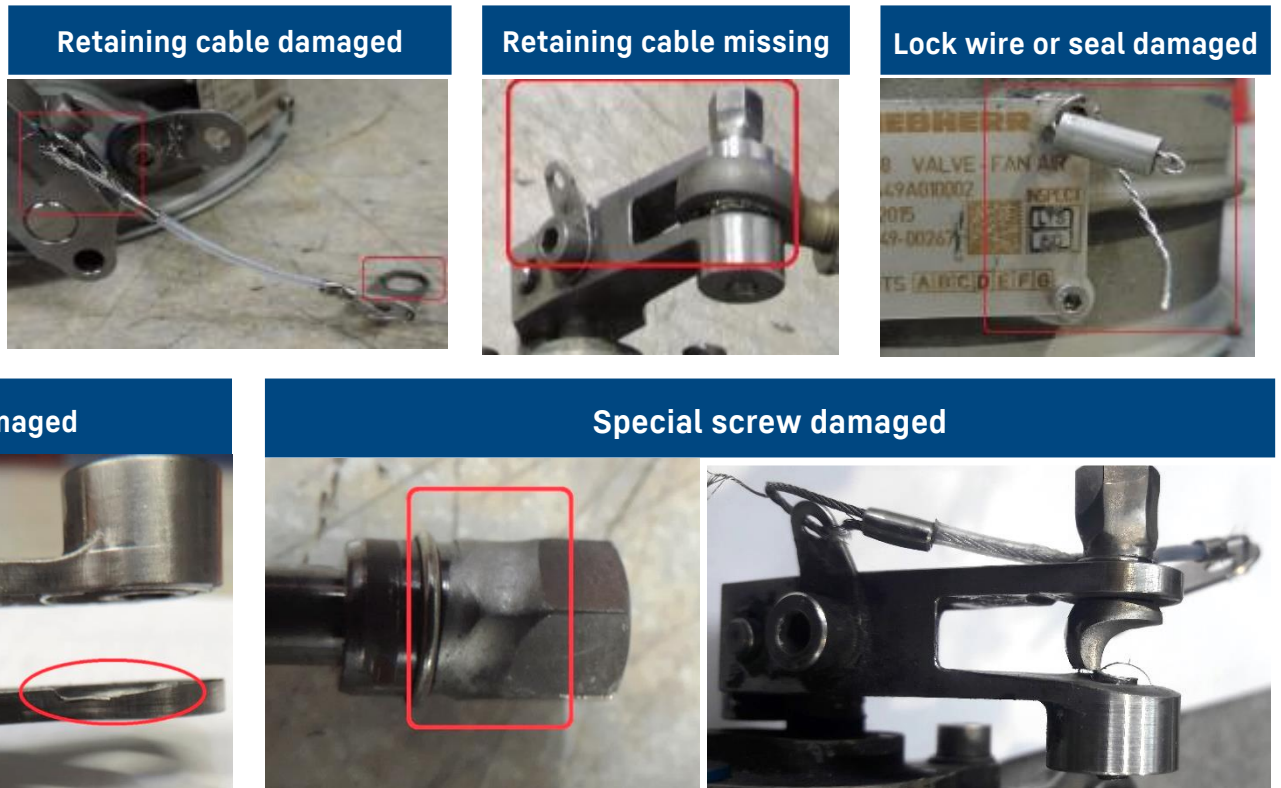
Root cause for FAV valve body observed damages



FAV valve body overview

From 2018, reports of FAV (body & rod) damage on AC with reinforced brackets i.e:

- Airbus POST SB 54-1045 or POST MOD 164147 for PW engines
 - Airbus POST SB 54-1044 or POST MOD 163328 for CFM engines
- Typical finding described here:



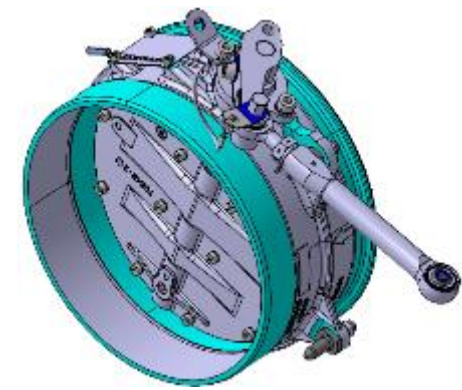
Pins damaged

Valve body damaged

Lever assy damaged

Special screw damaged

FAV body



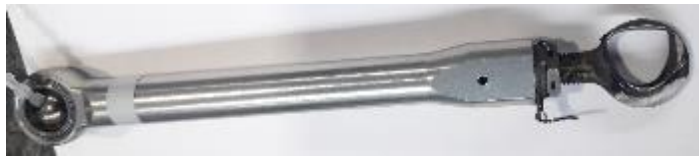
FAV valve body overview

Recommendation in case of FAV body damage



AMM does not provide instructions to replace only the FAV rod on the wing. Airbus and Liebherr absolutely do not recommend replacing only the rod because other parts integrity cannot be ensured.

Rod assy damaged



Rod assy broken



FAV FIN 7120HM1/7120HM2
PN 70649A010001 (PW)
PN 70649A010002 (CFM)

AIRBUS



During aircraft inspection, if any of these damages are observed, the complete FAV Body + ROD needs to be replaced

**Thank you
for your
participation**

A320 PCU MODELS

RTW 2022

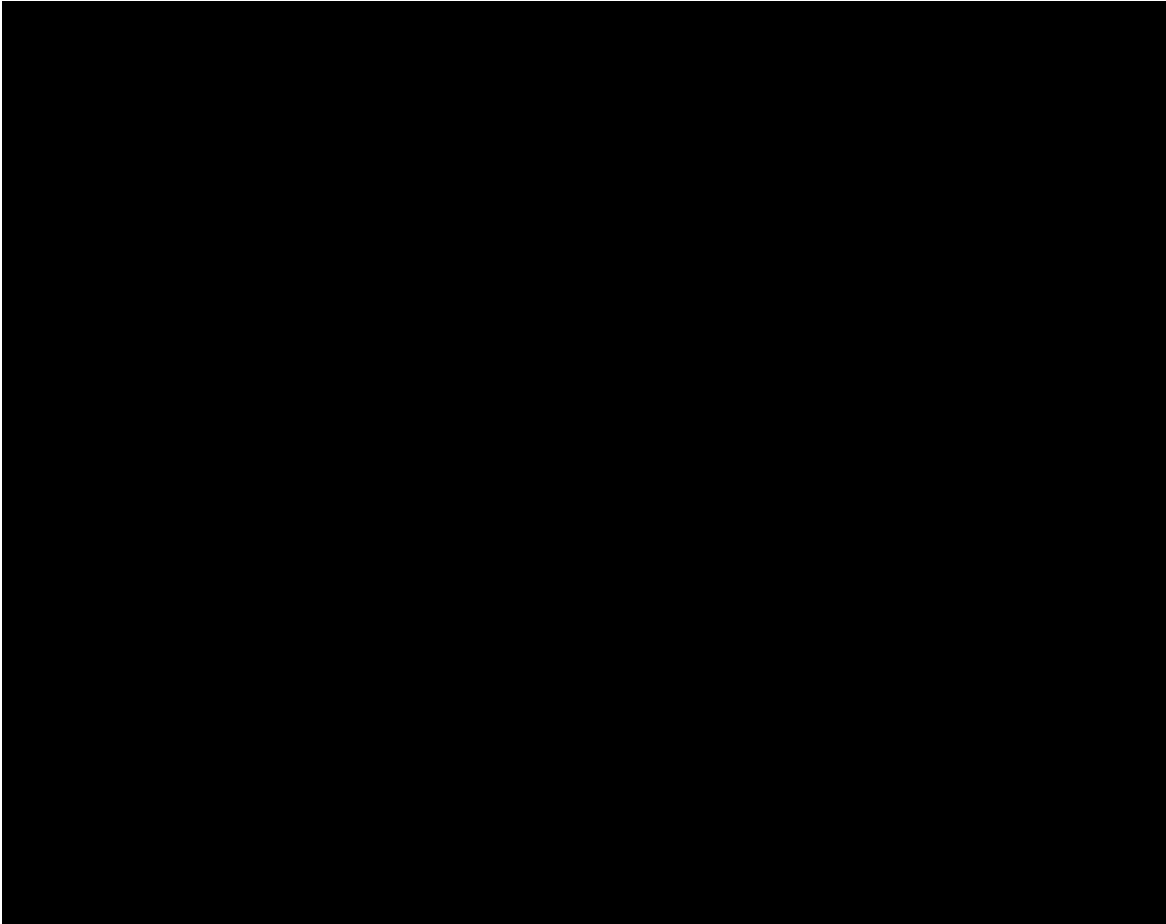
LIEBHERR

Liebherr-Aerospace

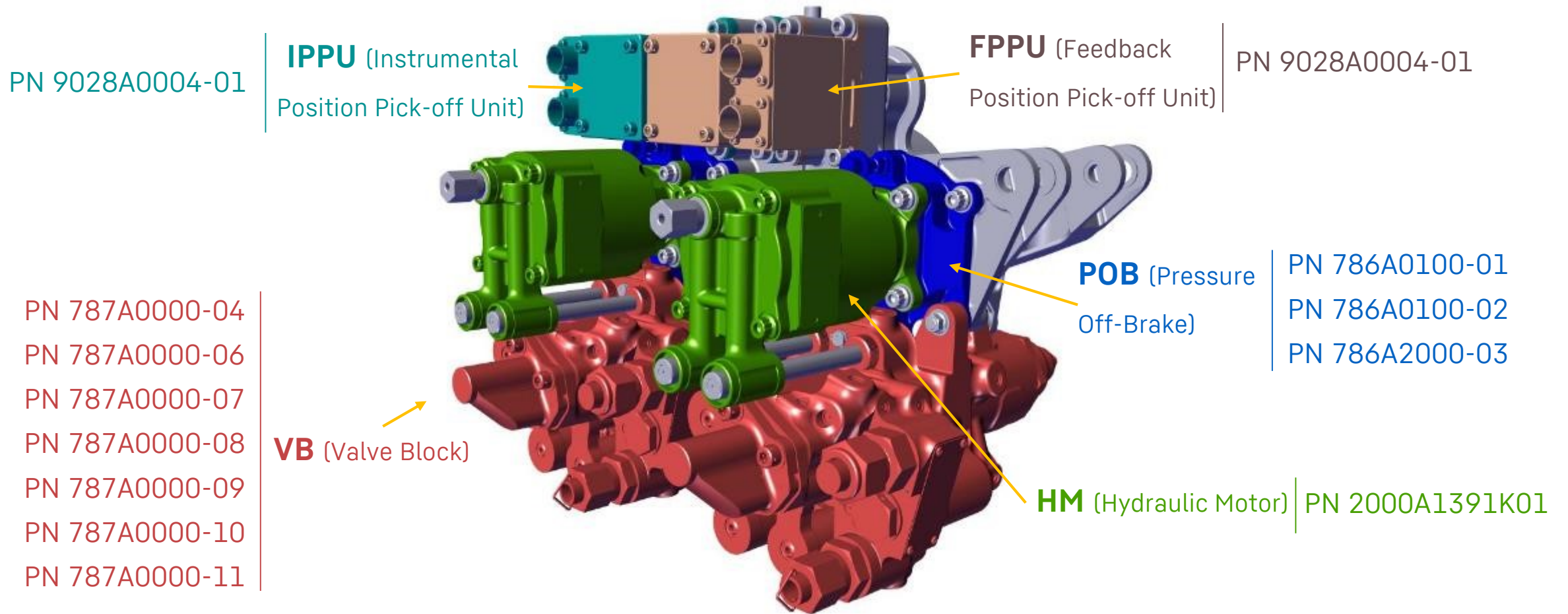
AGENDA

- Overview
- PN – Original Equipped
- PN - Options
- Operator Support Information

OVERVIEW



OVERVIEW



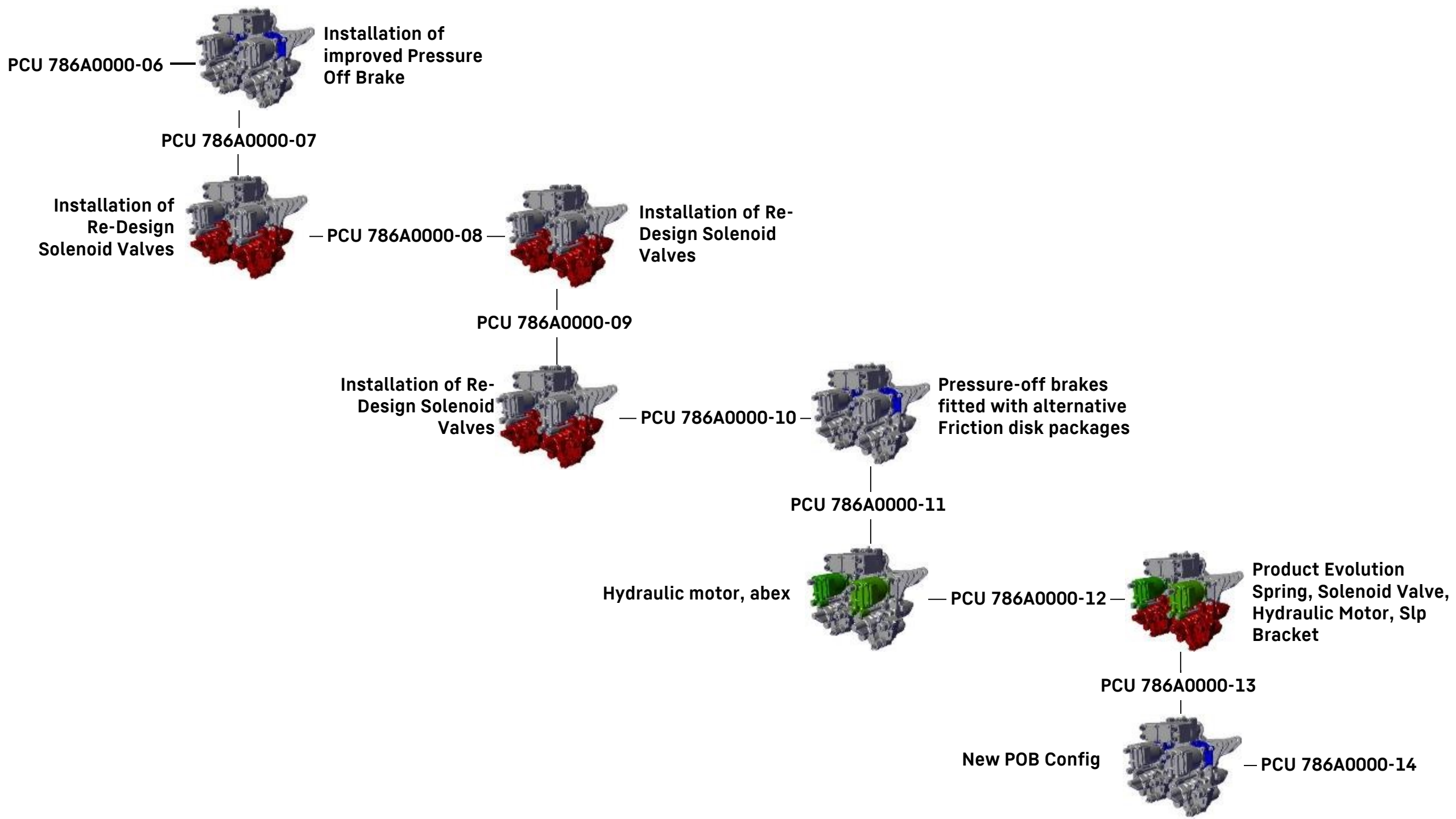
PNs – ORIGINAL EQUIPPED

PCU	POB	VB	IPPU	FPPU	HM
786A0000-06	786A0100-01	787A0000-04	9028A0004-01	9028A0004-01	2000A1391K01
786A0000-08	786A0100-01	787A0000-06			
786A0000-09	786A0100-02	787A0000-06			
786A0000-10	786A0100-02	787A0000-07			
786A0000-11	786A2000-01	787A0000-07			
786A0000-12	786A2000-01	787A0000-07			
786A0000-13	786A2000-01	787A0000-08			
	786A2000-02	787A0000-07			
786A0000-14	786A2000-03	787A0000-09			
		787A0000-10			
		787A0000-11			

PNs – OPTIONS



PCU	POB	VB	IPPU	FPPU	HM
786A0000-06					
786A0000-08					
786A0000-09					
786A0000-10		787A0000-07			
786A0000-11	786A2000-01	787A0000-08			
786A0000-12	786A2000-02	787A0000-09	9028A0004-01	9028A0004-01	2000A1391K01
786A0000-13	786A2000-03	787A0000-10 787A0000-11			
786A0000-14					



OPERATOR SUPPORT INFORMATION

Document Validation Record **LIEBHERR**

REF.-NO. 27-52-35 ISSUE 12

Product Support
Component Maintenance Manual
POWER CONTROL UNIT

PLATFORM : -
SYSTEM : -
EQUIPMENT : -
PARTNUMBER : 78A4000A-01, 78A4000A-02, 78A4000A-03, 78A4000A-04, 78A4000A-05, 78A4000A-06, 78A4000A-07, 78A4000A-08, 78A4000A-09, 78A4000A-10, 78A4000A-11, 78A4000A-12, 78A4000A-13, 78A4000A-14, 78A4000A-15, 78A4000A-16, 78A4000A-17, 78A4000A-18, 78A4000A-19, 78A4000A-20, 78A4000A-21, 78A4000A-22, 78A4000A-23, 78A4000A-24, 78A4000A-25, 78A4000A-26, 78A4000A-27, 78A4000A-28, 78A4000A-29, 78A4000A-30, 78A4000A-31, 78A4000A-32, 78A4000A-33, 78A4000A-34, 78A4000A-35, 78A4000A-36, 78A4000A-37, 78A4000A-38, 78A4000A-39, 78A4000A-40, 78A4000A-41, 78A4000A-42, 78A4000A-43, 78A4000A-44, 78A4000A-45, 78A4000A-46, 78A4000A-47, 78A4000A-48, 78A4000A-49, 78A4000A-50, 78A4000A-51, 78A4000A-52, 78A4000A-53, 78A4000A-54, 78A4000A-55, 78A4000A-56, 78A4000A-57, 78A4000A-58, 78A4000A-59, 78A4000A-60, 78A4000A-61, 78A4000A-62, 78A4000A-63, 78A4000A-64, 78A4000A-65, 78A4000A-66, 78A4000A-67, 78A4000A-68, 78A4000A-69, 78A4000A-70, 78A4000A-71, 78A4000A-72, 78A4000A-73, 78A4000A-74, 78A4000A-75, 78A4000A-76, 78A4000A-77, 78A4000A-78, 78A4000A-79, 78A4000A-80, 78A4000A-81, 78A4000A-82, 78A4000A-83, 78A4000A-84, 78A4000A-85, 78A4000A-86, 78A4000A-87, 78A4000A-88, 78A4000A-89, 78A4000A-90, 78A4000A-91, 78A4000A-92, 78A4000A-93, 78A4000A-94, 78A4000A-95, 78A4000A-96, 78A4000A-97, 78A4000A-98, 78A4000A-99, 78A4000A-100

DOCUMENT REF. NO. : -
CREATION DATE : 18.06.2018
CREATED BY : Erik Meters
FILE NAME : 27-52-35_12_11882187_02.pdf

EXTERNAL ID : 27-52-35
EXTERNAL REVISION : 02
CONFIDENTIAL LEVEL : CONFIDENTIAL SECRET

SIGNATURE-TYPE	ROLE	NAME	DATE	SIGNATURE
Approve	Technical Publication Manager	Paul Halligan	22.08.2018	[Signature]

CMM 27-52-35
PCU (all PNs)

Document Validation Record **LIEBHERR**

REF.-NO. 27-09-22 ISSUE 10

Product Support
Component Maintenance Manual
VALVE BLOCK

PLATFORM : -
SYSTEM : -
EQUIPMENT : -
PARTNUMBER : 91A0000-01, 91A0000-02, 91A0000-03, 91A0000-04, 91A0000-05, 91A0000-06, 91A0000-07, 91A0000-08, 91A0000-09, 91A0000-10, 91A0000-11, 91A0000-12, 91A0000-13, 91A0000-14, 91A0000-15, 91A0000-16, 91A0000-17, 91A0000-18, 91A0000-19, 91A0000-20, 91A0000-21, 91A0000-22, 91A0000-23, 91A0000-24, 91A0000-25, 91A0000-26, 91A0000-27, 91A0000-28, 91A0000-29, 91A0000-30, 91A0000-31, 91A0000-32, 91A0000-33, 91A0000-34, 91A0000-35, 91A0000-36, 91A0000-37, 91A0000-38, 91A0000-39, 91A0000-40, 91A0000-41, 91A0000-42, 91A0000-43, 91A0000-44, 91A0000-45, 91A0000-46, 91A0000-47, 91A0000-48, 91A0000-49, 91A0000-50, 91A0000-51, 91A0000-52, 91A0000-53, 91A0000-54, 91A0000-55, 91A0000-56, 91A0000-57, 91A0000-58, 91A0000-59, 91A0000-60, 91A0000-61, 91A0000-62, 91A0000-63, 91A0000-64, 91A0000-65, 91A0000-66, 91A0000-67, 91A0000-68, 91A0000-69, 91A0000-70, 91A0000-71, 91A0000-72, 91A0000-73, 91A0000-74, 91A0000-75, 91A0000-76, 91A0000-77, 91A0000-78, 91A0000-79, 91A0000-80, 91A0000-81, 91A0000-82, 91A0000-83, 91A0000-84, 91A0000-85, 91A0000-86, 91A0000-87, 91A0000-88, 91A0000-89, 91A0000-90, 91A0000-91, 91A0000-92, 91A0000-93, 91A0000-94, 91A0000-95, 91A0000-96, 91A0000-97, 91A0000-98, 91A0000-99, 91A0000-100

DOCUMENT REF. NO. : -
CREATION DATE : 24.07.2018
CREATED BY : Erik Meters
FILE NAME : 27-09-22_10_11882187_02.pdf

EXTERNAL ID : 27-09-22
EXTERNAL REVISION : 10
CONFIDENTIAL LEVEL : CONFIDENTIAL SECRET

SIGNATURE-TYPE	ROLE	NAME	DATE	SIGNATURE
Approve	Technical Publication Manager	Thomas Müller	28.11.2018	[Signature]

CMM 27-09-22
VB (all PNs)

Document Validation Record **LIEBHERR**

REF.-NO. 27-09-31 ISSUE 08

Product Support
Component Maintenance Manual
PRESSURE-OFF BRAKE

PLATFORM : -
SYSTEM : -
EQUIPMENT : -
PARTNUMBER : 78A42000-01, 78A42000-02, 78A42000-03, 78A42000-04, 78A42000-05, 78A42000-06, 78A42000-07, 78A42000-08, 78A42000-09, 78A42000-10, 78A42000-11, 78A42000-12, 78A42000-13, 78A42000-14, 78A42000-15, 78A42000-16, 78A42000-17, 78A42000-18, 78A42000-19, 78A42000-20, 78A42000-21, 78A42000-22, 78A42000-23, 78A42000-24, 78A42000-25, 78A42000-26, 78A42000-27, 78A42000-28, 78A42000-29, 78A42000-30, 78A42000-31, 78A42000-32, 78A42000-33, 78A42000-34, 78A42000-35, 78A42000-36, 78A42000-37, 78A42000-38, 78A42000-39, 78A42000-40, 78A42000-41, 78A42000-42, 78A42000-43, 78A42000-44, 78A42000-45, 78A42000-46, 78A42000-47, 78A42000-48, 78A42000-49, 78A42000-50, 78A42000-51, 78A42000-52, 78A42000-53, 78A42000-54, 78A42000-55, 78A42000-56, 78A42000-57, 78A42000-58, 78A42000-59, 78A42000-60, 78A42000-61, 78A42000-62, 78A42000-63, 78A42000-64, 78A42000-65, 78A42000-66, 78A42000-67, 78A42000-68, 78A42000-69, 78A42000-70, 78A42000-71, 78A42000-72, 78A42000-73, 78A42000-74, 78A42000-75, 78A42000-76, 78A42000-77, 78A42000-78, 78A42000-79, 78A42000-80, 78A42000-81, 78A42000-82, 78A42000-83, 78A42000-84, 78A42000-85, 78A42000-86, 78A42000-87, 78A42000-88, 78A42000-89, 78A42000-90, 78A42000-91, 78A42000-92, 78A42000-93, 78A42000-94, 78A42000-95, 78A42000-96, 78A42000-97, 78A42000-98, 78A42000-99, 78A42000-100

DOCUMENT REF. NO. : -
CREATION DATE : 01.08.2018
CREATED BY : Thomas Müller
FILE NAME : 27-09-31_08_11882187_02.pdf

EXTERNAL ID : 27-09-31
EXTERNAL REVISION : 08
CONFIDENTIAL LEVEL : CONFIDENTIAL SECRET

SIGNATURE-TYPE	ROLE	NAME	DATE	SIGNATURE
Approve	Technical Publication Manager	Thomas Müller	01.08.2018	[Signature]

CMM 27-09-31
POB (all PNs)

A320 SLAT GRA ATA 27

RTW 2022



Liebherr - Aerospace

AGENDA

- Overview
- Component Description
- Investigation and Root Cause
- Way-forward
- Timeline



OVERVIEW

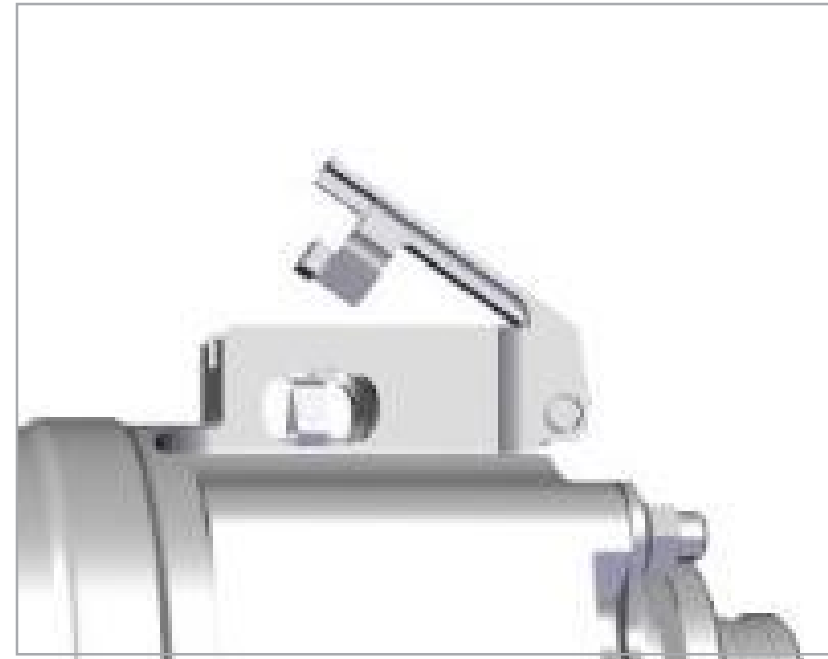
COMPONENT

A320 GEAR ROTARY ACTUATOR
830D0000-01/-02



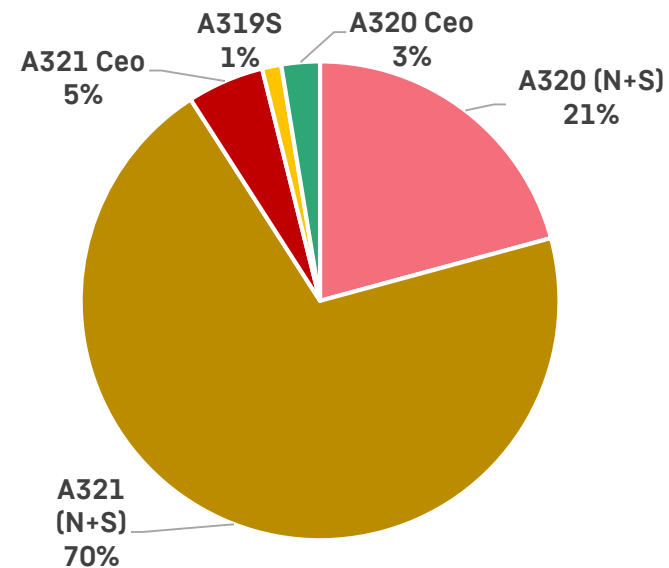
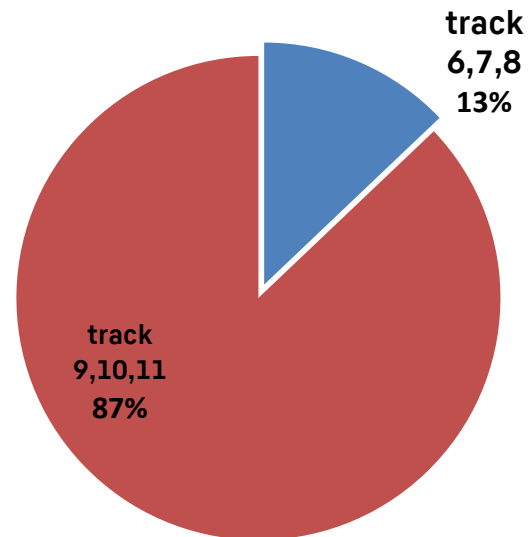
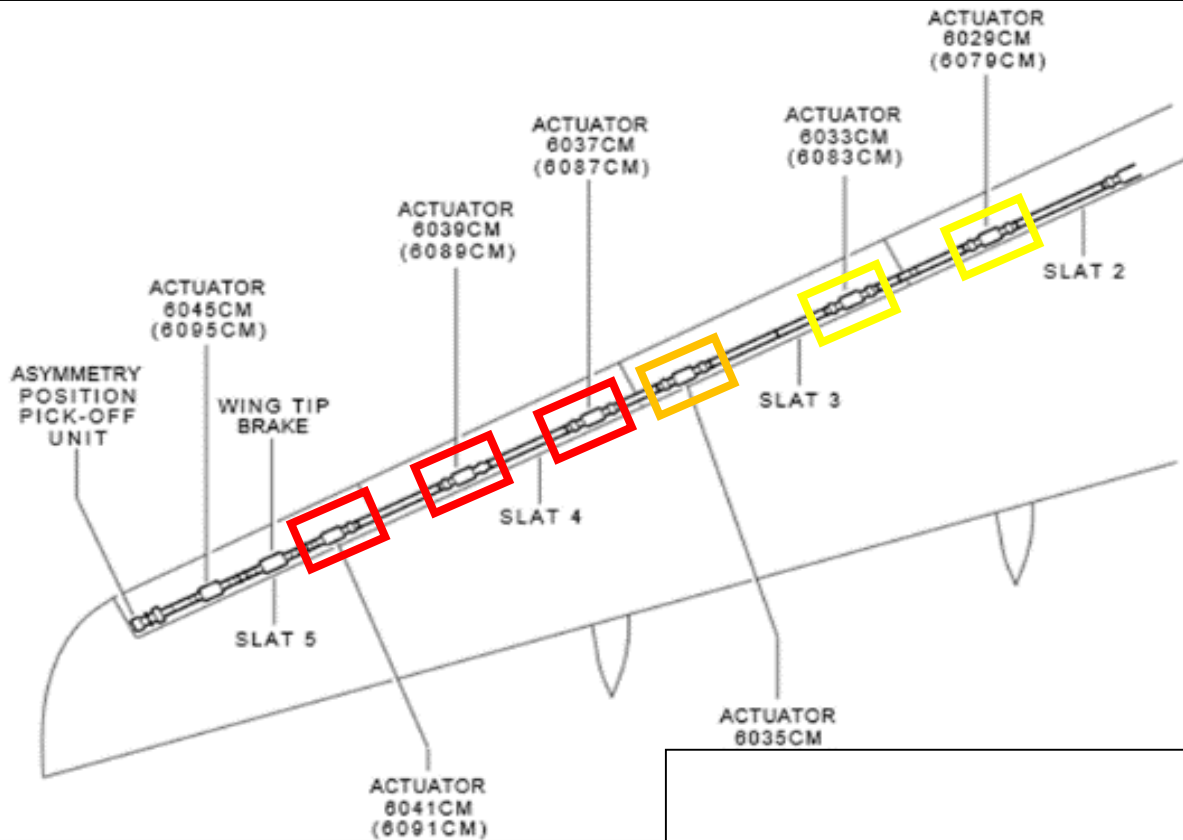
SLAT JAM

LOCKOUT INDICATOR ACTIVATED
MOSTLY ON A321 TRACKS 9, 10, 11:

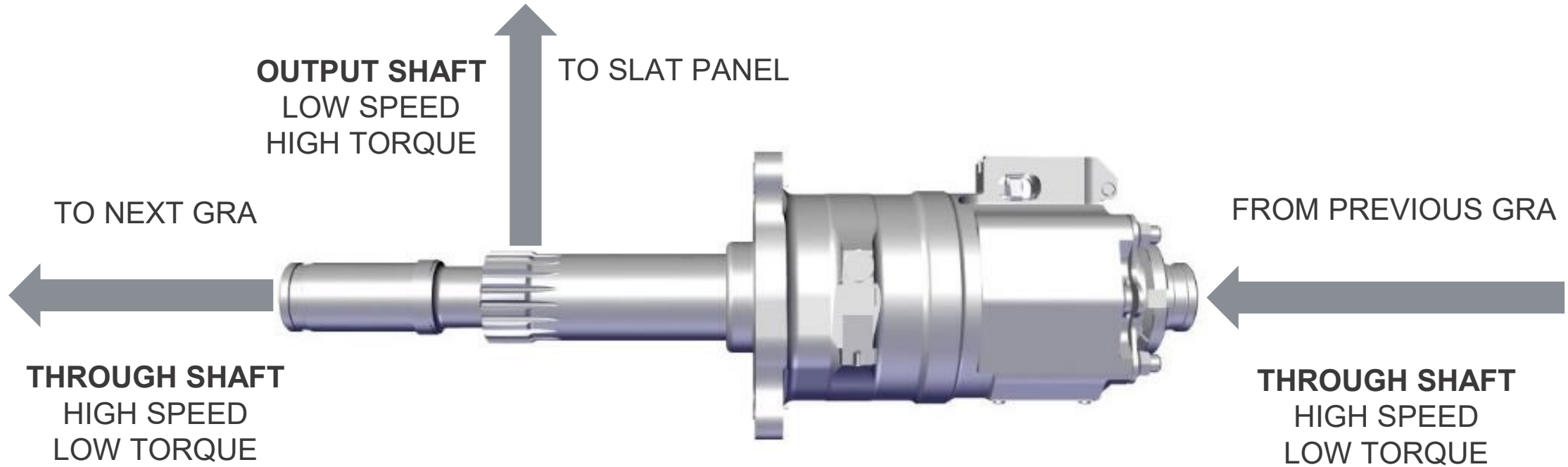


OVERVIEW

- Mainly slat track 9/10/11
- 77 reported slat Jam cases from 2014 to 2021



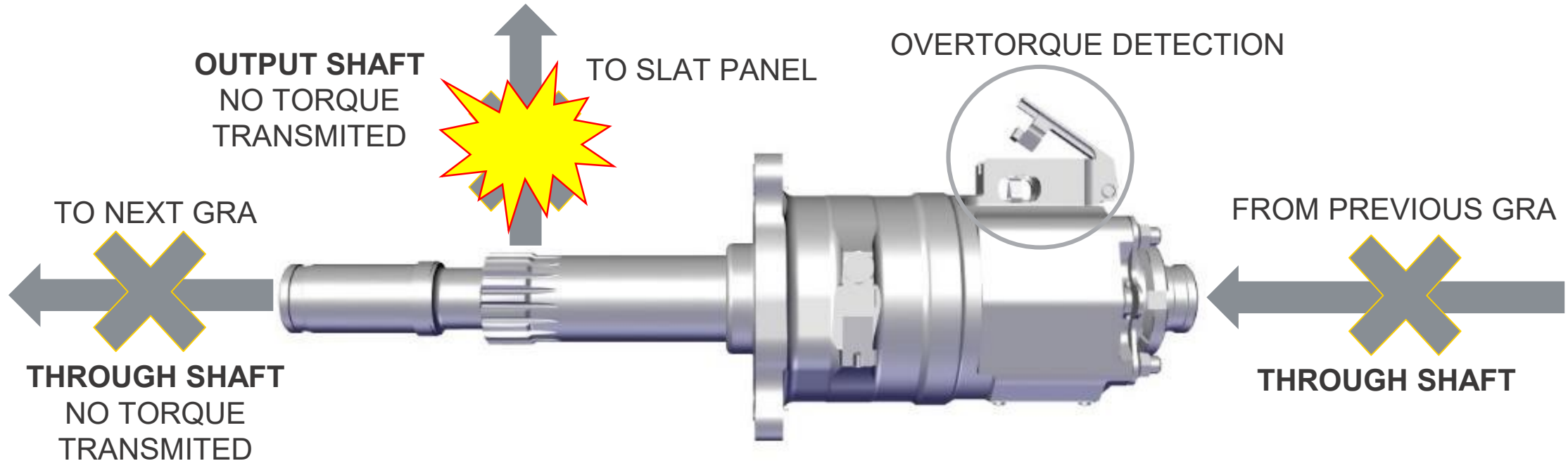
DESCRIPTION: A320 GRA



NORMAL OPERATION



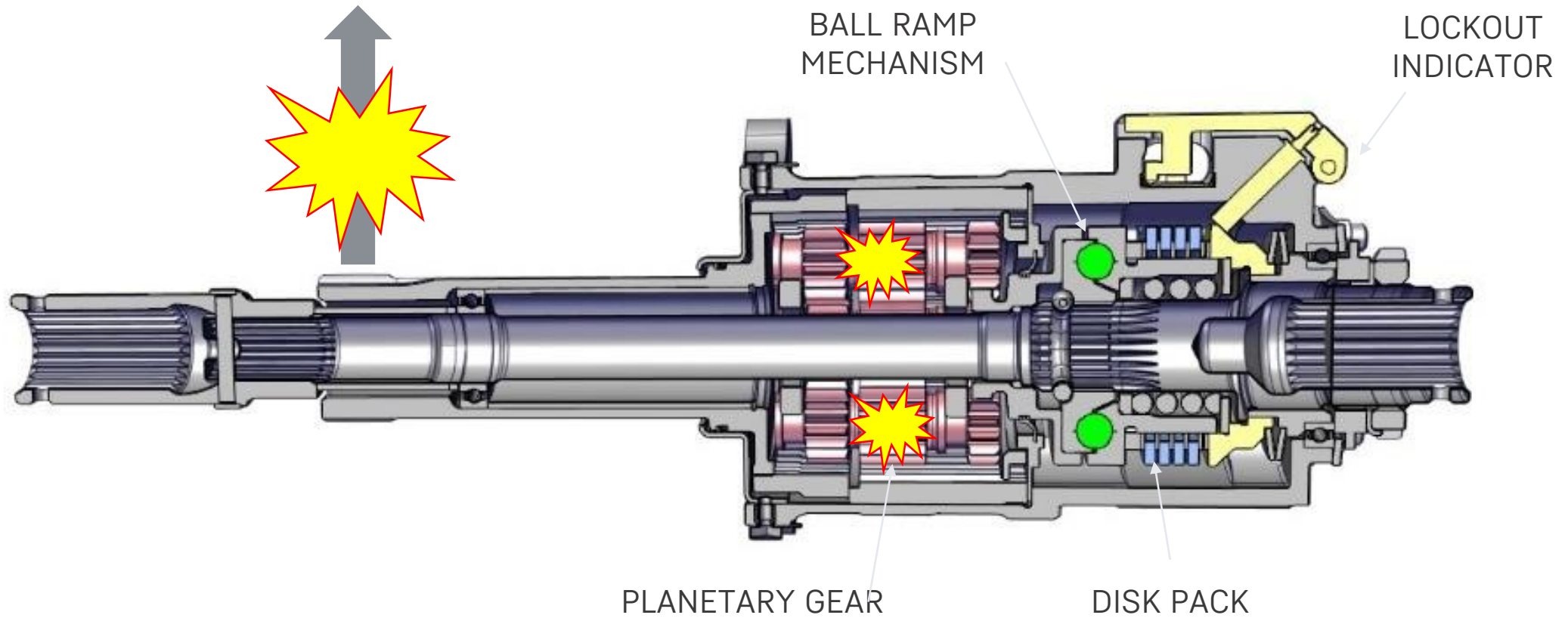
DESCRIPTION: A320 GRA



ABNORMAL OPERATION



DESCRIPTION: A320 GRA



INVESTIGATIONS & ROOT CAUSE

- 43% of returned GRAs jammed @ -40°C test *
- Moisture found on 45% GRAs during disassembly.*

- Recommendation: ship affected units in sealed plastic bags to avoid water evaporation
- Reminder: Report every slat jam event to Airbus



*: data based on returned GRAs due to slat jam (total units:55)

INVESTIGATIONS & ROOT CAUSE

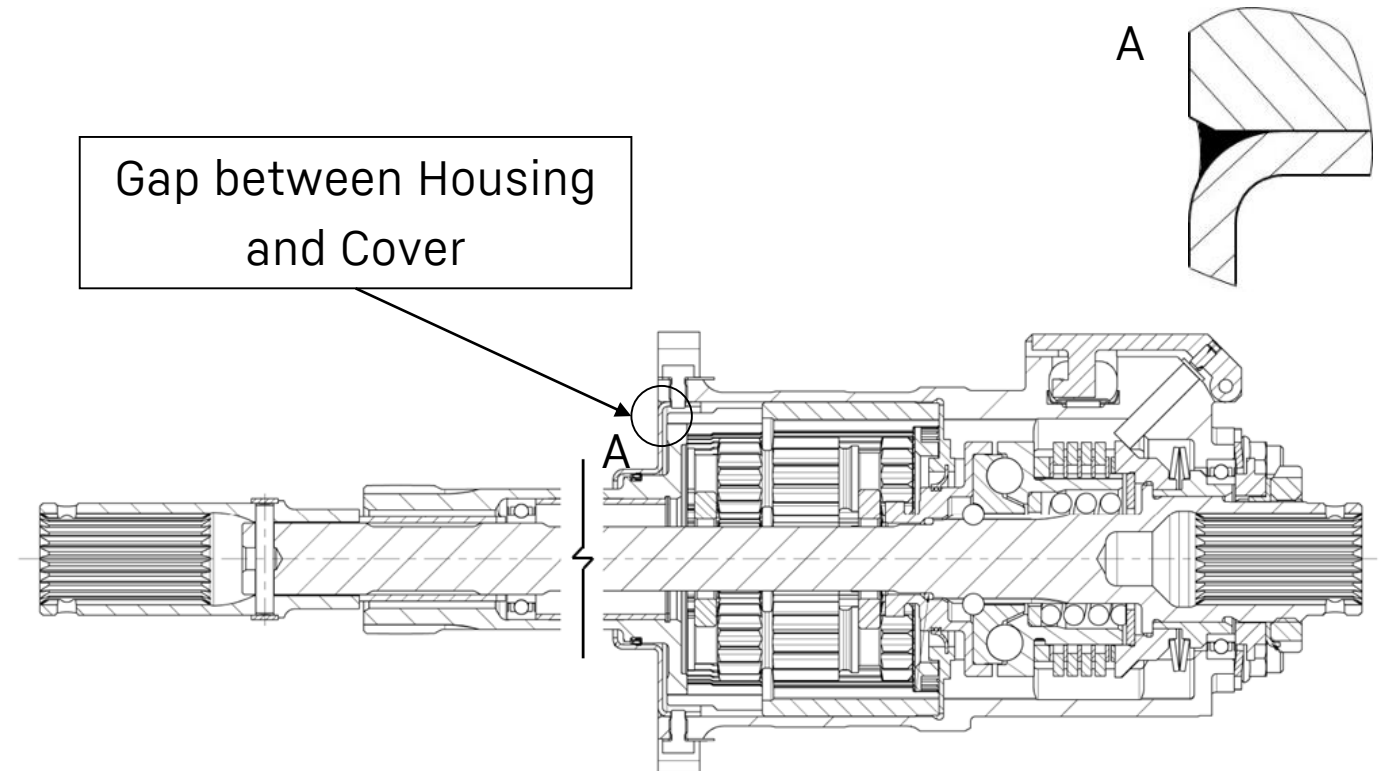
- Root cause on GRA level: Frozen water
- Root Cause contributor on A/C level: Increased wing bending (sharklets) - Refer to Airbus TFU 27.80.00023 for more information



WAY-FORWARD

Solution:

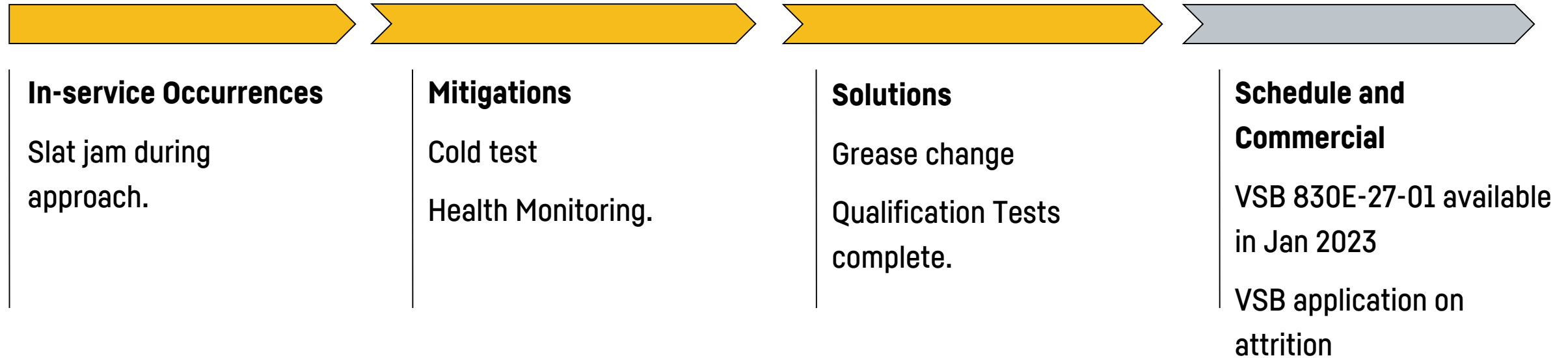
- Change the grease from AeroShell 33 back to Nyco GN22
- Sealing the gap between the Housing and the Cover.



PNR 830E0000-01: Planetary gear filled with lubricating grease NYCO GN22



TIMELINE



CASES UPDATE A320 ATA 27

RTW 2022

Liebherr-Aerospace

Agenda

- Valve Block LVDT
- Rudder Servo Actuator Eye-end
- E-Rudder Servo Control



Valve Block LVDT

SCHEDULE AND COMMERCIAL

Liebherr SB: 787A-27-05 Since 24.03.2016.

MITIGATIONS

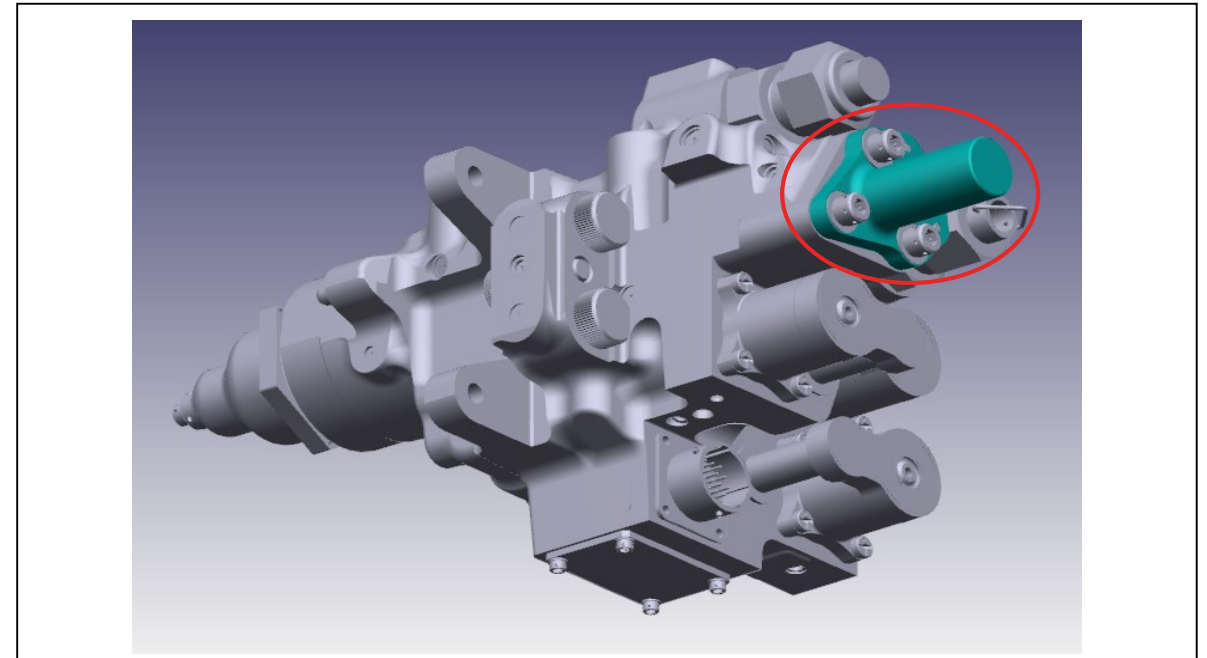
Low Temperature Test
High Temp Test

SOLUTIONS

LVDT PN: 9070A0008-03
since 24.03.2016.

IN-SERVICE OCCURRENCES

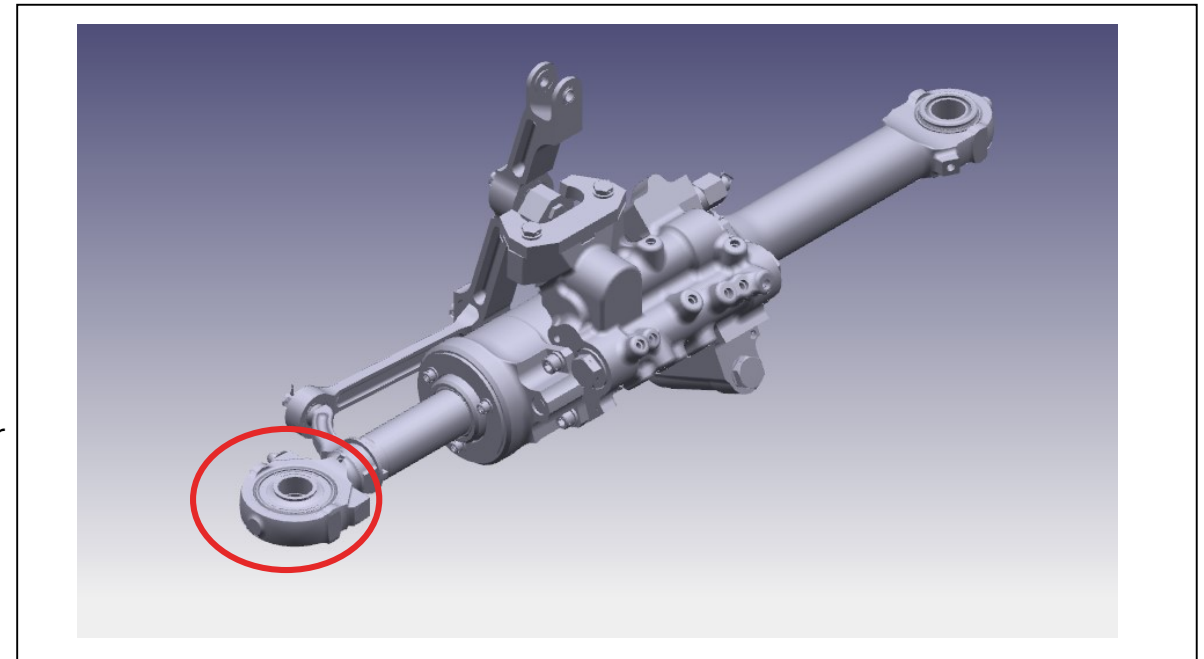
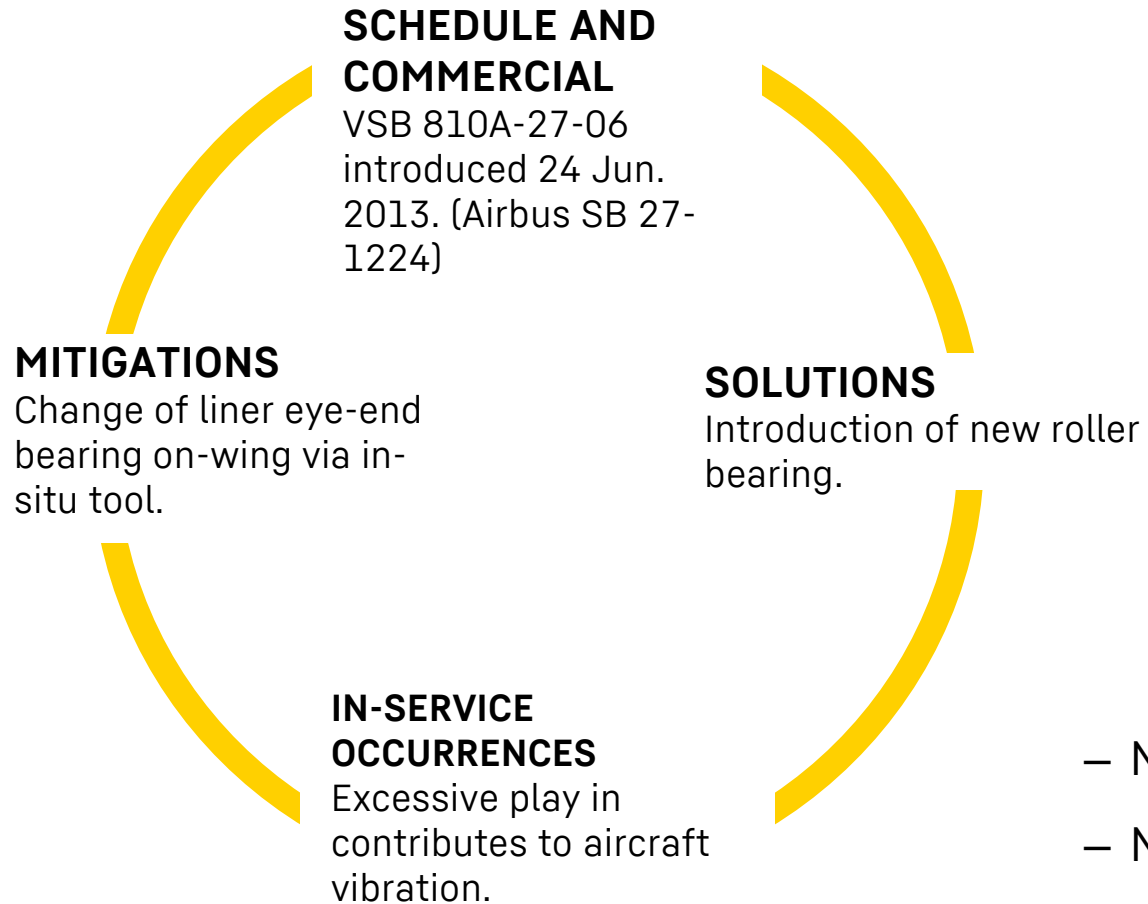
FLAP (SLAT) SYS 1 (2)
Fault with failure
message VALVE
BLOCK - VALVE SENSOR



- New LVDT shows good reliability.
- No more removals of new LVDT 9070A0008-03



Rudder Servo Actuator Eye-end



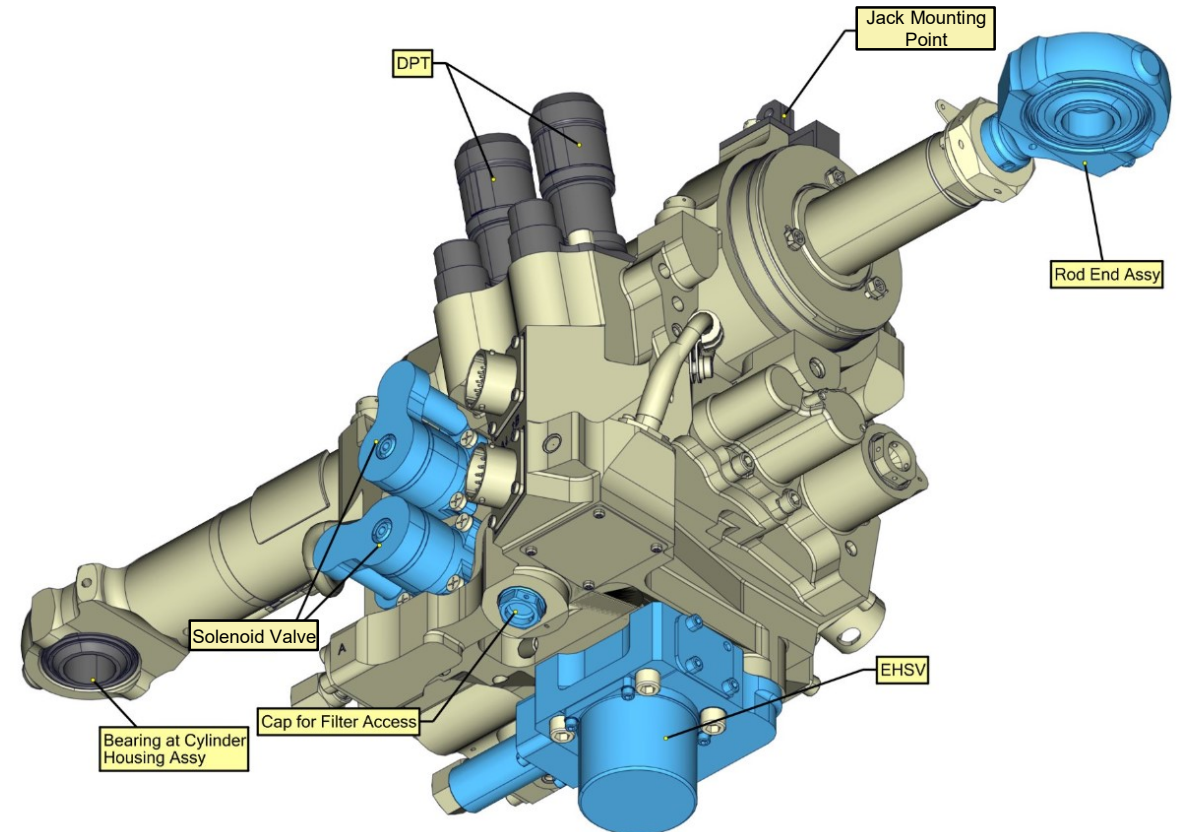
- New Eye-end shows good reliability
 - No new complaints
 - About 5,200 A/Cs flying with roller bearing as of end of 2021*
- *data from Airbus



E-Rudder Servo Control

E-Rudder Servo Control PN 812A0000-02 for future A320Neo E-Rudder system. Modification not possible from current build standard.

Component Name	Replacement Level
Rudder servo control	AMM level On AC
Rod End Assy	AMM level Off AC
EHSV	AMM level On AC
DPT	CMM level
Solenoid Valve	AMM level On AC
Bearing at Cylinder Housing Assy	CMM level
Jack Mounting point	CMM level
Filter	AMM level On AC



NEW TRAINING SOLUTIONS

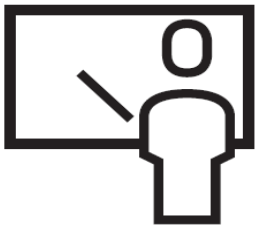
RTW 2022

LIEBHERR

Liebherr-Aerospace

New Training Solutions

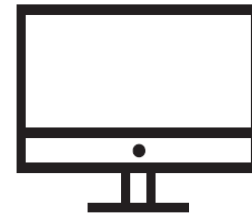
STANDARD CLASSROOM



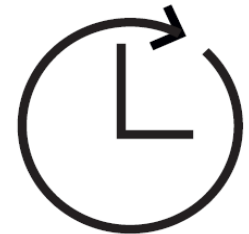
VIRTUAL CLASSROOM



eLEARNING



POCKET TRAINING





New Training Solutions

STANDARD CLASSROOM

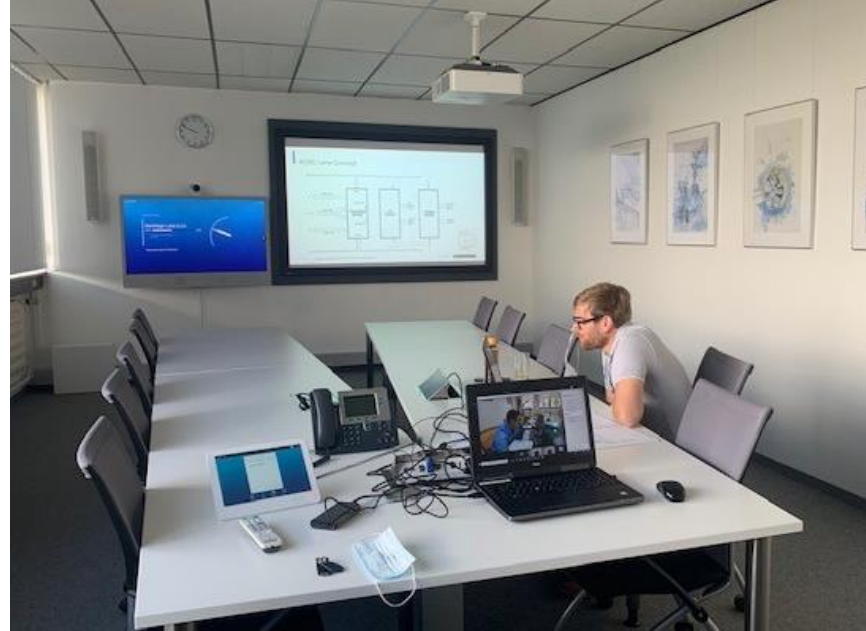
- Students and Trainer in a Classroom
- The training content can be theoretical or “Hands on” Training [at workshop]
- Trainings can be conducted at Liebherr Lindenberg, Liebherr Toulouse or Customer facilities.
- **Major advantage: contact with real components and systems**



New Training Solutions

VIRTUAL CLASSROOM

- Trainer and students sharing an Online Classroom.
- Same training content as theory Standard Classroom.
- **Major advantage: no travel is necessary.**



The screenshot shows a Cisco Webex meeting interface. At the top, there's a menu bar with options like 'File', 'Edit', 'Share', 'View', 'Audio & Video', 'Participant', 'Meeting', and 'Help'. Below the menu, there's a row of participant thumbnails, including 'Luize Bartelega Me', 'John', 'WuXiao', 'Jake YU', and '+862120337825'. The main content area displays a technical diagram titled 'Retraction and Extension System NLG & Door Uplock'. The diagram shows various components: 'Micro Switch', 'Connector', 'Electrical Motor', 'Can Disk', and 'Defined Gap, where Micro Switch is off'. The diagram is presented in a 3D perspective view. At the bottom of the diagram, there's a toolbar with icons for zooming and other functions. The bottom of the screen shows a Windows taskbar with the time '09:37' and date '29.04.2021'. On the right side, there's a 'Participants (10)' list with search and control options for each participant.

New Training Solutions

eLEARNING

- Training delivered in TELL. Students learn by themselves, at any time, at any place.
- Same Training Content as theory Standard Classroom.
- After completion of the eLearning, an optional Q&A Online Meeting can also be provided.
- **Major advantage: flexibility in learning process.**

The screenshot shows a web browser window displaying search results on the TELL platform. The browser address bar shows the URL: tell.liebherr.com/Saba/Web_spf/PRODTNT146/app/shared:spf-url=common%2Fsearchresults%2Fa220%2... The page header includes the LIEBHERR logo and a search bar with the text 'Browse' and a user greeting 'Hi, Luize Bartele...'. Below the header, there are filters for 'RESOURCE TYPE' and 'CATEGORY'. The 'RESOURCE TYPE' filter includes options like 'All', 'Videos (0)', 'Groups (0)', 'Meetings (0)', 'Bookmarks (0)', 'Pages (0)', 'People (0)', 'Ideas (0)', 'Learning Catalog (1)', 'Discussions (0)', 'Files (0)', and 'Links (0)'. The 'CATEGORY' filter includes 'LLI Know-How! Schulungsprogramm (1)' and 'Fachseminare (1)'. The search results section shows '2 Results found for 'a220'' and 'Sort by Relevance'. Two results are displayed as cards, each featuring an image of an Airbus A220 aircraft. The first card is titled 'eLearning Airbus A220 Integrated Air Management System (IAMS)' and includes details about the version (1.0_EN) and course (0 class). The second card is titled 'E-Learning A220 ATA 32 Landing Gear System' and includes details about the course (1 class) and a description of the technical training. Both cards have buttons for 'REQUEST LEAR...' and 'LAUNCH'.


POCKET TRAINING

- Short and condensed Training sessions, of maximum one hour. Only one specific topic is covered.
- Pocket Trainings explains maintenance tasks like Seal Changing, Servicing Procedures and VSBs.
- **Major advantages: fast and effective way to receive Technical Support. Travel expenses are avoided.**

☰ Liebherr Pocket Training - A220 Throttle Plate Mod RESOURCES


(5) ASSEMBLY OF THE CYLINDER TUBE ASSEMBLY **LIEBHERR**

(I) Install the **locking washers** and the **screws** to the **cover disc**. Make sure that the lower tab of the locking washers is properly positioned in the hole. Torque the screws in accordance with following procedure:
1 - Torque the screws in a criss-cross pattern to 24 +1 Nm (212 +8 lbf.in) for three times.




Screws:
PN NAS6706U9
Locking Washers:
PN MS9582-12

Illustration



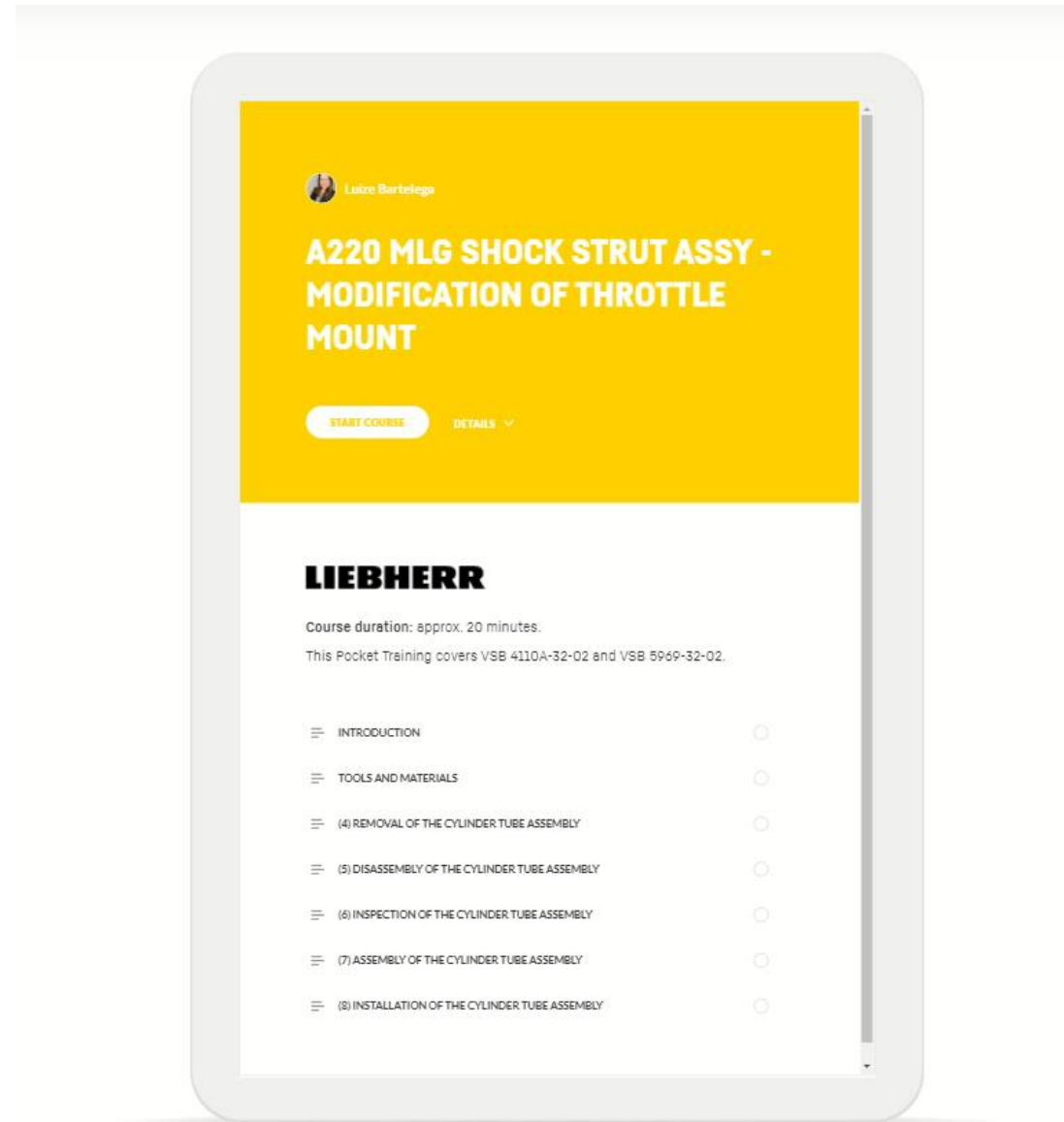
Photos



🔊 || ————— ↻ < PREV NEXT >

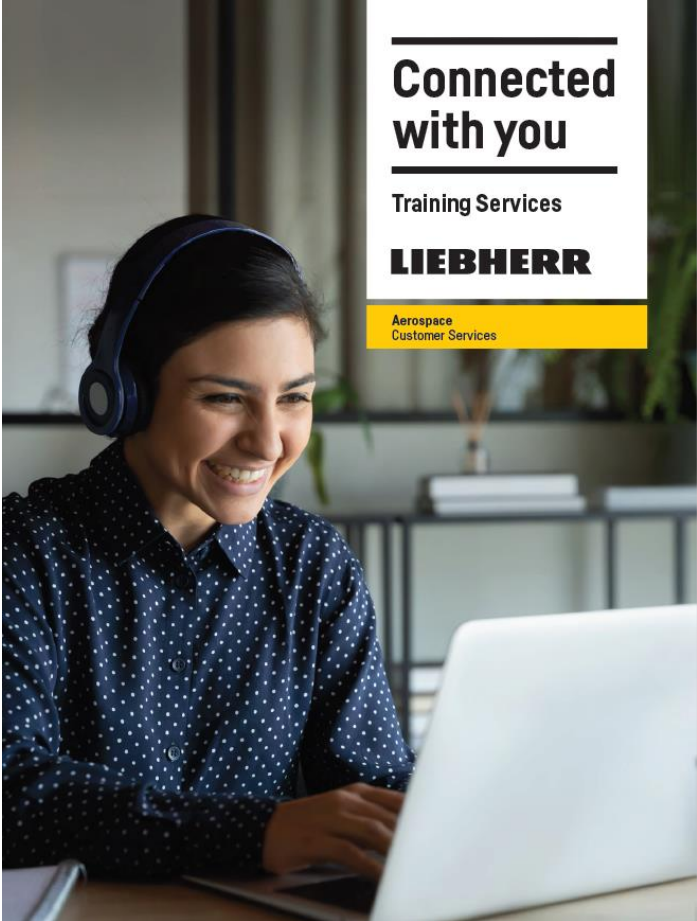
New Training Solutions

POCKET TRAINING



New Training Solutions

NEW ADVERTISING PACKAGE



New Training Solutions

MEET THE TEAM

Liebherr-Aerospace Lindenberg GmbH



LUIZE BARTELEGA

Customer Training
Instructor and Developer

Liebherr-Aerospace Toulouse SAS



OLIVIER LE GUENNEC

Customer Training
Instructor and Developer